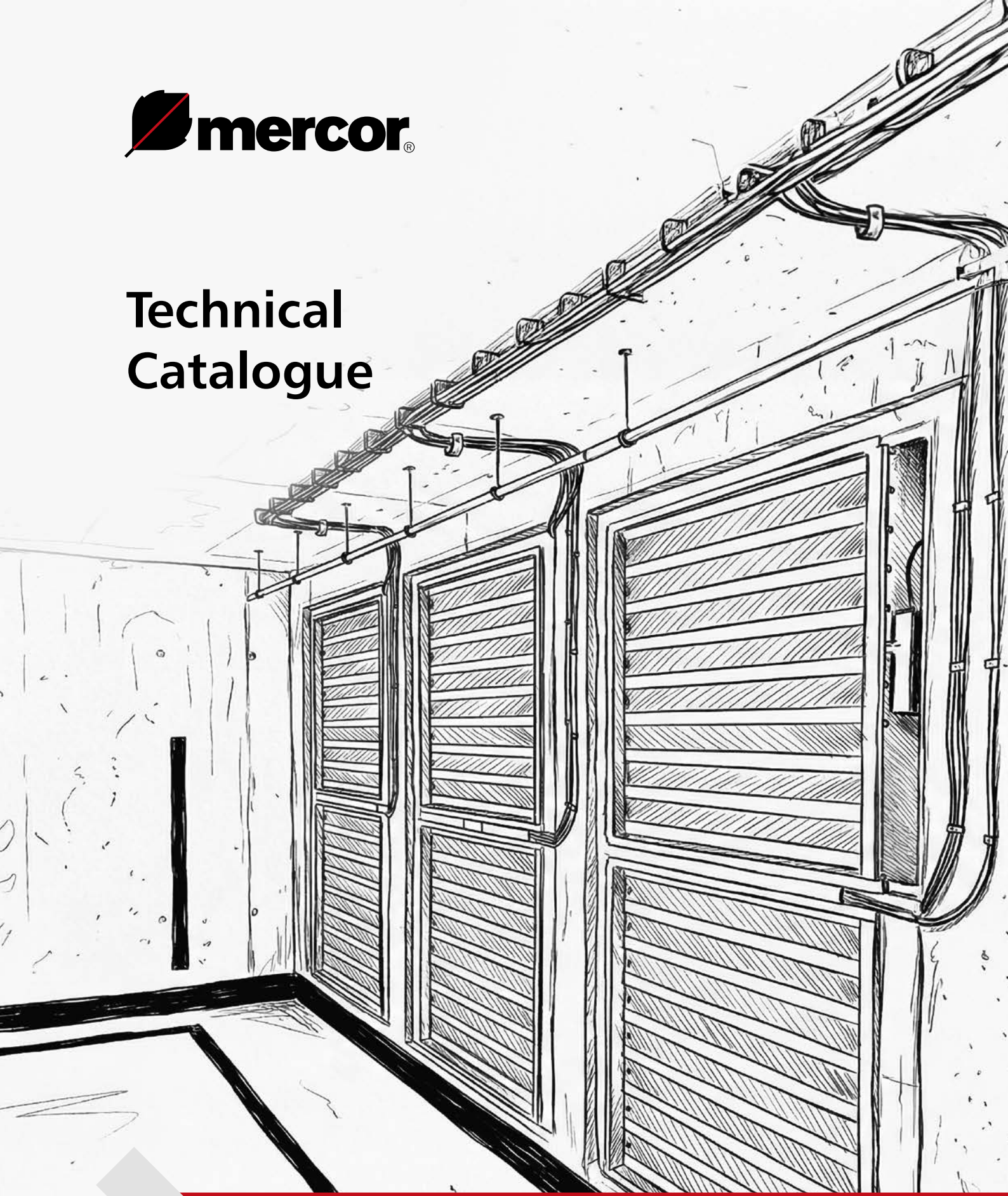
mercor®

Technical Catalogue



FIRE VENTILATION SYSTEMS

FIRE DAMPERS AND FIRE VALVES

Fire ventilation systems Technical Catalogue
Edited by: Mercor Light&Vent Sp. z o.o. - Fire Ventilation Systems Department Team

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Technical Catalogue

Dear Customers!

Below you will find our Technical Catalogue for fire ventilation systems, which contains detailed information on the application, design, versions, manufacturing options and equipment, methods of installation and technical parameters of our fire dampers and valves.

Every device dispatched from the Mercor Light&Vent Sp. z o.o. manufacturing plants to a Customer is thoroughly verified in accordance with the highest quality management standards and subject to a range of approval tests. We are proud to provide safety through our operations.

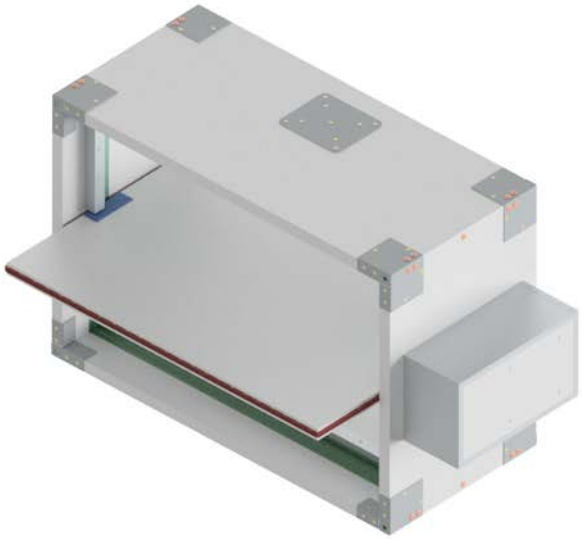
We are looking forward
to doing business with you.
The Mercor Light&Vent Sp. z o.o. Team

The electronic version
of our Technical Catalogue
is available at **www.mercor.com.pl**

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

BIM CAD

downloadable models
on the website
under the designer zone tab



2434-CPR-0031

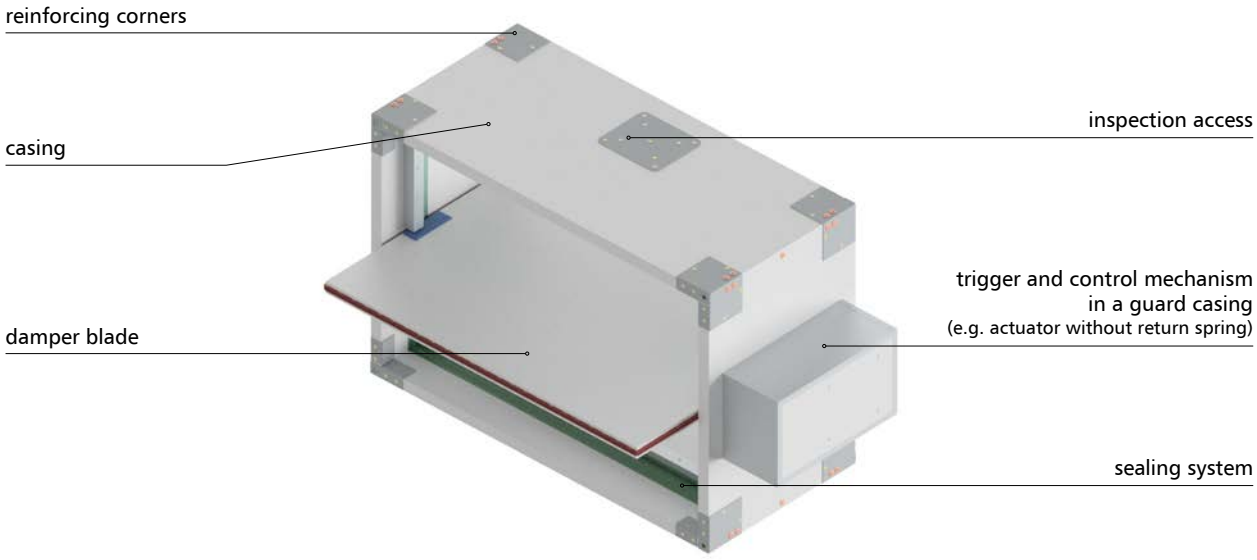
CTO S.A.

» **EIS120, E_{600} 120**
» Fire resistance class: EI120 (v_{ed} h_{od} i↔o)S1500C_{10000}MAmulti.
» Certificate of constancy of performance 2434-CPR-0031. Dampers certified for compliance with EN 12101-8.
» Dampers rated under EN 13501-4 and tested under EN 1366-10.
» Smoke control dampers resistance independent of airflow direction and installation side.
» The structure of the partition reduces acoustic noise and hydraulic resistance in the system.
» MA feature (the damper blade can change its position during a fire).

1.1| Application

The mcr FID B smoke control dampers are intended for installation in manually or automatically operated fire ventilation systems. mcr FID B dampers are used in fire ventilation systems or in mixed fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. Admissible flow velocity in the connected duct is 12 m/s. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades remain closed. The damper blade may change its position during a fire (MA feature), depending on the needs of the rescue teams and the fire scenario.

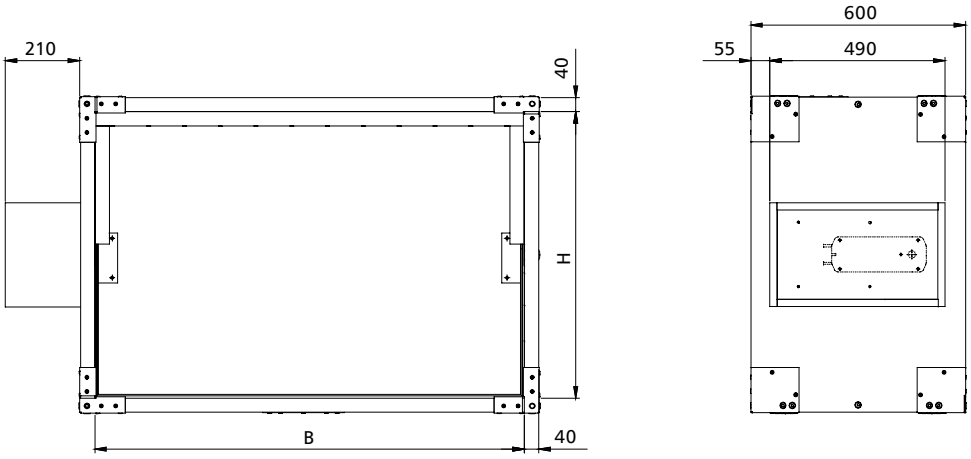
1.2| Design



mcr FID B smoke control dampers consist of a casing with a rectangular cross-section composed of fire-proof boards, a moving damper blade and an actuator, which is activated remotely. Special design casing with impregnated fire-proof boards are used in chemically aggressive environments. The casing total length is 600 mm. The damper blade is made of a fire-proof panel. The inner side of the fire damper casing is equipped with a sealing system. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. As a standard, the damper is equipped with an inspection access, located on one of the sides of the damper. At the corners of the casing, there are steel reinforcements with a rivet nut system, enabling the installation of masking grilles and frames for connecting steel ventilation ducts.

1.3 | Versions

1.3.1 | Closing and opening with an actuator



dimensions in [mm]

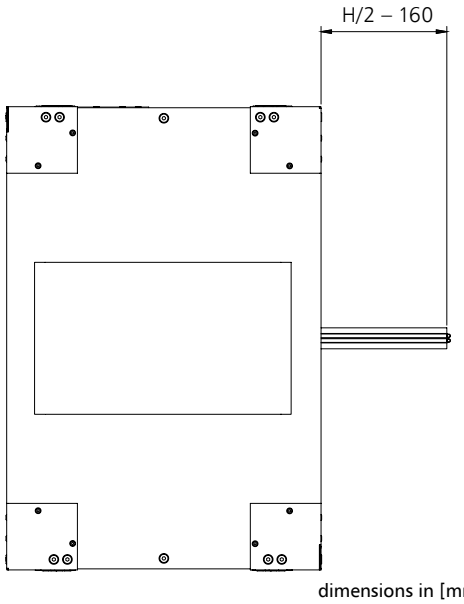
During normal operation, the damper blade of the fire damper remains open or closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments are closed – the blades are operated remotely by supplying power. The mcr FID B dampers are equipped with a trigger and control mechanism in the form of a BE, BEE, BEN, MLE, ME series axial actuator, supplied with 24 V AC/DC or 230 V AC voltage. Actuators are equipped with limit switches used to monitor the position of the damper blade. Dampers with BE, BEE, BEN, MLE or ME actuators can be opened/closed by supplying voltage to the actuator terminals.

1.4 | Dimensions

rectangular dampers:

- nominal width B: from 200 mm to 1200 mm
- nominal height H: from 200 mm to 800 mm
- maximum single damper cross-section surface up to 0.96 m^2
- the design of the damper ensures that its damper blade, regardless of the dimensions of the BxH damper, does not protrude beyond the device casing on one side.

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

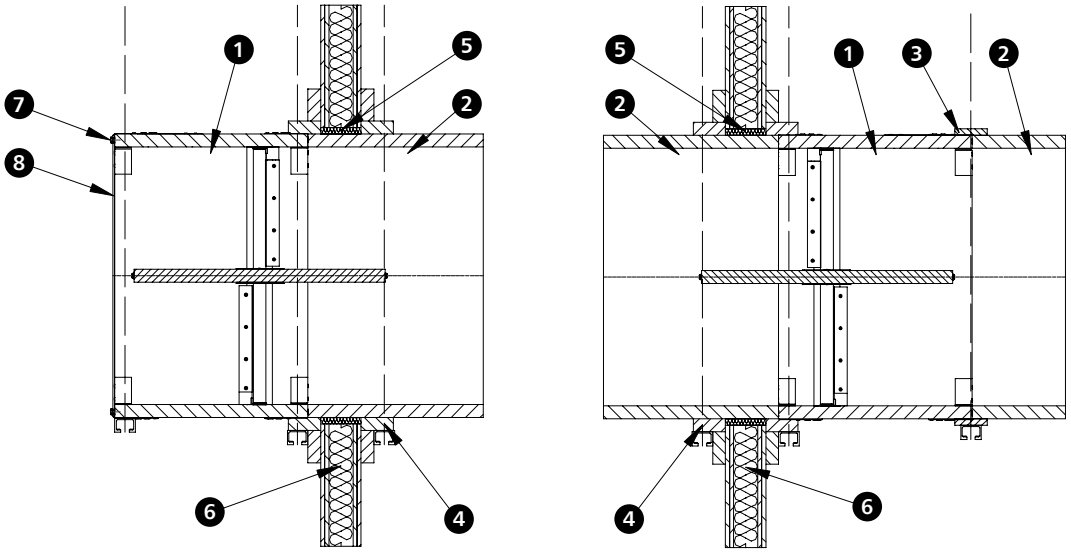


dimensions in [mm]

1.5 | Installation

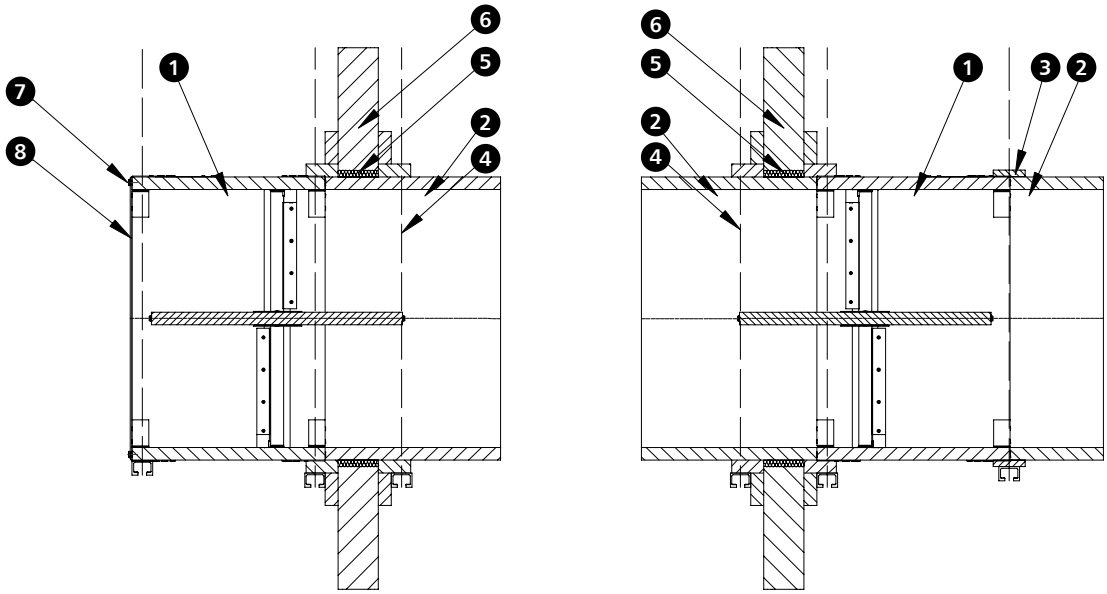
The mcr FID B rectangular dampers are rated as EI120(v_{ed} h_{od} i↔o)S1500$C_{10.000}$ MA multi if installed on fireproof ducts rated according to EN 1366-8 and EN 1366-9.
The mcr FID B rectangular dampers are rated E_{600} 120 (v_{ed} i↔o)S1500 C_{10000} MA single in single-zone fire ventilation systems.

1.5.1 | Damper installation in light walls (plasterboard)



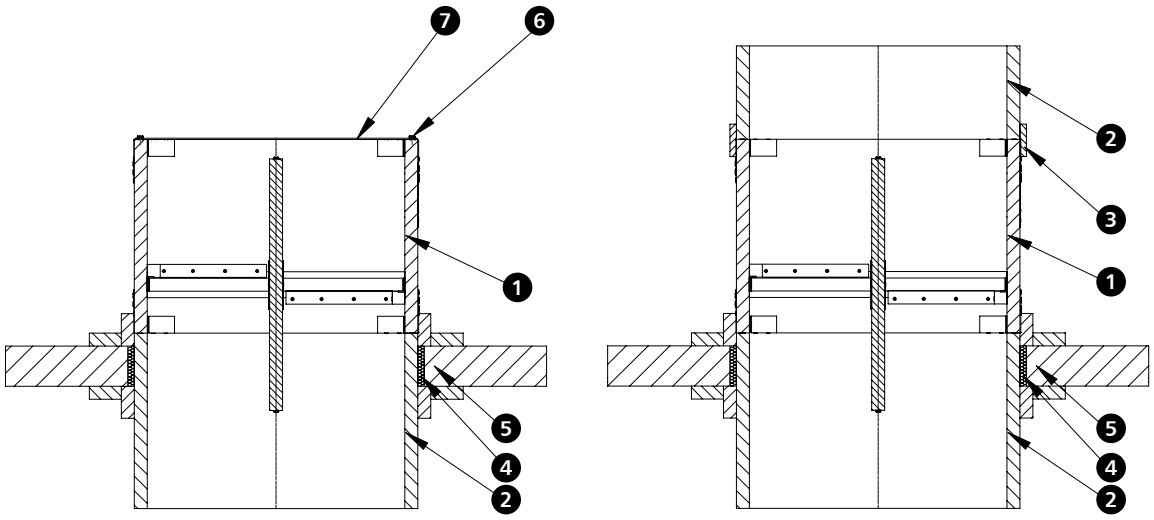
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability
5. fireproof duct installation penetration system
6. plasterboard wall
7. M10 x 20 bolt
8. MWB system grille (optional)

1.5.2 | Damper installation in solid walls



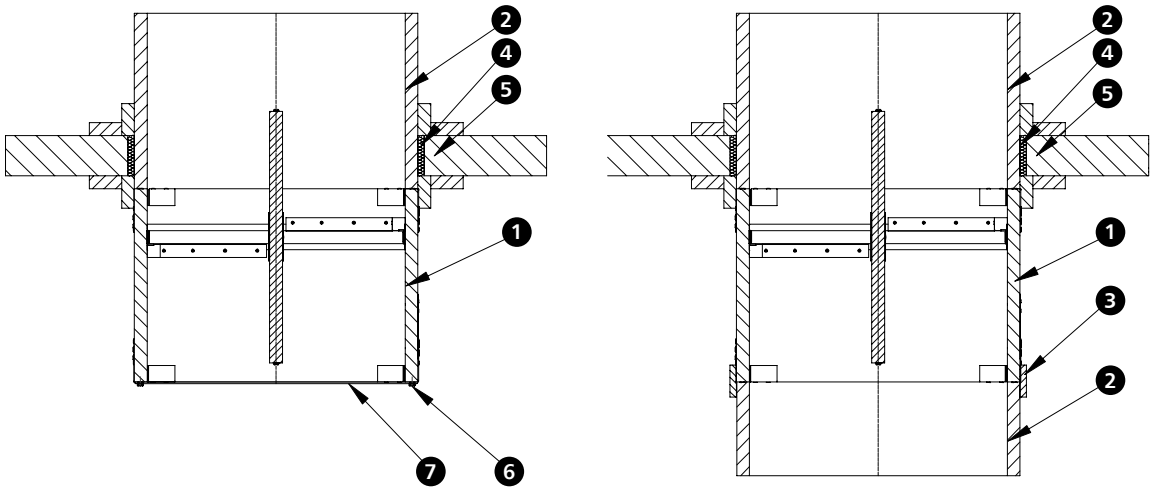
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability
5. fireproof duct installation penetration system
6. solid wall
7. M10 x 20 bolt
8. MWB system grille (optional)

1.5.3 | Installation of damper in floor slabs – damper above the floor slab



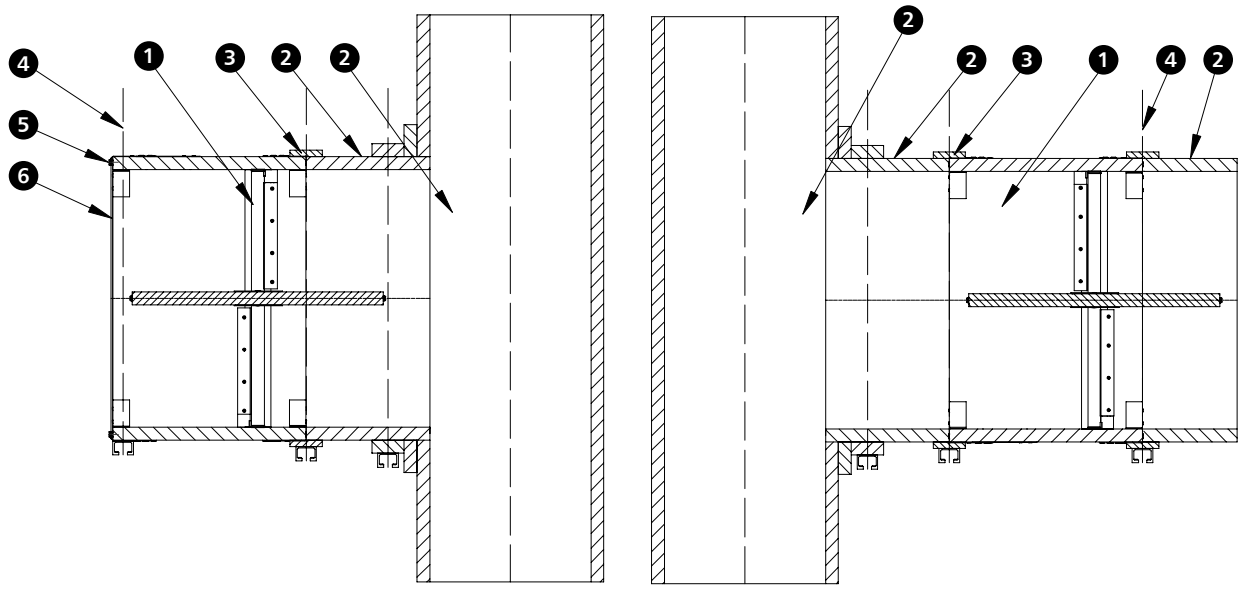
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. fireproof duct installation penetration system
5. floor slab
6. M10 x 20 bolt
7. MWB system grille (optional)

1.5.4 | Installation of damper in floor slabs – damper below the floor slab



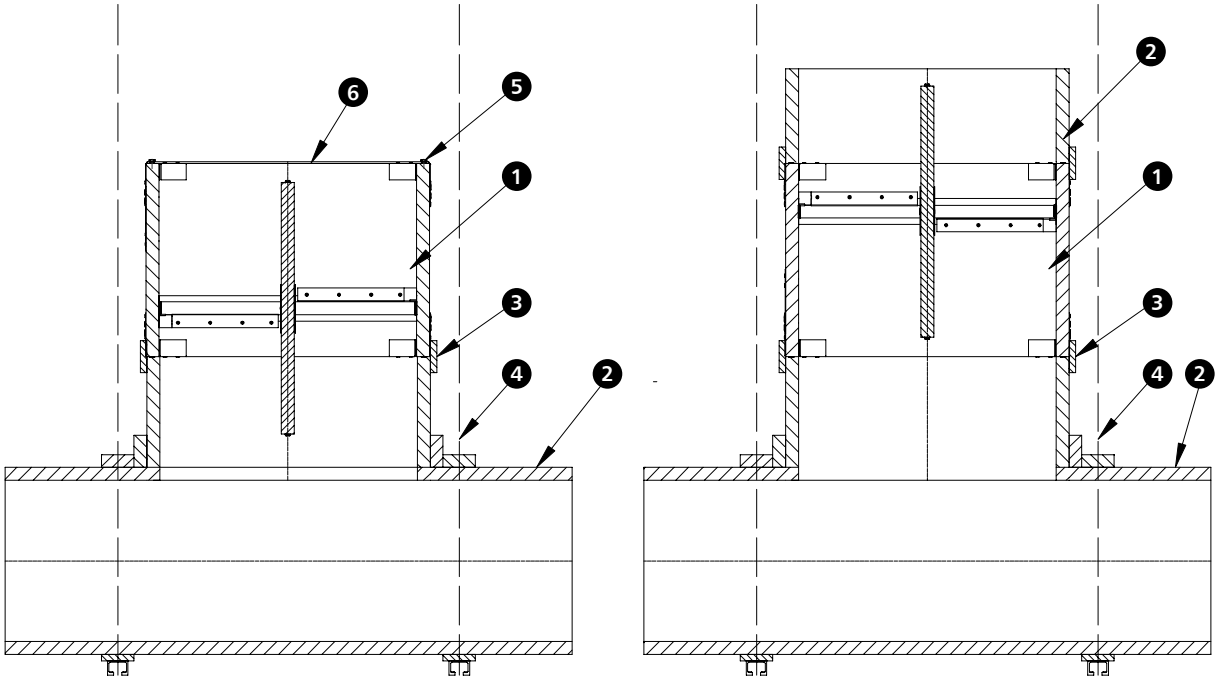
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. fireproof duct installation penetration system
5. floor slab
6. M10 x 20 bolt
7. MWB system grille (optional)

1.5.5 | Damper installation on horizontal ducts



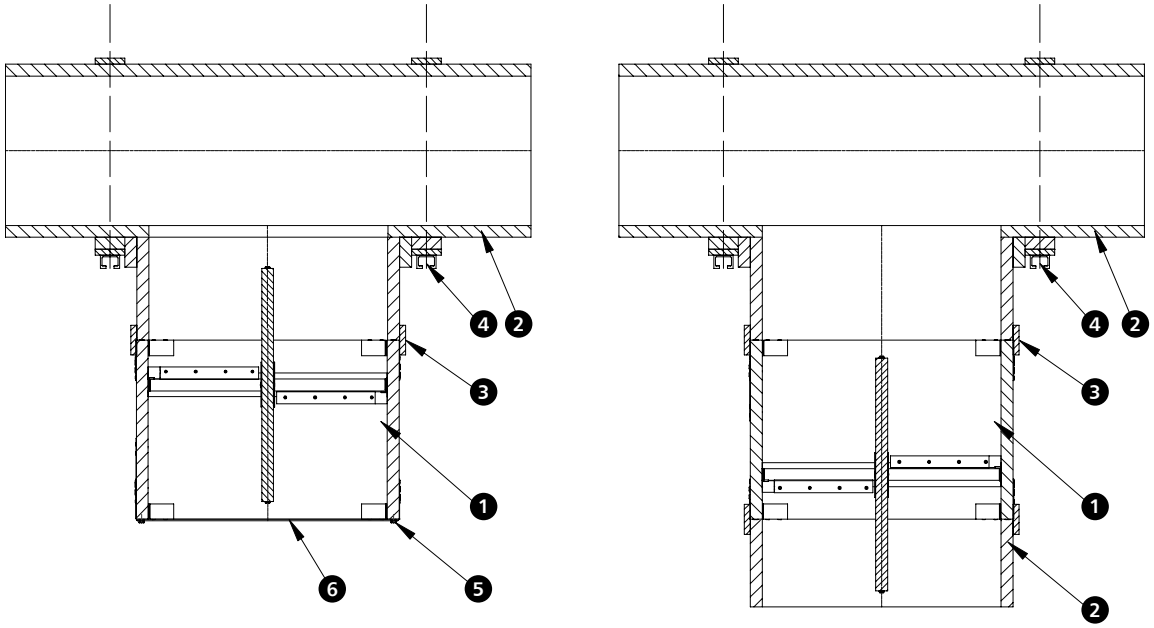
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)

1.5.6 | Damper installation on vertical ducts



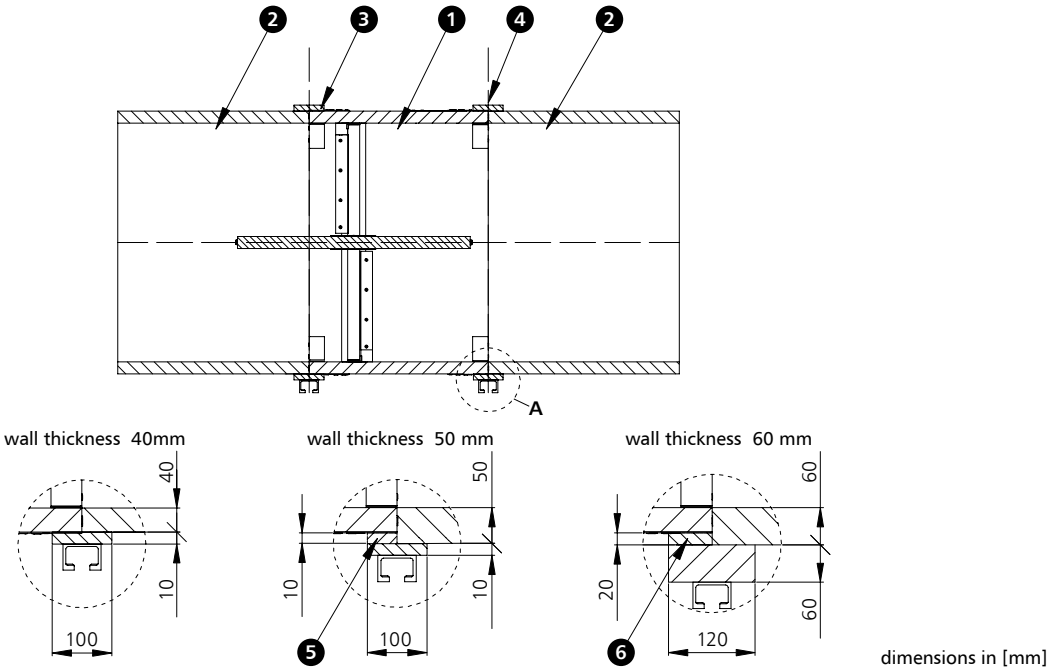
1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – fire-proof board
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)

1.5.7 | Damper installation on vertical ducts



1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – fire-proof board
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)

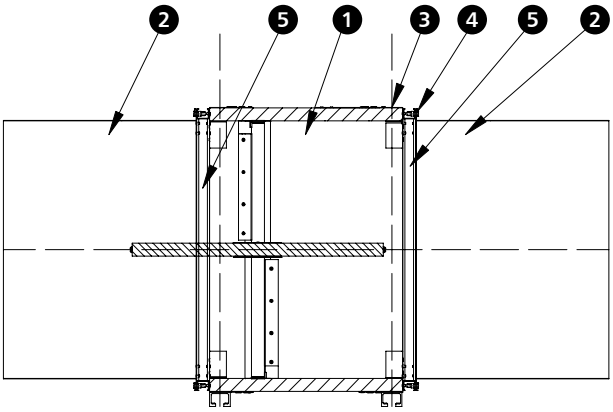
1.5.8 | Damper connection with a multi-compartment duct, e.g. made of fire-proof boards with various wall thickness



dimensions in [mm]

1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – fire-proof board
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. a strip of fire-proof board along the entire length of the BxH side with the dimensions 10 x 50 mm
6. a strip of fire-proof board along the entire length of the BxH side with the dimensions 20 x 60 mm

1.5.9 | Damper connection with single-compartment duct, e.g. made of metal sheets



1. mcr FID B BxH smoke damper
2. single-compartment smoke extract duct – metal sheets
3. installation hangers system
4. M10 x 20 bolt
5. RB mounting frame

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

1.6 | mcr FID B rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	9	31	0.050	0.039	564	9	31	0.06	0.049	708	8	32
		6			631	21	41			847	19	42			1 063	19	42
		8			841	37	49			1 129	35	49			1 417	33	50
		10			1 051	58	55			1 411	54	55			1 771	52	55
	250	4	0.050	0.037	526	9	31	0.063	0.049	706	9	32	0.075	0.062	886	8	32
		6			788	21	42			1 058	19	43			1 328	18	42
		8			1 051	37	50			1 411	35	50			1 771	31	50
		10			1 314	57	55			1 764	54	56			2 214	49	56
	300	4	0.060	0.044	631	9	32	0.075	0.059	847	8	33	0.09	0.074	1 063	8	32
		6			946	20	43			1 270	19	43			1 594	17	43
		8			1 261	36	50			1 693	34	51			2 125	30	50
		10			1 577	56	56			2 117	53	56			2 657	47	56
	350	4	0.070	0.051	736	9	33	0.088	0.069	988	8	33	0.105	0.086	1 240	7	32
		6			1 104	20	43			1 482	19	44			1 860	16	43
		8			1 472	36	51			1 976	33	51			2 480	29	50
		10			1 840	56	57			2 470	52	57			3 100	45	56
	400	4	0.080	0.058	841	9	33	0.100	0.078	1 129	8	34	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	19	44			2 125	15	42
		8			1 682	35	51			2 258	33	52			2 834	27	50
		10			2 102	54	57			2 822	52	57			3 542	42	56
	450	4	0.090	0.066	946	9	33	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	32
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	35	51			2 540	29	51			3 188	27	50
		10			2 365	54	57			3 175	46	56			3 985	42	56
	500	4	0.100	0.073	1 051	9	34	0.125	0.098	1 411	7	32	0.15	0.123	1 771	7	32
		6			1 577	19	44			2 117	16	43			2 657	15	43
		8			2 102	35	52			2 822	28	50			3 542	26	50
		10			2 628	54	58			3 528	44	56			4 428	41	56
	550	4	0.110	0.080	1 156	8	34	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	33
		6			1 734	19	44			2 328	16	43			2 922	14	43
		8			2 313	34	52			3 105	28	51			3 897	26	51
		10			2 891	53	58			3 881	44	57			4 871	40	56
	600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.18	0.148	2 125	6	33
		6			1 892	19	45			2 540	15	43			3 188	14	43
		8			2 523	34	52			3 387	27	51			4 251	26	51
		10			3 154	53	58			4 234	42	56			5 314	40	57
	650	4	0.130	0.095	1 367	8	35	0.163	0.127	1 835	6	32	0.195	0.160	2 303	6	33
		6			2 050	19	45			2 752	14	43			3 454	14	44
		8			2 733	34	53			3 669	26	50			4 605	26	51
		10			3 416	53	59			4 586	40	56			5 756	40	57
	700	4	0.140	0.102	1 472	8	35	0.175	0.137	1 976	6	33	0.21	0.172	2 480	6	34
		6			2 208	19	45			2 964	14	43			3 720	14	44
		8			2 943	33	53			3 951	26	51			4 959	26	52
		10			3 679	52	59			4 939	40	56			6 199	40	57

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	800	4	0.160	0.117	1 682	8	35	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
		6			2 523	18	45			3 387	14	43			4 251	14	44
		8			3 364	32	53			4 516	24	51			5 668	24	52
		10			4 205	50	59			5 645	38	56			7 085	38	57
	900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	32	0.27	0.221	3 188	5	32
		6			2 838	16	44			3 810	13	43			4 782	12	42
		8			3 784	29	52			5 080	23	50			6 376	21	50
		10			4 730	45	58			6 350	36	56			7 970	32	56
	1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	32	0.3	0.246	3 542	5	32
		6			3 154	16	45			4 234	13	43			5 314	12	43
		8			4 205	29	52			5 645	22	50			7 085	21	50
		10			5 256	45	58			7 056	35	56			8 856	32	56
	1100	4	0.220	0.161	2 313	7	35	0.275	0.216	3 105	5	32	0.33	0.271	3 897	5	33
		6			3 469	16	45			4 657	12	43			5 845	12	43
		8			4 625	29	53			6 209	22	50			7 793	21	51
		10			5 782	45	59			7 762	34	56			9 742	32	56
	1200	4	0.240	0.175	2 523	8	37	0.300	0.235	3 387	5	33	0.36	0.295	4 251	9	40
		6			3 784	18	47			5 080	12	43			6 376	20	51
		8			5 046	29	53			6 774	22	51			8 502	36	58
		10			6 307	45	59			8 467	34	57			10 627	42	60

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]	400 S_k [m²]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	400 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]
200		4	0.070	0.059	852	8	32	0.080	0.069	996	7	31	0.090	0.079	1 140	7	31
		6			1 279	18	42			1 495	17	42			1 711	15	41
		8			1 705	32	50			1 993	29	49			2 281	26	49
		10			2 131	50	56			2 491	46	55			2 851	41	54
250		4	0.088	0.074	1 066	7	31	0.100	0.087	1 246	6	29	0.113	0.099	1 426	6	29
		6			1 598	16	42			1 868	13	40			2 138	13	40
		8			2 131	29	50			2 491	23	47			2 851	22	47
		10			2 664	45	55			3 114	36	53			3 564	35	53
300		4	0.105	0.089	1 279	7	32	0.120	0.104	1 495	6	30	0.135	0.119	1 711	5	30
		6			1 918	16	43			2 242	13	41			2 566	12	40
		8			2 557	28	50			2 989	24	48			3 421	22	48
		10			3 197	44	56			3 737	37	54			4 277	34	54
350		4	0.123	0.104	1 492	7	32	0.140	0.121	1 744	6	30	0.158	0.139	1 996	5	30
		6			2 238	15	42			2 616	13	41			2 994	12	41
		8			2 984	26	50			3 488	22	48			3 992	21	48
		10			3 730	41	56			4 360	35	54			4 990	33	54
400		4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	31	0.180	0.158	2 281	5	30
		6			2 557	13	41			2 989	13	41			3 421	12	41
		8			3 410	24	49			3 986	22	49			4 562	21	48
		10			4 262	37	55			4 982	35	55			5 702	32	54
450		4	0.158	0.133	1 918	5	30	0.180	0.156	2 242	5	30	0.203	0.178	2 566	4	29
		6			2 877	12	41			3 363	12	41			3 849	10	40
		8			3 836	22	48			4 484	21	48			5 132	18	47
		10			4 795	34	54			5 605	32	54			6 415	28	53
500		4	0.175	0.148	2 131	5	31	0.200	0.173	2 491	5	30	0.225	0.198	2 851	4	29
		6			3 197	12	41			3 737	11	40			4 277	9	39
		8			4 262	22	49			4 982	19	48			5 702	17	47
		10			5 328	34	55			6 228	30	54			7 128	26	52
550		4	0.193	0.163	2 557	5	30	0.220	0.190	2 740	5	30	0.248	0.218	3 136	4	29
		6			3 836	12	41			4 110	11	41			4 704	9	40
		8			5 115	21	48			5 481	19	48			6 273	17	47
		10			6 394	32	54			6 851	30	54			7 841	26	53
600		4	0.210	0.178	2 557	5	30	0.240	0.208	2 989	4	28	0.270	0.238	3 421	4	29
		6			3 836	10	40			4 484	8	37			5 132	9	40
		8			5 115	19	48			5 979	14	45			6 843	17	47
		10			6 394	29	53			7 474	27	53			8 554	26	53
650		4	0.228	0.192	2 771	5	30	0.260	0.225	3 239	4	30	0.293	0.257	3 707	4	30
		6			4 156	10	40			4 858	10	40			5 560	9	40
		8			5 541	19	48			6 477	17	48			7 413	17	48
		10			6 926	29	54			8 096	27	53			9 266	26	54
700		4	0.245	0.207	2 984	5	30	0.28	0.242	3 488	4	30	0.315	0.277	3 992	4	30
		6			4 476	10	41			5 232	10	40			5 988	9	40
		8			5 967	19	48			6 975	17	48			7 983	16	48
		10			7 459	29	54			8 719	27	54			9 979	25	53

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			350					400					450				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	800	4	0.280	0.237	3 410	4	30	0.32	0.277	3 986	4	30	0.360	0.317	4 562	4	29
		6			5 115	10	41			5 979	9	41			6 843	9	40
		8			6 820	18	48			7 972	17	48			9 124	16	47
		10			8 525	28	54			9 965	26	54			11 405	25	53
	900	4	0.315	0.266	3 836	4	31	0.360	0.311	4 484	6	35	0.405	0.356	5 132	4	29
		6			5 754	10	41			6 726	12	44			7 698	9	40
		8			7 672	18	49			8 968	26	54			10 264	16	47
		10			9 590	28	55			11 210	33.4	58			12 830	25	53
	1000	4	0.350	0.296	4 262	4	30	0.400	0.346	4 982	4	31	0.450	0.396	5 702	4	29
		6			6 394	9	41			7 474	9	42			8 554	9	40
		8			8 525	17	48			9 965	17	49			11 405	16	47
		10			10 656	26	54			12 456	26	55			14 256	25	53
	1100	4	0.385	0.326	4 689	4	32	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29
		6			7 033	10	42			8 221	9	42			9 409	9	39
		8			9 377	18	50			10 961	17	49			12 545	15	47
		10			11 722	28	56			13 702	26	55			15 682	24	53
	1200	4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	4	29
		6			7 672	9	41			8 968	9	42			10 264	9	39
		8			10 230	16	49			11 958	16	49			13 686	15	47
		10			12 787	25	54			14 947	25	55			17 107	24	53

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			500					550					600				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0.1	0.089	1 284	6	29	0.110	0.099	1 428	5	29	0.120	0.109	1 572	5	29
		6			1 927	13	40			2 143	12	39			2 359	12	39
		8			2 569	22	47			2 857	21	47			3 145	21	47
		10			3 211	35	53			3 571	33	53			3 931	32	53
	250	4	0.125	0.112	1 606	6	30	0.138	0.124	1 786	5	30	0.150	0.137	1 966	5	30
		6			2 408	13	41			2 678	12	40			2 948	12	40
		8			3 211	22	48			3 571	21	48			3 931	21	48
		10			4 014	35	54			4 464	33	53			4 914	32	54
	300	4	0.15	0.134	1 927	5	30	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
		6			2 890	12	41			3 214	12	41			3 538	11	40
		8			3 853	21	48			4 285	21	48			4 717	19	48
		10			4 817	33	54			5 357	32	54			5 897	30	53
	350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	31	0.210	0.191	2 752	5	30
		6			3 372	12	41			3 750	12	41			4 128	10	40
		8			4 496	21	48			5 000	21	49			5 504	19	48
		10			5 620	32	54			6 250	32	55			6 880	29	54
	400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	30	0.240	0.218	3 145	4	30
		6			3 853	11	41			4 285	10	41			4 717	10	41
		8			5 138	19	48			5 714	19	48			6 290	18	48
		10			6 422	30	54			7 142	29	54			7 862	28	54
	450	4	0.225	0.201	2 890	4	29	0.248	0.223	3 214	4	29	0.270	0.246	3 538	4	30
		6			4 335	9	39			4 821	9	40			5 307	9	40
		8			5 780	17	47			6 428	17	47			7 076	17	48
		10			7 225	26	52			8 035	26	53			8 845	26	53
	500	4	0.250	0.223	3 211	4	27	0.275	0.248	3 571	4	29	0.300	0.273	3 931	4	29
		6			4 817	8	38			5 357	9	39			5 897	9	39
		8			6 422	14	45			7 142	15	47			7 862	15	47
		10			8 028	20	50			8 928	24	52			9 828	24	53
	550	4	0.275	0.245	3 853	3	27	0.303	0.273	4 285	4	28	0.330	0.300	4 717	4	28
		6			5 780	8	37			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	14	46			9 435	14	46
		10			9 634	21	51			10 714	22	52			11 794	22	52
	600	4	0.3	0.268	3 853	3	27	0.330	0.298	4 285	3	28	0.360	0.328	4 717	3	28
		6			5 780	8	38			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	13	46			9 435	13	46
		10			9 634	21	51			10 714	21	51			11 794	21	52
	650	4	0.325	0.290	4 175	4	31	0.358	0.322	4 643	3	28	0.390	0.355	5 111	3	28
		6			6 262	10	41			6 964	8	38			7 666	8	39
		8			8 349	17	49			9 285	13	46			10 221	13	46
		10			10 436	21	51			11 606	21	52			12 776	21	52
	700	4	0.350	0.312	4 496	3	28	0.385	0.347	5 000	3	28	0.420	0.382	5 504	3	29
		6			6 744	8	38			7 500	8	39			8 256	8	39
		8			8 991	13	46			9 999	13	46			11 007	13	47
		10			11 239	21	52			12 499	21	52			13 759	21	52

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			500					550					600				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	800	4	0.4	0.357	5 138	3	28	0.440	0.397	5 714	3	29	0.480	0.437	6 290	3	29
		6			7 707	8	39			8 571	8	39			9 435	8	40
		8			10 276	13	46			11 428	13	47			12 580	13	47
		10			12 845	21	52			14 285	21	53			15 725	21	53
	900	4	0.45	0.401	5 780	3	28	0.495	0.446	6 428	3	29	0.540	0.491	7 076	3	30
		6			8 670	8	39			9 642	8	40			10 614	8	38
		8			11 560	13	46			12 856	13	47			14 152	13	45
		10			14 450	21	52			16 070	21	53			17 690	21	51
	1000	4	0.5	0.446	6 422	3	28	0.550	0.496	6 428	3	30	0.600	0.546	7 862	3	30
		6			9 634	8	39			9 642	8	40			11 794	8	41
		8			12 845	13	46			12 856	13	48			15 725	13	48
		10			16 056	21	52			16 070	21	54			19 656	21	54
	1100	4	0.55	0.491	7 065	4	29	0.605	0.546	7 857	4	31	0.660	0.601	8 649	3	31
		6			10 597	8	39			11 785	8	41			12 973	8	41
		8			14 129	14	47			15 713	14	49			17 297	13	49
		10			17 662	22	53			19 642	22	55			21 622	21	54
	1200	4	0.6	0.535	7 707	3	27	0.660	0.595	8 571	3	30	0.720	0.655	9 435	3	30
		6			11 560	7	38			12 856	7	40			14 152	7	40
		8			15 414	13	45			17 142	13	48			18 870	12	48
		10			19 267	20	51			21 427	20	54			23 587	19	54

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]		height H [mm]														
		650					700					750				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
200	4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	5	29
	6			2 575	11	39			2 791	11	40			3 007	11	40
	8			3 433	20	47			3 721	20	47			4 009	20	47
	10			4 291	31	53			4 651	31	53			5 011	31	53
250	4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	5	30
	6			3 218	11	40			3 488	11	41			3 758	11	41
	8			4 291	20	48			4 651	20	48			5 011	20	48
	10			5 364	31	53			5 814	31	54			6 264	31	54
300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	29	0.225	0.209	3 007	4	30
	6			3 862	10	40			4 186	10	40			4 510	10	40
	8			5 149	19	48			5 581	18	47			6 013	18	48
	10			6 437	29	53			6 977	28	53			7 517	28	54
350	4	0.228	0.209	3 004	4	30	0.245	0.226	3 256	4	30	0.263	0.244	3 508	4	30
	6			4 506	10	40			4 884	10	40			5 262	10	41
	8			6 008	18	48			6 512	17	48			7 016	17	48
	10			7 510	28	54			8 140	27	53			8 770	27	54
400	4	0.260	0.238	3 433	4	30	0.280	0.258	3 721	4	30	0.300	0.278	4 009	4	31
	6			5 149	10	41			5 581	10	41			6 013	10	41
	8			6 866	18	48			7 442	17	48			8 018	17	49
	10			8 582	28	54			9 302	27	54			10 022	27	54
450	4	0.293	0.268	3 862	4	30	0.315	0.291	4 186	4	29	0.338	0.313	4 510	4	30
	6			5 793	9	40			6 279	9	40			6 765	9	40
	8			7 724	17	48			8 372	15	47			9 020	15	48
	10			9 655	26	54			10 465	24	53			11 275	24	53
500	4	0.325	0.298	4 291	4	29	0.350	0.323	4 651	4	29	0.375	0.348	5 011	4	29
	6			6 437	9	40			6 977	8	40			7 517	8	40
	8			8 582	15	47			9 302	15	47			10 022	15	47
	10			10 728	24	53			11 628	23	53			12 528	23	53
550	4	0.358	0.328	5 149	4	29	0.385	0.355	5 116	4	29	0.413	0.383	5 512	4	29
	6			7 724	8	39			7 674	8	39			8 268	8	40
	8			10 299	14	47			10 233	14	47			11 025	14	47
	10			12 874	22	52			12 791	22	53			13 781	22	53
600	4	0.390	0.358	5 149	3	28	0.420	0.388	5 581	3	29	0.450	0.418	6 013	3	29
	6			7 724	8	39			8 372	8	39			9 020	8	40
	8			10 299	13	46			11 163	13	47			12 027	13	47
	10			12 874	21	52			13 954	21	53			15 034	21	53
650	4	0.423	0.387	5 579	3	28	0.455	0.420	6 047	3	28	0.488	0.452	6 515	3	28
	6			8 368	7	39			9 070	7	39			9 772	7	39
	8			11 157	13	46			12 093	13	46			13 029	12	46
	10			13 946	20	52			15 116	20	52			16 286	19	52
700	4	0.455	0.417	6 008	3	28	0.490	0.452	6 512	3	29	0.525	0.487	7 016	3	28
	6			9 012	7	39			9 768	7	39			10 524	7	39
	8			12 015	13	46			13 023	13	47			14 031	12	46
	10			15 019	20	52			16 279	20	53			17 539	19	52

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			650					700					750				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	800	4	0.520	0.477	6 866	3	27	0.560	0.517	7 442	4	29	0.600	0.557	8 018	3	28
		6			10 299	6	38			11 163	7	37			12 027	6	39
		8			13 732	12	45			14 884	11	43			16 036	12	46
		10			17 165	18	51			18 605	16	47			20 045	18	52
	900	4	0.585	0.536	7 724	3	26	0.630	0.581	8 372	3	27	0.675	0.626	9 020	3	27
		6			11 586	6	36			12 558	6	37			13 530	6	38
		8			15 448	10	44			16 744	10	45			18 040	10	45
		10			19 310	16	50			20 930	16	51			22 550	16	51
	1000	4	0.650	0.596	8 582	3	26	0.700	0.646	9 302	3	27	0.750	0.696	10 022	3	28
		6			12 874	6	36			13 954	6	38			15 034	6	38
		8			17 165	10	44			18 605	10	45			20 045	10	46
		10			21 456	16	50			23 256	16	51			25 056	16	52
	1100	4	0.715	0.656	9 441	3	29	0.770	0.711	10 233	3	31	0.825	0.766	11 025	3	28
		6			14 161	8	40			15 349	8	42			16 537	6	39
		8			18 881	13	47			20 465	13	49			22 049	10	46
		10			23 602	21	53			25 582	21	55			27 562	16	52
	1200	4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	3	30	0.900	0.835	12 027	2	28
		6			15 448	7	39			16 744	7	41			18 040	5	38
		8			20 598	12	46			22 326	12	48			24 054	10	46
		10			25 747	19	52			27 907	19	54			30 067	15	52

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	800					
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
200	4	0.160	0.149	2 148	5	29
	6			3 223	11	40
	8			4 297	19	47
	10			5 371	30	53
250	4	0.200	0.187	2 686	5	30
	6			4 028	11	41
	8			5 371	19	48
	10			6 714	30	54
300	4	0.240	0.224	3 223	4	30
	6			4 834	10	41
	8			6 445	18	48
	10			8 057	28	54
350	4	0.280	0.261	3 760	4	30
	6			5 640	10	41
	8			7 520	17	48
	10			9 400	27	54
400	4	0.320	0.298	4 297	4	31
	6			6 445	10	41
	8			8 594	17	49
	10			10 742	27	55
450	4	0.360	0.336	4 834	4	29
	6			7 251	8	39
	8			9 668	14	47
	10			12 085	22	53
500	4	0.400	0.373	5 371	4	29
	6			8 057	8	40
	8			10 742	14	47
	10			13 428	22	53
550	4	0.440	0.410	5 908	3	29
	6			8 862	8	40
	8			11 817	13	47
	10			14 771	21	53

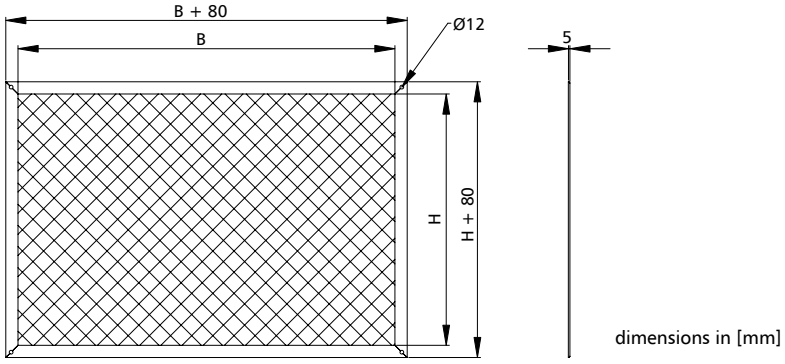
width B [mm]	800					
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
600	4	0.480	0.448	6 445	3	29
	6			9 668	7	39
	8			12 891	13	47
	10			16 114	20	53
650	4	0.520	0.485	6 983	3	28
	6			10 474	7	39
	8			13 965	12	46
	10			17 456	19	52
700	4	0.560	0.522	7 520	3	28
	6			11 280	6	39
	8			15 039	12	46
	10			18 799	18	52
800	4	0.640	0.597	8 594	3	27
	6			12 891	6	38
	8			17 188	10	45
	10			21 485	16	51
900	4	0.720	0.671	9 668	3	28
	6			14 502	6	38
	8			19 336	10	46
	10			24 170	16	51
1000	4	0.800	0.746	10 742	3	28
	6			16 114	6	39
	8			21 485	10	46
	10			26 856	16	52
1100	4	0.880	0.821	11 817	3	28
	6			17 725	6	39
	8			23 633	10	46
	10			29 542	16	52
1200	4	0.960	0.895	12 891	2	28
	6			19 336	5	39
	8			25 782	10	46
	10			32 227	15	52

1.7 | Estimated weight of the mcr FID B rectangular dampers [kg]

height H [mm] \ width B [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
200	26	28	29	31	33	34	36	37	39	40	42	43	45	46	48	49	51	53	54	56	57
250	28	30	31	33	34	36	37	39	41	42	44	45	47	49	50	52	53	55	57	58	60
300	29	31	33	34	36	38	39	41	43	44	46	48	49	51	53	54	56	58	59	61	62
350	31	33	34	36	38	40	41	43	45	46	48	50	51	53	55	57	58	60	62	63	65
400	33	34	36	38	40	41	43	45	47	48	50	52	54	55	57	59	61	62	64	66	68
450	34	36	38	40	41	43	45	47	49	50	52	54	56	58	59	61	63	65	67	69	70
500	36	37	39	41	43	45	47	49	51	52	54	56	58	60	62	64	66	67	69	71	73
550	37	39	41	43	45	47	49	51	53	54	56	58	60	62	64	66	68	70	72	74	76
600	39	41	43	45	47	49	51	53	55	57	59	60	62	64	66	68	70	72	74	76	78
650	40	42	44	46	48	50	52	54	57	59	61	63	65	67	69	71	73	75	77	79	81
700	42	44	46	48	50	52	54	56	59	61	63	65	67	69	71	73	75	77	79	81	84
750	43	45	48	50	52	54	56	58	60	63	65	67	69	71	73	76	78	80	82	84	86
800	45	47	49	51	54	56	58	60	62	65	67	69	71	73	76	78	80	82	84	87	89

1.8 | Accessories

1.8.1 | MWB masking grille



MWB system masking grille are designed to fulfill either supply or exhaust function. They allow for an aesthetic system termination. They come with a fixed steel mesh that covers the damper, reducing its visibility. Bolts are used to attach the masking grille body to the damper. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

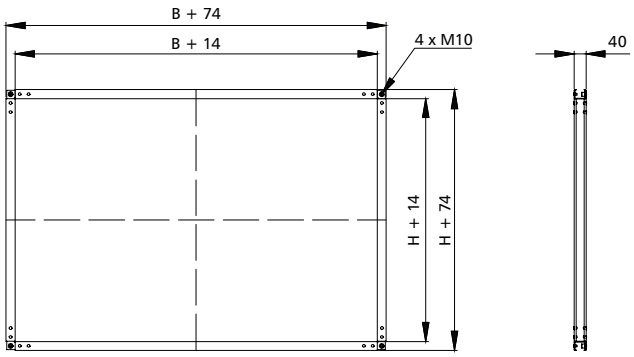
Dimensions:
» nominal width B: from 200 to 1200 mm
» nominal height H from 200 mm to 800 mm
» nominal thickness G 5 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.

Marking:

mcr MWB / B x H / X

- X — additional parameters
- B x H — width x height grille
- mcr MWB — type

1.8.2 | RB connecting subframe



dimensions in [mm]

Mcr RB connection frames are used to connect a steel ventilation duct to the damper. The connection may be made using bolts in the corners of the frame, as well as using latches/hasps for ventilation ducts or self-drilling screws.

Dimensions:
» nominal width B: from 200 to 1200 mm
» nominal height H from 200 mm to 800 mm
» nominal thickness G 40 mm
Apart from the standard dimensions, connection frames may be manufactured with intermediate dimensions.

Marking:

mcr RB / B x H / X

- X – additional parameters
- B x H – width x height grille
- RB – type

X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

1.9 | Marking

mcr FID B B x H 1 / 2 / 3

- 3 – additional parameters
- 2 – material
- 1 – control
- B x H – width x height (nominal) damper
- FID B – type

1 - control:

» **trigger control mechanism**
BE24 – actuator without a return spring, U = 24 V AC/DC
BEE24 – actuator without a return spring, U = 24 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC
BEE230 – actuator without a return spring, U = 230 V AC
BEN230 – actuator without a return spring, U = 230 V AC
MLE24 – actuator without a return spring, U = 24 V AC/DC
MLE230 – actuator without a return spring, U = 230 V AC
ME24 – actuator without a return spring, U = 24 V AC/DC
ME230 – actuator without a return spring, U = 230 V AC

2 - material

[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

3 - additional parameters

» **Control mechanism position**
[no symbol] – along the damper rotation axis

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

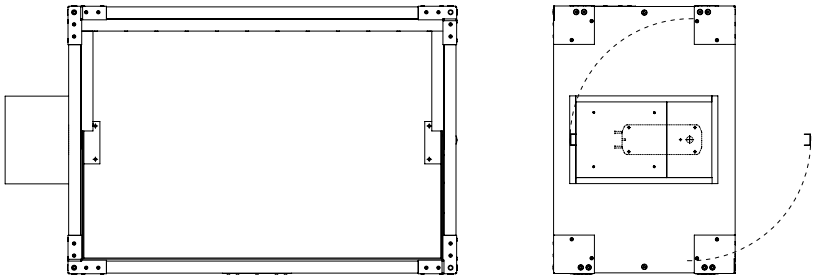
» **Extended damper casing**
[no symbol] – standard casing length

NOTE: **separate additional parameters entered with the "/" sign**

example marking:
mcr FID B 400 x 400 BEN24
Smoke control damper for fire ventilation systems with a 24 V actuator with limit switches.

1.9.1 | Design standards

» symmetrical damper



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

downloadable models
on the website
under the designer zone tab



1396-CPR-0114
1488-CPR-0203/W

HYGIENIC CERTIFICATE

» **EIS120**
» Fire resistance class: EI120 (v_e h_o i↔o)S.
» Certificate of constancy of performance 1396-CPR-0114.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Cut-off dampers with a fire resistance rating independent of the airflow direction and installation side.
» Lower acoustic noise and hydraulic resistance in the system achieved by reducing damper blade thickness.
» Admissible for operation with a horizontal and vertical rotation axis.
» Certified installation of the damper in close proximity to each other and the ceiling.
» Pressure difference range: 2000 Pa.
» KTB ATEX 2014/34/UE

2.1| Application

mcr FID S/S c/P low-resistance cut-off dampers are designed for installation in general ventilation systems at installation passages through vertical and horizontal construction partitions. These dampers are intended, for example, for applications in systems with increased acoustic requirements.
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes.
The dampers cannot be operated in systems exposed to dust, unless included in a special, individually developed service and technical inspections programme. Admissible flow velocity in the connected duct is 12 m/s.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

2.2| Design



mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

mcr FID S/S c/P cut-off fire dampers consist of a casing with a rectangular cross-section, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically when the thermal or thermoelectric trigger is tripped. Standard damper casing is made of galvanized steel sheets (Zn 275 g/m² coating). A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 acid-proof steel sheet, while other elements are impregnated.
The casing total length is at least 296 mm. In the middle part, where the damper blade is placed, the casing is perforated with a perforation width of 30 mm. An intumescent gasket is placed on the inner side of the casing, around the closed damper blade. The damper blade is made of a fire-proof panel with a total thickness of 30 mm.
The damper blade is embedded in a metal sheet reinforcement profile. The inner surface is equipped with a „P"-type ventilation gasket, which ensures the tightness of dampers at ambient temperature. Both ends of the fire damper casing are terminated with flange connections.

2.3 | Versions

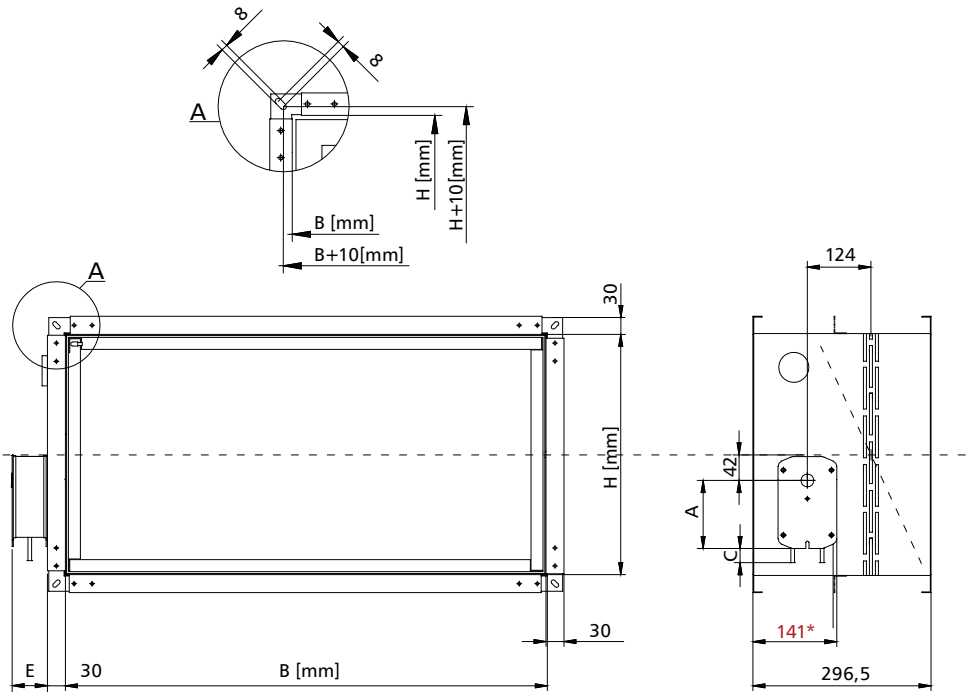
2.3.1 | Damper closing and opening with an actuator

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

mcr FID S/S c/P dampers are equipped with a trigger control mechanism in the form of a BFL, BFN, BF-TL, MF, MLF, EXBF and QT.ex series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with a nominal tripping temperature of 95°C). The actuators are equipped with limit switches used to monitor the blade position. Furthermore, a mechanical position indicator is placed on the actuator.

Thermoelectric triggers are equipped with a test switch.

Dampers with actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



dimensions in [mm]

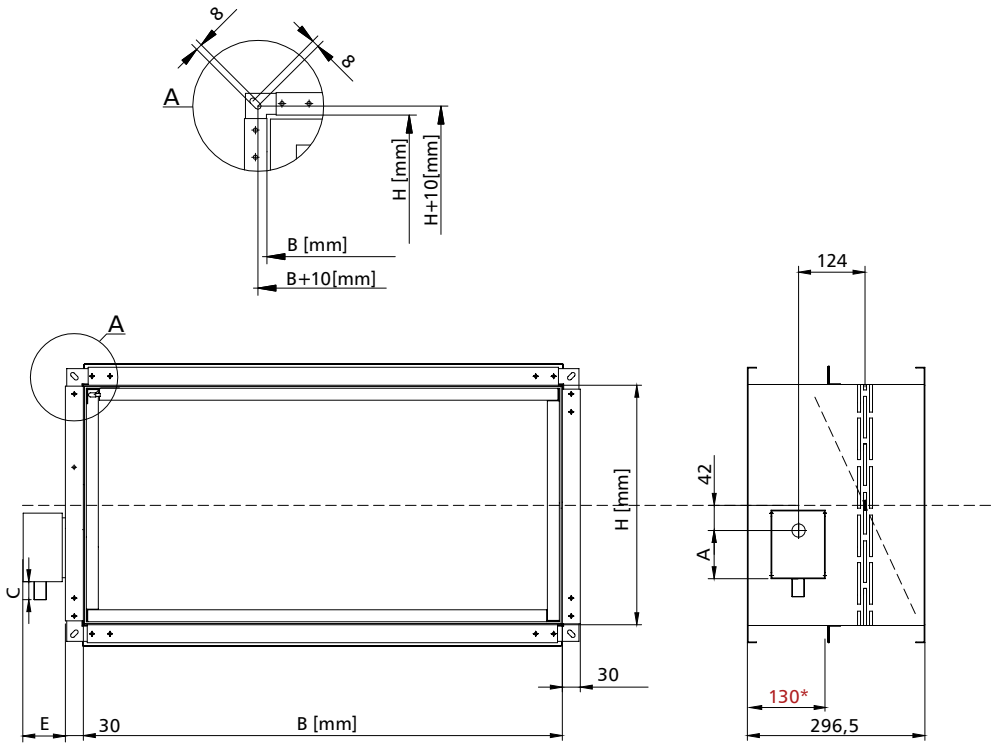
mechanism	A	C	E
BFN	157	30	57
BFL	138	30	53
BF24TL-ST	198	10	65
EXBF	225	55	175
QT.Ex	260	30	105
MF	198	30	70
MLF	114	30	62

*embedding border

2.3.2 | Cut-off fire damper for ventilation ducts with a spring drive and thermal trigger.

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically.

mcr FID S/S c/P dampers are equipped with a **RST** trigger control mechanism with a drive spring (without an integrated thermal trigger). In this case, a 74°C thermal trigger (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the RST mechanism. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position.



dimensions in [mm]

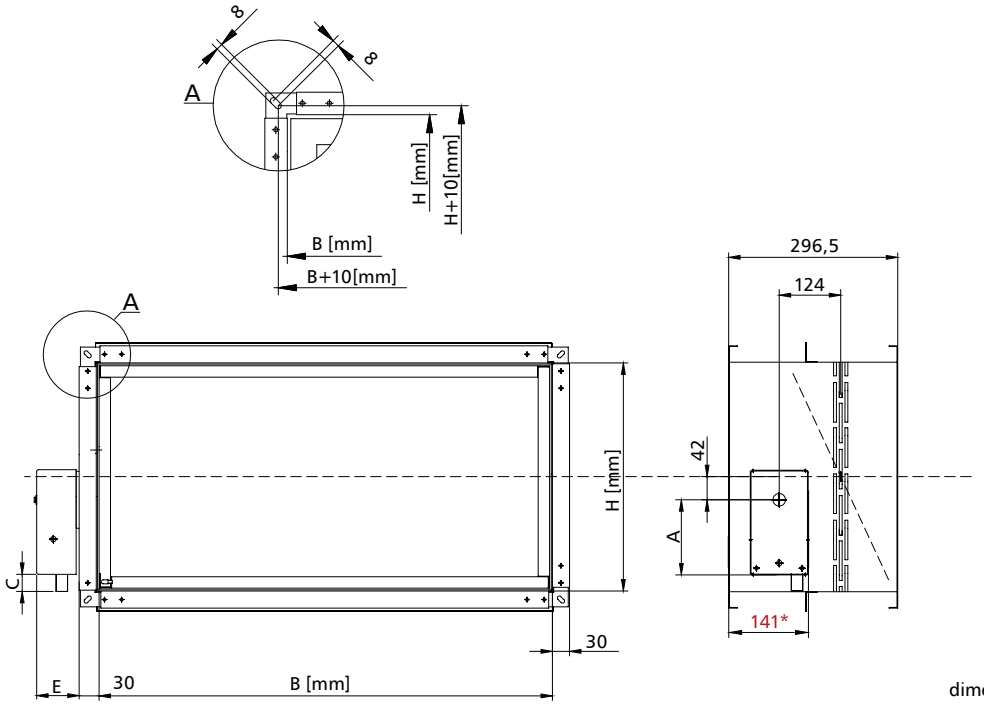
mechanism	A	C	E
RST	50	30	70

*embedding border

2.3.3 | Cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID S/S c/P dampers are equipped with a **KW1** trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse") or removal („break") of the power supply voltage and with limit switches used to signal the blade position. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



dimensions in [mm]

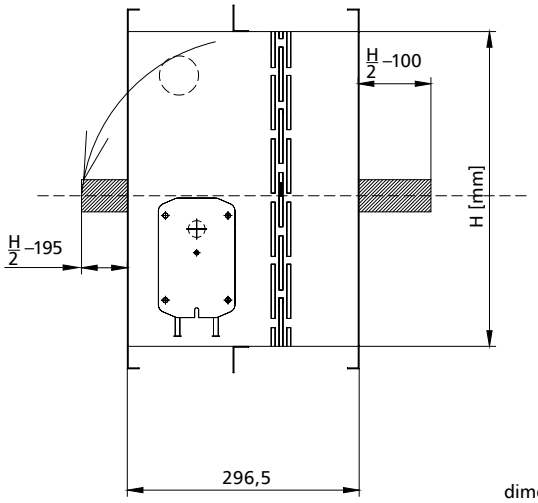
mechanism	A	C	E
KW1	130	30	80

*embedding border

2.4 | Dimensions

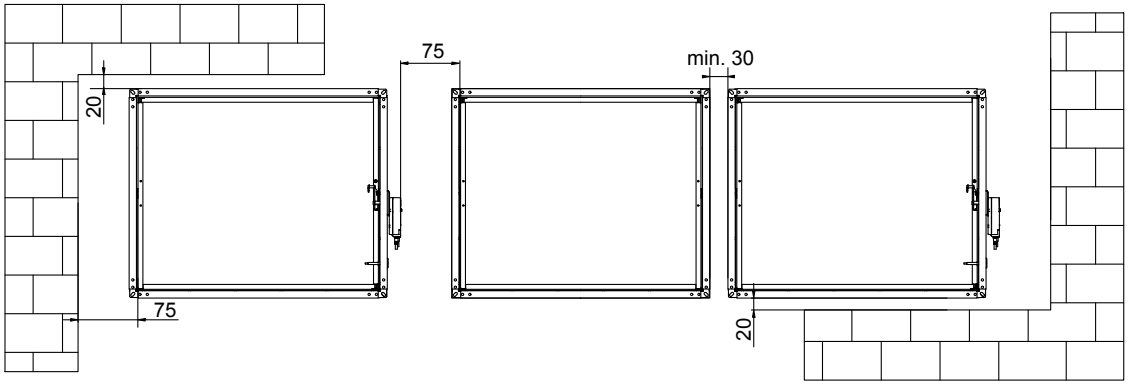
rectangular dampers:
» nominal width B: from 100 mm to 1000 mm
» nominal height H: from 100 mm to 800 mm
» maximum single damper cross-section surface up to 0.8 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).



dimensions in [mm]

» Minimum distance between systems and partitions



dimensions in [mm]

If the installation documentation does not provide otherwise, the minimum spacing between the casings of two fire dampers is ≥200 mm and ≥75 mm between the wall or floor slab, as per the EN-1366-2 standard.

2.5 | Installation

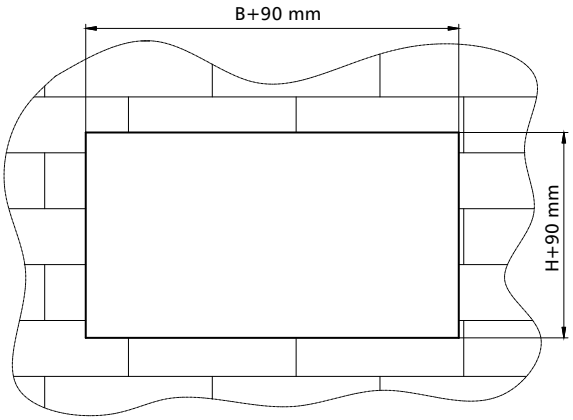
The mcr FID S/S c/P rectangular dampers have been classified in class EI120(v_e h_o i↔o)S in a size range of up to 800 x 400 and EI120(v_e i↔o)S in a size range of up to 1000 x 800. The dampers can be installed in concrete partitions for rigid walls/shafts with a minimum thickness of 120 mm using mortar and 125 mm using mineral wool, partitions made of full bricks or aerated concrete blocks with a min. thickness of 120 mm using mortar and 125 mm using mineral wool, light walls of gypsum boards on a steel framework with a thickness of at least 125 mm and EI120 or higher fire rating, and concrete floor slabs with a min. thickness of 150 mm. The dampers may be installed on grout or in dry installation in mineral wool with a horizontal and vertical rotation axis.

Damper installation with a vertical axis of rotation

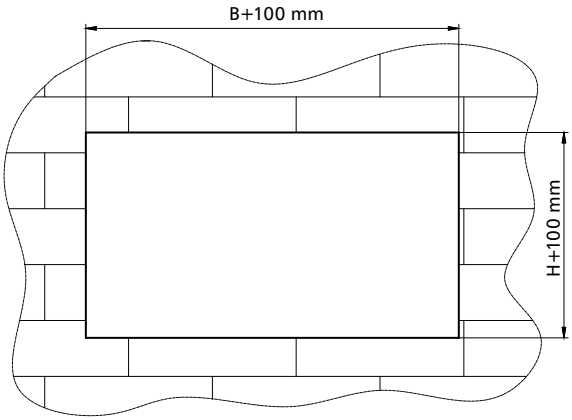
Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis.

2.5.1 | Preparation of installation openings

» **installation openings preparation - wet installation – preferred opening**

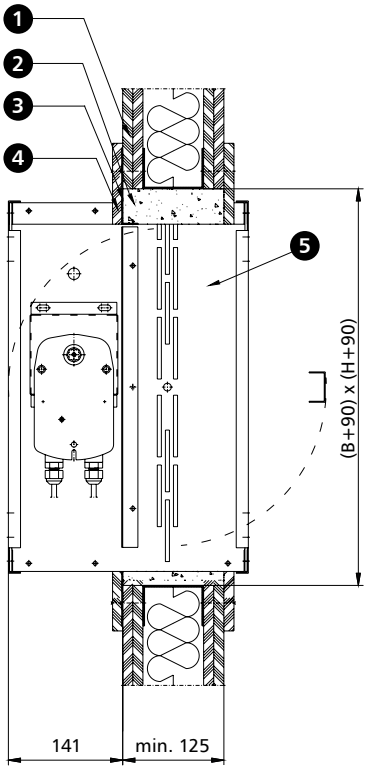


» **installation openings preparation – dry installation – preferred opening**

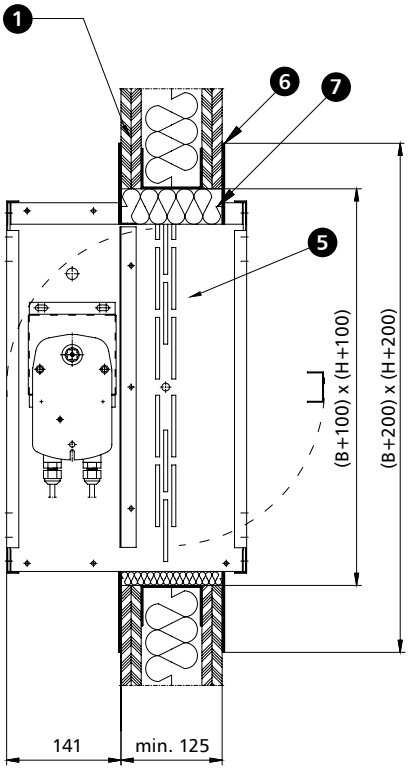


2.5.2 | Sample installation in gypsum board light walls

» WET installation



» DRY installation



dimensions in [mm]

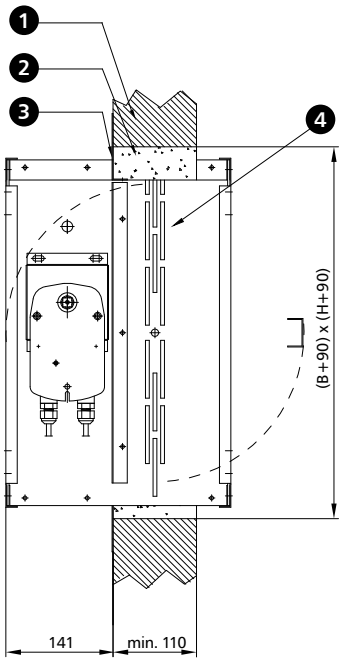
1. light wall
2. assembly mortar*
3. mounting flange - embedding border
4. damper circumference gypsum board trim 100 x 12.5
5. mcr FID S/S c/P fire damper
6. elastic fire protection grout/mass*
7. mineral wool*

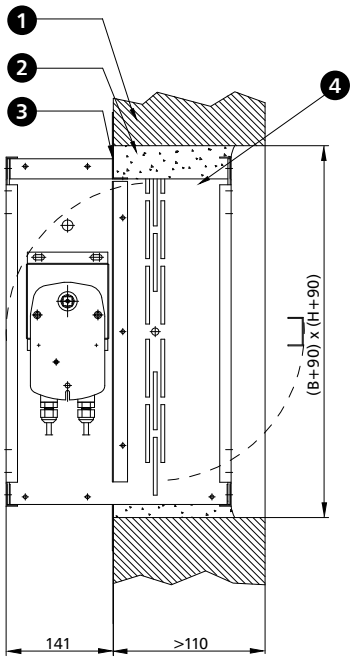
* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

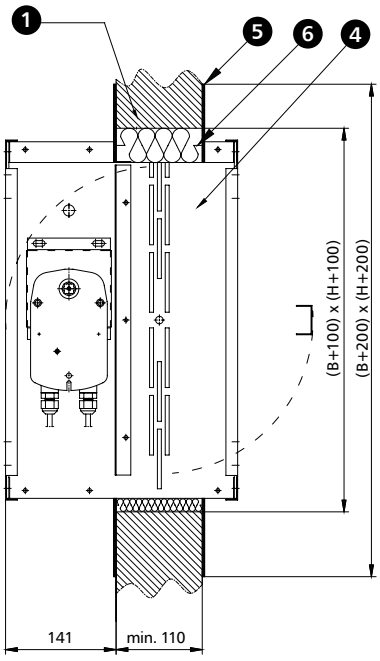
2.5.3 | Sample installation in concrete walls

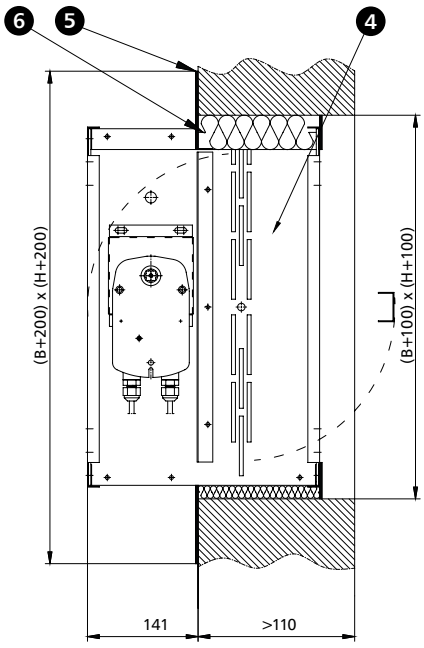
» **WET installation**





» **DRY installation**





dimensions in [mm]

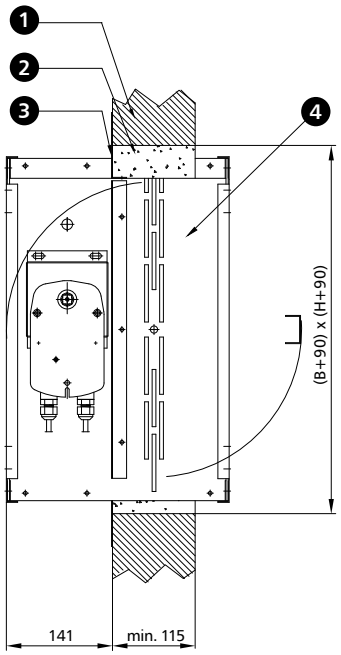
1. masonry wall
2. assembly mortar*
3. mounting flange - embedding border
4. mcr FID S/S c/P fire damper
5. elastic fire protection grout/mass*
6. mineral wool*

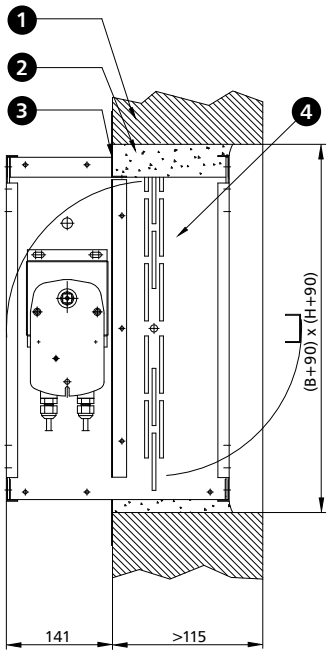
* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 110 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

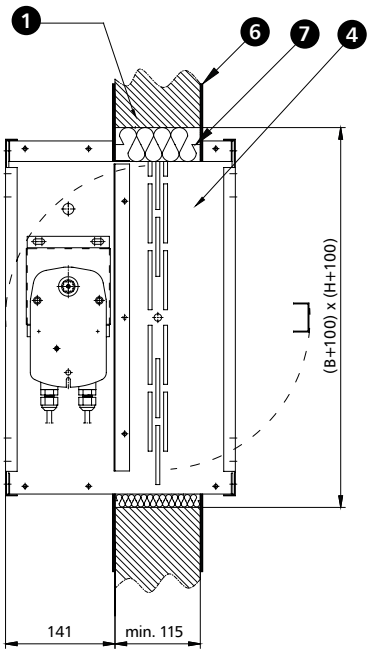
2.5.4 | Sample installation in masonry walls

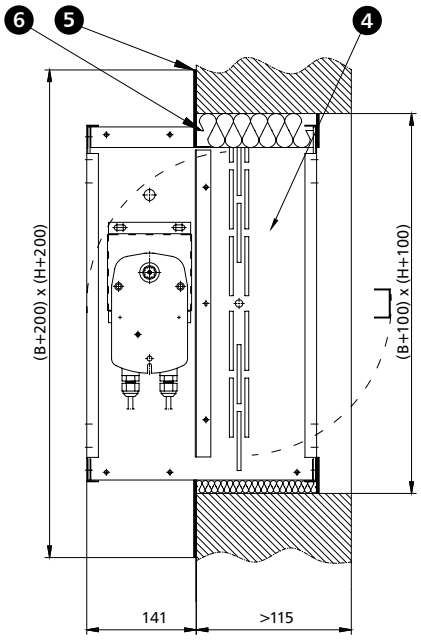
» WET installation





» DRY installation





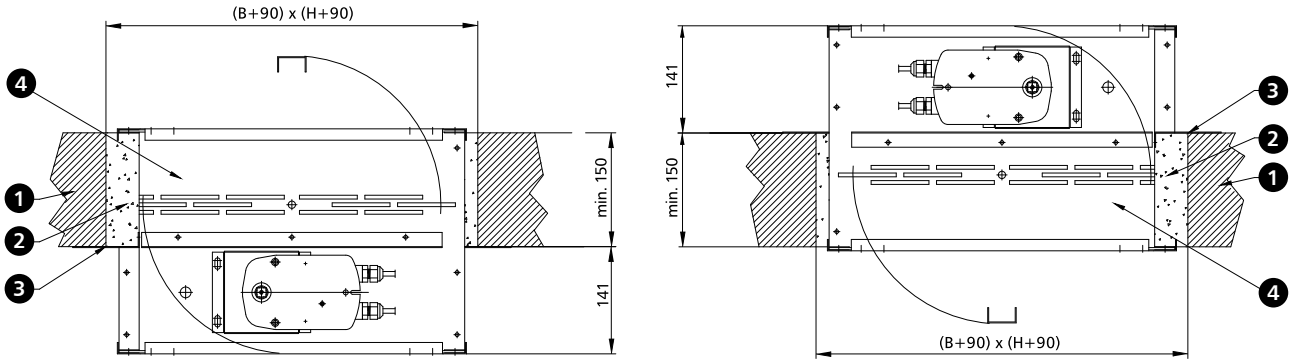
dimensions in [mm]

1. light wall
2. assembly mortar*
3. mounting flange - embedding border
4. damper circumference gypsum board trim 100 x 12.5
5. mcr FID S/S c/P fire damper
6. elastic fire protection grout/mass*
7. mineral wool*

* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 115 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

2.5.5 | Sample installation in floor slabs

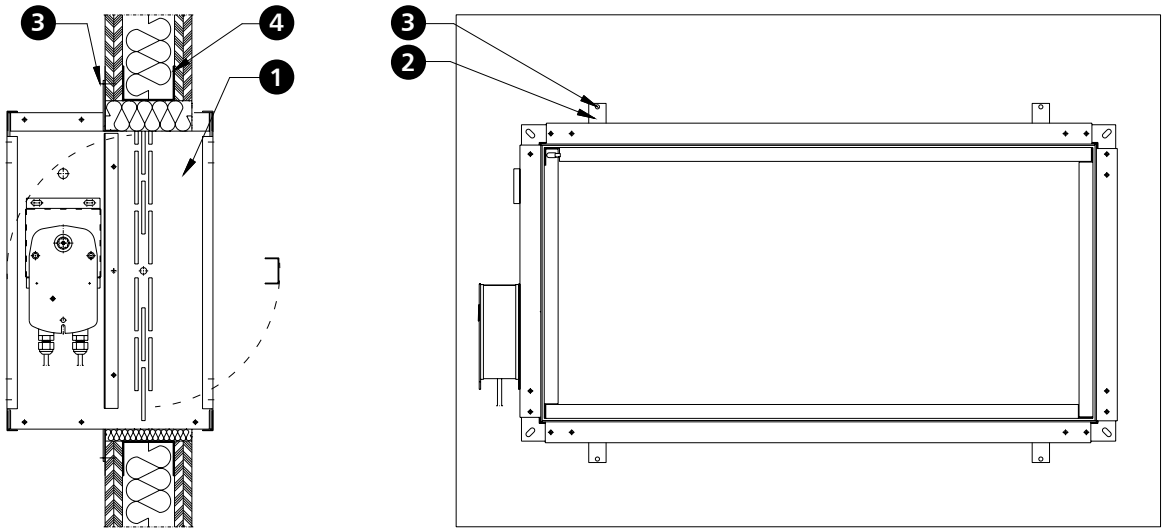


dimensions in [mm]

1. floor slab
2. assembly mortar*
3. mounting flange - embedding border
4. mcr FID S/S c/P fire damper

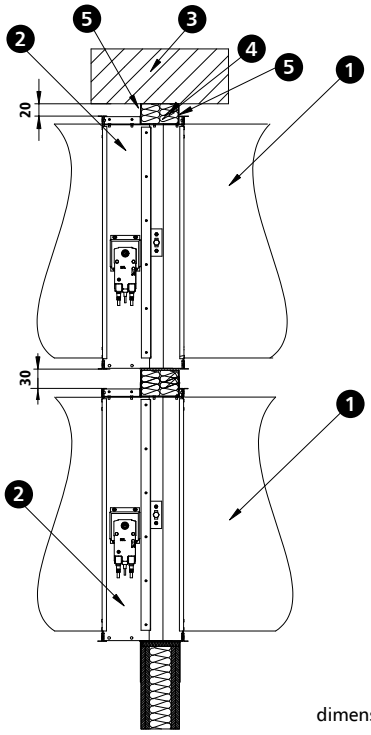
* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

2.5.6 | Sample installation with a bracket



1. mcr FID S/S c/P fire damper
2. WM installation bracket
3. plasterboard screw 3.5 x 20
4. e.g. plasterboard wall

2.5.7 | Sample installation below the floor slab



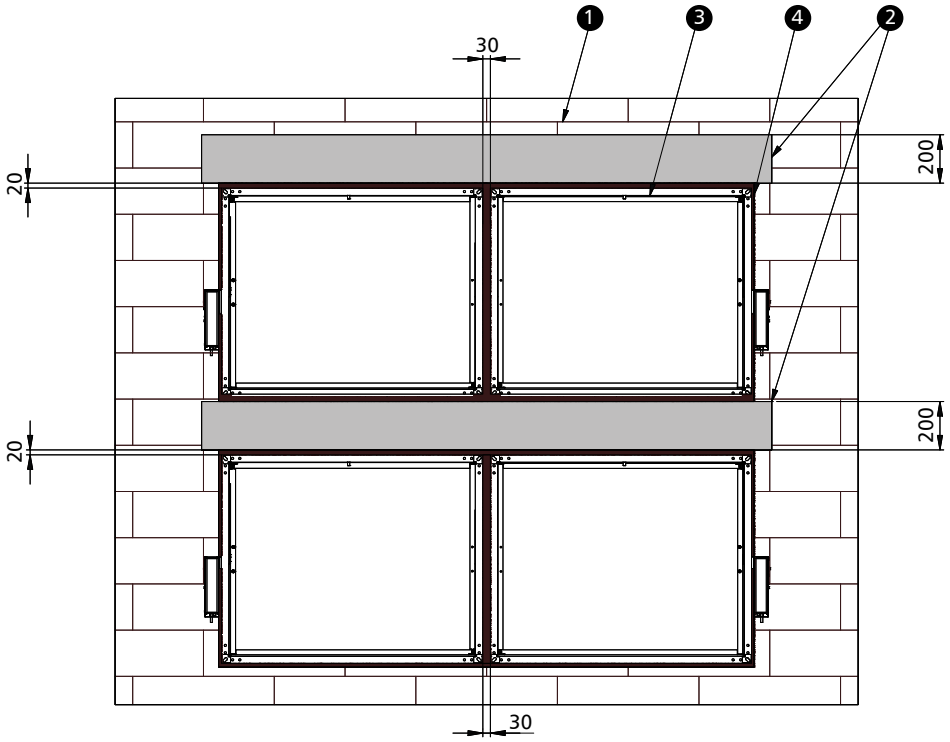
1. duct
2. mcr FID S/S c/P fire damper
3. floor slab
4. mineral wool*
5. elastic fire protection grout/mass*

Minimum installation distances of the damper from the ceiling according to the adjacent drawing. The damper can be installed in close proximity to another damper (damper next to damper, damper above damper, dampers diagonally positioned) provided that the minimum installation distances, as shown in the drawing, are maintained. Surrounding collars made of non-combustible material (e.g., gypsum board) with a minimum thickness of 10 mm for flexible walls and 15 mm for rigid walls are required.

* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

dimensions in [mm]

2.5.8 | Example of modular installation



dimensions in [mm]

1. wall
2. wall element, e.g. lintel
3. mcr FID S/S c/P damper
4. assembly mortar*

Other configurations for the installation of mcr FID S/S c/P damper modules, consisting of two or more dampers, are possible, while maintaining the minimum distances between dampers as shown above.

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

2.6 | mcr FID S/S c/P rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	100 S_k [m²]	100 S_e [m²]	100 Q [m³/h]	100 d_p [PA]	100 L_{WA} [dB]	200 S_k [m²]	200 S_e [m²]	200 Q [m³/h]	200 d_p [PA]	200 L_{WA} [dB]	250 S_k [m²]	250 S_e [m²]	250 Q [m³/h]	250 d_p [PA]	250 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]
	100	4	0,01	0,006	91	10	26	0,02	0,016	235	6	26	0,025	0,021	307	6	26	0,03	0,026	379	5	26
		6			136	23	36			352	14	36			460	12	37			568	12	37
		8			181	40	44			469	24	44			613	22	45			757	21	44
		10			227	63	50			587	38	50			767	34	50			947	33	50
	200	4	0,02	0,013	181	10	26	0,04	0,033	468	6	26	0,05	0,043	612	6	26	0,06	0,053	756	5	26
		6			272	23	36			702	14	36			918	13	37			1 134	12	37
		8			363	40	44			936	24	44			1 224	24	45			1 512	22	44
		10			454	63	50			1 170	38	50			1 530	37	50			1 890	34	50
	250	4	0,025	0,016	227	10	27	0,05	0,041	585	6	27	0,0625	0,053	765	6	27	0,075	0,066	945	5	26
		6			340	23	37			878	14	37			1 148	13	38			1 418	11	37
		8			454	40	45			1 170	24	45			1 530	23	45			1 890	20	44
		10			567	63	51			1 463	38	51			1 913	36	51			2 363	31	50
	300	4	0,03	0,019	272	10	27	0,06	0,049	702	6	27	0,075	0,064	918	6	28	0,09	0,079	1 134	4	26
		6			408	23	38			1 053	13	38			1 377	13	38			1 701	10	36
		8			544	40	45			1 404	24	45			1 836	22	46			2 268	18	44
		10			680	63	51			1 755	37	51			2 295	35	51			2 835	28	49
	350	4	0,035	0,022	318	10	27	0,07	0,057	819	6	27	0,0875	0,074	1 071	5	27	0,105	0,092	1 323	4	25
		6			476	23	38			1 229	13	38			1 607	11	37			1 985	9	35
		8			635	40	45			1 638	22	45			2 142	20	45			2 646	16	43
		10			794	63	51			2 048	35	51			2 678	31	50			3 308	25	49
	400	4	0,04	0,025	363	10	27	0,08	0,065	936	5	27	0,1	0,085	1 224	4	25	0,12	0,105	1 512	4	24
		6			544	23	38			1 404	12	38			1 836	9	35			2 268	8	34
		8			726	40	45			1 872	22	45			2 448	17	43			3 024	14	42
		10			907	63	51			2 340	34	51			3 060	26	49			3 780	22	48
	450	4	0,045	0,028	408	10	27	0,09	0,073	1 053	5	27	0,1125	0,096	1 377	3	22	0,135	0,118	1 701	3	23
		6			612	23	37			1 580	11	37			2 066	7	33			2 552	7	33
		8			816	40	45			2 106	20	45			2 754	13	40			3 402	13	41
		10			1021	63	50			2 633	31	50			3 443	20	46			4 253	20	47
	500	4	0,05	0,032	454	10	26	0,1	0,081	1 170	4	26	0,125	0,106	1 530	3	23	0,15	0,131	1 890	3	23
		6			680	23	36			1 755	10	36			2 295	8	34			2 835	7	34
		8			907	40	44			2 340	18	44			3 060	13	41			3 780	13	41
		10			1134	63	50			2 925	28	50			3 825	21	47			4 725	20	47
	550	4	0,055	0,035	499	10	25	0,11	0,089	1 287	4	25	0,1375	0,117	1 683	3	23	0,165	0,144	2 079	3	22
		6			748	23	36			1 931	9	36			2 525	7	33			3 119	6	33
		8			998	40	43			2 574	17	43			3 366	13	41			4 158	12	40
		10			1247	63	49			3 218	26	49			4 208	20	47			5 198	18	46
	600	4	0,06	0,038	544	10	21	0,12	0,098	1 404	3	21	0,15	0,128	1 836	3	20	0,18	0,158	2 268	2	20
		6			816	23	32			2 106	7	32			2 754	6	31			3 402	5	31
		8			1089	40	39			2 808	12	39			3 672	10	38			4 536	10	38
		10			1361	63	45			3 510	19	45			4 590	16	44			5 670	15	44
	650	4	0,065	0,041	590	10	22	0,13	0,106	1 521	3	22	0,1625	0,138	1 989	3	21	0,195	0,171	2 457	2	20
		6			885	23	32			2 282	7	32			2 984	6	31			3 686	5	30
		8			1179	40	40			3 042	12	40			3 978	10	39			4 914	9	38
		10			1474	63	46			3 803	19	46			4 973	16	45			6 143	14	44
	700	4	0,07	0,044	635	10	21	0,14	0,114	1 638	3	21	0,175	0,149	2 142	2	20	0,21	0,184	2 646	2	19
		6			953	23	32			2 457	6	32			3 213	5	31			3 969	5	30
		8			1270	40	39			3 276	12	39			4 284	10	38			5 292	8	37
		10			1588	63	45			4 095	18	45			5 355	15	44			6 615	13	43
	750	4	0,075	0,047	680	10	21	0,15	0,122	1 755	3	21	0,1875	0,159	2 295	2	20	0,225	0,197	2 835	2	20
		6			1021	23	31			2 633	6	31			3 443	5	31			4 253	5	30
		8			1361	40	39			3 510	11	39			4 590	10	39			5 670	8	38
		10			1701	63	45			4 388	17	45			5 738	15	44			7 088	13	43
	800	4	0,08	0,050	726	10	20	0,16	0,13	1 872	2	20	0,2	0,17	2 448	2	20	0,24	0,21	3 024	2	19
		6			1089	23	30			2 808	5	30			3 672	5	30			4 536	4	29
		8			1452	40	38			3 744	10	38			4 896	9	38			6 048	8	37
		10			1814	63	43			4 680	15	43			6 120	14	44			7 560	12	43
	900	4	0,09	0,057	816	10	17	0,18	0,146	2 106	2	17	0,225	0,191	2 754	2	17	0,27	0,236	3 402	2	17
		6			1225	23	28			3 159	4	28			4 131	4	28			5 103	4	27
		8			1633	40	35			4 212	8	35			5 508	7	35			6 804	6	35
		10			2041	63	41			5 265	12	41			6 885	11	41			8 505	10	41
	1000	4	0,1	0,063	907	10	15	0,2	0,163	2 340	2	15	0,25	0,213	3 060	1	14	0,3	0,263	3 780	1	14
		6			1361	23	25			3 510	3	25			4 590	3	25			5 670	3	25
					1814	40	33			4 680	6	33			6 120	6	32			7 560	5	32
		10			2268	63	39			5 850	10	39			7 650	9	38			9 450	8	38

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]																
	350						400					500					
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
100	4	0,035	0,031	451	5	26	0,04	0,036	523	5	26	0,05	0,046	667	5	26
	6			676	11	37			784	11	37			1000	10	37
	8			901	20	44			1045	19	44			1333	19	44
	10			1127	31	50			1307	30	50			1667	29	50
200	4	0,07	0,063	900	5	26	0,08	0,073	1 044	5	26	0,1	0,093	1 332	4	26
	6			1 350	12	37			1 566	11	37			1 998	10	37
	8			1 800	21	44			2 088	19	44			2 664	18	44
	10			2 250	32	50			2 610	30	50			3 330	27	50
250	4	0,0875	0,078	1 125	4	25	0,1	0,091	1 305	4	25	0,125	0,116	1 665	4	26
	6			1 688	10	36			1 958	9	35			2 498	9	36
	8			2 250	17	43			2 610	16	43			3 330	16	44
	10			2 813	27	49			3 263	25	49			4 163	25	50
300	4	0,105	0,094	1 350	4	26	0,12	0,109	1 566	4	24	0,15	0,139	1 998	4	26
	6			2 025	10	36			2 349	8	35			2 997	8	36
	8			2 700	17	44			3 132	15	42			3 996	15	44
	10			3 375	27	50			3 915	23	48			4 995	23	50
350	4	0,1225	0,109	1 575	4	25	0,14	0,127	1 827	4	25	0,175	0,162	2 331	3	25
	6			2 363	9	36			2 741	8	36			3 497	8	36
	8			3 150	15	43			3 654	15	43			4 662	14	43
	10			3 938	24	49			4 568	23	49			5 828	22	49
400	4	0,14	0,125	1 800	3	24	0,16	0,145	2 088	3	23	0,2	0,185	2 664	3	25
	6			2 700	8	34			3 132	7	34			3 996	7	35
	8			3 600	13	42			4 176	12	41			5 328	13	43
	10			4 500	21	48			5 220	19	47			6 660	20	49
450	4	0,1575	0,141	2 025	3	24	0,18	0,163	2 349	3	21	0,225	0,208	2 997	3	24
	6			3 038	7	34			3 524	6	32			4 496	7	35
	8			4 050	13	42			4 698	10	39			5 994	12	42
	10			5 063	20	48			5 873	16	45			7 493	18	48
500	4	0,175	0,156	2 250	2	20	0,2	0,181	2 610	2	20	0,25	0,231	3 330	3	23
	6			3 375	5	31			3 915	5	31			4 995	6	34
	8			4 500	10	38			5 220	9	38			6 660	11	42
	10			5 625	15	44			6 525	14	44			8 325	17	47
550	4	0,1925	0,172	2 475	2	19	0,22	0,199	2 871	2	20	0,275	0,254	3 663	2	23
	6			3 713	5	29			4 307	5	30			5 495	6	33
	8			4 950	8	37			5 742	8	38			7 326	10	41
	10			6 188	13	43			7 178	13	43			9 158	15	47
600	4	0,21	0,188	2 700	2	18	0,24	0,218	3 132	2	22	0,3	0,278	3 996	2	22
	6			4 050	4	29			4 698	6	33			5 994	5	32
	8			5 400	8	36			6 264	10	40			7 992	9	40
	10			6 750	12	42			7 830	16	46			9 990	14	46
650	4	0,2275	0,203	2 925	2	19	0,26	0,236	3 393	2	18	0,325	0,301	4 329	2	21
	6			4 388	4	29			5 090	4	29			6 494	5	32
	8			5 850	8	37			6 786	7	36			8 658	8	39
	10			7 313	12	42			8 483	11	42			10 823	13	45
700	4	0,245	0,219	3 150	2	18	0,28	0,254	3 654	2	18	0,35	0,324	4 662	2	20
	6			4 725	4	28			5 481	4	29			6 993	4	31
	8			6 300	7	36			7 308	7	36			9 324	7	38
	10			7 875	11	42			9 135	11	42			11 655	12	44
750	4	0,2625	0,234	3 375	2	18	0,3	0,272	3 915	2	17	0,375	0,347	4 995	2	19
	6			5 063	4	29			5 873	4	28			7 493	4	30
	8			6 750	7	36			7 830	6	36			9 990	7	37
	10			8 438	11	42			9 788	10	41			12 488	10	43
800	4	0,28	0,25	3 600	2	18	0,32	0,29	4 176	2	18	0,4	0,37	5 328	2	18
	6			5 400	4	29			6 264	4	28			7 992	3	29
	8			7 200	7	36			8 352	6	36			10 656	6	36
	10			9 000	11	42			10 440	10	42			13 320	9	42
900	4	0,315	0,281	4 050	1	16	0,36	0,326	4 698	1	16	0,45	0,416	5 994	1	16
	6			6 075	3	27			7 047	3	27			8 991	3	26
	8			8 100	6	34			9 396	5	34			11 988	5	34
	10			10 125	9	40			11 745	8	40			14 985	8	40
1000	4	0,35	0,313	4 500	1	14	0,4	0,363	5 220	1	13	0,5	0,463	6 660	1	13
	6			6 750	3	24			7 830	2	24			9 990	2	24
	8			9 000	5	32			10 440	4	32			13 320	4	31
	10			11 250	7	38			13 050	7	37			16 650	6	37

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m^2]
S_e – damper active cross-section [m^2]

Q – flow [m^3/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	600 S_k [m^2]	600 S_e [m^2]	600 Q [m^3/h]	600 d_p [PA]	600 L_{WA} [dB]	700 S_k [m^2]	700 S_e [m^2]	700 Q [m^3/h]	700 d_p [PA]	700 L_{WA} [dB]	800 S_k [m^2]	800 S_e [m^2]	800 Q [m^3/h]	800 d_p [PA]	800 L_{WA} [dB]
100		4	0,06	0,056	811	5	26	0,07	0,066	955	4	26	0,08	0,076	1099	4	26
		6			1216	10	36			1432	10	36			1648	10	36
		8			1621	18	44			1909	18	44			2197	18	44
		10			2027	28	50			2387	28	50			2747	27	49
200		4	0,12	0,113	1 620	4	26	0,14	0,133	1 908	4	26	0,16	0,153	2 196	4	26
		6			2 430	9	36			2 862	9	36			3 294	8	36
		8			3 240	16	44			3 816	15	44			4 392	14	44
		10			4 050	25	50			4 770	24	50			5 490	22	49
250		4	0,15	0,141	2 025	4	26	0,175	0,166	2 385	4	26	0,2	0,191	2 745	3	25
		6			3 038	8	36			3 578	8	36			4 118	7	36
		8			4 050	15	44			4 770	14	44			5 490	13	43
		10			5 063	23	50			5 963	22	49			6 863	21	49
300		4	0,18	0,169	2 430	3	25	0,21	0,199	2 862	3	25	0,24	0,229	3 294	3	25
		6			3 645	8	36			4 293	7	36			4 941	7	36
		8			4 860	14	44			5 724	13	43			6 588	12	43
		10			6 075	22	49			7 155	20	49			8 235	19	49
350		4	0,21	0,197	2 835	3	25	0,245	0,232	3 339	3	25	0,28	0,267	3 843	3	25
		6			4 253	7	36			5 009	7	35			5 765	6	35
		8			5 670	13	43			6 678	12	43			7 686	11	43
		10			7 088	20	49			8 348	19	49			9 608	18	49
400		4	0,24	0,225	3 240	3	25	0,28	0,265	3 816	3	24	0,32	0,305	4 392	3	24
		6			4 860	7	35			5 724	6	35			6 588	6	35
		8			6 480	12	43			7 632	11	42			8 784	10	42
		10			8 100	18	48			9 540	17	48			10 980	16	48
450		4	0,27	0,253	3 645	3	24	0,315	0,298	4 293	3	24	0,36	0,343	4 941	2	24
		6			5 468	6	34			6 440	6	34			7 412	5	34
		8			7 290	11	42			8 586	10	42			9 882	9	42
		10			9 113	17	48			10 733	16	48			12 353	15	47
500		4	0,3	0,281	4 050	2	23	0,35	0,331	4 770	2	23	0,4	0,381	5 490	2	23
		6			6 075	6	34			7 155	5	34			8 235	5	33
		8			8 100	10	41			9 540	9	41			10 980	9	41
		10			10 125	15	47			11 925	14	47			13 725	13	47
550		4	0,33	0,309	4 455	2	22	0,385	0,364	5 247	2	22	0,44	0,419	6 039	2	22
		6			6 683	5	33			7 871	5	33			9 059	4	33
		8			8 910	9	41			10 494	8	40			12 078	8	40
		10			11 138	14	46			13 118	13	46			15 098	12	46
600		4	0,36	0,338	4 860	2	22	0,42	0,398	5 724	2	21	0,48	0,458	6 588	2	21
		6			7 290	5	32			8 586	4	32			9 882	4	32
		8			9 720	8	40			11 448	8	39			13 176	7	39
		10			12 150	13	45			14 310	12	45			16 470	11	45
650		4	0,39	0,366	5 265	2	21	0,455	0,431	6 201	2	20	0,52	0,496	7 137	2	20
		6			7 898	4	31			9 302	4	31			10 706	4	31
		8			10 530	7	39			12 402	7	39			14 274	6	38
		10			13 163	12	45			15 503	11	44			17 843	10	44
700		4	0,42	0,394	5 670	2	20	0,49	0,464	6 678	2	19	0,56	0,534	7 686	1	19
		6			8 505	4	30			10 017	4	30			11 529	3	30
		8			11 340	7	38			13 356	6	38			15 372	6	37
		10			14 175	11	44			16 695	10	43			19 215	9	43
750		4	0,45	0,422	6 075	2	19	0,525	0,497	7 155	1	18	0,6	0,572	8 235	1	18
		6			9 113	3	29			10 733	3	29			12 353	3	29
		8			12 150	6	37			14 310	6	37			16 470	5	36
		10			15 188	10	43			17 888	9	42			20 588	8	42
800		4	0,48	0,45	6 480	1	18	0,56	0,53	7 632	1	17	0,64	0,61	8 784	1	17
		6			9 720	3	28			11 448	3	28			13 176	3	28
		8			12 960	5	36			15 264	5	35			17 568	5	35
		10			16 200	9	42			19 080	8	41			21 960	7	41
900		4	0,54	0,506	7 290	1	15	0,63	0,596	8 586	1	15	0,72	0,686	9 882	1	15
		6			10 935	2	26			12 879	2	25			14 823	2	25
		8			14 580	4	33			17 172	4	33			19 764	4	33
		10			18 225	7	39			21 465	6	39			24 705	6	39
1000		4	0,6	0,563	8 100	1	13	0,7	0,663	9 540	1	12	0,8	0,763	10 980	1	12
		6			12 150	2	23			14 310	2	23			16 470	2	22
		8			16 200	3	31			19 080	3	30			21 960	3	30
		10			20 250	5	36			23 850	5	36			27 450	5	36

The mcr FID S/S c/P fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

2.7 | Estimated weights of mcr FID S/S c/P dampers for rectangular ventilation ducts [kg]

height H [mm] \ width B [mm]	100	150	200	250	300	400	500	600	700	800	900	1000
100	5,5	6,0	6,5	7,0	8,0	9,0	10,0	13,0	15,0	17,0	19,0	21,0
150	6,0	6,5	7,0	7,5	8,5	9,5	10,5	13,5	15,5	17,5	19,5	21,5
200	6,5	7,0	7,5	8,0	9,0	10,0	11,0	14,0	16,0	18,0	20,0	22,0
250	7,0	7,5	8,0	9,5	10,0	11,0	14,0	15,0	17,0	19,0	21,0	23,0
300	8,0	8,5	9,0	10,5	11,0	12,0	15,0	16,0	18,0	20,0	22,0	24,0
350	9,0	9,5	10,0	11,5	12,0	13,0	16,0	17,0	19,0	21,0	23,0	25,0
400	10,0	10,5	11,0	12,5	13,5	14,0	17,0	18,0	21,0	22,0	24,0	26,0
500	12,0	12,5	13,0	14,5	15,5	16,0	18,0	19,0	22,0	24,0	26,0	28,0
600	14,0	14,5	15,0	16,5	17,5	18,5	20,0	22,0	24,0	26,0	28,0	30,0
700	16,0	16,5	17,0	18,5	19,5	20,0	22,0	24,0	26,0	28,0	30,0	32,0
800	18,0	18,5	19,0	20,5	21,5	22,0	24,0	26,0	28,0	30,0	32,0	34,0

For dampers with no actuator, subtract ~1 kg from the weight given.

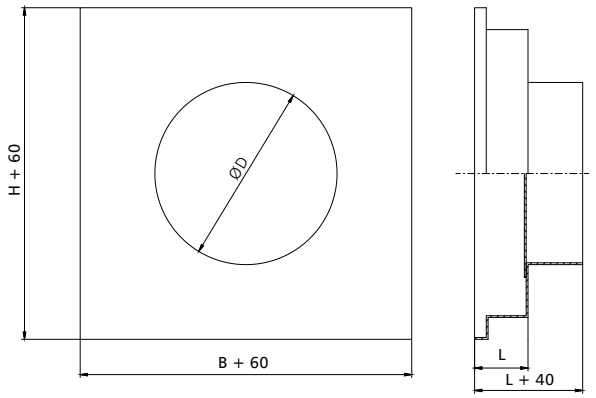
2.8 | Accessories

2.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

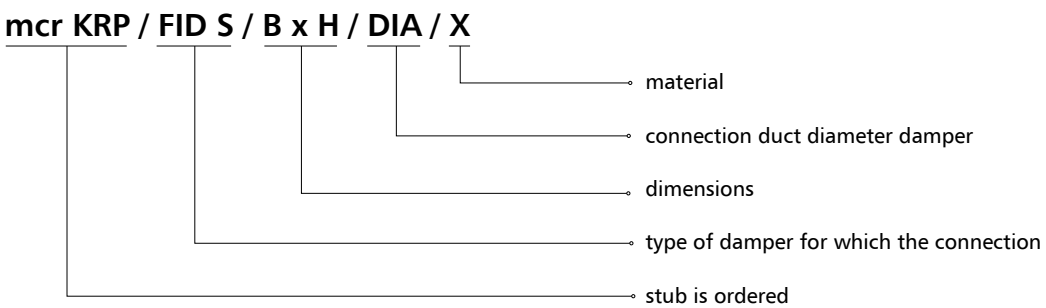
NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.

Dimensions:
- BxH - damper dimensions [mm]
- ØD - diameter of the connection duct [mm]
- L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side



dimensions in [mm]

Marking:

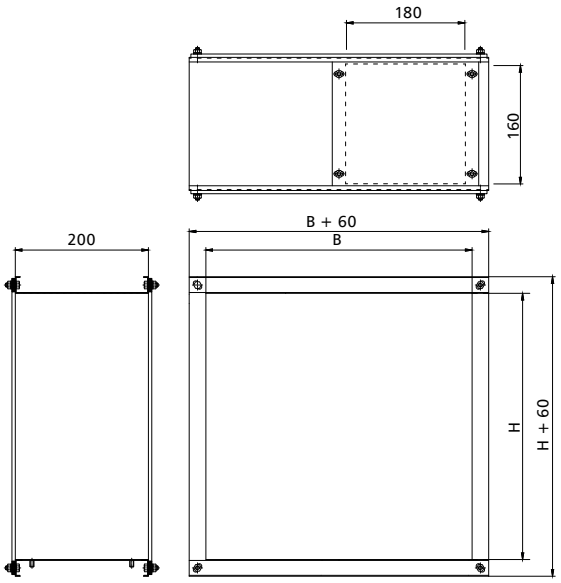


X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

2.8.2 | Casing module with KRW-type inspection access

The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

» KRW P module for rectangular damper



dimensions in [mm]

Marking:

mcr KRW P / FID S / B x H / X

- material
- dimensions
- type of damper for which the module is ordered
- rectangular module

X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

2.9 | Marking

mcr FID S/S c/P B x H 1 / 2 / 3

- additional parameters
- material
- control
- width x height (nominal)
- damper type

1 - control:

» **RST trigger control mechanism**
RST – thermal trigger
RST/WK1 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
RST/WK2 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade)

» **KW1 trigger control mechanism**
KW1/S – thermal trigger
KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
KW1/24I/WK2 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/24P/WK2 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)
KW1/24I/WK2 (+MP230/24) – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
KW1/24P/WK2 (+MP230/24) – thermal trigger + "break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger and control mechanism, axial actuator**
BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
BFL24-T / BFL24-SR-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN 24-T / BFN 24-SR-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
MF24T1 – actuator with a return spring, U = 24 V AC
MF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material:

» **[no symbol]** – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – sspecial damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters :

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T2-95 (MLF) – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Control mechanism position**
[no symbol] – perpendicular to the damper rotation axis
WOK – along the damper rotation axis

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – right damper
KL – left damper
KO – inverted damper

» **Damper casing**
[no symbol] – standard casing length
400 – casing with a length of 400 mm
BU – earth pin

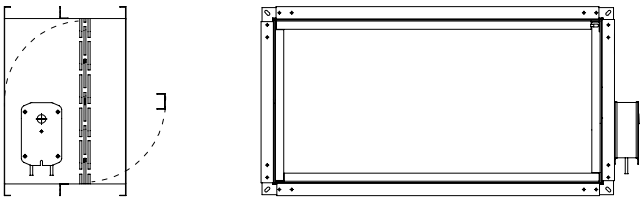
» **Installation bracket**
[no symbol] – no bracket
WM – installation bracket

NOTE: **separate additional parameters entered with the "/" sign**

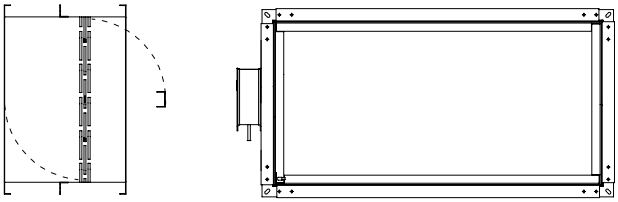
example marking:
mcr FID S/S c/P 400 x 400 BFL24-T
Low-resistance EIS120 cut-off damper with a 24 V actuator with limit switches.

2.9.1 | Design standard

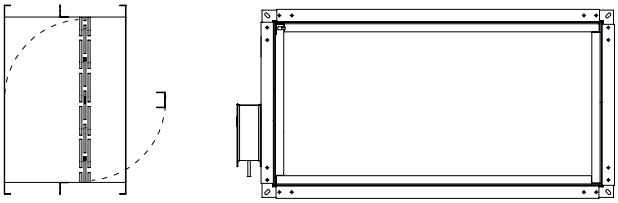
» **right damper - standard**



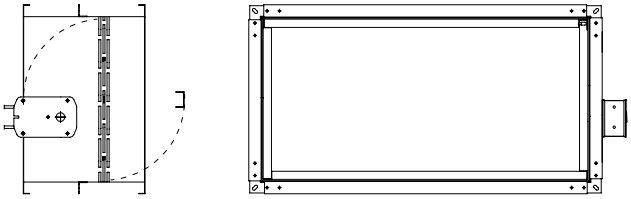
» **inverted damper - (ducts facing downwards)**



» **left damper**



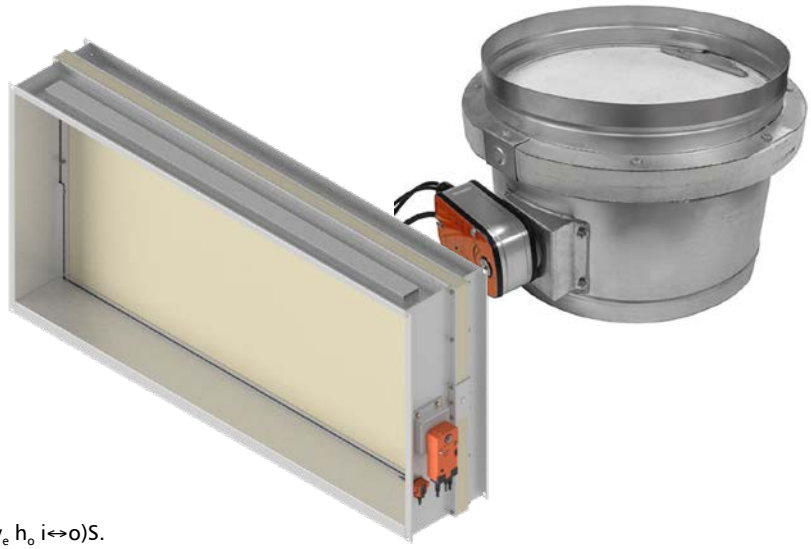
» **along the damper axis**



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

downloadable models
on the website
under the designer zone tab



1396-CPR-0103
1488-CPR-0422/W

HYGIENIC CERTIFICATE

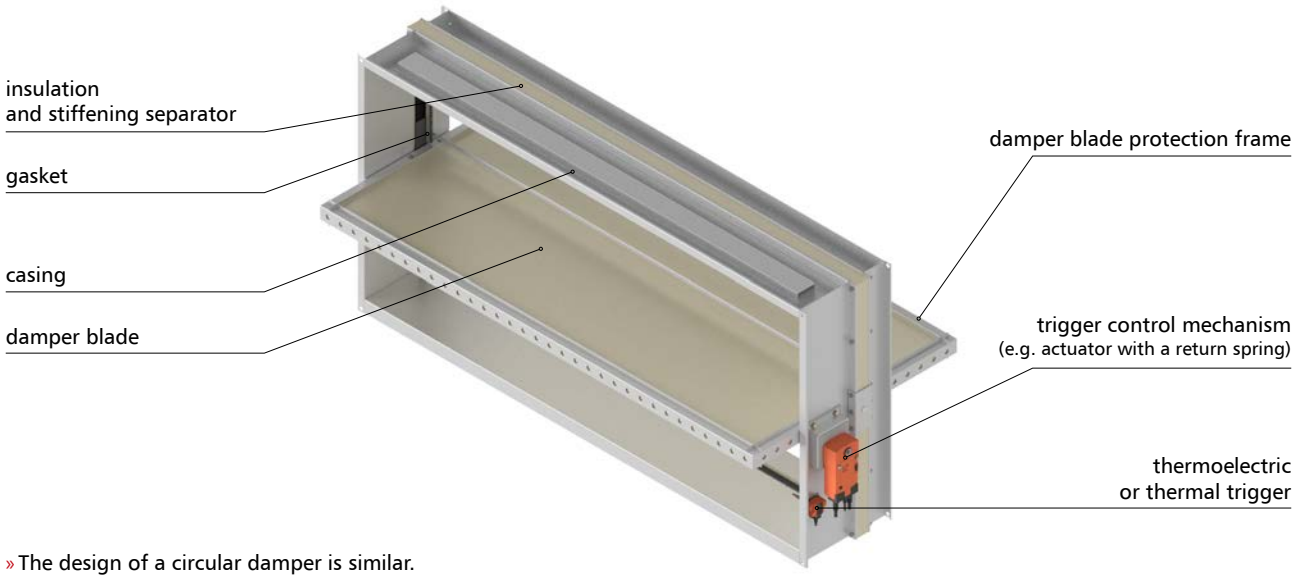
PRODUCT CERTIFICATION

» **EIS120**
» Fire resistance class: EI120 (v_e h_o i↔o)S.
» Certificate of constancy of performance 1488-CPR-0422/W and 1396-CPR-0103.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Cut-off dampers with a fire resistance rating independent of the airflow direction and installation side.
» Dampers for rectangular and circular ventilation ducts
» Certified installation of dampers in close proximity.
» Certified installation of dampers at a distance from construction partitions.
» Certified modular installation.
» Admitted operation of a damper with a horizontal and vertical rotation axis.
» Pressure difference range: 2000 Pa.
» KTB ATEX 2014/34/UE

3.1| Application

mcr FID S/S p/P, mcr FID S/S p/O cut-off dampers are designed for installation in general ventilation systems at installation passages through construction partitions.
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes. Admissible flow velocity in the connected duct is 12 m/s.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

3.2| Design



» The design of a circular damper is similar.

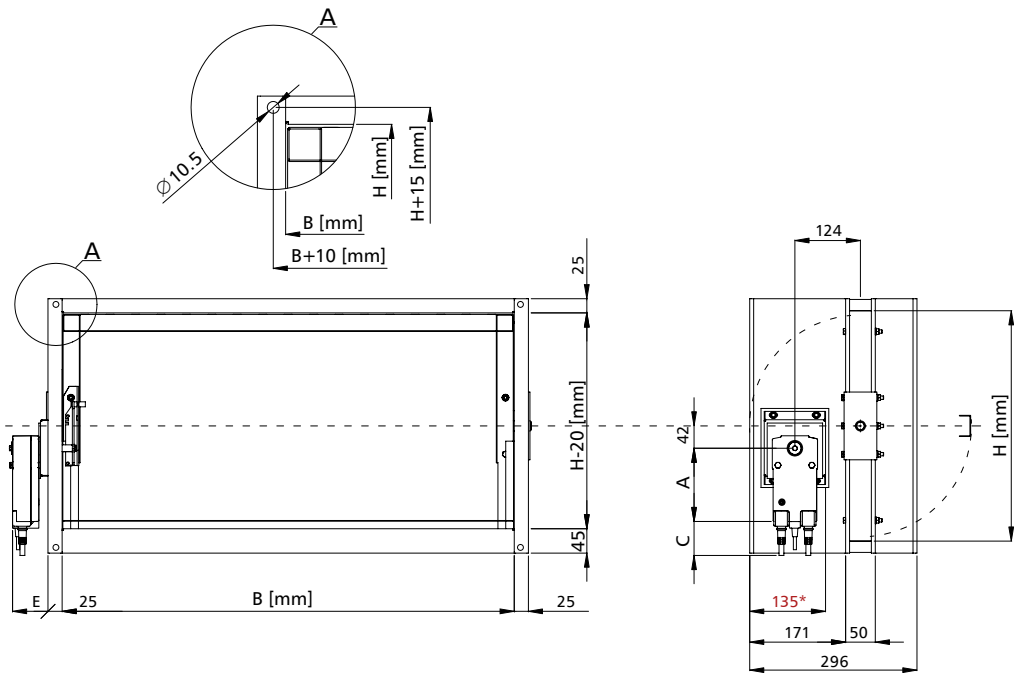
mcr FID S/S cut-off dampers consist of a casing with a rectangular (mcr FID S/S p/P) or circular (mcr FID S/S p/O) cross-section, made of two segments separated with a fire-proof panel with the cross-section of 20 x 40 mm, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically by tripping a thermal or thermoelectric trigger. Standard damper casing is made of galvanized steel sheets. A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 (316L) acid-proof steel sheet, while other elements are impregnated. The casing total length is at least 296 mm. Dampers may be made with an extension element, in such a case the casing length is 400 mm.
The damper blade is made of a fire-proof panel with the total thickness of 40 mm, which is covered with a metal sheet reinforcement profile. The inner side of the fire damper casing is equipped with an intumescent gasket. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. Stop profiles are lined with a polyethylene ventilation gasket. In dampers with a rectangular cross-section, both ends of the casing are finished with flange connections, and in circular dampers they are finished with nipple or flange connections.

3.3 | Versions

3.3.1 | Damper closing and opening with an actuator

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

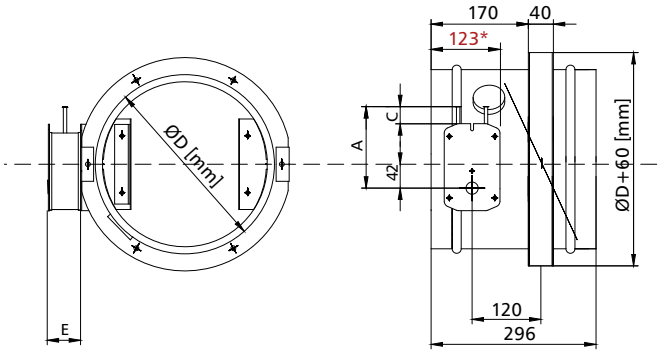
The mcr FID S/S dampers are equipped with a trigger control mechanism in the form of BF, BFL, BFN, BF-TL, EXBF, QT.Ex, MLF, MF series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C).
The actuators are equipped with limit switches used to monitor the blade position. Furthermore, a mechanical position indicator is placed on the actuator.
Thermoelectric triggers are equipped with a test switch.
Dampers with actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



dimensions in [mm]

mechanism	A	C	E
BFN	157	30	62
BFL/MLF	138	30	58
BF24TL-ST	198	10	70
EXBF	225	55	175
QT.Ex	260	30	105
BF/MF	198	10	70

*embedding border



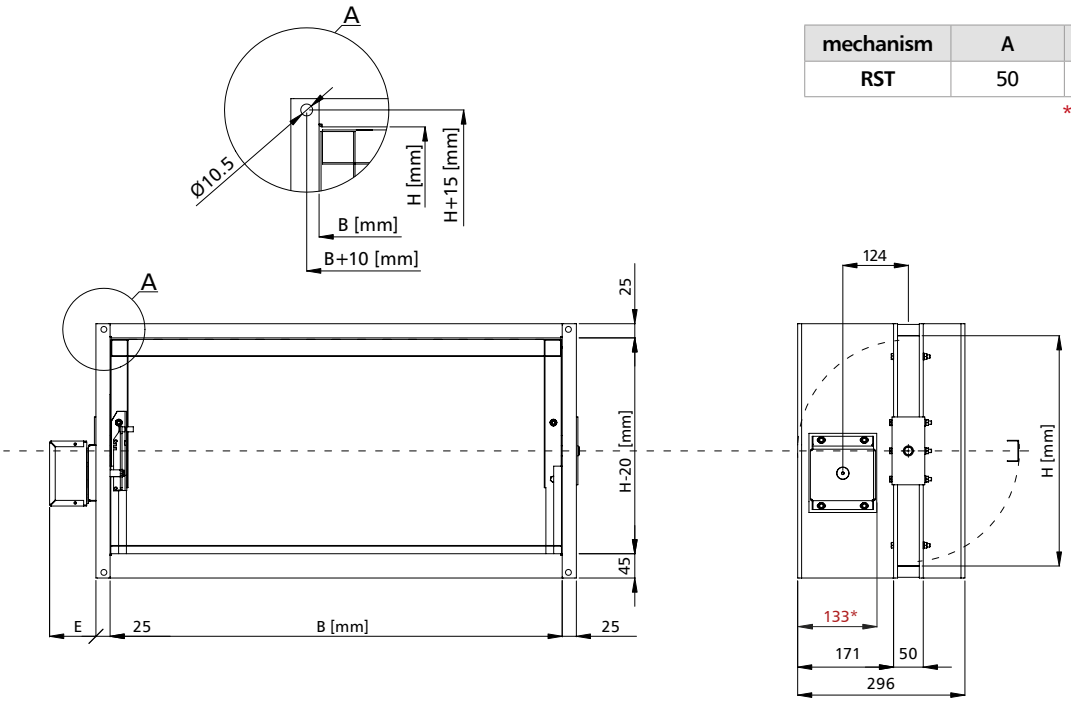
mechanism	A	C	E
BFN	157	30	42
BFL/MLF	138	30	38
BF24TL-ST	198	10	50
EXBF	225	55	160
QT.Ex	260	30	105
BF/MF	198	10	50

dimensions in [mm] *embedding border

3.3.2 | mcr FID S/S – cut-off fire damper for ventilation ducts with a spring drive and thermal trigger.

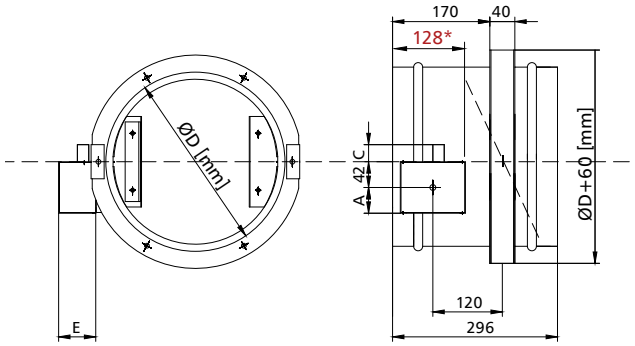
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically.

mcr **FID S/S** dampers are equipped with a RST trigger control mechanism with a drive spring (without an integrated thermal trigger). In this case, a 74°C thermal trigger (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the RST mechanism. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position.



mechanism	A	C	E
RST	50	30	75

*embedding border



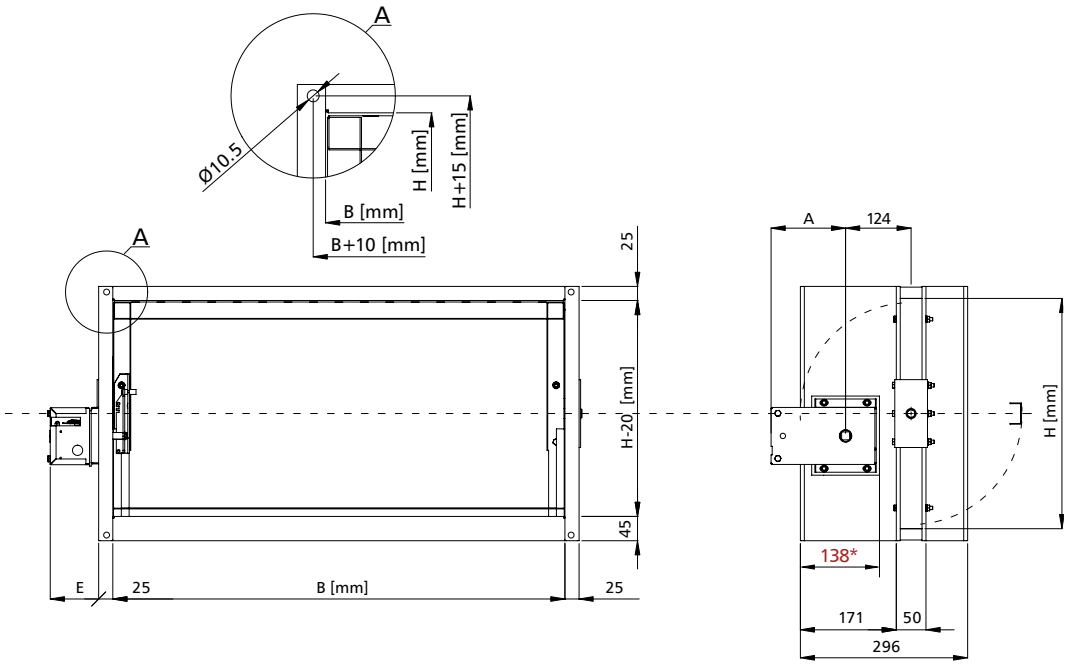
mechanism	A	C	E
RST	40	30	55

*embedding border

3.3.3 | mcr FID S/S – cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

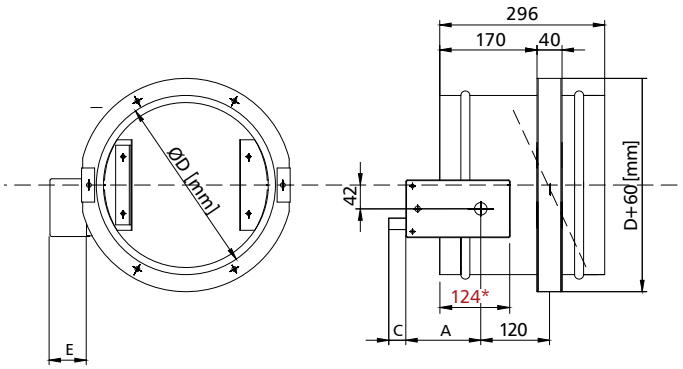
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID S/S dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse") or removal („break") of the power supply voltage and with limit switches used to signal the blade position. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually. It is not required to dismantle the system to replace the thermal trigger. The KW1 mechanism may be replaced with an electric actuator.



mechanism	A	C	E
KW1	130	30	85

*embedding border



dimensions in [mm]

mechanism	A	C	E
KW1	130	30	**65**

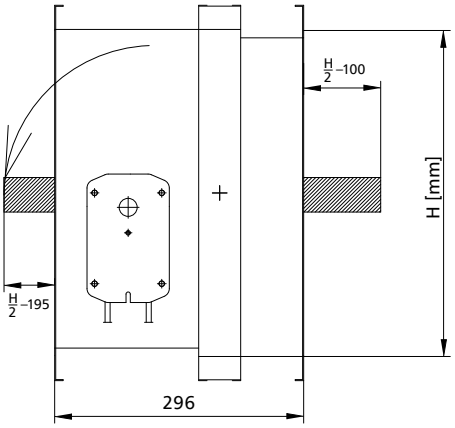
*embedding border

3.4 | Dimensions

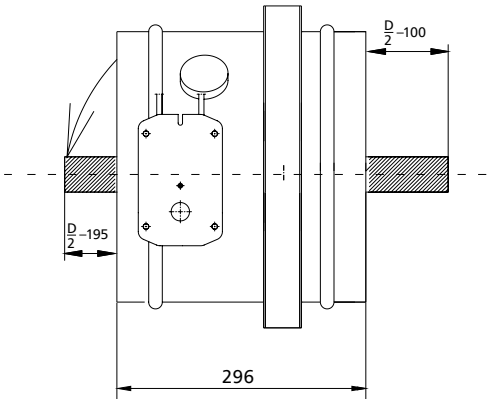
rectangular dampers:
» nominal width B: from 200 mm to 1500 mm
» nominal height H from 200 mm to 1500 mm
» maximum single damper cross-section surface up to 1.8 m²
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

circular dampers:
» nominal diameter D from 250 mm to 630 mm
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

» **mcr FID S/S p/P fire damper**



» **mcr FID S/S p/O fire damper**



dimensions in [mm]

3.5 | Installation

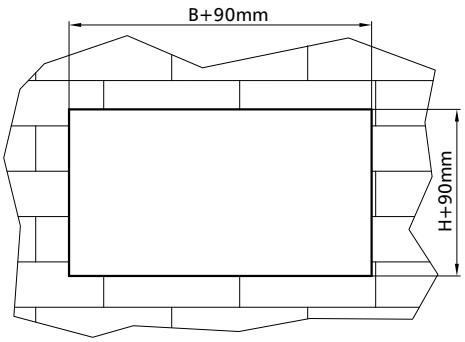
mcr FID S/S p/P rectangular dampers have been rated as EI120(v_e h_o i↔o)S class. These dampers may be installed in the following partitions:
» light walls/shafts made of gypsum boards with a min. thickness of 125 mm;
» rigid walls/shafts made of blocks or hollow bricks with a min. thickness of 120 mm;
» solid walls/shafts with a min. thickness of 120 mm;
» solid floor slabs with a min. thickness of 150 mm.
Dampers may be installed at a distance to the vertical construction partitions, using fire-proof boards providing a fire resistance rating no lesser that the fire resistance rating of the partition.
Dampers may be installed in vertical construction partitions with small distance between the dampers, equal to 60 mm.

mcr FID S/S p/O circular dampers have been rated as EI120(v_e h_o i↔o)S class. These dampers may be installed in the following partitions:
» light walls/shafts made of gypsum boards with a min. thickness of 125 mm;
» rigid walls/shafts made of blocks or hollow bricks with a min. thickness of 110 mm;
» solid walls/shafts with a min. thickness of 110 mm;
» solid floor slabs with a min. thickness of 150 mm.

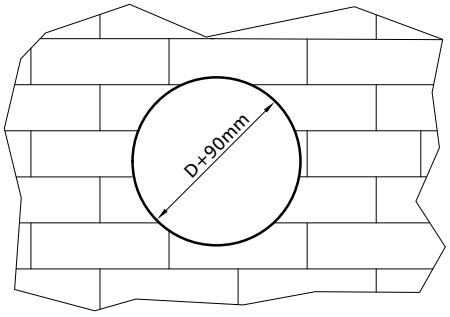
* The above mentioned installation must be clearly specified in the design documentation and communicated to the manufacturer when placing the order. The dimensions of the damper BxH (width x height), which is to be installed with a vertical rotation axis, should be provided as if for a damper with a horizontal rotation axis (the power and control mechanism is mounted on the H dimension) with an indication of vertical axis installation.

3.5.1 | Preparation of installation openings

» **mcr FID S/S p/P fire damper – preferred opening**

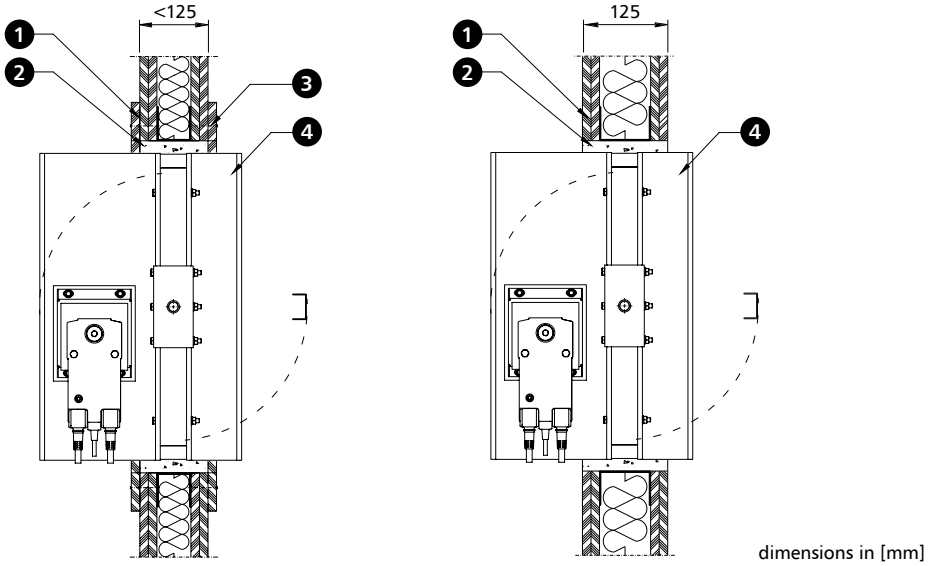


» **mcr FID S/S p/O fire damper – preferred opening**



3.5.2 | Sample installation in gypsum board light walls

» mcr FID S/S p/P fire damper



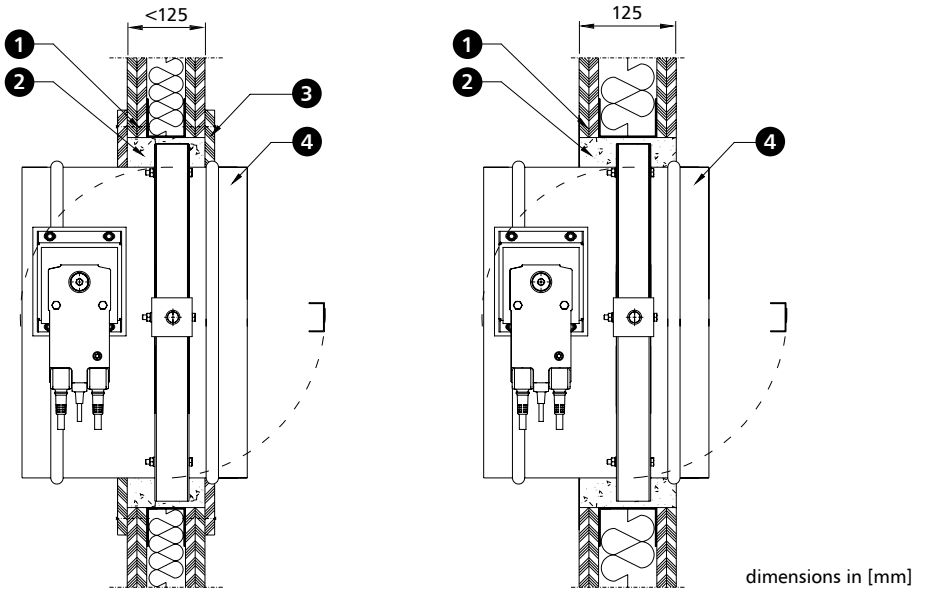
dimensions in [mm]

1. light wall
2. assembly mortar*
3. circumferential gypsum board trim
4. mcr FID S/S p/P fire damper

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

» mcr FID S/S p/O fire damper



dimensions in [mm]

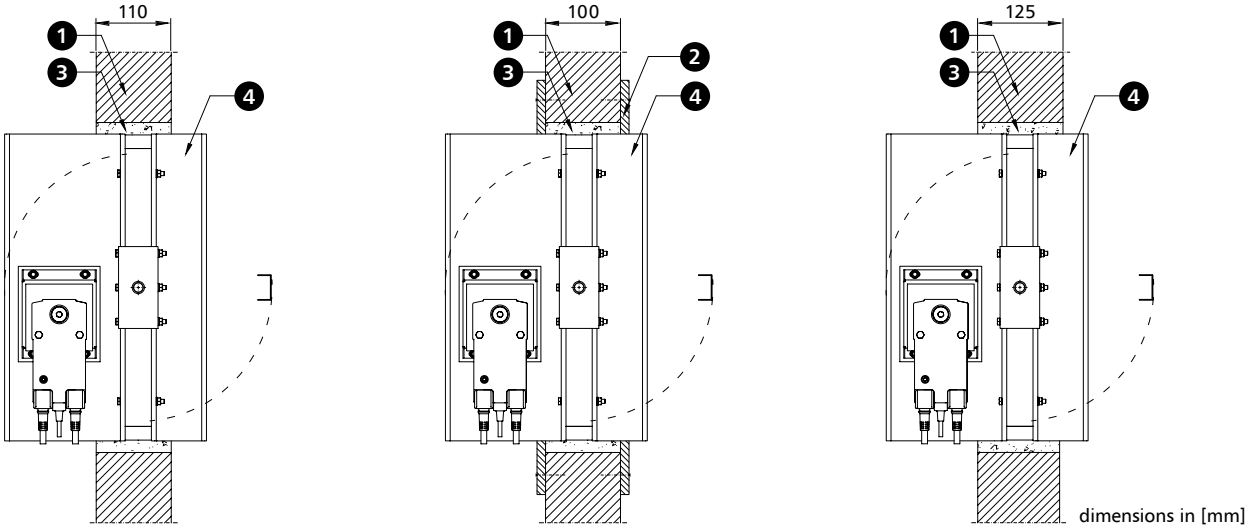
1. light wall
2. assembly mortar*
3. circumferential gypsum board trim
4. mcr FID S/S p/P fire damper

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

3.5.3 | Sample installation in concrete and brick walls

» mcr FID S/S p/P fire damper



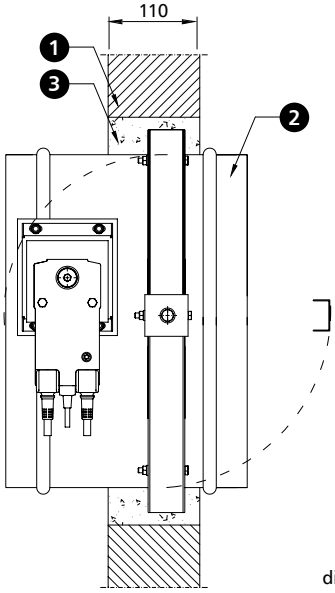
dimensions in [mm]

1. rigid wall - concrete, aerated concrete or bricks
2. circumferential gypsum board trim
3. assembly mortar*
4. mcr FID S/S p/P fire damper

*The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 120 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

» mcr FID S/S p/O fire damper



dimensions in [mm]

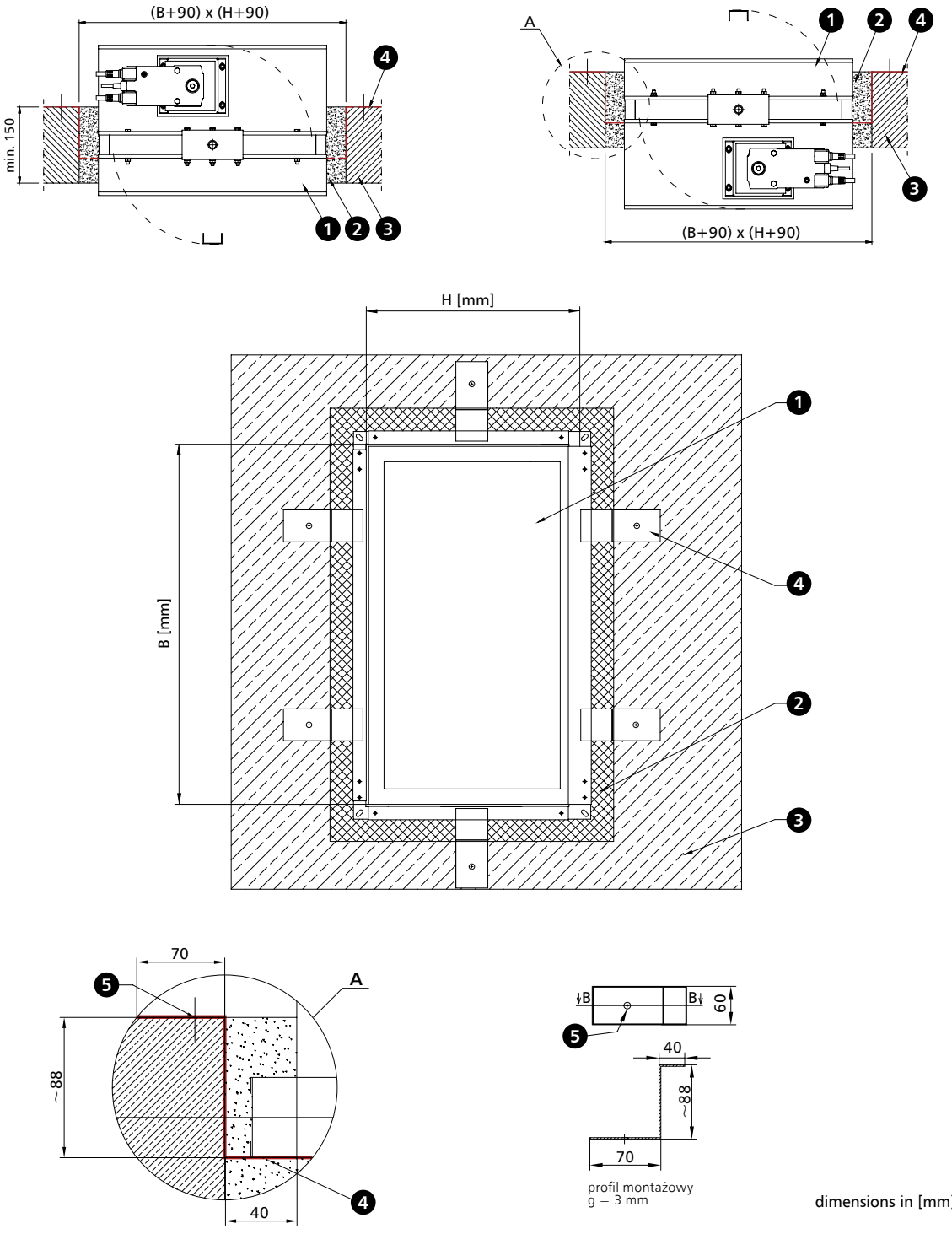
1. rigid wall - concrete, aerated concrete or bricks
2. mcr FID S/S p/O fire damper
3. assembly mortar*

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 120 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

3.5.4 | Sample installation in floor slabs

» **mcr FID S/S p/P fire damper**



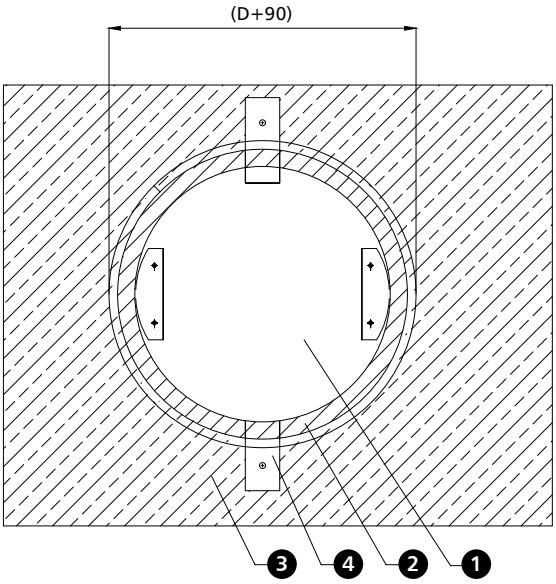
dimensions in [mm]

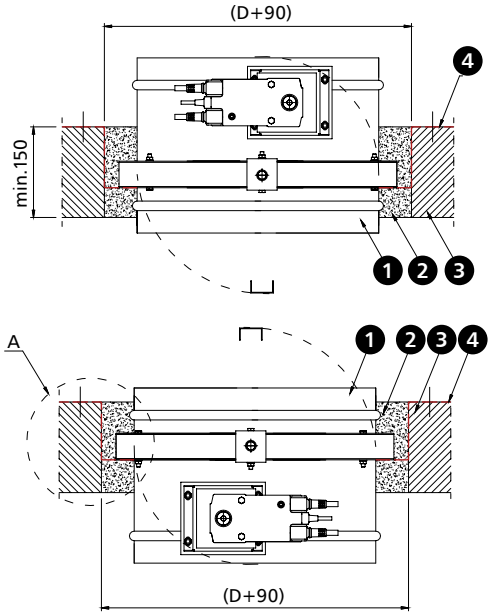
1. mcr FID S/S p/P fire damper
2. assembly mortar*
3. floor slab
4. installation profile g = 3 mm
5. steel expansion plug

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the applied

NOTE: If the damper is installed in a floor slab with a thickness of less than 150 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

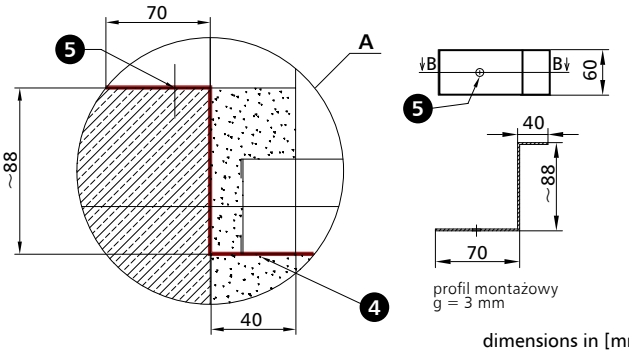
» **mcr FID S/S p/O fire damper**





1. mcr FID S/S p/O fire damper
2. assembly mortar*
3. floor slab
4. installation profile g = 3 mm
5. steel expansion plug

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

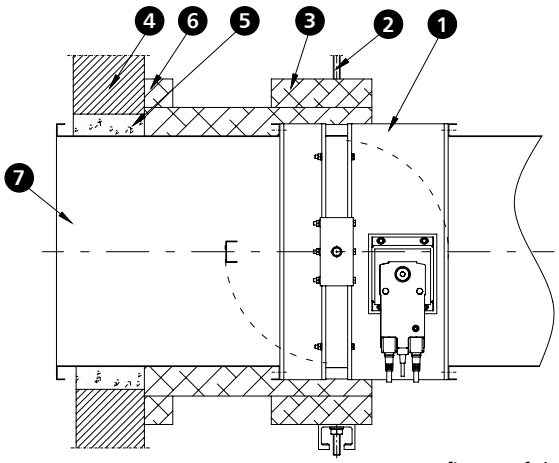


dimensions in [mm]

NOTE: If the damper is installed in a floor slab with a thickness of less than 150 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

3.5.5 | Sample installation at a distance to the construction partition

» **mcr FID S/S p/P fire damper**

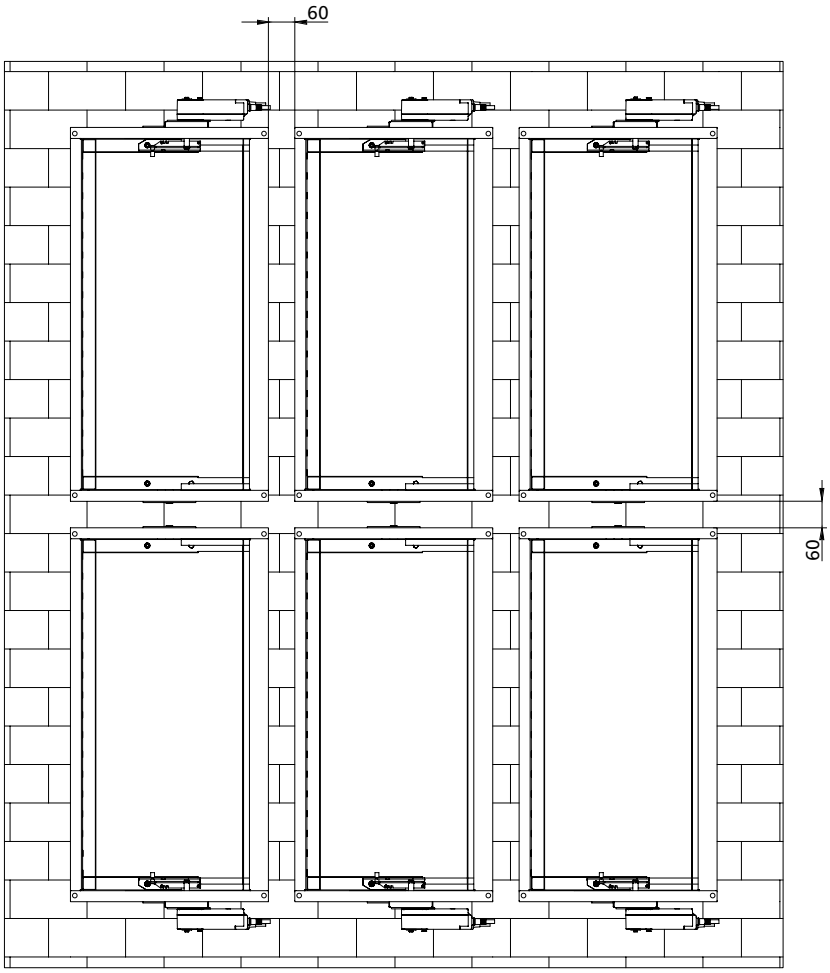


dimensions in [mm]

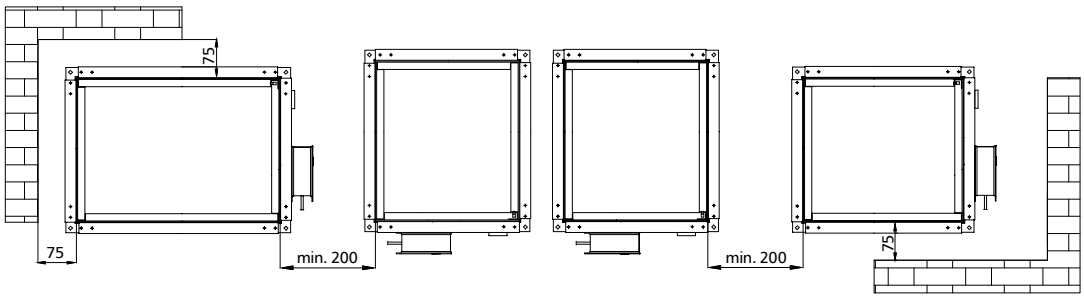
1. mcr FID S/S p/P fire damper
2. installation hangers system
3. duct and damper casing – e.g. made of fire-proof boards
4. wall
5. fireproof duct installation penetration system
6. a strip of fire-proof board along the entire length of the BxH side
7. steel ventilation duct

3.5.6 | Sample modular installation – close installation

» **mcr FID S/S p/P fire damper**



Minimum distance between systems and partitions



dimensions in [mm]

Distances between the dampers in PP_G and PP_D configuration may be ≥60 mm; if the installation documentation does not provide otherwise, the minimum spacing between the casings of two fire dampers is ≥200 mm and ≥75 mm between the wall or floor slab, as per the EN-1366-2 standard.

Damper installation with a vertical axis of rotation
Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis.

3.6.1 | mcr FID S/S p/P rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	8	29	0.050	0.039	564	7	28	0.06	0.049	708	7	29
		6			631	19	40			847	17	40			1 063	16	40
		8			841	34	48			1 129	31	48			1 417	29	48
		10			1 051	54	54			1 411	49	54			1 771	45	54
	250	4	0.050	0.037	526	8	30	0.063	0.049	706	7	29	0.075	0.062	886	7	30
		6			788	19	41			1 058	17	41			1 328	16	41
		8			1 051	34	49			1 411	31	49			1 771	29	49
		10			1 314	54	55			1 764	49	55			2 214	45	54
	300	4	0.060	0.044	631	8	31	0.075	0.059	847	7	30	0.09	0.074	1 063	7	31
		6			946	19	42			1 270	17	42			1 594	16	42
		8			1 261	34	49			1 693	31	49			2 125	28	49
		10			1 577	54	55			2 117	48	55			2 657	45	55
	350	4	0.070	0.051	736	8	31	0.088	0.069	988	7	31	0.105	0.086	1 240	7	32
		6			1 104	19	42			1 482	17	42			1 860	16	42
		8			1 472	34	50			1 976	31	50			2 480	28	50
		10			1 840	53	56			2 470	48	56			3 100	44	56
	400	4	0.080	0.058	841	8	32	0.100	0.078	1 129	7	31	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	17	43			2 125	15	42
		8			1 682	34	51			2 258	30	50			2 834	28	50
		10			2 102	53	56			2 822	48	56			3 542	44	56
	450	4	0.090	0.066	946	8	32	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	33
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	33	51			2 540	30	51			3 188	28	51
		10			2 365	53	57			3 175	47	57			3 985	43	56
	500	4	0.100	0.073	1 051	8	33	0.125	0.098	1 411	7	32	0.15	0.123	1 771	6	31
		6			1 577	18	43			2 117	16	43			2 657	15	43
		8			2 102	33	51			2 822	30	51			3 542	27	51
		10			2 628	52	57			3 528	47	57			4 428	43	57
	550	4	0.110	0.080	1 156	8	33	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	32
		6			1 734	18	44			2 328	16	43			2 922	15	44
		8			2 313	33	52			3 105	29	51			3 897	27	51
		10			2 891	51	57			3 881	46	57			4 871	42	57
	600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.18	0.148	2 125	6	32
		6			1 892	18	44			2 540	16	44			3 188	15	44
		8			2 523	32	52			3 387	29	52			4 251	26	51
		10			3 154	51	58			4 234	45	57			5 314	41	57
	650	4	0.130	0.095	1 367	8	34	0.163	0.127	1 835	7	33	0.195	0.160	2 303	6	32
		6			2 050	18	44			2 752	16	44			3 454	14	43
		8			2 733	32	52			3 669	28	51			4 605	26	51
		10			3 416	50	58			4 586	44	57			5 756	40	57
	700	4	0.140	0.102	1 472	7	32	0.175	0.137	1 976	7	34	0.21	0.172	2 480	6	33
		6			2 208	17	44			2 964	15	44			3 720	14	44
		8			2 943	31	52			3 951	28	52			4 959	25	51
		10			3 679	49	58			4 939	44	58			6 199	40	57

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		200					250					300				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
750	4	0.150	0.110	1 577	7	33	0.188	0.147	2 117	6	32	0.225	0.185	2 657	6	33
	6			2 365	17	44			3 175	15	44			3 985	14	44
	8			3 154	31	52			4 234	27	52			5 314	25	52
	10			3 942	48	58			5 292	43	58			6 642	39	57
800	4	0.160	0.117	1 682	7	33	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
	6			2 523	17	45			3 387	15	44			4 251	13	43
	8			3 364	30	52			4 516	27	52			5 668	24	51
	10			4 205	47	58			5 645	42	58			7 085	38	57
850	4	0.170	0.124	1 787	7	33	0.213	0.167	2 399	6	33	0.255	0.209	3 011	5	31
	6			2 681	16	44			3 599	14	44			4 517	13	44
	8			3 574	29	52			4 798	26	52			6 022	23	51
	10			4 468	46	58			5 998	41	58			7 528	37	57
900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	33	0.27	0.221	3 188	5	31
	6			2 838	16	44			3 810	14	44			4 782	13	44
	8			3 784	29	52			5 080	25	51			6 376	23	51
	10			4 730	45	58			6 350	40	58			7 970	36	57
1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	33	0.3	0.246	3 542	5	32
	6			3 154	15	44			4 234	13	43			5 314	12	43
	8			4 205	28	52			5 645	24	51			7 085	22	51
	10			5 256	43	58			7 056	38	57			8 856	34	57
1100	4	0.220	0.161	2 313	6	32	0.275	0.216	3 105	5	31	0.33	0.271	3 897	5	32
	6			3 469	15	44			4 657	13	44			5 845	11	43
	8			4 625	26	52			6 209	23	51			7 793	20	50
	10			5 782	41	57			7 762	36	57			9 742	32	56
1200	4	0.240	0.175	2 523	6	33	0.300	0.235	3 387	5	32	0.36	0.295	4 251	4	30
	6			3 784	14	44			5 080	12	43			6 376	11	43
	8			5 046	25	51			6 774	22	51			8 502	19	50
	10			6 307	39	57			8 467	34	57			10 627	30	56
1300	4	0.260	0.190	2 733	5	31	0.325	0.255	3 669	5	32	0.39	0.320	4 605	4	30
	6			4 100	13	43			5 504	11	42			6 908	10	42
	8			5 466	23	51			7 338	20	50			9 210	18	50
	10			6 833	37	57			9 173	32	56			11 513	28	55
1400	4	0.280	0.204	2 943	5	31	0.350	0.274	3 951	4	29	0.42	0.344	4 959	4	30
	6			4 415	12	42			5 927	10	41			7 439	9	41
	8			5 887	22	50			7 903	19	50			9 919	17	49
	10			7 358	35	56			9 878	30	56			12 398	27	55
1500	4	0.300	0.219	3 154	5	31	0.375	0.294	4 234	4	30	0.45	0.369	5 314	4	31
	6			4 730	12	43			6 350	10	42			7 970	9	41
	8			6 307	21	50			8 467	18	49			10 627	16	49
	10			7 884	33	56			10 584	28	55			13 284	25	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		350					400					450				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.070	0.059	852	6	28	0.080	0.069	996	6	29	0.090	0.079	1 140	6	29
	6			1 279	15	40			1 495	14	40			1 711	13	39
	8			1 705	27	48			1 993	25	47			2 281	24	47
	10			2 131	42	53			2 491	40	53			2 851	38	53
250	4	0.088	0.074	1 066	6	29	0.100	0.087	1 246	6	30	0.113	0.099	1 426	6	30
	6			1 598	15	41			1 868	14	41			2 138	13	40
	8			2 131	27	49			2 491	25	48			2 851	24	48
	10			2 664	42	54			3 114	40	54			3 564	38	54
300	4	0.105	0.089	1 279	6	30	0.120	0.104	1 495	6	31	0.135	0.119	1 711	6	31
	6			1 918	15	42			2 242	14	42			2 566	13	41
	8			2 557	27	49			2 989	25	49			3 421	24	49
	10			3 197	42	55			3 737	39	55			4 277	37	55
350	4	0.123	0.104	1 492	6	30	0.140	0.121	1 744	6	31	0.158	0.139	1 996	5	29
	6			2 238	15	42			2 616	14	42			2 994	13	42
	8			2 984	26	50			3 488	25	50			3 992	23	49
	10			3 730	41	56			4 360	39	56			4 990	37	55
400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	32	0.180	0.158	2 281	5	30
	6			2 557	14	42			2 989	13	42			3 421	13	42
	8			3 410	26	50			3 986	24	50			4 562	23	50
	10			4 262	41	56			4 982	38	56			5 702	36	56
450	4	0.158	0.133	1 918	6	32	0.180	0.156	2 242	6	32	0.203	0.178	2 566	5	30
	6			2 877	14	43			3 363	13	42			3 849	13	43
	8			3 836	26	51			4 484	24	50			5 132	23	50
	10			4 795	40	56			5 605	38	56			6 415	36	56
500	4	0.175	0.148	2 131	6	32	0.200	0.173	2 491	6	33	0.225	0.198	2 851	5	31
	6			3 197	14	43			3 737	13	43			4 277	12	42
	8			4 262	25	51			4 982	24	51			5 702	22	50
	10			5 328	40	57			6 228	37	56			7 128	35	56
550	4	0.193	0.163	2 557	6	32	0.220	0.190	2 740	5	31	0.248	0.218	3 136	5	31
	6			3 836	14	44			4 110	13	43			4 704	12	43
	8			5 115	25	51			5 481	23	51			6 273	22	51
	10			6 394	39	57			6 851	36	56			7 841	34	56
600	4	0.210	0.178	2 557	6	33	0.240	0.208	2 989	5	31	0.270	0.238	3 421	5	32
	6			3 836	13	43			4 484	13	44			5 132	12	43
	8			5 115	24	51			5 979	23	51			6 843	21	50
	10			6 394	38	57			7 474	36	57			8 554	34	57
650	4	0.228	0.192	2 771	6	33	0.260	0.225	3 239	5	31	0.293	0.257	3 707	5	32
	6			4 156	13	43			4 858	12	43			5 560	11	42
	8			5 541	24	51			6 477	22	51			7 413	21	51
	10			6 926	37	57			8 096	35	57			9 266	33	57
700	4	0.245	0.207	2 984	5	31	0.28	0.242	3 488	5	32	0.315	0.277	3 992	5	32
	6			4 476	13	44			5 232	12	43			5 988	11	43
	8			5 967	23	51			6 975	22	51			7 983	20	50
	10			7 459	37	57			8 719	34	57			9 979	32	57

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		350					400					450				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
750	4	0.263	0.222	3 197	5	31	0.3	0.260	3 737	5	32	0.338	0.297	4 277	5	33
	6			4 795	13	44			5 605	12	44			6 415	11	43
	8			6 394	23	51			7 474	21	51			8 554	20	51
	10			7 992	36	57			9 342	33	57			10 692	31	56
800	4	0.280	0.237	3 410	5	32	0.32	0.277	3 986	5	32	0.360	0.317	4 562	4	29
	6			5 115	12	43			5 979	11	43			6 843	11	42
	8			6 820	22	51			7 972	21	51			9 124	19	49
	10			8 525	35	57			9 965	32	57			11 405	30	55
850	4	0.298	0.252	3 623	5	32	0.34	0.294	4 235	5	33	0.383	0.337	4 847	4	29
	6			5 435	12	43			6 353	11	43			7 271	10	41
	8			7 246	22	51			8 470	20	51			9 694	19	49
	10			9 058	34	57			10 588	31	56			12 118	29	55
900	4	0.315	0.266	3 836	5	32	0.360	0.311	4 484	4	30	0.405	0.356	5 132	4	29
	6			5 754	12	44			6 726	11	43			7 698	10	41
	8			7 672	21	51			8 968	19	50			10 264	18	49
	10			9 590	33	57			11 210	31	57			12 830	29	55
1000	4	0.350	0.296	4 262	5	33	0.400	0.346	4 982	4	30	0.450	0.396	5 702	4	29
	6			6 394	11	43			7 474	10	42			8 554	9	40
	8			8 525	20	51			9 965	18	50			11 405	17	48
	10			10 656	31	56			12 456	29	56			14 256	27	54
1100	4	0.385	0.326	4 689	4	30	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29
	6			7 033	10	42			8 221	9	41			9 409	9	40
	8			9 377	19	50			10 961	17	50			12 545	16	47
	10			11 722	29	56			13 702	27	56			15 682	25	53
1200	4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	3	25
	6			7 672	10	43			8 968	9	42			10 264	8	38
	8			10 230	17	49			11 958	16	49			13 686	15	46
	10			12 787	27	55			14 947	25	55			17 107	23	52
1300	4	0.455	0.385	5 541	4	31	0.520	0.450	6 477	3	28	0.585	0.515	7 413	3	25
	6			8 312	9	41			9 716	8	41			11 120	8	38
	8			11 082	16	49			12 954	15	49			14 826	14	45
	10			13 853	26	55			16 193	24	55			18 533	22	51
1400	4	0.490	0.414	5 967	3	27	0.560	0.484	6 975	3	28	0.630	0.554	7 983	3	25
	6			8 951	8	40			10 463	8	41			11 975	7	36
	8			11 935	15	48			13 951	14	48			15 967	13	45
	10			14 918	24	55			17 438	22	54			19 958	20	50
1500	4	0.525	0.444	6 394	3	28	0.600	0.519	7 474	3	28	0.675	0.594	8 554	3	25
	6			9 590	8	41			11 210	7	40			12 830	6	34
	8			12 787	14	48			14 947	13	48			17 107	12	43
	10			15 984	22	54			18 684	20	53			21 384	19	49

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		500					550					600				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.1	0.089	1 284	5	27	0.110	0.099	1 428	5	28	0.120	0.109	1 572	5	28
	6			1 927	13	40			2 143	12	39			2 359	12	40
	8			2 569	23	47			2 857	22	47			3 145	21	47
	10			3 211	36	53			3 571	35	53			3 931	34	53
250	4	0.125	0.112	1 606	5	28	0.138	0.124	1 786	5	29	0.150	0.137	1 966	5	29
	6			2 408	13	41			2 678	12	40			2 948	12	41
	8			3 211	23	48			3 571	22	48			3 931	21	48
	10			4 014	36	54			4 464	35	54			4 914	33	54
300	4	0.15	0.134	1 927	5	29	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
	6			2 890	12	41			3 214	12	41			3 538	11	40
	8			3 853	23	49			4 285	22	49			4 717	21	49
	10			4 817	36	55			5 357	34	55			5 897	33	55
350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	30	0.210	0.191	2 752	5	31
	6			3 372	12	41			3 750	12	42			4 128	11	41
	8			4 496	22	49			5 000	21	49			5 504	20	49
	10			5 620	35	55			6 250	34	55			6 880	32	55
400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	31	0.240	0.218	3 145	5	31
	6			3 853	12	42			4 285	12	42			4 717	11	42
	8			5 138	22	50			5 714	21	50			6 290	20	49
	10			6 422	35	56			7 142	33	56			7 862	32	56
450	4	0.225	0.201	2 890	5	31	0.248	0.223	3 214	5	31	0.270	0.246	3 538	5	32
	6			4 335	12	42			4 821	11	42			5 307	11	42
	8			5 780	22	50			6 428	21	50			7 076	20	50
	10			7 225	34	56			8 035	32	56			8 845	31	56
500	4	0.250	0.223	3 211	5	31	0.275	0.248	3 571	5	32	0.300	0.273	3 931	4	29
	6			4 817	12	43			5 357	11	42			5 897	11	43
	8			6 422	21	50			7 142	20	50			7 862	19	50
	10			8 028	33	56			8 928	32	56			9 828	30	56
550	4	0.275	0.245	3 853	5	32	0.303	0.273	4 285	5	32	0.330	0.300	4 717	4	30
	6			5 780	11	42			6 428	11	43			7 076	10	42
	8			7 707	21	51			8 571	20	50			9 435	19	50
	10			9 634	33	56			10 714	31	56			11 794	30	56
600	4	0.3	0.268	3 853	5	32	0.330	0.298	4 285	4	30	0.360	0.328	4 717	4	30
	6			5 780	11	43			6 428	11	43			7 076	10	42
	8			7 707	20	50			8 571	19	50			9 435	18	50
	10			9 634	32	56			10 714	30	56			11 794	29	56
650	4	0.325	0.290	4 175	5	33	0.358	0.322	4 643	4	30	0.390	0.355	5 111	4	31
	6			6 262	11	43			6 964	10	42			7 666	10	43
	8			8 349	20	51			9 285	19	50			10 221	18	50
	10			10 436	31	56			11 606	30	56			12 776	28	56
700	4	0.350	0.312	4 496	4	30	0.385	0.347	5 000	4	30	0.420	0.382	5 504	4	31
	6			6 744	11	43			7 500	10	42			8 256	10	43
	8			8 991	19	50			9 999	18	50			11 007	17	50
	10			11 239	30	56			12 499	29	56			13 759	27	56

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			500					550					600				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	750	4	0.375	0.335	4 817	4	30	0.413	0.372	5 357	4	31	0.450	0.410	5 897	4	31
		6			7 225	10	42			8 035	10	43			8 845	9	42
		8			9 634	19	51			10 714	18	50			11 794	17	50
		10			12 042	29	56			13 392	28	56			14 742	27	56
	800	4	0.4	0.357	5 138	4	30	0.440	0.397	5 714	4	31	0.480	0.437	6 290	4	31
		6			7 707	10	42			8 571	9	42			9 435	9	42
		8			10 276	18	50			11 428	17	50			12 580	16	50
		10			12 845	29	56			14 285	27	56			15 725	26	56
	850	4	0.425	0.379	5 459	4	30	0.468	0.422	6 071	4	31	0.510	0.464	6 683	4	32
		6			8 189	10	42			9 107	9	42			10 025	9	42
		8			10 918	18	50			12 142	17	50			13 366	16	50
		10			13 648	28	56			15 178	26	56			16 708	25	56
	900	4	0.45	0.401	5 780	4	30	0.495	0.446	6 428	4	32	0.540	0.491	7 076	3	28
		6			8 670	9	41			9 642	9	42			10 614	8	39
		8			11 560	17	49			12 856	16	50			14 152	15	47
		10			14 450	27	55			16 070	25	55			17 690	24	52
	1000	4	0.5	0.446	6 422	4	30	0.550	0.496	6 428	3	28	0.600	0.546	7 862	3	29
		6			9 634	9	41			9 642	8	41			11 794	8	41
		8			12 845	16	48			12 856	15	49			15 725	14	49
		10			16 056	25	54			16 070	24	55			19 656	23	55
	1100	4	0.55	0.491	7 065	3	27	0.605	0.546	7 857	3	29	0.660	0.601	8 649	3	29
		6			10 597	8	39			11 785	8	41			12 973	7	40
		8			14 129	15	48			15 713	14	49			17 297	13	48
		10			17 662	24	54			19 642	22	55			21 622	21	54
	1200	4	0.6	0.535	7 707	3	27	0.660	0.595	8 571	3	29	0.720	0.655	9 435	3	29
		6			11 560	8	39			12 856	7	40			14 152	7	41
		8			15 414	14	47			17 142	13	48			18 870	12	48
		10			19 267	22	53			21 427	21	54			23 587	20	54
	1300	4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	29	0.780	0.710	10 221	2	25
		6			12 524	7	38			13 928	7	40			15 332	6	39
		8			16 698	13	46			18 570	12	47			20 442	11	47
		10			20 873	20	51			23 213	19	53			25 553	18	53
	1400	4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	2	24	0.840	0.764	11 007	2	25
		6			13 487	6	36			14 999	6	39			16 511	6	39
		8			17 983	12	45			19 999	11	47			22 015	10	46
		10			22 478	19	51			24 998	18	53			27 518	17	53
	1500	4	0.75	0.669	9 634	2	21	0.825	0.744	10 714	2	25	0.900	0.819	11 794	2	25
		6			14 450	6	36			16 070	6	39			17 690	5	37
		8			19 267	11	43			21 427	10	46			23 587	10	46
		10			24 084	17	49			26 784	16	52			29 484	15	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		650					700					750				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	200	4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	4	26
		6			2 575	11	39			2 791	11	39			3 007	11	40
		8			3 433	21	47			3 721	20	47			4 009	19	47
		10			4 291	32	53			4 651	31	53			5 011	31	53
	250	4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	4	27
		6			3 218	11	40			3 488	11	40			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	19	48
		10			5 364	32	54			5 814	31	54			6 264	30	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	28	0.225	0.209	3 007	4	28
		6			3 862	11	41			4 186	11	41			4 510	10	40
		8			5 149	20	49			5 581	19	48			6 013	19	49
		10			6 437	32	55			6 977	31	55			7 517	30	55
	350	4	0.228	0.209	3 004	5	31	0.245	0.226	3 256	4	29	0.263	0.244	3 508	4	29
		6			4 506	11	41			4 884	11	42			5 262	10	41
		8			6 008	20	49			6 512	19	49			7 016	18	49
		10			7 510	31	55			8 140	30	55			8 770	29	55
	400	4	0.260	0.238	3 433	4	29	0.280	0.258	3 721	4	29	0.300	0.278	4 009	4	30
		6			5 149	11	42			5 581	10	41			6 013	10	41
		8			6 866	19	49			7 442	19	49			8 018	18	49
		10			8 582	31	56			9 302	30	55			10 022	29	55
	450	4	0.293	0.268	3 862	4	29	0.315	0.291	4 186	4	30	0.338	0.313	4 510	4	30
		6			5 793	10	41			6 279	10	42			6 765	10	42
		8			7 724	19	50			8 372	18	49			9 020	18	50
		10			9 655	30	56			10 465	29	56			11 275	28	55
	500	4	0.325	0.298	4 291	4	30	0.350	0.323	4 651	4	30	0.375	0.348	5 011	4	30
		6			6 437	10	42			6 977	10	42			7 517	10	42
		8			8 582	19	50			9 302	18	50			10 022	17	49
		10			10 728	29	56			11 628	28	56			12 528	27	55
	550	4	0.358	0.328	5 149	4	30	0.385	0.355	5 116	4	31	0.413	0.383	5 512	4	31
		6			7 724	10	42			7 674	10	43			8 268	9	41
		8			10 299	18	50			10 233	17	49			11 025	17	50
		10			12 874	29	56			12 791	28	56			13 781	27	56
	600	4	0.390	0.358	5 149	4	31	0.420	0.388	5 581	4	31	0.450	0.418	6 013	4	31
		6			7 724	10	43			8 372	9	42			9 020	9	42
		8			10 299	18	50			11 163	17	50			12 027	16	49
		10			12 874	28	56			13 954	27	56			15 034	26	56
	650	4	0.423	0.387	5 579	4	31	0.455	0.420	6 047	4	31	0.488	0.452	6 515	4	32
		6			8 368	9	42			9 070	9	42			9 772	9	42
		8			11 157	17	50			12 093	17	50			13 029	16	50
		10			13 946	27	56			15 116	26	56			16 286	25	55
	700	4	0.455	0.417	6 008	4	31	0.490	0.452	6 512	4	32	0.525	0.487	7 016	3	28
		6			9 012	9	42			9 768	9	42			10 524	8	41
		8			12 015	17	50			13 023	16	50			14 031	15	49
		10			15 019	26	56			16 279	25	55			17 539	24	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		650					700					750				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
750	4	0.488	0.447	6 437	4	32	0.525	0.485	6 977	4	32	0.563	0.522	7 517	3	28
	6			9 655	9	42			10 465	9	42			11 275	8	41
	8			12 874	16	50			13 954	16	50			15 034	15	49
	10			16 092	26	56			17 442	25	56			18 792	24	56
800	4	0.520	0.477	6 866	4	32	0.560	0.517	7 442	3	26	0.600	0.557	8 018	3	29
	6			10 299	9	42			11 163	8	39			12 027	8	42
	8			13 732	16	50			14 884	15	47			16 036	14	49
	10			17 165	25	55			18 605	24	52			20 045	23	55
850	4	0.553	0.507	7 295	3	28	0.595	0.549	7 907	3	29	0.638	0.592	8 519	3	29
	6			10 943	8	41			11 861	8	41			12 779	8	42
	8			14 590	15	49			15 814	15	50			17 038	14	49
	10			18 238	24	55			19 768	23	55			21 298	22	55
900	4	0.585	0.536	7 724	3	28	0.630	0.581	8 372	3	29	0.675	0.626	9 020	3	29
	6			11 586	8	41			12 558	8	42			13 530	7	40
	8			15 448	15	49			16 744	14	49			18 040	13	48
	10			19 310	23	54			20 930	22	55			22 550	21	55
1000	4	0.650	0.596	8 582	3	28	0.700	0.646	9 302	3	29	0.750	0.696	10 022	3	30
	6			12 874	7	39			13 954	7	40			15 034	7	41
	8			17 165	14	48			18 605	13	49			20 045	13	49
	10			21 456	22	54			23 256	21	55			25 056	20	54
1100	4	0.715	0.656	9 441	3	28	0.770	0.711	10 233	3	30	0.825	0.766	11 025	3	30
	6			14 161	7	39			15 349	7	41			16 537	6	39
	8			18 881	13	47			20 465	12	48			22 049	12	48
	10			23 602	20	53			25 582	19	54			27 562	18	53
1200	4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	2	25	0.900	0.835	12 027	2	25
	6			15 448	6	37			16 744	6	39			18 040	6	40
	8			20 598	12	46			22 326	11	47			24 054	11	47
	10			25 747	19	52			27 907	18	54			30 067	17	53
1300	4	0.845	0.775	11 157	2	23	0.910	0.840	12 093	2	25	0.975	0.905	13 029	2	26
	6			16 736	6	37			18 140	6	40			19 544	5	38
	8			22 314	11	45			24 186	10	46			26 058	10	47
	10			27 893	17	50			30 233	16	52			32 573	16	53
1400	4	0.910	0.834	12 015	2	23	0.980	0.904	13 023	2	26	1.050	0.974	14 031	2	26
	6			18 023	5	34			19 535	5	38			21 047	5	38
	8			24 031	10	44			26 047	9	45			28 063	9	46
	10			30 038	16	50			32 558	15	52			35 078	14	51
1500	4	0.975	0.894	12 874	2	23	1.050	0.969	13 954	2	26	1.125	1.044	15 034	2	26
	6			19 310	5	34			20 930	5	38			22 550	4	35
	8			25 747	9	42			27 907	9	45			30 067	8	44
	10			32 184	14	48			34 884	14	51			37 584	13	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]
200		4	0.160	0.149	2 148	4	27	0.170	0.159	2 292	4	27	0.180	0.169	2 436	4	27
		6			3 223	10	39			3 439	10	39			3 655	10	39
		8			4 297	19	47			4 585	18	47			4 873	18	47
		10			5 371	30	53			5 731	29	53			6 091	28	53
250		4	0.200	0.187	2 686	4	28	0.213	0.199	2 866	4	28	0.225	0.212	3 046	4	28
		6			4 028	10	40			4 298	10	40			4 568	10	40
		8			5 371	19	48			5 731	18	48			6 091	18	48
		10			6 714	29	54			7 164	29	54			7 614	28	54
300		4	0.240	0.224	3 223	4	29	0.255	0.239	3 439	4	29	0.270	0.254	3 655	4	29
		6			4 834	10	40			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	29	54			8 597	28	54			9 137	27	54
350		4	0.280	0.261	3 760	4	29	0.298	0.279	4 012	4	30	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	40
		8			7 520	18	49			8 024	17	48			8 528	17	49
		10			9 400	28	55			10 030	28	55			10 660	27	55
400		4	0.320	0.298	4 297	4	30	0.340	0.318	4 585	4	30	0.360	0.338	4 873	4	30
		6			6 445	10	42			6 877	9	41			7 309	9	41
		8			8 594	18	49			9 170	17	49			9 746	17	49
		10			10 742	28	55			11 462	27	55			12 182	26	55
450		4	0.360	0.336	4 834	4	30	0.383	0.358	5 158	4	31	0.405	0.381	5 482	4	31
		6			7 251	9	41			7 737	9	41			8 223	9	41
		8			9 668	17	49			10 316	17	49			10 964	16	49
		10			12 085	27	55			12 895	26	55			13 705	26	55
500		4	0.400	0.373	5 371	4	31	0.425	0.398	5 731	4	31	0.450	0.423	6 091	4	31
		6			8 057	9	41			8 597	9	42			9 137	9	42
		8			10 742	17	50			11 462	16	49			12 182	16	49
		10			13 428	26	55			14 328	26	55			15 228	25	55
550		4	0.440	0.410	5 908	4	31	0.468	0.438	6 304	4	31	0.495	0.465	6 700	3	28
		6			8 862	9	42			9 456	9	42			10 050	8	41
		8			11 817	16	49			12 609	16	50			13 401	15	49
		10			14 771	26	56			15 761	25	55			16 751	24	55
600		4	0.480	0.448	6 445	4	32	0.510	0.478	6 877	3	28	0.540	0.508	7 309	3	28
		6			9 668	9	42			10 316	8	41			10 964	8	41
		8			12 891	16	50			13 755	15	49			14 619	15	49
		10			16 114	25	55			17 194	24	55			18 274	24	55
650		4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	28	0.585	0.550	7 919	3	29
		6			10 474	8	41			11 176	8	41			11 878	8	41
		8			13 965	15	49			14 901	15	49			15 837	14	49
		10			17 456	24	55			18 626	24	56			19 796	23	55
700		4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	29	0.630	0.592	8 528	3	29
		6			11 280	8	41			12 036	8	42			12 792	8	42
		8			15 039	15	49			16 047	14	49			17 055	14	49
		10			18 799	24	56			20 059	23	55			21 319	22	55

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]
750		4	0.600	0.560	**8 057**	**3**	**29**	0.638	0.597	8 597	3	29	0.675	0.635	9 137	3	29
		6			**12 085**	**8**	**42**			12 895	8	42			13 705	7	40
		8			**16 114**	**14**	**49**			17 194	14	49			18 274	14	49
		10			**20 142**	**23**	**55**			21 492	22	55			22 842	21	55
800		4	0.640	0.597	**8 594**	**3**	**29**	0.680	0.637	9 170	3	29	0.720	0.677	9 746	3	30
		6			**12 891**	**8**	**42**			13 755	7	40			14 619	7	41
		8			**17 188**	**14**	**49**			18 340	13	48			19 492	13	49
		10			**21 485**	**22**	**55**			22 925	21	55			24 365	21	55
850		4	0.680	0.634	**9 131**	**3**	**29**	0.723	0.677	9 743	3	30	0.765	0.719	10 355	3	30
		6			**13 697**	**7**	**40**			14 615	7	41			15 533	7	41
		8			**18 262**	**13**	**48**			19 486	13	49			20 710	13	49
		10			**22 828**	**21**	**55**			24 358	21	55			25 888	20	55
900		4	0.720	0.671	**9 668**	**3**	**30**	0.765	0.716	10 316	3	30	0.810	0.761	10 964	3	30
		6			**14 502**	**7**	**41**			15 474	7	41			16 446	7	41
		8			**19 336**	**13**	**49**			20 632	13	49			21 928	12	48
		10			**24 170**	**21**	**55**			25 790	20	55			27 410	19	54
1000		4	0.800	0.746	**10 742**	**3**	**30**	0.850	0.796	11 462	3	30	0.900	0.846	12 182	2	25
		6			**16 114**	**7**	**41**			17 194	6	39			18 274	6	40
		8			**21 485**	**12**	**48**			22 925	12	48			24 365	11	48
		10			**26 856**	**19**	**54**			28 656	18	54			30 456	18	54
1100		4	0.880	0.821	**11 817**	**2**	**25**	0.935	0.876	12 609	2	25	0.990	0.931	13 401	2	26
		6			**17 725**	**6**	**39**			18 913	6	40			20 101	6	40
		8			**23 633**	**11**	**47**			25 217	11	48			26 801	10	47
		10			**29 542**	**18**	**54**			31 522	17	53			33 502	16	53
1200		4	0.960	0.895	**12 891**	**2**	**26**	1.020	0.955	13 755	2	26	1.080	1.015	14 619	2	26
		6			**19 336**	**6**	**40**			20 632	5	38			21 928	5	38
		8			**25 782**	**10**	**47**			27 510	10	47			29 238	9	46
		10			**32 227**	**16**	**53**			34 387	16	53			36 547	15	52
1300		4	1.040	0.970	**13 965**	**2**	**26**	1.105	1.035	14 901	2	26	1.170	1.100	15 837	2	26
		6			**20 948**	**5**	**38**			22 352	5	38			23 756	5	38
		8			**27 930**	**9**	**45**			29 802	9	46			31 674	9	46
		10			**34 913**	**15**	**52**			37 253	14	52			39 593	14	52
1400		4	1.120	1.044	**15 039**	**2**	**26**	1.190	1.114	16 047	2	27	1.260	1.184	17 055	2	27
		6			**22 559**	**5**	**38**			24 071	4	36			25 583	4	36
		8			**30 079**	**9**	**46**			32 095	8	45			34 111	8	45
		10			**37 598**	**14**	**52**			40 118	13	51			42 638	13	51
1500		4	1.200	1.119	**16 114**	**2**	**27**	1.275	1.194	17 194	1	18	1.350	1.269	18 274	1	18
		6			**24 170**	**4**	**36**			25 790	4	36			27 410	4	36
		8			**32 227**	**8**	**45**			34 387	7	43			36 547	7	43
		10			**40 284**	**12**	**50**			42 984	12	50			45 684	11	49

B – nominal width [mm]
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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1000					1100					1200				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.200	0.189	2 724	4	28	0.220	0.209	3 012	4	28	0.240	0.229	3 300	4	29
	6			4 087	9	38			4 519	9	39			4 951	9	39
	8			5 449	17	47			6 025	16	46			6 601	16	47
	10			6 811	27	53			7 531	26	53			8 251	25	53
250	4	0.250	0.237	3 406	4	29	0.275	0.262	3 766	4	29	0.300	0.287	4 126	4	30
	6			5 108	9	39			5 648	9	40			6 188	9	40
	8			6 811	17	48			7 531	16	47			8 251	16	48
	10			8 514	27	54			9 414	25	53			10 314	25	54
300	4	0.300	0.284	4 087	4	30	0.330	0.314	4 519	4	30	0.360	0.344	4 951	3	27
	6			6 130	9	40			6 778	9	41			7 426	8	39
	8			8 173	17	48			9 037	16	48			9 901	15	48
	10			10 217	26	54			11 297	25	54			12 377	24	54
350	4	0.350	0.331	4 768	4	30	0.385	0.366	5 272	3	27	0.420	0.401	5 776	3	27
	6			7 152	9	41			7 908	8	40			8 664	8	40
	8			9 536	16	48			10 544	15	48			11 552	15	48
	10			11 920	26	55			13 180	24	54			14 440	24	54
400	4	0.400	0.378	5 449	4	31	0.440	0.418	6 025	3	28	0.480	0.458	6 601	3	28
	6			8 173	9	41			9 037	8	40			9 901	8	41
	8			10 898	16	49			12 050	15	48			13 202	14	48
	10			13 622	25	55			15 062	24	55			16 502	23	54
450	4	0.450	0.426	6 130	3	28	0.495	0.471	6 778	3	28	0.540	0.516	7 426	3	28
	6			9 195	8	40			10 167	8	41			11 139	8	41
	8			12 260	15	49			13 556	15	49			14 852	14	49
	10			15 325	24	55			16 945	23	55			18 565	22	54
500	4	0.500	0.473	6 811	3	28	0.550	0.523	7 531	3	28	0.600	0.573	8 251	3	29
	6			10 217	8	41			11 297	8	41			12 377	7	40
	8			13 622	15	49			15 062	14	49			16 502	14	49
	10			17 028	24	55			18 828	23	55			20 628	22	55
550	4	0.550	0.520	7 492	3	28	0.605	0.575	8 284	3	29	0.660	0.630	9 076	3	29
	6			11 238	8	41			12 426	8	42			13 614	7	40
	8			14 985	15	49			16 569	14	49			18 153	13	48
	10			18 731	23	55			20 711	22	55			22 691	21	55
600	4	0.600	0.568	8 173	3	29	0.660	0.628	9 037	3	29	0.720	0.688	9 901	3	30
	6			12 260	8	42			13 556	7	40			14 852	7	41
	8			16 347	14	49			18 075	13	48			19 803	13	49
	10			20 434	22	55			22 594	21	55			24 754	20	54
650	4	0.650	0.615	8 855	3	29	0.715	0.680	9 791	3	30	0.780	0.745	10 727	3	30
	6			13 282	7	40			14 686	7	41			16 090	7	41
	8			17 709	14	49			19 581	13	49			21 453	12	48
	10			22 136	22	55			24 476	21	55			26 816	20	55
700	4	0.700	0.662	9 536	3	30	0.770	0.732	10 544	3	30	0.840	0.802	11 552	3	30
	6			14 304	7	41			15 816	7	41			17 328	7	41
	8			19 071	13	49			21 087	13	49			23 103	12	48
	10			23 839	21	55			26 359	20	55			28 879	19	54

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1000					1100					1200				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
750	4	0.750	0.710	10 217	3	30	0.825	0.785	11 297	3	30	0.900	0.860	12 377	3	31
	6			15 325	7	41			16 945	7	41			18 565	6	40
	8			20 434	13	49			22 594	12	48			24 754	12	49
	10			25 542	20	55			28 242	19	54			30 942	18	54
800	4	0.800	0.757	10 898	3	30	0.880	0.837	12 050	3	31	0.960	0.917	13 202	2	26
	6			16 347	7	41			18 075	6	40			19 803	6	40
	8			21 796	12	48			24 100	12	49			26 404	11	48
	10			27 245	20	55			30 125	19	55			33 005	18	54
850	4	0.850	0.804	11 579	3	30	0.935	0.889	12 803	2	26	1.020	0.974	14 027	2	26
	6			17 369	6	39			19 205	6	40			21 041	6	40
	8			23 158	12	48			25 606	11	48			28 054	11	48
	10			28 948	19	54			32 008	18	54			35 068	17	54
900	4	0.900	0.851	12 260	2	25	0.990	0.941	13 556	2	26	1.080	1.031	14 852	2	26
	6			18 390	6	40			20 334	6	40			22 278	6	40
	8			24 520	11	48			27 112	11	48			29 704	10	47
	10			30 650	18	54			33 890	17	54			37 130	16	53
1000	4	1.000	0.946	13 622	2	26	1.100	1.046	15 062	2	26	1.200	1.146	16 502	2	27
	6			20 434	6	40			22 594	5	38			24 754	5	39
	8			27 245	11	48			30 125	10	47			33 005	9	46
	10			34 056	17	54			37 656	16	53			41 256	15	53
1100	4	1.100	1.041	14 985	2	26	1.210	1.151	16 569	2	27	1.320	1.261	18 153	2	27
	6			22 477	5	38			24 853	5	39			27 229	5	39
	8			29 969	10	47			33 137	9	46			36 305	9	47
	10			37 462	15	52			41 422	14	52			45 382	14	52
1200	4	1.200	1.135	16 347	2	27	1.320	1.255	18 075	2	27	1.440	1.375	19 803	2	27
	6			24 520	5	39			27 112	4	36			29 704	4	36
	8			32 694	9	46			36 150	8	45			39 606	8	45
	10			40 867	14	52			45 187	13	51			49 507	13	52
1300	4	1.300	1.230	17 709	2	27	1.430	1.360	19 581	2	27	1.560	1.490	21 453	1	19
	6			26 564	4	36			29 372	4	36			32 180	4	37
	8			35 418	8	45			39 162	8	45			42 906	7	44
	10			44 273	13	51			48 953	12	51			53 633	11	50
1400	4	1.400	1.324	19 071	1	18	1.540	1.464	21 087	1	19	1.680	1.604	23 103	1	19
	6			28 607	4	36			31 631	4	37			34 655	3	33
	8			38 143	7	44			42 175	7	44			46 207	6	42
	10			47 678	12	51			52 718	11	50			57 758	10	49
1500	4	1.500	1.419	20 434	1	19	1.650	1.569	22 594	1	19	1.800	1.719	24 754	1	19
	6			30 650	4	37			33 890	3	33			37 130	3	34
	8			40 867	7	44			45 187	6	42			49 507	6	43
	10			51 084	11	50			56 484	10	49			61 884	9	48

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1300					1400					1500				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm] 200	4	0.260	0.249	3 588	3	25	0.280	0.269	3 876	3	26	0.300	0.289	4 164	3	26
	6			5 383	8	38			5 815	8	38			6 247	8	39
	8			7 177	15	46			7 753	15	47			8 329	14	46
	10			8 971	24	52			9 691	23	52			10 411	23	52
250	4	0.325	0.312	4 486	3	26	0.350	0.337	4 846	3	27	0.375	0.362	4 164	3	27
	6			6 728	8	39			7 268	8	39			6 247	8	40
	8			8 971	15	47			9 691	14	47			8 329	14	47
	10			11 214	24	53			12 114	23	53			10 411	22	53
300	4	0.390	0.374	5 383	3	27	0.420	0.404	5 815	3	27	0.450	0.434	6 247	3	28
	6			8 074	8	40			8 722	8	40			9 370	8	40
	8			10 765	15	48			11 629	14	47			12 493	14	48
	10			13 457	23	54			14 537	22	53			15 617	22	54
350	4	0.455	0.436	6 280	3	28	0.490	0.471	6 784	3	28	0.525	0.506	7 288	3	28
	6			9 420	8	40			10 176	8	41			10 932	7	39
	8			12 560	14	48			13 568	14	48			14 576	13	47
	10			15 700	23	54			16 960	22	54			18 220	21	54
400	4	0.520	0.498	7 177	3	28	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	29
	6			10 765	8	41			11 629	7	40			12 493	7	40
	8			14 354	14	48			15 506	13	48			16 658	13	48
	10			17 942	22	54			19 382	21	54			20 822	21	54
450	4	0.585	0.561	8 074	3	29	0.630	0.606	8 722	3	29	0.675	0.651	9 370	3	29
	6			12 111	7	40			13 083	7	40			14 055	7	40
	8			16 148	14	49			17 444	13	48			18 740	13	49
	10			20 185	21	54			21 805	21	54			23 425	20	54
500	4	0.650	0.623	8 971	3	29	0.700	0.673	9 691	3	30	0.750	0.723	10 411	3	30
	6			13 457	7	40			14 537	7	41			15 617	7	41
	8			17 942	13	48			19 382	13	49			20 822	12	48
	10			22 428	21	55			24 228	20	54			26 028	19	54
550	4	0.715	0.685	9 868	3	30	0.770	0.740	10 660	3	30	0.825	0.795	11 452	3	30
	6			14 802	7	41			15 990	7	41			17 178	6	39
	8			19 737	13	49			21 321	12	48			22 905	12	48
	10			24 671	20	54			26 651	19	54			28 631	19	54
600	4	0.780	0.748	10 765	3	30	0.840	0.808	11 629	3	30	0.900	0.868	12 493	2	25
	6			16 148	7	41			17 444	6	39			18 740	6	40
	8			21 531	12	48			23 259	12	48			24 987	11	48
	10			26 914	20	55			29 074	19	54			31 234	18	54
650	4	0.845	0.810	11 663	3	30	0.910	0.875	12 599	2	25	0.975	0.940	13 535	2	26
	6			17 494	6	39			18 898	6	40			20 302	6	40
	8			23 325	12	48			25 197	11	48			27 069	11	48
	10			29 156	19	54			31 496	18	54			33 836	18	54
700	4	0.910	0.872	12 560	2	25	0.980	0.942	13 568	2	26	1.050	1.012	14 576	2	26
	6			18 840	6	40			20 352	6	40			21 864	6	40
	8			25 119	11	48			27 135	11	48			29 151	11	48
	10			31 399	18	54			33 919	17	54			36 439	17	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1300					1400					1500				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	750	4	0.975	0.935	13 457	2	26	1.050	1.010	14 537	2	26	1.125	1.085	15 617	3	31
		6			20 185	6	40			21 805	6	40			23 425	6	40
		8			26 914	11	48			29 074	11	48			31 234	12	49
		10			33 642	18	54			36 342	17	54			39 042	18	54
	800	4	1.040	0.997	14 354	2	26	1.120	1.077	15 506	2	26	1.200	1.157	16 658	2	26
		6			21 531	6	40			23 259	6	41			24 987	6	40
		8			28 708	11	48			31 012	10	47			33 316	11	48
		10			35 885	17	54			38 765	16	53			41 645	18	54
	850	4	1.105	1.059	15 251	2	26	1.190	1.144	16 475	2	27	1.275	1.229	17 699	2	26
		6			22 877	6	41			24 713	5	39			26 549	6	40
		8			30 502	10	47			32 950	10	48			35 398	11	48
		10			38 128	16	53			41 188	16	54			44 248	17	54
	900	4	1.170	1.121	16 148	2	27	1.260	1.211	17 444	2	27	1.350	1.301	18 740	2	26
		6			24 222	5	38			26 166	5	39			28 110	6	40
		8			32 296	10	47			34 888	9	46			37 480	10	47
		10			40 370	16	54			43 610	15	53			46 850	16	53
	1000	4	1.300	1.246	17 942	2	27	1.400	1.346	19 382	2	27	1.500	1.446	20 822	2	27
		6			26 914	5	39			29 074	5	39			31 234	5	39
		8			35 885	9	47			38 765	9	47			41 645	9	46
		10			44 856	14	52			48 456	14	53			52 056	15	53
	1100	4	1.430	1.371	19 737	2	27	1.540	1.481	21 321	2	28	1.650	1.591	22 905	2	27
		6			29 605	4	36			31 981	4	37			34 357	5	39
		8			39 473	8	45			42 641	8	46			45 809	9	47
		10			49 342	13	52			53 302	12	51			57 262	14	52
	1200	4	1.560	1.495	21 531	1	19	1.680	1.615	23 259	1	19	1.800	1.735	24 987	2	27
		6			32 296	4	37			34 888	4	37			37 480	4	36
		8			32 694	9	46			36 150	8	45			39 606	8	45
		10			40 867	14	52			45 187	13	51			49 507	13	52

3.6.2 | mcr FID S/S p/O circular dampers technical parameters

D – nominal diameter [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

D	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
250	4	0.0491	0.0401	577	1	15
	6			866	4	24
	8			1154	8	28
	10			1443	11	33
315	4	0.0779	0.0664	956	1	18
	6			1434	4	24
	8			1912	8	30
	10			2390	16	35
355	4	0.0990	0.0859	1237	1	17
	6			1855	5	24
	8			2474	11	34
	10			3092	20	40
400	4	0.1257	0.1108	1596	1	17
	6			2394	5	25
	8			3192	11	34
	10			3990	19	41

D	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
450	4	0.1590	0.1423	2049	1	16
	6			3073	4	25
	8			4097	10	35
	10			5122	18	41
500	4	0.1963	0.1776	2558	1	18
	6			3837	4	24
	8			5116	8	33
	10			6395	15	40
560	4	0.2463	0.2253	3244	1	16
	6			4865	3	24
	8			6487	7	33
	10			8109	13	39
630	4	0.3117	0.2880	4147	1	20
	6			6220	2	22
	8			8293	5	33
	10			10366	9	40

3.7.1 | Estimated weights of mcr FID S/S p/P dampers for rectangular ventilation ducts [kg]

height H [mm] \ width B [mm]	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
400	10	11	12	18	19	21	25	29	30	33	35	36	39	54	55
500	15	16	17	19	20	23	27	32	33	35	38	40	44	55	56
600	17	17.5	20	21	30	26	30	35	37	39	43	48	52	56	58
700	17.5	18	21	23	30	35	35	40	42	44	47	52	54	57	65
800	20	21	22	24	29	35	37	41	43	49	52	57	60	62	78
900	22	25	25	28	33	35	39	43	47	53	56	60	62	64	82
1000	23	29	28	33	36	42	43	49	53	56	59	65	67	69	98
1100	26	30	31	35	38	42	47	56	59	62	63	69	71	73	101
1200	32	33	35	36	40	49	53	56	61	71	72	73	85	86	105
1300	35	36	38	39	44	52	57	59	78	79	80	81	92		
1400	37	39	41	44	48	56	63	65	80	82	85	87			
1500	40	41	44	48	52	58	68	71	82	98	115	120			

3.7.2 | Estimated weights of mcr FID S/S p/O dampers for circular ventilation ducts [kg]

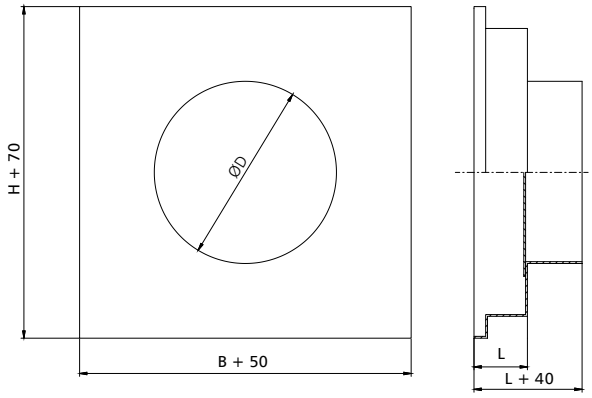
diameter D [mm]	RST, KW1	actuator
250	7	8
315	9	10
355	12	13
400	14	15
450	15	16
500	16	17
560	18	19
630	20	21

3.8 | Accessories

3.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

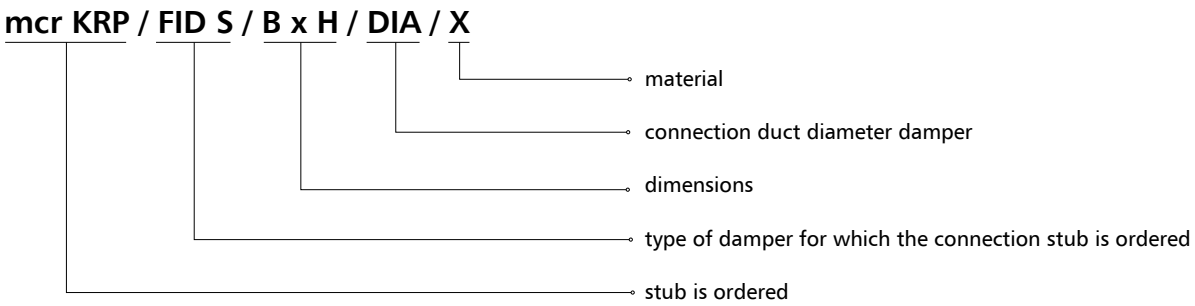
NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.



dimensions in [mm]

Dimensions:
- BxH - damper dimensions [mm]
- ØD - diameter of the connection duct [mm]
- L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side

Marking:

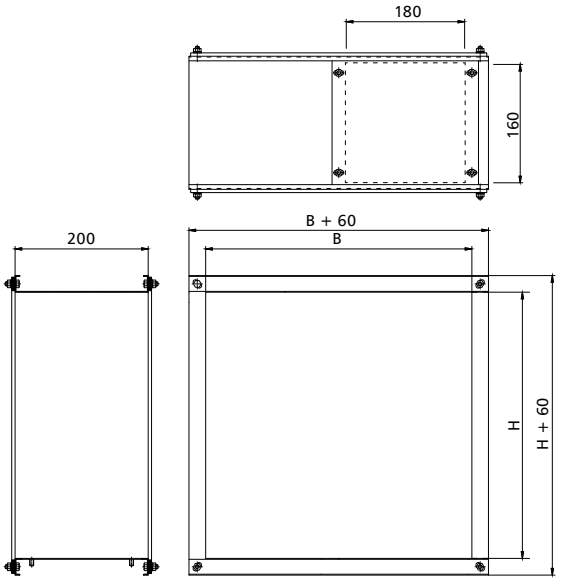


X – material
[no symbol] – galvanized steel, Zn 275 g/m2 coating[2]
KN – stainless steel
KK – 1.4404 acid-proof steel

3.8.2 | Casing module with KRW-type inspection access

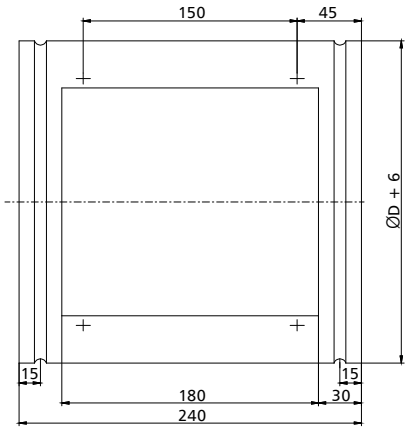
The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

KRW P module for rectangular damper



dimensions in [mm]

» KRW OM module
» round muff module for nipple damper



dimensions in [mm]

Marking:

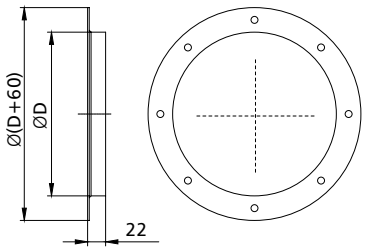
mcr KRW OM / FID S / B x H / X

- material
- dimensions
- type of damper for which the module is ordered
- rectangular module - mcr KRW P
  round muff module - mcr KRW OM

X – material
[no symbol] – galvanized steel, Zn 275 g/m2 coating²
KN – stainless steel
KK – 1.4404 acid-proof steel

3.8.3 | KP type connection flange

The KP type connection flange is used to connect a round fire damper to a duct with a connection made in accordance with PN-EN 12220.



dimensions in [mm]

3.9 | Marking

mcr FID S/S p/P B x H 1 / 2 / 3

- additional parameters
- material
- control
- width x height (nominal)
- damper type

1 - control:

» **RST trigger control mechanism**
RST – thermal trigger
RST/WK1 – thermal trigger + limit switch (closed blade signal)
RST/WK2 – thermal trigger + limit switch (open/closed blade signal)

» **RST-KW1 trigger control mechanism**
KW1/S – thermal trigger
KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
KW1/24I/WK2 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/24P/WK2 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)
KW1/24I/WK2(+MP230/24) – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
KW1/24P/WK2(+MP230/24) – thermal trigger + "break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger and control mechanism, axial actuator**
BF 24-T/BF 24-SR-T – actuator with a return spring, U = 24 V AC/DC
BF230-T – actuator with a return spring, U = 230 V AC
BF24TL-T-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
BF24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL 24-T/BFL 24-SR-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T/MLF230T1 – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN 24-T/BFN 24-SR-T– actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
MF24T1 – actuator with a return spring, U = 24 V AC/DC
MF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF/MF) – thermoelectric trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Control mechanism position**
[no symbol] – perpendicular to the damper rotation axis*
WOK – along the damper rotation axis

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
P_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – right damper
KL – left damper (excl. round dampers)
KO – inverted damper (excl. round dampers)

» **Damper casing**
[no symbol] – standard casing length
400 – casing with a length of 400 mm
BU – earth pin

» **Connection flange** (round dampers only)
[no symbol] – damper without a flange – for the "bare end" connection
KP – damper with a connection flange

» **Mounting runners** (round dampers only)
WM – mounting runners (set)
Perimeter gaskets (round dampers only)
UKW – external perimeter gaskets

* for a round damper with a RST, RST-KW1 mechanism and a BF actuator, the trigger control mechanism is installed along the axis of rotation as standard – exception

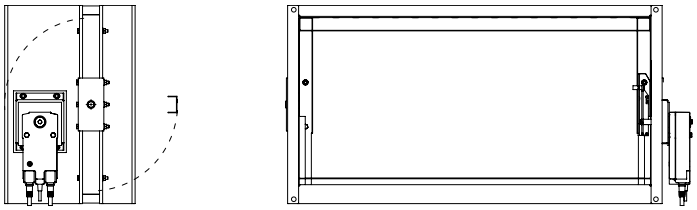
NOTE: separate additional parameters entered with the "/" sign
example marking:

mcr FID S/S p/P 400 x 400 BFL24-T
EI120 cut-off fire damper with a 24 V actuator with limit switches.

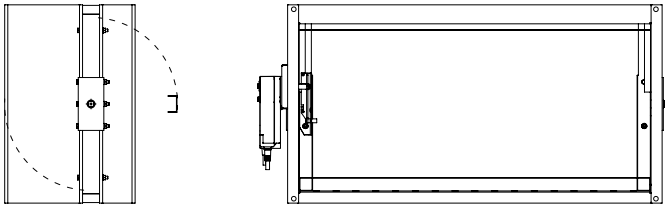
mcr FID S/S p/O Ø400 RST / WK2
EI120 cut-off fire damper with a 72°C thermal trigger and damper blade opening and closing limit switch.

3.9.1 | Design standard

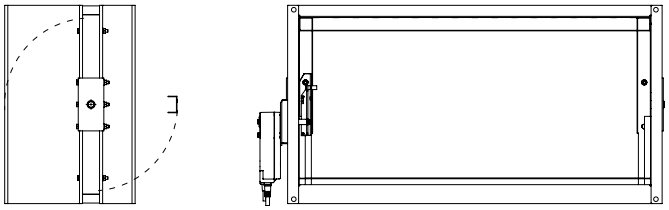
» right damper - standard



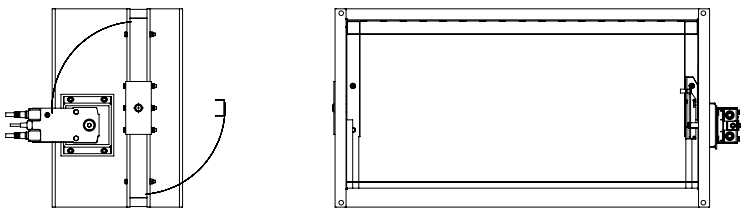
» inverted damper - (ducts facing downwards)



» left damper



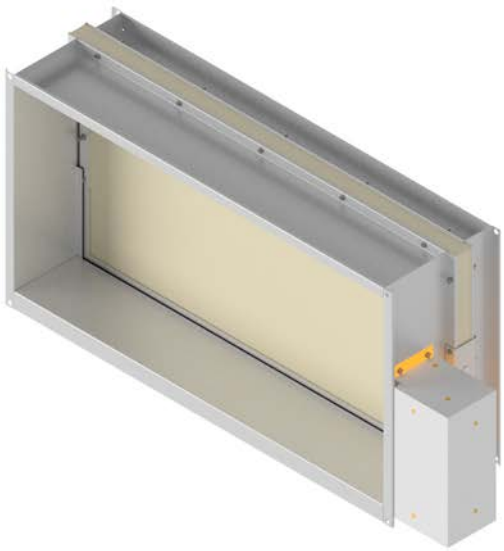
» along the damper axis



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

downloadable models
on the website
under the designer zone tab



1488-CPR-0448/W
2434-CPR-0029

ATEST HIGIENICZNY

CERTYFIKACJA PRODUKTU

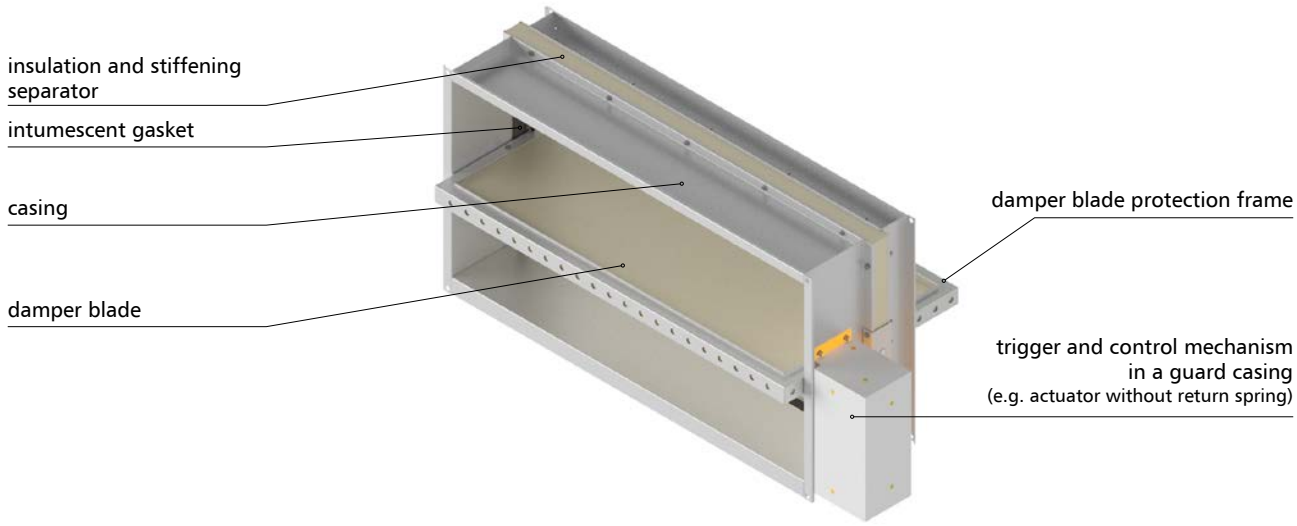
CTO S.A.

» **EIS120, E_{600} 120**
» Fire resistance class: EI120(v_{ed} h_{od} i↔o)S1000C_{10000}AAmulti, EI120 (v_{ew} i↔o)S1500C_{10000}AAmulti, EI120 (v_{edw} i↔o)S1000C_{10000}AAmulti.
» Certificate of constancy of performance 1488-CPR-0448/W, 2434-CPR-0029.
» Dampers certified for compliance with EN 12101-8.
» Dampers rated under EN 13501-4 and tested under EN 1366-10.
» Cut-off dampers resistance independent of airflow direction and installation side.
» Dampers certified for modular installation (batteries).
» Certified installation on smoke ventilation ducts.
» Certified AA (Automatic Activation) feature.
» Permitted operation with both vertical and horizontal axis of rotation.

4.1| Application

mcr FID S/V p/P, mcr FID S/V-M p/P smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr FID S/V p/P dampers are used in fire ventilation systems and the dampers marked mcr FID S/V-M p/P are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades remain closed. Admissible flow velocity in the connected duct is 12 m/s.

4.2| Design



mcr FID S/V p/P, mcr FID S/V-M p/P smoke control dampers consist of a casing with a rectangular cross-section, made of two segments separated with a fire-proof panel with a cross-section of 20 x 40 mm, a moving damper blade and a remotely activated actuator. Standard damper casing is made of galvanized steel sheets. A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 acid-proof steel sheet, while other elements are impregnated. The casing total length is at least 296 mm. Dampers may be made with an extension element, in such a case the casing length is 400 mm.

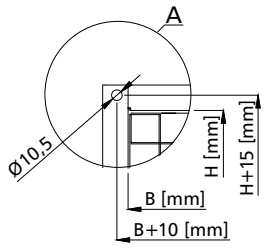
The damper blade is made of a fire-proof panel with the total thickness of 40 mm, which is covered with a metal sheet reinforcement profile. The inner side of the fire damper casing is equipped with an intumescent gasket. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. Stop profiles are lined with a polyethylene ventilation gasket.

4.3 | Versions

4.3.1 | Damper closing and opening with an actuator

During normal operation, the damper blade of the fire damper remains open or closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments are closed – the blades are operated remotely by supplying power.

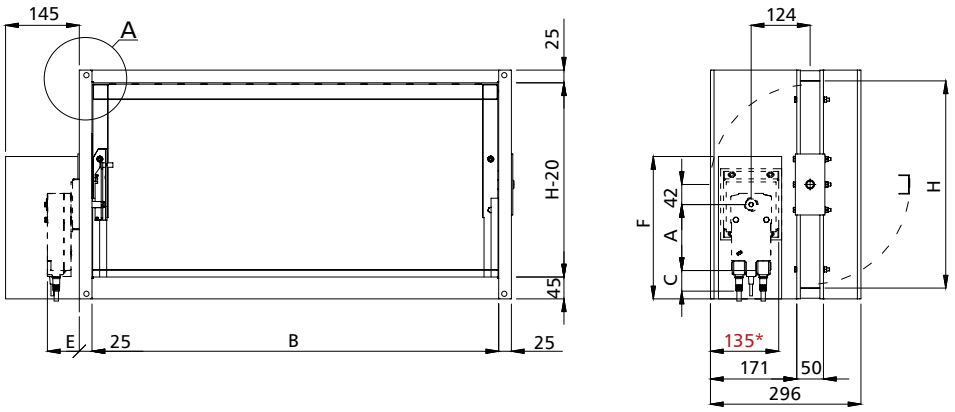
The mcr FID S/V p/P, mcr FID S/V-M p/P dampers are equipped with a trigger and control mechanism in the form of BE, BEE, BEN, MLE or ME series axial actuator, supplied with 24 V AC/DC or 230 V AC. Actuators are equipped with limit switches used to monitor the position of the damper blade. Dampers with BE, BEE, BEN, MLE or ME actuators can be opened/closed by supplying voltage to the actuator terminals.



dimensions in [mm]

mechanism	A	C	E	F
BE	198	10	70	345
BEE	140	28	52	305
BEN	130	20	48	305
ME	198	10	57	345
MLE	126	10	59	305

*embedding border



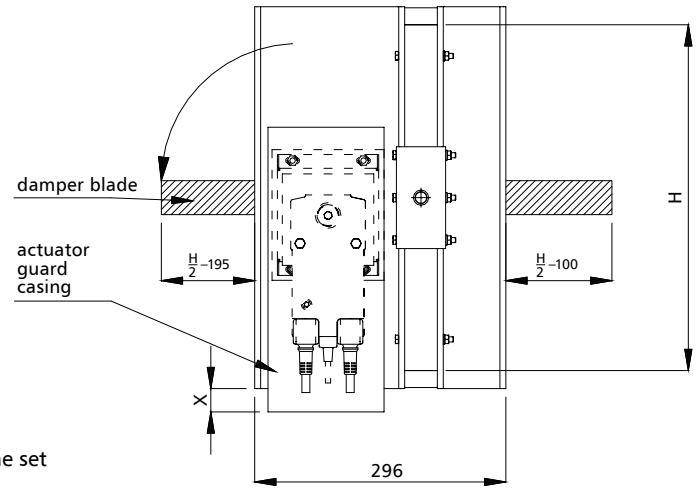
4.4 | Dimensions

damper installation in a construction partition:
» nominal width B: from 200 mm to 1500 mm
» nominal height H from 200 mm to 1500 mm
» maximum single damper cross-section surface up to
- 1.5 m² for FID S/V p/P dampers
- 1.25 m² for FID S/V-M p/P dampers

damper installation on a fireproof duct:
» nominal width B: from 200 mm to 1500 mm
» nominal height H from 200 mm to 1000 mm
» maximum single damper cross-section surface up to 1.5 m²

installation of dampers in a battery (set) made up of 2 or 3 dampers:
» dimensions 200 x 200 to 1500 x 710 mm
» vertical rotation axis, mechanism on the top or bottom of the set

modular installation – one damper next to another (only vertical rotation axes):
» maximum width: n x 710 mm
» maximum height: 2 x 1500 mm



Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). For dampers with a H<500 mm side, the actuator guard casing protrudes outside the damper body by the value X, calculated from the following formula $X = 250 - \frac{H}{2}$

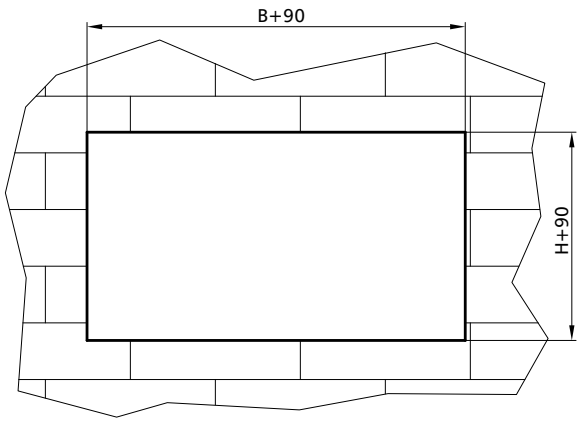
4.5 | Installation

- mcr FID S/V p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1000C_{300}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 110 mm.
- mcr FID S/V p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1500C_{10000}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 120 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 125 mm and a resistance rating no lesser than EI120.
- mcr FID S/V-M p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1500C_{10000}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 125 mm and a resistance rating no lesser than EI120.
- mcr FID S/V p/P rectangular dampers are rated EI120(v_{ed} h_{od} i↔o)S1000C_{10000}AAmulti if installed in a fireproof duct compliant with EN 1366-8 or EN 1366-9, with fire resistance ratings equal to or lesser than the fire resistance rating of the damper.
- mcr FID S/V-M p/P rectangular dampers are rated EI120(v_{edw} i↔o)S1000C_{10000}AAmulti if installed in solid building shafts, masonry of blocks, hollow bricks with s min. thicness 120 mm and a resistance rating no lesser than EI120.
- A rectangular damper battery (set) is rated EI120(v_{ew} i↔o)S1000C_{10000}AAmulti and EI60(v_{ew} i↔o)S1500C_{10000}AAmulti if installed in partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 120 mm. Damper batteries can be combined together into modules.
- mcr FID S/V p/P rectangular dampers are rated E_{600} 120 (v_{ed} i↔o) S1000 C_{10000} AA single in single-zone fire ventilation systems.

* The above mentioned installation must be clearly specified in the design documentation and communicated to the manufacturer when placing the order. The dimensions of the damper BxH (width x height), which is to be installed with a vertical rotation axis, should be provided as if for a damper with a horizontal rotation axis (the power and control mechanism is mounted on the H dimension) with an indication of vertical axis installation.

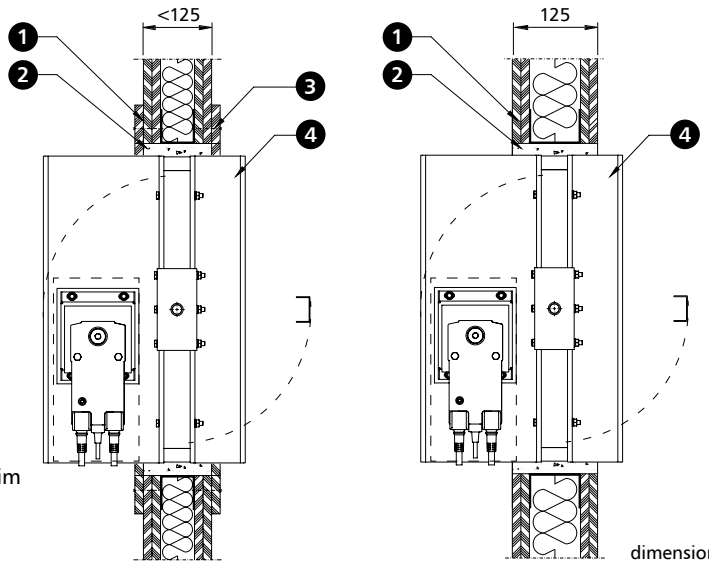
4.5.1 | Preparation of installation openings

- **preferred opening**



dimensions in [mm]

4.5.2 | Sample installation in gypsum board light walls



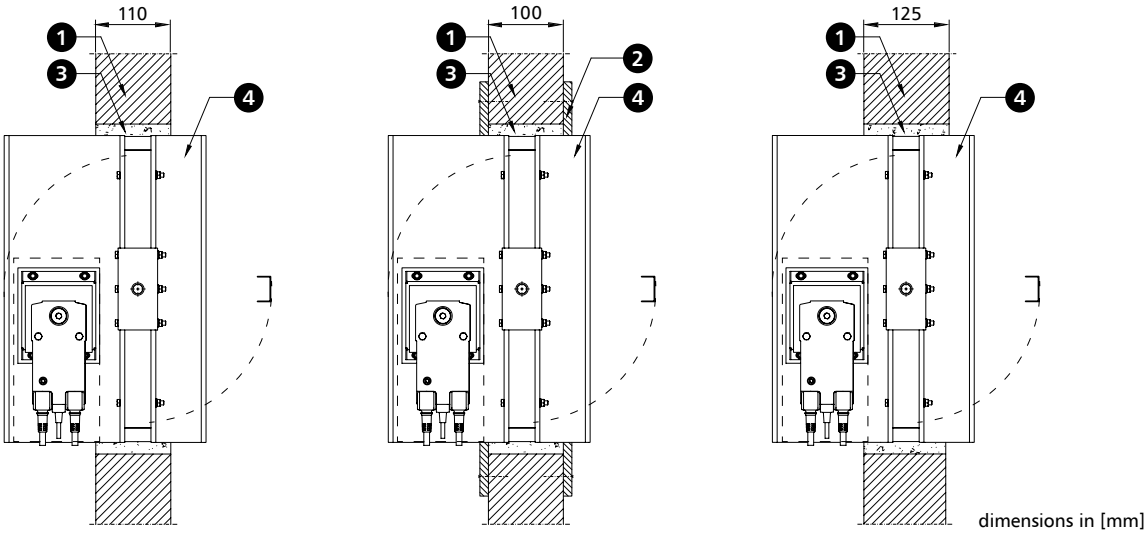
1. light wall
2. assembly mortar*
3. circumferential gypsum board trim
4. mcr FID S/V p/P smoke damper

dimensions in [mm]

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

4.5.3 | Sample installation in concrete and brick walls



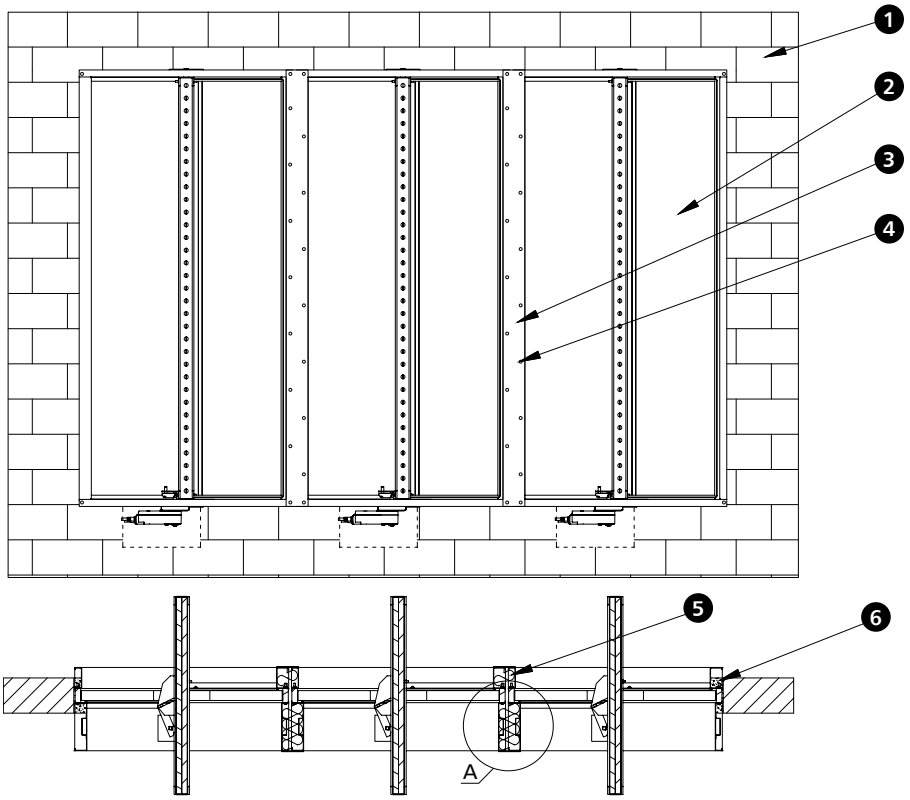
dimensions in [mm]

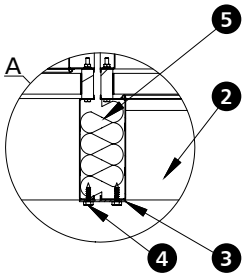
1. rigid wall - concrete, aerated concrete or bricks
2. circumferential gypsum board trim
3. assembly mortar*
4. mcr FID S/V p/P smoke damper

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied

NOTE: If the damper is installed in a wall with a thickness of less than 110 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

4.5.4 | Sample battery installation



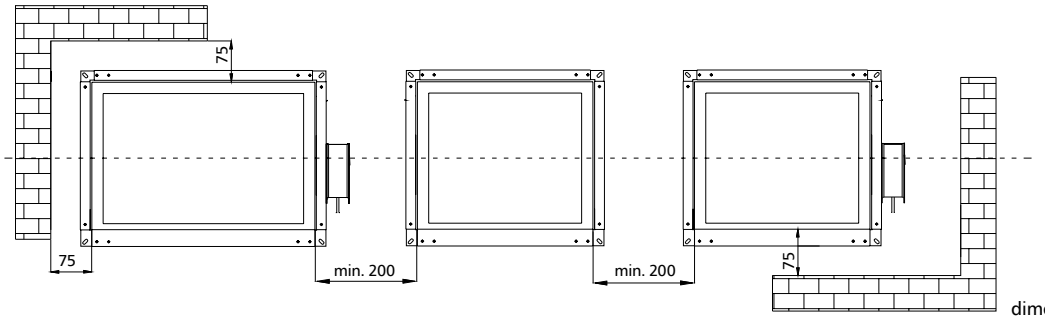


1. wall
2. mcr FID S/V p/P BxH smoke damper
3. installation flat bar along the entire H height of the module
4. self-drilling screw 3.5 x 25
5. mineral wool*
6. assembly mortar + gypsum board trim, min. 100x20mm*

dimensions in [mm]

* Recommended filling of spaces between the dampers is based on wool with a min. density of 100 kg/m3 and fire resistance class A1. Recommended damper installation to the wall is based on assembly mortar on the basis of gypsum or cement.

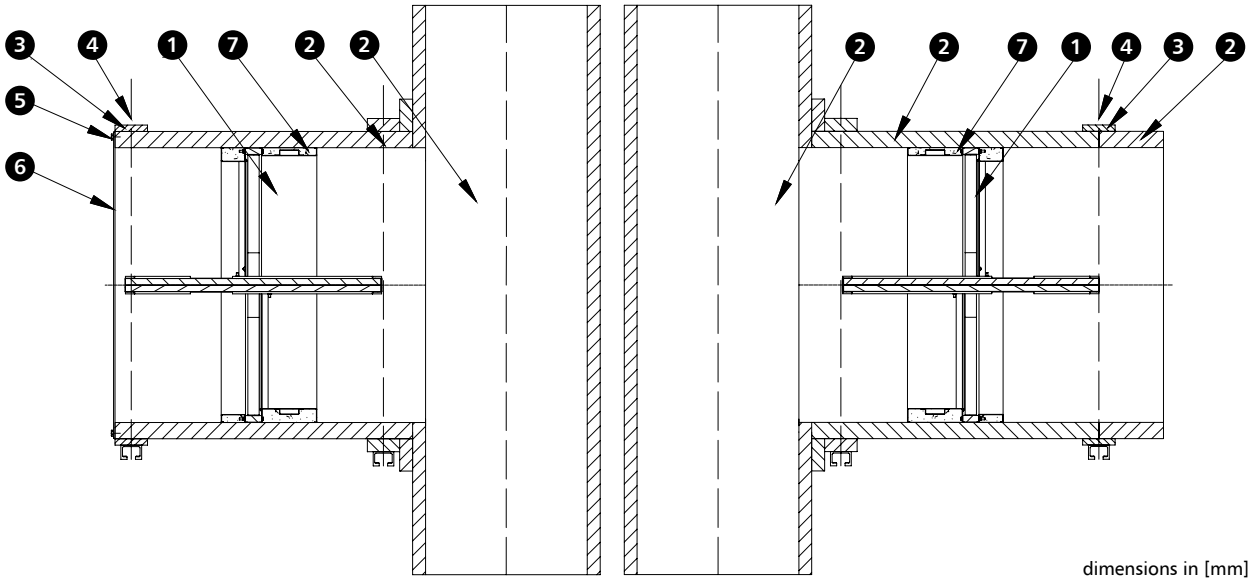
Minimum distance between the individual systems and partitions



dimensions in [mm]

Damper installation with a vertical axis of rotation
Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis (actuator installed on the dimension provided as the second one, e.g. 1000 x 200(s) or 200 x 1000(s) PP).

4.5.5 | Damper installation on horizontal ducts

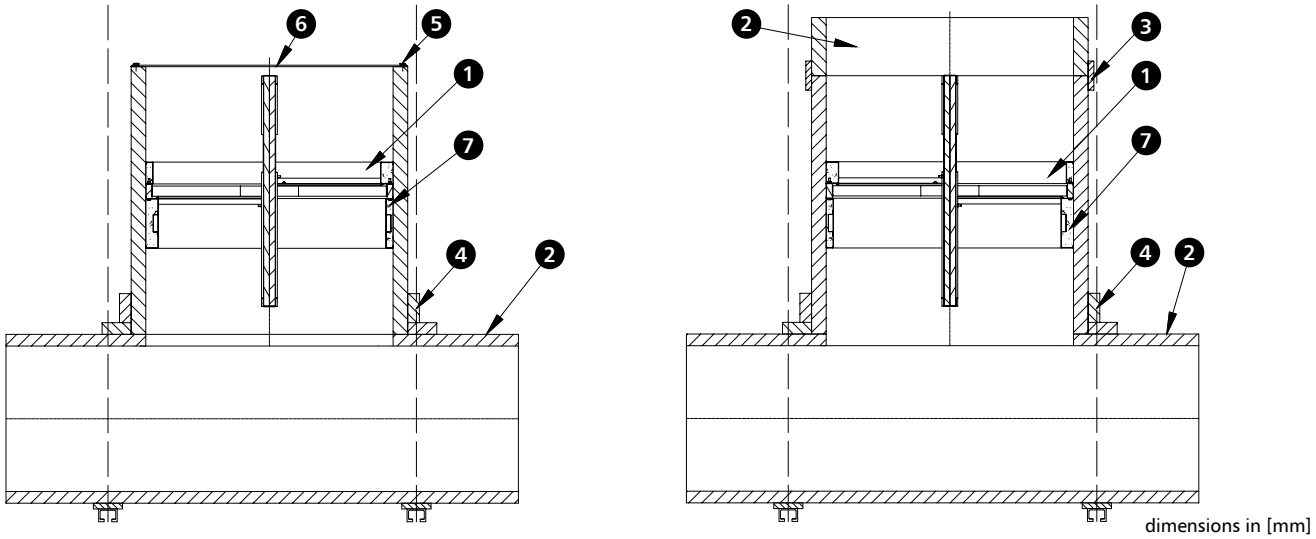


dimensions in [mm]

1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)
7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

4.5.6 | Damper installation on vertical ducts

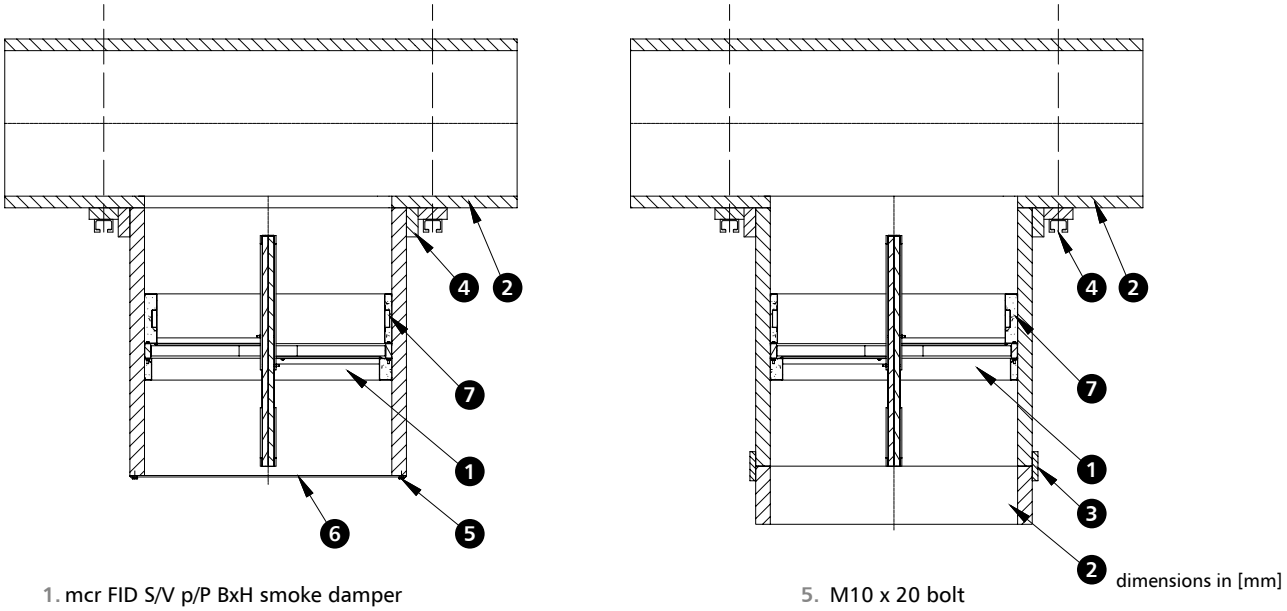


dimensions in [mm]

1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)
7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

4.5.7 | Damper installation on vertical ducts

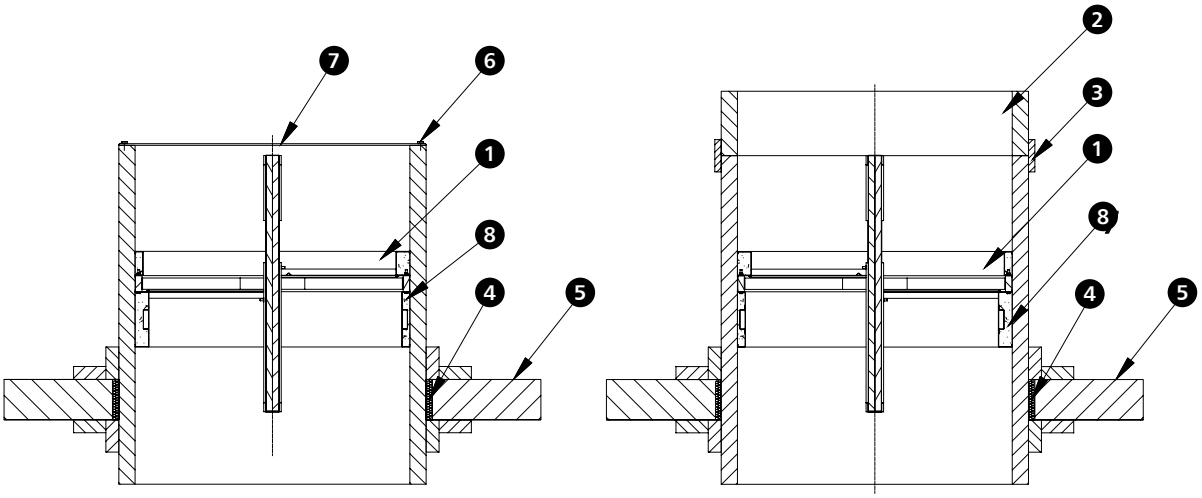


dimensions in [mm]

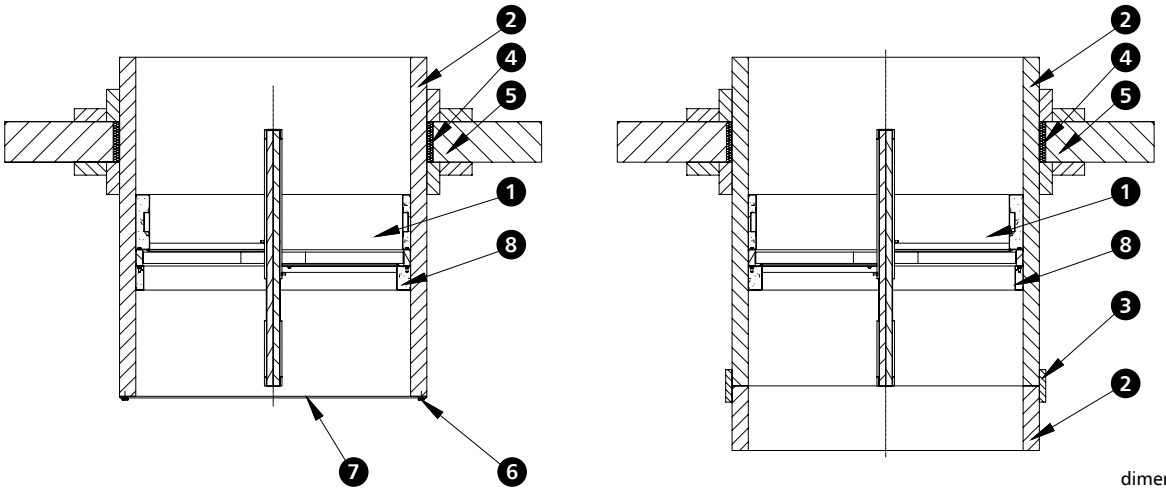
1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)
7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

4.5.8 | Damper installation on vertical ducts



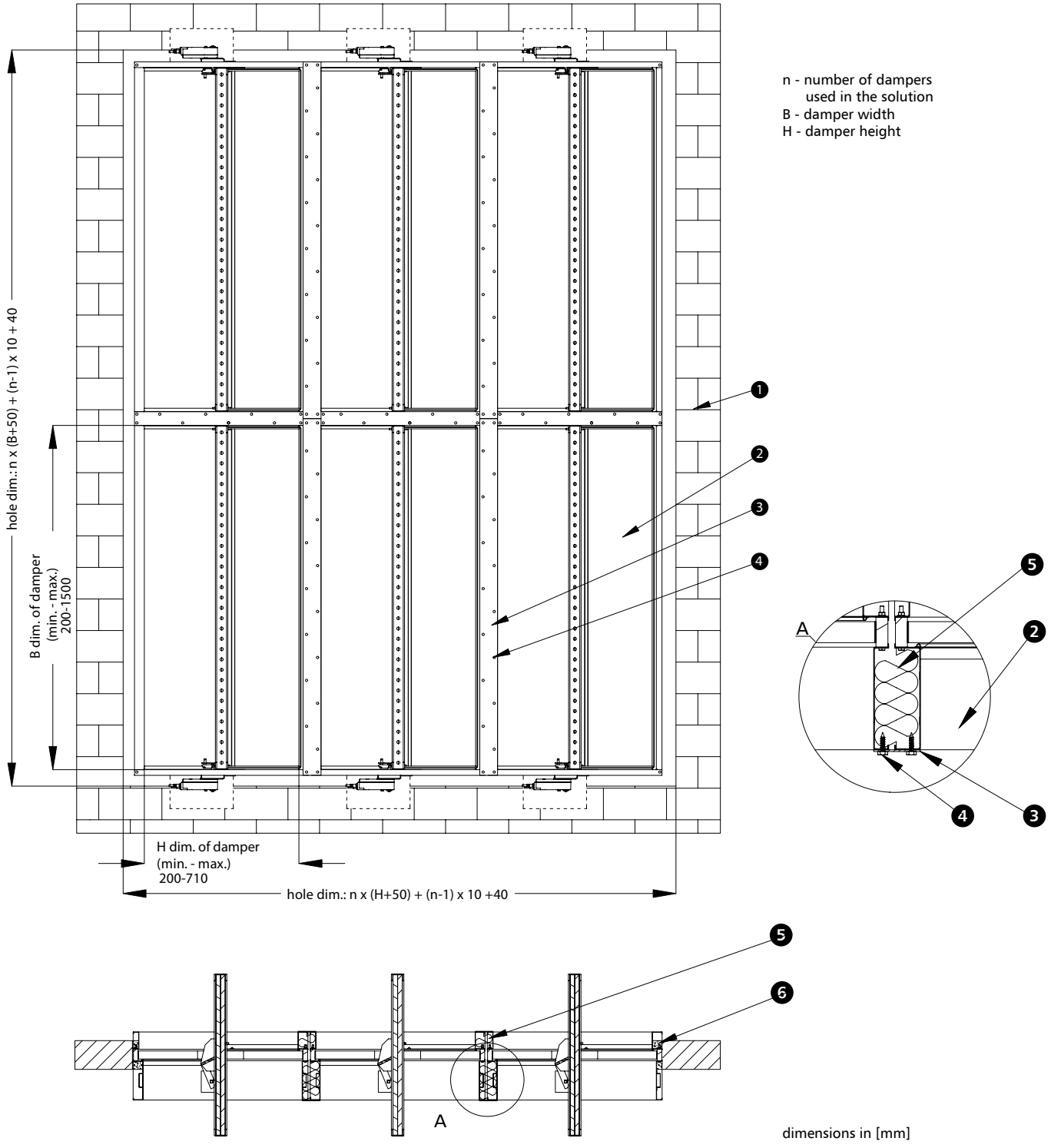
1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. Fireproof duct installation penetration system
5. Floor slab
6. M10 x 20 bolt
7. MWB system grille (optional)
8. sealing



dimensions in [mm]

1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. Fireproof duct installation penetration system
5. Floor slab
6. M10 x 20 bolt
7. MWB system grille (optional)
8. sealing

4.5.9 | Sample damper battery (module) installation



dimensions in [mm]

1. wall
2. mcr FID S/V p/P BxH smoke damper
3. installation flat bar along the entire H height of the module
4. self-drilling screw 3.5 x 25
5. mineral wool*
6. assembly mortar + gypsum board trim, min. 100x20mm*

* Recommended filling of spaces between the dampers is based on wool with a min. density of 100 kg/m³ and fire resistance class A1. Recommended damper installation to the wall is based on assembly mortar on the basis of gypsum or cement.

4.6 | mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	8	29	0.050	0.039	564	7	28	0.06	0.049	708	7	29
		6			631	19	40			847	17	40			1 063	16	40
		8			841	34	48			1 129	31	48			1 417	29	48
		10			1 051	54	54			1 411	49	54			1 771	45	54
	250	4	0.050	0.037	526	8	30	0.063	0.049	706	7	29	0.075	0.062	886	7	30
		6			788	19	41			1 058	17	41			1 328	16	41
		8			1 051	34	49			1 411	31	49			1 771	29	49
		10			1 314	54	55			1 764	49	55			2 214	45	54
	300	4	0.060	0.044	631	8	31	0.075	0.059	847	7	30	0.09	0.074	1 063	7	31
		6			946	19	42			1 270	17	42			1 594	16	42
		8			1 261	34	49			1 693	31	49			2 125	28	49
		10			1 577	54	55			2 117	48	55			2 657	45	55
	350	4	0.070	0.051	736	8	31	0.088	0.069	988	7	31	0.105	0.086	1 240	7	32
		6			1 104	19	42			1 482	17	42			1 860	16	42
		8			1 472	34	50			1 976	31	50			2 480	28	50
		10			1 840	53	56			2 470	48	56			3 100	44	56
	400	4	0.080	0.058	841	8	32	0.100	0.078	1 129	7	31	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	17	43			2 125	15	42
		8			1 682	34	51			2 258	30	50			2 834	28	50
		10			2 102	53	56			2 822	48	56			3 542	44	56
	450	4	0.090	0.066	946	8	32	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	33
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	33	51			2 540	30	51			3 188	28	51
		10			2 365	53	57			3 175	47	57			3 985	43	56
	500	4	0.100	0.073	1 051	8	33	0.125	0.098	1 411	7	32	0.15	0.123	1 771	6	31
		6			1 577	18	43			2 117	16	43			2 657	15	43
		8			2 102	33	51			2 822	30	51			3 542	27	51
		10			2 628	52	57			3 528	47	57			4 428	43	57
	550	4	0.110	0.080	1 156	8	33	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	32
		6			1 734	18	44			2 328	16	43			2 922	15	44
		8			2 313	33	52			3 105	29	51			3 897	27	51
		10			2 891	51	57			3 881	46	57			4 871	42	57
	600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.18	0.148	2 125	6	32
		6			1 892	18	44			2 540	16	44			3 188	15	44
		8			2 523	32	52			3 387	29	52			4 251	26	51
		10			3 154	51	58			4 234	45	57			5 314	41	57
	650	4	0.130	0.095	1 367	8	34	0.163	0.127	1 835	7	33	0.195	0.160	2 303	6	32
		6			2 050	18	44			2 752	16	44			3 454	14	43
		8			2 733	32	52			3 669	28	51			4 605	26	51
		10			3 416	50	58			4 586	44	57			5 756	40	57
	700	4	0.140	0.102	1 472	7	32	0.175	0.137	1 976	7	34	0.21	0.172	2 480	6	33
		6			2 208	17	44			2 964	15	44			3 720	14	44
		8			2 943	31	52			3 951	28	52			4 959	25	51
		10			3 679	49	58			4 939	44	58			6 199	40	57

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	200 S_k [m²]	200 S_e [m²]	200 Q [m³/h]	200 d_p [PA]	200 L_{WA} [dB]	250 S_k [m²]	250 S_e [m²]	250 Q [m³/h]	250 d_p [PA]	250 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]
750		4	0.150	0.110	1 577	7	33	0.188	0.147	2 117	6	32	0.225	0.185	2 657	6	33
		6			2 365	17	44			3 175	15	44			3 985	14	44
		8			3 154	31	52			4 234	27	52			5 314	25	52
		10			3 942	48	58			5 292	43	58			6 642	39	57
800		4	0.160	0.117	1 682	7	33	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
		6			2 523	17	45			3 387	15	44			4 251	13	43
		8			3 364	30	52			4 516	27	52			5 668	24	51
		10			4 205	47	58			5 645	42	58			7 085	38	57
850		4	0.170	0.124	1 787	7	33	0.213	0.167	2 399	6	33	0.255	0.209	3 011	5	31
		6			2 681	16	44			3 599	14	44			4 517	13	44
		8			3 574	29	52			4 798	26	52			6 022	23	51
		10			4 468	46	58			5 998	41	58			7 528	37	57
900		4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	33	0.27	0.221	3 188	5	31
		6			2 838	16	44			3 810	14	44			4 782	13	44
		8			3 784	29	52			5 080	25	51			6 376	23	51
		10			4 730	45	58			6 350	40	58			7 970	36	57
1000		4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	33	0.3	0.246	3 542	5	32
		6			3 154	15	44			4 234	13	43			5 314	12	43
		8			4 205	28	52			5 645	24	51			7 085	22	51
		10			5 256	43	58			7 056	38	57			8 856	34	57
1100		4	0.220	0.161	2 313	6	32	0.275	0.216	3 105	5	31	0.33	0.271	3 897	5	32
		6			3 469	15	44			4 657	13	44			5 845	11	43
		8			4 625	26	52			6 209	23	51			7 793	20	50
		10			5 782	41	57			7 762	36	57			9 742	32	56
1200		4	0.240	0.175	2 523	6	33	0.300	0.235	3 387	5	32	0.36	0.295	4 251	4	30
		6			3 784	14	44			5 080	12	43			6 376	11	43
		8			5 046	25	51			6 774	22	51			8 502	19	50
		10			6 307	39	57			8 467	34	57			10 627	30	56
1300		4	0.260	0.190	2 733	5	31	0.325	0.255	3 669	5	32	0.39	0.320	4 605	4	30
		6			4 100	13	43			5 504	11	42			6 908	10	42
		8			5 466	23	51			7 338	20	50			9 210	18	50
		10			6 833	37	57			9 173	32	56			11 513	28	55
1400		4	0.280	0.204	2 943	5	31	0.350	0.274	3 951	4	29	0.42	0.344	4 959	4	30
		6			4 415	12	42			5 927	10	41			7 439	9	41
		8			5 887	22	50			7 903	19	50			9 919	17	49
		10			7 358	35	56			9 878	30	56			12 398	27	55
1500		4	0.300	0.219	3 154	5	31	0.375	0.294	4 234	4	30	0.45	0.369	5 314	4	31
		6			4 730	12	43			6 350	10	42			7 970	9	41
		8			6 307	21	50			8 467	18	49			10 627	16	49
		10			7 884	33	56			10 584	28	55			13 284	25	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		350					400					450				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.070	0.059	852	6	28	0.080	0.069	996	6	29	0.090	0.079	1 140	6	29
	6			1 279	15	40			1 495	14	40			1 711	13	39
	8			1 705	27	48			1 993	25	47			2 281	24	47
	10			2 131	42	53			2 491	40	53			2 851	38	53
250	4	0.088	0.074	1 066	6	29	0.100	0.087	1 246	6	30	0.113	0.099	1 426	6	30
	6			1 598	15	41			1 868	14	41			2 138	13	40
	8			2 131	27	49			2 491	25	48			2 851	24	48
	10			2 664	42	54			3 114	40	54			3 564	38	54
300	4	0.105	0.089	1 279	6	30	0.120	0.104	1 495	6	31	0.135	0.119	1 711	6	31
	6			1 918	15	42			2 242	14	42			2 566	13	41
	8			2 557	27	49			2 989	25	49			3 421	24	49
	10			3 197	42	55			3 737	39	55			4 277	37	55
350	4	0.123	0.104	1 492	6	30	0.140	0.121	1 744	6	31	0.158	0.139	1 996	5	29
	6			2 238	15	42			2 616	14	42			2 994	13	42
	8			2 984	26	50			3 488	25	50			3 992	23	49
	10			3 730	41	56			4 360	39	56			4 990	37	55
400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	32	0.180	0.158	2 281	5	30
	6			2 557	14	42			2 989	13	42			3 421	13	42
	8			3 410	26	50			3 986	24	50			4 562	23	50
	10			4 262	41	56			4 982	38	56			5 702	36	56
450	4	0.158	0.133	1 918	6	32	0.180	0.156	2 242	6	32	0.203	0.178	2 566	5	30
	6			2 877	14	43			3 363	13	42			3 849	13	43
	8			3 836	26	51			4 484	24	50			5 132	23	50
	10			4 795	40	56			5 605	38	56			6 415	36	56
500	4	0.175	0.148	2 131	6	32	0.200	0.173	2 491	6	33	0.225	0.198	2 851	5	31
	6			3 197	14	43			3 737	13	43			4 277	12	42
	8			4 262	25	51			4 982	24	51			5 702	22	50
	10			5 328	40	57			6 228	37	56			7 128	35	56
550	4	0.193	0.163	2 557	6	32	0.220	0.190	2 740	5	31	0.248	0.218	3 136	5	31
	6			3 836	14	44			4 110	13	43			4 704	12	43
	8			5 115	25	51			5 481	23	51			6 273	22	51
	10			6 394	39	57			6 851	36	56			7 841	34	56
600	4	0.210	0.178	2 557	6	33	0.240	0.208	2 989	5	31	0.270	0.238	3 421	5	32
	6			3 836	13	43			4 484	13	44			5 132	12	43
	8			5 115	24	51			5 979	23	51			6 843	21	50
	10			6 394	38	57			7 474	36	57			8 554	34	57
650	4	0.228	0.192	2 771	6	33	0.260	0.225	3 239	5	31	0.293	0.257	3 707	5	32
	6			4 156	13	43			4 858	12	43			5 560	11	42
	8			5 541	24	51			6 477	22	51			7 413	21	51
	10			6 926	37	57			8 096	35	57			9 266	33	57
700	4	0.245	0.207	2 984	5	31	0.28	0.242	3 488	5	32	0.315	0.277	3 992	5	32
	6			4 476	13	44			5 232	12	43			5 988	11	43
	8			5 967	23	51			6 975	22	51			7 983	20	50
	10			7 459	37	57			8 719	34	57			9 979	32	57

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]	400 S_k [m²]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	400 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]
750		4	0.263	0.222	3 197	5	31	0.3	0.260	3 737	5	32	0.338	0.297	4 277	5	33
		6			4 795	13	44			5 605	12	44			6 415	11	43
		8			6 394	23	51			7 474	21	51			8 554	20	51
		10			7 992	36	57			9 342	33	57			10 692	31	56
800		4	0.280	0.237	3 410	5	32	0.32	0.277	3 986	5	32	0.360	0.317	4 562	4	29
		6			5 115	12	43			5 979	11	43			6 843	11	42
		8			6 820	22	51			7 972	21	51			9 124	19	49
		10			8 525	35	57			9 965	32	57			11 405	30	55
850		4	0.298	0.252	3 623	5	32	0.34	0.294	4 235	5	33	0.383	0.337	4 847	4	29
		6			5 435	12	43			6 353	11	43			7 271	10	41
		8			7 246	22	51			8 470	20	51			9 694	19	49
		10			9 058	34	57			10 588	31	56			12 118	29	55
900		4	0.315	0.266	3 836	5	32	0.360	0.311	4 484	4	30	0.405	0.356	5 132	4	29
		6			5 754	12	44			6 726	11	43			7 698	10	41
		8			7 672	21	51			8 968	19	50			10 264	18	49
		10			9 590	33	57			11 210	31	57			12 830	29	55
1000		4	0.350	0.296	4 262	5	33	0.400	0.346	4 982	4	30	0.450	0.396	5 702	4	29
		6			6 394	11	43			7 474	10	42			8 554	9	40
		8			8 525	20	51			9 965	18	50			11 405	17	48
		10			10 656	31	56			12 456	29	56			14 256	27	54
1100		4	0.385	0.326	4 689	4	30	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29
		6			7 033	10	42			8 221	9	41			9 409	9	40
		8			9 377	19	50			10 961	17	50			12 545	16	47
		10			11 722	29	56			13 702	27	56			15 682	25	53
1200		4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	3	25
		6			7 672	10	43			8 968	9	42			10 264	8	38
		8			10 230	17	49			11 958	16	49			13 686	15	46
		10			12 787	27	55			14 947	25	55			17 107	23	52
1300		4	0.455	0.385	5 541	4	31	0.520	0.450	6 477	3	28	0.585	0.515	7 413	3	25
		6			8 312	9	41			9 716	8	41			11 120	8	38
		8			11 082	16	49			12 954	15	49			14 826	14	45
		10			13 853	26	55			16 193	24	55			18 533	22	51
1400		4	0.490	0.414	5 967	3	27	0.560	0.484	6 975	3	28	0.630	0.554	7 983	3	25
		6			8 951	8	40			10 463	8	41			11 975	7	36
		8			11 935	15	48			13 951	14	48			15 967	13	45
		10			14 918	24	55			17 438	22	54			19 958	20	50
1500		4	0.525	0.444	6 394	3	28	0.600	0.519	7 474	3	28	0.675	0.594	8 554	3	25
		6			9 590	8	41			11 210	7	40			12 830	6	34
		8			12 787	14	48			14 947	13	48			17 107	12	43
		10			15 984	22	54			18 684	20	53			21 384	19	49

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		500					550					600				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.1	0.089	1 284	5	27	0.110	0.099	1 428	5	28	0.120	0.109	1 572	5	28
	6			1 927	13	40			2 143	12	39			2 359	12	40
	8			2 569	23	47			2 857	22	47			3 145	21	47
	10			3 211	36	53			3 571	35	53			3 931	34	53
250	4	0.125	0.112	1 606	5	28	0.138	0.124	1 786	5	29	0.150	0.137	1 966	5	29
	6			2 408	13	41			2 678	12	40			2 948	12	41
	8			3 211	23	48			3 571	22	48			3 931	21	48
	10			4 014	36	54			4 464	35	54			4 914	33	54
300	4	0.15	0.134	1 927	5	29	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
	6			2 890	12	41			3 214	12	41			3 538	11	40
	8			3 853	23	49			4 285	22	49			4 717	21	49
	10			4 817	36	55			5 357	34	55			5 897	33	55
350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	30	0.210	0.191	2 752	5	31
	6			3 372	12	41			3 750	12	42			4 128	11	41
	8			4 496	22	49			5 000	21	49			5 504	20	49
	10			5 620	35	55			6 250	34	55			6 880	32	55
400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	31	0.240	0.218	3 145	5	31
	6			3 853	12	42			4 285	12	42			4 717	11	42
	8			5 138	22	50			5 714	21	50			6 290	20	49
	10			6 422	35	56			7 142	33	56			7 862	32	56
450	4	0.225	0.201	2 890	5	31	0.248	0.223	3 214	5	31	0.270	0.246	3 538	5	32
	6			4 335	12	42			4 821	11	42			5 307	11	42
	8			5 780	22	50			6 428	21	50			7 076	20	50
	10			7 225	34	56			8 035	32	56			8 845	31	56
500	4	0.250	0.223	3 211	5	31	0.275	0.248	3 571	5	32	0.300	0.273	3 931	4	29
	6			4 817	12	43			5 357	11	42			5 897	11	43
	8			6 422	21	50			7 142	20	50			7 862	19	50
	10			8 028	33	56			8 928	32	56			9 828	30	56
550	4	0.275	0.245	3 853	5	32	0.303	0.273	4 285	5	32	0.330	0.300	4 717	4	30
	6			5 780	11	42			6 428	11	43			7 076	10	42
	8			7 707	21	51			8 571	20	50			9 435	19	50
	10			9 634	33	56			10 714	31	56			11 794	30	56
600	4	0.3	0.268	3 853	5	32	0.330	0.298	4 285	4	30	0.360	0.328	4 717	4	30
	6			5 780	11	43			6 428	11	43			7 076	10	42
	8			7 707	20	50			8 571	19	50			9 435	18	50
	10			9 634	32	56			10 714	30	56			11 794	29	56
650	4	0.325	0.290	4 175	5	33	0.358	0.322	4 643	4	30	0.390	0.355	5 111	4	31
	6			6 262	11	43			6 964	10	42			7 666	10	43
	8			8 349	20	51			9 285	19	50			10 221	18	50
	10			10 436	31	56			11 606	30	56			12 776	28	56
700	4	0.350	0.312	4 496	4	30	0.385	0.347	5 000	4	30	0.420	0.382	5 504	4	31
	6			6 744	11	43			7 500	10	42			8 256	10	43
	8			8 991	19	50			9 999	18	50			11 007	17	50
	10			11 239	30	56			12 499	29	56			13 759	27	56

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	500 S_k [m²]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]	500 L_{WA} [dB]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	600 L_{WA} [dB]
750		4	0.375	0.335	4 817	4	30	0.413	0.372	5 357	4	31	0.450	0.410	5 897	4	31
		6			7 225	10	42			8 035	10	43			8 845	9	42
		8			9 634	19	51			10 714	18	50			11 794	17	50
		10			12 042	29	56			13 392	28	56			14 742	27	56
800		4	0.4	0.357	5 138	4	30	0.440	0.397	5 714	4	31	0.480	0.437	6 290	4	31
		6			7 707	10	42			8 571	9	42			9 435	9	42
		8			10 276	18	50			11 428	17	50			12 580	16	50
		10			12 845	29	56			14 285	27	56			15 725	26	56
850		4	0.425	0.379	5 459	4	30	0.468	0.422	6 071	4	31	0.510	0.464	6 683	4	32
		6			8 189	10	42			9 107	9	42			10 025	9	42
		8			10 918	18	50			12 142	17	50			13 366	16	50
		10			13 648	28	56			15 178	26	56			16 708	25	56
900		4	0.45	0.401	5 780	4	30	0.495	0.446	6 428	4	32	0.540	0.491	7 076	3	28
		6			8 670	9	41			9 642	9	42			10 614	8	39
		8			11 560	17	49			12 856	16	50			14 152	15	47
		10			14 450	27	55			16 070	25	55			17 690	24	52
1000		4	0.5	0.446	6 422	4	30	0.550	0.496	6 428	3	28	0.600	0.546	7 862	3	29
		6			9 634	9	41			9 642	8	41			11 794	8	41
		8			12 845	16	48			12 856	15	49			15 725	14	49
		10			16 056	25	54			16 070	24	55			19 656	23	55
1100		4	0.55	0.491	7 065	3	27	0.605	0.546	7 857	3	29	0.660	0.601	8 649	3	29
		6			10 597	8	39			11 785	8	41			12 973	7	40
		8			14 129	15	48			15 713	14	49			17 297	13	48
		10			17 662	24	54			19 642	22	55			21 622	21	54
1200		4	0.6	0.535	7 707	3	27	0.660	0.595	8 571	3	29	0.720	0.655	9 435	3	29
		6			11 560	8	39			12 856	7	40			14 152	7	41
		8			15 414	14	47			17 142	13	48			18 870	12	48
		10			19 267	22	53			21 427	21	54			23 587	20	54
1300		4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	29	0.780	0.710	10 221	2	25
		6			12 524	7	38			13 928	7	40			15 332	6	39
		8			16 698	13	46			18 570	12	47			20 442	11	47
		10			20 873	20	51			23 213	19	53			25 553	18	53
1400		4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	2	24	0.840	0.764	11 007	2	25
		6			13 487	6	36			14 999	6	39			16 511	6	39
		8			17 983	12	45			19 999	11	47			22 015	10	46
		10			22 478	19	51			24 998	18	53			27 518	17	53
1500		4	0.75	0.669	9 634	2	21	0.825	0.744	10 714	2	25	0.900	0.819	11 794	2	25
		6			14 450	6	36			16 070	6	39			17 690	5	37
		8			19 267	11	43			21 427	10	46			23 587	10	46
		10			24 084	17	49			26 784	16	52			29 484	15	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	750 S_k [m²]	750 S_e [m²]	750 Q [m³/h]	750 d_p [PA]	750 L_{WA} [dB]
200		4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	4	26
		6			2 575	11	39			2 791	11	39			3 007	11	40
		8			3 433	21	47			3 721	20	47			4 009	19	47
		10			4 291	32	53			4 651	31	53			5 011	31	53
250		4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	4	27
		6			3 218	11	40			3 488	11	40			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	19	48
		10			5 364	32	54			5 814	31	54			6 264	30	54
300		4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	28	0.225	0.209	3 007	4	28
		6			3 862	11	41			4 186	11	41			4 510	10	40
		8			5 149	20	49			5 581	19	48			6 013	19	49
		10			6 437	32	55			6 977	31	55			7 517	30	55
350		4	0.228	0.209	3 004	5	31	0.245	0.226	3 256	4	29	0.263	0.244	3 508	4	29
		6			4 506	11	41			4 884	11	42			5 262	10	41
		8			6 008	20	49			6 512	19	49			7 016	18	49
		10			7 510	31	55			8 140	30	55			8 770	29	55
400		4	0.260	0.238	3 433	4	29	0.280	0.258	3 721	4	29	0.300	0.278	4 009	4	30
		6			5 149	11	42			5 581	10	41			6 013	10	41
		8			6 866	19	49			7 442	19	49			8 018	18	49
		10			8 582	31	56			9 302	30	55			10 022	29	55
450		4	0.293	0.268	3 862	4	29	0.315	0.291	4 186	4	30	0.338	0.313	4 510	4	30
		6			5 793	10	41			6 279	10	42			6 765	10	42
		8			7 724	19	50			8 372	18	49			9 020	18	50
		10			9 655	30	56			10 465	29	56			11 275	28	55
500		4	0.325	0.298	4 291	4	30	0.350	0.323	4 651	4	30	0.375	0.348	5 011	4	30
		6			6 437	10	42			6 977	10	42			7 517	10	42
		8			8 582	19	50			9 302	18	50			10 022	17	49
		10			10 728	29	56			11 628	28	56			12 528	27	55
550		4	0.358	0.328	5 149	4	30	0.385	0.355	5 116	4	31	0.413	0.383	5 512	4	31
		6			7 724	10	42			7 674	10	43			8 268	9	41
		8			10 299	18	50			10 233	17	49			11 025	17	50
		10			12 874	29	56			12 791	28	56			13 781	27	56
600		4	0.390	0.358	5 149	4	31	0.420	0.388	5 581	4	31	0.450	0.418	6 013	4	31
		6			7 724	10	43			8 372	9	42			9 020	9	42
		8			10 299	18	50			11 163	17	50			12 027	16	49
		10			12 874	28	56			13 954	27	56			15 034	26	56
650		4	0.423	0.387	5 579	4	31	0.455	0.420	6 047	4	31	0.488	0.452	6 515	4	32
		6			8 368	9	42			9 070	9	42			9 772	9	42
		8			11 157	17	50			12 093	17	50			13 029	16	50
		10			13 946	27	56			15 116	26	56			16 286	25	55
700		4	0.455	0.417	6 008	4	31	0.490	0.452	6 512	4	32	0.525	0.487	7 016	3	28
		6			9 012	9	42			9 768	9	42			10 524	8	41
		8			12 015	17	50			13 023	16	50			14 031	15	49
		10			15 019	26	56			16 279	25	55			17 539	24	55

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	750 S_k [m²]	750 S_e [m²]	750 Q [m³/h]	750 d_p [PA]	750 L_{WA} [dB]
750		4	0.488	0.447	6 437	4	32	0.525	0.485	6 977	4	32	0.563	0.522	7 517	3	28
		6			9 655	9	42			10 465	9	42			11 275	8	41
		8			12 874	16	50			13 954	16	50			15 034	15	49
		10			16 092	26	56			17 442	25	56			18 792	24	56
800		4	0.520	0.477	6 866	4	32	0.560	0.517	7 442	3	26	0.600	0.557	8 018	3	29
		6			10 299	9	42			11 163	8	39			12 027	8	42
		8			13 732	16	50			14 884	15	47			16 036	14	49
		10			17 165	25	55			18 605	24	52			20 045	23	55
850		4	0.553	0.507	7 295	3	28	0.595	0.549	7 907	3	29	0.638	0.592	8 519	3	29
		6			10 943	8	41			11 861	8	41			12 779	8	42
		8			14 590	15	49			15 814	15	50			17 038	14	49
		10			18 238	24	55			19 768	23	55			21 298	22	55
900		4	0.585	0.536	7 724	3	28	0.630	0.581	8 372	3	29	0.675	0.626	9 020	3	29
		6			11 586	8	41			12 558	8	42			13 530	7	40
		8			15 448	15	49			16 744	14	49			18 040	13	48
		10			19 310	23	54			20 930	22	55			22 550	21	55
1000		4	0.650	0.596	8 582	3	28	0.700	0.646	9 302	3	29	0.750	0.696	10 022	3	30
		6			12 874	7	39			13 954	7	40			15 034	7	41
		8			17 165	14	48			18 605	13	49			20 045	13	49
		10			21 456	22	54			23 256	21	55			25 056	20	54
1100		4	0.715	0.656	9 441	3	28	0.770	0.711	10 233	3	30	0.825	0.766	11 025	3	30
		6			14 161	7	39			15 349	7	41			16 537	6	39
		8			18 881	13	47			20 465	12	48			22 049	12	48
		10			23 602	20	53			25 582	19	54			27 562	18	53
1200		4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	2	25	0.900	0.835	12 027	2	25
		6			15 448	6	37			16 744	6	39			18 040	6	40
		8			20 598	12	46			22 326	11	47			24 054	11	47
		10			25 747	19	52			27 907	18	54			30 067	17	53
1300		4	0.845	0.775	11 157	2	23	0.910	0.840	12 093	2	25	0.975	0.905	13 029	2	26
		6			16 736	6	37			18 140	6	40			19 544	5	38
		8			22 314	11	45			24 186	10	46			26 058	10	47
		10			27 893	17	50			30 233	16	52			32 573	16	53
1400		4	0.910	0.834	12 015	2	23	0.980	0.904	13 023	2	26	1.050	0.974	14 031	2	26
		6			18 023	5	34			19 535	5	38			21 047	5	38
		8			24 031	10	44			26 047	9	45			28 063	9	46
		10			30 038	16	50			32 558	15	52			35 078	14	51
1500		4	0.975	0.894	12 874	2	23	1.050	0.969	13 954	2	26	1.125	1.044	15 034	2	26
		6			19 310	5	34			20 930	5	38			22 550	4	35
		8			25 747	9	42			27 907	9	45			30 067	8	44
		10			32 184	14	48			34 884	14	51			37 584	13	51

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]
200		4	0.160	0.149	2 148	4	27	0.170	0.159	2 292	4	27	0.180	0.169	2 436	4	27
		6			3 223	10	39			3 439	10	39			3 655	10	39
		8			4 297	19	47			4 585	18	47			4 873	18	47
		10			5 371	30	53			5 731	29	53			6 091	28	53
250		4	0.200	0.187	2 686	4	28	0.213	0.199	2 866	4	28	0.225	0.212	3 046	4	28
		6			4 028	10	40			4 298	10	40			4 568	10	40
		8			5 371	19	48			5 731	18	48			6 091	18	48
		10			6 714	29	54			7 164	29	54			7 614	28	54
300		4	0.240	0.224	3 223	4	29	0.255	0.239	3 439	4	29	0.270	0.254	3 655	4	29
		6			4 834	10	40			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	29	54			8 597	28	54			9 137	27	54
350		4	0.280	0.261	3 760	4	29	0.298	0.279	4 012	4	30	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	40
		8			7 520	18	49			8 024	17	48			8 528	17	49
		10			9 400	28	55			10 030	28	55			10 660	27	55
400		4	0.320	0.298	4 297	4	30	0.340	0.318	4 585	4	30	0.360	0.338	4 873	4	30
		6			6 445	10	42			6 877	9	41			7 309	9	41
		8			8 594	18	49			9 170	17	49			9 746	17	49
		10			10 742	28	55			11 462	27	55			12 182	26	55
450		4	0.360	0.336	4 834	4	30	0.383	0.358	5 158	4	31	0.405	0.381	5 482	4	31
		6			7 251	9	41			7 737	9	41			8 223	9	41
		8			9 668	17	49			10 316	17	49			10 964	16	49
		10			12 085	27	55			12 895	26	55			13 705	26	55
500		4	0.400	0.373	5 371	4	31	0.425	0.398	5 731	4	31	0.450	0.423	6 091	4	31
		6			8 057	9	41			8 597	9	42			9 137	9	42
		8			10 742	17	50			11 462	16	49			12 182	16	49
		10			13 428	26	55			14 328	26	55			15 228	25	55
550		4	0.440	0.410	5 908	4	31	0.468	0.438	6 304	4	31	0.495	0.465	6 700	3	28
		6			8 862	9	42			9 456	9	42			10 050	8	41
		8			11 817	16	49			12 609	16	50			13 401	15	49
		10			14 771	26	56			15 761	25	55			16 751	24	55
600		4	0.480	0.448	6 445	4	32	0.510	0.478	6 877	3	28	0.540	0.508	7 309	3	28
		6			9 668	9	42			10 316	8	41			10 964	8	41
		8			12 891	16	50			13 755	15	49			14 619	15	49
		10			16 114	25	55			17 194	24	55			18 274	24	55
650		4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	28	0.585	0.550	7 919	3	29
		6			10 474	8	41			11 176	8	41			11 878	8	41
		8			13 965	15	49			14 901	15	49			15 837	14	49
		10			17 456	24	55			18 626	24	56			19 796	23	55
700		4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	29	0.630	0.592	8 528	3	29
		6			11 280	8	41			12 036	8	42			12 792	8	42
		8			15 039	15	49			16 047	14	49			17 055	14	49
		10			18 799	24	56			20 059	23	55			21 319	22	55

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]
750		4	0.600	0.560	8 057	3	29	0.638	0.597	8 597	3	29	0.675	0.635	9 137	3	29
		6			12 085	8	42			12 895	8	42			13 705	7	40
		8			16 114	14	49			17 194	14	49			18 274	14	49
		10			20 142	23	55			21 492	22	55			22 842	21	55
800		4	0.640	0.597	8 594	3	29	0.680	0.637	9 170	3	29	0.720	0.677	9 746	3	30
		6			12 891	8	42			13 755	7	40			14 619	7	41
		8			17 188	14	49			18 340	13	48			19 492	13	49
		10			21 485	22	55			22 925	21	55			24 365	21	55
850		4	0.680	0.634	9 131	3	29	0.723	0.677	9 743	3	30	0.765	0.719	10 355	3	30
		6			13 697	7	40			14 615	7	41			15 533	7	41
		8			18 262	13	48			19 486	13	49			20 710	13	49
		10			22 828	21	55			24 358	21	55			25 888	20	55
900		4	0.720	0.671	9 668	3	30	0.765	0.716	10 316	3	30	0.810	0.761	10 964	3	30
		6			14 502	7	41			15 474	7	41			16 446	7	41
		8			19 336	13	49			20 632	13	49			21 928	12	48
		10			24 170	21	55			25 790	20	55			27 410	19	54
1000		4	0.800	0.746	10 742	3	30	0.850	0.796	11 462	3	30	0.900	0.846	12 182	2	25
		6			16 114	7	41			17 194	6	39			18 274	6	40
		8			21 485	12	48			22 925	12	48			24 365	11	48
		10			26 856	19	54			28 656	18	54			30 456	18	54
1100		4	0.880	0.821	11 817	2	25	0.935	0.876	12 609	2	25	0.990	0.931	13 401	2	26
		6			17 725	6	39			18 913	6	40			20 101	6	40
		8			23 633	11	47			25 217	11	48			26 801	10	47
		10			29 542	18	54			31 522	17	53			33 502	16	53
1200		4	0.960	0.895	12 891	2	26	1.020	0.955	13 755	2	26	1.080	1.015	14 619	2	26
		6			19 336	6	40			20 632	5	38			21 928	5	38
		8			25 782	10	47			27 510	10	47			29 238	9	46
		10			32 227	16	53			34 387	16	53			36 547	15	52
1300		4	1.040	0.970	13 965	2	26	1.105	1.035	14 901	2	26	1.170	1.100	15 837	2	26
		6			20 948	5	38			22 352	5	38			23 756	5	38
		8			27 930	9	45			29 802	9	46			31 674	9	46
		10			34 913	15	52			37 253	14	52			39 593	14	52
1400		4	1.120	1.044	15 039	2	26	1.190	1.114	16 047	2	27	1.260	1.184	17 055	2	27
		6			22 559	5	38			24 071	4	36			25 583	4	36
		8			30 079	9	46			32 095	8	45			34 111	8	45
		10			37 598	14	52			40 118	13	51			42 638	13	51
1500		4	1.200	1.119	16 114	2	27	1.275	1.194	17 194	1	18	1.350	1.269	18 274	1	18
		6			24 170	4	36			25 790	4	36			27 410	4	36
		8			32 227	8	45			34 387	7	43			36 547	7	43
		10			40 284	12	50			42 984	12	50			45 684	11	49

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H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1000					1100					1200				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.200	0.189	2 724	4	28	0.220	0.209	3 012	4	28	0.240	0.229	3 300	4	29
	6			4 087	9	38			4 519	9	39			4 951	9	39
	8			5 449	17	47			6 025	16	46			6 601	16	47
	10			6 811	27	53			7 531	26	53			8 251	25	53
250	4	0.250	0.237	3 406	4	29	0.275	0.262	3 766	4	29	0.300	0.287	4 126	4	30
	6			5 108	9	39			5 648	9	40			6 188	9	40
	8			6 811	17	48			7 531	16	47			8 251	16	48
	10			8 514	27	54			9 414	25	53			10 314	25	54
300	4	0.300	0.284	4 087	4	30	0.330	0.314	4 519	4	30	0.360	0.344	4 951	3	27
	6			6 130	9	40			6 778	9	41			7 426	8	39
	8			8 173	17	48			9 037	16	48			9 901	15	48
	10			10 217	26	54			11 297	25	54			12 377	24	54
350	4	0.350	0.331	4 768	4	30	0.385	0.366	5 272	3	27	0.420	0.401	5 776	3	27
	6			7 152	9	41			7 908	8	40			8 664	8	40
	8			9 536	16	48			10 544	15	48			11 552	15	48
	10			11 920	26	55			13 180	24	54			14 440	24	54
400	4	0.400	0.378	5 449	4	31	0.440	0.418	6 025	3	28	0.480	0.458	6 601	3	28
	6			8 173	9	41			9 037	8	40			9 901	8	41
	8			10 898	16	49			12 050	15	48			13 202	14	48
	10			13 622	25	55			15 062	24	55			16 502	23	54
450	4	0.450	0.426	6 130	3	28	0.495	0.471	6 778	3	28	0.540	0.516	7 426	3	28
	6			9 195	8	40			10 167	8	41			11 139	8	41
	8			12 260	15	49			13 556	15	49			14 852	14	49
	10			15 325	24	55			16 945	23	55			18 565	22	54
500	4	0.500	0.473	6 811	3	28	0.550	0.523	7 531	3	28	0.600	0.573	8 251	3	29
	6			10 217	8	41			11 297	8	41			12 377	7	40
	8			13 622	15	49			15 062	14	49			16 502	14	49
	10			17 028	24	55			18 828	23	55			20 628	22	55
550	4	0.550	0.520	7 492	3	28	0.605	0.575	8 284	3	29	0.660	0.630	9 076	3	29
	6			11 238	8	41			12 426	8	42			13 614	7	40
	8			14 985	15	49			16 569	14	49			18 153	13	48
	10			18 731	23	55			20 711	22	55			22 691	21	55
600	4	0.600	0.568	8 173	3	29	0.660	0.628	9 037	3	29	0.720	0.688	9 901	3	30
	6			12 260	8	42			13 556	7	40			14 852	7	41
	8			16 347	14	49			18 075	13	48			19 803	13	49
	10			20 434	22	55			22 594	21	55			24 754	20	54
650	4	0.650	0.615	8 855	3	29	0.715	0.680	9 791	3	30	0.780	0.745	10 727	3	30
	6			13 282	7	40			14 686	7	41			16 090	7	41
	8			17 709	14	49			19 581	13	49			21 453	12	48
	10			22 136	22	55			24 476	21	55			26 816	20	55
700	4	0.700	0.662	9 536	3	30	0.770	0.732	10 544	3	30	0.840	0.802	11 552	3	30
	6			14 304	7	41			15 816	7	41			17 328	7	41
	8			19 071	13	49			21 087	13	49			23 103	12	48
	10			23 839	21	55			26 359	20	55			28 879	19	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1100 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]
	750	4	0.750	0.710	10 217	3	30	0.825	0.785	11 297	3	30	0.900	0.860	12 377	3	31
		6			15 325	7	41			16 945	7	41			18 565	6	40
		8			20 434	13	49			22 594	12	48			24 754	12	49
		10			25 542	20	55			28 242	19	54			30 942	18	54
	800	4	0.800	0.757	10 898	3	30	0.880	0.837	12 050	3	31	0.960	0.917	13 202	2	26
		6			16 347	7	41			18 075	6	40			19 803	6	40
		8			21 796	12	48			24 100	12	49			26 404	11	48
		10			27 245	20	55			30 125	19	55			33 005	18	54
	850	4	0.850	0.804	11 579	3	30	0.935	0.889	12 803	2	26	1.020	0.974	14 027	2	26
		6			17 369	6	39			19 205	6	40			21 041	6	40
		8			23 158	12	48			25 606	11	48			28 054	11	48
		10			28 948	19	54			32 008	18	54			35 068	17	54
	900	4	0.900	0.851	12 260	2	25	0.990	0.941	13 556	2	26	1.080	1.031	14 852	2	26
		6			18 390	6	40			20 334	6	40			22 278	6	40
		8			24 520	11	48			27 112	11	48			29 704	10	47
		10			30 650	18	54			33 890	17	54			37 130	16	53
	1000	4	1.000	0.946	13 622	2	26	1.100	1.046	15 062	2	26	1.200	1.146	16 502	2	27
		6			20 434	6	40			22 594	5	38			24 754	5	39
		8			27 245	11	48			30 125	10	47			33 005	9	46
		10			34 056	17	54			37 656	16	53			41 256	15	53
	1100	4	1.100	1.041	14 985	2	26	1.210	1.151	16 569	2	27	1.320	1.261	18 153	2	27
		6			22 477	5	38			24 853	5	39			27 229	5	39
		8			29 969	10	47			33 137	9	46			36 305	9	47
		10			37 462	15	52			41 422	14	52			45 382	14	52
	1200	4	1.200	1.135	16 347	2	27	1.320	1.255	18 075	2	27	1.440	1.375	19 803	2	27
		6			24 520	5	39			27 112	4	36			29 704	4	36
		8			32 694	9	46			36 150	8	45			39 606	8	45
		10			40 867	14	52			45 187	13	51			49 507	13	52
	1300	4	1.300	1.230	17 709	2	27	1.430	1.360	19 581	2	27					
		6			26 564	4	36			29 372	4	36					
		8			35 418	8	45			39 162	8	45					
		10			44 273	13	51			48 953	12	51					
	1400	4	1.400	1.324	19 071	1	18										
		6			28 607	4	36										
		8			38 143	7	44										
		10			47 678	12	51										
	1500	4	1.500	1.419	20 434	1	19										
		6			30 650	4	37										
		8			40 867	7	44										
		10			51 084	11	50										

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1300 L_{WA} [dB]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]	1400 L_{WA} [dB]	1500 S_k [m²]	1500 S_e [m²]	1500 Q [m³/h]	1500 d_p [PA]	1500 L_{WA} [dB]
	200	4	0.260	0.249	3 588	3	25	0.280	0.269	3 876	3	26	0.300	0.289	4 164	3	26
		6			5 383	8	38			5 815	8	38			6 247	8	39
		8			7 177	15	46			7 753	15	47			8 329	14	46
		10			8 971	24	52			9 691	23	52			10 411	23	52
	250	4	0.325	0.312	4 486	3	26	0.350	0.337	4 846	3	27	0.375	0.362	4 164	3	27
		6			6 728	8	39			7 268	8	39			6 247	8	40
		8			8 971	15	47			9 691	14	47			8 329	14	47
		10			11 214	24	53			12 114	23	53			10 411	22	53
	300	4	0.390	0.374	5 383	3	27	0.420	0.404	5 815	3	27	0.450	0.434	6 247	3	28
		6			8 074	8	40			8 722	8	40			9 370	8	40
		8			10 765	15	48			11 629	14	47			12 493	14	48
		10			13 457	23	54			14 537	22	53			15 617	22	54
	350	4	0.455	0.436	6 280	3	28	0.490	0.471	6 784	3	28	0.525	0.506	7 288	3	28
		6			9 420	8	40			10 176	8	41			10 932	7	39
		8			12 560	14	48			13 568	14	48			14 576	13	47
		10			15 700	23	54			16 960	22	54			18 220	21	54
	400	4	0.520	0.498	7 177	3	28	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	29
		6			10 765	8	41			11 629	7	40			12 493	7	40
		8			14 354	14	48			15 506	13	48			16 658	13	48
		10			17 942	22	54			19 382	21	54			20 822	21	54
	450	4	0.585	0.561	8 074	3	29	0.630	0.606	8 722	3	29	0.675	0.651	9 370	3	29
		6			12 111	7	40			13 083	7	40			14 055	7	40
		8			16 148	14	49			17 444	13	48			18 740	13	49
		10			20 185	21	54			21 805	21	54			23 425	20	54
	500	4	0.650	0.623	8 971	3	29	0.700	0.673	9 691	3	30	0.750	0.723	10 411	3	30
		6			13 457	7	40			14 537	7	41			15 617	7	41
		8			17 942	13	48			19 382	13	49			20 822	12	48
		10			22 428	21	55			24 228	20	54			26 028	19	54
	550	4	0.715	0.685	9 868	3	30	0.770	0.740	10 660	3	30	0.825	0.795	11 452	3	30
		6			14 802	7	41			15 990	7	41			17 178	6	39
		8			19 737	13	49			21 321	12	48			22 905	12	48
		10			24 671	20	54			26 651	19	54			28 631	19	54
	600	4	0.780	0.748	10 765	3	30	0.840	0.808	11 629	3	30	0.900	0.868	12 493	2	25
		6			16 148	7	41			17 444	6	39			18 740	6	40
		8			21 531	12	48			23 259	12	48			24 987	11	48
		10			26 914	20	55			29 074	19	54			31 234	18	54
	650	4	0.845	0.810	11 663	3	30	0.910	0.875	12 599	2	25	0.975	0.940	13 535	2	26
		6			17 494	6	39			18 898	6	40			20 302	6	40
		8			23 325	12	48			25 197	11	48			27 069	11	48
		10			29 156	19	54			31 496	18	54			33 836	18	54
	700	4	0.910	0.872	12 560	2	25	0.980	0.942	13 568	2	26	1.050	1.012	14 576	2	26
		6			18 840	6	40			20 352	6	40			21 864	6	40
		8			25 119	11	48			27 135	11	48			29 151	11	48
		10			31 399	18	54			33 919	17	54			36 439	17	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1300					1400					1500				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	750	4	0.975	0.935	13 457	2	26	1.050	1.010	14 537	2	26	1.125	1.085	15 617	2	26
		6			20 185	6	40			21 805	6	40			23 425	6	41
		8			26 914	11	48			29 074	11	48			31 234	10	47
		10			33 642	18	54			36 342	17	54			39 042	16	53
	800	4	1.040	0.997	14 354	2	26	1.120	1.077	15 506	2	26	1.200	1.157	16 658	2	27
		6			21 531	6	40			23 259	6	41			24 987	5	39
		8			28 708	11	48			31 012	10	47			33 316	10	48
		10			35 885	17	54			38 765	16	53			41 645	16	54
	850	4	1.105	1.059	15 251	2	26	1.190	1.144	16 475	2	27	1.275	1.229	17 699	2	27
		6			22 877	6	41			24 713	5	39			26 549	5	39
		8			30 502	10	47			32 950	10	48			35 398	9	47
		10			38 128	16	53			41 188	16	54			44 248	15	53
	900	4	1.170	1.121	16 148	2	27	1.260	1.211	17 444	2	27	1.350	1.301	18 740	2	27
		6			24 222	5	38			26 166	5	39			28 110	5	39
		8			32 296	10	47			34 888	9	46			37 480	9	47
		10			40 370	16	54			43 610	15	53			46 850	14	53
	1000	4	1.300	1.246	17 942	2	27	1.400	1.346	19 382	2	27	1.500	1.446	20 822	2	28
		6			26 914	5	39			29 074	5	39			31 234	4	37
		8			35 885	9	47			38 765	9	47			41 645	8	46
		10			44 856	14	52			48 456	14	53			52 056	13	52
	1100	4	1.430	1.371	19 737	2	27										
		6			29 605	4	36										
		8			39 473	8	45										
		10			49 342	13	52										

4.7 | Estimated weight of the mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers [kg]

height H [mm] \ width B [mm]	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
400	10	11	12	18	19	21	25	29	30	33	35	36	39	54	55
500	15	16	17	19	20	23	27	32	33	35	38	40	44	55	56
600	17	17.5	20	21	30	26	30	35	37	39	43	48	52	56	58
700	17.5	18	21	23	30	35	35	40	42	44	47	52	54	57	65
800	20	21	22	24	29	35	37	41	43	49	52	57	60	62	78
900	22	25	25	28	33	35	39	43	47	53	56	60	62	64	82
1000	23	29	28	33	36	42	43	49	53	56	59	65	67	69	98
1100	26	30	31	35	38	42	47	56	59	62	63	69	71		
1200	32	33	35	36	40	49	53	56	61	71	72	73			
1300	39	40	38	39	44	52	57	59	78	79	80				
1400	42	45	48	39	48	56	63	65	80	82					
1500	45	48	50	50	52	58	68	71	82	98					

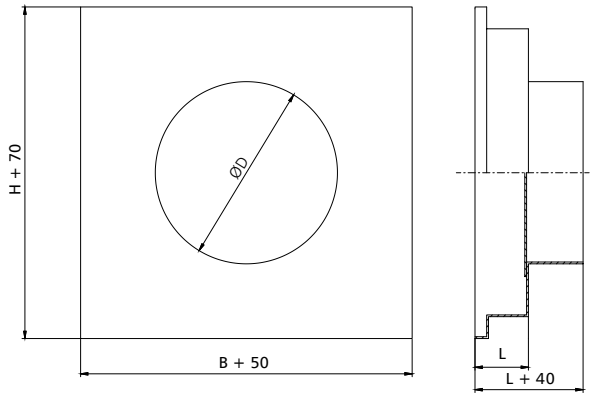
4.8 | Accessories

4.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

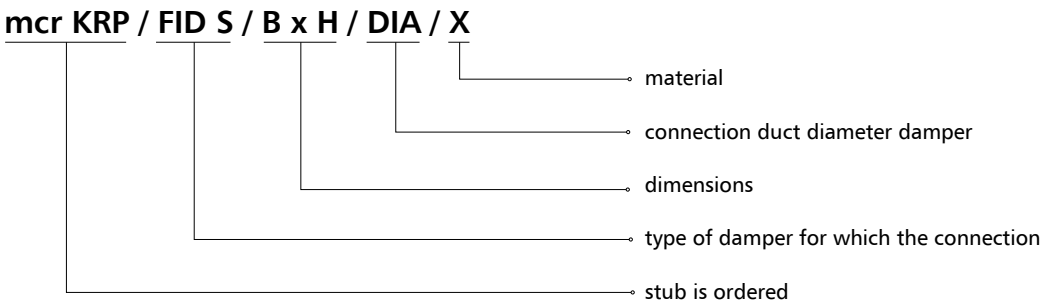
NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.

Dimensions:
- BxH - damper dimensions [mm]
- ØD - diameter of the connection duct [mm]
- L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side



dimensions in [mm]

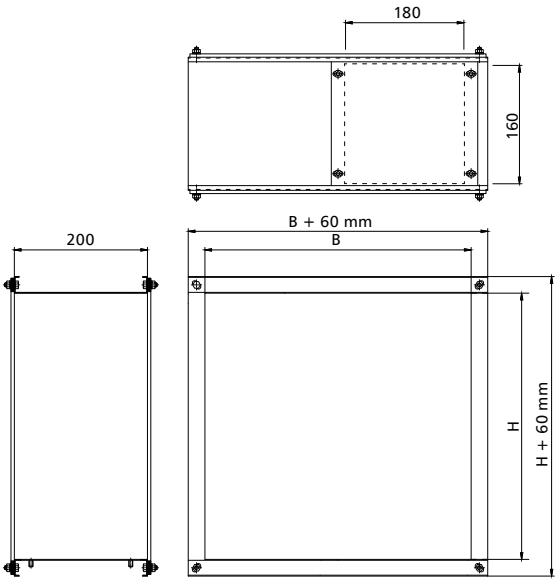
Marking:



X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

4.8.2 | Casing module with KRW-type inspection access

The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.



dimensions in [mm]

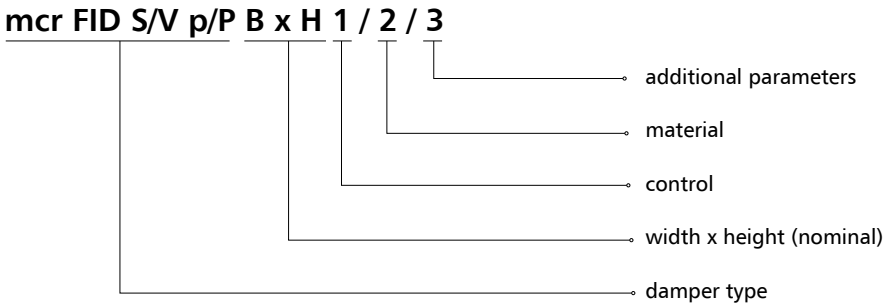
Marking:

mcr KRW P / FID S / B x H / X

- material
- dimensions
- type of damper for which the module is ordered
- rectangular module

X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

4.9 | Marking



1 - control:

» **trigger and control mechanism, axial actuator**
BE24 – actuator without a return spring, U = 24 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BEE24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC
BEN230 – actuator without a return spring, U = 230 V AC
BEE230 – actuator without a return spring, U = 230 V AC
MLE24 – actuator without a return spring, U = 24 V AC/DC
MLE230 – actuator without a return spring, U = 230 V AC
ME24 – actuator without a return spring, U = 24 V AC/DC
ME230 – actuator without a return spring, U = 230 V AC

2 - material

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters

» **Control mechanism position**
[no symbol] – perpendicular to the damper rotation axis
WOK – along the damper rotation axis

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – right damper
KL – left damper
KO – inverted damper

» **Damper casing**
[no symbol] – standard casing length
400 – casing with a length of 400 mm
BU - earth pin

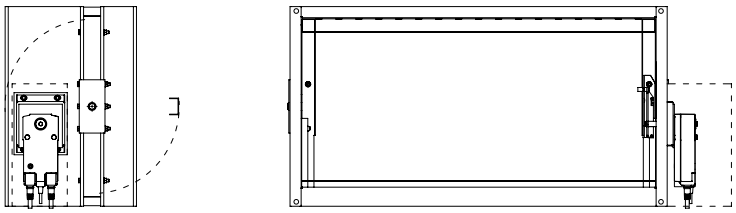
NOTE: **separate additional parameters entered with the "/" sign**

example marking:

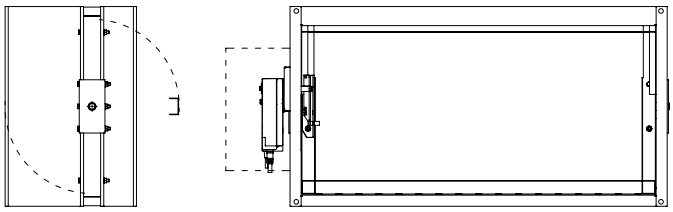
mcr FID S/V p/P 400 x 400 BEN24
Smoke control damper for fire ventilation systems with a 24 V actuator with limit switches.

4.9.1 | Design standard

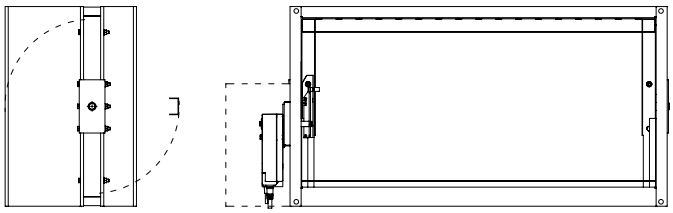
» right damper - standard



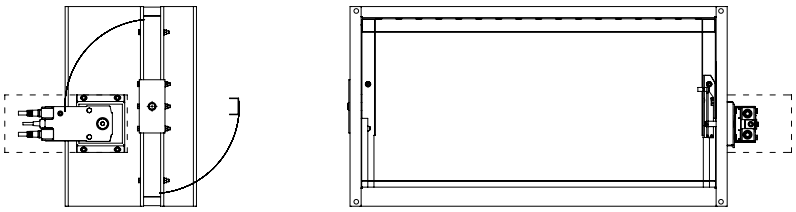
» inverted damper - (ducts facing downwards)



» left damper



» along the damper axis



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

downloadable models
on the website
under the designer zone tab



2434-CPR-0009

HYGIENIC CERTIFICATE

CTO S.A.

» **EIS120**
» Fire resistance class: EI60 (v_e h_o i↔o)S, EI90 (v_e i↔o)S, EI120 (v_e o→i)S, EI120 (v_e h_o i↔o)S, EI180 (h_o i↔o)S.
» Certificate of constancy of performance 2434-CPR-0009.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Cut-off dampers with a fire resistance rating independent of the airflow direction and installation side.
» Lower acoustic noise and hydraulic resistance in the system achieved through a reduction of damper blade thickness.
» Certified installation of dampers in close proximity.
» Certified installation of dampers at a distance from construction partitions.
» Certified damper dry installation in mineral wool.
» Pressure difference range: 2000 Pa.
» Permitted operation with both vertical and horizontal axis of rotation.
» KTB ATEX 2014/34/UE

5.1| Application

mcr FID PRO low-resistance cut-off dampers are designed for installation in comfort ventilation systems at installation passages through vertical and horizontal construction partitions. They are installed for example in systems with higher acoustic parameters requirements. During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes. Admissible flow velocity in the connected duct is 12 m/s for dampers with actuators and 10 m/s for fusible link dampers.
The dampers cannot be operated in systems exposed to dust, unless included in a special, individually developed service and technical inspections programme.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

5.2| Design



mcr FID PRO cut-off fire dampers consist of a casing with a circular cross-section, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically when the thermal or thermoelectric trigger is tripped. Standard damper casing is made of galvanized metal sheets. A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 acid-proof steel sheet, while other elements are impregnated. In the middle part, where the damper blade is placed, the casing is perforated along a width that depends on the blade diameter and thickness. On the damper circumference, around the closed damper blade, there is an intumescent gasket.
The blade is covered on both sides with metal sheets to ensure mechanical reinforcement and reduction of friction resistance. A ventilation gasket is installed on the perimeter of the blade, ensuring tightness of the dampers at ambient temperature. Both ends of the casing are terminated with a nipple (standard) or muff connection. Nipple dampers are made without external rubber perimeter gaskets as a standard. Upon the customer's request, dampers may be supplied with a perimeter lip gasket.

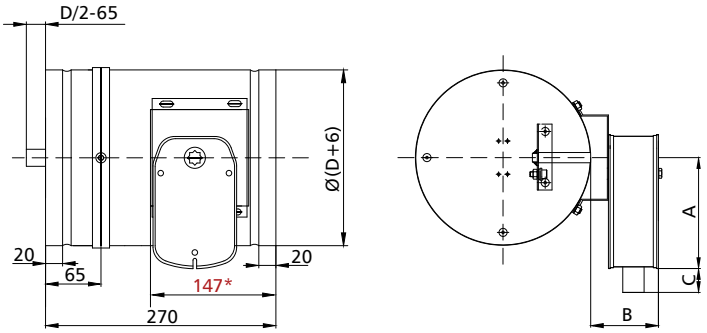
5.3 | Versions

5.3.1 | Damper closing and opening with an actuator

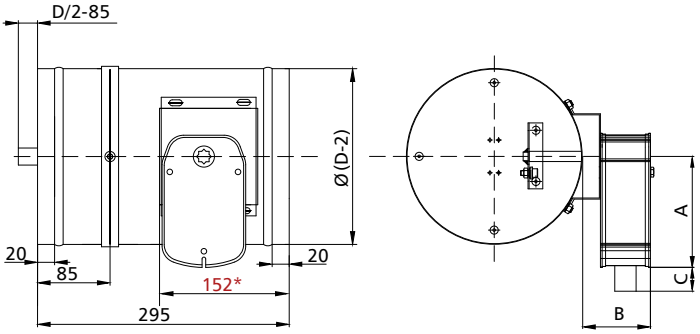
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

mcr FID PRO dampers are equipped with a trigger control mechanism in the form of BFL, MLF, EXBF, QT.Ex or BF-TL series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). The actuators are equipped with limit switches used to monitor the blade position. Furthermore, a mechanical position indicator is placed on the actuator. Thermoelectric triggers are equipped with a test switch.
Dampers with analog actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.

» muff version



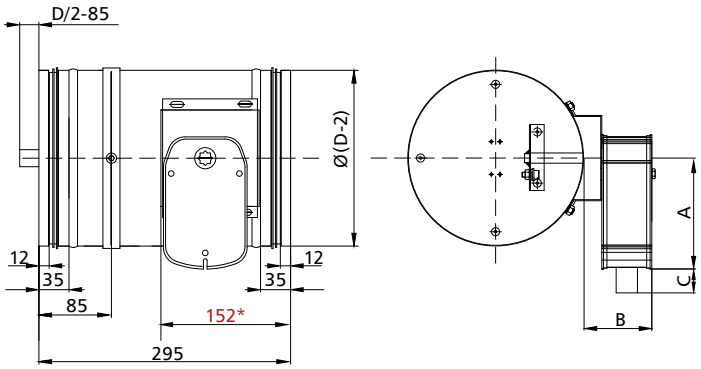
» nipple version



dimensions in [mm]

*embedding border

» version with UKW perimeter gasket

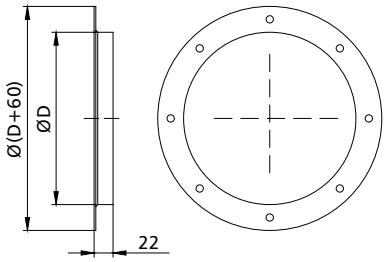


dimensions in [mm]

mechanism	A	B	C
BFL, MLF	138	74	30
BF24TL-ST	198	85	10
EXBF	225	190	55
QT.Ex	260	105	30

*embedding border

» connection flange



dimensions in [mm]

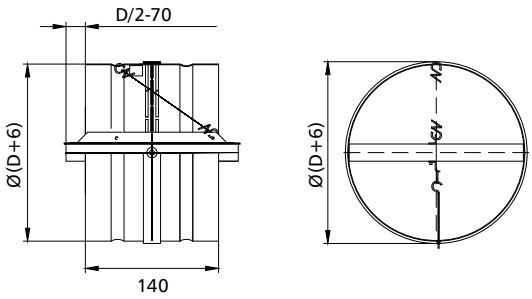
Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.3.2 | mcr FID PRO – cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically.

mcr FID PRO dampers are equipped with a **RST** trigger control mechanism with a drive spring (without an integrated thermal trigger). In this case, a 74°C thermal trigger (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position.

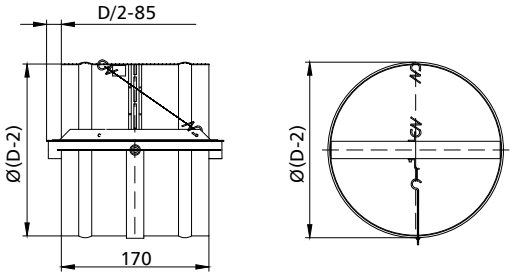
» muff version



dimensions in [mm]

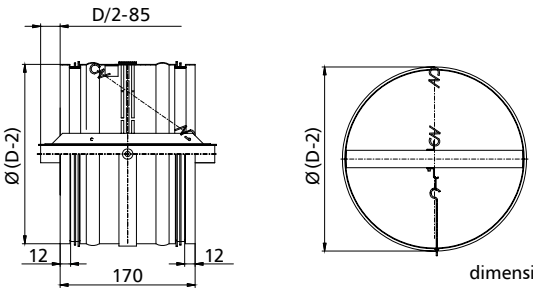
insert symmetrically against the wall axis

» nipple version



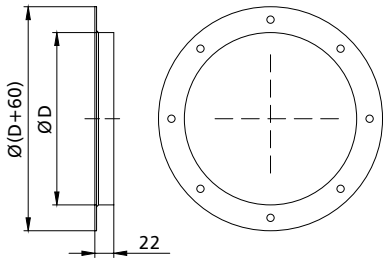
insert symmetrically against the wall axis

» version with an UKW perimeter gasket



dimensions in [mm]

» connection flange



dimensions in [mm]

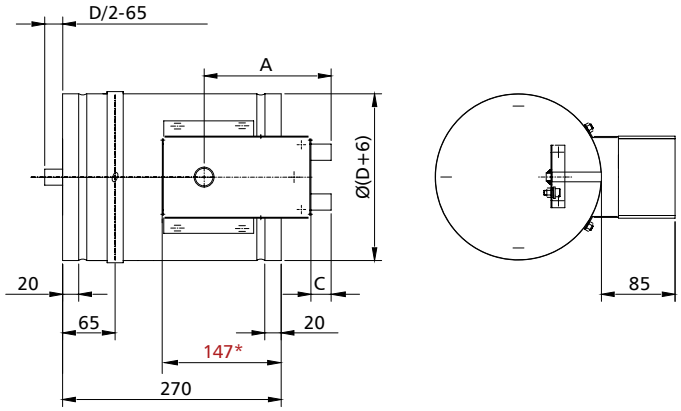
Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.3.3 | mcr FID PRO – cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID PRO dampers are equipped with a **KW1** trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse") or removal („break") of the power supply voltage and with limit switches used to signal the blade position. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually using a key. It is not required to dismantle the system to replace the thermal trigger. The KW1 mechanism may be replaced with an electric actuator.

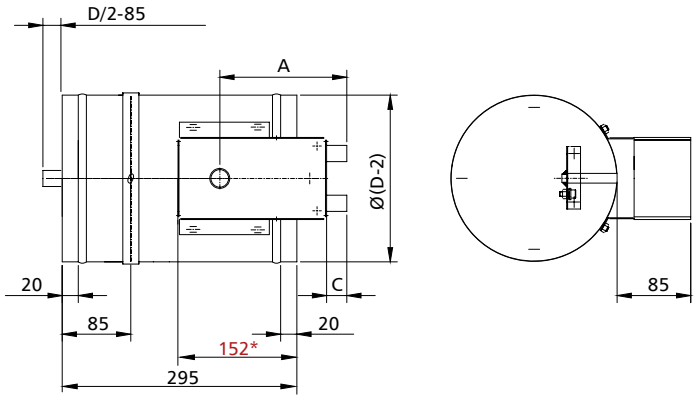
» muff version



dimensions in [mm]

*embedding border

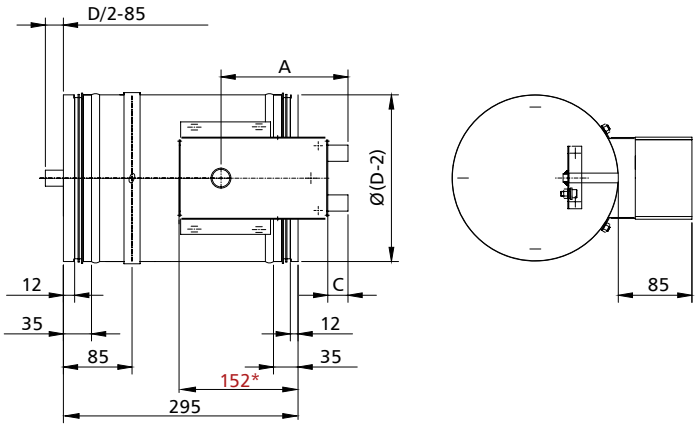
» nipple version



dimensions in [mm]

*embedding border

» version with UKW perimeter gasket

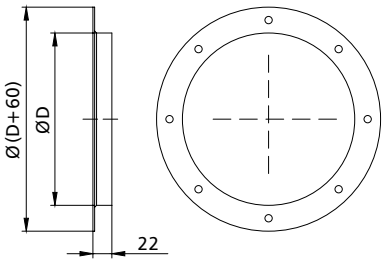


dimensions in [mm]

*embedding border

mechanism	A	C
KW1	130	30

» connection flange



dimensions in [mm]

Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.4 | Dimensions

Circular dampers:
» nominal diameter D from 100 mm to 315 mm

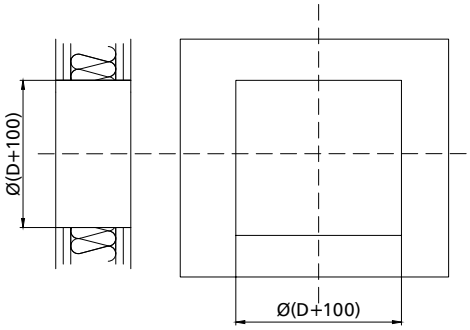
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

5.5 | Installation

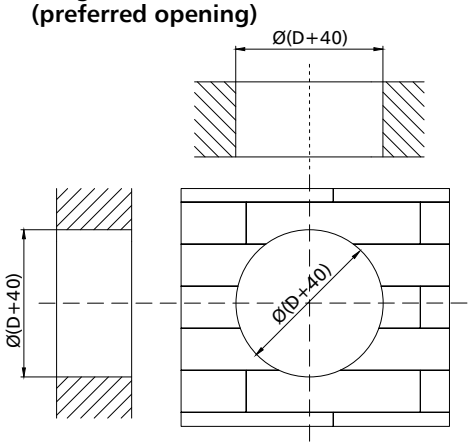
mcr FID PRO round dampers are rated EI120(v_e h_o i↔o)S and EI90S(v_e h_o i↔o)S if installed in concrete partitions, partitions made of full bricks or aerated concrete blocks with a thickness of at least or 125 mm, with mortar or mineral wool, or 120 mm with mortar for EIS120 class, in light walls/shafts made of gypsum boards with a min. thickness of 125 mm and concrete floors with a min. thickness of 150 mm. Additionally, mcr FID PRO dampers with diameters from 201 to 315 mm installed in concrete floor slabs are EI180(h_o i↔o) S rated. Dampers may also be installed away from walls/shafts, provided that the ventilation duct section between the damper and the wall meets the criteria of EIS120 fire resistance rating. The dampers can also be installed in flexible walls of the RIGIPS 3.50.11 system and have been classified as EI90 S with permitted dry installation for dampers D100 to D200, and EI120 S with permitted wet and dry installation for D100 dampers.

5.5.1 | Preparation of installation openings

» **in light gypsum board walls – dry installation (preferred opening)**



» **in rigid walls and floor slabs - wet installation (preferred opening)**

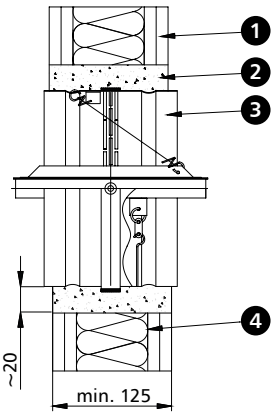


dimensions in [mm]

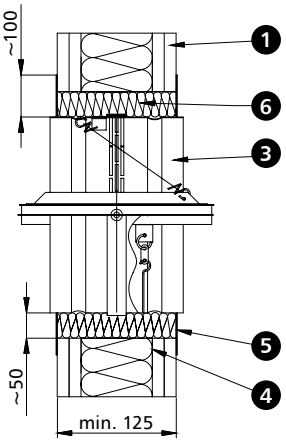
5.5.2 | Sample installation in gypsum board light walls

» **mcr FID PRO damper with an RST mechanism**

» **WET installation**



» **DRY installation**



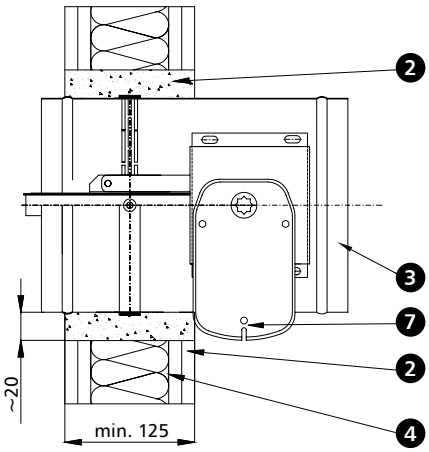
1. light wall
2. assembly mortar*
3. mcr FID PRO fire damper
4. structural profile
5. elastic fire protection grout/mass*
6. mineral wool

* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

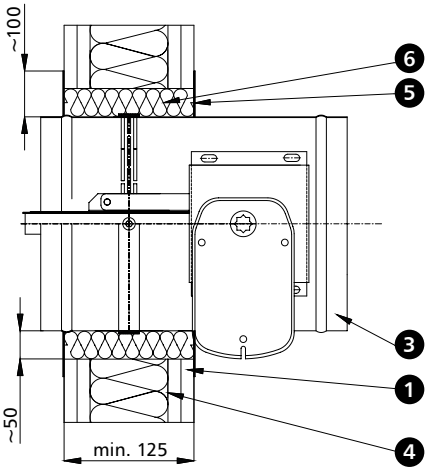
NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

» mcr FID PRO damper with a BFL, MLF, KW1 mechanism

» WET installation



» DRY installation



dimensions in [mm]

1. light wall
2. assembly mortar*
3. mcr FID PRO fire damper
4. structural profile
5. elastic fire protection grout/mass*
6. mineral wool*
7. trigger control mechanism

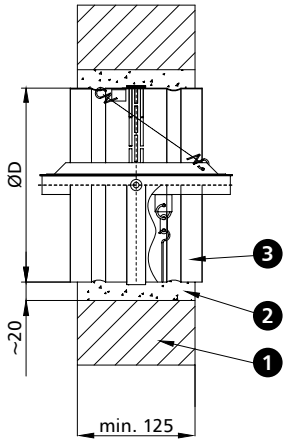
* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

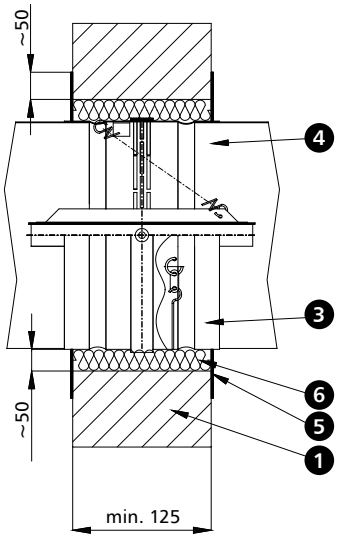
5.5.3 | Sample installation in concrete and brick walls

» mcr FID PRO damper with an RST mechanism

» WET installation



» DRY installation



dimensions in [mm]

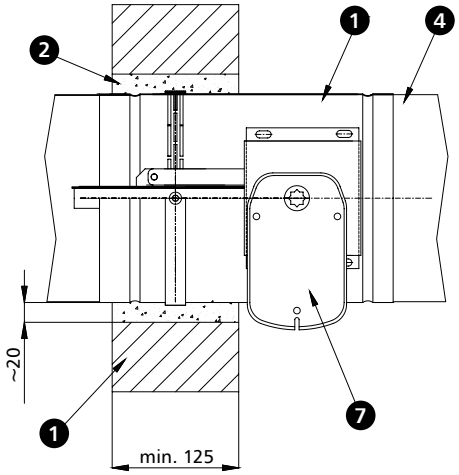
1. rigid wall
2. assembly mortar*
3. mcr FID PRO fire damper
4. ventilation duct
5. elastic fire protection grout/mass*
6. mineral wool*

* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

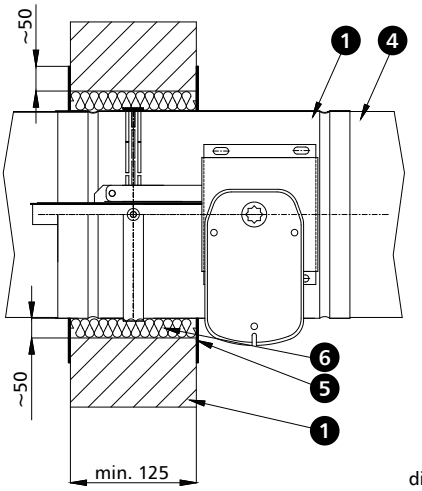
NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

» mcr FID PRO damper with a BFL, MLF, KW1 mechanism

» WET installation



» DRY installation



dimensions in [mm]

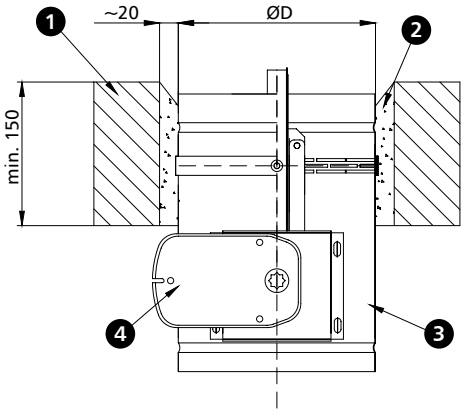
1. rigid wall
2. assembly mortar*
3. mcr FID PRO fire damper
4. ventilation duct
5. elastic fire protection grout/mass*
6. mineral wool*
7. trigger control mechanism

* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m3 and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

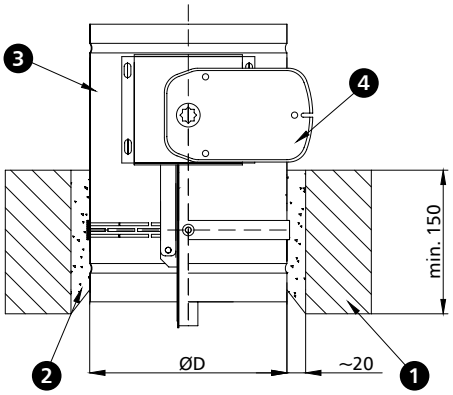
NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

5.5.4 | Sample installation in floor slabs

» mcr FID PRO damper
» with a BFL, MLF, KW1 mechanism



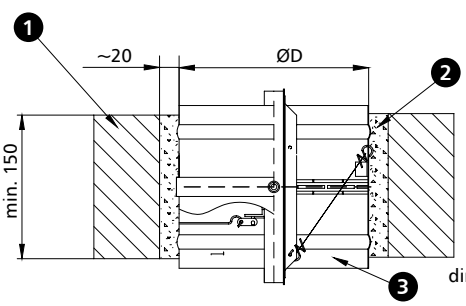
» mcr FID PRO damper
» with a BFL, MLF, KW1 mechanism



1. floor slab
2. assembly mortar*
3. mcr FID PRO fire damper
4. trigger control mechanism

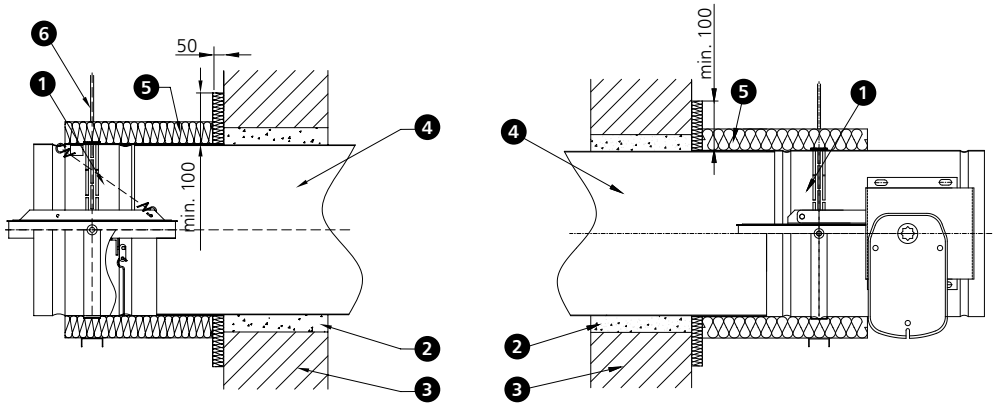
* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied

» mcr FID PRO damper with an RST mechanism



dimensions in [mm]

5.5.5 | Sample installation outside of a fire partition

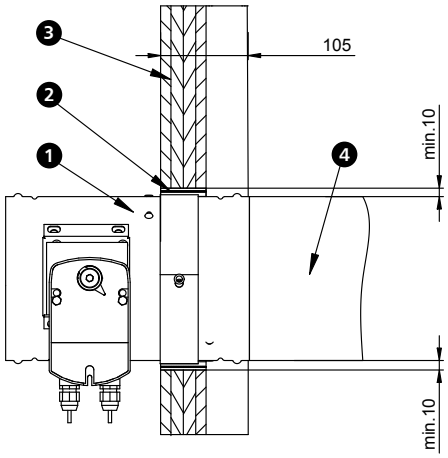


1. mcr FID PRO fire damper
2. assembly mortar*
3. wall
4. ventilation duct
5. fire protection material ensuring the required fire resistance rating
6. duct suspension

dimensions in [mm]

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied. The maximum distance of the damper from the building partition is 1000 mm.

5.5.6 | Sample installation in RIGIPS 3.50.11 walls*

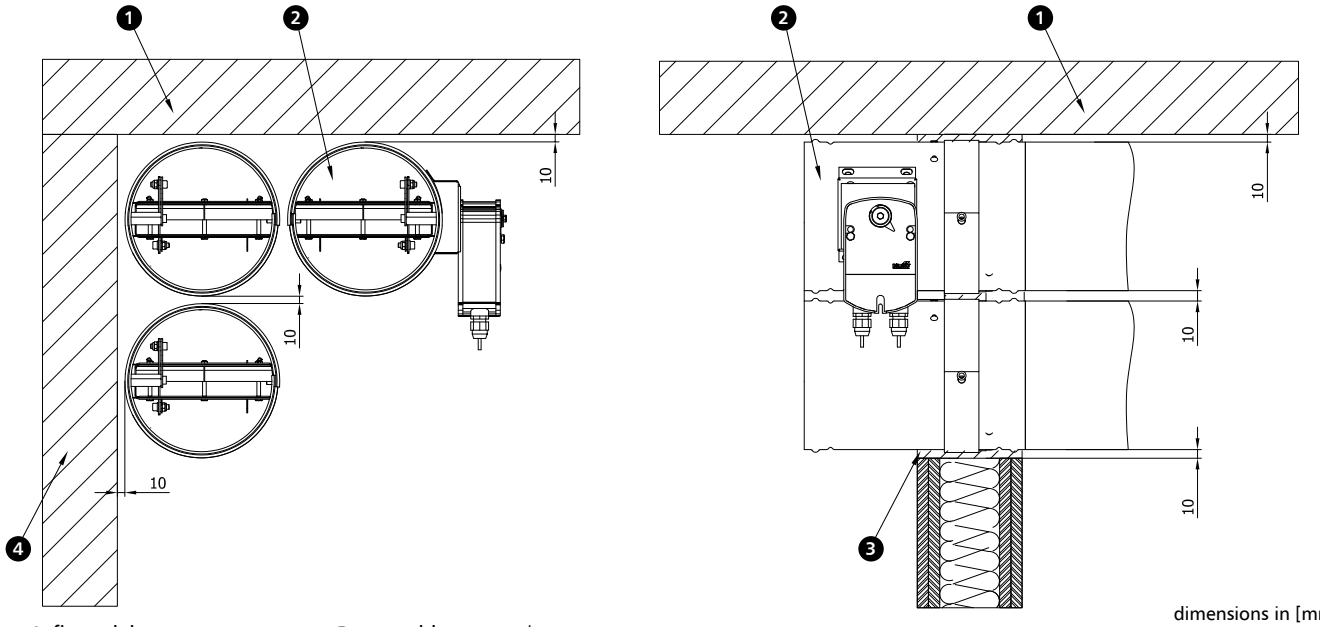


1. mcr FID PRO fire damper
2. wool
3. Rigips wall
4. ventilation duct

* the D100 to D200 damper has an EI90 (v_e i↔o)S - dry installation allowed
* the D100 damper has an EI120 (v_e o→i)S - wet and dry installation allowed

dimensions in [mm]

Minimum distance between systems and partitions



1. floor slab
2. mcr FID PRO damper
3. assembly mortar *
4. wall

dimensions in [mm]

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied.

5.6 | mcr FID PRO rectangular dampers technical parameters

D – nominal diameter [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

» mcr FID PRO EIS 60

» mcr FID PRO 100

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
100	2	0.0079	0.0064	46	3	16
	4			91	11	25
	6			137	20	33
	8			183	32	40

» mcr FID PRO 125

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
125	2	0.0123	0.0104	75	2	14
	4			150	8	23
	6			224	15	32
	8			299	25	39

» mcr FID PRO 160

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
160	2	0.0201	0.0177	127	1	11
	4			255	3	14
	6			382	7	24
	8			510	12	32

» mcr FID PRO 200

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
200	2	0.0314	0.0284	204	1	12
	4			409	3	17
	6			613	8	29
	8			818	15	37

» mcr FID PRO 250

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
250	2	0.0491	0.0453	326	1	3
	4			653	2	8
	6			979	2	15
	8			1305	4	20

» mcr FID PRO 315

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
315	2	0.0779	0.0732	527	1	4
	4			1054	2	10
	6			1580	3	18
	8			2107	5	26

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

D – nominal diameter [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

» mcr FID PRO EIS 120

» mcr FID PRO 100

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
100	2	0.0079	0.0059	42	4.5	21
	4			84	14	29
	6			126	26	37
	8			168	42	43

» mcr FID PRO 125

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
125	2	0.0123	0.0098	70	3	19
	4			141	10	27
	6			211	20	36
	8			281	33	42

» mcr FID PRO 160

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
160	2	0.0201	0.0169	122	1	16
	4			243	4	17
	6			365	9	28
	8			487	16	35

» mcr FID PRO 200

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
200	2	0.0314	0.0274	197	1	16
	4			395	5	21
	6			592	11	33
	8			789	20	40

» mcr FID PRO 250

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
250	2	0.0491	0.0391	281	2	17
	4			563	4	21
	6			844	7	27
	8			1125	10	33

» mcr FID PRO 315

D [m/s]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
315	2	0.0779	0.0653	470	2	18
	4			940	4	23
	6			1410	7	31
	8			1880	13	39

The mcr FID PRO fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

5.6.1 | Flow characteristics for mcr FID PRO circular dampers

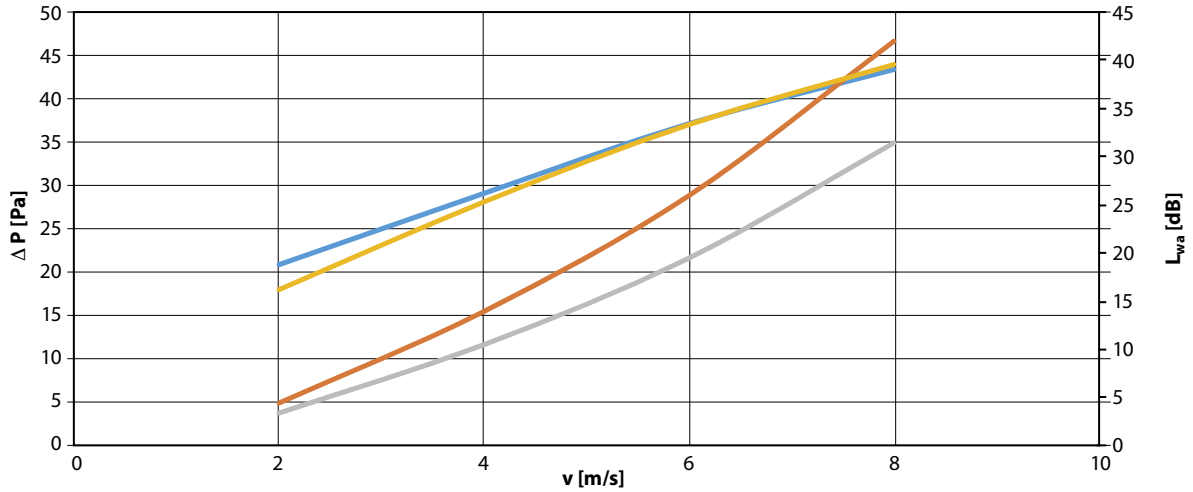
EIS120 — damper noise emission level

EIS120 — pressure drop on a damper

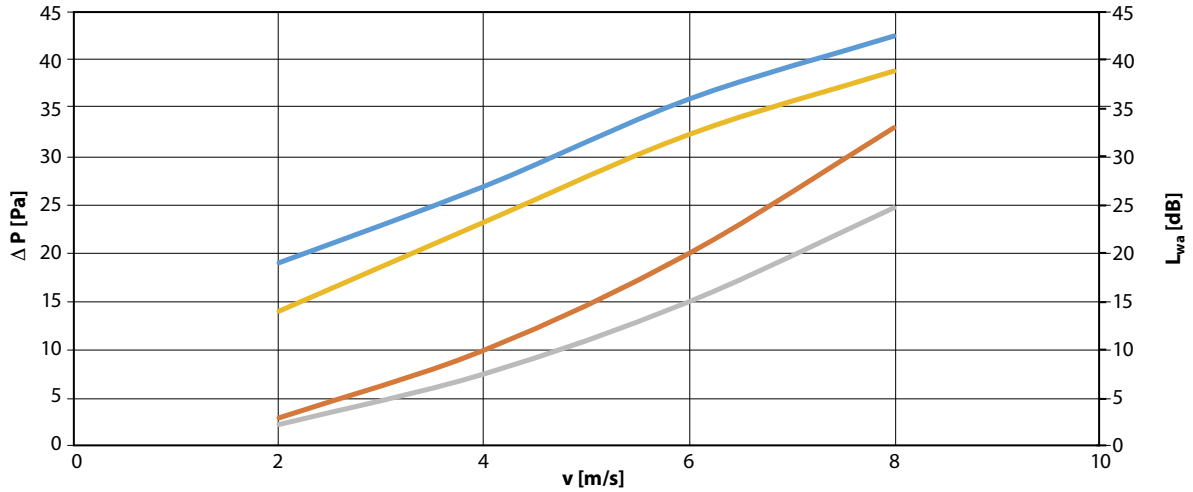
EIS60 — pressure drop on a damper

EIS60 — damper noise emission level

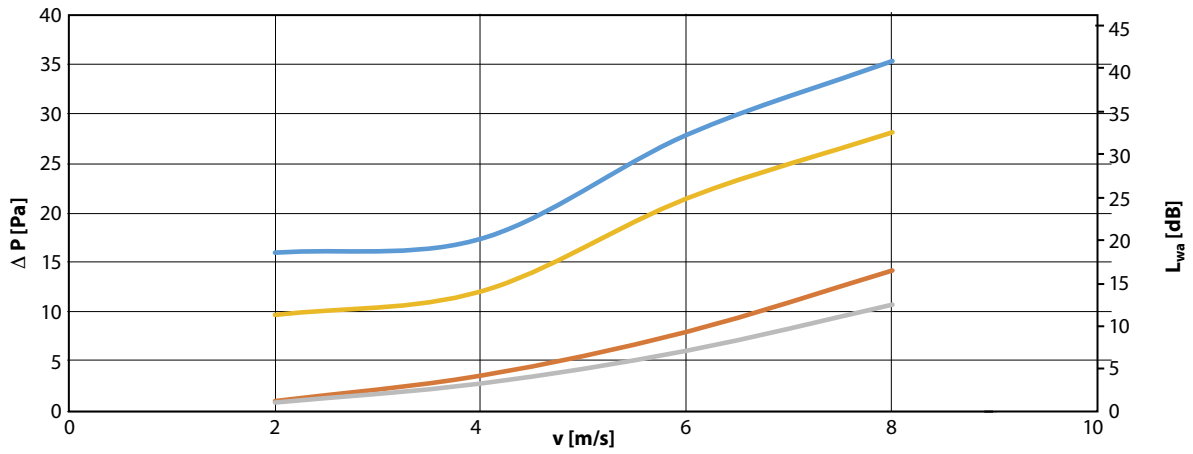
» mcr FID PRO 100



» mcr FID PRO 125



» mcr FID PRO 160



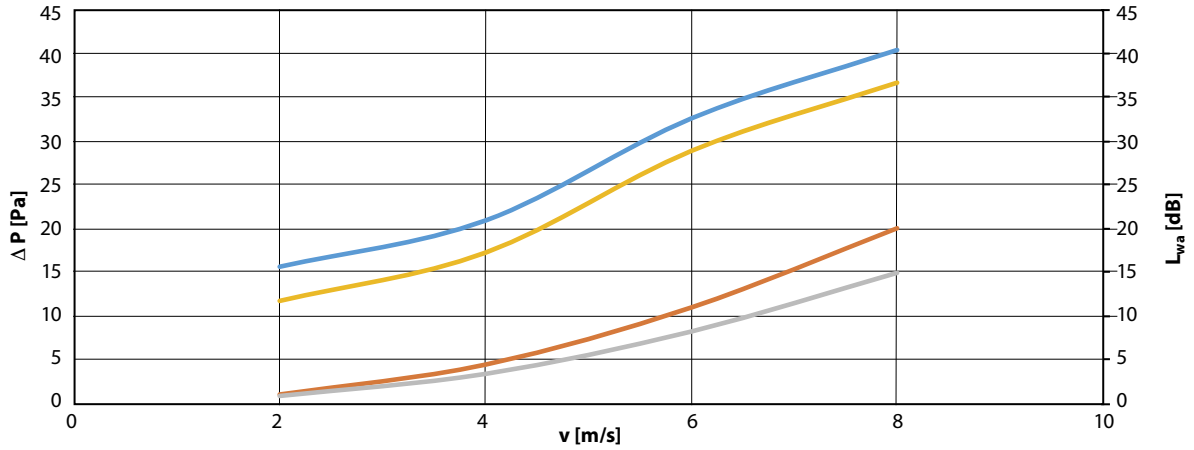
EIS120 — damper noise emission level

EIS120 — pressure drop on a damper

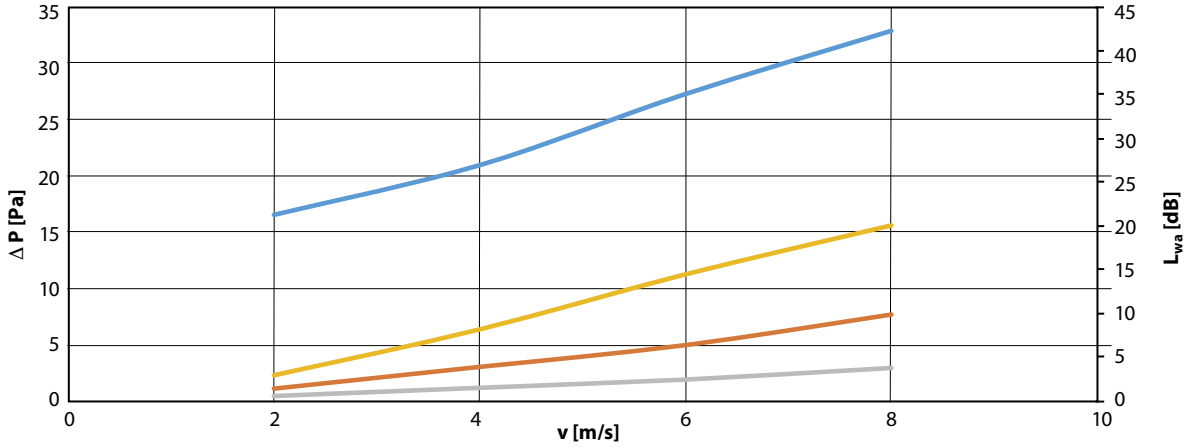
EIS60 — pressure drop on a damper

EIS60 — damper noise emission level

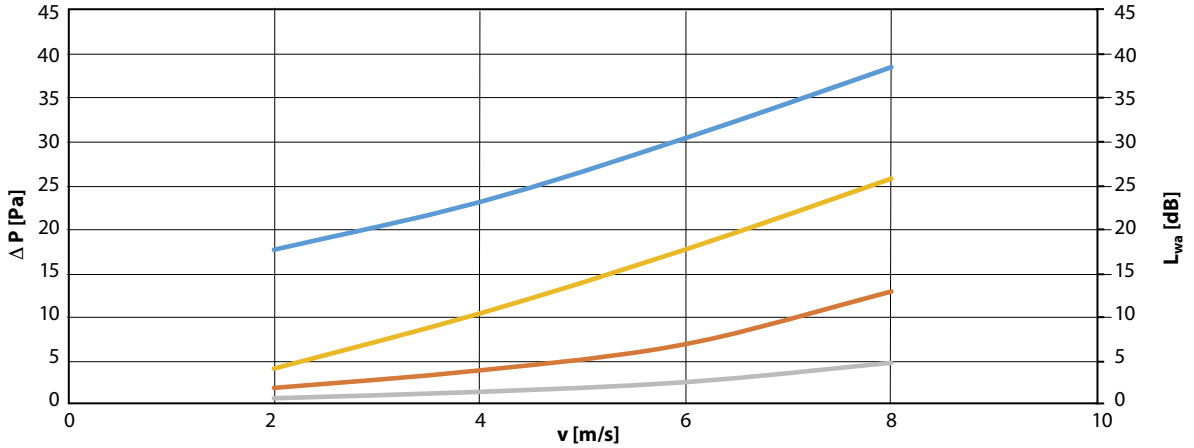
» mcr FID PRO 200



» mcr FID PRO 250



» mcr FID PRO 315



5.7 | Estimated weights of mcr FID PRO dampers for circular ventilation ducts [kg]

diameter D [mm]	RST	actuator/KW1
100	0.7	3
125	0.9	3.2
160	1.2	3.6
200	1.7	4.2
250	2.1	4.6
315	2.6	5.1

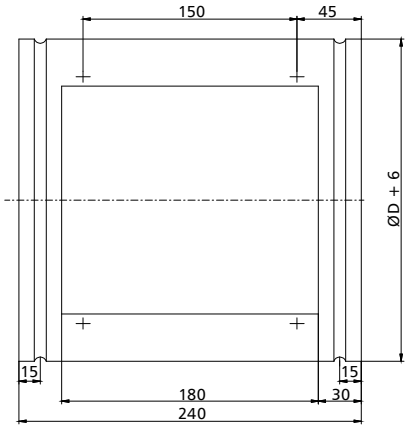
5.8 | Accessories

5.8.1 | Casing module with KRW-type inspection access

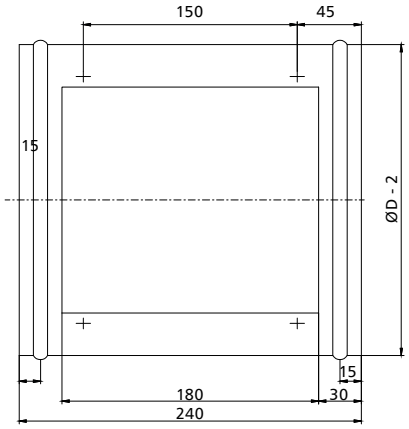
The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

Versions:

- **KRW OM module**
- **round muff module for nipple damper**



- **KRW ON module**
- **round nipple module for muff damper**



dimensions in [mm]

Marking

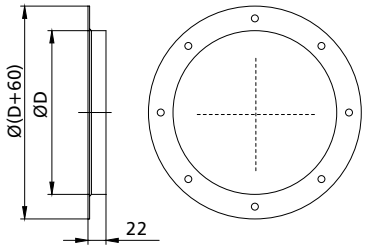
mcr KRW ON / FID PRO / B x H / X

- material
- dimensions
- type of damper for which the module is ordered
- round nipple module - mcr KRW ON
  round muff module - mcr KRW OM

X – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

5.8.2 | Connection flange

The connection flange is used to connect a round fire damper to a duct with a connection made in accordance with PN-EN 12220.



dimensions in [mm]

5.9 | Marking

mcr FID PRO S/1 / Ø / 2 / 3 / 4 / 5

- 5 – fire resistance rating
- 4 – additional parameters
- 3 – material
- 2 – control
- Ø – nominal diameter
- S/1 – connection method
- mcr FID PRO – damper type

1 - connection method

N or **[no symbol]** – nipple
M – muff
K – flange

2 - control:

» **RST trigger control mechanism**
RST – thermal trigger
RST/WK1 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
RST/WK2 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade)
» **RST trigger control mechanism-KW1**
KW1/S – thermal trigger
KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
KW1/24I/WK2 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/24P/WK2 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)
KW1/24I/WK2(+MP230/24) – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
KW1/24P/WK2(+MP230/24) – thermal trigger + "break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
» **trigger and control mechanism, axial actuator**
BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
BFL24-SR-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

3 - material

[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

4 - additional parameters

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF) – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Control mechanism position**
[no symbol] – perpendicular to the damper rotation axis*
WOK – along the damper axis

» **Damper casing**
[no symbol] – standard casing length
400 – casing with a length of 400 mm
BU - earth pin

» **Extended damper casing**
[no symbol] – design without gaskets
UKW – version with external gaskets

5 - fire resistance rating

[no symbol] – fire resistance rating EI120
EI60 – fire resistance rating EI60

* – for dampers with the KW1 mechanism, the trigger control mechanism is installed along the axis of rotation as standard – exception

NOTE: **separate additional parameters entered with the "/" sign**

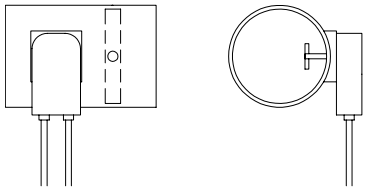
example marking:

mcr FID PRO Ø125 BFL24-T
EI120 low-resistance cut-off damper with a 24 V actuator with a thermoelectric trigger and limit switches.

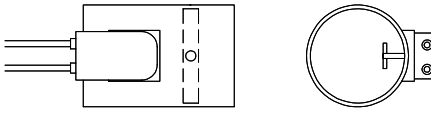
mcr FID PRO Ø125 RST/WK1
EI120 low-resistance cut-off damper with a 74°C thermal trigger and damper blade opening limit switch.

5.9.1 | Design standard

» right damper - standard



» actuator along the damper axis



standard for **BFL24-TN-ST**

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



1812-CPR-1916
1812-CPR-1917
1812-CPR-1918
1812-CPR-1919

HYGIENIC CERTIFICATE

» **EIS120**
» Fire resistance class: EI120 (v_e h_o i↔o)S, EI60 (v_e h_o i↔o)S.
» Certificate of constancy of performance 1812-CPR-1916, 1812-CPR-1917, 1812-CPR-1918, 1812-CPR-1919.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Cut-off dampers resistance independent of airflow direction and installation side.
» Certified installation in ductwork or with anemostat at system termination.
» Certified installation with both horizontal and vertical axis of rotation.

6.1| Application

mcr FID WING cut-off dampers are designed for installation in general ventilation systems at installation passages through vertical and horizontal construction partitions. During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes.
The dampers cannot be operated in systems exposed to dust, unless included in a special, individually developed service and technical inspections programme.

6.2| Design



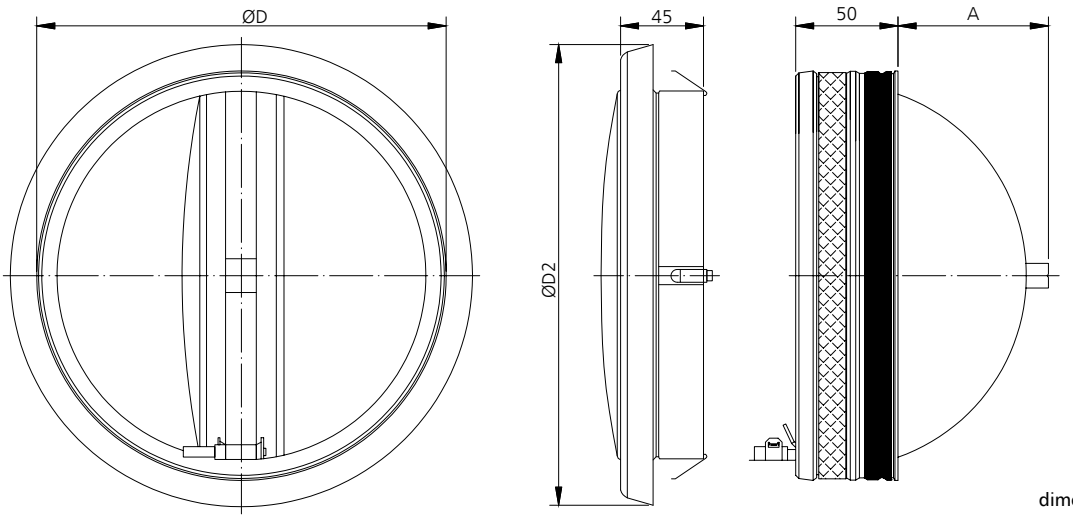
mcr FID WING cut-off fire dampers consist of a casing with a circular cross-section, a moving damper blade and a trigger and control mechanism, which is activated when the thermal trigger is tripped. The damper casing is made of galvanized steel sheets. There is an intumescent gasket and ventilation gasket on its outer part. The damper blade is made of a fireproof material.
mcr FID WING fire dampers remain open during normal operation. Dampers are switched over into safety state (closed) automatically when the thermal trigger (RST-type actuation and control mechanism) trips.
Fire dampers may be equipped with an adjustable air anemostat, the performance (active surface area) of which is adjusted by turning its disc. Anemostats are supplied in RAL 9010.

6.3 | Versions

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically. mcr FID WING fire dampers are equipped with an RST trigger and control mechanism with a 74°C thermal trigger and driving spring. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the valves with a WK1 limit switch used to signal the blade position.

6.4 | Dimensions

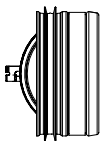
» circular dampers:



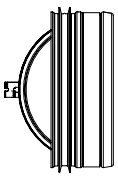
dimensions in [mm]

nominal diameter ØD [mm]	anemostat external diameter ØD2 [mm]	length A [mm]	weight [kg]
100	149	21	0,2
125	169	34	0,3
160	195	51	0,4
200	240	72	0,6

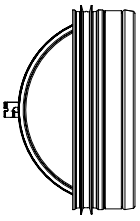
» mcr FID WING Ø100



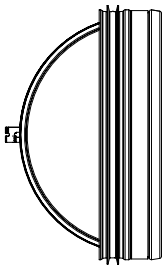
» mcr FID WING Ø125



» mcr FID WING Ø160



» mcr FID WING Ø200



6.5 | Installation

mcr FID WING circular dampers are rated EI 120 (v_e h_o i↔o) S and EI 60 (v_e h_o i↔o) S if installed in concrete, solid brickwork or aerated concrete blockwork partitions with min. thickness of 100 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 100 mm and a fire resistance rating equal to the expected fire resistance rating of the fire damper in question and in concrete floor slabs with a min. thickness of 100 mm for EIS60 and 150 mm for EIS120.

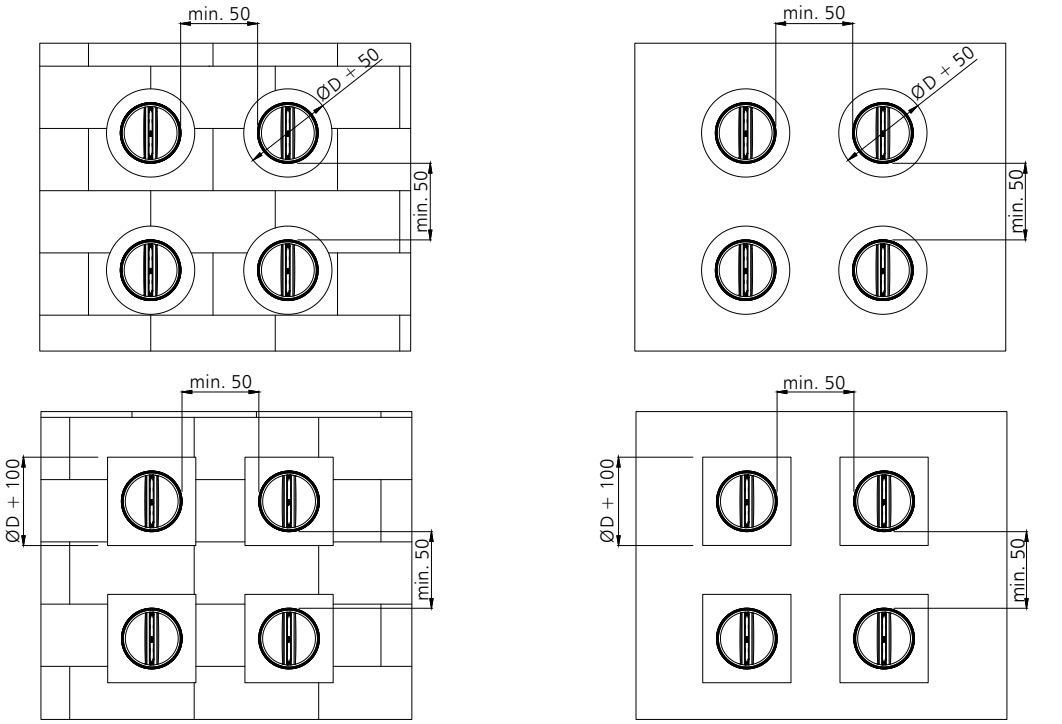
6.5.1 | Preparation of installation openings

» walls - preferred opening

» floor slabs - preferred opening

» wet installation

» dry installation

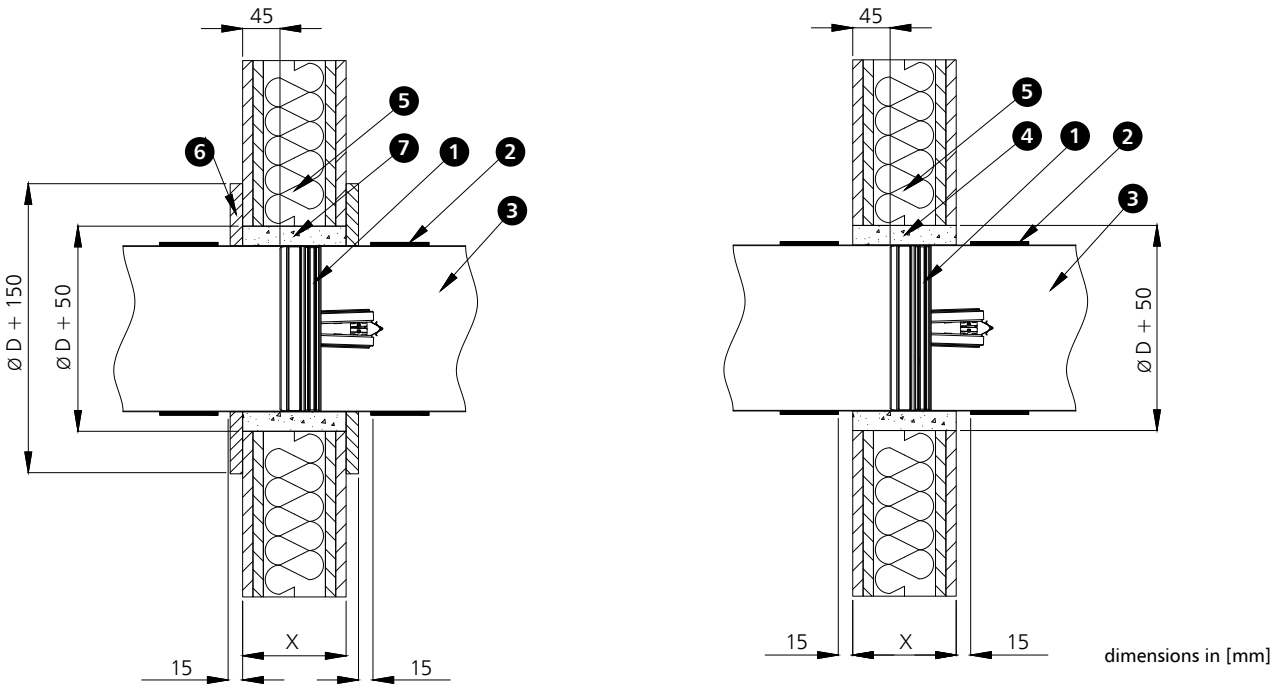


dimensions in [mm]

6.5.2 | mcr FID WING damper installation in plasterboard walls for EI60

» opening □

» opening ○



dimensions in [mm]

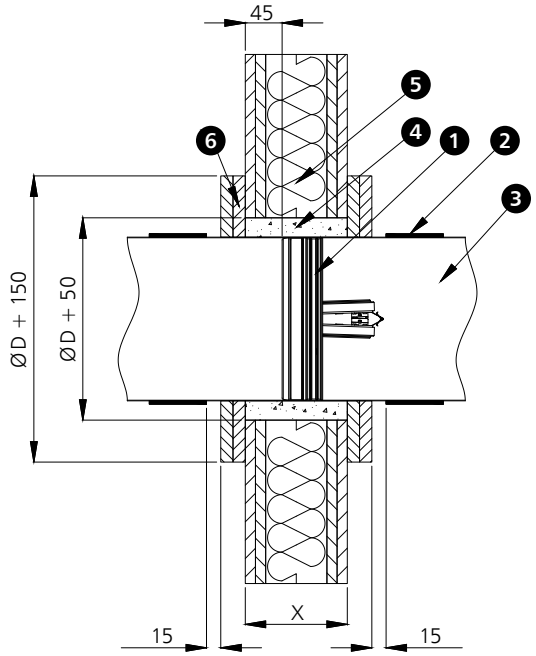
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar*
5. plasterboard wall
6. gypsum board trim 12.5 mm
7. assembly mortar or mineral wool *

X wall thickness

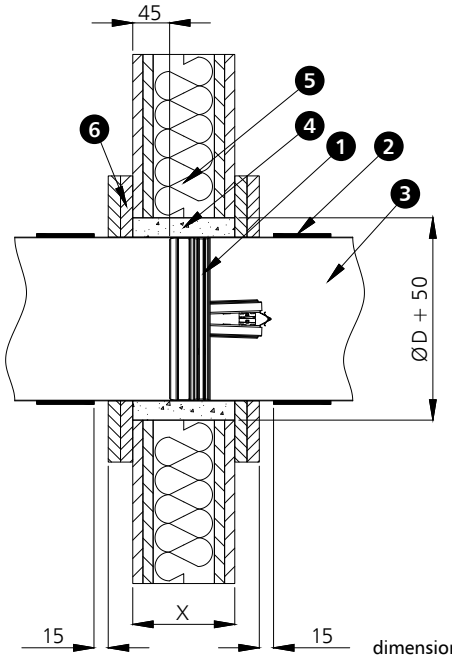
* Recommended installation of the damper in a dry system is based on wool of min. 40 kg / m3 with A1 nonflammability class. The recommended installation of the damper in a wet system is based on a plaster or cementbased mortar. The manufacturer allows the use of other materials with parameters that confirm and ensure the appropriate class of fire resistance for the applied method of assembly.

6.5.3 | mcr FID WING damper installation in plasterboard walls for EI60

» opening □



» opening ○



dimensions in [mm]

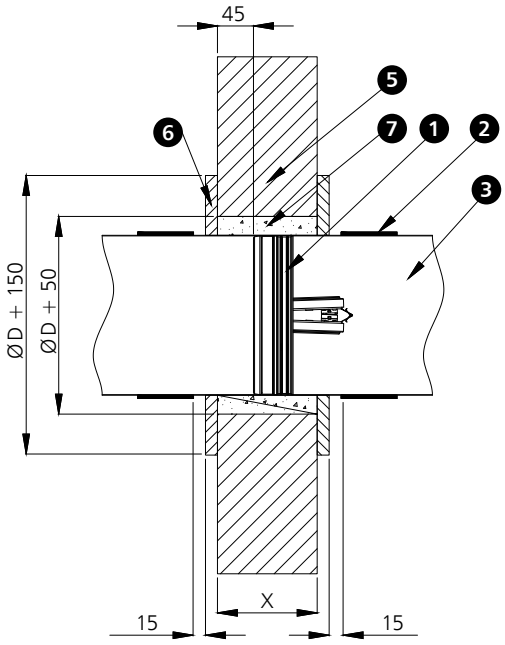
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar*
5. plasterboard wall
6. gypsum board trim 12.5 mm

X wall thickness

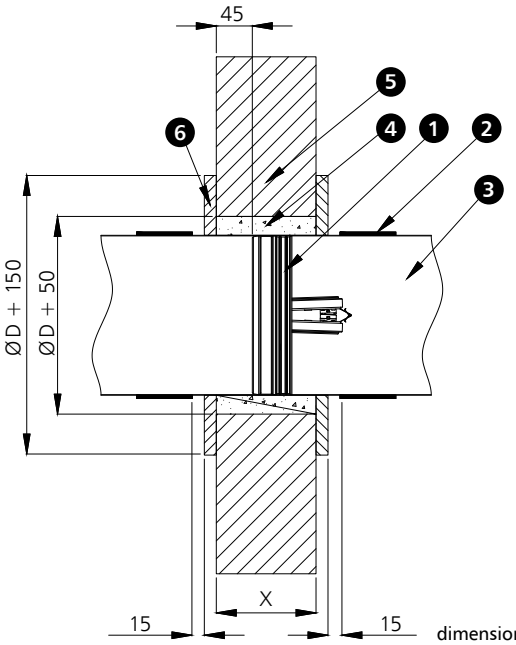
* Recommended installation of the damper in a dry system is based on wool of min. 100 kg / m³ with A1 nonflammability class. The recommended installation of the damper in a wet system is based on a plaster or cementbased mortar. The manufacturer allows the use of other materials with parameters that confirm and ensure the appropriate class of fire resistance for the applied method of assembly.

6.5.4 | mcr FID WING damper installation in rigid walls for EI60

» opening □



» opening ○



dimensions in [mm]

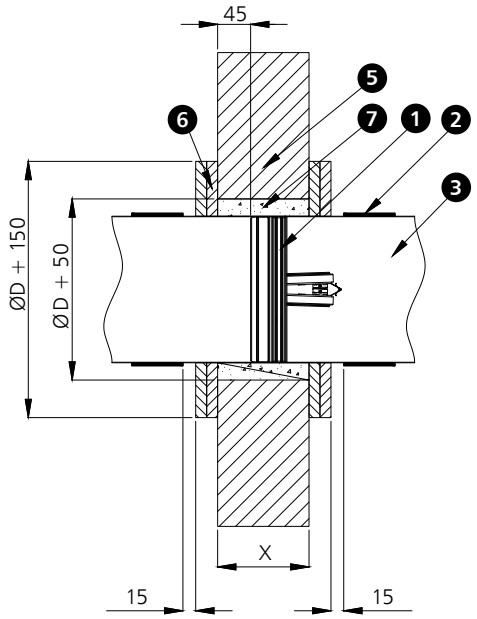
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. .assembly mortar*
5. rigid wall
6. gypsum board trim 12.5 mm
7. assembly mortar or mineral wool*

X wall thickness

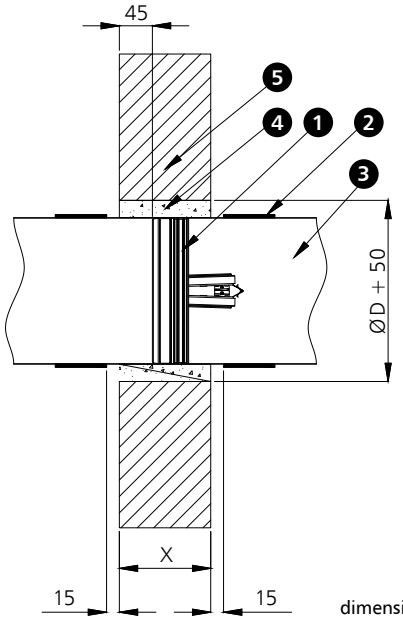
* Recommended installation of the damper in a dry system is based on wool of min. 100 kg / m³ with A1 nonflammability class. The recommended installation of the damper in a wet system is based on a plaster or cementbased mortar. The manufacturer allows the use of other materials with parameters that confirm and ensure the appropriate class of fire resistance for the applied method of assembly.

6.5.5 | mcr FID WING damper installation in rigid walls for EIS120

» opening □



» opening ○



dimensions in [mm]

1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar*
5. rigid wall
6. gypsum board trim 12.5 mm
7. assembly mortar or mineral wool* X wall thicknes*

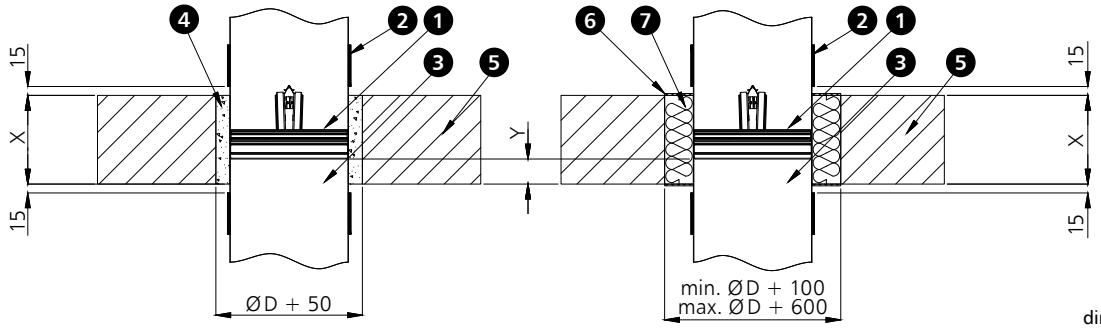
X wall thickness

* Recommended installation of the damper in a dry system is based on wool of min. 100 kg / m³ with A1 nonflammability class. The recommended installation of the damper in a wet system is based on a plaster or cementbased mortar. The manufacturer allows the use of other materials with parameters that confirm and ensure the appropriate class of fire resistance for the applied method of assembly.

6.5.6 | mcr FID WING damper installation in floor slabs

» opening □

» opening ○



dimensions in [mm]

1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar*
5. floor slab
6. elastic fire protection grout/mass*
7. .mineral wool*

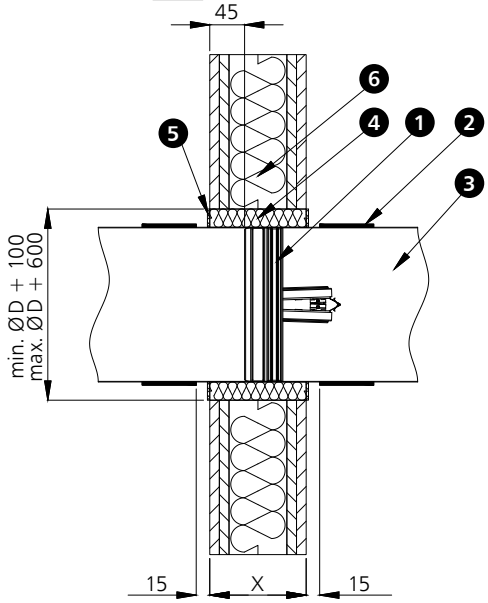
X wall thickness

Y 75 mm for EIS120, 45 mm for EIS60

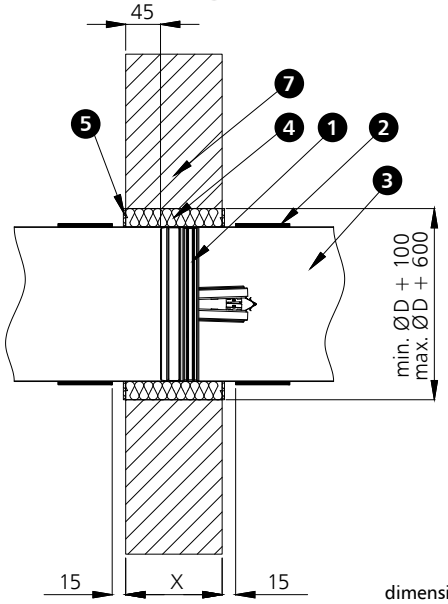
* Recommended installation of the damper in a dry system is based on wool of min. 140 kg / m³ with non-flammability class A1, thickness min. 50mm and securing the joint between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT paint and wool with the fire-retardant PROMASTOP E PASTE or HILTI CFS-S ACR paint, as shown in the above drawing. The recommended installation of the damper in a wet system is based on plaster or cement mortar. The manufacturer allows the use of other materials with parameters that confirm and ensure the appropriate class of fire resistance for the applied method of assembly.

6.5.7 | mcr FID WING damper installation in dry systems

» opening □



» opening ○



dimensions in [mm]

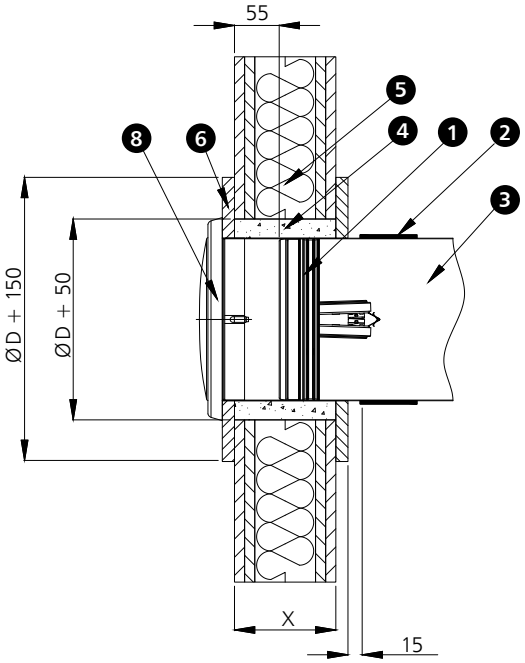
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. mineral wool*
5. elastic fire protection grout/mass*
6. plasterboard wall
7. rigid wall

X wall thickness

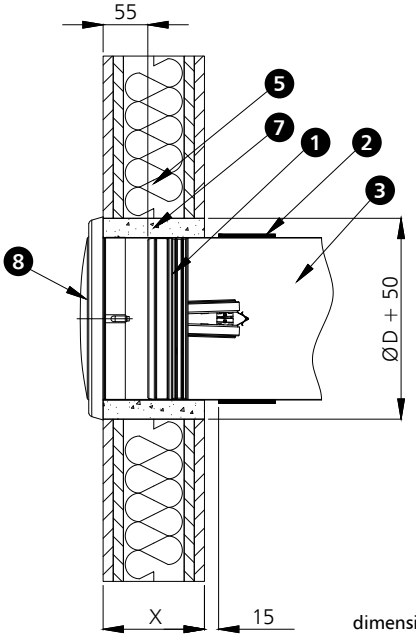
* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m3 and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.8 | mcr FID WING damper installation in plasterboard walls for EIS60

» opening □



» opening ○



dimensions in [mm]

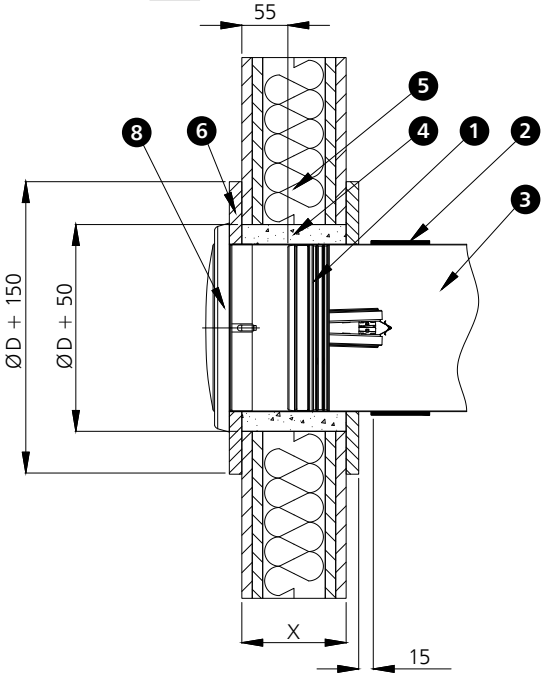
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar or mineral wool*
5. plasterboard wall
6. gypsum board trim 12.5 mm
7. assembly mortar*
8. anemostat

X wall thickness

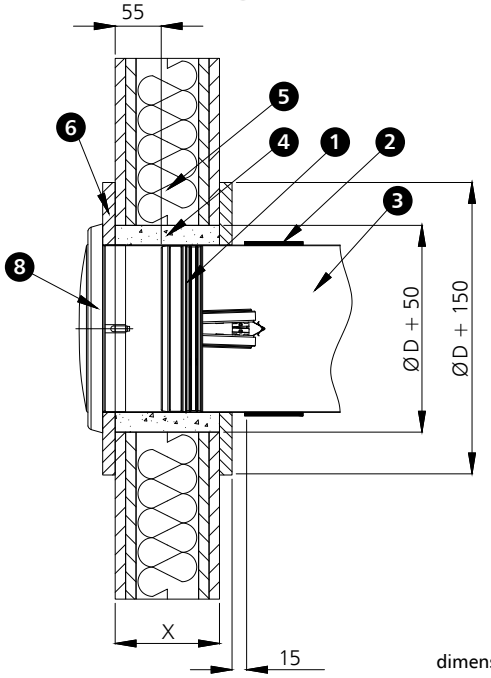
* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.9 | mcr FID WING damper installation in plasterboard walls for EIS120

» opening □



» opening ○



dimensions in [mm]

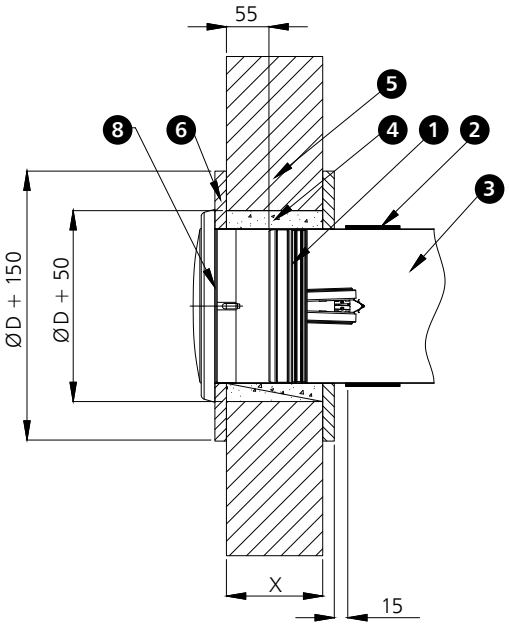
1. mcr FID WING fire damper
2. .insulating wrap
3. ventilation duct
4. assembly mortar or mineral wool*
5. .plasterboard wall
6. gypsum board trim 12.5 mm
7. anemostat

X wall thickness

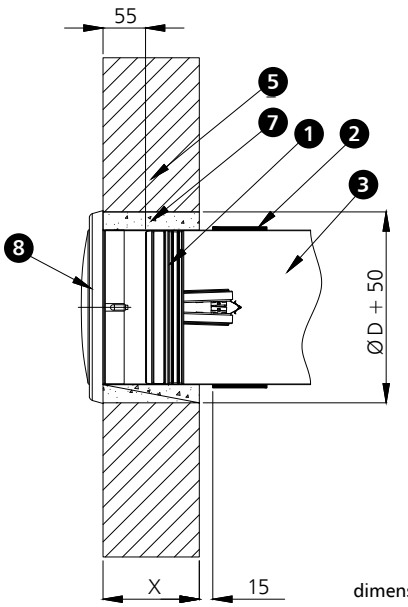
* Recommended damper installation in a dry system is based on wool with a min. density of 40 kg/m³ and fire resistance class A1, as well as on securing the contact portion of the damper. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.10 | mcr FID WING damper installation in rigid walls for EIS120 and EIS60

» opening □



» opening ○



dimensions in [mm]

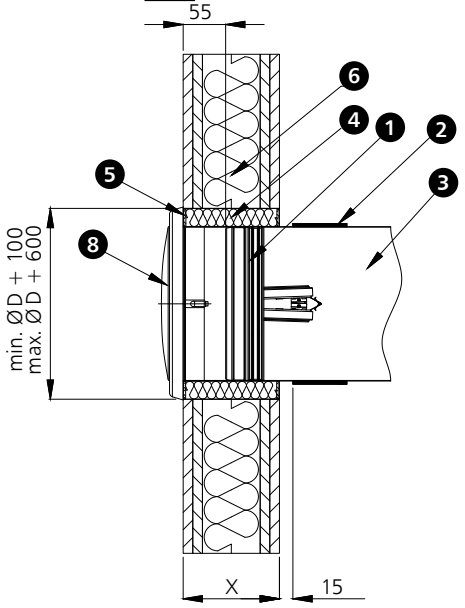
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar or mineral wool*
5. rigid wall
6. gypsum board trim 12.5 mm
7. .assembly mortar*
8. anemostat

X wall thickness

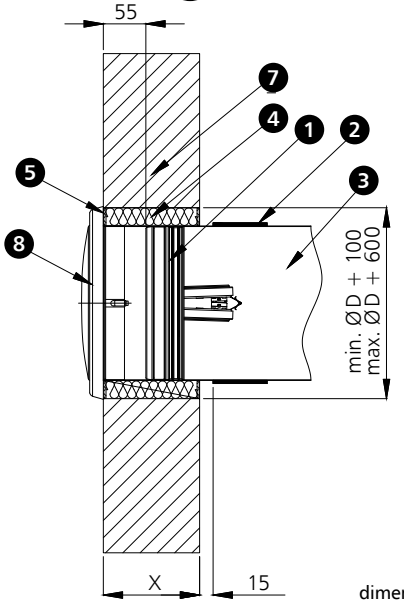
* Recommended damper installation in a dry system is based on wool with a min. density of 40 kg/m³ and fire resistance class A1, as well as on securing the contact portion of the damper. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.

6.5.11 | mcr FID WING damper installation in dry systems

» opening □



» opening ○



dimensions in [mm]

1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. mineral wool*
5. elastic fire protection grout/mass*
6. plasterboard wall
7. rigid wall
8. anemostat

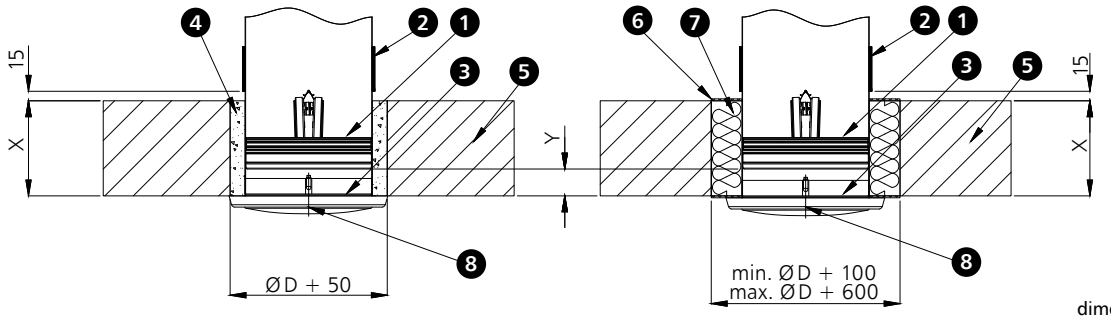
X wall thickness

* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m³ and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.12 | mcr FID WING damper installation in floor slabs

» opening □

» opening ○



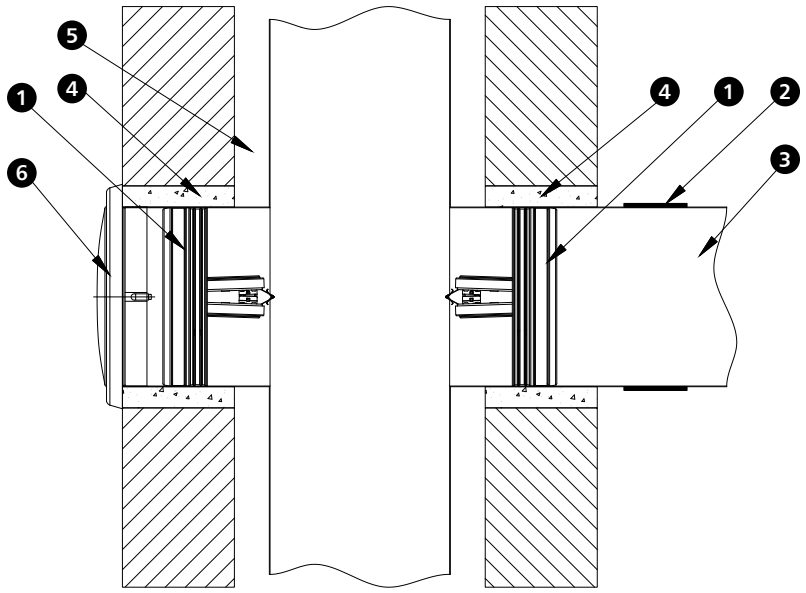
dimensions in [mm]

1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. assembly mortar*
5. floor slab
6. elastic fire protection grout/mass*
7. .mineral wool*
8. anemostat

X wall thickness
Y70 mm for EI120
55 mm for EI60

* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m3 and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above. Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.13 | mcr FID WING damper installation in service shaft openings for EIS120 and EIS60



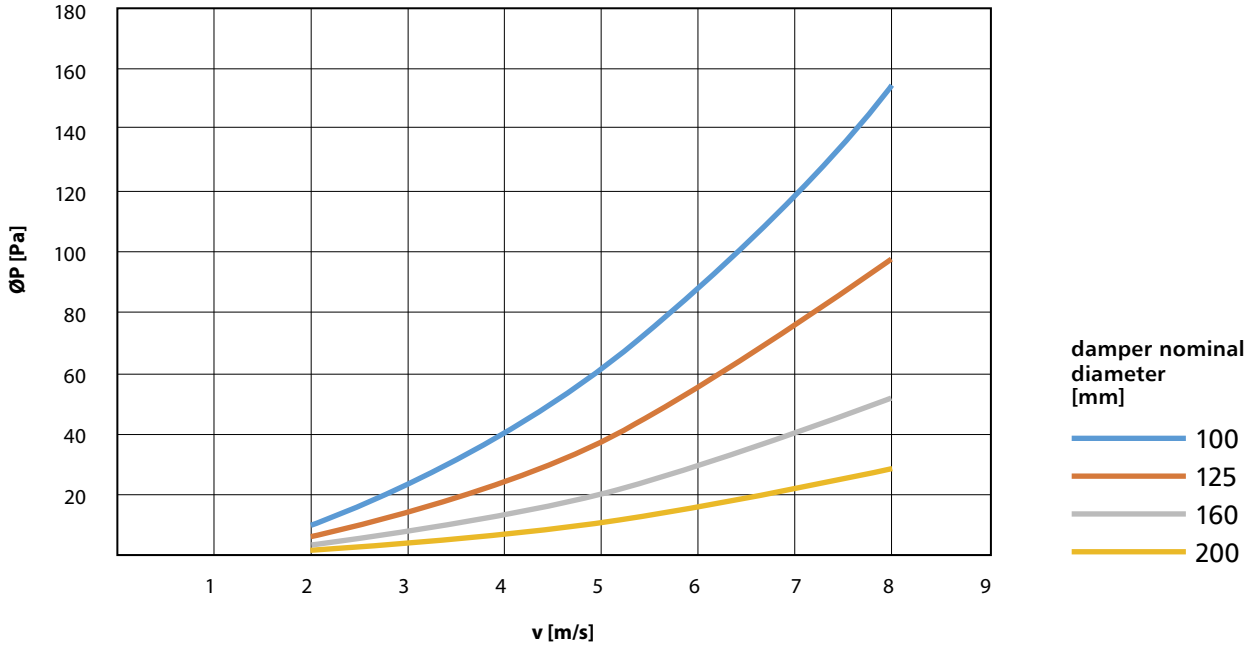
1. mcr FID WING fire damper
2. insulating wrap
3. ventilation duct
4. installation clearance filling*
5. service shaft
6. anemostat

* The method of filling the installation clearance is based on the fire resistance rating of the solution and the assembly method as shown in the drawings above. When the damper is installed in the service shaft openings (in technical shafts that are not designed for continuous presence or stay of people), it is not necessary to use the insulating wrap supplied with the damper. The fire damper should be placed at the duct side inside the shaft. Fire resistance rating of the shaft walls should be equal to or higher than that of the fire damper.

6.6 | mcr FID WING circular dampers technical parameters

product	D [mm²]	S_k [m²]	S_e [m²]	v [m/s]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
mcr FID WING	100	0.008	0.002	2	58	11	27
				4	29	40	44
				6	43	88	54
				8	58	154	61
	125	0.012	0.004	2	29	6	24
				4	58	25	40
				6	86	55	49
				8	115	98	55
	160	0.02	0.01	2	72	3	17
				4	144	13	34
				6	216	30	44
				8	288	53	52
	200	0.031	0.017	2	122	2	16
				4	245	7	32
				6	367	16	41
				8	490	29	48

» pressure drop – mcr FID WING damper



6.7 | mcr FID WING circular fire dampers estimated weights

nominal diameter ØD [mm]	weight [kg]
100	0.3
125	0.4
160	0.5
200	0.9

6.8 | Accessories

» anemostat

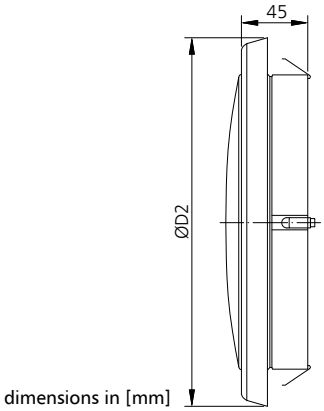


System AN anemostats are designed to fulfill either supply or exhaust function. They are made of plastic. They allow for an aesthetic system termination. They are equipped with a movable disc, allowing adjustment of the airflow supplied by the system. The body of the anemostat is attached to the ventilation duct with the connection collar supplied in the kit. The anemostat is fixed in the connection collar using strutting elements on the anemostat's perimeter. Such a solution allows for installing the product even in the most visually-demanding applications. Anemostats are supplied in RAL 9010 as a standard.

Marking

AN / ∅D

- nominal diameter
- anemostat type

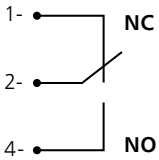


nominal diameter ØD [mm]	external diameter ØD2 [mm]
100	149
125	169
160	195
200	240

Trigger control mechanisms – specifications and connections diagram

execution type	RST	RST + WK1
thermal trigger	+	+
limit switch	–	250 V AC / 6A

Electrical connections diagram for the mcr FID WING +WK1 damper



1 – black
2 – grey
4 - blue 1 mA
4 V AC min. 6 A
250 V AC max.

6.9 | Marking

mcr FID WING / DIA 200 / WK1 / EIS 120

- fire resistance rating
- additional parameters
- diameter
- damper type

additional parameters

WK1 – limit switch – closed damper blade signal
AN – anemostat

NOTE: **separate additional parameters entered with the "/" sign**

example marking:

mcr FID WING / DIA 200 / AN / EIS120
EIS120 cut-off damper with a 74°C thermal trigger, equipped with a anemostat.

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr FID 240L | Single-blade cut-off fire dampers for comfort ventilation systems

downloadable models
on the website
under the designer zone tab



2434-CPR-0407

HYGIENIC CERTIFICATE

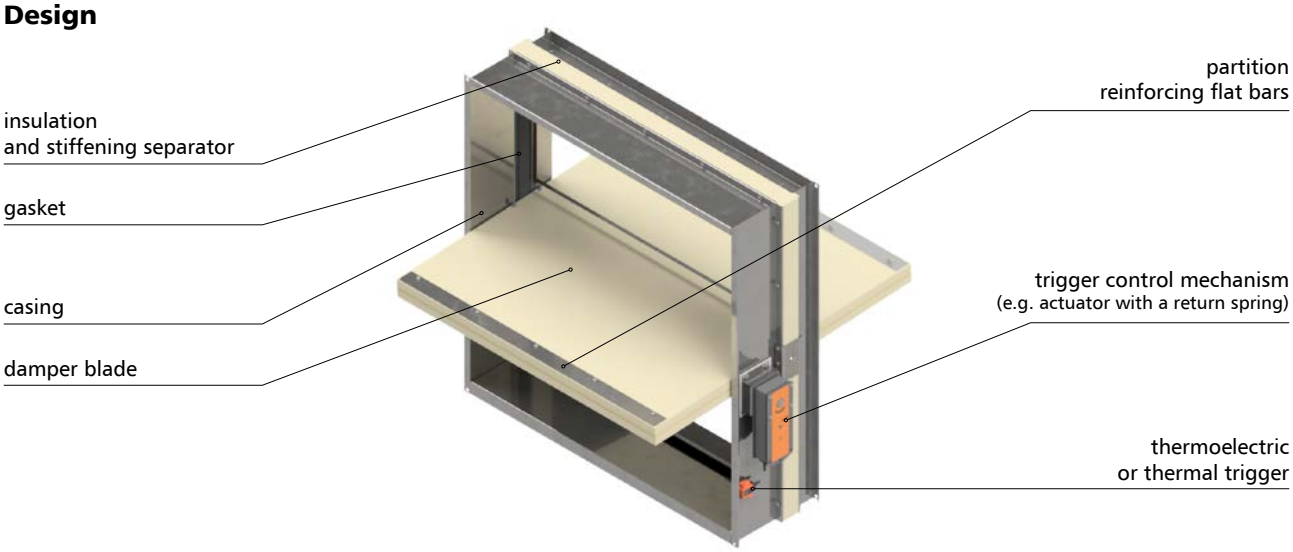
CTO S.A.

» **EIS240**
» Fire resistance class: EI240 (v_e i↔o)S.
» Certificate of constancy of performance 2434-CPR-0407.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Cut-off dampers with a fire resistance rating independent of the airflow direction and installation side.
» Dampers for rectangular ventilation ducts.
» KTB ATEX 2014/34/UE

7.1| Application

mcr FID 240L cut-off dampers are designed for installation in general ventilation systems at installation passages through construction partitions.
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes. Admissible flow velocity in the connected duct is 12 m/s.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

7.2| Design



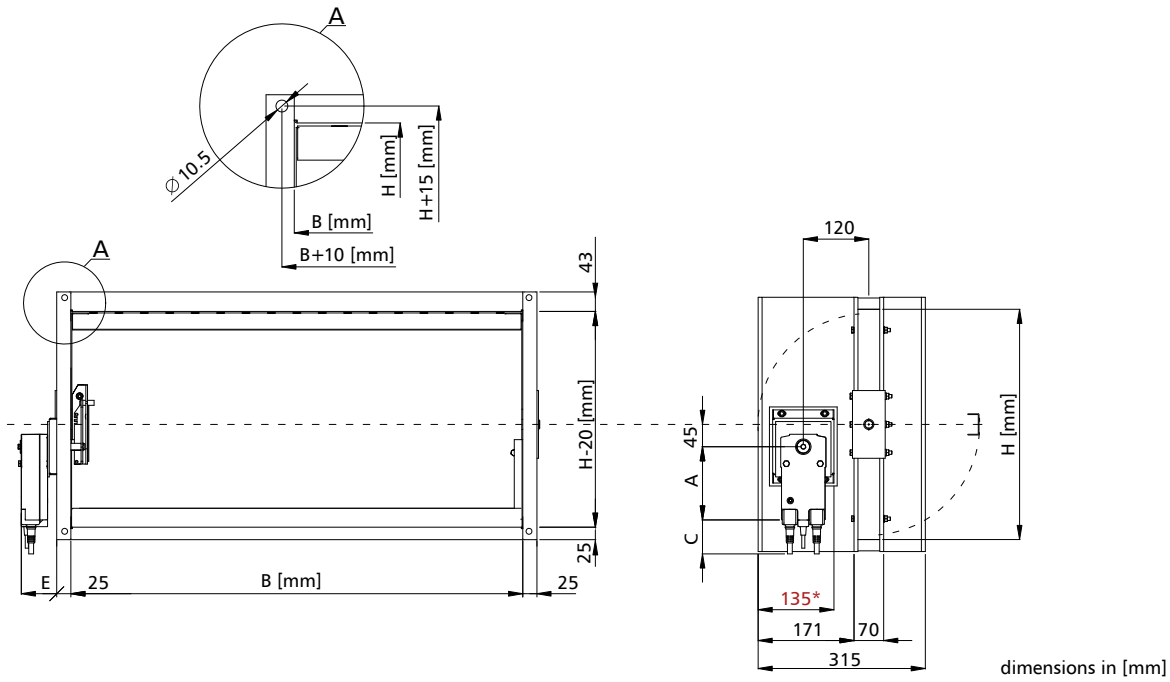
mcr FID 240L cut-off dampers consist of a casing with a rectangular, made of two segments separated by a fire-proof panel, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically by tripping a thermal or thermoelectric trigger. Standard damper casing is made of galvanized steel sheets. A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 (316L) acid-proof steel sheet. The casing total length is at least 315 mm. Dampers may be made with an extension element, in such a case the casing length is 400 mm.
The damper blade is made of a fire-proof panel, which is covered with a partition reinforcing flat bars. The inner side of the fire damper casing is equipped with an intumescent gasket. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. Stop profiles are lined with a polyethylene ventilation gasket. In dampers both ends of the casing are finished with flange connections.

7.3 | Versions

7.3.1 | Damper closing and opening with an actuator

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

The mcr FID 240L dampers are equipped with a trigger control mechanism in the form of **BF, BFL, BFN, BF-TL, EXBF, QT.Ex, MLF, MF** series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally, triggers with a nominal tripping temperature of 95°C may be used).
The actuators are equipped with limit switches used to monitor the blade position. Furthermore, a mechanical position indicator is placed on the actuator.
Dampers with actuators close either when the thermoelectric trigger trips or when the power supply is cut off, activating the actuator's return spring. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



dimensions in [mm]

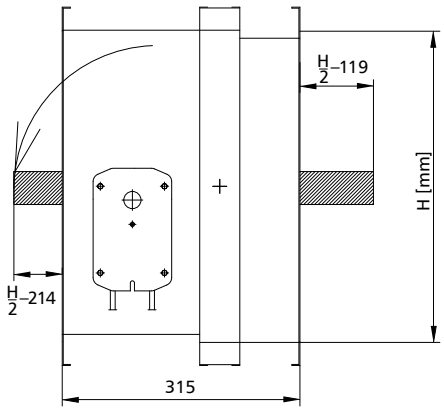
mechanism	A	C	E
BFN	157	30	62
BFL	138	30	58
BF24TL-ST	198	10	70
EXBF	225	55	175
QT.Ex	260	30	105
BF	198	10	70
MLF	114	30	67
MF	198	30	75

*embedding border

7.4 | Dimensions

rectangular dampers:
» nominal width B from 200 mm to 1050 mm
» nominal height H from 200 mm to 1000 mm
» maximum single damper cross-section surface up to 1.05 m²
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

» **mcr FID 240L fire damper**



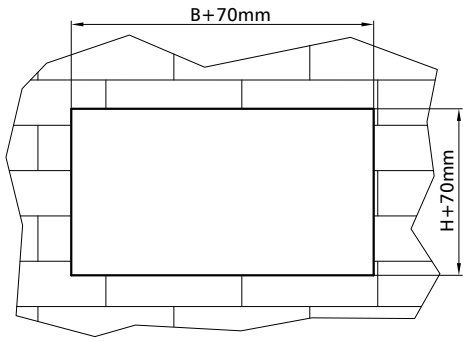
dimensions in [mm]

7.5 | Installation

mcr FID 240L rectangular dampers have been rated as EI240(v_e i↔o)S class. These dampers may be installed in the following partitions:
» rigid walls/shafts made of blocks or hollow bricks with a min. thickness of 150 mm;
» solid walls/shafts with a min. thickness of 150 mm;

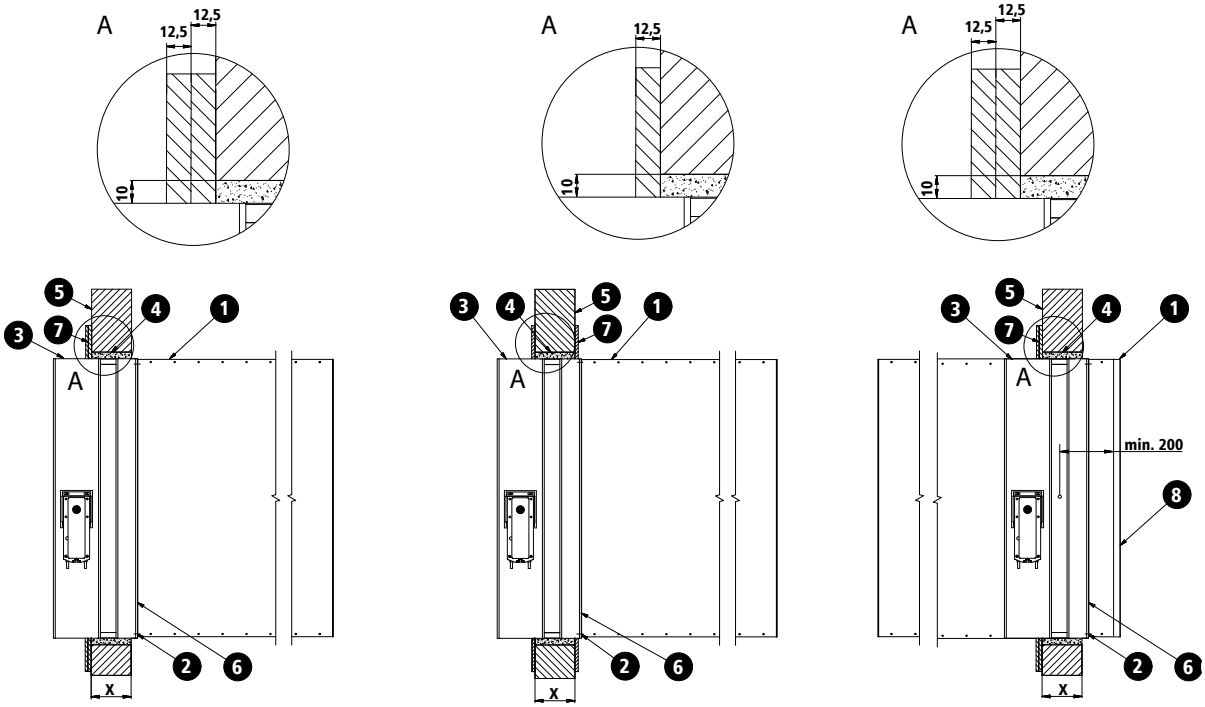
7.5.1 | Preparation of installation openings

» **mcr FID 240L fire damper – preferred opening**



7.5.2 | Sample installation in concrete and brick walls

» **mcr FID 240L fire damper**



dimensions in [mm]

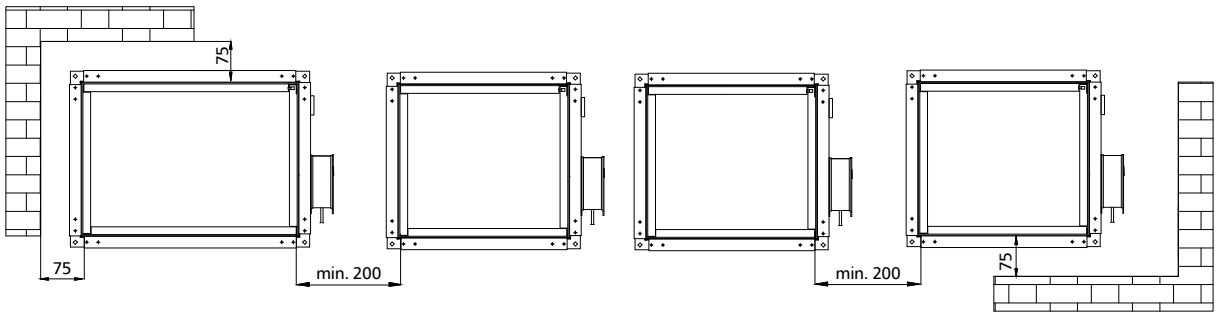
1. ventilation duct
2. self-tapping screw ST 4.2x16
3. mcr FID 240L fire damper
4. assembly mortar*
5. masonry wall
6. ventilation gasket
7. 12.5x100 mm plasterboard strip attached around the circumference of the damper
8. masking grille

X - min. 150mm

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall less than 120 mm thick, the thickness around the damper should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

Minimum distance between systems and partitions



dimensions in [mm]

The minimum distance between the casings of two fire dampers in accordance with EN 1366-2 shall be ≥ 200 mm, and the minimum distance between the damper casing and a wall or ceiling shall be ≥ 75 mm.

7.6.1 | mcr FID 240L rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0,04	0,024	348	9	24	0,05	0,034	492	9	25	0,06	0,044	636	8	26
		6			522	20	35			738	19	36			954	19	37
		8			696	35	42			984	34	43			1272	34	44
		10			869	55	48			1229	54	49			1589	53	50
	250	4	0,05	0,030	435	9	25	0,0625	0,043	615	8	26	0,075	0,055	795	8	27
		6			652	19	35			922	19	37			1192	19	37
		8			869	34	43			1229	34	44			1589	33	45
		10			1087	54	49			1537	53	50			1987	51	51
	300	4	0,06	0,036	522	8	25	0,075	0,051	738	8	27	0,09	0,066	954	8	27
		6			782	19	36			1106	19	37			1430	18	38
		8			1043	34	43			1475	33	45			1907	32	45
		10			1304	53	49			1844	51	50			2384	50	51
	350	4	0,07	0,042	609	8	26	0,0875	0,060	861	8	27	0,105	0,077	1113	8	28
		6			913	19	36			1291	18	37			1669	18	38
		8			1217	33	44			1721	32	45			2225	31	46
		10			1521	51	50			2151	50	51			2781	49	52
	400	4	0,08	0,048	696	8	26	0,1	0,068	984	8	27	0,12	0,088	1272	8	28
		6			1043	18	37			1475	18	38			1907	17	39
		8			1391	32	44			1967	31	45			2543	31	46
		10			1739	50	50			2459	49	51			3179	48	52
	450	4	0,09	0,054	782	8	26	0,1125	0,077	1106	8	27	0,135	0,099	1430	7	28
		6			1174	18	37			1660	17	38			2146	17	39
		8			1565	31	44			2213	31	45			2861	30	46
		10			1956	49	50			2766	48	51			3576	47	52
	500	4	0,1	0,060	869	8	26	0,125	0,085	1229	7	27	0,15	0,110	1589	7	28
		6			1304	17	37			1844	17	38			2384	16	39
		8			1739	31	44			2459	30	46			3179	29	46
		10			2174	48	50			3074	47	51			3974	45	52
	550	4	0,11	0,066	956	7	26	0,1375	0,094	1352	7	28	0,165	0,121	1748	7	28
		6			1435	17	37			2029	16	38			2623	16	39
		8			1913	30	44			2705	29	46			3497	28	46
		10			2391	47	50			3381	45	51			4371	44	52
	600	4	0,12	0,072	1043	7	26	0,15	0,102	1475	7	28	0,18	0,132	1907	7	28
		6			1565	16	37			2213	16	38			2861	15	39
		8			2087	29	44			2951	28	46			3815	27	46
		10			2608	45	50			3688	44	51			4768	43	52
	650	4	0,13	0,078	1130	7	26	0,1625	0,111	1598	7	28	0,195	0,143	2066	7	28
		6			1695	16	37			2397	15	38			3099	15	39
		8			2260	28	44			3196	27	46			4132	27	46
		10			2826	44	50			3996	43	51			5166	42	52
	700	4	0,14	0,085	1217	7	26	0,175	0,120	1721	7	27	0,21	0,155	2225	6	28
		6			1826	15	37			2582	15	38			3338	15	39
		8			2434	27	44			3442	27	46			4450	26	46
		10			3043	43	50			4303	42	51			5563	40	52
	750	4	0,15	0,091	1304	7	26	0,1875	0,128	1844	6	27	0,225	0,166	2384	6	28
		6			1956	15	37			2766	15	38			3576	14	39
		8			2608	27	44			3688	26	45			4768	25	46
		10			3260	42	50			4610	40	51			5960	39	52
	800	4	0,16	0,097	1391	6	26	0,2	0,137	1967	6	27	0,24	0,177	2543	6	28
		6			2087	15	37			2951	14	38			3815	14	39
		8			2782	26	44			3934	25	45			5086	24	46
		10			3478	40	50			4918	39	51			6358	38	52
	850	4	0,17	0,103	1478	6	26	0,2125	0,145	2090	6	27	0,255	0,188	2702	6	28
		6			2217	14	37			3135	14	38			4053	13	38
		8			2956	25	44			4180	24	45			5404	24	46
		10			3695	39	50			5225	38	51			6755	37	52
	900	4	0,18	0,109	1565	6	26	0,225	0,154	2213	6	27	0,27	0,199	2861	6	28
		6			2347	14	36			3319	13	38			4291	13	38
		8			3130	24	44			4426	24	45			5722	23	46
		10			3912	38	50			5532	37	51			7152	36	51
	950	4	0,19	0,115	1652	6	26	0,2375	0,162	2336	6	27	0,285	0,210	3020	5	27
		6			2478	13	36			3504	13	37			4530	12	38
		8			3304	24	44			4672	23	45			6040	22	45
		10			4130	37	50			5840	36	51			7550	34	51
	1000	4	0,2	0,121	1739	6	25	0,25	0,171	2459	5	27	0,3	0,221	3179	5	27
		6			2608	13	36			3688	12	37			4768	12	38
		8			3478	23	44			4918	22	45			6358	21	45
		10			4347	36	49			6147	34	50			7947	33	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]	400 S_k [m²]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	400 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]
	200	4	0,07	0,054	780	8	27	0,08	0,064	924	8	27	0,09	0,074	1068	8	28
		6			1170	19	37			1386	18	38			1602	18	38
		8			1560	33	45			1848	32	45			2136	31	46
		10			1949	51	51			2309	50	51			2669	49	51
	250	4	0,0875	0,068	975	8	27	0,1	0,080	1155	8	28	0,1125	0,093	1335	8	28
		6			1462	18	38			1732	18	38			2002	17	39
		8			1949	32	46			2309	31	46			2669	31	46
		10			2437	50	51			2887	49	52			3337	48	52
	300	4	0,105	0,081	1170	8	28	0,12	0,096	1386	8	28	0,135	0,111	1602	7	29
		6			1754	18	38			2078	17	39			2402	17	39
		8			2339	31	46			2771	31	46			3203	30	47
		10			2924	49	52			3464	48	52			4004	47	52
	350	4	0,1225	0,095	1365	8	28	0,14	0,112	1617	7	29	0,1575	0,130	1869	7	29
		6			2047	17	39			2425	17	39			2803	16	40
		8			2729	31	46			3233	30	47			3737	29	47
		10			3411	48	52			4041	47	53			4671	45	53
	400	4	0,14	0,108	1560	7	29	0,16	0,128	1848	7	29	0,18	0,148	2136	7	29
		6			2339	17	39			2771	16	39			3203	16	40
		8			3119	30	47			3695	29	47			4271	28	47
		10			3899	47	52			4619	45	53			5339	44	53
	450	4	0,1575	0,122	1754	7	29	0,18	0,144	2078	7	29	0,2025	0,167	2402	7	29
		6			2632	16	39			3118	16	40			3604	15	40
		8			3509	29	47			4157	28	47			4805	27	47
		10			4386	45	53			5196	44	53			6006	43	53
	500	4	0,175	0,135	1949	7	29	0,2	0,160	2309	7	29	0,225	0,185	2669	7	29
		6			2924	16	39			3464	15	40			4004	15	40
		8			3899	28	47			4619	27	47			5339	27	47
		10			4874	44	53			5774	43	53			6674	42	53
	550	4	0,1925	0,149	2144	7	29	0,22	0,176	2540	7	29	0,2475	0,204	2936	6	29
		6			3217	15	39			3811	15	40			4405	15	40
		8			4289	27	47			5081	27	47			5873	26	47
		10			5361	43	53			6351	42	53			7341	40	53
	600	4	0,21	0,162	2339	7	29	0,24	0,192	2771	6	29	0,27	0,222	3203	6	29
		6			3509	15	39			4157	15	40			4805	14	40
		8			4679	27	47			5543	26	47			6407	25	47
		10			5848	42	53			6928	40	53			8008	39	53
	650	4	0,2275	0,176	2534	6	29	0,26	0,208	3002	6	29	0,2925	0,241	3470	6	29
		6			3801	15	39			4503	14	40			5205	14	40
		8			5068	26	47			6004	25	47			6940	24	47
		10			6336	40	53			7506	39	53			8676	38	53
	700	4	0,245	0,190	2729	6	29	0,28	0,225	3233	6	29	0,315	0,260	3737	6	29
		6			4094	14	39			4850	14	40			5606	13	40
		8			5458	25	47			6466	24	47			7474	24	47
		10			6823	39	53			8083	38	53			9343	37	53
	750	4	0,2625	0,203	2924	6	29	0,3	0,241	3464	6	29	0,3375	0,278	4004	6	29
		6			4386	14	39			5196	13	39			6006	13	40
		8			5848	24	47			6928	24	47			8008	23	47
		10			7310	38	52			8660	37	53			10010	36	53
	800	4	0,28	0,217	3119	6	28	0,32	0,257	3695	6	29	0,36	0,297	4271	5	29
		6			4679	13	39			5543	13	39			6407	12	39
		8			6238	24	46			7390	23	47			8542	22	47
		10			7798	37	52			9238	36	53			10678	34	53
	850	4	0,2975	0,230	3314	6	28	0,34	0,273	3926	5	29	0,3825	0,315	4538	5	29
		6			4971	13	39			5889	12	39			6807	12	39
		8			6628	23	46			7852	22	47			9076	21	47
		10			8285	36	52			9815	34	52			11345	33	53
	900	4	0,315	0,244	3509	5	28	0,36	0,289	4157	5	28	0,405	0,334	4805	5	28
		6			5263	12	39			6235	12	39			7207	11	39
		8			7018	22	46			8314	21	46			9610	20	47
		10			8772	34	52			10392	33	52			12012	32	52
	950	4	0,3325	0,257	3704	5	28	0,38	0,305	4388	5	28	0,4275	0,352	5072	5	28
		6			5556	12	38			6582	11	39			7608	11	39
		8			7408	21	46			8776	20	46			10144	20	46
		10			9260	33	52			10970	32	52			12680	31	52
	1000	4	0,35	0,271	3899	5	28	0,4	0,321	4619	5	28	0,45	0,371	5339	5	28
		6			5848	11	38			6928	11	38			8008	11	38
		8			7798	20	46			9238	20	46			10678	19	46
		10			9747	32	51			11547	31	52			13347	29	52

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			500					550					600				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0,1	0,084	1212	8	28	0,11	0,094	1356	7	28	0,12	0,104	1500	7	28
		6			1818	17	38			2034	17	38			2250	16	39
		8			2424	31	46			2712	30	46			3000	29	46
		10			3029	48	52			3389	47	52			3749	45	52
	250	4	0,125	0,105	1515	7	28	0,1375	0,118	1695	7	29	0,15	0,130	1875	7	29
		6			2272	17	39			2542	16	39			2812	16	39
		8			3029	30	46			3389	29	47			3749	28	47
		10			3787	47	52			4237	45	52			4687	44	52
	300	4	0,15	0,126	1818	7	29	0,165	0,141	2034	7	29	0,18	0,156	2250	7	29
		6			2726	16	39			3050	16	40			3374	15	40
		8			3635	29	47			4067	28	47			4499	27	47
		10			4544	45	53			5084	44	53			5624	43	53
	350	4	0,175	0,147	2121	7	29	0,1925	0,165	2373	7	29	0,21	0,182	2625	7	29
		6			3181	16	40			3559	15	40			3937	15	40
		8			4241	28	47			4745	27	47			5249	27	47
		10			5301	44	53			5931	43	53			6561	42	53
	400	4	0,2	0,168	2424	7	29	0,22	0,188	2712	7	29	0,24	0,208	3000	6	30
		6			3635	15	40			4067	15	40			4499	15	40
		8			4847	27	47			5423	27	48			5999	26	48
		10			6059	43	53			6779	42	53			7499	40	53
	450	4	0,225	0,189	2726	7	29	0,2475	0,212	3050	6	30	0,27	0,234	3374	6	30
		6			4090	15	40			4576	15	40			5062	14	40
		8			5453	27	48			6101	26	48			6749	25	48
		10			6816	42	53			7626	40	53			8436	39	53
	500	4	0,25	0,210	3029	6	30	0,275	0,235	3389	6	30	0,3	0,260	3749	6	30
		6			4544	15	40			5084	14	40			5624	14	40
		8			6059	26	48			6779	25	48			7499	24	48
		10			7574	40	53			8474	39	54			9374	38	54
	550	4	0,275	0,231	3332	6	30	0,3025	0,259	3728	6	30	0,33	0,286	4124	6	30
		6			4999	14	40			5593	14	40			6187	13	40
		8			6665	25	48			7457	24	48			8249	24	48
		10			8331	39	53			9321	38	54			10311	37	54
	600	4	0,3	0,252	3635	6	30	0,33	0,282	4067	6	30	0,36	0,312	4499	6	30
		6			5453	14	40			6101	13	40			6749	13	40
		8			7271	24	48			8135	24	48			8999	23	48
		10			9088	38	53			10168	37	53			11248	36	53
	650	4	0,325	0,273	3938	6	29	0,3575	0,306	4406	6	29	0,39	0,338	4874	5	29
		6			5907	13	40			6609	13	40			7311	12	40
		8			7876	24	48			8812	23	48			9748	22	48
		10			9846	37	53			11016	36	53			12186	34	53
	700	4	0,35	0,295	4241	6	29	0,385	0,330	4745	5	29	0,42	0,365	5249	5	29
		6			6362	13	40			7118	12	40			7874	12	40
		8			8482	23	47			9490	22	47			10498	21	47
		10			10603	36	53			11863	34	53			13123	33	53
	750	4	0,375	0,316	4544	5	29	0,4125	0,353	5084	5	29	0,45	0,391	5624	5	29
		6			6816	12	40			7626	12	40			8436	11	40
		8			9088	22	47			10168	21	47			11248	20	47
		10			11360	34	53			12710	33	53			14060	32	53
	800	4	0,4	0,337	4847	5	29	0,44	0,377	5423	5	29	0,48	0,417	5999	5	29
		6			7271	12	40			8135	11	40			8999	11	39
		8			9694	21	47			10846	20	47			11998	20	47
		10			12118	33	53			13558	32	53			14998	31	53
	850	4	0,425	0,358	5150	5	29	0,4675	0,400	5762	5	29	0,51	0,443	6374	5	29
		6			7725	11	39			8643	11	39			9561	11	39
		8			10300	20	47			11524	20	47			12748	19	47
		10			12875	32	53			14405	31	53			15935	29	53
	900	4	0,45	0,379	5453	5	28	0,495	0,424	6101	5	28	0,54	0,469	6749	5	28
		6			8179	11	39			9151	11	39			10123	10	39
		8			10906	20	47			12202	19	47			13498	18	46
		10			13632	31	52			15252	29	52			16872	28	52
	950	4	0,475	0,400	5756	5	28	0,5225	0,447	6440	5	28	0,57	0,495	7124	4	28
		6			8634	11	39			9660	10	39			10686	10	39
		8			11512	19	46			12880	18	46			14248	17	46
		10			14390	29	52			16100	28	52			17810	27	52
	1000	4	0,5	0,421	6059	5	28	0,55	0,471	6779	4	28	0,6	0,521	7499	4	28
		6			9088	10	38			10168	10	38			11248	9	38
		8			12118	18	46			13558	17	46			14998	16	46
		10			15147	28	52			16947	27	52			18747	26	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	750 S_k [m²]	750 S_e [m²]	750 Q [m³/h]	750 d_p [PA]	750 L_{WA} [dB]
200		4	0,13	0,114	1644	7	28	0,14	0,124	1788	7	28	0,15	0,134	1932	7	28
		6			2466	16	39			2682	15	39			2898	15	39
		8			3288	28	46			3576	27	46			3864	27	46
		10			4109	44	52			4469	43	52			4829	42	52
250		4	0,1625	0,143	2055	7	29	0,175	0,155	2235	7	29	0,1875	0,168	2415	6	29
		6			3082	15	39			3352	15	39			3622	15	39
		8			4109	27	47			4469	27	47			4829	26	47
		10			5137	43	53			5587	42	52			6037	40	52
300		4	0,195	0,171	2466	7	29	0,21	0,186	2682	6	29	0,225	0,201	2898	6	29
		6			3698	15	40			4022	15	40			4346	14	40
		8			4931	27	47			5363	26	47			5795	25	47
		10			6164	42	53			6704	40	53			7244	39	53
350		4	0,2275	0,200	2877	6	29	0,245	0,217	3129	6	29	0,2625	0,235	3381	6	29
		6			4315	15	40			4693	14	40			5071	14	40
		8			5753	26	47			6257	25	47			6761	24	47
		10			7191	40	53			7821	39	53			8451	38	53
400		4	0,26	0,228	3288	6	30	0,28	0,248	3576	6	29	0,3	0,268	3864	6	29
		6			4931	14	40			5363	14	40			5795	13	40
		8			6575	25	48			7151	24	48			7727	24	47
		10			8219	39	53			8939	38	53			9659	37	53
450		4	0,2925	0,257	3698	6	30	0,315	0,279	4022	6	30	0,3375	0,302	4346	6	29
		6			5548	14	40			6034	13	40			6520	13	40
		8			7397	24	48			8045	24	48			8693	23	47
		10			9246	38	53			10056	37	53			10866	36	53
500		4	0,325	0,285	4109	6	30	0,35	0,310	4469	6	30	0,375	0,335	4829	5	29
		6			6164	13	40			6704	13	40			7244	12	40
		8			8219	24	48			8939	23	48			9659	22	47
		10			10274	37	54			11174	36	53			12074	34	53
550		4	0,3575	0,314	4520	6	30	0,385	0,341	4916	5	30	0,4125	0,369	5312	5	29
		6			6781	13	40			7375	12	40			7969	12	40
		8			9041	23	48			9833	22	48			10625	21	47
		10			11301	36	53			12291	34	53			13281	33	53
600		4	0,39	0,342	4931	5	30	0,42	0,372	5363	5	29	0,45	0,402	5795	5	29
		6			7397	12	40			8045	12	40			8693	11	40
		8			9863	22	48			10727	21	47			11591	20	47
		10			12328	34	53			13408	33	53			14488	32	53
650		4	0,4225	0,371	5342	5	29	0,455	0,403	5810	5	29	0,4875	0,436	6278	5	29
		6			8013	12	40			8715	11	40			9417	11	40
		8			10684	21	47			11620	20	47			12556	20	47
		10			13356	33	53			14526	32	53			15696	31	53
700		4	0,455	0,400	5753	5	29	0,49	0,435	6257	5	29	0,525	0,470	6761	5	29
		6			8630	11	40			9386	11	40			10142	11	39
		8			11506	20	47			12514	20	47			13522	19	47
		10			14383	32	53			15643	31	53			16903	29	53
750		4	0,4875	0,428	6164	5	29	0,525	0,466	6704	5	29	0,5625	0,503	7244	5	29
		6			9246	11	40			10056	11	39			10866	10	39
		8			12328	20	47			13408	19	47			14488	18	47
		10			15410	31	53			16760	29	53			18110	28	53
800		4	0,52	0,457	6575	5	29	0,56	0,497	7151	5	29	0,6	0,537	7727	4	28
		6			9863	11	39			10727	10	39			11591	10	39
		8			13150	19	47			14302	18	47			15454	17	46
		10			16438	29	53			17878	28	52			19318	27	52
850		4	0,5525	0,485	6986	5	28	0,595	0,528	7598	4	28	0,6375	0,570	8210	4	28
		6			10479	10	39			11397	10	39			12315	9	39
		8			13972	18	47			15196	17	46			16420	16	46
		10			17465	28	52			18995	27	52			20525	26	52
900		4	0,585	0,514	7397	4	28	0,63	0,559	8045	4	28	0,675	0,604	8693	4	28
		6			11095	10	39			12067	9	38			13039	9	38
		8			14794	17	46			16090	16	46			17386	16	46
		10			18492	27	52			20112	26	52			21732	25	51
950		4	0,6175	0,542	7808	4	28	0,665	0,590	8492	4	28	0,7125	0,637	9176	4	27
		6			11712	9	38			12738	9	38			13764	8	38
		8			15616	16	46			16984	16	46			18352	15	45
		10			19520	26	52			21230	25	51			22940	23	51
1000		4	0,65	0,571	8219	4	27	0,7	0,621	8939	4	27	0,75	0,671	9659	4	27
		6			12328	9	38			13408	8	38			14488	8	37
		8			16438	16	45			17878	15	45			19318	14	45
		10			20547	25	51			22347	23	51			24147	22	51

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			800					850					900				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0,16	0,144	2076	6	28	0,17	0,154	2220	6	28	0,18	0,164	2364	6	28
		6			3114	15	38			3330	14	38			3546	14	38
		8			4152	26	46			4440	25	46			4728	24	46
		10			5189	40	52			5549	39	52			5909	38	52
	250	4	0,2	0,180	2595	6	28	0,2125	0,193	2775	6	28	0,225	0,205	2955	6	28
		6			3892	14	39			4162	14	39			4432	13	39
		8			5189	25	47			5549	24	46			5909	24	46
		10			6487	39	52			6937	38	52			7387	37	52
	300	4	0,24	0,216	3114	6	29	0,255	0,231	3330	6	29	0,27	0,246	3546	6	29
		6			4670	14	39			4994	13	39			5318	13	39
		8			6227	24	47			6659	24	47			7091	23	47
		10			7784	38	53			8324	37	53			8864	36	52
	350	4	0,28	0,252	3633	6	29	0,2975	0,270	3885	6	29	0,315	0,287	4137	5	29
		6			5449	13	40			5827	13	40			6205	12	39
		8			7265	24	47			7769	23	47			8273	22	47
		10			9081	37	53			9711	36	53			10341	34	53
	400	4	0,32	0,288	4152	6	29	0,34	0,308	4440	5	29	0,36	0,328	4728	5	29
		6			6227	13	40			6659	12	40			7091	12	39
		8			8303	23	47			8879	22	47			9455	21	47
		10			10379	36	53			11099	34	53			11819	33	53
	450	4	0,36	0,324	4670	5	29	0,3825	0,347	4994	5	29	0,405	0,369	5318	5	29
		6			7006	12	40			7492	12	40			7978	11	39
		8			9341	22	47			9989	21	47			10637	20	47
		10			11676	34	53			12486	33	53			13296	32	53
	500	4	0,4	0,360	5189	5	29	0,425	0,385	5549	5	29	0,45	0,410	5909	5	29
		6			7784	12	40			8324	11	40			8864	11	39
		8			10379	21	47			11099	20	47			11819	20	47
		10			12974	33	53			13874	32	53			14774	31	53
	550	4	0,44	0,396	5708	5	29	0,4675	0,424	6104	5	29	0,495	0,451	6500	5	29
		6			8563	11	40			9157	11	40			9751	11	39
		8			11417	20	47			12209	20	47			13001	19	47
		10			14271	32	53			15261	31	53			16251	29	53
	600	4	0,48	0,432	6227	5	29	0,51	0,462	6659	5	29	0,54	0,492	7091	5	29
		6			9341	11	40			9989	11	39			10637	10	39
		8			12455	20	47			13319	19	47			14183	18	47
		10			15568	31	53			16648	29	53			17728	28	52
	650	4	0,52	0,468	6746	5	29	0,5525	0,501	7214	5	29	0,585	0,533	7682	4	28
		6			10119	11	39			10821	10	39			11523	10	39
		8			13492	19	47			14428	18	47			15364	17	46
		10			16866	29	53			18036	28	52			19206	27	52
	700	4	0,56	0,505	7265	5	29	0,595	0,540	7769	4	28	0,63	0,575	8273	4	28
		6			10898	10	39			11654	10	39			12410	9	39
		8			14530	18	47			15538	17	46			16546	16	46
		10			18163	28	53			19423	27	52			20683	26	52
	750	4	0,6	0,541	7784	4	28	0,6375	0,578	8324	4	28	0,675	0,616	8864	4	28
		6			11676	10	39			12486	9	39			13296	9	38
		8			15568	17	46			16648	16	46			17728	16	46
		10			19460	27	52			20810	26	52			22160	25	52
	800	4	0,64	0,577	8303	4	28	0,68	0,617	8879	4	28	0,72	0,657	9455	4	27
		6			12455	9	39			13319	9	38			14183	8	38
		8			16606	16	46			17758	16	46			18910	15	45
		10			20758	26	52			22198	25	52			23638	23	51
	850	4	0,68	0,613	8822	4	28	0,7225	0,655	9434	4	27	0,765	0,698	10046	4	27
		6			13233	9	38			14151	8	38			15069	8	37
		8			17644	16	46			18868	15	45			20092	14	45
		10			22055	25	52			23585	23	51			25115	22	51
	900	4	0,72	0,649	9341	4	27	0,765	0,694	9989	4	27	0,81	0,739	10637	3	26
		6			14011	8	38			14983	8	37			15955	7	37
		8			18682	15	45			19978	14	45			21274	13	44
		10			23352	23	51			24972	22	51			26592	21	50
	950	4	0,76	0,685	9860	4	27	0,8075	0,732	10544	3	26	0,855	0,780	11228	3	26
		6			14790	8	37			15816	7	37			16842	7	36
		8			19720	14	45			21088	13	44			22456	13	44
		10			24650	22	51			26360	21	50			28070	20	50
	1000	4	0,8	0,721	10379	3	26	0,85	0,771	11099	3	26	0,9	0,821	11819	3	25
		6			15568	7	37			16648	7	36			17728	7	36
		8			20758	13	44			22198	13	44			23638	12	43
		10			25947	21	50			27747	20	50			29547	18	49

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

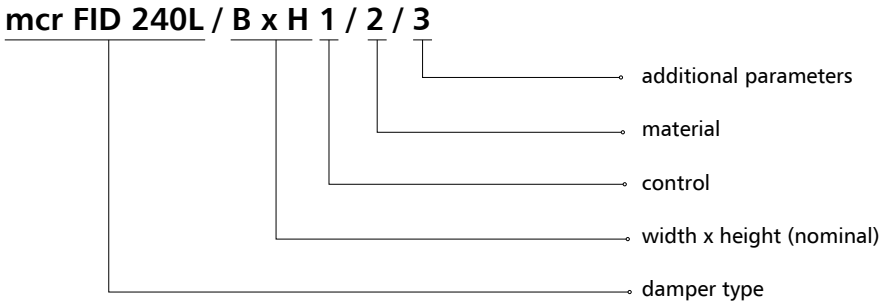
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]	1050 S_k [m²]	1050 S_e [m²]	1050 Q [m³/h]	1050 d_p [PA]	1050 L_{WA} [dB]
	200	4	0,19	0,174	2508	6	27	0,2	0,184	2652	6	27	0,21	0,194	2796	5	27
		6			3762	13	38			3978	13	38			4194	12	38
		8			5016	24	46			5304	23	45			5592	22	45
		10			6269	37	51			6629	36	51			6989	34	51
	250	4	0,2375	0,218	3135	6	28	0,25	0,230	3315	5	28	0,2625	0,243	3495	5	28
		6			4702	13	39			4972	12	38			5242	12	38
		8			6269	23	46			6629	22	46			6989	21	46
		10			7837	36	52			8287	34	52			8737	33	51
	300	4	0,285	0,261	3762	5	28	0,3	0,276	3978	5	28	0,315	0,291	4194	5	28
		6			5642	12	39			5966	12	39			6290	11	38
		8			7523	22	46			7955	21	46			8387	20	46
		10			9404	34	52			9944	33	52			10484	32	52
	350	4	0,3325	0,305	4389	5	29	0,35	0,322	4641	5	28	0,3675	0,340	4893	5	28
		6			6583	12	39			6961	11	39			7339	11	39
		8			8777	21	47			9281	20	46			9785	20	46
		10			10971	33	52			11601	32	52			12231	31	52
	400	4	0,38	0,348	5016	5	29	0,4	0,368	5304	5	28	0,42	0,388	5592	5	28
		6			7523	11	39			7955	11	39			8387	11	39
		8			10031	20	47			10607	20	46			11183	19	46
		10			12539	32	53			13259	31	52			13979	29	52
	450	4	0,4275	0,392	5642	5	29	0,45	0,414	5966	5	28	0,4725	0,437	6290	5	28
		6			8464	11	39			8950	11	39			9436	10	39
		8			11285	20	47			11933	19	46			12581	18	46
		10			14106	31	53			14916	29	52			15726	28	52
	500	4	0,475	0,435	6269	5	29	0,5	0,460	6629	5	28	0,525	0,485	6989	4	28
		6			9404	11	39			9944	10	39			10484	10	38
		8			12539	19	47			13259	18	46			13979	17	46
		10			15674	29	52			16574	28	52			17474	27	52
	550	4	0,5225	0,479	6896	5	28	0,55	0,506	7292	4	28	0,5775	0,534	7688	4	28
		6			10345	10	39			10939	10	39			11533	9	38
		8			13793	18	46			14585	17	46			15377	16	46
		10			17241	28	52			18231	27	52			19221	26	52
	600	4	0,57	0,522	7523	4	28	0,6	0,552	7955	4	28	0,63	0,582	8387	4	27
		6			11285	10	39			11933	9	38			12581	9	38
		8			15047	17	46			15911	16	46			16775	16	46
		10			18808	27	52			19888	26	52			20968	25	51
	650	4	0,6175	0,566	8150	4	28	0,65	0,598	8618	4	28	0,6825	0,631	9086	4	27
		6			12225	9	39			12927	9	38			13629	8	38
		8			16300	16	46			17236	16	46			18172	15	45
		10			20376	26	52			21546	25	51			22716	23	51
	700	4	0,665	0,610	8777	4	28	0,7	0,645	9281	4	27	0,735	0,680	9785	4	27
		6			13166	9	38			13922	8	38			14678	8	37
		8			17554	16	46			18562	15	45			19570	14	45
		10			21943	25	52			23203	23	51			24463	22	51
	750	4	0,7125	0,653	9404	4	27	0,75	0,691	9944	4	27	0,7875	0,728	10484	3	26
		6			14106	8	38			14916	8	37			15726	7	37
		8			18808	15	45			19888	14	45			20968	13	44
		10			23510	23	51			24860	22	51			26210	21	50
	800	4	0,76	0,697	10031	4	27	0,8	0,737	10607	3	26	0,84	0,777	11183	3	26
		6			15047	8	37			15911	7	37			16775	7	36
		8			20062	14	45			21214	13	44			22366	13	44
		10			25078	22	51			26518	21	50			27958	20	50
	850	4	0,8075	0,740	10658	3	26	0,85	0,783	11270	3	26	0,8925	0,825	11882	3	25
		6			15987	7	37			16905	7	36			17823	7	36
		8			21316	13	44			22540	13	44			23764	12	43
		10			26645	21	50			28175	20	50			29705	18	49
	900	4	0,855	0,784	11285	3	26	0,9	0,829	11933	3	25	0,945	0,874	12581	3	25
		6			16927	7	36			17899	7	36			18871	6	35
		8			22570	13	44			23866	12	43			25162	11	43
		10			28212	20	50			29832	18	49			31452	17	48
	950	4	0,9025	0,827	11912	3	25	0,95	0,875	12596	3	25	0,9975	0,922	13280	3	24
		6			17868	7	36			18894	6	35			19920	6	34
		8			23824	12	43			25192	11	43			26560	10	42
		10			29780	18	49			31490	17	48			33200	16	48
	1000	4	0,95	0,871	12539	3	25	1	0,921	13259	3	24	1,05	0,971	13979	2	23
		6			18808	6	35			19888	6	34			20968	5	34
		8			25078	11	43			26518	10	42			27958	9	41
		10			31347	17	48			33147	16	48			34947	15	47

7.7.1 | Estimated weights of mcr FID 240L dampers for rectangular ventilation ducts [kg]

height H [mm] \ width B [mm]	200	250	300	400	500	600	700	800	900	1000	1050
200	10.5	11	11	11	17	19	20	21	25	28	30
250	10.5	11	12	12	18	20	20	24	27	30	31
300	11	12	12	13	19	22	24	26	29	31	33
350	12	12	12	18	20	23	26	29	31	32	35
400	11	12	13	20	21	24	28	32	34	37	38
500	17	18	19	21	22	26	30	36	37	39	41
600	19	20	22	24	34	29	34	39	41	44	46
700	20	20	24	26	34	39	39	45	47	49	51
800	22	24	25	27	32	39	41	46	48	55	57
900	25	28	28	31	37	39	44	48	53	59	61
1000	26	32	31	37	40	47	48	55	59	63	64

7.8 | Marking



1 - control:

» **trigger and control mechanism, axial actuator**

BF 24-T/BF 24-SR-T – actuator with a return spring, U = 24 V AC/DC
BF230-T – actuator with a return spring, U = 230 V AC
BF24TL-T-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
BF24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL 24-T/BFL 24-SR-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T/MLF230T1 – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN 24-T/BFN 24-SR-T– actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
MF24T1 – actuator with a return spring, U = 24 V AC/DC
MF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material

[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF/MF) – thermoelectric trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Control mechanism position**
[no symbol] – perpendicular to the damper rotation axis*
WOK – along the damper rotation axis

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper

» **Design standard**
[no symbol] – right damper
KL – left damper (excl. round dampers)
KO – inverted damper (excl. round dampers)

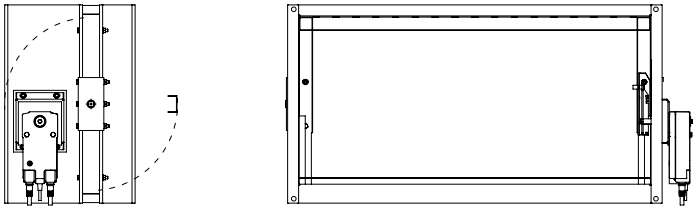
» **Damper casing**
[no symbol] – standard casing length
400 – casing with a length of 400 mm
BU – earth pin

NOTE: separate additional parameters entered with the "/" sign

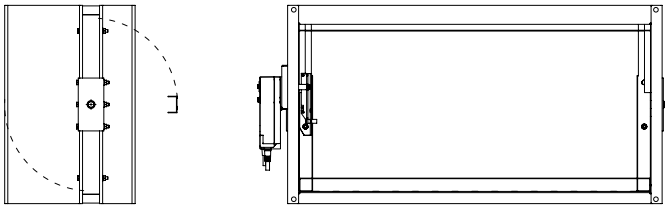
example marking:
mcr FID 240L /500 x 600 /BFL 24-T
EI240 cut-off fire damper with a 24 V actuator with limit switches.

7.9 | Design standard

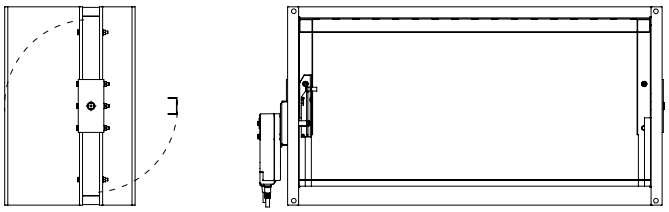
» right damper - standard



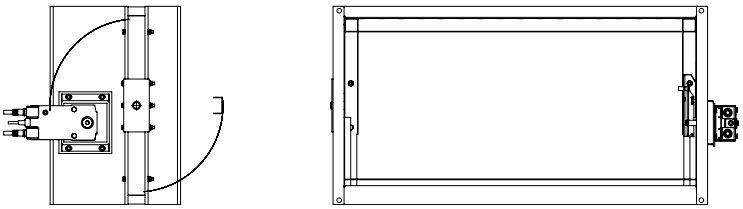
» inverted damper - (ducts facing downwards)



» left damper



» along the damper axis



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams for **the trigger control mechanisms supporting the damper**.

downloadable models
on the website
under the designer zone tab



1396-CPR-0092

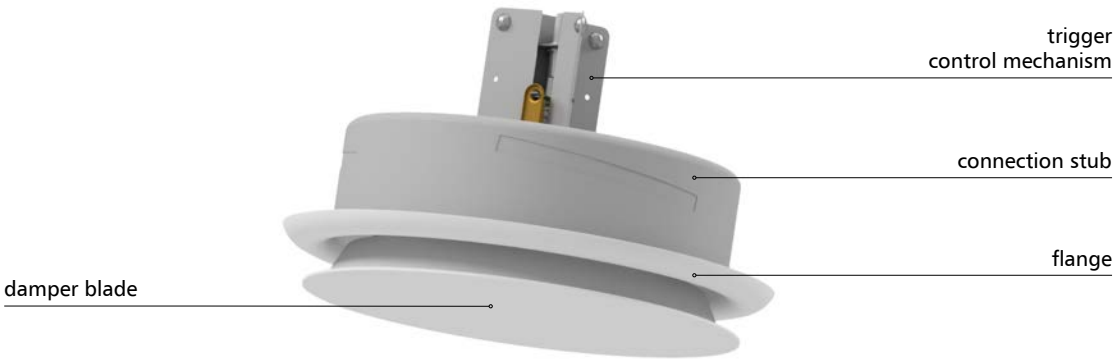
HYGIENIC CERTIFICATE

» **EIS120**
» Fire resistance class: EI120 (v_e h_o o→i)S, EI120 (v_e i→o), EI180 (v_e o→i)S.
» Certificate of constancy of performance 1396-CPR-0092.
» Valves certified for compliance with EN 15650.
» Valves qualified under EN 13501-3 and tested under EN 1366-2.
» Airflow adjustment function and cut-off damper in one device

8.1| Application

The mcr ZIPP cut-off fire valves are designed for installation at the terminal points of general ventilation systems, where those systems pass through construction partitions. They are used to separate a fire hazard zone from other parts of the building and to transfer air through construction partitions. During normal system operation, the valves are open. In case of fire, the valves close.
Furthermore, mcr ZIPP cut-off fire valves may be used to close transfer openings, in which case they are installed without connection ducts.
Valves may also be used in the systems which are protecting egress routes from smoke, in which case they remain open during the fire and ensure a supply of fresh air to egress routes. As the fire develops further, the valves are automatically closed as a result of thermal trigger tripping, which prevents the spreading of fire and smoke to other rooms.

8.2| Design



mcr ZIPP cut-off valves consist of a casing with a circular cross-section, a moving blade (cover), a connection stub and a trigger control mechanism activated when the thermal or electromagnetic trigger trips, whereby the automatic trip of the thermal trigger overrides remote power supply or disconnection.
The connection stub is made of galvanized steel sheet. The valve flange is made of powder-painted steel sheets. The insulation blade of the valve is made of a material that provides fire protection, coated on the outside with powder-painted steel sheets. The blade is placed on a treaded, moving guiding pin, which enables the adjustment of performance (active surface) of the valve by tightening the cover.
During normal operation, cut-off valves remain open. The valve switches to safe mode (closes):
» automatically, by means of thermal trigger tripping (RST trigger control mechanism),
» remotely, by means of electromagnetic and thermal trigger tripping (RST+EK trigger control mechanism). As a standard, the valves are painted in RAL 9010.

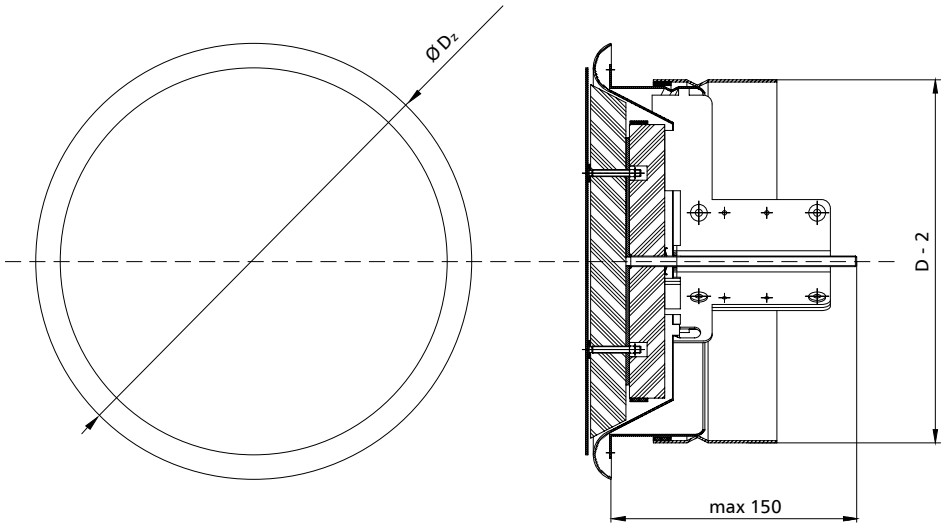
8.3 | Versions

8.3.1 | mcr ZIPP RST – cut-off fire valve for ventilation ducts with a thermal trigger

During normal operation, the insulation blade of the fire valve remains open. In case of fire, the blade closes automatically.

mcr ZIPP RST valves are equipped with an **RST** trigger and control mechanism with a 74˚C thermal trigger (it is possible to use a thermal trigger with the nominal tripping temperature of 95˚C as an option) and drive spring. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the valves with a WK1 limit switch used to signal the blade position.

» **closed valve blade**



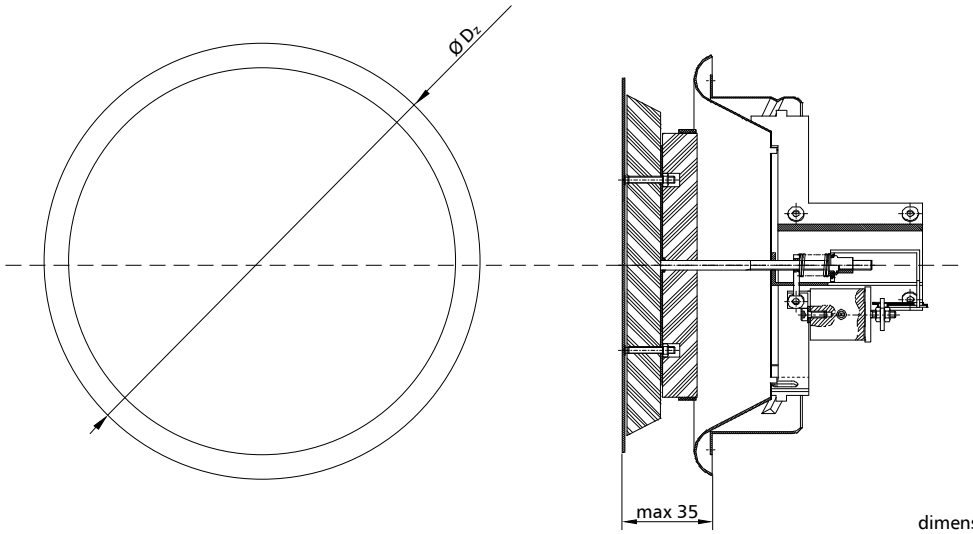
dimensions in [mm]

8.3.2 | mcr ZIPP RST+EK – cut-off fire valve for ventilation ducts with an electromagnetic and thermal trigger

During normal operation, the insulation blade of the fire valve remains open. In case of fire, the blade closes automatically or remotely when power is supplied or cut off.

mcr ZIPP RST+EK valves are equipped with a trigger control mechanism with a 74°C thermal trigger (optionally 95°C), a spring drive and an electromagnetic trigger tripped by the power supply application (“pulse”) or removal (“break”).

» **open valve blade**



dimensions in [mm]

8.4 | Dimensions

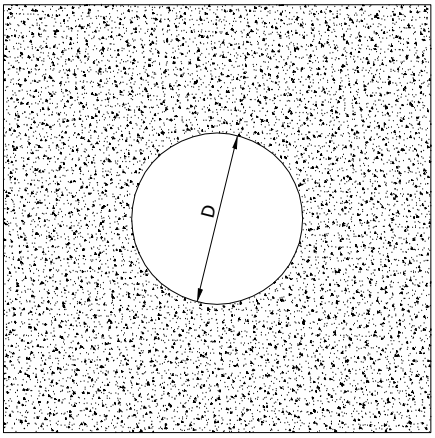
» **Circular valves:**
nominal diameter D: 100 mm, 125 mm, 160 mm, 200 mm.

8.5 | Installation

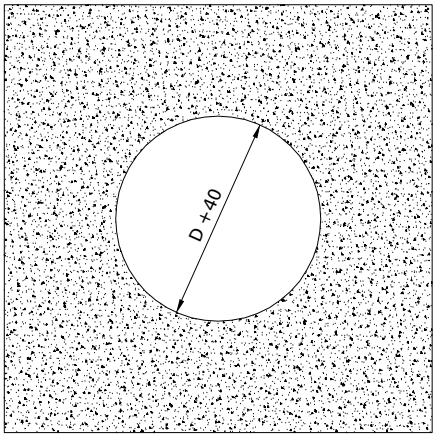
mcr ZIPP valves are rated EI120(v_e h_o o→i)S if installed in concrete partitions, partitions made of full bricks or aerated concrete blocks with a thickness of at least 110 mm, gypsum board light walls on a steel framework with a thickness of min. 125 mm and EI120 or higher fire rating, as well as concrete floor slabs with a thickness of at least 150 mm.

8.5.1 | Preparation of installation openings

» **in light gypsum board walls – preferred opening**



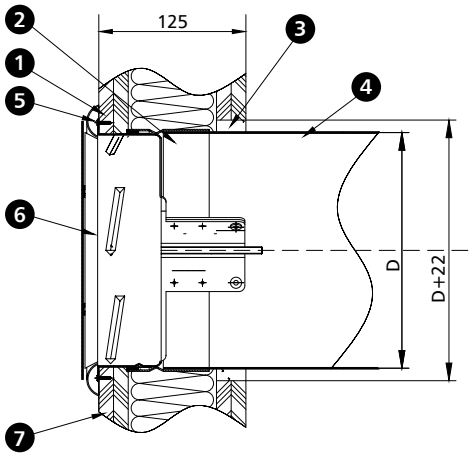
» **in rigid walls and floor slabs – preferred opening**



dimensions in [mm]

8.5.2 | Sample installation in gypsum board light walls on a steel framework

» **duct installation**



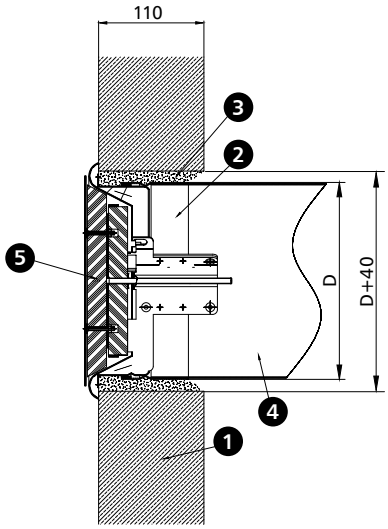
dimensions in [mm]

1. gypsum board
2. extension stub
3. assembly mortar*
4. ventilation duct
5. gypsum board screw
6. mcr ZIPP valve
7. gypsum board light wall

*it is possible to use a different filling that ensures the required fire resistance

8.5.3 | Sample installation in brick and concrete walls

» duct installation



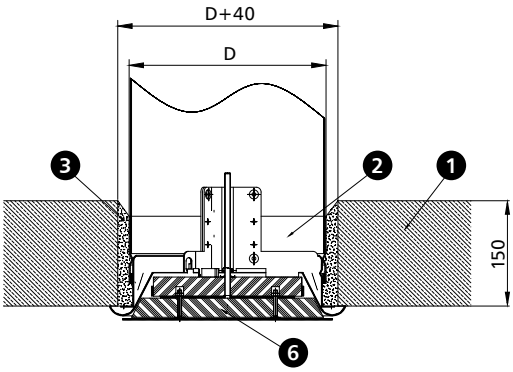
1. rigid concrete or masonry wall
2. extension stub
3. sealing - plaster or assembly mortar*
4. duct
5. mcr ZIPP valve

*it is possible to use a different filling that ensures the required fire resistance

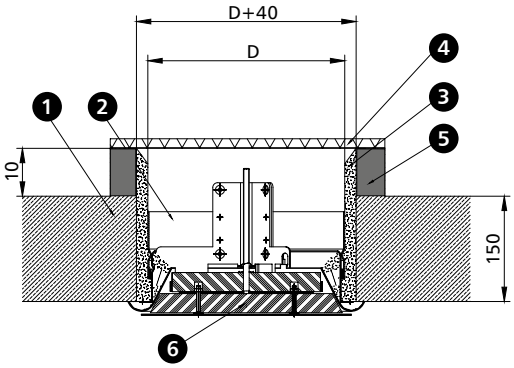
dimensions in [mm]

8.5.4 | Sample installation in floor slabs

» duct installation



» ductless installation



dimensions in [mm]

1. floor slab
2. extension stub
3. sealing - plaster or cement mortar*
4. masking grille (not included)
5. circumferential trim or masking grille with suitable height
6. mcr ZIPP valve

*it is possible to use a different filling that ensures the required fire resistance

8.6 | mcr ZIPP valves technical parameters

S_e – valve active cross-section [m²]
S_k – duct cross-section [m²]
D – nominal diameter [mm]

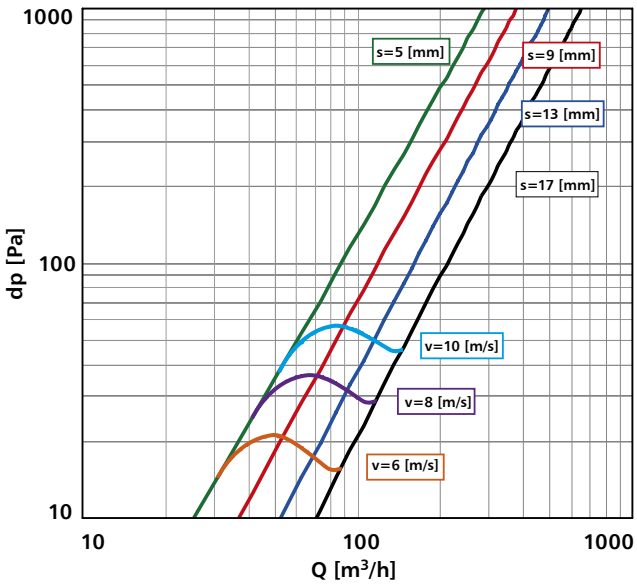
diameter D [mm]	100	125	160	200
S_e	0,0027	0,0055	0,0111	0,0191
S_k	0,0079	0,0123	0,0201	0,0314

» Flow characteristics

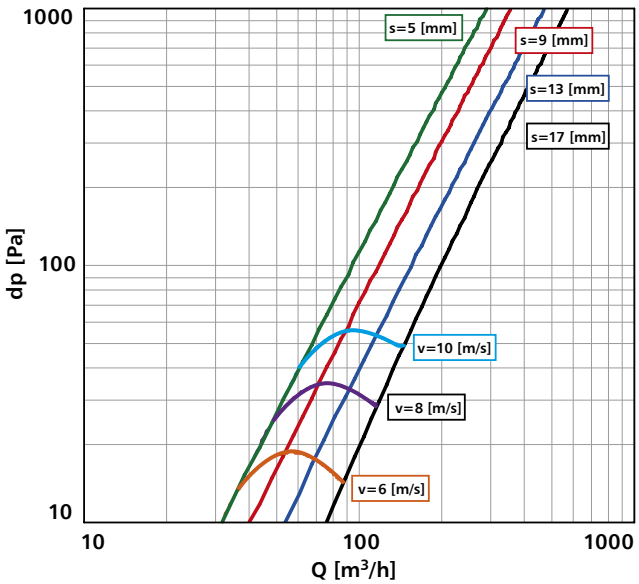
d_p – pressure drop [Pa] **s** – valve opening [mm] **v** – velocity [m/s] Q – flow [m³/h]

» mcr ZIPP 100 flow characteristics

supply

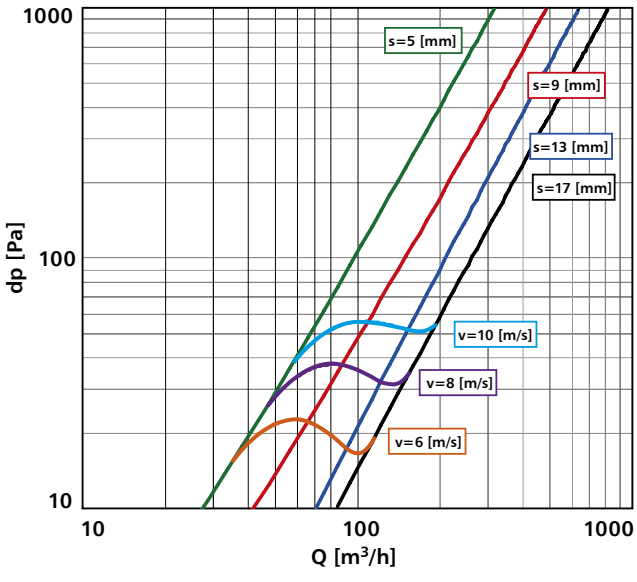


exhaust

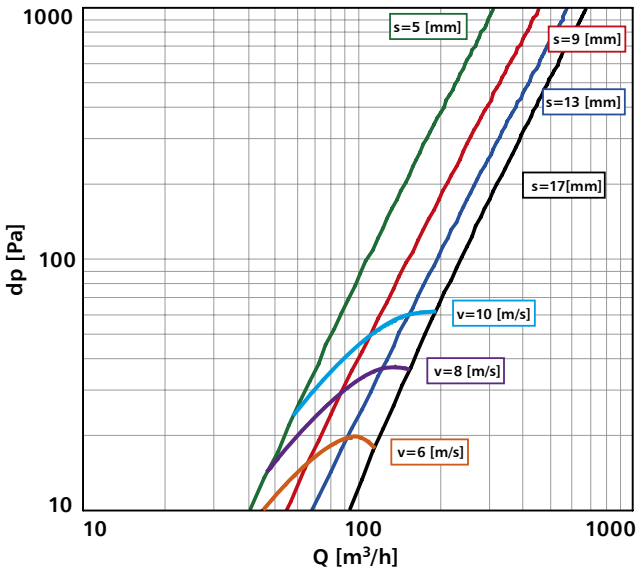


» mcr ZIPP 125 flow characteristics

supply



exhaust

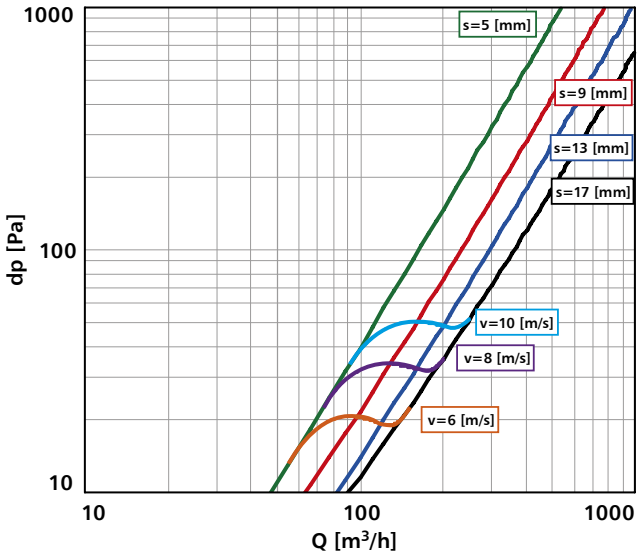


» Flow characteristics

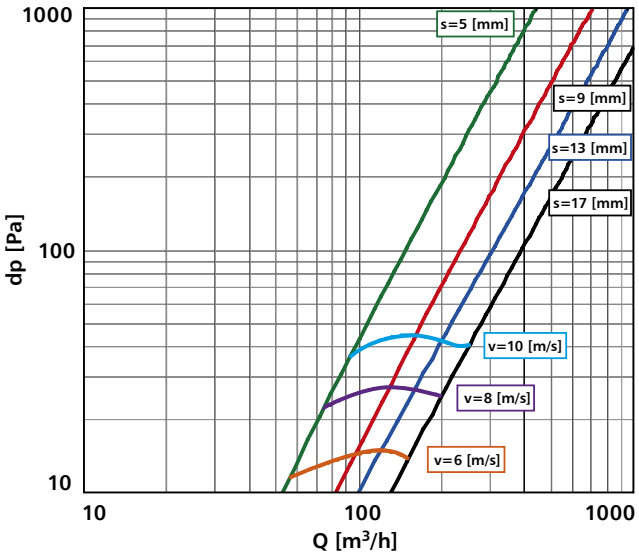
d_p – pressure drop [Pa] **s** – valve opening [mm] **v** – velocity [m/s] Q – flow [m³/h]

» mcr ZIPP 160 flow characteristics

supply

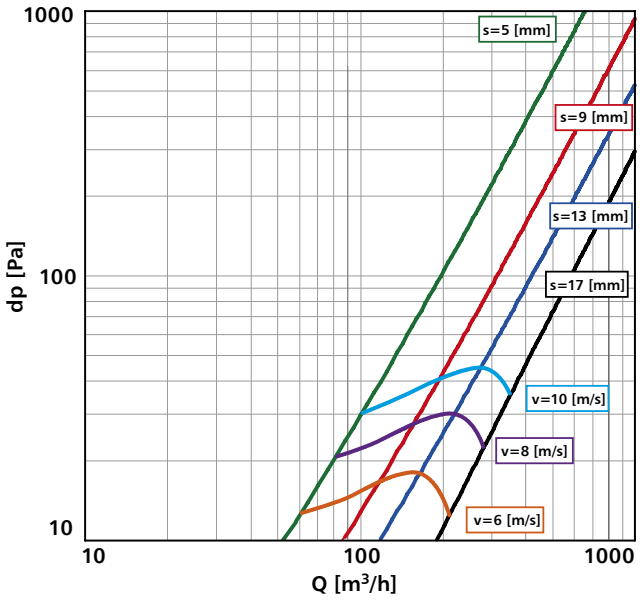


exhaust

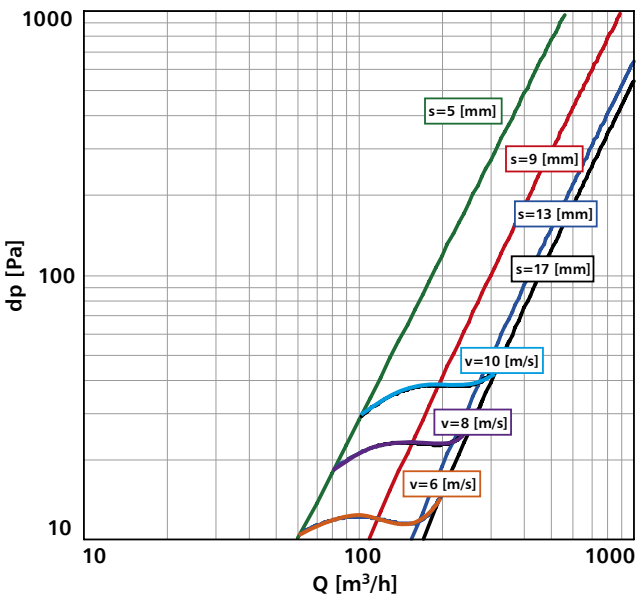


» mcr ZIPP 200 flow characteristics

supply



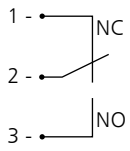
exhaust



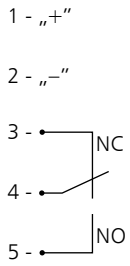
8.7 | Trigger control mechanisms – specifications and connections diagram

execution type	RST	RST+WK1	RST+EKI24+WK1	RST+EKI230+WK1	RST+EKP24+WK1	RST+EKP240+WK1
thermal trigger	+	+	+	+	+	+
limit switch	-	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A
rated voltage	-	-	24 V DC / pulse	230V AC / pulse	24 V DC / break	230V AC / break
power consumption	-	-	3.5 W	3.5 W	1.8 W	1.8 W

»electrical connections diagram for the mcr ZIPP RST+WK1 valve



»electrical connections diagram for the mcr ZIPP RST+EKI valve or RST+EKP+WK1
»

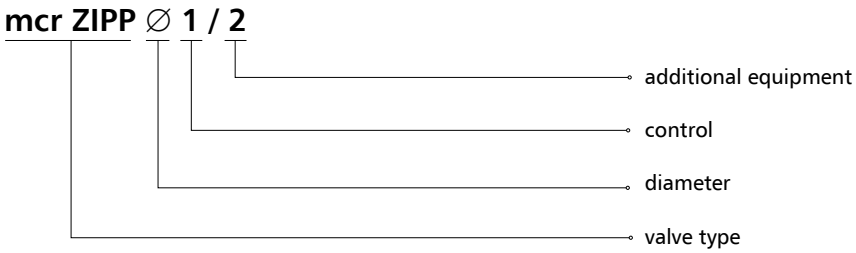


NOTE: the position of limit switch in standby (valve open)

8.8 | Weights of the mcr ZIPP valves [kg]

D [mm]	RST	RST+EK
100	0.9	1
125	1.5	1.6
160	1.7	1.8
200	2.7	2.8

8.9 | Marking



1 - control:

» **RST trigger control mechanism**
RST – thermal trigger
» **RST+EK trigger control mechanism**
RST+EKI24 – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC
RST+EKI230 – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC
RST+EKP24 – thermal trigger + "break" electromagnetic trigger, U = 24 V DC
RST+EKP230 – thermal trigger + "break" electromagnetic trigger, U = 230 V AC

2 - additional equipment:

WK1 – limit switch (closed blade signal)
RMK – extension stub
T95 – thermal trigger for 95°C

NOTE: **separate additional equipment entered with the "/" sign**

example marking:

mcr ZIPP Ø125 RST
EIS120 cut-off fire valve with a thermal trigger rated at 74°C.

mcr ZIPP Ø125 RST + WK1
EIS120 cut-off fire valve with a thermal trigger rated at 74°C and a limit switch.

mcr ZIPP Ø125 RST + EKP24 + WK1
EIS120 cut-off fire valve with a thermal trigger rated at 74°C and a „break" electromagnetic trigger, U = 24 V DC and a limit switch.

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



1396-CPR-0097

HYGIENIC CERTIFICATE

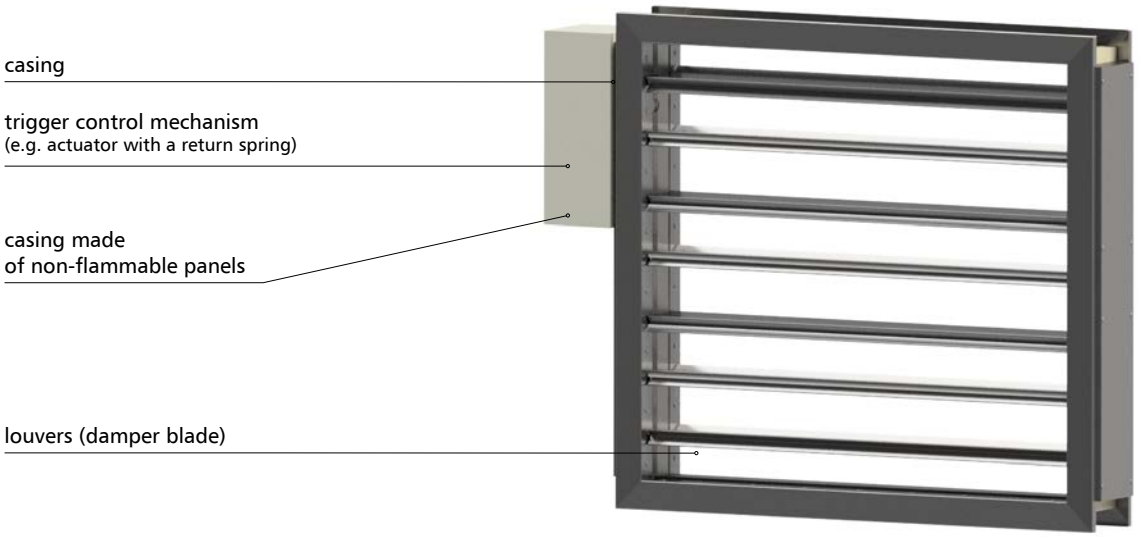
» **EIS60, ES120**
» Fire resistance class: EI60 (v_e i↔o)S, E120 (v_e i↔o)S.
» Certificate of constancy of performance 1396-CPR-0097.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Narrow louvered cut-off dampers.
» KTB ATEX 2014/34/UE

9.1| Application

mcr WIP/S multi-blade cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions mcr WIP/S fire dampers are intended for use especially in systems, where the components such as a silencer, bend or supply and extract grille are installed downstream of the fire damper, as the partition does not protrude beyond the damper casing.
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the louvers are open. In case of fire, the louver closes. Admissible flow velocity in the connected duct is 12 m/s.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

9.2| Design



mcr WIP/S cut-off dampers consist of a casing with a rectangular cross-section, multiple moving damper blades - louvers rotating on their own axes and a trigger control mechanism which is tripped remotely or automatically by tripping a thermoelectric trigger. The damper casing is made of galvanized steel sheets or stainless steel sheets. Its integral part is a flange made of boards with a fire resistance rating. The inner side of the fire damper casing is equipped with an intumescent gasket. The casing total length is 140 mm.

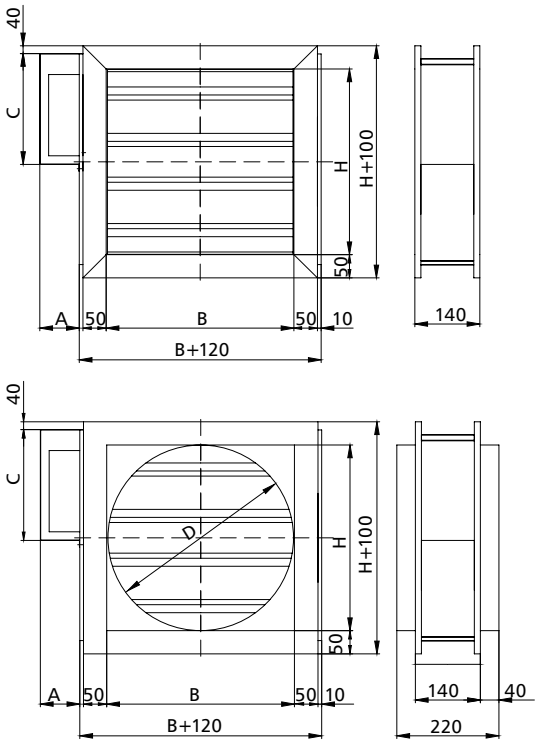
The louver surface is covered with galvanized or stainless steel sheets. Each louver with a thickness of 15 mm is filled with a plaster board with fire protection properties. The damper blades revolve on their own axes, which consist of two steel pins.
Dampers are made with 50 mm flanges that enable the correct installation of dampers in ventilation ducts. In a circular duct, the damper is made as a square with a circular “bare end” connection.

9.3 | Versions

9.3.1 | Damper closing and opening with an actuator

During normal operation, the cut-off louvers of the fire damper remain open. In case of fire, the louvers close automatically or remotely when the power supply is cut off.

The mcr WIP/S dampers are equipped with a trigger control mechanism in the form of BFL, BFN, BF, BF-TL, QT.Ex, MLF, MF series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). Actuators are equipped with limit switches used to monitor the position of the louver.
Dampers with actuators: analog BFL, BFN, BF, MLF, MF, digital BF-TL, QT.Ex explosion-proof actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals.



dimensions in [mm]

insert symmetrically against the wall axis

mechanism	A	C
BFN/MLF	125	325
BFL	125	275
BF/MF	125	325
BF24TL-ST	125	275
QT.Ex	125	400

9.4 | Dimensions

Rectangular dampers:
» nominal width B: from 120 mm to 1000 mm
» nominal height H from 160 mm to 1000 mm
» maximum single damper cross-section surface up to 1m^2.

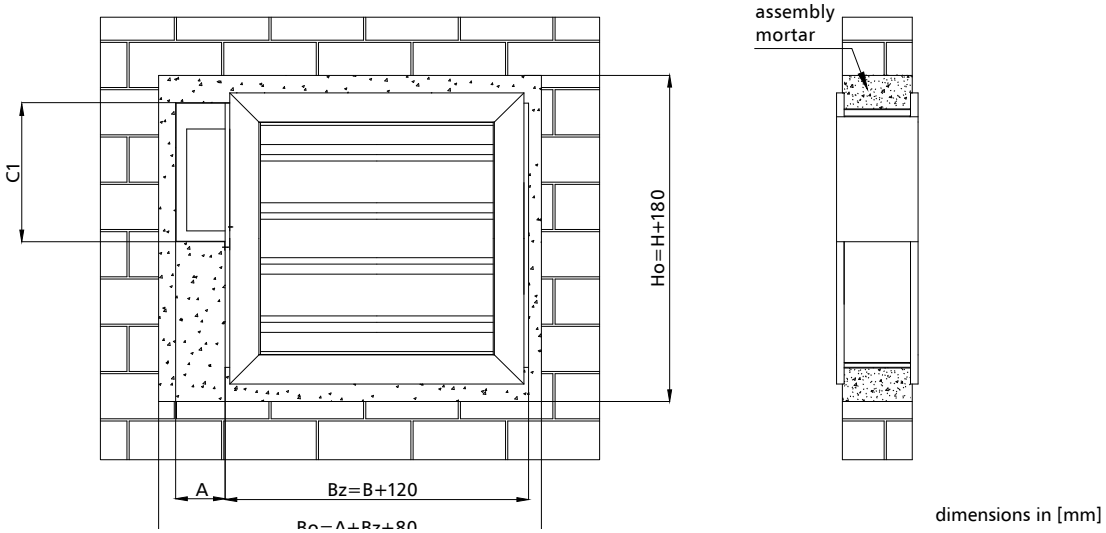
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254...
Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

9.5 | Installation

mcr WIP/S rectangular dampers are rated EI60(v_e i↔o)S and E120(v_e i↔o)S if installed in concrete partitions with a thickness of at least 120 mm, partitions made of full bricks or aerated concrete blocks with a thickness of at least 120 mm.

9.5.1 | Preparation of installation openings

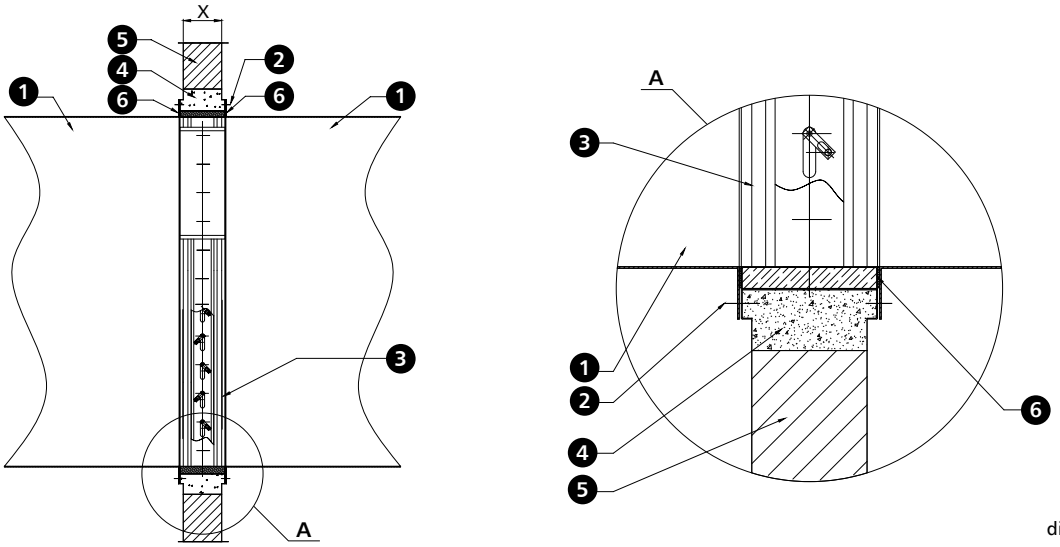
The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/S damper is:
Bo = (A+Bz+80) mm
Ho = (H+180) mm



dimensions in [mm]

mechanism	BF	BFL	BFN	MF	MLF	QT.Ex
C1 [mm]	325	335	325	325	325	400
A [mm]	125	125	125	125	125	125

9.5.2 | Sample installation in concrete or masonry walls



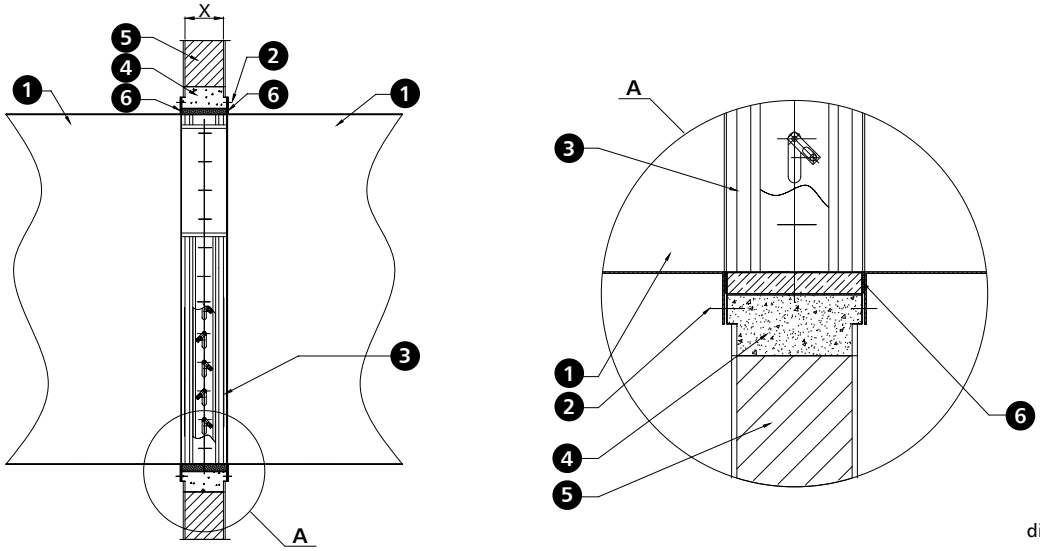
dimensions in [mm]

1. ventilation duct
2. ST4.2 x 16 sheet metal screw
3. mcr WIP/S fire damper
4. assembly mortar*
5. masonry wall
6. heat resistant gasket

X. wall thickness

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

9.5.3 | Sample installation in concrete block or full brick walls



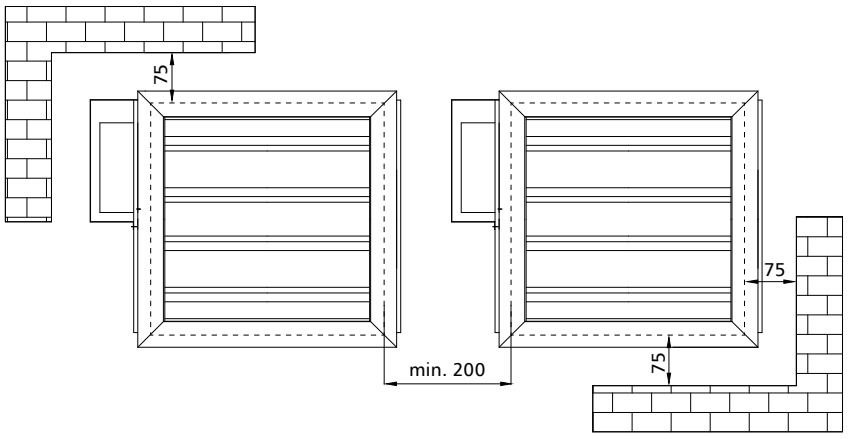
dimensions in [mm]

1. ventilation duct
2. ST4.2 x 16 sheet metal screw
3. mcr WIP/S fire damper
4. .assembly mortar*
5. wall of concrete blocks or full bricks
6. .heat resistant gasket

X. wall thickness

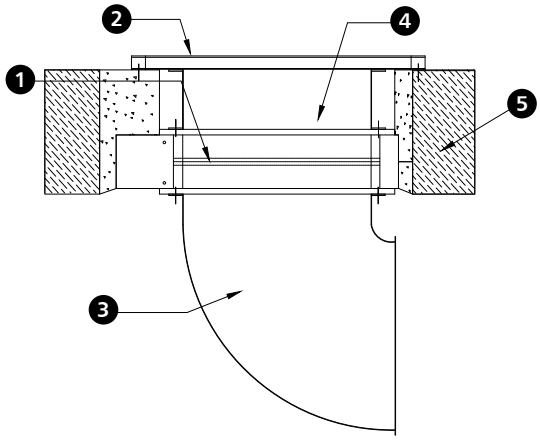
* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

» Minimum distance between systems and partitions



dimensions in [mm]

» Example applications - installation with a masking element



1. mcr WIP/S fire damper
2. masking element
3. ventilation duct
4. duct - ventilation straight connection piece
5. wall, floor slab

If a mcr WIP/S damper is used, the application of louvers (no single-blade design) it is possible to use the space in front of and behind the damper for such system elements as a masking grille or a silencer with additional attenuation barrier or to route a duct along the wall using a duct bend or reduction.

9.6 | mcr WIP/S rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	200	4	0.040	0.034	490	6	26	0.050	0.043	612	6	26	0.06	0.051	734	6	27
		6			734	13	36			918	13	37			1 102	13	37
		8			979	24	44			1 224	23	44			1 469	22	45
		10			1 224	37	49			1 530	36	50			1 836	35	50
	250	4	0.050	0.043	612	6	26	0.063	0.053	765	6	27	0.075	0.064	918	6	28
		6			918	13	37			1 148	13	38			1 377	13	38
		8			1 224	23	44			1 530	23	45			1 836	22	46
		10			1 530	36	50			1 913	36	51			2 295	35	51
	300	4	0.060	0.051	734	6	27	0.075	0.064	918	6	28	0.09	0.077	1 102	6	28
		6			1 102	13	37			1 377	13	38			1 652	13	39
		8			1 469	23	45			1 836	23	46			2 203	22	46
		10			1 836	36	51			2 295	36	52			2 754	35	52
	350	4	0.070	0.060	857	6	27	0.088	0.074	1 071	36	52	0.105	0.089	1 285	5	29
		6			1 285	13	38			1 607	13	39			1 928	12	39
		8			1 714	22	45			2 142	22	46			2 570	22	47
		10			2 142	35	51			2 678	35	52			3 213	34	52
	400	4	0.080	0.068	979	6	28	0.100	0.085	1 224	6	29	0.12	0.102	1 469	5	29
		6			1 469	13	38			1 836	13	39			2 203	12	40
		8			1 958	22	46			2 448	22	47			2 938	22	47
		10			2 448	35	52			3 060	35	53			3 672	34	53
	450	4	0.090	0.077	1 102	6	28	0.113	0.096	1 377	6	29	0.135	0.115	1 652	5	30
		6			1 652	13	39			2 066	13	40			2 479	12	40
		8			2 203	22	46			2 754	22	47			3 305	22	48
		10			2 754	35	52			3 443	35	53			4 131	34	54
	500	4	0.100	0.085	1 224	5	28	0.125	0.106	1 530	5	29	0.15	0.128	1 836	5	30
		6			1 836	12	39			2 295	12	40			2 754	12	40
		8			2 448	22	46			3 060	22	47			3 672	21	48
		10			3 060	34	52			3 825	34	53			4 590	33	54
	550	4	0.110	0.094	1 346	5	29	0.138	0.117	1 683	5	30	0.165	0.140	2 020	5	31
		6			2 020	12	39			2 525	12	40			3 029	12	41
		8			2 693	22	47			3 366	22	48			4 039	22	49
		10			3 366	34	53			4 208	34	54			5 049	34	54
	600	4	0.120	0.102	1 469	5	29	0.150	0.128	1 836	5	30	0.18	0.153	2 203	5	31
		6			2 203	12	40			2 754	12	41			3 305	12	41
		8			2 938	22	47			3 672	22	48			4 406	21	49
		10			3 672	34	53			4 590	34	54			5 508	33	54
	650	4	0.130	0.111	1 591	5	30	0.163	0.138	1 989	5	30	0.195	0.166	2 387	5	31
		6			2 387	12	40			2 984	12	41			3 580	12	41
		8			3 182	22	48			3 978	22	49			4 774	21	49
		10			3 978	34	53			4 973	34	54			5 967	33	55
	700	4	0.140	0.119	1 714	5	30	0.175	0.149	2 142	5	31	0.21	0.179	2 570	5	31
		6			2 570	12	40			3 213	12	41			3 856	12	42
		8			3 427	22	48			4 284	22	49			5 141	21	49
		10			4 284	34	54			5 355	34	55			6 426	33	55
	750	4	0.150	0.128	1 836	5	30	0.188	0.159	2 295	5	31	0.225	0.191	2 754	5	31
		6			2 754	12	40			3 443	12	41			4 131	12	42
		8			3 672	21	48			4 590	21	49			5 508	21	49
		10			4 590	33	54			5 738	33	55			6 885	32	55
	800	4	0.160	0.136	1 958	5	30	0.200	0.170	2 448	5	31	0.24	0.204	2 938	5	31
		6			2 938	12	41			3 672	12	42			4 406	12	42
		8			3 917	21	48			4 896	21	49			5 875	21	49
		10			4 896	33	54			6 120	33	55			7 344	32	55
	850	4	0.170	0.145	2 081	5	30	0.213	0.181	2 601	5	31	0.255	0.217	3 121	5	31
		6			3 121	12	40			3 902	12	41			4 682	11	42
		8			4 162	21	48			5 202	21	49			6 242	20	49
		10			5 202	32	54			6 503	32	55			7 803	31	55
	900	4	0.180	0.153	2 203	5	30	0.225	0.191	2 754	5	31	0.27	0.230	3 305	5	31
		6			3 305	12	41			4 131	12	42			4 957	11	42
		8			4 406	21	48			5 508	21	49			6 610	20	50
		10			5 508	32	54			6 885	32	55			8 262	31	55
	1000	4	0.200	0.170	2 448	5	31	0.250	0.213	3 060	5	32	0.3	0.255	3 672	5	32
		6			3 672	12	41			4 590	12	42			5 508	11	43
		8			4 896	21	49			6 120	21	50			7 344	20	50
		10			6 120	32	54			7 650	32	55			9 180	31	56

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			350					400					450				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	200	4	0.070	0.060	857	6	27	0.080	0.068	979	5	27	0.090	0.077	1 102	5	28
		6			1 285	13	38			1 469	12	38			1 652	12	38
		8			1 714	22	45			1 958	22	45			2 203	22	46
		10			2 142	35	51			2 448	34	51			2 754	34	52
	250	4	0.088	0.074	1 071	6	28	0.100	0.085	1 224	5	28	0.113	0.096	1 377	5	29
		6			1 607	13	39			1 836	12	39			2 066	12	39
		8			2 142	22	46			2 448	22	46			2 754	22	47
		10			2 678	35	52			3 060	34	52			3 443	34	53
	300	4	0.105	0.089	1 285	6	29	0.120	0.102	1 469	5	29	0.135	0.115	1 652	5	30
		6			1 928	13	40			2 203	12	40			2 479	12	40
		8			2 570	22	47			2 938	22	47			3 305	22	48
		10			3 213	35	53			3 672	34	53			4 131	34	54
	350	4	0.123	0.104	1 499	5	29	0.140	0.119	1 714	5	29	0.158	0.134	1 928	5	30
		6			2 249	12	40			2 570	12	40			2 892	12	41
		8			2 999	22	47			3 427	21	48			3 856	21	48
		10			3 749	34	53			4 284	33	53			4 820	33	54
	400	4	0.140	0.119	1 714	5	30	0.160	0.136	1 958	5	30	0.180	0.153	2 203	5	31
		6			2 570	12	40			2 938	12	41			3 305	12	41
		8			3 427	22	48			3 917	21	48			4 406	21	49
		10			4 284	34	54			4 896	33	54			5 508	33	54
	450	4	0.158	0.134	1 928	5	30	0.180	0.153	2 203	5	31	0.203	0.172	2 479	5	31
		6			2 892	12	41			3 305	12	41			3 718	12	42
		8			3 856	22	48			4 406	21	49			4 957	21	49
		10			4 820	34	54			5 508	33	54			6 197	33	55
	500	4	0.175	0.149	2 142	5	30	0.200	0.170	2 448	5	31	0.225	0.191	2 754	5	32
		6			3 213	12	41			3 672	12	42			4 131	12	42
		8			4 284	21	48			4 896	21	49			5 508	21	50
		10			5 355	33	54			6 120	33	55			6 885	33	55
	550	4	0.193	0.164	2 570	5	31	0.220	0.187	2 693	5	31	0.248	0.210	3 029	5	32
		6			3 856	12	42			4 039	12	42			4 544	12	43
		8			5 141	22	49			5 386	21	49			6 059	21	50
		10			6 426	34	55			6 732	33	55			7 574	33	56
	600	4	0.210	0.179	2 570	5	31	0.240	0.204	2 938	4	28	0.270	0.230	3 305	5	32
		6			3 856	12	42			4 406	8	37			4 957	12	42
		8			5 141	21	49			5 875	14	44			6 610	21	50
		10			6 426	33	55			7 344	32	55			8 262	32	56
	650	4	0.228	0.193	2 785	5	32	0.260	0.221	3 182	5	32	0.293	0.249	3 580	5	32
		6			4 177	12	42			4 774	12	42			5 370	12	43
		8			5 569	21	50			6 365	21	50			7 160	21	50
		10			6 962	33	55			7 956	32	56			8 951	32	56
	700	4	0.245	0.208	2 999	5	32	0.28	0.238	3 427	5	32	0.315	0.268	3 856	5	33
		6			4 498	12	42			5 141	12	43			5 783	12	43
		8			5 998	21	50			6 854	21	50			7 711	21	51
		10			7 497	33	56			8 568	32	56			9 639	32	56
	750	4	0.263	0.223	3 213	5	32	0.3	0.255	3 672	5	32	0.338	0.287	4 131	5	33
		6			4 820	12	42			5 508	12	43			6 197	12	43
		8			6 426	21	50			7 344	21	50			8 262	21	51
		10			8 033	32	56			9 180	32	56			10 328	32	57
	800	4	0.280	0.238	3 427	5	32	0.32	0.272	3 917	5	33	0.360	0.306	4 406	5	32
		6			5 141	12	43			5 875	11	43			6 610	11	42
		8			6 854	21	50			7 834	20	50			8 813	20	50
		10			8 568	32	56			9 792	31	56			11 016	31	56
	850	4	0.298	0.253	3 641	5	32	0.34	0.289	4 162	5	32	0.383	0.325	4 682	5	31
		6			5 462	11	42			6 242	11	43			7 023	11	42
		8			7 283	20	50			8 323	19	50			9 364	19	49
		10			9 104	31	56			10 404	30	56			11 705	30	55
	900	4	0.315	0.268	3 856	5	32	0.360	0.306	4 406	6	35	0.405	0.344	4 957	5	31
		6			5 783	11	43			6 610	12	44			7 436	11	42
		8			7 711	20	50			8 813	26	54			9 914	19	49
		10			9 639	31	56			11 016	30	56			12 393	30	55
	1000	4	0.350	0.298	4 284	5	33	0.400	0.340	4 896	5	33	0.450	0.383	5 508	5	31
		6			6 426	11	43			7 344	11	43			8 262	11	42
		8			8 568	20	51			9 792	19	51			11 016	19	49
		10			10 710	31	56			12 240	30	57			13 770	30	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		500					550					600				
width B [mm]	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
200	4	0.100	0.085	1 224	5	28	0.110	0.094	1 346	5	28	0.120	0.102	1 469	5	28
	6			1 836	12	39			2 020	12	39			2 203	12	39
	8			2 448	21	46			2 693	21	46			2 938	21	46
	10			3 060	33	52			3 366	33	52			3 672	32	52
250	4	0.125	0.106	1 530	5	29	0.138	0.117	1 683	5	29	0.150	0.128	1 836	5	29
	6			2 295	12	40			2 525	12	40			2 754	12	40
	8			3 060	21	47			3 366	21	47			3 672	21	47
	10			3 825	33	53			4 208	33	53			4 590	32	53
300	4	0.150	0.128	1 836	5	30	0.165	0.140	2 020	5	30	0.180	0.153	2 203	5	30
	6			2 754	12	40			3 029	12	41			3 305	12	41
	8			3 672	21	48			4 039	21	48			4 406	21	48
	10			4 590	33	54			5 049	33	54			5 508	32	54
350	4	0.175	0.149	2 142	5	30	0.193	0.164	2 356	5	30	0.210	0.179	2 570	5	30
	6			3 213	12	41			3 534	12	41			3 856	11	41
	8			4 284	21	48			4 712	21	49			5 141	20	48
	10			5 355	32	54			5 891	32	54			6 426	31	54
400	4	0.200	0.170	2 448	5	31	0.220	0.187	2 693	5	31	0.240	0.204	2 938	5	31
	6			3 672	12	41			4 039	12	42			4 406	11	42
	8			4 896	21	49			5 386	21	49			5 875	20	49
	10			6 120	32	54			6 732	32	55			7 344	31	55
450	4	0.225	0.191	2 754	5	31	0.248	0.210	3 029	5	32	0.270	0.230	3 305	5	31
	6			4 131	12	42			4 544	12	42			4 957	11	42
	8			5 508	21	49			6 059	21	50			6 610	20	50
	10			6 885	32	55			7 574	32	55			8 262	31	55
500	4	0.250	0.213	3 060	5	31	0.275	0.234	3 366	5	32	0.300	0.255	3 672	5	32
	6			4 590	11	42			5 049	12	43			5 508	11	43
	8			6 120	22	51			6 732	21	50			7 344	20	50
	10			7 650	32	55			8 415	32	56			9 180	31	56
550	4	0.275	0.234	3 672	5	32	0.303	0.257	4 039	5	32	0.330	0.281	4 406	5	32
	6			5 508	12	43			6 059	12	43			6 610	11	43
	8			7 344	21	50			8 078	21	50			8 813	20	50
	10			9 180	32	56			10 098	32	56			11 016	31	56
600	4	0.300	0.255	3 672	5	32	0.330	0.281	4 039	5	32	0.360	0.306	4 406	5	32
	6			5 508	11	43			6 059	11	43			6 610	11	43
	8			7 344	20	50			8 078	20	50			8 813	19	50
	10			9 180	31	56			10 098	31	56			11 016	30	56
650	4	0.325	0.276	3 978	5	33	0.358	0.304	4 376	5	33	0.390	0.332	4 774	5	33
	6			5 967	12	43			6 564	11	43			7 160	11	43
	8			7 956	21	51			8 752	20	51			9 547	19	51
	10			9 945	31	56			10 940	31	57			11 934	30	57
700	4	0.350	0.298	4 284	5	33	0.385	0.327	4 712	5	33	0.420	0.357	5 141	5	33
	6			6 426	11	43			7 069	11	44			7 711	11	44
	8			8 568	20	51			9 425	20	51			10 282	19	51
	10			10 710	31	56			11 781	31	57			12 852	30	57
750	4	0.375	0.319	4 590	5	33	0.413	0.351	5 049	5	33	0.450	0.383	5 508	5	33
	6			6 885	11	43			7 574	11	44			8 262	11	44
	8			9 180	20	51			10 098	20	51			11 016	19	51
	10			11 475	31	57			12 623	31	57			13 770	30	57
800	4	0.400	0.340	4 896	5	32	0.440	0.374	5 386	5	33	0.480	0.408	5 875	5	33
	6			7 344	11	43			8 078	11	44			8 813	10	44
	8			9 792	19	51			10 771	19	51			11 750	19	51
	10			12 240	30	56			13 464	30	57			14 688	29	57
850	4	0.425	0.361	5 202	5	32	0.468	0.397	5 722	5	33	0.510	0.434	6 242	4	33
	6			7 803	10	43			8 583	10	44			9 364	10	43
	8			10 404	19	50			11 444	19	51			12 485	18	51
	10			13 005	29	56			14 306	29	57			15 606	28	57
900	4	0.450	0.383	5 508	5	32	0.495	0.421	6 059	5	33	0.540	0.459	6 610	4	33
	6			8 262	10	43			9 088	10	44			9 914	10	41
	8			11 016	19	50			12 118	19	51			13 219	18	49
	10			13 770	29	56			15 147	29	57			16 524	28	54
1000	4	0.500	0.425	6 120	5	32	0.550	0.468	6 059	5	34	0.600	0.510	7 344	4	34
	6			9 180	10	43			9 088	10	44			11 016	10	44
	8			12 240	19	50			12 118	19	52			14 688	18	52
	10			15 300	29	56			15 147	29	58			18 360	28	57

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		650					700					750				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	200	4	0.130	0.111	1 591	5	29	0.140	0.119	1 714	5	29	0.150	0.128	1 836	5	29
		6			2 387	12	39			2 570	11	39			2 754	11	40
		8			3 182	21	47			3 427	20	47			3 672	20	47
		10			3 978	32	53			4 284	31	52			4 590	31	53
	250	4	0.163	0.138	1 989	5	30	0.175	0.149	2 142	5	30	0.188	0.159	2 295	5	30
		6			2 984	12	40			3 213	11	40			3 443	11	40
		8			3 978	21	48			4 284	20	48			4 590	20	48
		10			4 973	32	54			5 355	31	53			5 738	31	54
	300	4	0.195	0.166	2 387	5	30	0.210	0.179	2 570	5	30	0.225	0.191	2 754	5	31
		6			3 580	12	41			3 856	11	41			4 131	11	41
		8			4 774	21	49			5 141	20	48			5 508	20	49
		10			5 967	32	54			6 426	31	54			6 885	31	55
	350	4	0.228	0.193	2 785	5	31	0.245	0.208	2 999	5	31	0.263	0.223	3 213	5	31
		6			4 177	11	41			4 498	11	41			4 820	11	42
		8			5 569	20	49			5 998	19	49			6 426	19	49
		10			6 962	31	55			7 497	30	54			8 033	30	55
	400	4	0.260	0.221	3 182	5	31	0.280	0.238	3 427	5	31	0.300	0.255	3 672	5	32
		6			4 774	11	42			5 141	11	42			5 508	11	42
		8			6 365	20	49			6 854	19	49			7 344	19	50
		10			7 956	31	55			8 568	30	55			9 180	30	55
	450	4	0.293	0.249	3 580	5	32	0.315	0.268	3 856	5	32	0.338	0.287	4 131	5	32
		6			5 370	11	42			5 783	11	42			6 197	11	43
		8			7 160	20	50			7 711	19	50			8 262	19	50
		10			8 951	31	56			9 639	30	56			10 328	30	56
	500	4	0.325	0.276	3 978	5	32	0.350	0.298	4 284	5	32	0.375	0.319	4 590	5	32
		6			5 967	11	43			6 426	11	43			6 885	11	43
		8			7 956	20	50			8 568	19	50			9 180	19	51
		10			9 945	31	56			10 710	30	56			11 475	30	56
	550	4	0.358	0.304	4 774	5	33	0.385	0.327	4 712	5	33	0.413	0.351	5 049	5	33
		6			7 160	11	43			7 069	11	43			7 574	11	43
		8			9 547	20	51			9 425	19	51			10 098	19	51
		10			11 934	31	57			11 781	30	56			12 623	30	57
	600	4	0.390	0.332	4 774	5	33	0.420	0.357	5 141	5	33	0.450	0.383	5 508	5	33
		6			7 160	11	44			7 711	11	44			8 262	11	44
		8			9 547	20	51			10 282	19	51			11 016	19	51
		10			11 934	31	57			12 852	30	57			13 770	30	57
	650	4	0.423	0.359	5 171	5	33	0.455	0.387	5 569	5	33	0.488	0.414	5 967	5	33
		6			7 757	11	44			8 354	10	43			8 951	10	44
		8			10 343	19	51			11 138	19	51			11 934	19	51
		10			12 929	30	57			13 923	29	57			14 918	29	57
	700	4	0.455	0.387	5 569	5	33	0.490	0.417	5 998	5	33	0.525	0.446	6 426	5	34
		6			8 354	11	44			8 996	10	44			9 639	10	44
		8			11 138	19	51			11 995	19	51			12 852	19	52
		10			13 923	30	57			14 994	29	57			16 065	29	57
	750	4	0.488	0.414	5 967	5	34	0.525	0.446	6 426	5	34	0.563	0.478	6 885	5	34
		6			8 951	11	44			9 639	10	44			10 328	10	44
		8			11 934	19	52			12 852	19	52			13 770	19	52
		10			14 918	30	57			16 065	29	57			17 213	29	58
	800	4	0.520	0.442	6 365	5	33	0.560	0.476	6 854	4	29	0.600	0.510	7 344	4	34
		6			9 547	10	44			10 282	7	37			11 016	10	44
		8			12 730	19	51			13 709	11	43			14 688	18	52
		10			15 912	29	57			17 136	28	54			18 360	28	57
	850	4	0.553	0.470	6 763	4	33	0.595	0.506	7 283	4	34	0.638	0.542	7 803	4	34
		6			10 144	10	43			10 924	10	44			11 705	10	44
		8			13 525	18	51			14 566	18	52			15 606	18	52
		10			16 907	28	57			18 207	28	57			19 508	28	58
	900	4	0.585	0.497	7 160	4	33	0.630	0.536	7 711	4	33	0.675	0.574	8 262	4	34
		6			10 741	10	43			11 567	10	44			12 393	10	44
		8			14 321	18	51			15 422	17	51			16 524	17	52
		10			17 901	28	57			19 278	27	57			20 655	27	58
	1000	4	0.650	0.553	7 956	4	33	0.700	0.595	8 568	4	34	0.750	0.638	9 180	4	34
		6			11 934	10	43			12 852	10	44			13 770	10	45
		8			15 912	18	51			17 136	17	52			18 360	17	52
		10			19 890	28	57			21 420	27	58			22 950	27	58

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]
200	4	0.160	0.136	1 958	5	29	0.170	0.145	2 081	5	29	0.180	0.153	2 203	5	29	0.200	0.170	2 448	5	29
	6			2 938	11	39			3 121	11	40			3 305	10	39			3 672	10	40
	8			3 917	19	47			4 162	19	47			4 406	19	47			4 896	19	47
	10			4 896	30	53			5 202	30	53			5 508	29	53			6 120	29	53
250	4	0.200	0.170	2 448	5	30	0.213	0.181	2 601	5	30	0.225	0.191	2 754	5	30	0.250	0.213	3 060	5	30
	6			3 672	11	40			3 902	11	41			4 131	10	40			4 590	10	41
	8			4 896	19	48			5 202	19	48			5 508	19	48			6 120	19	48
	10			6 120	30	54			6 503	30	54			6 885	29	54			7 650	29	54
300	4	0.240	0.204	2 938	5	31	0.255	0.217	3 121	5	31	0.270	0.230	3 305	5	31	0.300	0.255	3 672	5	31
	6			4 406	11	41			4 682	11	41			4 957	10	41			5 508	10	42
	8			5 875	19	49			6 242	19	49			6 610	19	49			7 344	19	49
	10			7 344	30	54			7 803	30	55			8 262	29	54			9 180	29	55
350	4	0.280	0.238	3 427	5	31	0.298	0.253	3 641	5	31	0.315	0.268	3 856	4	31	0.350	0.298	4 284	4	31
	6			5 141	10	41			5 462	10	42			5 783	10	41			6 426	10	42
	8			6 854	19	49			7 283	19	49			7 711	18	49			8 568	18	49
	10			8 568	29	55			9 104	29	55			9 639	28	55			10 710	28	55
400	4	0.320	0.272	3 917	5	31	0.340	0.289	4 162	5	32	0.360	0.306	4 406	4	31	0.400	0.340	4 896	4	32
	6			5 875	10	42			6 242	10	42			6 610	10	42			7 344	10	42
	8			7 834	19	49			8 323	19	50			8 813	18	49			9 792	18	50
	10			9 792	29	55			10 404	29	55			11 016	28	55			12 240	28	56
450	4	0.360	0.306	4 406	5	32	0.383	0.325	4 682	4	32	0.405	0.344	4 957	4	31	0.450	0.383	5 508	4	32
	6			6 610	10	42			7 023	10	42			7 436	10	42			8 262	10	42
	8			8 813	19	50			9 364	18	50			9 914	17	50			11 016	17	50
	10			11 016	29	56			11 705	28	56			12 393	27	55			13 770	27	56
500	4	0.400	0.340	4 896	5	32	0.425	0.361	5 202	4	32	0.450	0.383	5 508	4	32	0.500	0.425	6 120	4	32
	6			7 344	10	43			7 803	10	43			8 262	10	42			9 180	10	43
	8			9 792	19	50			10 404	18	50			11 016	17	50			12 240	17	50
	10			12 240	29	56			13 005	28	56			13 770	27	56			15 300	27	56
550	4	0.440	0.374	5 386	5	33	0.468	0.397	5 722	4	33	0.495	0.421	6 059	4	32	0.550	0.468	6 732	4	33
	6			8 078	10	43			8 583	10	43			9 088	10	43			10 098	10	43
	8			10 771	19	51			11 444	18	51			12 118	17	50			13 464	17	51
	10			13 464	29	57			14 306	28	56			15 147	27	56			16 830	27	57
600	4	0.480	0.408	5 875	5	33	0.510	0.434	6 242	4	33	0.540	0.459	6 610	4	33	0.600	0.510	7 344	4	33
	6			8 813	10	44			9 364	10	43			9 914	10	43			11 016	10	44
	8			11 750	19	51			12 485	18	51			13 219	17	51			14 688	17	51
	10			14 688	29	57			15 606	28	57			16 524	27	57			18 360	27	57
650	4	0.520	0.442	6 365	5	33	0.553	0.470	6 763	4	33	0.585	0.497	7 160	4	33	0.650	0.553	7 956	4	34
	6			9 547	10	44			10 144	10	44			10 741	10	44			11 934	10	44
	8			12 730	19	52			13 525	18	51			14 321	17	51			15 912	17	52
	10			15 912	29	57			16 907	28	57			17 901	27	57			19 890	27	57
700	4	0.560	0.476	6 854	4	33	0.595	0.506	7 283	4	33	0.630	0.536	7 711	4	33	0.700	0.595	8 568	4	33
	6			10 282	10	44			10 924	10	44			11 567	9	43			12 852	9	44
	8			13 709	18	51			14 566	17	51			15 422	17	51			17 136	17	51
	10			17 136	28	57			18 207	27	57			19 278	26	57			21 420	26	57
750	4	0.600	0.510	7 344	4	34	0.638	0.542	7 803	4	33	0.675	0.574	8 262	4	33	0.750	0.638	9 180	4	34
	6			11 016	10	44			11 705	10	44			12 393	9	44			13 770	9	44
	8			14 688	18	52			15 606	17	51			16 524	17	51			18 360	17	52
	10			18 360	28	57			19 508	27	57			20 655	26	57			22 950	26	57
800	4	0.640	0.544	7 834	4	34	0.680	0.578	8 323	4	34	0.720	0.612	8 813	4	33	0.800	0.680	9 792	4	34
	6			11 750	10	44			12 485	10	44			13 219	9	44			14 688	9	44
	8			15 667	18	52			16 646	17	52			17 626	17	52			19 584	17	52
	10			19 584	28	58			20 808	27	58			22 032	26	57			24 480	26	58
850	4	0.680	0.578	8 323	4	34	0.723	0.614	8 843	4	33	0.765	0.650	9 364	4	34	0.850	0.723	10 404	4	34
	6			12 485	10	44			13 265	9	44			14 045	9	44			15 606	9	45
	8			16 646	17	52			17 687	17	52			18 727	17	52			20 808	17	52
	10			20 808	27	58			22 109	26	57			23 409	26	58			26 010	26	58
900	4	0.720	0.612	8 813	4	34	0.765	0.650	9 364	4	34	0.810	0.689	9 914	4	34	0.900	0.765	11 016	4	34
	6			13 219	10	45			14 045	9	44			14 872	9	45			16 524	9	44
	8			17 626	17	52			18 727	17	52			19 829	17	52			22 032	16	52
	10			22 032	27	58			23 409	26	58			24 786	26	58			27 540	25	58
1000	4	0.800	0.680	9 792	4	34	0.850	0.723	10 404	4	34	0.900	0.765	11 016	4	33	1.000	0.850	12 240	4	34
	6			14 688	9	44			15 606	9	44			16 524	9	44			18 360	9	44
	8			19 584	17	52			20 808	16	52			22 032	15	51			24 480	15	52
	10			24 480	26	58			26 010	25	58			27 540	24	57			30 600	24	58

The mcr WIP/S fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

9.7 | Estimated weights of mcr WIP/S dampers for rectangular ventilation ducts [kg]

height H [mm] \ width B [mm]	200	250	300	400	500	600	700	800	900	1000
200	10	10	10	10	15	17	18	19	22	25
250	10	10	11	11	16	18	18	21	24	27
300	10	11	11	12	17	20	21	23	26	28
350	11	11	11	16	18	21	23	26	28	30
400	12	12	14	18	19	21	25	29	30	33
500	15	16	17	19	20	23	27	32	33	35
600	17	18	20	21	23	26	30	35	37	39
700	18	18	21	23	25	28	32	35	38	40
800	20	21	22	24	29	35	37	41	43	49
900	22	25	25	28	33	35	39	43	49	52
1000	23	29	32	33	36	42	43	47	53	60

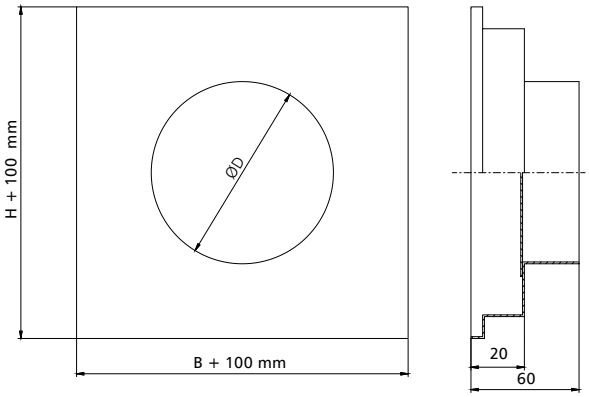
The table shows the weights of dampers with RST-KW1 trigger control mechanisms or actuators

9.8 | Accessories

9.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:
BxH - damper dimensions [mm]
ØD - diameter of the connection duct [mm]



dimensions in [mm]

9.9 | Marking

mcr WIP/S / B x H / 1 / 2 / 3

- additional parameters
- material
- control
- width x height (nominal) damper
- damper type

1 - control:

» **trigger and control mechanism – BF24-TN axial**

BF24-TN – actuator with a return spring, U = 24 V AC/DC
BF230-TN – actuator with a return spring, U = 230 V AC
BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
BF24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL24-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN24-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MF24T1 – actuator with a return spring, U = 24 V AC/DC
MF230T1 – actuator with a return spring, U = 230 V AC
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material

[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

3 - additional parameters

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF/MF) – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – left damper
KP – right damper

» **Damper casing**
BU - earth pin

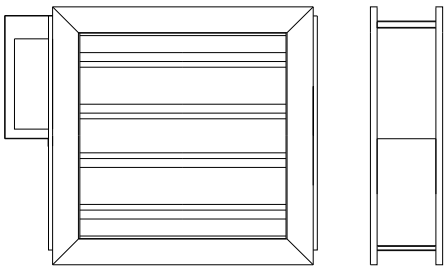
NOTE: **separate additional parameters entered with the "/" sign**

example marking:

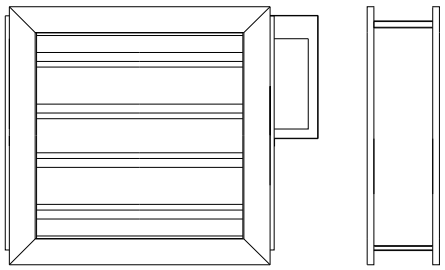
mcr WIP/S 400 x 400 BFL24-T
EIS60 louvered cut-off damper with a 24 V actuator with limit switches.

9.9.1 | Design standard

» **left damper standard**



» **right damper**



reverse installation possible

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



1396-CPR-0097

HYGIENIC CERTIFICATE

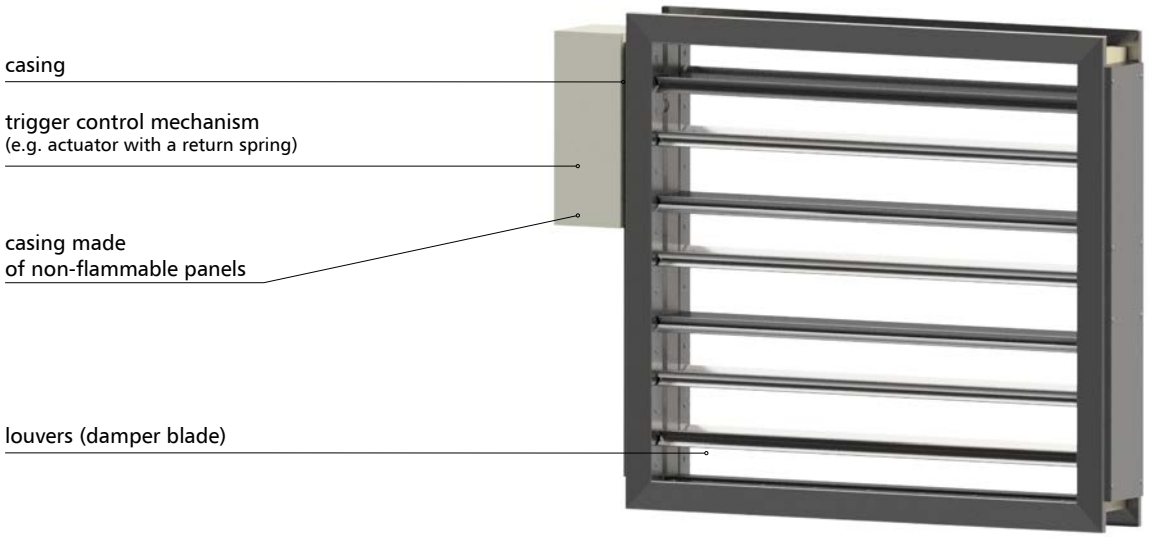
» **EI120, E120**
» Fire resistance class: EI120 (v_e i↔o), E120 (v_e i↔o).
» Certificate of constancy of performance 1396-CPR-0097.
» Dampers qualified under EN 13501-2, EN 13501-3 and tested under EN 1366-2.
» Louvered transfer damper.
» Installation with a horizontal and vertical rotation axis.
» KTB ATEX 2014/34/UE

10.1| Application

mcr WIP/T transfer dampers are intended for installation in fire ventilation systems. They are installed in fire partitions without connecting ventilation ducts and retain their fire resistance rating during the fire. During normal operation, damper blades are open, which enables the supply of fresh air to egress routes, protecting them from smoke, or to the space where air exchange or supply through vertical construction partitions is required.

It is possible to use a closed transfer damper, in which the louvers open to transfer compensation air upon the receipt of an alarm signal from the fire signaling centre.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

10.2| Design



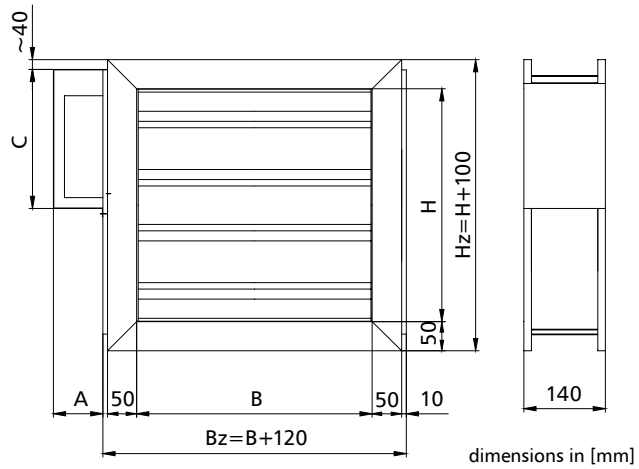
mcr WIP/T transfer dampers consist of a casing with a rectangular cross section, a moving insulation blade in the form of multiple blades - louvers rotating on their axes and a trigger control mechanism which is tripped remotely or automatically by tripping a thermal trigger. The damper casing is made of galvanized steel sheets or stainless steel sheets. Its integral part is a flange made of boards with a fire resistance rating. The inner side of the fire damper casing is equipped with an intumescent gasket. The casing total length is 140 mm.
The louver surface is covered with galvanized or stainless steel sheets. Each louver with a thickness of 15 mm is filled with a plaster board. The damper blades revolve on their own axes, which consist of two steel pins. Transfer dampers must be protected with masking grilles.

10.3 | Versions

10.3.1 | Damper closing and opening with an actuator

During normal operation, the louvers of the fire damper remain open or closed. In case of fire, the louvers shift or remain in standby.

The mcr WIP/T dampers are equipped with a trigger control mechanism in the form of BFL, BFN, BF, BF-TL, QT.Ex, MF, MLF series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C).
Dampers with actuators: analog BFL, BFN, BF, MF, MLF, digital BF-TL, QT.Ex explosion-proof actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



dimensions in [mm]

mechanism	A	C
MF	125	325
MLF	125	325
BFN	125	325
BFL	125	275
BF	125	325
BF24TL-ST	125	325
QT.Ex	125	400

insert symmetrically against the wall axis

10.4 | Dimensions

» **Rectangular dampers:**

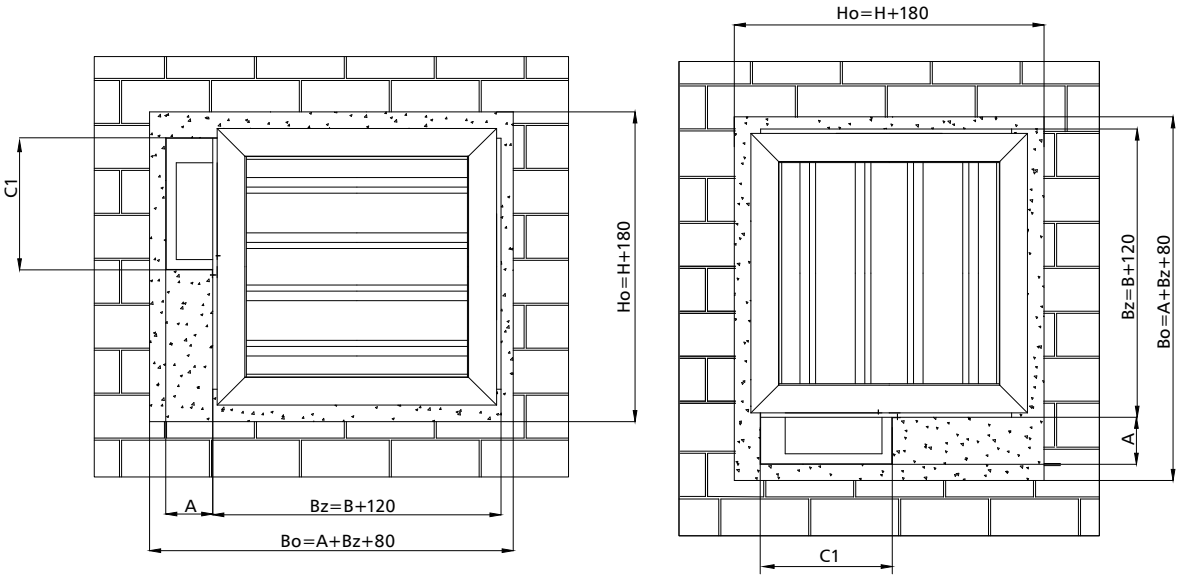
» nominal width B: from 120 mm to 1000 mm
» nominal height H from 160 mm to 1000 mm
» maximum single damper cross-section surface up to 1 m^2
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254...

10.5 | Installation

mcr WIP/T rectangular dampers are rated EI120(v_e i↔o) / E120(v_e i↔o) if installed in concrete or reinforced concrete partitions with a thickness of at least 120 mm, partitions made of full bricks or concrete blocks with a thickness of at least 120 mm, masonry partitions made of perforated bricks or aerated concrete blocks with a thickness of at least 120 mm.

10.5.1 | Preparation of installation openings

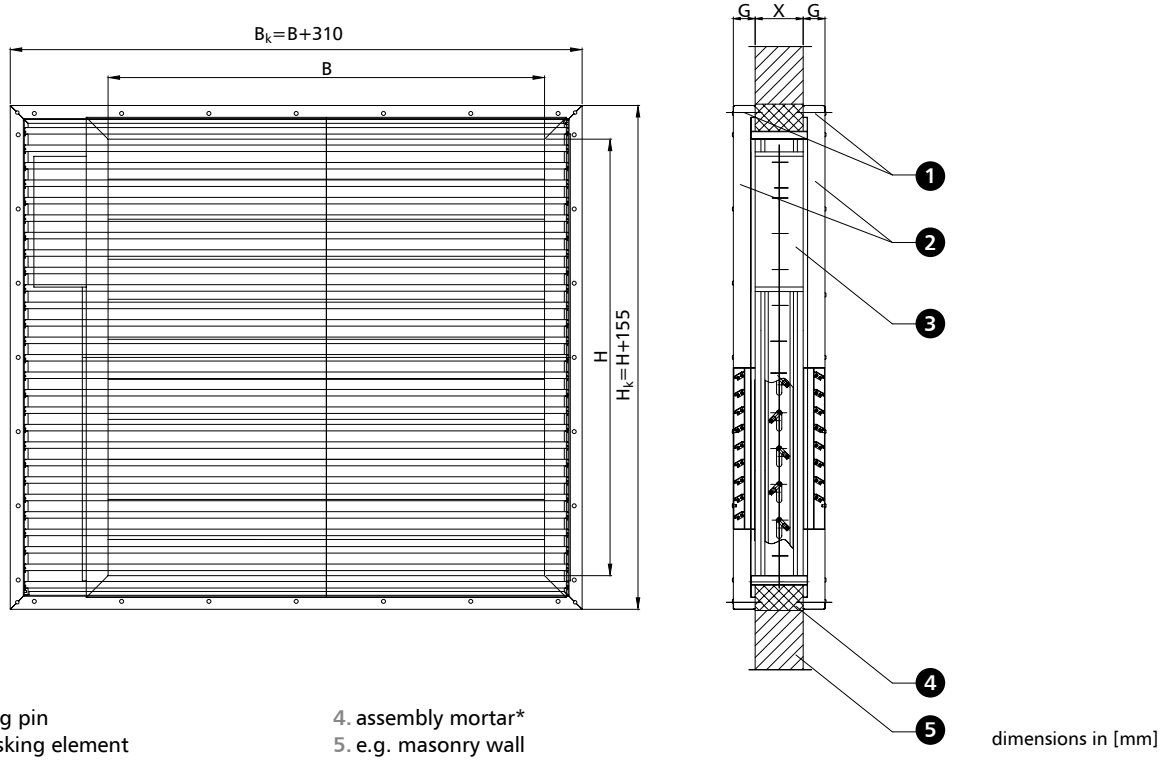
The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/T damper is:
Preferred
Bo = (A+Bz+80) mm
Ho = (H+180) mm



dimensions in [mm]

	BF	MF	MLF	BFL	BFN	QT.Ex
C1 [mm]	325	325	325	335	325	400
A [mm]	125	125	125	125	125	125

10.5.2 | Sample installation in concrete block or full brick walls



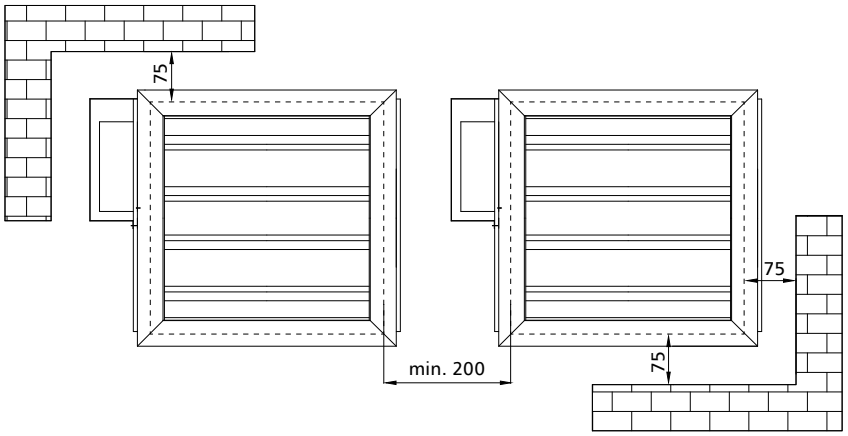
1. mounting pin
2. MST masking element
3. mcr WIP/T fire damper
4. assembly mortar*
5. e.g. masonry wall

dimensions in [mm]

The thickness of the masking grille "G" is 50 mm for wall thickness up to 120 mm. For walls thicker than 120 mm the manufacturer allows masking grilles with a thickness of below 50 mm. For walls wider than the dampers' thickness, 30 mm masking grilles may be used. The system masking grille may be made of galvanized or stainless steel and painted in any RAL color (RAL 9010 as a standard).

» Damper installation with a vertical louver rotation axis
The damper can operate with a vertical louver rotation axis with a top or bottom-mounted mechanism.

» Minimum distance between systems and partitions



dimensions in [mm]

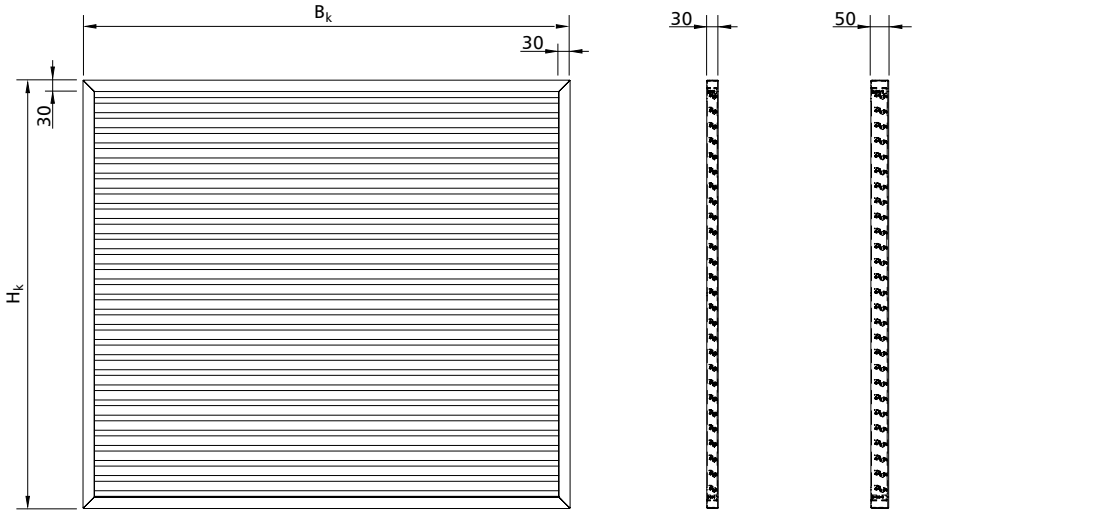
10.5.3 | MST system masking grilles



MST system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility.

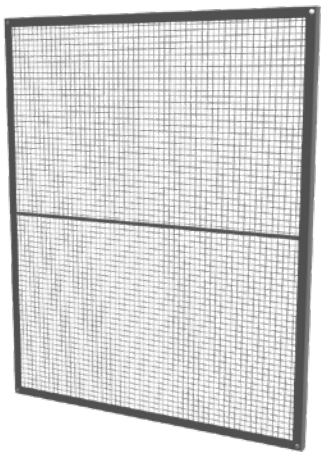
Bolts embedded in the body are used to attach the masking grille body. After installation, an outer frame is mounted on the masking grille body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

dimensions:
» nominal width Bk: from 200 mm to 1500 mm
» nominal height Hk from 200 mm to 1500 mm
» nominal thickness G 30 and 50 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



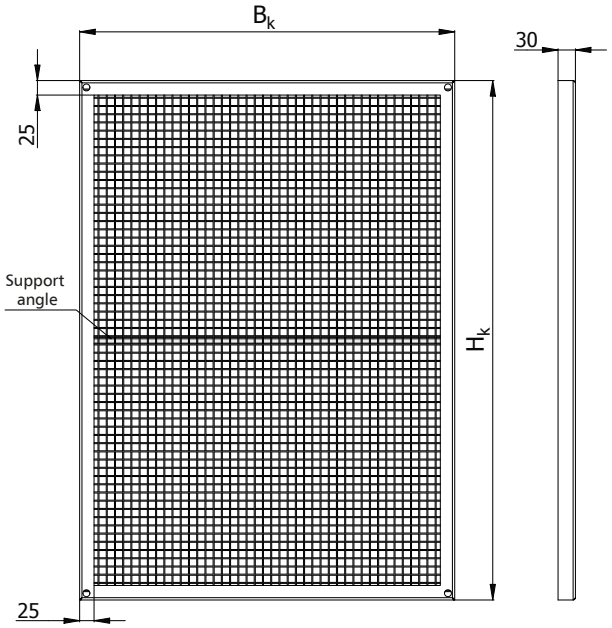
MST-30 **MST-50** dimensions in [mm]

10.5.4 | MWP mesh cover



The MWP mesh cover may be supplied together with the damper by the damper manufacturer. System masking grilles, dedicated especially for commercial premises with high architectonical and service requirements allows for covering the damper with any additional masking grille while fulfilling the fire rating requirements of the mcr WIP damper. With a wall thickness greater than 200 mm, system and non-system grilles can be applied directly to the wall.

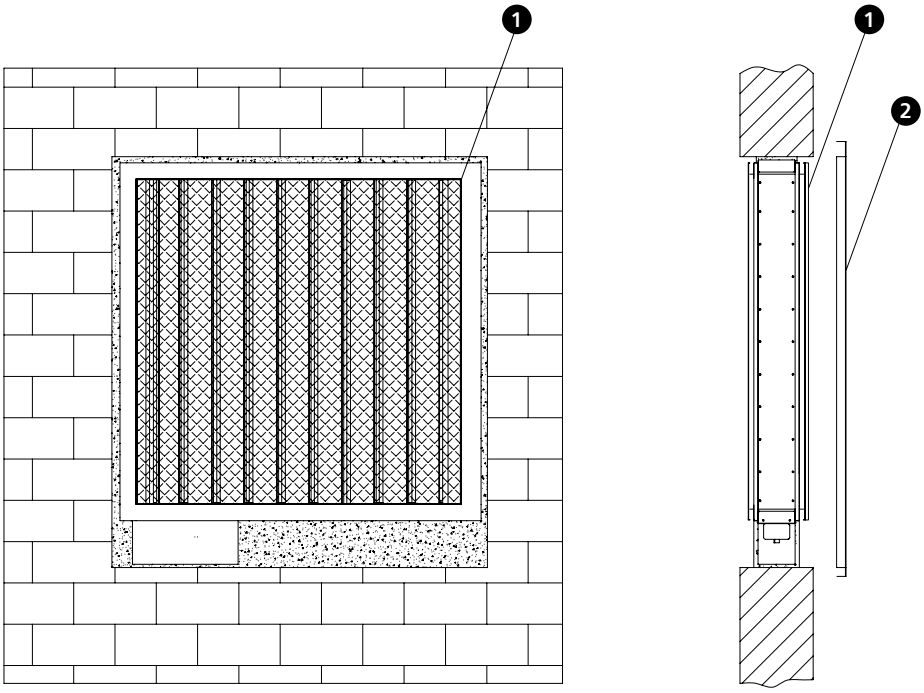
dimensions:
» nominal width Bk: from 200 mm to 1100 mm
» nominal height Hk from 200 mm to 1100 mm
» nominal thickness 30 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



dimensions in [mm]

Number of support angles	Height [mm] - Hk	
	from	to
1	850	1100
0	200	849

» sample installation



1. MWP mesh cover
2. decorative grille (any, e.g. as indicated by the architect)

10.5.5 | MST masking grille technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	200 S_e [m²]	200 Q [m³/h]	200 d_p [PA]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]
	200	4	0.015	210	12	0.028	403	10	0.041	596	9	0.055	789	9
		6		315	27		605	23		894	21		1 184	20
		8		420	49		806	41		1 192	37		1 578	35
		10		526	76		1 008	64		1 490	58		1 973	54
	300	4	0.028	402	10	0.051	734	8	0.074	1 067	7	0.097	1 400	7
		6		603	23		1 102	19		1 601	17		2 100	15
		8		804	41		1 469	33		2 134	29		2 799	27
		10		1 004	64		1 836	52		2 668	46		3 499	42
	400	4	0.041	593	9	0.074	1 066	7	0.107	1 538	6	0.140	2 010	6
		6		890	21		1 598	17		2 307	14		3 015	13
		8		1 187	37		2 131	29		3 076	26		4 020	23
		10		1 483	58		2 664	46		3 845	40		5 026	36
	500	4	0.055	785	9	0.097	1 397	7	0.140	2 009	6	0.182	2 621	5
		6		1 177	20		2 095	15		3 013	13		3 931	12
		8		1 570	35		2 794	27		4 018	23		5 242	21
		10		1 962	55		3 492	42		5 022	36		6 552	33
	600	4	0.068	976	8	0.120	1 728	6	0.172	2 480	5	0.224	3 231	5
		6		1 464	19		2 592	14		3 720	12		4 847	11
		8		1 953	33		3 456	26		4 959	22		6 463	19
		10		2 441	52		4 320	40		6 199	34		8 078	30
	700	4	0.081	1 168	8	0.143	2 059	6	0.205	2 951	5	0.267	3 842	5
		6		1 752	18		3 089	14		4 426	12		5 763	10
		8		2 336	32		4 118	25		5 901	21		7 684	18
		10		2 920	50		5 148	38		7 376	32		9 605	29
	800	4	0.094	1 359	8	0.166	2 390	6	0.238	3 421	5	0.309	4 452	4
		6		2 039	18		3 586	13		5 132	11		6 679	10
		8		2 719	31		4 781	24		6 843	20		8 905	17
		10		3 398	49		5 976	37		8 554	31		11 131	27
	900	4	0.108	1 551	8	0.189	2 722	6	0.270	3 892	5	0.352	5 063	4
		6		2 326	17		4 082	13		5 838	11		7 595	9
		8		3 102	31		5 443	23		7 785	19		10 126	17
		10		3 877	48		6 804	36		9 731	30		12 658	26
	1000	4	0.121	1 742	8	0.212	3 053	6	0.303	4 363	5	0.394	5 674	4
		6		2 614	17		4 579	13		6 545	10		8 510	9
		8		3 485	30		6 106	23		8 726	19		11 347	16
		10		4 356	47		7 632	35		10 908	29		14 184	25
	1100	4	0.134	1 934	7	0.235	3 384	6	0.336	4 834	5	0.436	6 284	4
		6		2 901	17		5 076	12		7 251	10		9 426	9
		8		3 868	30		6 768	22		9 668	18		12 568	16
		10		4 835	47		8 460	35		12 085	28		15 710	25
	1200	4	0.148	2 125	7	0.258	3 715	5	0.368	5 305	4	0.479	6 895	4
		6		3 188	17		5 573	12		7 957	10		10 342	9
		8		4 251	30		7 430	22		10 610	18		13 789	16
		10		5 314	46		9 288	34		13 262	28		17 237	24
	1300	4	0.161	2 317	7	0.281	4 046	5	0.401	5 776	4	0.521	7 505	4
		6		3 475	16		6 070	12		8 664	10		11 258	9
		8		4 634	29		8 093	21		11 552	18		15 011	15
		10		5 792	46		10 116	34		14 440	27		18 763	24
	1400	4	0.174	2 508	7	0.304	4 378	5	0.434	6 247	4	0.564	8 116	4
		6		3 763	16		6 566	12		9 370	10		12 174	8
		8		5 017	29		8 755	21		12 493	17		16 232	15
		10		6 271	45		10 944	33		15 617	27		20 290	23
	1500	4	0.188	2 700	7	0.327	4 709	5	0.467	6 718	4	0.606	8 726	4
		6		4 050	16		7 063	12		10 076	10		13 090	8
		8		5 400	29		9 418	21		13 435	17		17 453	15
		10		6 750	45		11 772	33		16 794	27		21 816	23

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]
200		4	0.068	982	8	0.082	1 175	8	0.095	1 368	8	0.108	1 558	8
		6		1 473	19		1 763	18		2 052	18		2 337	17
		8		1 964	33		2 350	32		2 736	31		3 116	31
		10		2 455	52		2 938	50		3 420	49		3 895	48
300		4	0.120	1 732	6	0.143	2 065	6	0.167	2 398	6	0.189	2 726	6
		6		2 598	14		3 097	14		3 596	13		4 089	13
		8		3 465	25		4 130	24		4 795	24		5 452	23
		10		4 331	40		5 162	38		5 994	37		6 815	36
400		4	0.172	2 483	5	0.205	2 955	5	0.238	3 427	5	0.270	3 894	5
		6		3 724	12		4 432	12		5 141	11		5 841	11
		8		4 965	22		5 910	21		6 854	20		7 788	19
		10		6 206	34		7 387	32		8 568	31		9 734	30
500		4	0.225	3 233	5	0.267	3 845	5	0.310	4 457	4	0.352	5 062	4
		6		4 849	11		5 767	10		6 685	10		7 592	9
		8		6 466	19		7 690	18		8 914	17		10 123	17
		10		8 082	30		9 612	28		11 142	27		12 654	26
600		4	0.277	3 983	4	0.329	4 735	4	0.381	5 486	4	0.433	6 229	4
		6		5 975	10		7 102	9		8 230	9		9 344	9
		8		7 966	18		9 469	17		10 973	16		12 459	15
		10		9 958	28		11 837	26		13 716	25		15 574	24
700		4	0.329	4 733	4	0.391	5 625	4	0.453	6 516	4	0.514	7 397	4
		6		7 100	9		8 437	9		9 774	8		11 096	8
		8		9 467	17		11 249	16		13 032	15		14 795	14
		10		11 833	26		14 062	24		16 290	23		18 493	22
800		4	0.381	5 484	4	0.452	6 515	4	0.524	7 546	3	0.595	8 565	3
		6		8 225	9		9 772	8		11 318	8		12 848	8
		8		10 967	16		13 029	15		15 091	14		17 130	13
		10		13 709	25		16 286	23		18 864	22		21 413	21
900		4	0.433	6 234	4	0.514	7 404	4	0.596	8 575	3	0.676	9 733	3
		6		9 351	9		11 107	8		12 863	7		14 599	7
		8		12 468	15		14 809	14		17 150	13		19 466	13
		10		15 584	24		18 511	22		21 438	21		24 332	20
1000		4	0.485	6 984	4	0.576	8 294	3	0.667	9 605	3	0.757	10 901	3
		6		10 476	8		12 442	8		14 407	7		16 351	7
		8		13 968	15		16 589	14		19 210	13		21 802	12
		10		17 460	23		20 736	21		24 012	20		27 252	19
1100		4	0.537	7 734	4	0.638	9 184	3	0.739	10 634	3	0.838	12 069	3
		6		11 601	8		13 776	7		15 952	7		18 103	7
		8		15 468	14		18 369	13		21 269	12		24 137	12
		10		19 336	22		22 961	21		26 586	19		30 172	18
1200		4	0.589	8 484	3	0.700	10 074	3	0.810	11 664	3	0.919	13 236	3
		6		12 727	8		15 111	7		17 496	7		19 855	6
		8		16 969	14		20 148	13		23 328	12		26 473	11
		10		21 211	22		25 186	20		29 160	19		33 091	18
1300		4	0.641	9 235	3	0.761	10 964	3	0.882	12 694	3	1.000	14 404	3
		6		13 852	8		16 446	7		19 040	7		21 606	6
		8		18 469	14		21 928	13		25 387	12		28 809	11
		10		23 087	21		27 410	20		31 734	18		36 011	17
1400		4	0.693	9 985	3	0.823	11 854	3	0.953	13 723	3	1.081	15 572	3
		6		14 977	8		17 781	7		20 585	6		23 358	6
		8		19 970	13		23 708	12		27 446	11		31 144	11
		10		24 962	21		29 635	19		34 308	18		38 930	17
1500		4	0.746	10 735	3	0.885	12 744	3	1.025	14 753	3	1.163	16 740	3
		6		16 103	7		19 116	7		22 129	6		25 110	6
		8		21 470	13		25 488	12		29 506	11		33 480	11
		10		26 838	21		31 860	19		36 882	18		41 850	17

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]
200	4	0.122	1 751	8	0.135	1 944	7	0.148	2 137	7	0.162	2 330	7
	6		2 627	17		2 916	17		3 205	16		3 495	16
	8		3 502	30		3 888	30		4 274	29		4 660	29
	10		4 378	47		4 860	46		5 342	46		5 825	45
300	4	0.212	3 059	6	0.236	3 391	5	0.259	3 724	5	0.282	4 056	5
	6		4 588	13		5 087	12		5 586	12		6 085	12
	8		6 117	22		6 782	22		7 448	22		8 113	21
	10		7 646	35		8 478	34		9 310	34		10 141	33
400	4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4
	6		6 549	10		7 258	10		7 966	10		8 675	10
	8		8 732	19		9 677	18		10 621	18		11 566	17
	10		10 915	29		12 096	28		13 277	28		14 458	27
500	4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4
	6		8 510	9		9 428	9		10 346	9		11 264	9
	8		11 347	16		12 571	16		13 795	15		15 019	15
	10		14 184	25		15 714	25		17 244	24		18 774	24
600	4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3
	6		10 472	8		11 599	8		12 727	8		13 854	8
	8		13 962	15		15 466	14		16 969	14		18 472	14
	10		17 453	23		19 332	22		21 211	22		23 090	21
700	4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3
	6		12 433	8		13 770	7		15 107	7		16 444	7
	8		16 577	14		18 360	13		20 143	13		21 925	13
	10		20 722	21		22 950	21		25 178	20		27 407	20
800	4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3
	6		14 394	7		15 941	7		17 487	7		19 034	7
	8		19 192	13		21 254	12		23 316	12		25 379	12
	10		23 990	20		26 568	19		29 146	19		31 723	18
900	4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3
	6		16 356	7		18 112	7		19 868	6		21 624	6
	8		21 807	12		24 149	12		26 490	11		28 832	11
	10		27 259	19		30 186	18		33 113	18		36 040	17
1000	4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3
	6		18 317	7		20 282	6		22 248	6		24 214	6
	8		24 422	12		27 043	11		29 664	11		32 285	11
	10		30 528	18		33 804	18		37 080	17		40 356	17
1100	4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3
	6		20 278	6		22 453	6		24 628	6		26 803	6
	8		27 037	11		29 938	11		32 838	10		35 738	10
	10		33 797	18		37 422	17		41 047	16		44 672	16
1200	4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2
	6		22 239	6		24 624	6		27 009	6		29 393	6
	8		29 652	11		32 832	10		36 012	10		39 191	10
	10		37 066	17		41 040	16		45 014	16		48 989	15
1300	4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2
	6		24 201	6		26 795	6		29 389	6		31 983	5
	8		32 268	11		35 726	10		39 185	10		42 644	10
	10		40 334	17		44 658	16		48 982	15		53 305	15
1400	4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2
	6		26 162	6		28 966	6		31 769	5		34 573	5
	8		34 883	10		38 621	10		42 359	10		46 097	9
	10		43 603	16		48 276	16		52 949	15		57 622	14
1500	4	1.302	18 749	3	1.442	20 758	2	1.581	22 766	2	1.721	24 775	2
	6		28 123	6		31 136	5		34 150	5		37 163	5
	8		37 498	10		41 515	10		45 533	9		49 550	9
	10		46 872	16		51 894	15		56 916	15		61 938	14

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]						
	1400				1500		
	v [m/s]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]
200	4	0.175	2 523	7	0.189	2 716	7
	6		3 784	16		4 074	16
	8		5 046	29		5 432	29
	10		6 307	45		6 790	45
300	4	0.305	4 389	5	0.328	4 722	5
	6		6 584	12		7 083	12
	8		8 778	21		9 444	21
	10		10 973	33		11 804	33
400	4	0.434	6 255	4	0.467	6 728	4
	6		9 383	10		10 092	10
	8		12 511	17		13 455	17
	10		15 638	27		16 819	27
500	4	0.564	8 122	4	0.607	8 734	4
	6		12 182	8		13 100	8
	8		16 243	15		17 467	15
	10		20 304	23		21 834	23
600	4	0.694	9 988	3	0.746	10 740	3
	6		14 982	8		16 109	7
	8		19 976	13		21 479	13
	10		24 970	21		26 849	21
700	4	0.823	11 854	3	0.885	12 745	3
	6		17 781	7		19 118	7
	8		23 708	12		25 491	12
	10		29 635	19		31 864	19
800	4	0.953	13 720	3	1.024	14 751	3
	6		20 580	6		22 127	6
	8		27 441	11		29 503	11
	10		34 301	18		36 878	18
900	4	1.082	15 587	3	1.164	16 757	3
	6		23 380	6		25 136	6
	8		31 173	11		33 515	11
	10		38 966	17		41 893	17
1000	4	1.212	17 453	3	1.303	18 763	3
	6		26 179	6		28 145	6
	8		34 906	10		37 526	10
	10		43 632	16		46 908	16
1100	4	1.342	19 319	2	1.442	20 769	2
	6		28 979	6		31 154	5
	8		38 638	10		41 538	10
	10		48 298	15		51 923	15
1200	4	1.471	21 185	2	1.582	22 775	2
	6		31 778	5		34 163	5
	8		42 371	10		45 550	9
	10		52 963	15		56 938	15
1300	4	1.601	23 052	2	1.721	24 781	2
	6		34 577	5		37 171	5
	8		46 103	9		49 562	9
	10		57 629	14		61 952	14
1400	4	1.730	24 918	2	1.860	26 787	2
	6		37 377	5		40 180	5
	8		49 836	9		53 574	9
	10		62 294	14		66 967	14
1500	4	1.860	26 784	2	2.000	28 793	2
	6		40 176	5		43 189	5
	8		53 568	9		57 586	9
	10		66 960	14		71 982	13

10.6 | mcr WIP/T rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	200	4	0.040	0.034	490	6	26	0.050	0.043	612	6	26	0.06	0.051	734	6	27
		6			734	13	36			918	13	37			1 102	13	37
		8			979	24	44			1 224	23	44			1 469	22	45
		10			1 224	37	49			1 530	36	50			1 836	35	50
	250	4	0.050	0.043	612	6	26	0.063	0.053	765	6	27	0.075	0.064	918	6	28
		6			918	13	37			1 148	13	38			1 377	13	38
		8			1 224	23	44			1 530	23	45			1 836	22	46
		10			1 530	36	50			1 913	36	51			2 295	35	51
	300	4	0.060	0.051	734	6	27	0.075	0.064	918	6	28	0.09	0.077	1 102	6	28
		6			1 102	13	37			1 377	13	38			1 652	13	39
		8			1 469	23	45			1 836	23	46			2 203	22	46
		10			1 836	36	51			2 295	36	52			2 754	35	52
	350	4	0.070	0.060	857	6	27	0.088	0.074	1 071	36	52	0.105	0.089	1 285	5	29
		6			1 285	13	38			1 607	13	39			1 928	12	39
		8			1 714	22	45			2 142	22	46			2 570	22	47
		10			2 142	35	51			2 678	35	52			3 213	34	52
	400	4	0.080	0.068	979	6	28	0.100	0.085	1 224	6	29	0.12	0.102	1 469	5	29
		6			1 469	13	38			1 836	13	39			2 203	12	40
		8			1 958	22	46			2 448	22	47			2 938	22	47
		10			2 448	35	52			3 060	35	53			3 672	34	53
	450	4	0.090	0.077	1 102	6	28	0.113	0.096	1 377	6	29	0.135	0.115	1 652	5	30
		6			1 652	13	39			2 066	13	40			2 479	12	40
		8			2 203	22	46			2 754	22	47			3 305	22	48
		10			2 754	35	52			3 443	35	53			4 131	34	54
	500	4	0.100	0.085	1 224	5	28	0.125	0.106	1 530	5	29	0.15	0.128	1 836	5	30
		6			1 836	12	39			2 295	12	40			2 754	12	40
		8			2 448	22	46			3 060	22	47			3 672	21	48
		10			3 060	34	52			3 825	34	53			4 590	33	54
	550	4	0.110	0.094	1 346	5	29	0.138	0.117	1 683	5	30	0.165	0.140	2 020	5	31
		6			2 020	12	39			2 525	12	40			3 029	12	41
		8			2 693	22	47			3 366	22	48			4 039	22	49
		10			3 366	34	53			4 208	34	54			5 049	34	54
	600	4	0.120	0.102	1 469	5	29	0.150	0.128	1 836	5	30	0.18	0.153	2 203	5	31
		6			2 203	12	40			2 754	12	41			3 305	12	41
		8			2 938	22	47			3 672	22	48			4 406	21	49
		10			3 672	34	53			4 590	34	54			5 508	33	54
	650	4	0.130	0.111	1 591	5	30	0.163	0.138	1 989	5	30	0.195	0.166	2 387	5	31
		6			2 387	12	40			2 984	12	41			3 580	12	41
		8			3 182	22	48			3 978	22	49			4 774	21	49
		10			3 978	34	53			4 973	34	54			5 967	33	55
	700	4	0.140	0.119	1 714	5	30	0.175	0.149	2 142	5	31	0.21	0.179	2 570	5	31
		6			2 570	12	40			3 213	12	41			3 856	12	42
		8			3 427	22	48			4 284	22	49			5 141	21	49
		10			4 284	34	54			5 355	34	55			6 426	33	55
	750	4	0.150	0.128	1 836	5	30	0.188	0.159	2 295	5	31	0.225	0.191	2 754	5	31
		6			2 754	12	40			3 443	12	41			4 131	12	42
		8			3 672	21	48			4 590	21	49			5 508	21	49
		10			4 590	33	54			5 738	33	55			6 885	32	55
	800	4	0.160	0.136	1 958	5	30	0.200	0.170	2 448	5	31	0.24	0.204	2 938	5	31
		6			2 938	12	41			3 672	12	42			4 406	12	42
		8			3 917	21	48			4 896	21	49			5 875	21	49
		10			4 896	33	54			6 120	33	55			7 344	32	55
	850	4	0.170	0.145	2 081	5	30	0.213	0.181	2 601	5	31	0.255	0.217	3 121	5	31
		6			3 121	12	40			3 902	12	41			4 682	11	42
		8			4 162	21	48			5 202	21	49			6 242	20	49
		10			5 202	32	54			6 503	32	55			7 803	31	55
	900	4	0.180	0.153	2 203	5	30	0.225	0.191	2 754	5	31	0.27	0.230	3 305	5	31
		6			3 305	12	41			4 131	12	42			4 957	11	42
		8			4 406	21	48			5 508	21	49			6 610	20	50
		10			5 508	32	54			6 885	32	55			8 262	31	55
	1000	4	0.200	0.170	2 448	5	31	0.250	0.213	3 060	5	32	0.3	0.255	3 672	5	32
		6			3 672	12	41			4 590	12	42			5 508	11	43
		8			4 896	21	49			6 120	21	50			7 344	20	50
		10			6 120	32	54			7 650	32	55			9 180	31	56

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		350					400					450				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
200	4	0.070	0.060	857	6	27	0.080	0.068	979	5	27	0.090	0.077	1 102	5	28
	6			1 285	13	38			1 469	12	38			1 652	12	38
	8			1 714	22	45			1 958	22	45			2 203	22	46
	10			2 142	35	51			2 448	34	51			2 754	34	52
250	4	0.088	0.074	1 071	6	28	0.100	0.085	1 224	5	28	0.113	0.096	1 377	5	29
	6			1 607	13	39			1 836	12	39			2 066	12	39
	8			2 142	22	46			2 448	22	46			2 754	22	47
	10			2 678	35	52			3 060	34	52			3 443	34	53
300	4	0.105	0.089	1 285	6	29	0.120	0.102	1 469	5	29	0.135	0.115	1 652	5	30
	6			1 928	13	40			2 203	12	40			2 479	12	40
	8			2 570	22	47			2 938	22	47			3 305	22	48
	10			3 213	35	53			3 672	34	53			4 131	34	54
350	4	0.123	0.104	1 499	5	29	0.140	0.119	1 714	5	29	0.158	0.134	1 928	5	30
	6			2 249	12	40			2 570	12	40			2 892	12	41
	8			2 999	22	47			3 427	21	48			3 856	21	48
	10			3 749	34	53			4 284	33	53			4 820	33	54
400	4	0.140	0.119	1 714	5	30	0.160	0.136	1 958	5	30	0.180	0.153	2 203	5	31
	6			2 570	12	40			2 938	12	41			3 305	12	41
	8			3 427	22	48			3 917	21	48			4 406	21	49
	10			4 284	34	54			4 896	33	54			5 508	33	54
450	4	0.158	0.134	1 928	5	30	0.180	0.153	2 203	5	31	0.203	0.172	2 479	5	31
	6			2 892	12	41			3 305	12	41			3 718	12	42
	8			3 856	22	48			4 406	21	49			4 957	21	49
	10			4 820	34	54			5 508	33	54			6 197	33	55
500	4	0.175	0.149	2 142	5	30	0.200	0.170	2 448	5	31	0.225	0.191	2 754	5	32
	6			3 213	12	41			3 672	12	42			4 131	12	42
	8			4 284	21	48			4 896	21	49			5 508	21	50
	10			5 355	33	54			6 120	33	55			6 885	33	55
550	4	0.193	0.164	2 570	5	31	0.220	0.187	2 693	5	31	0.248	0.210	3 029	5	32
	6			3 856	12	42			4 039	12	42			4 544	12	43
	8			5 141	22	49			5 386	21	49			6 059	21	50
	10			6 426	34	55			6 732	33	55			7 574	33	56
600	4	0.210	0.179	2 570	5	31	0.240	0.204	2 938	4	28	0.270	0.230	3 305	5	32
	6			3 856	12	42			4 406	8	37			4 957	12	42
	8			5 141	21	49			5 875	14	44			6 610	21	50
	10			6 426	33	55			7 344	32	55			8 262	32	56
650	4	0.228	0.193	2 785	5	32	0.260	0.221	3 182	5	32	0.293	0.249	3 580	5	32
	6			4 177	12	42			4 774	12	42			5 370	12	43
	8			5 569	21	50			6 365	21	50			7 160	21	50
	10			6 962	33	55			7 956	32	56			8 951	32	56
700	4	0.245	0.208	2 999	5	32	0.28	0.238	3 427	5	32	0.315	0.268	3 856	5	33
	6			4 498	12	42			5 141	12	43			5 783	12	43
	8			5 998	21	50			6 854	21	50			7 711	21	51
	10			7 497	33	56			8 568	32	56			9 639	32	56
750	4	0.263	0.223	3 213	5	32	0.3	0.255	3 672	5	32	0.338	0.287	4 131	5	33
	6			4 820	12	42			5 508	12	43			6 197	12	43
	8			6 426	21	50			7 344	21	50			8 262	21	51
	10			8 033	32	56			9 180	32	56			10 328	32	57
800	4	0.280	0.238	3 427	5	32	0.32	0.272	3 917	5	33	0.360	0.306	4 406	5	32
	6			5 141	12	43			5 875	11	43			6 610	11	42
	8			6 854	21	50			7 834	20	50			8 813	20	50
	10			8 568	32	56			9 792	31	56			11 016	31	56
850	4	0.298	0.253	3 641	5	32	0.34	0.289	4 162	5	32	0.383	0.325	4 682	5	31
	6			5 462	11	42			6 242	11	43			7 023	11	42
	8			7 283	20	50			8 323	19	50			9 364	19	49
	10			9 104	31	56			10 404	30	56			11 705	30	55
900	4	0.315	0.268	3 856	5	32	0.360	0.306	4 406	6	35	0.405	0.344	4 957	5	31
	6			5 783	11	43			6 610	12	44			7 436	11	42
	8			7 711	20	50			8 813	26	54			9 914	19	49
	10			9 639	31	56			11 016	30	56			12 393	30	55
1000	4	0.350	0.298	4 284	5	33	0.400	0.340	4 896	5	33	0.450	0.383	5 508	5	31
	6			6 426	11	43			7 344	11	43			8 262	11	42
	8			8 568	20	51			9 792	19	51			11 016	19	49
	10			10 710	31	56			12 240	30	57			13 770	30	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	500 S_k [m²]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]	500 L_{WA} [dB]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	600 L_{WA} [dB]
	200	4	0.100	0.085	1 224	5	28	0.110	0.094	1 346	5	28	0.120	0.102	1 469	5	28
		6			1 836	12	39			2 020	12	39			2 203	12	39
		8			2 448	21	46			2 693	21	46			2 938	21	46
		10			3 060	33	52			3 366	33	52			3 672	32	52
	250	4	0.125	0.106	1 530	5	29	0.138	0.117	1 683	5	29	0.150	0.128	1 836	5	29
		6			2 295	12	40			2 525	12	40			2 754	12	40
		8			3 060	21	47			3 366	21	47			3 672	21	47
		10			3 825	33	53			4 208	33	53			4 590	32	53
	300	4	0.150	0.128	1 836	5	30	0.165	0.140	2 020	5	30	0.180	0.153	2 203	5	30
		6			2 754	12	40			3 029	12	41			3 305	12	41
		8			3 672	21	48			4 039	21	48			4 406	21	48
		10			4 590	33	54			5 049	33	54			5 508	32	54
	350	4	0.175	0.149	2 142	5	30	0.193	0.164	2 356	5	30	0.210	0.179	2 570	5	30
		6			3 213	12	41			3 534	12	41			3 856	11	41
		8			4 284	21	48			4 712	21	49			5 141	20	48
		10			5 355	32	54			5 891	32	54			6 426	31	54
	400	4	0.200	0.170	2 448	5	31	0.220	0.187	2 693	5	31	0.240	0.204	2 938	5	31
		6			3 672	12	41			4 039	12	42			4 406	11	42
		8			4 896	21	49			5 386	21	49			5 875	20	49
		10			6 120	32	54			6 732	32	55			7 344	31	55
	450	4	0.225	0.191	2 754	5	31	0.248	0.210	3 029	5	32	0.270	0.230	3 305	5	31
		6			4 131	12	42			4 544	12	42			4 957	11	42
		8			5 508	21	49			6 059	21	50			6 610	20	50
		10			6 885	32	55			7 574	32	55			8 262	31	55
	500	4	0.250	0.213	3 060	5	31	0.275	0.234	3 366	5	32	0.300	0.255	3 672	5	32
		6			4 590	11	42			5 049	12	43			5 508	11	43
		8			6 120	22	51			6 732	21	50			7 344	20	50
		10			7 650	32	55			8 415	32	56			9 180	31	56
	550	4	0.275	0.234	3 672	5	32	0.303	0.257	4 039	5	32	0.330	0.281	4 406	5	32
		6			5 508	12	43			6 059	12	43			6 610	11	43
		8			7 344	21	50			8 078	21	50			8 813	20	50
		10			9 180	32	56			10 098	32	56			11 016	31	56
	600	4	0.300	0.255	3 672	5	32	0.330	0.281	4 039	5	32	0.360	0.306	4 406	5	32
		6			5 508	11	43			6 059	11	43			6 610	11	43
		8			7 344	20	50			8 078	20	50			8 813	19	50
		10			9 180	31	56			10 098	31	56			11 016	30	56
	650	4	0.325	0.276	3 978	5	33	0.358	0.304	4 376	5	33	0.390	0.332	4 774	5	33
		6			5 967	12	43			6 564	11	43			7 160	11	43
		8			7 956	21	51			8 752	20	51			9 547	19	51
		10			9 945	31	56			10 940	31	57			11 934	30	57
	700	4	0.350	0.298	4 284	5	33	0.385	0.327	4 712	5	33	0.420	0.357	5 141	5	33
		6			6 426	11	43			7 069	11	44			7 711	11	44
		8			8 568	20	51			9 425	20	51			10 282	19	51
		10			10 710	31	56			11 781	31	57			12 852	30	57
	750	4	0.375	0.319	4 590	5	33	0.413	0.351	5 049	5	33	0.450	0.383	5 508	5	33
		6			6 885	11	43			7 574	11	44			8 262	11	44
		8			9 180	20	51			10 098	20	51			11 016	19	51
		10			11 475	31	57			12 623	31	57			13 770	30	57
	800	4	0.400	0.340	4 896	5	32	0.440	0.374	5 386	5	33	0.480	0.408	5 875	5	33
		6			7 344	11	43			8 078	11	44			8 813	10	44
		8			9 792	19	51			10 771	19	51			11 750	19	51
		10			12 240	30	56			13 464	30	57			14 688	29	57
	850	4	0.425	0.361	5 202	5	32	0.468	0.397	5 722	5	33	0.510	0.434	6 242	4	33
		6			7 803	10	43			8 583	10	44			9 364	10	43
		8			10 404	19	50			11 444	19	51			12 485	18	51
		10			13 005	29	56			14 306	29	57			15 606	28	57
	900	4	0.450	0.383	5 508	5	32	0.495	0.421	6 059	5	33	0.540	0.459	6 610	4	33
		6			8 262	10	43			9 088	10	44			9 914	10	41
		8			11 016	19	50			12 118	19	51			13 219	18	49
		10			13 770	29	56			15 147	29	57			16 524	28	54
	1000	4	0.500	0.425	6 120	5	32	0.550	0.468	6 059	5	34	0.600	0.510	7 344	4	34
		6			9 180	10	43			9 088	10	44			11 016	10	44
		8			12 240	19	50			12 118	19	52			14 688	18	52
		10			15 300	29	56			15 147	29	58			18 360	28	57

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			650					700					750				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	200	4	0.130	0.111	1 591	5	29	0.140	0.119	1 714	5	29	0.150	0.128	1 836	5	29
		6			2 387	12	39			2 570	11	39			2 754	11	40
		8			3 182	21	47			3 427	20	47			3 672	20	47
		10			3 978	32	53			4 284	31	52			4 590	31	53
	250	4	0.163	0.138	1 989	5	30	0.175	0.149	2 142	5	30	0.188	0.159	2 295	5	30
		6			2 984	12	40			3 213	11	40			3 443	11	40
		8			3 978	21	48			4 284	20	48			4 590	20	48
		10			4 973	32	54			5 355	31	53			5 738	31	54
	300	4	0.195	0.166	2 387	5	30	0.210	0.179	2 570	5	30	0.225	0.191	2 754	5	31
		6			3 580	12	41			3 856	11	41			4 131	11	41
		8			4 774	21	49			5 141	20	48			5 508	20	49
		10			5 967	32	54			6 426	31	54			6 885	31	55
	350	4	0.228	0.193	2 785	5	31	0.245	0.208	2 999	5	31	0.263	0.223	3 213	5	31
		6			4 177	11	41			4 498	11	41			4 820	11	42
		8			5 569	20	49			5 998	19	49			6 426	19	49
		10			6 962	31	55			7 497	30	54			8 033	30	55
	400	4	0.260	0.221	3 182	5	31	0.280	0.238	3 427	5	31	0.300	0.255	3 672	5	32
		6			4 774	11	42			5 141	11	42			5 508	11	42
		8			6 365	20	49			6 854	19	49			7 344	19	50
		10			7 956	31	55			8 568	30	55			9 180	30	55
	450	4	0.293	0.249	3 580	5	32	0.315	0.268	3 856	5	32	0.338	0.287	4 131	5	32
		6			5 370	11	42			5 783	11	42			6 197	11	43
		8			7 160	20	50			7 711	19	50			8 262	19	50
		10			8 951	31	56			9 639	30	56			10 328	30	56
	500	4	0.325	0.276	3 978	5	32	0.350	0.298	4 284	5	32	0.375	0.319	4 590	5	32
		6			5 967	11	43			6 426	11	43			6 885	11	43
		8			7 956	20	50			8 568	19	50			9 180	19	51
		10			9 945	31	56			10 710	30	56			11 475	30	56
	550	4	0.358	0.304	4 774	5	33	0.385	0.327	4 712	5	33	0.413	0.351	5 049	5	33
		6			7 160	11	43			7 069	11	43			7 574	11	43
		8			9 547	20	51			9 425	19	51			10 098	19	51
		10			11 934	31	57			11 781	30	56			12 623	30	57
	600	4	0.390	0.332	4 774	5	33	0.420	0.357	5 141	5	33	0.450	0.383	5 508	5	33
		6			7 160	11	44			7 711	11	44			8 262	11	44
		8			9 547	20	51			10 282	19	51			11 016	19	51
		10			11 934	31	57			12 852	30	57			13 770	30	57
	650	4	0.423	0.359	5 171	5	33	0.455	0.387	5 569	5	33	0.488	0.414	5 967	5	33
		6			7 757	11	44			8 354	10	43			8 951	10	44
		8			10 343	19	51			11 138	19	51			11 934	19	51
		10			12 929	30	57			13 923	29	57			14 918	29	57
	700	4	0.455	0.387	5 569	5	33	0.490	0.417	5 998	5	33	0.525	0.446	6 426	5	34
		6			8 354	11	44			8 996	10	44			9 639	10	44
		8			11 138	19	51			11 995	19	51			12 852	19	52
		10			13 923	30	57			14 994	29	57			16 065	29	57
	750	4	0.488	0.414	5 967	5	34	0.525	0.446	6 426	5	34	0.563	0.478	6 885	5	34
		6			8 951	11	44			9 639	10	44			10 328	10	44
		8			11 934	19	52			12 852	19	52			13 770	19	52
		10			14 918	30	57			16 065	29	57			17 213	29	58
	800	4	0.520	0.442	6 365	5	33	0.560	0.476	6 854	4	29	0.600	0.510	7 344	4	34
		6			9 547	10	44			10 282	7	37			11 016	10	44
		8			12 730	19	51			13 709	11	43			14 688	18	52
		10			15 912	29	57			17 136	28	54			18 360	28	57
	850	4	0.553	0.470	6 763	4	33	0.595	0.506	7 283	4	34	0.638	0.542	7 803	4	34
		6			10 144	10	43			10 924	10	44			11 705	10	44
		8			13 525	18	51			14 566	18	52			15 606	18	52
		10			16 907	28	57			18 207	28	57			19 508	28	58
	900	4	0.585	0.497	7 160	4	33	0.630	0.536	7 711	4	33	0.675	0.574	8 262	4	34
		6			10 741	10	43			11 567	10	44			12 393	10	44
		8			14 321	18	51			15 422	17	51			16 524	17	52
		10			17 901	28	57			19 278	27	57			20 655	27	58
	1000	4	0.650	0.553	7 956	4	33	0.700	0.595	8 568	4	34	0.750	0.638	9 180	4	34
		6			11 934	10	43			12 852	10	44			13 770	10	45
		8			15 912	18	51			17 136	17	52			18 360	17	52
		10			19 890	28	57			21 420	27	58			22 950	27	58

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

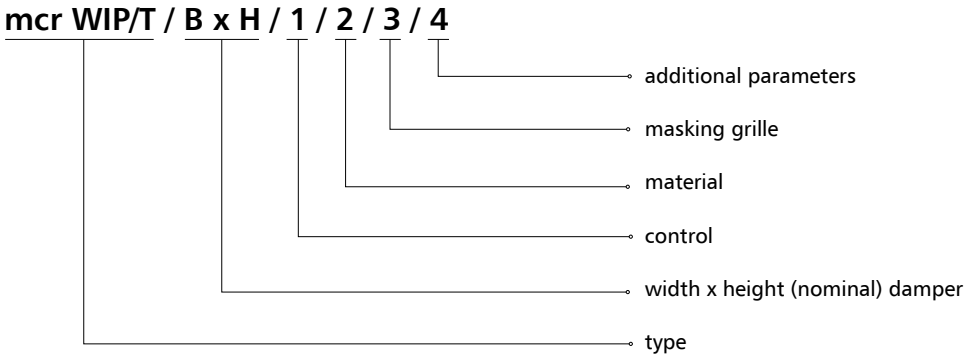
width B [mm]	height H [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]
200		4	0.160	0.136	1 958	5	29	0.170	0.145	2 081	5	29	0.180	0.153	2 203	5	29	0.200	0.170	2 448	5	29
		6			2 938	11	39			3 121	11	40			3 305	10	39			3 672	10	40
		8			3 917	19	47			4 162	19	47			4 406	19	47			4 896	19	47
		10			4 896	30	53			5 202	30	53			5 508	29	53			6 120	29	53
250		4	0.200	0.170	2 448	5	30	0.213	0.181	2 601	5	30	0.225	0.191	2 754	5	30	0.250	0.213	3 060	5	30
		6			3 672	11	40			3 902	11	41			4 131	10	40			4 590	10	41
		8			4 896	19	48			5 202	19	48			5 508	19	48			6 120	19	48
		10			6 120	30	54			6 503	30	54			6 885	29	54			7 650	29	54
300		4	0.240	0.204	2 938	5	31	0.255	0.217	3 121	5	31	0.270	0.230	3 305	5	31	0.300	0.255	3 672	5	31
		6			4 406	11	41			4 682	11	41			4 957	10	41			5 508	10	42
		8			5 875	19	49			6 242	19	49			6 610	19	49			7 344	19	49
		10			7 344	30	54			7 803	30	55			8 262	29	54			9 180	29	55
350		4	0.280	0.238	3 427	5	31	0.298	0.253	3 641	5	31	0.315	0.268	3 856	4	31	0.350	0.298	4 284	4	31
		6			5 141	10	41			5 462	10	42			5 783	10	41			6 426	10	42
		8			6 854	19	49			7 283	19	49			7 711	18	49			8 568	18	49
		10			8 568	29	55			9 104	29	55			9 639	28	55			10 710	28	55
400		4	0.320	0.272	3 917	5	31	0.340	0.289	4 162	5	32	0.360	0.306	4 406	4	31	0.400	0.340	4 896	4	32
		6			5 875	10	42			6 242	10	42			6 610	10	42			7 344	10	42
		8			7 834	19	49			8 323	19	50			8 813	18	49			9 792	18	50
		10			9 792	29	55			10 404	29	55			11 016	28	55			12 240	28	56
450		4	0.360	0.306	4 406	5	32	0.383	0.325	4 682	4	32	0.405	0.344	4 957	4	31	0.450	0.383	5 508	4	32
		6			6 610	10	42			7 023	10	42			7 436	10	42			8 262	10	42
		8			8 813	19	50			9 364	18	50			9 914	17	50			11 016	17	50
		10			11 016	29	56			11 705	28	56			12 393	27	55			13 770	27	56
500		4	0.400	0.340	4 896	5	32	0.425	0.361	5 202	4	32	0.450	0.383	5 508	4	32	0.500	0.425	6 120	4	32
		6			7 344	10	43			7 803	10	43			8 262	10	42			9 180	10	43
		8			9 792	19	50			10 404	18	50			11 016	17	50			12 240	17	50
		10			12 240	29	56			13 005	28	56			13 770	27	56			15 300	27	56
550		4	0.440	0.374	5 386	5	33	0.468	0.397	5 722	4	33	0.495	0.421	6 059	4	32	0.550	0.468	6 732	4	33
		6			8 078	10	43			8 583	10	43			9 088	10	43			10 098	10	43
		8			10 771	19	51			11 444	18	51			12 118	17	50			13 464	17	51
		10			13 464	29	57			14 306	28	56			15 147	27	56			16 830	27	57
600		4	0.480	0.408	5 875	5	33	0.510	0.434	6 242	4	33	0.540	0.459	6 610	4	33	0.600	0.510	7 344	4	33
		6			8 813	10	44			9 364	10	43			9 914	10	43			11 016	10	44
		8			11 750	19	51			12 485	18	51			13 219	17	51			14 688	17	51
		10			14 688	29	57			15 606	28	57			16 524	27	57			18 360	27	57
650		4	0.520	0.442	6 365	5	33	0.553	0.470	6 763	4	33	0.585	0.497	7 160	4	33	0.650	0.553	7 956	4	34
		6			9 547	10	44			10 144	10	44			10 741	10	44			11 934	10	44
		8			12 730	19	52			13 525	18	51			14 321	17	51			15 912	17	52
		10			15 912	29	57			16 907	28	57			17 901	27	57			19 890	27	57
700		4	0.560	0.476	6 854	4	33	0.595	0.506	7 283	4	33	0.630	0.536	7 711	4	33	0.700	0.595	8 568	4	33
		6			10 282	10	44			10 924	10	44			11 567	9	43			12 852	9	44
		8			13 709	18	51			14 566	17	51			15 422	17	51			17 136	17	51
		10			17 136	28	57			18 207	27	57			19 278	26	57			21 420	26	57
750		4	0.600	0.510	7 344	4	34	0.638	0.542	7 803	4	33	0.675	0.574	8 262	4	33	0.750	0.638	9 180	4	34
		6			11 016	10	44			11 705	10	44			12 393	9	44			13 770	9	44
		8			14 688	18	52			15 606	17	51			16 524	17	51			18 360	17	52
		10			18 360	28	57			19 508	27	57			20 655	26	57			22 950	26	57
800		4	0.640	0.544	7 834	4	34	0.680	0.578	8 323	4	34	0.720	0.612	8 813	4	33	0.800	0.680	9 792	4	34
		6			11 750	10	44			12 485	10	44			13 219	9	44			14 688	9	44
		8			15 667	18	52			16 646	17	52			17 626	17	52			19 584	17	52
		10			19 584	28	58			20 808	27	58			22 032	26	57			24 480	26	58
850		4	0.680	0.578	8 323	4	34	0.723	0.614	8 843	4	33	0.765	0.650	9 364	4	34	0.850	0.723	10 404	4	34
		6			12 485	10	44			13 265	9	44			14 045	9	44			15 606	9	45
		8			16 646	17	52			17 687	17	52			18 727	17	52			20 808	17	52
		10			20 808	27	58			22 109	26	57			23 409	26	58			26 010	26	58
900		4	0.720	0.612	8 813	4	34	0.765	0.650	9 364	4	34	0.810	0.689	9 914	4	34	0.900	0.765	11 016	4	34
		6			13 219	10	45			14 045	9	44			14 872	9	45			16 524	9	44
		8			17 626	17	52			18 727	17	52			19 829	17	52			22 032	16	52
		10			22 032	27	58			23 409	26	58			24 786	26	58			27 540	25	58
1000		4	0.800	0.680	9 792	4	34	0.850	0.723	10 404	4	34	0.900	0.765	11 016	4	33	1.000	0.850	12 240	4	34
		6			14 688	9	44			15 606	9	44			16 524	9	44			18 360	9	44
		8			19 584	17	52			20 808	16	52			22 032	15	51			24 480	15	52
		10			24 480	26	58			26 010	25	58			27 540	24	57			30 600	24	58

The mcr WIP/T fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

10.7 | Estimated weights of mcr WIP/T dampers [kg]

height H [mm]	width B [mm]									
	200	250	300	400	500	600	700	800	900	1000
200	10	10	10	10	15	17	18	19	22	25
250	10	10	11	11	16	18	18	21	24	27
300	10	11	11	12	17	20	21	23	26	28
350	11	11	11	16	18	21	23	26	28	30
400	12	12	14	18	19	21	25	29	30	33
500	15	16	17	19	20	23	27	32	33	35
600	17	18	20	21	23	26	30	35	37	39
700	18	18	21	23	25	28	32	35	38	40
800	20	21	22	24	29	35	37	41	43	49
900	22	25	25	28	33	35	39	43	49	52
1000	23	29	32	33	36	42	43	47	53	60

10.8 | Marking



1 - control:

» **trigger control mechanism**

BF24-TN – actuator with a return spring, U = 24 V AC/DC
BF230-TN – actuator with a return spring, U = 230 V AC
BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
BF24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL24-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN24-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MF24T1 – actuator with a return spring, U = 24 V AC/DC
MF230T1 – actuator with a return spring, U = 230 V AC
MLF24T1 – actuator with a return spring, U = 24 V AC/DC
MLF230T1 – actuator with a return spring, U = 230 V AC
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material:

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel

3 - masking element:

MSTx1 – single masking grille
MSTx2 – two masking grilles
MWPx1 – single mesh cover
MWPx2 – two mesh cover

4 - additional parameters :

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF / MF) – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – left damper
KO – inverted damper

» **Damper casing**
BU - earth pin

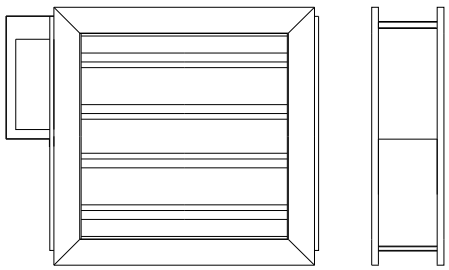
NOTE: **separate additional parameters entered with the "/" sign**

example marking:

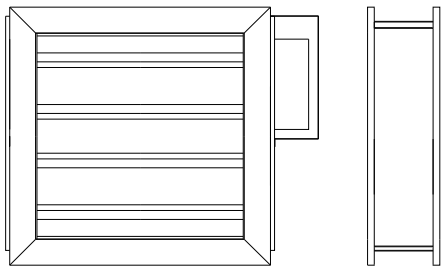
mcr WIP/T 400 x 400 BFL24-T
EI120 louvered transfer damper with a 24 V actuator with limit switches.

10.8.1 | Design standard

» left damper standard

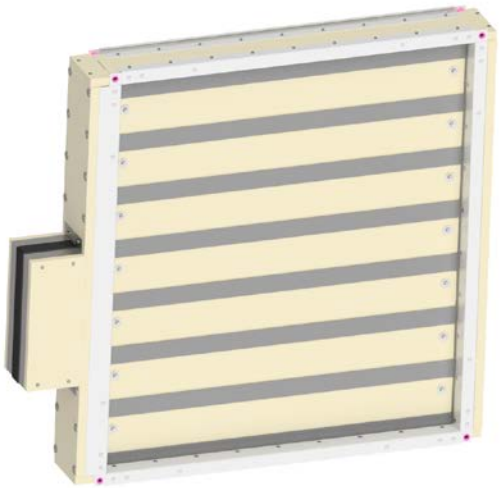


» right damper



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



2434-CPR-0003

CTO S.A.

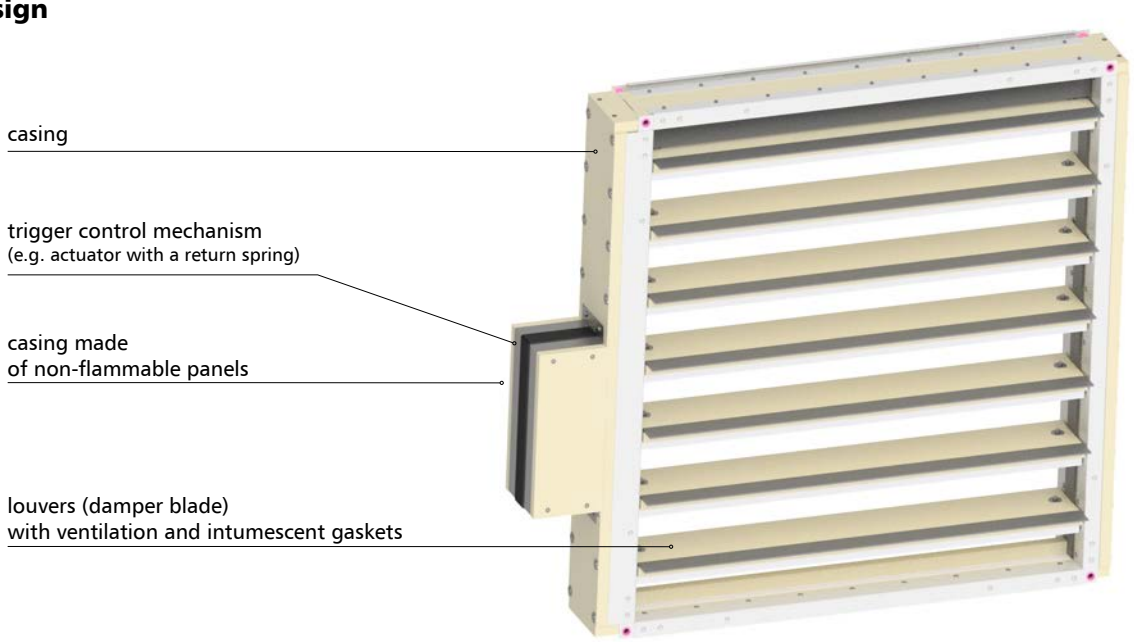
HYGIENIC CERTIFICATE

» **EI120S, EI90S, EI180**
» Fire resistance class: EI120 (v_e i↔o)S, EI90 (h_o i↔o)S, E120 (h_o i↔o)S, EI180 (v_e i↔o).
» Certificate of constancy of performance 2434-CPR-0031.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Narrow louvered cut-off dampers.
» KTB ATEX 2014/34/UE

11.1| Application

mcr WIP PRO/S multi-blade cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions mcr WIP PRO/S fire dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the fire damper.
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper louvers are open. In case of fire, the louver closes. Admissible flow velocity in the connected duct is 12 m/s. In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20°... +50°C

11.2| Design



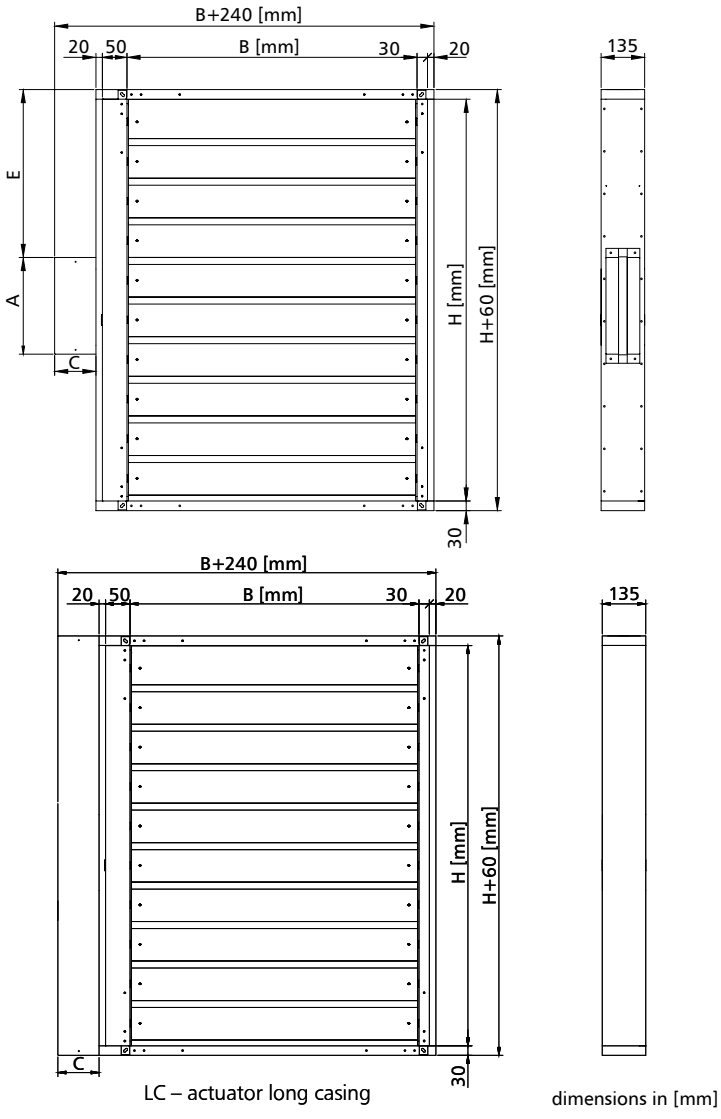
The multi-blade mcr WIP PRO/S damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panels, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a sleeve installed on the vertical side H of the fire damper casing.

11.3 | Versions

11.3.1 | Damper closing and opening with an actuator

During normal operation, the cut-off louvers of the fire damper remain open. In case of fire, the louvers close automatically or remotely when the power supply is cut off.

The mcr WIP PRO/S dampers are equipped with a trigger control mechanism in the form of BFL, BFN, BF, BF-TL, QT.Ex, MF, MLF series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). The BFL, BFN, BF, MLF, MF series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator.
Dampers with analog BFL, BFN, BF, MLF, MF digital BF-TL, QT.Ex actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



LC – actuator long casing

dimensions in [mm]

mechanism	A	C	E
BF, BFL, BFN	298	120	formula
QT.Ex	400	120	formula
MLF, MF	298	120	formula

for an even number of blades
E [mm] = (H/2 - 123) + 30
for an odd number of blades
E [mm] = (H/2 - 61,5) + 30

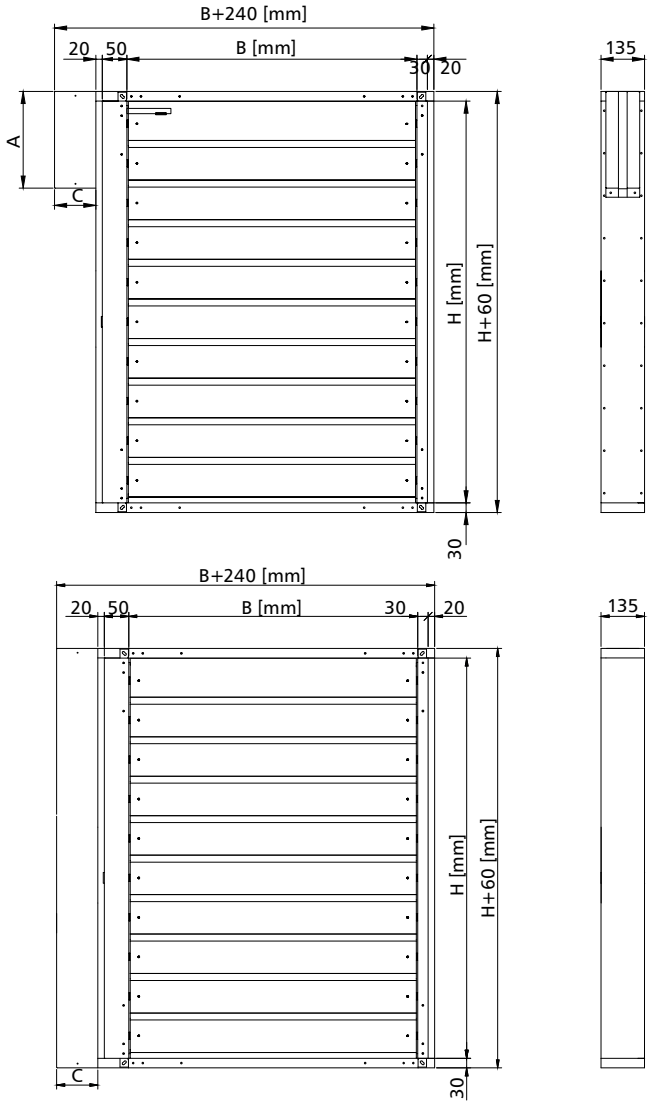
Number of blades = H/123

insert symmetrically against the wall axis

11.3.2 | mcr WIP PRO/S - fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

During normal operation, the cut-off louvers of the fire damper remain open. In case of fire, the louvers close automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr WIP PRO/S dampers are equipped with a **KW1** trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse") or removal („break") of the power supply voltage and with limit switches used to signal the blade position. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



LC – actuator long casing

dimensions in [mm]

mechanism	A	C
KW1	298	120

insert symmetrically against the wall axis

11.4 | Dimensions

» **Rectangular dampers:**

» nominal width B: from 110 mm to 900 mm
» nominal height H from 270 mm to 1250 mm
» maximum single damper cross-section surface up to 1.125 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

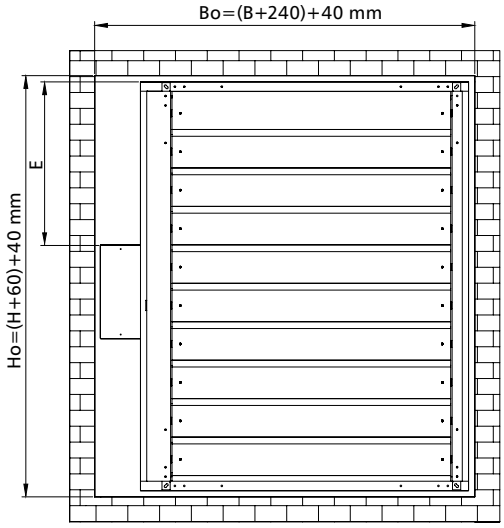
Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

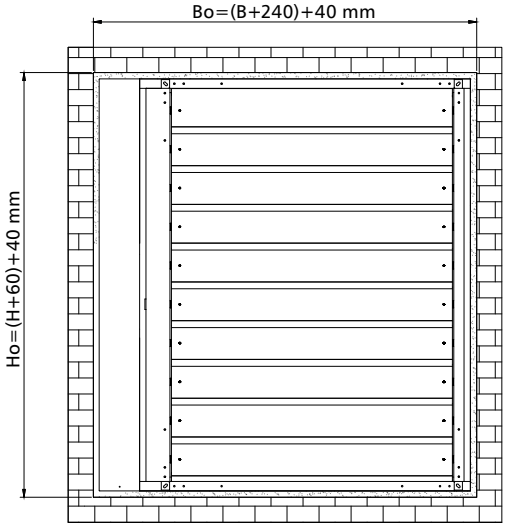
11.5 | Installation

Rectangular mcr WIP PRO/S fire dampers are class EI120(v_e i↔o)S rated if installed in concrete partitions with a min. thickness of 120 mm, partitions made of full bricks or aerated concrete blocks with a min. thickness of 120 mm, light walls with EI120 or higher fire rating, and EI90(h_o i↔o)S / E120(h_o i↔o)S rated when installed in floor slabs with a min. thickness of 150 mm.

11.5.1 | Preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP PRO/S damper is:
Preferred
Bo = (B + 240) + 40 mm
Ho = (H + 60) + 40 mm





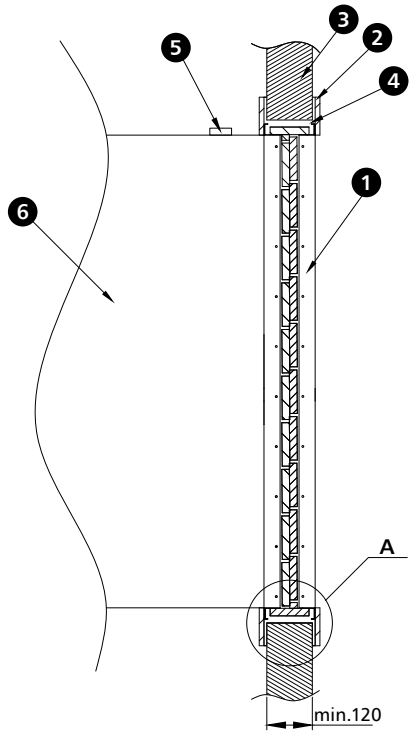
LC – actuator long casing

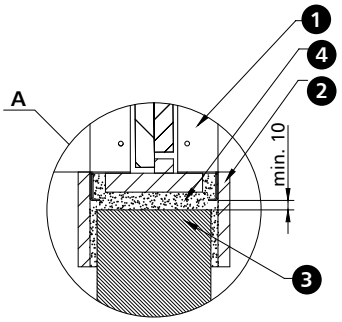
dimensions in [mm]

Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

mechanism	for an even number of blades	for an odd number of blades
BF, BLF, BFN, MF, MLF, QT.Ex	E [mm] = (H/2 - 123) + 30	E [mm] = (H/2 - 61,5) + 30
KW1	E [mm] = 0	E [mm] = 0

11.5.2 | Sample installation in concrete block or full brick walls



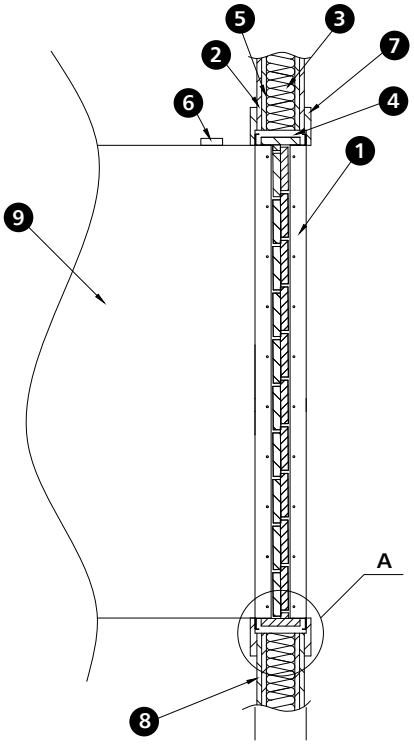


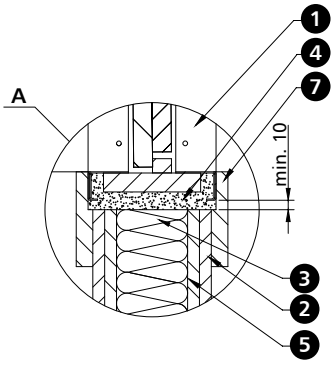
dimensions in [mm]

1. mcr WIP PRO/S fire damper
2. gypsum board trim 100 x 12.5 mm
3. solid wall
4. assembly mortar*
5. thermoelectric trigger
6. ventilation duct

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

11.5.3 | Sample installation in light walls



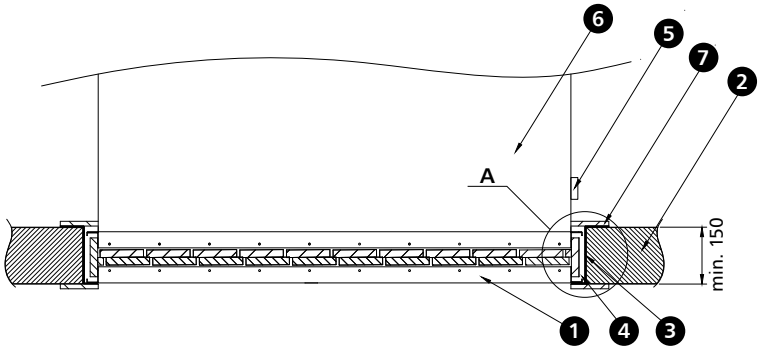


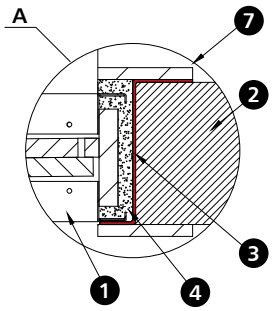
dimensions in [mm]

1. mcr WIP PRO/S fire damper
2. gypsum board 12.5 mm
3. mineral wool with a density of at least 80 kg/m³ , A1 class
4. assembly mortar*
5. structural profile
6. thermoelectric trigger
7. gypsum board trim 100 x 12.5 mm
8. gypsum board light wall
9. ventilation duct

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

11.5.4 | Sample installation in floor slabs

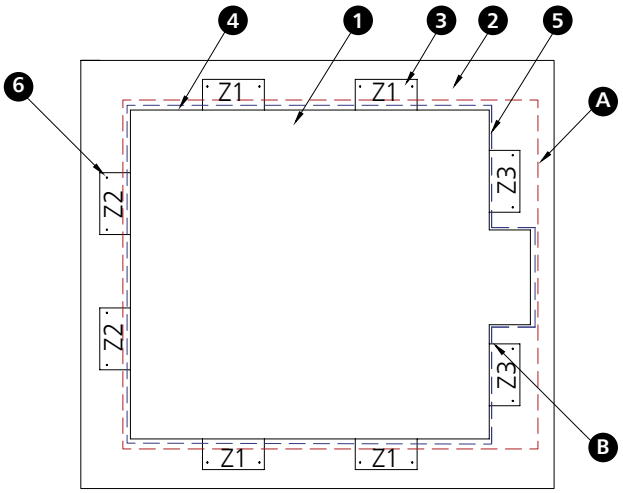




dimensions in [mm]

1. mcr WIP PRO/S fire damper
2. concrete floor slab
3. Z-shape installation bars
4. assembly mortar*
5. thermoelectric trigger
6. ventilation duct
7. gypsum board trims 100 x 12.5 mm

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

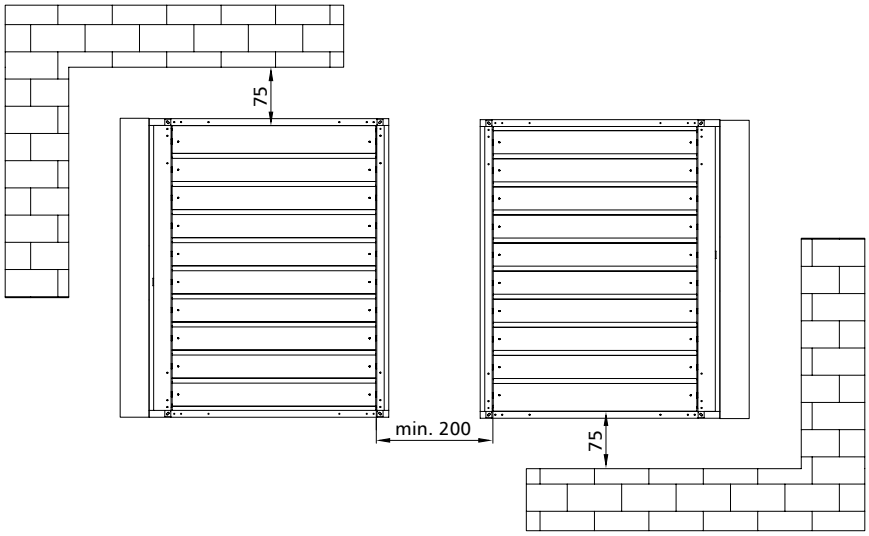


1. mcr WIP PRO/S fire damper
2. concrete floor slab
3. Z-shape installation bars
4. assembly mortar*
5. installation opening A or B
6. anchor plug M8 x 80 mm

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

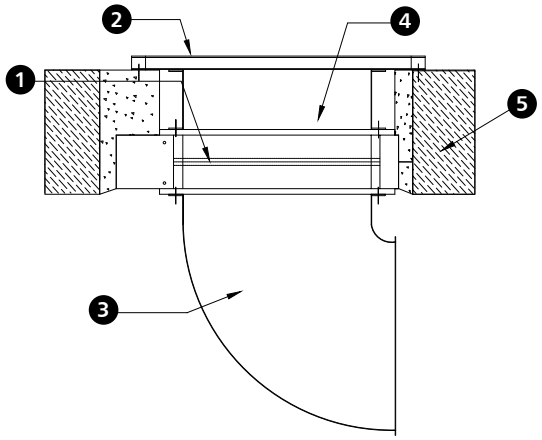
For mcr WIP PRO/S damper installation in the floor slab, use Z1/Z2/Z3 fasteners compatible with the width of the fire damper and construction opening "5" as per the guidelines in the operation and maintenance manual. Z1, Z2, Z3 fasteners are not included with the fire damper.
For construction openings with a cut-out for the trigger control mechanism box B, use standard Z3 fasteners.
For construction openings in form of a regular rectangular A, extend the Z3 fasteners by 120 mm.

»Minimum distance between systems and partitions



dimensions in [mm]

»Example applications - installation with a masking element



1. mcr WIP PRO/S fire damper
2. masking element
3. ventilation duct
4. duct - ventilation straight connection piece
5. wall, floor slab

If a mcr WIP PRO/S damper is used, the application of louvers (no single-blade design) it is possible to use the space in front of and behind the damper for such system elements as a masking grille or a silencer with additional attenuation barrier or to route a duct along the wall using a duct bend or reduction.

11.6 | mcr WIP PRO/S rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	270 S_k [m²]	270 S_e [m²]	270 Q [m³/h]	270 d_p [PA]	270 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]
	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
	250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39
		6			918	30	47			918	30	48			918	36	50
		8			1 224	53	55			1 224	54	55			1 224	63	57
		10			1 530	82	61			1 530	85	61			1 530	99	63
	300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40
		6			1 102	30	48			1 102	30	49			1 102	36	51
		8			1 469	53	56			1 469	54	56			1 469	63	58
		10			1 836	82	62			1 836	85	62			1 836	99	64
	350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41
		6			1 285	30	49			1 285	30	49			1 285	36	51
		8			1 714	53	56			1 714	54	57			1 714	63	59
		10			2 142	82	62			2 142	85	63			2 142	99	65
	400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41
		6			1 469	30	49			1 469	30	50			1 469	36	52
		8			1 958	53	57			1 958	54	57			1 958	63	59
		10			2 448	82	63			2 448	84	63			2 448	99	65
	450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42
		6			1 652	30	50			1 652	30	50			1 652	36	52
		8			2 203	53	57			2 203	54	58			2 203	63	60
		10			2 754	82	63			2 754	84	64			2 754	99	66
	500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42
		6			1 836	30	50			1 836	30	51			1 836	36	53
		8			2 448	53	58			2 448	54	58			2 448	63	60
		10			3 060	82	64			3 060	85	64			3 060	99	66
	550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43
		6			2 020	4	24			2 020	30	51			2 020	36	53
		8			2 693	7	31			2 693	54	59			2 693	63	61
		10			3 366	10	37			3 366	84	65			3 366	99	67
	600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43
		6			2 203	30	51			2 203	30	52			2 203	36	54
		8			2 938	53	59			2 938	54	59			2 938	63	61
		10			3 672	82	65			3 672	85	65			3 672	99	67
	650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43
		6			2 387	30	52			2 387	30	52			2 387	36	54
		8			3 182	53	59			3 182	54	59			3 182	63	62
		10			3 978	82	65			3 978	85	65			3 978	99	67
	700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44
		6			2 570	30	52			2 570	30	52			2 570	36	54
		8			3 427	53	59			3 427	54	60			3 427	63	62
		10			4 284	82	65			4 284	85	66			4 284	99	68
	750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44
		6			2 754	30	52			2 754	30	53			2 754	36	55
		8			3 672	53	60			3 672	54	60			3 672	63	62
		10			4 590	82	66			4 590	85	66			4 590	99	68
	800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44
		6			2 938	30	52			2 938	30	53			2 938	36	55
		8			3 917	53	60			3 917	54	60			3 917	63	62
		10			4 896	82	66			4 896	84	66			4 896	99	68
	850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45
		6			3 121	30	53			3 121	30	53			3 121	36	55
		8			4 162	53	60			4 162	54	61			4 162	63	63
		10			5 202	82	66			5 202	84	66			5 202	99	68
	900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45
		6			3 305	30	53			3 305	30	53			3 305	36	55
		8			4 406	53	60			4 406	54	61			4 406	63	63
		10			5 508	82	66			5 508	84	67			5 508	99	69

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	390 S_k [m²]	390 S_e [m²]	390 Q [m³/h]	390 d_p [PA]	390 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]	520 S_k [m²]	520 S_e [m²]	520 Q [m³/h]	520 d_p [PA]	520 L_{WA} [dB]
	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
	250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39
		6			1 366	27	48			1 366	31	50			1 814	27	49
		8			1 822	47	55			1 822	55	57			2 419	48	57
		10			2 277	74	61			2 277	86	63			3 024	75	63
	300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39
		6			1 639	27	49			1 639	31	51			2 177	27	50
		8			2 186	47	56			2 186	55	58			2 903	48	57
		10			2 732	74	62			2 732	86	64			3 629	75	63
	350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40
		6			1 913	27	49			1 913	31	51			2 540	27	51
		8			2 550	47	57			2 550	55	59			3 387	48	58
		10			3 188	74	63			3 188	86	65			4 234	75	64
	400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41
		6			2 186	27	50			2 186	31	52			2 903	27	51
		8			2 915	47	57			2 915	55	59			3 871	48	59
		10			3 643	74	63			3 643	86	65			4 838	75	65
	450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41
		6			2 459	27	50			2 459	31	52			3 266	27	52
		8			3 279	47	58			3 279	55	60			4 355	48	59
		10			4 099	74	64			4 099	86	66			5 443	75	65
	500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42
		6			2 732	27	51			2 732	31	53			3 629	27	52
		8			3 643	47	58			3 643	55	60			4 838	48	60
		10			4 554	74	64			4 554	86	66			6 048	75	66
	550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42
		6			3 006	27	51			3 006	31	53			3 992	27	53
		8			4 008	47	59			4 008	55	61			5 322	48	60
		10			5 009	74	65			5 009	86	67			6 653	75	66
	600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42
		6			3 279	27	52			3 279	31	54			4 355	27	53
		8			4 372	47	59			4 372	55	61			5 806	48	61
		10			5 465	74	65			5 465	86	67			7 258	75	66
	650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43
		6			3 552	27	52			3 552	31	54			4 717	27	53
		8			4 736	47	59			4 736	55	61			6 290	48	61
		10			5 920	74	65			5 920	86	67			7 862	75	67
	700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43
		6			3 825	27	52			3 825	31	54			5 080	27	54
		8			5 100	47	60			5 100	55	62			6 774	48	61
		10			6 376	74	66			6 376	86	68			8 467	75	67
	750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43
		6			4 099	27	53			4 099	31	55			5 443	27	54
		8			5 465	47	60			5 465	55	62			7 258	48	61
		10			6 831	74	66			6 831	86	68			9 072	75	67
	800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43
		6			4 372	27	53			4 372	31	54			5 806	27	54
		8			5 829	47	60			5 829	55	61			7 741	48	61
		10			7 286	74	66			7 286	86	67			9 677	75	67
	850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43
		6			4 645	27	53			4 645	31	54			6 169	27	54
		8			6 193	47	61			6 193	55	61			8 225	48	61
		10			7 742	74	66			7 742	86	67			10 282	75	67
	900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43
		6			4 918	27	53			4 918	31	54			6 532	27	54
		8			6 558	47	61			6 558	55	61			8 709	48	61
		10			8 197	74	67			8 197	86	67			10 886	75	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
110		4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
150		4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
200		4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
250		4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40
		6			1 814	29	50			2 263	26	50			2 263	27	50
		8			2 419	51	57			3 017	46	57			3 017	48	58
		10			3 024	79	63			3 771	72	63			3 771	76	64
300		4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41
		6			2 177	29	51			2 715	26	50			2 715	27	51
		8			2 903	51	58			3 620	46	58			3 620	48	59
		10			3 629	79	64			4 525	72	64			4 525	76	64
350		4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41
		6			2 540	29	51			3 168	26	51			3 168	27	52
		8			3 387	51	59			4 224	46	58			4 224	48	59
		10			4 234	79	65			5 279	72	64			5 279	76	65
400		4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42
		6			2 903	29	52			3 620	26	52			3 620	27	52
		8			3 871	51	59			4 827	46	59			4 827	48	60
		10			4 838	79	65			6 034	72	65			6 034	76	66
450		4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42
		6			3 266	29	52			4 073	26	52			4 073	27	53
		8			4 355	51	60			5 430	46	60			5 430	48	60
		10			5 443	79	66			6 788	72	65			6 788	76	66
500		4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43
		6			3 629	29	53			4 525	26	53			4 525	27	53
		8			4 838	51	60			6 034	46	60			6 034	48	61
		10			6 048	79	66			7 542	72	66			7 542	76	67
550		4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43
		6			3 992	29	53			4 978	26	53			4 978	27	54
		8			5 322	51	61			6 637	46	60			6 637	48	61
		10			6 653	79	67			8 296	72	66			8 296	76	67
600		4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44
		6			4 355	29	54			5 430	26	53			5 430	27	54
		8			5 806	51	61			7 240	46	61			7 240	48	62
		10			7 258	79	67			9 050	72	67			9 050	76	67
650		4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44
		6			4 717	29	54			5 883	26	54			5 883	27	54
		8			6 290	51	62			7 844	46	61			7 844	48	62
		10			7 862	79	67			9 805	72	67			9 805	76	68
700		4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44
		6			5 080	29	54			6 335	26	54			6 335	27	55
		8			6 774	51	62			8 447	46	61			8 447	48	62
		10			8 467	79	68			10 559	72	67			10 559	76	68
750		4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44
		6			5 443	29	55			6 788	26	54			6 788	27	55
		8			7 258	51	62			9 050	46	62			9 050	48	63
		10			9 072	79	68			11 313	72	68			11 313	76	68
800		4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44
		6			5 806	29	55			7 240	26	55			7 240	27	55
		8			7 741	51	62			9 654	46	62			9 654	48	63
		10			9 677	79	68			12 067	72	68			12 067	76	68
850		4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44
		6			6 169	29	55			7 693	26	55			7 693	27	55
		8			8 225	51	63			10 257	46	62			10 257	48	63
		10			10 282	79	69			12 821	72	68			12 821	76	68
900		4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44
		6			6 532	29	56			8 145	26	52			8 145	27	55
		8			8 709	51	63			10 860	46	60			10 860	48	63
		10			10 886	79	69			13 576	72	65			13 576	76	68

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			700					760					800				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
	250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38
		6			2 263	30	52			2 711	28	51			2 711	22	49
		8			3 017	54	59			3 614	50	59			3 614	40	56
		10			3 771	85	65			4 518	78	65			4 518	62	62
	300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39
		6			2 715	30	53			3 253	28	52			3 253	22	49
		8			3 620	54	60			4 337	50	60			4 337	40	57
		10			4 525	85	66			5 422	78	66			5 422	62	63
	350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39
		6			3 168	30	53			3 795	28	53			3 795	22	50
		8			4 224	54	61			5 060	50	60			5 060	40	57
		10			5 279	85	66			6 325	78	66			6 325	62	63
	400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40
		6			3 620	30	54			4 337	28	53			4 337	22	51
		8			4 827	54	61			5 783	50	61			5 783	40	58
		10			6 034	85	67			7 229	78	67			7 229	62	64
	450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41
		6			4 073	30	54			4 879	28	54			4 879	22	51
		8			5 430	54	62			6 506	50	61			6 506	40	59
		10			6 788	85	68			8 132	78	67			8 132	62	64
	500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41
		6			4 525	30	55			5 422	28	54			5 422	22	52
		8			6 034	54	62			7 229	50	62			7 229	40	59
		10			7 542	85	68			9 036	78	68			9 036	62	65
	550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41
		6			4 978	30	55			5 964	28	55			5 964	22	52
		8			6 637	54	63			7 952	50	62			7 952	40	59
		10			8 296	85	68			9 940	78	68			9 940	62	65
	600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42
		6			5 430	30	56			6 506	28	55			6 506	22	52
		8			7 240	54	63			8 675	50	63			8 675	40	60
		10			9 050	85	69			10 843	78	69			10 843	62	66
	650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42
		6			5 883	30	56			7 048	28	56			7 048	22	53
		8			7 844	54	63			9 397	50	63			9 397	40	60
		10			9 805	85	69			11 747	78	69			11 747	62	66
	700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42
		6			6 335	30	56			7 590	28	56			7 590	22	53
		8			8 447	54	64			10 120	50	63			10 120	40	61
		10			10 559	85	69			12 650	78	69			12 650	62	66
	750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43
		6			6 788	30	56			8 132	28	56			8 132	22	53
		8			9 050	54	64			10 843	50	64			10 843	40	61
		10			11 313	85	70			13 554	78	69			13 554	62	67
	800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43
		6			7 240	30	55			8 675	28	56			8 675	22	54
		8			9 654	54	62			11 566	50	64			11 566	40	61
		10			12 067	85	67			14 458	78	70			14 458	62	67
	850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43
		6			7 693	30	57			9 217	28	57			9 217	22	54
		8			10 257	54	65			12 289	50	64			12 289	40	61
		10			12 821	85	70			15 361	78	70			15 361	62	67
	900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44
		6			8 145	30	57			9 759	28	57			9 759	22	54
		8			10 860	54	65			13 012	50	64			13 012	40	62
		10			13 576	85	71			16 265	78	70			16 265	62	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	890 S_k [m²]	890 S_e [m²]	890 Q [m³/h]	890 d_p [PA]	890 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]
110		4	0,098	0,064	927	13	38	0,099	0,064	927	13	39	0,105	0,064	927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8			1 853	51	56			1 853	53	57			1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
150		4	0,134	0,088	1 264	13	40	0,135	0,088	1 264	13	40	0,143	0,088	1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8			2 527	51	58			2 527	53	58			2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
200		4	0,178	0,117	1 685	13	41	0,180	0,117	1 685	13	41	0,190	0,117	1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8			3 370	51	59			3 370	53	59			3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
250		4	0,223	0,146	2 106	13	42	0,225	0,146	2 106	13	42	0,238	0,146	2 106	14	43
		6			3 159	29	52			3 159	30	53			3 159	32	54
		8			4 212	51	60			4 212	53	60			4 212	57	61
		10			5 265	79	66			5 265	83	66			5 265	89	67
300		4	0,267	0,176	2 527	13	43	0,270	0,176	2 527	13	43	0,285	0,176	2 527	14	44
		6			3 791	29	53			3 791	30	54			3 791	32	55
		8			5 054	51	61			5 054	53	61			5 054	57	62
		10			6 318	79	66			6 318	83	67			6 318	89	68
350		4	0,312	0,205	2 948	13	43	0,315	0,205	2 948	13	44	0,333	0,205	2 948	14	45
		6			4 423	29	54			4 423	30	54			4 423	32	55
		8			5 897	51	61			5 897	53	62			5 897	57	63
		10			7 371	79	67			7 371	83	68			7 371	89	69
400		4	0,356	0,234	3 370	13	44	0,360	0,234	3 370	13	44	0,380	0,234	3 370	14	45
		6			5 054	29	54			5 054	30	55			5 054	32	56
		8			6 739	51	62			6 739	53	62			6 739	57	63
		10			8 424	79	68			8 424	83	68			8 424	89	69
450		4	0,401	0,263	3 791	13	44	0,405	0,263	3 791	13	45	0,428	0,263	3 791	14	46
		6			5 686	29	55			5 686	30	55			5 686	32	56
		8			7 582	51	62			7 582	53	63			7 582	57	64
		10			9 477	79	68			9 477	83	69			9 477	89	70
500		4	0,445	0,293	4 212	13	45	0,450	0,293	4 212	13	45	0,475	0,293	4 212	14	46
		6			6 318	29	55			6 318	30	56			6 318	32	57
		8			8 424	51	63			8 424	53	63			8 424	57	64
		10			10 530	79	69			10 530	83	69			10 530	89	70
550		4	0,490	0,322	4 633	13	45	0,495	0,322	4 633	13	46	0,523	0,322	4 633	14	47
		6			6 950	29	56			6 950	30	56			6 950	32	57
		8			9 266	51	63			9 266	53	64			9 266	57	65
		10			11 583	79	69			11 583	83	70			11 583	89	70
600		4	0,534	0,351	5 054	13	46	0,540	0,351	5 054	13	46	0,570	0,351	5 054	14	47
		6			7 582	29	56			7 582	30	57			7 582	32	58
		8			10 109	51	64			10 109	53	64			10 109	57	65
		10			12 636	79	69			12 636	83	70			12 636	89	71
650		4	0,579	0,380	5 476	13	46	0,585	0,380	5 476	13	46	0,618	0,380	5 476	14	47
		6			8 213	29	56			8 213	30	57			8 213	32	58
		8			10 951	51	64			10 951	53	65			10 951	57	65
		10			13 689	79	70			13 689	83	70			13 689	89	71
700		4	0,623	0,410	5 897	13	46	0,630	0,410	5 897	13	47	0,665	0,410	5 897	14	48
		6			8 845	29	57			8 845	30	57			8 845	32	58
		8			11 794	51	64			11 794	53	65			11 794	57	66
		10			14 742	79	70			14 742	83	71			14 742	89	72
750		4	0,668	0,439	6 318	13	47	0,675	0,439	6 318	13	47	0,713	0,439	6 318	14	48
		6			9 477	29	57			9 477	30	58			9 477	32	59
		8			12 636	51	65			12 636	53	65			12 636	57	66
		10			15 795	79	70			15 795	83	71			15 795	89	72
800		4	0,712	0,468	6 739	13	47	0,720	0,468	6 739	13	47	0,760	0,468	6 739	14	48
		6			10 109	29	57			10 109	30	58			10 109	32	59
		8			13 478	51	65			13 478	53	65			13 478	57	66
		10			16 848	79	71			16 848	83	71			16 848	89	72
850		4	0,757	0,497	7 160	13	47	0,765	0,497	7 160	13	48	0,808	0,497	7 160	14	49
		6			10 741	29	58			10 741	30	58			10 741	32	59
		8			14 321	51	65			14 321	53	66			14 321	57	67
		10			17 901	79	71			17 901	83	71			17 901	89	72
900		4	0,801	0,527	7 582	13	47	0,810	0,527	7 582	13	48	0,855	0,527	7 582	14	49
		6			11 372	29	58			11 372	30	58			11 372	32	59
		8			15 163	51	65			15 163	53	66			15 163	57	67
		10			18 954	79	71			18 954	83	72			18 954	89	73

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1010					1050					1100				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0,111	0,073	1 058	12	38	0,116	0,073	1 058	13	39	0,121	0,073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0,152	0,100	1 443	12	40	0,158	0,100	1 443	13	40	0,165	0,100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0,202	0,134	1 924	12	41	0,210	0,134	1 924	13	41	0,220	0,134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
	250	4	0,253	0,167	2 405	12	42	0,263	0,167	2 405	13	42	0,275	0,167	2 405	15	44
		6			3 607	28	53			3 607	29	53			3 607	33	55
		8			4 810	50	60			4 810	51	60			4 810	59	62
		10			6 012	77	66			6 012	79	66			6 012	93	68
	300	4	0,303	0,200	2 886	12	43	0,315	0,200	2 886	13	43	0,330	0,200	2 886	15	45
		6			4 329	28	53			4 329	29	54			4 329	33	56
		8			5 772	50	61			5 772	51	61			5 772	59	63
		10			7 214	77	67			7 214	79	67			7 214	93	69
	350	4	0,354	0,234	3 367	12	43	0,368	0,234	3 367	13	44	0,385	0,234	3 367	15	46
		6			5 050	28	54			5 050	29	54			5 050	33	56
		8			6 733	50	62			6 733	51	62			6 733	59	64
		10			8 417	77	67			8 417	79	68			8 417	93	70
	400	4	0,404	0,267	3 848	12	44	0,420	0,267	3 848	13	44	0,440	0,267	3 848	15	46
		6			5 772	28	55			5 772	29	55			5 772	33	57
		8			7 695	50	62			7 695	51	62			7 695	59	64
		10			9 619	77	68			9 619	79	68			9 619	93	70
	450	4	0,455	0,301	4 329	12	45	0,473	0,301	4 329	13	45	0,495	0,301	4 329	15	47
		6			6 493	28	55			6 493	29	55			6 493	33	57
		8			8 657	50	63			8 657	51	63			8 657	59	65
		10			10 822	77	68			10 822	79	69			10 822	93	71
	500	4	0,505	0,334	4 810	12	45	0,525	0,334	4 810	13	45	0,550	0,334	4 810	15	47
		6			7 214	28	56			7 214	29	56			7 214	33	58
		8			9 619	50	63			9 619	51	63			9 619	59	65
		10			12 024	77	69			12 024	79	69			12 024	93	71
	550	4	0,556	0,367	5 291	12	45	0,578	0,367	5 291	13	46	0,605	0,367	5 291	15	48
		6			7 936	28	56			7 936	29	56			7 936	33	58
		8			10 581	50	63			10 581	51	64			10 581	59	66
		10			13 226	77	69			13 226	79	70			13 226	93	72
	600	4	0,606	0,401	5 772	12	46	0,630	0,401	5 772	13	46	0,660	0,401	5 772	15	48
		6			8 657	28	56			8 657	29	57			8 657	33	59
		8			11 543	50	64			11 543	51	64			11 543	59	66
		10			14 429	77	70			14 429	79	70			14 429	93	72
	650	4	0,657	0,434	6 252	12	46	0,683	0,434	6 252	13	46	0,715	0,434	6 252	15	48
		6			9 379	28	57			9 379	29	57			9 379	33	59
		8			12 505	50	64			12 505	51	65			12 505	59	67
		10			15 631	77	70			15 631	79	70			15 631	93	72
	700	4	0,707	0,468	6 733	12	46	0,735	0,468	6 733	13	47	0,770	0,468	6 733	15	49
		6			10 100	28	57			10 100	29	57			10 100	33	59
		8			13 467	50	65			13 467	51	65			13 467	59	67
		10			16 834	77	70			16 834	79	71			16 834	93	73
	750	4	0,758	0,501	7 214	12	47	0,788	0,501	7 214	13	47	0,825	0,501	7 214	15	49
		6			10 822	28	57			10 822	29	58			10 822	33	60
		8			14 429	50	65			14 429	51	65			14 429	59	67
		10			18 036	77	71			18 036	79	71			18 036	93	73
	800	4	0,808	0,534	7 695	12	47	0,840	0,534	7 695	13	47	0,880	0,534	7 695	15	49
		6			11 543	28	58			11 543	29	58			11 543	33	60
		8			15 391	50	65			15 391	51	65			15 391	59	67
		10			19 238	77	71			19 238	79	71			19 238	93	73
	850	4	0,859	0,568	8 176	12	47	0,893	0,568	8 176	13	48	0,935	0,568	8 176	15	50
		6			12 264	28	58			12 264	29	58			12 264	33	60
		8			16 353	50	65			16 353	51	66			16 353	59	68
		10			20 441	77	71			20 441	79	72			20 441	93	74
	900	4	0,909	0,601	8 657	12	48	0,945	0,601	8 657	13	48	0,990	0,601	8 657	15	50
		6			12 986	28	58			12 986	29	58			12 986	33	60
		8			17 315	50	66			17 315	51	66			17 315	59	68
		10			21 643	77	71			21 643	79	72			21 643	93	74

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
	250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40
		6			4 055	27	52			4 055	30	54			4 504	24	51
		8			5 407	49	60			5 407	54	61			6 005	43	58
		10			6 759	76	66			6 759	84	67			7 506	66	64
	300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41
		6			4 866	27	53			4 866	30	54			5 404	24	51
		8			6 489	49	61			6 489	54	62			7 206	43	59
		10			8 111	76	66			8 111	84	68			9 007	66	65
	350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41
		6			5 678	27	54			5 678	30	55			6 305	24	52
		8			7 570	49	61			7 570	54	63			8 407	43	60
		10			9 463	76	67			9 463	84	68			10 508	66	65
	400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42
		6			6 489	27	54			6 489	30	56			7 206	24	53
		8			8 652	49	62			8 652	54	63			9 608	43	60
		10			10 814	76	68			10 814	84	69			12 010	66	66
	450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43
		6			7 300	27	55			7 300	30	56			8 106	24	53
		8			9 733	49	62			9 733	54	64			10 809	43	61
		10			12 166	76	68			12 166	84	70			13 511	66	66
	500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43
		6			8 111	27	55			8 111	30	57			9 007	24	54
		8			10 814	49	63			10 814	54	64			12 010	43	61
		10			13 518	76	69			13 518	84	70			15 012	66	67
	550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43
		6			8 922	27	56			8 922	30	57			9 908	24	54
		8			11 896	49	63			11 896	54	65			13 211	43	62
		10			14 870	76	69			14 870	84	70			16 513	66	67
	600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44
		6			9 733	27	56			9 733	30	57			10 809	24	54
		8			12 977	49	64			12 977	54	65			14 412	43	62
		10			16 222	76	69			16 222	84	71			18 014	66	68
	650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44
		6			10 544	27	56			10 544	30	58			11 709	24	55
		8			14 059	49	64			14 059	54	65			15 612	43	62
		10			17 573	76	70			17 573	84	71			19 516	66	68
	700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44
		6			11 355	27	57			11 355	30	58			12 610	24	55
		8			15 140	49	64			15 140	54	66			16 813	43	63
		10			18 925	76	70			18 925	84	71			21 017	66	68
	750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45
		6			12 166	27	57			12 166	30	58			13 511	24	55
		8			16 222	49	65			16 222	54	66			18 014	43	63
		10			20 277	76	70			20 277	84	72			22 518	66	69
	800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45
		6			12 977	27	57			12 977	30	59			14 412	24	56
		8			17 303	49	65			17 303	54	66			19 215	43	63
		10			21 629	76	71			21 629	84	72			24 019	66	69
	850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45
		6			13 788	27	58			13 788	30	59			15 312	24	56
		8			18 384	49	65			18 384	54	66			20 416	43	63
		10			22 981	76	71			22 981	84	72			25 520	66	69
	900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46
		6			14 599	27	58			14 599	30	59			16 213	24	56
		8			19 466	49	65			19 466	54	67			21 617	43	64
		10			24 332	76	71			24 332	84	73			27 022	66	69

The mcr WIP PRO/S fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

11.7 | Estimated weights of mcr WIP PRO/S dampers for rectangular ventilation ducts [kg]

		width B [mm]											
		110	150	200	250	300	350	400	500	600	700	800	900
height H [mm]	270	3	4	5	7	8	9	11	14	16	19	22	25
	300	3	4	6	8	9	11	12	16	19	22	25	29
	400	4	6	8	12	12	15	17	21	25	30	34	38
	500	5	8	10	13	16	18	21	27	32	37	43	48
	600	7	9	12	16	19	22	25	32	38	45	51	58
	700	8	11	15	18	22	26	30	37	45	52	60	68
	800	9	12	17	21	25	30	34	43	51	60	69	77
	900	10	14	19	24	29	34	38	48	58	68	77	87
	1000	11	16	21	27	32	37	43	54	64	75	86	97
	1100	13	17	23	29	35	41	47	59	71	83	95	106
	1250	14	20	27	33	40	47	54	67	81	94	108	128

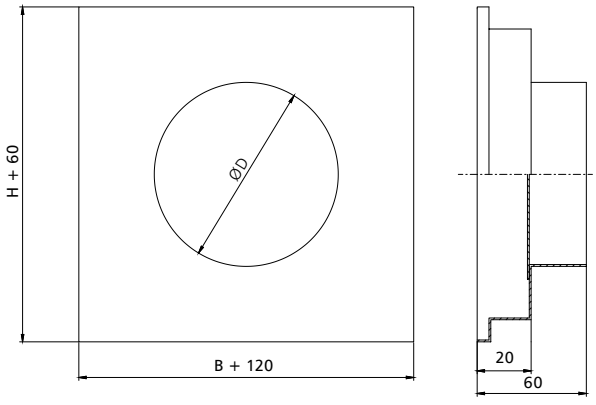
The table shows the weights of dampers with KW1 trigger control mechanisms or actuators.

11.8 | Accessories

11.8.1 | mcr KRP connection stub

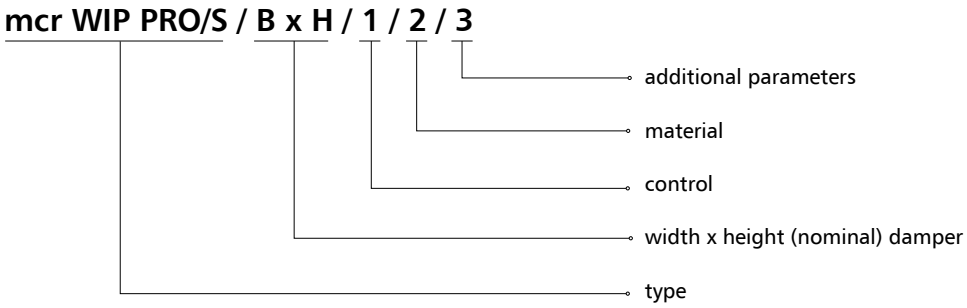
Mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:
BxH - damper dimensions [mm]
ØD - diameter of the connection duct [mm]



dimensions in [mm]

11.9 | Marking



1 - control:

» **KW1 trigger control mechanism**
KW1/S – thermal trigger
KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
KW1/24I – – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/24P – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/230I – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
KW1/230P – thermal trigger + "break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger control mechanism**
BF24-T, BF24-TN – actuator with a return spring, U = 24 V AC/DC
BF230-T, BF230-TN – actuator with a return spring, U = 230 V AC
BF24TL-T-ST, BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
BF24-T-ST, BF24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL24-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN24-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MF24T1 – thermal trigger
MF230T1 – thermal trigger + limit switch (open/closed blade signal)
MLF24T1 – thermal trigger
MLF230T1 – thermal trigger + limit switch (open/closed blade signal)
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material:

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters :

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF / MF) – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – left damper
KP – right damper
LC - actuator long casing

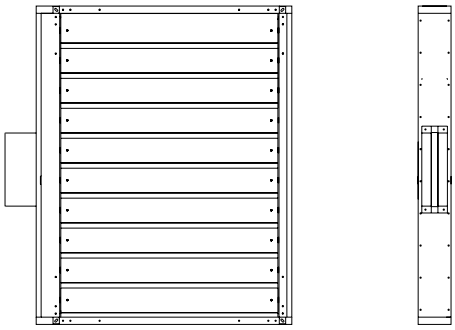
» **Damper casing**
BU - earth pin

NOTE: separate additional parameters entered with the "/" sign example marking:
mcr WIP PRO/S 400 x 400 BFL24-T
EI120 louvered cut-off damper with a 24 V actuator with limit switches.

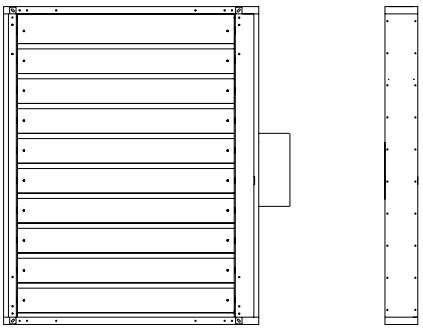
11.9.1 | Design standard

» mcr WIP PRO/S damper with actuator

» left damper standard



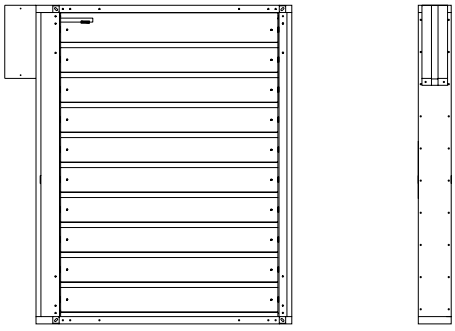
» right damper



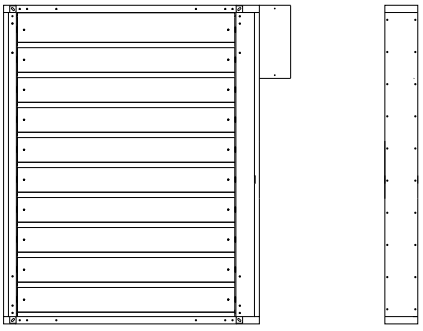
installation in reversed horizontal and vertical position possible

» mcr WIP PRO/S damper with KW1 mechanism

» left damper standard



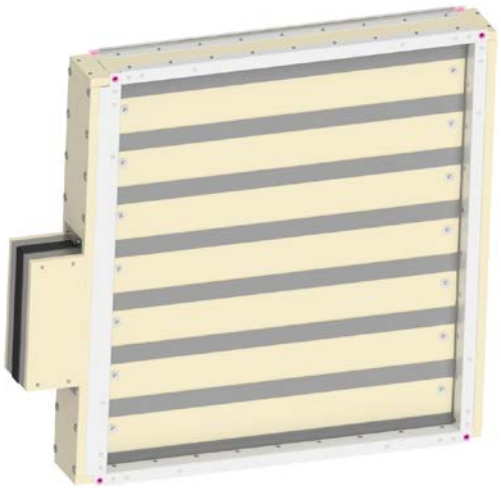
» right damper



installation in reversed horizontal and vertical position possible

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



2434-CPR-0003

HYGIENIC CERTIFICATE

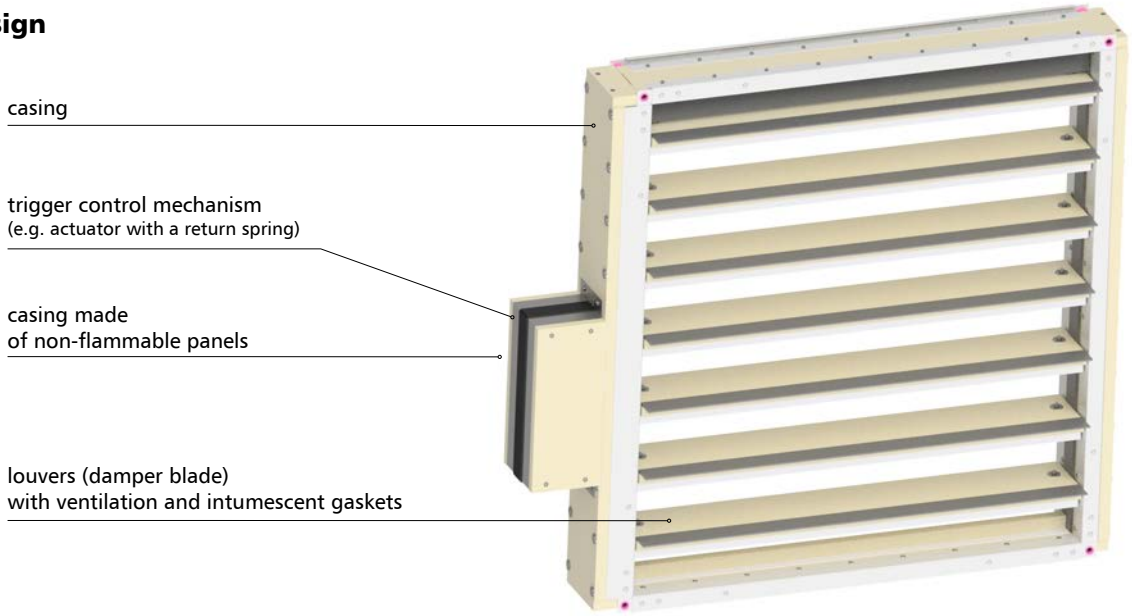
CTO S.A.

» **EI120, EI180**
» Fire resistance class: EI120 (v_e i↔o)S, EI90 (h_o i↔o)S
» Certificate of constancy of performance 2434-CPR-0031.
» Dampers qualified under EN 15650-3 and tested under EN 1366-2.
» Narrow louvered transfer damper.
» Permitted operation with both vertical and horizontal axis of rotation.
» KTB ATEX 2014/34/UE

12.1| Application

mcr WIP PRO/T transfer dampers are intended for installation in fire ventilation systems. They are installed in fire partitions without connecting ventilation ducts and retain their fire resistance rating during the fire. During normal operation, damper blades are open, which enables the supply of fresh air to egress routes, protecting them from smoke, or to the space where air exchange or supply through vertical construction partitions is required. It is possible to use a closed transfer damper, in which the louvers open to transfer compensation air upon the receipt of an alarm signal from the fire signaling centre.
In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and 2D:
» II 2G Ex h IIC T6...T5 Gb
» II 2D Ex h IIIC T72...95°C Db
Ambient temperature: Ta: -20˚... +50˚C

12.2| Design



The mcr WIP PRO/T transfer damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panel, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a brass sleeve installed on the vertical side H of the fire damper casing.

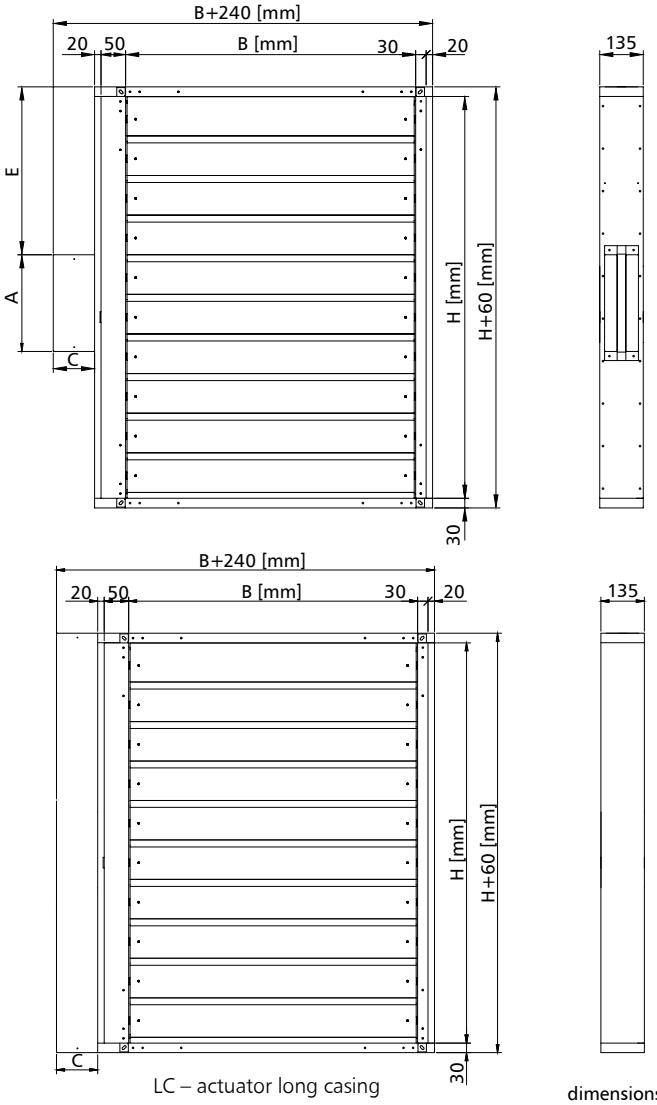
12.3 | Versions

12.3.1 | Damper closing and opening with an actuator

During normal operation, the louvers of the fire damper remain open or closed. In case of fire, the louvers shift or remain in standby.

The mcr WIP PRO/T dampers are equipped with a trigger control mechanism in the form of BFL, BFN, BF, BF-TL, QT.Ex, MLF, MF series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). The BFL, BFN, BF, MLF, MF, QT.Ex series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator.

Dampers with actuators: analog BFL, BFN, BF, MLF, MF and digital BF-TL, QT.Ex explosion-proof actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.



LC – actuator long casing

dimensions in [mm]

mechanism	A	C	E
BF, BFL, BFN	298	120	formula
QT.Ex	400	120	formula
MLF, MF	298	120	formula

for an even number of blades
E [mm] = (H/2 - 123) + 30
for an odd number of blades
E [mm] = (H/2 - 61,5) + 30

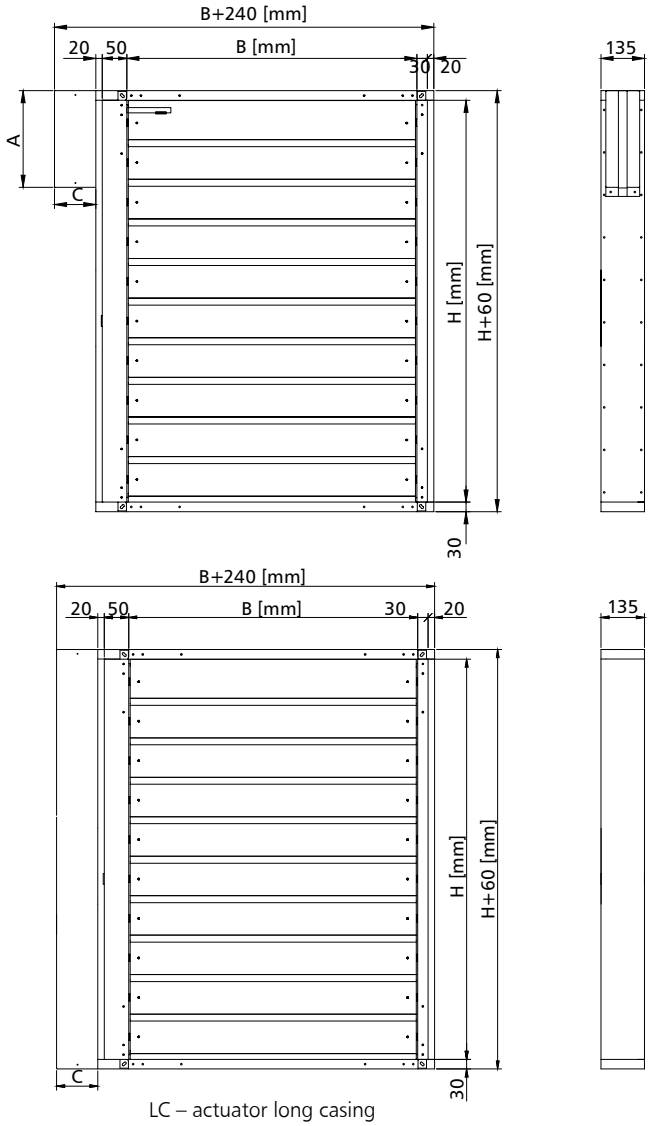
Number of blades = H/123

insert symmetrically against the wall axis

12.3.2 | The transfer fire damper with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

During normal operation, the cut-off louvers of the fire damper remain open. In case of fire, the louvers close automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr WIP PRO/T dampers are equipped with a **KW1** trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse") or removal („break") of the power supply voltage and with limit switches used to signal the blade position. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



LC – actuator long casing

mechanism	A	C
KW1	298	120

insert symmetrically against the wall axis

dimensions in [mm]

12.4 | Dimensions

» **Rectangular dampers:**

» nominal width B: from 110 mm to 900 mm
» nominal height H from 270 mm to 1250 mm
» maximum single damper cross-section surface up to 1.125 m^2
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

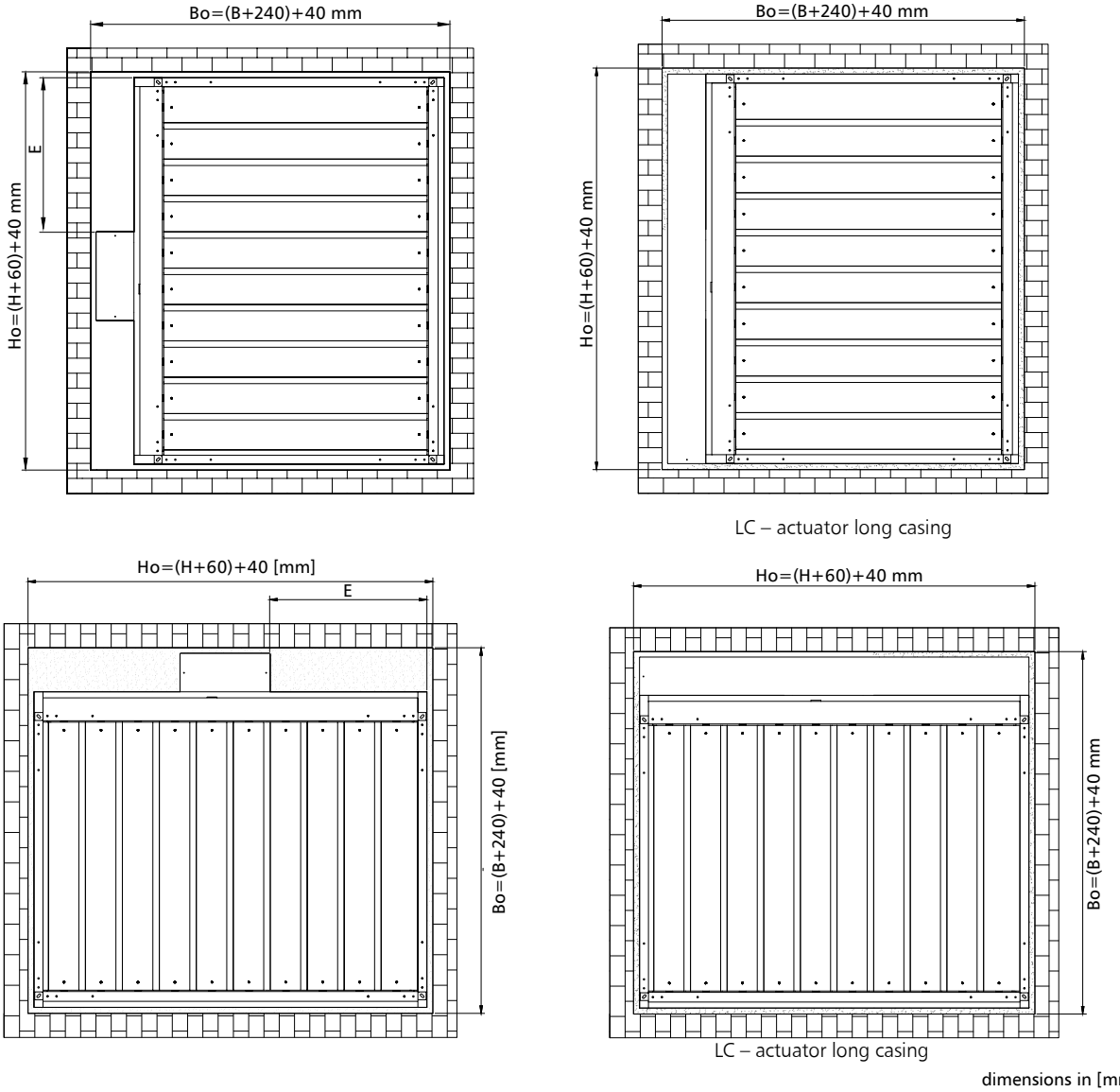
12.5 | Installation

Rectangular mcr WIP PRO/T fire dampers are class EI180(v_e i↔o) rated if installed in concrete partitions with a min. thickness of 120 mm, partitions made of full bricks or aerated concrete blocks with a min. thickness of 120 mm or light walls with EI120 or higher fire resistance rating.

* The above mentioned installation must be clearly specified in the design documentation and communicated to the manufacturer when placing the order. The dimensions of the damper BxH (width x height), which is to be installed with a vertical rotation axis, should be provided as if for a damper with a horizontal rotation axis (the power and control mechanism is mounted on the H dimension) with an indication of vertical axis installation.

12.5.1 | Preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP PRO/T damper is:
Preferred
Bo = (B + 240) + 40 mm
Ho = (H + 60) + 40 mm

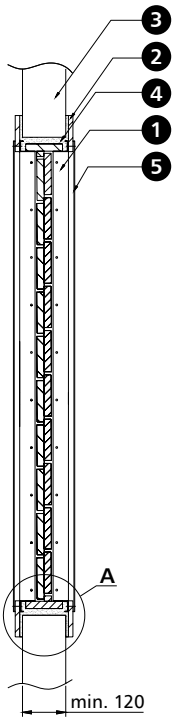


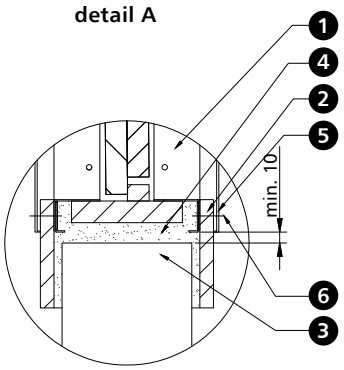
dimensions in [mm]

Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

mechanism	for an even number of blades	for an odd number of blades
BF, BFL, BFN, MLF, MF, QT.Ex	E [mm] = (H/2 - 123) +30	E [mm] = (H/2 - 61,5) + 30
KW1	E [mm] = 0	E [mm] = 0

12.5.2 | Sample installation in concrete block or full brick walls





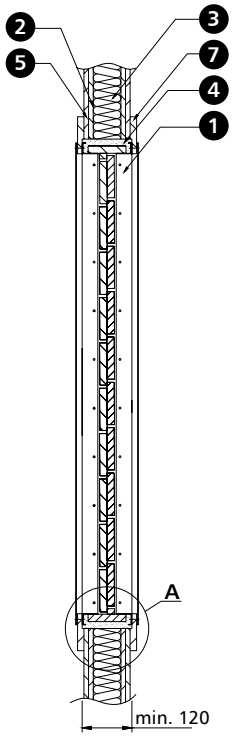
dimensions in [mm]

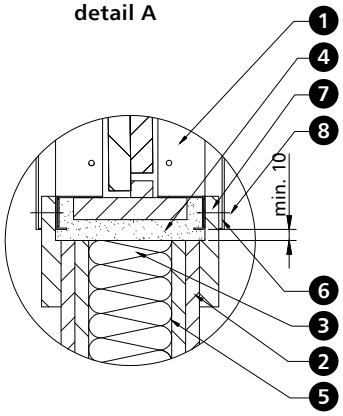
1. mcr WIP PRO/T fire damper
2. gypsum board trim 100 x 12.5 mm
3. solid wall, min. 120 mm
4. assembly mortar*
5. masking element
6. M8 bolt

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

The system masking grille has the thickness of 5 mm. The masking grille may be made of galvanized or stainless steel and painted in any RAL color (RAL 9010 as a standard).

12.5.3 | Sample installation in light walls





dimensions in [mm]

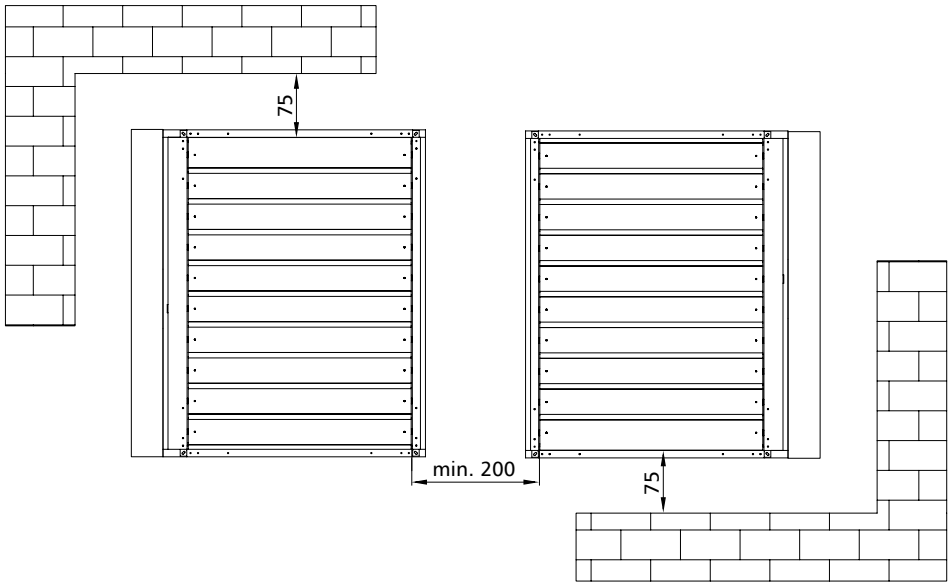
1. mcr WIP PRO/T fire damper
2. gypsum board 12.5 mm
3. mineral wool
4. assembly montar*
5. structural profile
6. masking element
7. gypsum board trim 100 x 12.5 mm
8. M8 bolt

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

»Damper installation with a vertical louver rotation axis

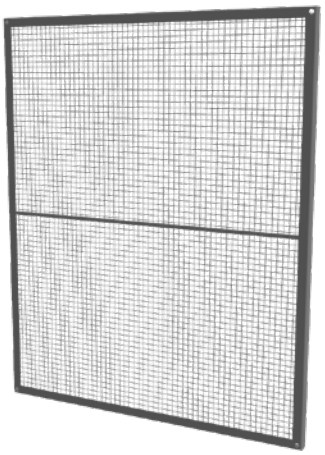
The damper can operate with a vertical louver rotation axis with a top or bottom-mounted mechanism

»Minimum distance between systems and partitions



dimensions in [mm]

12.5.4 | MWP system masking grilles

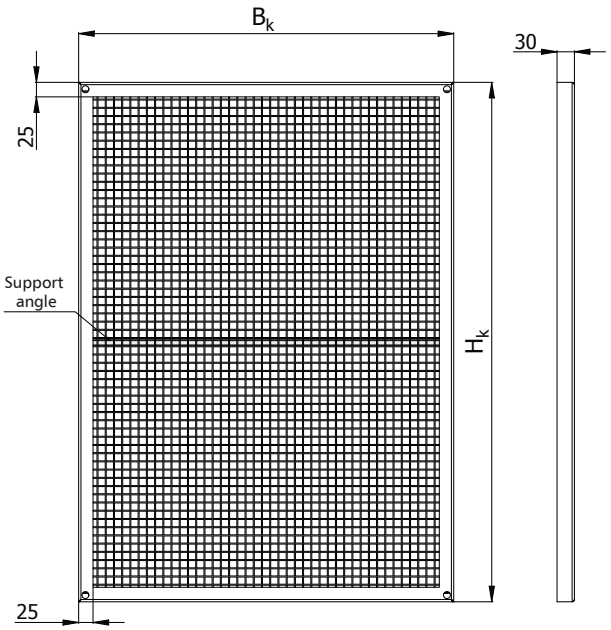


MWP masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with a fixed steel mesh that covers the damper, reducing its visibility.

Bolts are used to attach the masking grille body to the damper. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

dimensions:
» nominal width Bk: from 200 mm to 950 mm
» nominal height Hk from 200 mm to 1300 mm
» nominal thickness 30 mm

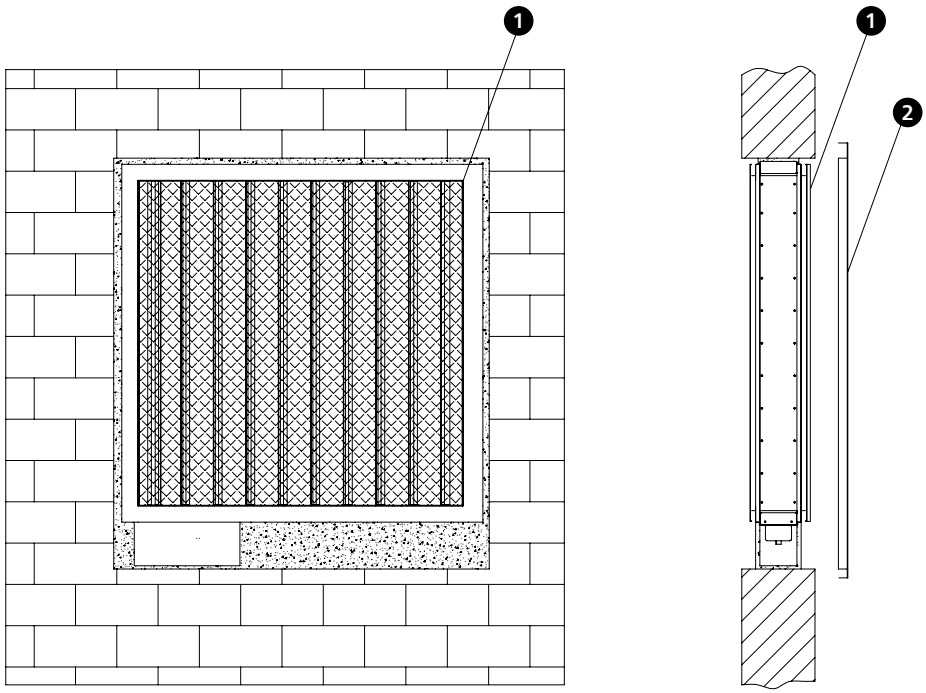
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



dimensions in [mm]

Number of support angles	Height [mm] - Hk	
	from	to
1	850	1300
0	200	849

» sample installation



1. MWP mesh cover
2. decorative grille (any, e.g. as indicated by the architect)

12.5.5 | MWP masking grilles technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	200 S_k [m²]	200 S_e [m²]	200 Q [m³/h]	200 d_p [PA]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	400 S_k [m²]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	500 S_k [m²]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]
200		4	0.040	0.028	409	8	0.060	0.043	613	8	0.080	0.057	818	8	0.100	0.071	1 022	8
		6			613	17			920	17			1 227	17			1 534	17
		8			818	31			1 227	31			1 636	31			2 045	31
		10			1 022	48			1 534	48			2 045	48			2 556	48
300		4	0.060	0.043	613	8	0.090	0.064	920	8	0.120	0.085	1 227	8	0.150	0.107	1 534	8
		6			920	17			1 380	17			1 840	17			2 300	17
		8			1 227	31			1 840	31			2 454	31			3 067	31
		10			1 534	48			2 300	48			3 067	48			3 834	48
400		4	0.080	0.057	818	8	0.120	0.085	1 227	8	0.160	0.114	1 636	8	0.200	0.142	2 045	8
		6			1 227	17			1 840	17			2 454	17			3 067	17
		8			1 636	31			2 454	31			3 272	31			4 090	31
		10			2 045	48			3 067	48			4 090	48			5 112	48
500		4	0.100	0.071	1 022	8	0.150	0.107	1 534	8	0.200	0.142	2 045	8	0.250	0.178	2 556	8
		6			1 534	17			2 300	17			3 067	17			3 834	17
		8			2 045	31			3 067	31			4 090	31			5 112	31
		10			2 556	48			3 834	48			5 112	48			6 390	48
600		4	0.120	0.085	1 227	8	0.180	0.128	1 840	8	0.240	0.170	2 454	8	0.300	0.213	3 067	8
		6			1 840	17			2 760	17			3 681	17			4 601	17
		8			2 454	31			3 681	31			4 908	31			6 134	31
		10			3 067	48			4 601	48			6 134	48			7 668	48
700		4	0.140	0.099	1 431	8	0.210	0.149	2 147	8	0.280	0.199	2 863	8	0.350	0.249	3 578	8
		6			2 147	17			3 221	17			4 294	17			5 368	17
		8			2 863	31			4 294	31			5 725	31			7 157	31
		10			3 578	48			5 368	48			7 157	48			8 946	48
800		4	0.160	0.114	1 636	8	0.240	0.170	2 454	8	0.320	0.227	3 272	8	0.400	0.284	4 090	8
		6			2 454	17			3 681	17			4 908	17			6 134	17
		8			3 272	31			4 908	31			6 543	31			8 179	31
		10			4 090	48			6 134	48			8 179	48			10 224	48
900		4	0.180	0.128	1 840	8	0.270	0.192	2 760	8	0.360	0.256	3 681	8	0.450	0.320	4 601	8
		6			2 760	17			4 141	17			5 521	17			6 901	17
		8			3 681	31			5 521	31			7 361	31			9 202	31
		10			4 601	48			6 901	48			9 202	48			11 502	48

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]
200		4	0.120	0.085	1 227	8	0.140	0.099	1 431	8	0.160	0.114	1 636	8	0.180	0.128	1 840	8
		6			1 840	17			2 147	17			2 454	17			2 760	17
		8			2 454	31			2 863	31			3 272	31			3 681	31
		10			3 067	48			3 578	48			4 090	48			4 601	48
300		4	0.180	0.128	1 840	8	0.210	0.149	2 147	8	0.240	0.170	2 454	8	0.270	0.192	2 760	8
		6			2 760	17			3 221	17			3 681	17			4 141	17
		8			3 681	31			4 294	31			4 908	31			5 521	31
		10			4 601	48			5 368	48			6 134	48			6 901	48
400		4	0.240	0.170	2 454	8	0.280	0.199	2 863	8	0.320	0.227	3 272	8	0.360	0.256	3 681	8
		6			3 681	17			4 294	17			4 908	17			5 521	17
		8			4 908	31			5 725	31			6 543	31			7 361	31
		10			6 134	48			7 157	48			8 179	48			9 202	48
500		4	0.300	0.213	3 067	8	0.350	0.249	3 578	8	0.400	0.284	4 090	8	0.450	0.320	4 601	8
		6			4 601	17			5 368	17			6 134	17			6 901	17
		8			6 134	31			7 157	31			8 179	31			9 202	31
		10			7 668	48			8 946	48			10 224	48			11 502	48
600		4	0.360	0.256	3 681	8	0.420	0.298	4 294	8	0.480	0.341	4 908	8	0.540	0.383	5 521	8
		6			5 521	17			6 441	17			7 361	17			8 281	17
		8			7 361	31			8 588	31			9 815	31			11 042	31
		10			9 202	48			10 735	48			12 269	48			13 802	48
700		4	0.420	0.298	4 294	8	0.490	0.348	5 010	8	0.560	0.398	5 725	8	0.630	0.447	6 441	8
		6			6 441	17			7 515	17			8 588	17			9 662	17
		8			8 588	31			10 020	31			11 451	31			12 882	31
		10			10 735	48			12 524	48			14 314	48			16 103	48
800		4	0.480	0.341	4 908	8	0.560	0.398	5 725	8	0.640	0.454	6 543	8	0.720	0.511	7 361	8
		6			7 361	17			8 588	17			9 815	17			11 042	17
		8			9 815	31			11 451	31			13 087	31			14 723	31
		10			12 269	48			14 314	48			16 358	48			18 403	48
900		4	0.540	0.383	5 521	8	0.630	0.447	6 441	8	0.720	0.511	7 361	8	0.810	0.575	8 281	8
		6			8 281	17			9 662	17			11 042	17			12 422	17
		8			11 042	31			12 882	31			14 723	31			16 563	31
		10			13 802	48			16 103	48			18 403	48			20 704	48

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1000 S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	1100 S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	1250 S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
200	4	0.200	0.142	2 045	8	0.220	0.156	2 249	8	0.250	0.178	2 556	8
	6			3 067	17			3 374	17			3 834	17
	8			4 090	31			4 499	31			5 112	31
	10			5 112	48			5 623	48			6 390	48
300	4	0.300	0.213	3 067	8	0.330	0.234	3 374	8	0.375	0.266	3 834	8
	6			4 601	17			5 061	17			5 751	17
	8			6 134	31			6 748	31			7 668	31
	10			7 668	48			8 435	48			9 585	48
400	4	0.400	0.284	4 090	8	0.440	0.312	4 499	8	0.500	0.355	5 112	8
	6			6 134	17			6 748	17			7 668	17
	8			8 179	31			8 997	31			10 224	31
	10			10 224	48			11 246	48			12 780	48
500	4	0.500	0.355	5 112	8	0.550	0.391	5 623	8	0.625	0.444	6 390	8
	6			7 668	17			8 435	17			9 585	17
	8			10 224	31			11 246	31			12 780	31
	10			12 780	48			14 058	48			15 975	48
600	4	0.600	0.426	6 134	8	0.660	0.469	6 748	8	0.750	0.533	7 668	8
	6			9 202	17			10 122	17			11 502	17
	8			12 269	31			13 496	31			15 336	31
	10			15 336	48			16 870	48			19 170	48
700	4	0.700	0.497	7 157	8	0.770	0.547	7 872	8	0.875	0.621	8 946	8
	6			10 735	17			11 809	17			13 419	17
	8			14 314	31			15 745	31			17 892	31
	10			17 892	48			19 681	48			22 365	48
800	4	0.800	0.568	8 179	8	0.880	0.625	8 997	8	1.000	0.710	10 224	8
	6			12 269	17			13 496	17			15 336	17
	8			16 358	31			17 994	31			20 448	31
	10			20 448	48			22 493	48			25 560	48
900	4	0.900	0.639	9 202	8	0.990	0.703	10 122	8	1.125	0.799	11 502	8
	6			13 802	17			15 183	17			17 253	17
	8			18 403	31			20 244	31			23 004	31
	10			23 004	48			25 304	48			28 755	48

12.5.6 | MST system masking grilles

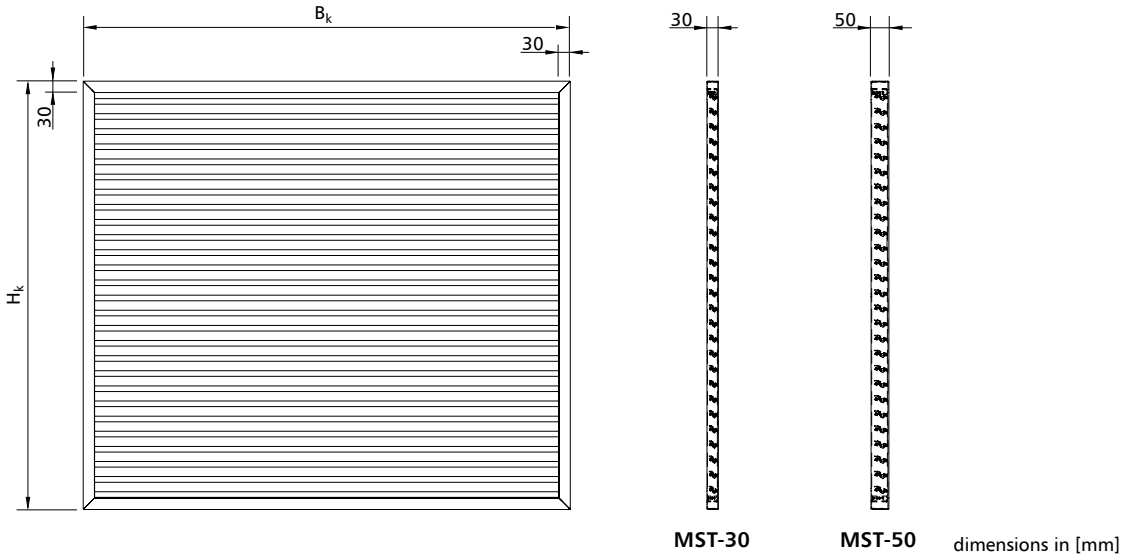


MST system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility.

Bolts embedded in the body are used to attach the masking grille body. After installation, an outer frame is mounted on the masking grille body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

dimensions:
» nominal width Bk: from 200 mm to 1500 mm
» nominal height Hk from 200 mm to 1500 mm
» nominal thickness G 30 and 50 mm

Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



dimensions in [mm]

12.5.7 | MST masking grille technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	200 S_e [m²]	200 Q [m³/h]	200 d_p [PA]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]
200		4	0.015	210	12	0.028	403	10	0.041	596	9	0.055	789	9
		6		315	27		605	23		894	21		1 184	20
		8		420	49		806	41		1 192	37		1 578	35
		10		526	76		1 008	64		1 490	58		1 973	54
300		4	0.028	402	10	0.051	734	8	0.074	1 067	7	0.097	1 400	7
		6		603	23		1 102	19		1 601	17		2 100	15
		8		804	41		1 469	33		2 134	29		2 799	27
		10		1 004	64		1 836	52		2 668	46		3 499	42
400		4	0.041	593	9	0.074	1 066	7	0.107	1 538	6	0.140	2 010	6
		6		890	21		1 598	17		2 307	14		3 015	13
		8		1 187	37		2 131	29		3 076	26		4 020	23
		10		1 483	58		2 664	46		3 845	40		5 026	36
500		4	0.055	785	9	0.097	1 397	7	0.140	2 009	6	0.182	2 621	5
		6		1 177	20		2 095	15		3 013	13		3 931	12
		8		1 570	35		2 794	27		4 018	23		5 242	21
		10		1 962	55		3 492	42		5 022	36		6 552	33
600		4	0.068	976	8	0.120	1 728	6	0.172	2 480	5	0.224	3 231	5
		6		1 464	19		2 592	14		3 720	12		4 847	11
		8		1 953	33		3 456	26		4 959	22		6 463	19
		10		2 441	52		4 320	40		6 199	34		8 078	30
700		4	0.081	1 168	8	0.143	2 059	6	0.205	2 951	5	0.267	3 842	5
		6		1 752	18		3 089	14		4 426	12		5 763	10
		8		2 336	32		4 118	25		5 901	21		7 684	18
		10		2 920	50		5 148	38		7 376	32		9 605	29
800		4	0.094	1 359	8	0.166	2 390	6	0.238	3 421	5	0.309	4 452	4
		6		2 039	18		3 586	13		5 132	11		6 679	10
		8		2 719	31		4 781	24		6 843	20		8 905	17
		10		3 398	49		5 976	37		8 554	31		11 131	27
900		4	0.108	1 551	8	0.189	2 722	6	0.270	3 892	5	0.352	5 063	4
		6		2 326	17		4 082	13		5 838	11		7 595	9
		8		3 102	31		5 443	23		7 785	19		10 126	17
		10		3 877	48		6 804	36		9 731	30		12 658	26
1000		4	0.121	1 742	8	0.212	3 053	6	0.303	4 363	5	0.394	5 674	4
		6		2 614	17		4 579	13		6 545	10		8 510	9
		8		3 485	30		6 106	23		8 726	19		11 347	16
		10		4 356	47		7 632	35		10 908	29		14 184	25
1100		4	0.134	1 934	7	0.235	3 384	6	0.336	4 834	5	0.436	6 284	4
		6		2 901	17		5 076	12		7 251	10		9 426	9
		8		3 868	30		6 768	22		9 668	18		12 568	16
		10		4 835	47		8 460	35		12 085	28		15 710	25
1200		4	0.148	2 125	7	0.258	3 715	5	0.368	5 305	4	0.479	6 895	4
		6		3 188	17		5 573	12		7 957	10		10 342	9
		8		4 251	30		7 430	22		10 610	18		13 789	16
		10		5 314	46		9 288	34		13 262	28		17 237	24
1300		4	0.161	2 317	7	0.281	4 046	5	0.401	5 776	4	0.521	7 505	4
		6		3 475	16		6 070	12		8 664	10		11 258	9
		8		4 634	29		8 093	21		11 552	18		15 011	15
		10		5 792	46		10 116	34		14 440	27		18 763	24
1400		4	0.174	2 508	7	0.304	4 378	5	0.434	6 247	4	0.564	8 116	4
		6		3 763	16		6 566	12		9 370	10		12 174	8
		8		5 017	29		8 755	21		12 493	17		16 232	15
		10		6 271	45		10 944	33		15 617	27		20 290	23
1500		4	0.188	2 700	7	0.327	4 709	5	0.467	6 718	4	0.606	8 726	4
		6		4 050	16		7 063	12		10 076	10		13 090	8
		8		5 400	29		9 418	21		13 435	17		17 453	15
		10		6 750	45		11 772	33		16 794	27		21 816	23

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]
200		4	0.068	982	8	0.082	1 175	8	0.095	1 368	8	0.108	1 558	8
		6		1 473	19		1 763	18		2 052	18		2 337	17
		8		1 964	33		2 350	32		2 736	31		3 116	31
		10		2 455	52		2 938	50		3 420	49		3 895	48
300		4	0.120	1 732	6	0.143	2 065	6	0.167	2 398	6	0.189	2 726	6
		6		2 598	14		3 097	14		3 596	13		4 089	13
		8		3 465	25		4 130	24		4 795	24		5 452	23
		10		4 331	40		5 162	38		5 994	37		6 815	36
400		4	0.172	2 483	5	0.205	2 955	5	0.238	3 427	5	0.270	3 894	5
		6		3 724	12		4 432	12		5 141	11		5 841	11
		8		4 965	22		5 910	21		6 854	20		7 788	19
		10		6 206	34		7 387	32		8 568	31		9 734	30
500		4	0.225	3 233	5	0.267	3 845	5	0.310	4 457	4	0.352	5 062	4
		6		4 849	11		5 767	10		6 685	10		7 592	9
		8		6 466	19		7 690	18		8 914	17		10 123	17
		10		8 082	30		9 612	28		11 142	27		12 654	26
600		4	0.277	3 983	4	0.329	4 735	4	0.381	5 486	4	0.433	6 229	4
		6		5 975	10		7 102	9		8 230	9		9 344	9
		8		7 966	18		9 469	17		10 973	16		12 459	15
		10		9 958	28		11 837	26		13 716	25		15 574	24
700		4	0.329	4 733	4	0.391	5 625	4	0.453	6 516	4	0.514	7 397	4
		6		7 100	9		8 437	9		9 774	8		11 096	8
		8		9 467	17		11 249	16		13 032	15		14 795	14
		10		11 833	26		14 062	24		16 290	23		18 493	22
800		4	0.381	5 484	4	0.452	6 515	4	0.524	7 546	3	0.595	8 565	3
		6		8 225	9		9 772	8		11 318	8		12 848	8
		8		10 967	16		13 029	15		15 091	14		17 130	13
		10		13 709	25		16 286	23		18 864	22		21 413	21
900		4	0.433	6 234	4	0.514	7 404	4	0.596	8 575	3	0.676	9 733	3
		6		9 351	9		11 107	8		12 863	7		14 599	7
		8		12 468	15		14 809	14		17 150	13		19 466	13
		10		15 584	24		18 511	22		21 438	21		24 332	20
1000		4	0.485	6 984	4	0.576	8 294	3	0.667	9 605	3	0.757	10 901	3
		6		10 476	8		12 442	8		14 407	7		16 351	7
		8		13 968	15		16 589	14		19 210	13		21 802	12
		10		17 460	23		20 736	21		24 012	20		27 252	19
1100		4	0.537	7 734	4	0.638	9 184	3	0.739	10 634	3	0.838	12 069	3
		6		11 601	8		13 776	7		15 952	7		18 103	7
		8		15 468	14		18 369	13		21 269	12		24 137	12
		10		19 336	22		22 961	21		26 586	19		30 172	18
1200		4	0.589	8 484	3	0.700	10 074	3	0.810	11 664	3	0.919	13 236	3
		6		12 727	8		15 111	7		17 496	7		19 855	6
		8		16 969	14		20 148	13		23 328	12		26 473	11
		10		21 211	22		25 186	20		29 160	19		33 091	18
1300		4	0.641	9 235	3	0.761	10 964	3	0.882	12 694	3	1.000	14 404	3
		6		13 852	8		16 446	7		19 040	7		21 606	6
		8		18 469	14		21 928	13		25 387	12		28 809	11
		10		23 087	21		27 410	20		31 734	18		36 011	17
1400		4	0.693	9 985	3	0.823	11 854	3	0.953	13 723	3	1.081	15 572	3
		6		14 977	8		17 781	7		20 585	6		23 358	6
		8		19 970	13		23 708	12		27 446	11		31 144	11
		10		24 962	21		29 635	19		34 308	18		38 930	17
1500		4	0.746	10 735	3	0.885	12 744	3	1.025	14 753	3	1.163	16 740	3
		6		16 103	7		19 116	7		22 129	6		25 110	6
		8		21 470	13		25 488	12		29 506	11		33 480	11
		10		26 838	21		31 860	19		36 882	18		41 850	17

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]
200		4	0.122	1 751	8	0.135	1 944	7	0.148	2 137	7	0.162	2 330	7
		6		2 627	17		2 916	17		3 205	16		3 495	16
		8		3 502	30		3 888	30		4 274	29		4 660	29
		10		4 378	47		4 860	46		5 342	46		5 825	45
300		4	0.212	3 059	6	0.236	3 391	5	0.259	3 724	5	0.282	4 056	5
		6		4 588	13		5 087	12		5 586	12		6 085	12
		8		6 117	22		6 782	22		7 448	22		8 113	21
		10		7 646	35		8 478	34		9 310	34		10 141	33
400		4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4
		6		6 549	10		7 258	10		7 966	10		8 675	10
		8		8 732	19		9 677	18		10 621	18		11 566	17
		10		10 915	29		12 096	28		13 277	28		14 458	27
500		4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4
		6		8 510	9		9 428	9		10 346	9		11 264	9
		8		11 347	16		12 571	16		13 795	15		15 019	15
		10		14 184	25		15 714	25		17 244	24		18 774	24
600		4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3
		6		10 472	8		11 599	8		12 727	8		13 854	8
		8		13 962	15		15 466	14		16 969	14		18 472	14
		10		17 453	23		19 332	22		21 211	22		23 090	21
700		4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3
		6		12 433	8		13 770	7		15 107	7		16 444	7
		8		16 577	14		18 360	13		20 143	13		21 925	13
		10		20 722	21		22 950	21		25 178	20		27 407	20
800		4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3
		6		14 394	7		15 941	7		17 487	7		19 034	7
		8		19 192	13		21 254	12		23 316	12		25 379	12
		10		23 990	20		26 568	19		29 146	19		31 723	18
900		4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3
		6		16 356	7		18 112	7		19 868	6		21 624	6
		8		21 807	12		24 149	12		26 490	11		28 832	11
		10		27 259	19		30 186	18		33 113	18		36 040	17
1000		4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3
		6		18 317	7		20 282	6		22 248	6		24 214	6
		8		24 422	12		27 043	11		29 664	11		32 285	11
		10		30 528	18		33 804	18		37 080	17		40 356	17
1100		4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3
		6		20 278	6		22 453	6		24 628	6		26 803	6
		8		27 037	11		29 938	11		32 838	10		35 738	10
		10		33 797	18		37 422	17		41 047	16		44 672	16
1200		4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2
		6		22 239	6		24 624	6		27 009	6		29 393	6
		8		29 652	11		32 832	10		36 012	10		39 191	10
		10		37 066	17		41 040	16		45 014	16		48 989	15
1300		4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2
		6		24 201	6		26 795	6		29 389	6		31 983	5
		8		32 268	11		35 726	10		39 185	10		42 644	10
		10		40 334	17		44 658	16		48 982	15		53 305	15
1400		4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2
		6		26 162	6		28 966	6		31 769	5		34 573	5
		8		34 883	10		38 621	10		42 359	10		46 097	9
		10		43 603	16		48 276	16		52 949	15		57 622	14
1500		4	1.302	18 749	3	1.442	20 758	2	1.581	22 766	2	1.721	24 775	2
		6		28 123	6		31 136	5		34 150	5		37 163	5
		8		37 498	10		41 515	10		45 533	9		49 550	9
		10		46 872	16		51 894	15		56 916	15		61 938	14

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]						
		1400			1500		
	v [m/s]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]
200	4	0.175	2 523	7	0.189	2 716	7
	6		3 784	16		4 074	16
	8		5 046	29		5 432	29
	10		6 307	45		6 790	45
300	4	0.305	4 389	5	0.328	4 722	5
	6		6 584	12		7 083	12
	8		8 778	21		9 444	21
	10		10 973	33		11 804	33
400	4	0.434	6 255	4	0.467	6 728	4
	6		9 383	10		10 092	10
	8		12 511	17		13 455	17
	10		15 638	27		16 819	27
500	4	0.564	8 122	4	0.607	8 734	4
	6		12 182	8		13 100	8
	8		16 243	15		17 467	15
	10		20 304	23		21 834	23
600	4	0.694	9 988	3	0.746	10 740	3
	6		14 982	8		16 109	7
	8		19 976	13		21 479	13
	10		24 970	21		26 849	21
700	4	0.823	11 854	3	0.885	12 745	3
	6		17 781	7		19 118	7
	8		23 708	12		25 491	12
	10		29 635	19		31 864	19
800	4	0.953	13 720	3	1.024	14 751	3
	6		20 580	6		22 127	6
	8		27 441	11		29 503	11
	10		34 301	18		36 878	18
900	4	1.082	15 587	3	1.164	16 757	3
	6		23 380	6		25 136	6
	8		31 173	11		33 515	11
	10		38 966	17		41 893	17
1000	4	1.212	17 453	3	1.303	18 763	3
	6		26 179	6		28 145	6
	8		34 906	10		37 526	10
	10		43 632	16		46 908	16
1100	4	1.342	19 319	2	1.442	20 769	2
	6		28 979	6		31 154	5
	8		38 638	10		41 538	10
	10		48 298	15		51 923	15
1200	4	1.471	21 185	2	1.582	22 775	2
	6		31 778	5		34 163	5
	8		42 371	10		45 550	9
	10		52 963	15		56 938	15
1300	4	1.601	23 052	2	1.721	24 781	2
	6		34 577	5		37 171	5
	8		46 103	9		49 562	9
	10		57 629	14		61 952	14
1400	4	1.730	24 918	2	1.860	26 787	2
	6		37 377	5		40 180	5
	8		49 836	9		53 574	9
	10		62 294	14		66 967	14
1500	4	1.860	26 784	2	2.000	28 793	2
	6		40 176	5		43 189	5
	8		53 568	9		57 586	9
	10		66 960	14		71 982	13

12.6 | mcr WIP PRO/T rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	270 S_k [m²]	270 S_e [m²]	270 Q [m³/h]	270 d_p [PA]	270 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]
	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
	250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39
		6			918	30	47			918	30	48			918	36	50
		8			1 224	53	55			1 224	54	55			1 224	63	57
		10			1 530	82	61			1 530	85	61			1 530	99	63
	300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40
		6			1 102	30	48			1 102	30	49			1 102	36	51
		8			1 469	53	56			1 469	54	56			1 469	63	58
		10			1 836	82	62			1 836	85	62			1 836	99	64
	350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41
		6			1 285	30	49			1 285	30	49			1 285	36	51
		8			1 714	53	56			1 714	54	57			1 714	63	59
		10			2 142	82	62			2 142	85	63			2 142	99	65
	400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41
		6			1 469	30	49			1 469	30	50			1 469	36	52
		8			1 958	53	57			1 958	54	57			1 958	63	59
		10			2 448	82	63			2 448	84	63			2 448	99	65
	450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42
		6			1 652	30	50			1 652	30	50			1 652	36	52
		8			2 203	53	57			2 203	54	58			2 203	63	60
		10			2 754	82	63			2 754	84	64			2 754	99	66
	500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42
		6			1 836	30	50			1 836	30	51			1 836	36	53
		8			2 448	53	58			2 448	54	58			2 448	63	60
		10			3 060	82	64			3 060	85	64			3 060	99	66
	550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43
		6			2 020	4	24			2 020	30	51			2 020	36	53
		8			2 693	7	31			2 693	54	59			2 693	63	61
		10			3 366	10	37			3 366	84	65			3 366	99	67
	600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43
		6			2 203	30	51			2 203	30	52			2 203	36	54
		8			2 938	53	59			2 938	54	59			2 938	63	61
		10			3 672	82	65			3 672	85	65			3 672	99	67
	650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43
		6			2 387	30	52			2 387	30	52			2 387	36	54
		8			3 182	53	59			3 182	54	59			3 182	63	62
		10			3 978	82	65			3 978	85	65			3 978	99	67
	700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44
		6			2 570	30	52			2 570	30	52			2 570	36	54
		8			3 427	53	59			3 427	54	60			3 427	63	62
		10			4 284	82	65			4 284	85	66			4 284	99	68
	750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44
		6			2 754	30	52			2 754	30	53			2 754	36	55
		8			3 672	53	60			3 672	54	60			3 672	63	62
		10			4 590	82	66			4 590	85	66			4 590	99	68
	800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44
		6			2 938	30	52			2 938	30	53			2 938	36	55
		8			3 917	53	60			3 917	54	60			3 917	63	62
		10			4 896	82	66			4 896	84	66			4 896	99	68
	850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45
		6			3 121	30	53			3 121	30	53			3 121	36	55
		8			4 162	53	60			4 162	54	61			4 162	63	63
		10			5 202	82	66			5 202	84	66			5 202	99	68
	900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45
		6			3 305	30	53			3 305	30	53			3 305	36	55
		8			4 406	53	60			4 406	54	61			4 406	63	63
		10			5 508	82	66			5 508	84	67			5 508	99	69

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	390 S_k [m²]	390 S_e [m²]	390 Q [m³/h]	390 d_p [PA]	390 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]	520 S_k [m²]	520 S_e [m²]	520 Q [m³/h]	520 d_p [PA]	520 L_{WA} [dB]
	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
	250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39
		6			1 366	27	48			1 366	31	50			1 814	27	49
		8			1 822	47	55			1 822	55	57			2 419	48	57
		10			2 277	74	61			2 277	86	63			3 024	75	63
	300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39
		6			1 639	27	49			1 639	31	51			2 177	27	50
		8			2 186	47	56			2 186	55	58			2 903	48	57
		10			2 732	74	62			2 732	86	64			3 629	75	63
	350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40
		6			1 913	27	49			1 913	31	51			2 540	27	51
		8			2 550	47	57			2 550	55	59			3 387	48	58
		10			3 188	74	63			3 188	86	65			4 234	75	64
	400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41
		6			2 186	27	50			2 186	31	52			2 903	27	51
		8			2 915	47	57			2 915	55	59			3 871	48	59
		10			3 643	74	63			3 643	86	65			4 838	75	65
	450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41
		6			2 459	27	50			2 459	31	52			3 266	27	52
		8			3 279	47	58			3 279	55	60			4 355	48	59
		10			4 099	74	64			4 099	86	66			5 443	75	65
	500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42
		6			2 732	27	51			2 732	31	53			3 629	27	52
		8			3 643	47	58			3 643	55	60			4 838	48	60
		10			4 554	74	64			4 554	86	66			6 048	75	66
	550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42
		6			3 006	27	51			3 006	31	53			3 992	27	53
		8			4 008	47	59			4 008	55	61			5 322	48	60
		10			5 009	74	65			5 009	86	67			6 653	75	66
	600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42
		6			3 279	27	52			3 279	31	54			4 355	27	53
		8			4 372	47	59			4 372	55	61			5 806	48	61
		10			5 465	74	65			5 465	86	67			7 258	75	66
	650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43
		6			3 552	27	52			3 552	31	54			4 717	27	53
		8			4 736	47	59			4 736	55	61			6 290	48	61
		10			5 920	74	65			5 920	86	67			7 862	75	67
	700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43
		6			3 825	27	52			3 825	31	54			5 080	27	54
		8			5 100	47	60			5 100	55	62			6 774	48	61
		10			6 376	74	66			6 376	86	68			8 467	75	67
	750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43
		6			4 099	27	53			4 099	31	55			5 443	27	54
		8			5 465	47	60			5 465	55	62			7 258	48	61
		10			6 831	74	66			6 831	86	68			9 072	75	67
	800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43
		6			4 372	27	53			4 372	31	54			5 806	27	54
		8			5 829	47	60			5 829	55	61			7 741	48	61
		10			7 286	74	66			7 286	86	67			9 677	75	67
	850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43
		6			4 645	27	53			4 645	31	54			6 169	27	54
		8			6 193	47	61			6 193	55	61			8 225	48	61
		10			7 742	74	66			7 742	86	67			10 282	75	67
	900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43
		6			4 918	27	53			4 918	31	54			6 532	27	54
		8			6 558	47	61			6 558	55	61			8 709	48	61
		10			8 197	74	67			8 197	86	67			10 886	75	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
	110	4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
	150	4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
	200	4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
	250	4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40
		6			1 814	29	50			2 263	26	50			2 263	27	50
		8			2 419	51	57			3 017	46	57			3 017	48	58
		10			3 024	79	63			3 771	72	63			3 771	76	64
	300	4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41
		6			2 177	29	51			2 715	26	50			2 715	27	51
		8			2 903	51	58			3 620	46	58			3 620	48	59
		10			3 629	79	64			4 525	72	64			4 525	76	64
	350	4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41
		6			2 540	29	51			3 168	26	51			3 168	27	52
		8			3 387	51	59			4 224	46	58			4 224	48	59
		10			4 234	79	65			5 279	72	64			5 279	76	65
	400	4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42
		6			2 903	29	52			3 620	26	52			3 620	27	52
		8			3 871	51	59			4 827	46	59			4 827	48	60
		10			4 838	79	65			6 034	72	65			6 034	76	66
	450	4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42
		6			3 266	29	52			4 073	26	52			4 073	27	53
		8			4 355	51	60			5 430	46	60			5 430	48	60
		10			5 443	79	66			6 788	72	65			6 788	76	66
	500	4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43
		6			3 629	29	53			4 525	26	53			4 525	27	53
		8			4 838	51	60			6 034	46	60			6 034	48	61
		10			6 048	79	66			7 542	72	66			7 542	76	67
	550	4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43
		6			3 992	29	53			4 978	26	53			4 978	27	54
		8			5 322	51	61			6 637	46	60			6 637	48	61
		10			6 653	79	67			8 296	72	66			8 296	76	67
	600	4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44
		6			4 355	29	54			5 430	26	53			5 430	27	54
		8			5 806	51	61			7 240	46	61			7 240	48	62
		10			7 258	79	67			9 050	72	67			9 050	76	67
	650	4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44
		6			4 717	29	54			5 883	26	54			5 883	27	54
		8			6 290	51	62			7 844	46	61			7 844	48	62
		10			7 862	79	67			9 805	72	67			9 805	76	68
	700	4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44
		6			5 080	29	54			6 335	26	54			6 335	27	55
		8			6 774	51	62			8 447	46	61			8 447	48	62
		10			8 467	79	68			10 559	72	67			10 559	76	68
	750	4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44
		6			5 443	29	55			6 788	26	54			6 788	27	55
		8			7 258	51	62			9 050	46	62			9 050	48	63
		10			9 072	79	68			11 313	72	68			11 313	76	68
	800	4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44
		6			5 806	29	55			7 240	26	55			7 240	27	55
		8			7 741	51	62			9 654	46	62			9 654	48	63
		10			9 677	79	68			12 067	72	68			12 067	76	68
	850	4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44
		6			6 169	29	55			7 693	26	55			7 693	27	55
		8			8 225	51	63			10 257	46	62			10 257	48	63
		10			10 282	79	69			12 821	72	68			12 821	76	68
	900	4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44
		6			6 532	29	56			8 145	26	52			8 145	27	55
		8			8 709	51	63			10 860	46	60			10 860	48	63
		10			10 886	79	69			13 576	72	65			13 576	76	68

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		700					760					800				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
	250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38
		6			2 263	30	52			2 711	28	51			2 711	22	49
		8			3 017	54	59			3 614	50	59			3 614	40	56
		10			3 771	85	65			4 518	78	65			4 518	62	62
	300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39
		6			2 715	30	53			3 253	28	52			3 253	22	49
		8			3 620	54	60			4 337	50	60			4 337	40	57
		10			4 525	85	66			5 422	78	66			5 422	62	63
	350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39
		6			3 168	30	53			3 795	28	53			3 795	22	50
		8			4 224	54	61			5 060	50	60			5 060	40	57
		10			5 279	85	66			6 325	78	66			6 325	62	63
	400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40
		6			3 620	30	54			4 337	28	53			4 337	22	51
		8			4 827	54	61			5 783	50	61			5 783	40	58
		10			6 034	85	67			7 229	78	67			7 229	62	64
	450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41
		6			4 073	30	54			4 879	28	54			4 879	22	51
		8			5 430	54	62			6 506	50	61			6 506	40	59
		10			6 788	85	68			8 132	78	67			8 132	62	64
	500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41
		6			4 525	30	55			5 422	28	54			5 422	22	52
		8			6 034	54	62			7 229	50	62			7 229	40	59
		10			7 542	85	68			9 036	78	68			9 036	62	65
	550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41
		6			4 978	30	55			5 964	28	55			5 964	22	52
		8			6 637	54	63			7 952	50	62			7 952	40	59
		10			8 296	85	68			9 940	78	68			9 940	62	65
	600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42
		6			5 430	30	56			6 506	28	55			6 506	22	52
		8			7 240	54	63			8 675	50	63			8 675	40	60
		10			9 050	85	69			10 843	78	69			10 843	62	66
	650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42
		6			5 883	30	56			7 048	28	56			7 048	22	53
		8			7 844	54	63			9 397	50	63			9 397	40	60
		10			9 805	85	69			11 747	78	69			11 747	62	66
	700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42
		6			6 335	30	56			7 590	28	56			7 590	22	53
		8			8 447	54	64			10 120	50	63			10 120	40	61
		10			10 559	85	69			12 650	78	69			12 650	62	66
	750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43
		6			6 788	30	56			8 132	28	56			8 132	22	53
		8			9 050	54	64			10 843	50	64			10 843	40	61
		10			11 313	85	70			13 554	78	69			13 554	62	67
	800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43
		6			7 240	30	55			8 675	28	56			8 675	22	54
		8			9 654	54	62			11 566	50	64			11 566	40	61
		10			12 067	85	67			14 458	78	70			14 458	62	67
	850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43
		6			7 693	30	57			9 217	28	57			9 217	22	54
		8			10 257	54	65			12 289	50	64			12 289	40	61
		10			12 821	85	70			15 361	78	70			15 361	62	67
	900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44
		6			8 145	30	57			9 759	28	57			9 759	22	54
		8			10 860	54	65			13 012	50	64			13 012	40	62
		10			13 576	85	71			16 265	78	70			16 265	62	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		890					900					950				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	110	4	0.098	0.064	927	13	38	0.099	0.064	927	13	39	0.105	0.064	927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8			1 853	51	56			1 853	53	57			1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
	150	4	0.134	0.088	1 264	13	40	0.135	0.088	1 264	13	40	0.143	0.088	1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8			2 527	51	58			2 527	53	58			2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
	200	4	0.178	0.117	1 685	13	41	0.180	0.117	1 685	13	41	0.190	0.117	1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8			3 370	51	59			3 370	53	59			3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
	250	4	0.223	0.146	2 106	13	42	0.225	0.146	2 106	13	42	0.238	0.146	2 106	14	43
		6			3 159	29	52			3 159	30	53			3 159	32	54
		8			4 212	51	60			4 212	53	60			4 212	57	61
		10			5 265	79	66			5 265	83	66			5 265	89	67
	300	4	0.267	0.176	2 527	13	43	0.270	0.176	2 527	13	43	0.285	0.176	2 527	14	44
		6			3 791	29	53			3 791	30	54			3 791	32	55
		8			5 054	51	61			5 054	53	61			5 054	57	62
		10			6 318	79	66			6 318	83	67			6 318	89	68
	350	4	0.312	0.205	2 948	13	43	0.315	0.205	2 948	13	44	0.333	0.205	2 948	14	45
		6			4 423	29	54			4 423	30	54			4 423	32	55
		8			5 897	51	61			5 897	53	62			5 897	57	63
		10			7 371	79	67			7 371	83	68			7 371	89	69
	400	4	0.356	0.234	3 370	13	44	0.360	0.234	3 370	13	44	0.380	0.234	3 370	14	45
		6			5 054	29	54			5 054	30	55			5 054	32	56
		8			6 739	51	62			6 739	53	62			6 739	57	63
		10			8 424	79	68			8 424	83	68			8 424	89	69
	450	4	0.401	0.263	3 791	13	44	0.405	0.263	3 791	13	45	0.428	0.263	3 791	14	46
		6			5 686	29	55			5 686	30	55			5 686	32	56
		8			7 582	51	62			7 582	53	63			7 582	57	64
		10			9 477	79	68			9 477	83	69			9 477	89	70
	500	4	0.445	0.293	4 212	13	45	0.450	0.293	4 212	13	45	0.475	0.293	4 212	14	46
		6			6 318	29	55			6 318	30	56			6 318	32	57
		8			8 424	51	63			8 424	53	63			8 424	57	64
		10			10 530	79	69			10 530	83	69			10 530	89	70
	550	4	0.490	0.322	4 633	13	45	0.495	0.322	4 633	13	46	0.523	0.322	4 633	14	47
		6			6 950	29	56			6 950	30	56			6 950	32	57
		8			9 266	51	63			9 266	53	64			9 266	57	65
		10			11 583	79	69			11 583	83	70			11 583	89	70
	600	4	0.534	0.351	5 054	13	46	0.540	0.351	5 054	13	46	0.570	0.351	5 054	14	47
		6			7 582	29	56			7 582	30	57			7 582	32	58
		8			10 109	51	64			10 109	53	64			10 109	57	65
		10			12 636	79	69			12 636	83	70			12 636	89	71
	650	4	0.579	0.380	5 476	13	46	0.585	0.380	5 476	13	46	0.618	0.380	5 476	14	47
		6			8 213	29	56			8 213	30	57			8 213	32	58
		8			10 951	51	64			10 951	53	65			10 951	57	65
		10			13 689	79	70			13 689	83	70			13 689	89	71
	700	4	0.623	0.410	5 897	13	46	0.630	0.410	5 897	13	47	0.665	0.410	5 897	14	48
		6			8 845	29	57			8 845	30	57			8 845	32	58
		8			11 794	51	64			11 794	53	65			11 794	57	66
		10			14 742	79	70			14 742	83	71			14 742	89	72
	750	4	0.668	0.439	6 318	13	47	0.675	0.439	6 318	13	47	0.713	0.439	6 318	14	48
		6			9 477	29	57			9 477	30	58			9 477	32	59
		8			12 636	51	65			12 636	53	65			12 636	57	66
		10			15 795	79	70			15 795	83	71			15 795	89	72
	800	4	0.712	0.468	6 739	13	47	0.720	0.468	6 739	13	47	0.760	0.468	6 739	14	48
		6			10 109	29	57			10 109	30	58			10 109	32	59
		8			13 478	51	65			13 478	53	65			13 478	57	66
		10			16 848	79	71			16 848	83	71			16 848	89	72
	850	4	0.757	0.497	7 160	13	47	0.765	0.497	7 160	13	48	0.808	0.497	7 160	14	49
		6			10 741	29	58			10 741	30	58			10 741	32	59
		8			14 321	51	65			14 321	53	66			14 321	57	67
		10			17 901	79	71			17 901	83	71			17 901	89	72
	900	4	0.801	0.527	7 582	13	47	0.810	0.527	7 582	13	48	0.855	0.527	7 582	14	49
		6			11 372	29	58			11 372	30	58			11 372	32	59
		8			15 163	51	65			15 163	53	66			15 163	57	67
		10			18 954	79	71			18 954	83	72			18 954	89	73

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1010					1050					1100				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
110	4	0.111	0.073	1 058	12	38	0.116	0.073	1 058	13	39	0.121	0.073	1 058	15	41
	6			1 587	28	49			1 587	29	49			1 587	33	51
	8			2 116	50	57			2 116	51	57			2 116	59	59
	10			2 645	77	62			2 645	79	63			2 645	93	65
150	4	0.152	0.100	1 443	12	40	0.158	0.100	1 443	13	40	0.165	0.100	1 443	15	42
	6			2 164	28	50			2 164	29	51			2 164	33	53
	8			2 886	50	58			2 886	51	58			2 886	59	60
	10			3 607	77	64			3 607	79	64			3 607	93	66
200	4	0.202	0.134	1 924	12	41	0.210	0.134	1 924	13	41	0.220	0.134	1 924	15	43
	6			2 886	28	52			2 886	29	52			2 886	33	54
	8			3 848	50	59			3 848	51	59			3 848	59	61
	10			4 810	77	65			4 810	79	65			4 810	93	67
250	4	0.253	0.167	2 405	12	42	0.263	0.167	2 405	13	42	0.275	0.167	2 405	15	44
	6			3 607	28	53			3 607	29	53			3 607	33	55
	8			4 810	50	60			4 810	51	60			4 810	59	62
	10			6 012	77	66			6 012	79	66			6 012	93	68
300	4	0.303	0.200	2 886	12	43	0.315	0.200	2 886	13	43	0.330	0.200	2 886	15	45
	6			4 329	28	53			4 329	29	54			4 329	33	56
	8			5 772	50	61			5 772	51	61			5 772	59	63
	10			7 214	77	67			7 214	79	67			7 214	93	69
350	4	0.354	0.234	3 367	12	43	0.368	0.234	3 367	13	44	0.385	0.234	3 367	15	46
	6			5 050	28	54			5 050	29	54			5 050	33	56
	8			6 733	50	62			6 733	51	62			6 733	59	64
	10			8 417	77	67			8 417	79	68			8 417	93	70
400	4	0.404	0.267	3 848	12	44	0.420	0.267	3 848	13	44	0.440	0.267	3 848	15	46
	6			5 772	28	55			5 772	29	55			5 772	33	57
	8			7 695	50	62			7 695	51	62			7 695	59	64
	10			9 619	77	68			9 619	79	68			9 619	93	70
450	4	0.455	0.301	4 329	12	45	0.473	0.301	4 329	13	45	0.495	0.301	4 329	15	47
	6			6 493	28	55			6 493	29	55			6 493	33	57
	8			8 657	50	63			8 657	51	63			8 657	59	65
	10			10 822	77	68			10 822	79	69			10 822	93	71
500	4	0.505	0.334	4 810	12	45	0.525	0.334	4 810	13	45	0.550	0.334	4 810	15	47
	6			7 214	28	56			7 214	29	56			7 214	33	58
	8			9 619	50	63			9 619	51	63			9 619	59	65
	10			12 024	77	69			12 024	79	69			12 024	93	71
550	4	0.556	0.367	5 291	12	45	0.578	0.367	5 291	13	46	0.605	0.367	5 291	15	48
	6			7 936	28	56			7 936	29	56			7 936	33	58
	8			10 581	50	63			10 581	51	64			10 581	59	66
	10			13 226	77	69			13 226	79	70			13 226	93	72
600	4	0.606	0.401	5 772	12	46	0.630	0.401	5 772	13	46	0.660	0.401	5 772	15	48
	6			8 657	28	56			8 657	29	57			8 657	33	59
	8			11 543	50	64			11 543	51	64			11 543	59	66
	10			14 429	77	70			14 429	79	70			14 429	93	72
650	4	0.657	0.434	6 252	12	46	0.683	0.434	6 252	13	46	0.715	0.434	6 252	15	48
	6			9 379	28	57			9 379	29	57			9 379	33	59
	8			12 505	50	64			12 505	51	65			12 505	59	67
	10			15 631	77	70			15 631	79	70			15 631	93	72
700	4	0.707	0.468	6 733	12	46	0.735	0.468	6 733	13	47	0.770	0.468	6 733	15	49
	6			10 100	28	57			10 100	29	57			10 100	33	59
	8			13 467	50	65			13 467	51	65			13 467	59	67
	10			16 834	77	70			16 834	79	71			16 834	93	73
750	4	0.758	0.501	7 214	12	47	0.788	0.501	7 214	13	47	0.825	0.501	7 214	15	49
	6			10 822	28	57			10 822	29	58			10 822	33	60
	8			14 429	50	65			14 429	51	65			14 429	59	67
	10			18 036	77	71			18 036	79	71			18 036	93	73
800	4	0.808	0.534	7 695	12	47	0.840	0.534	7 695	13	47	0.880	0.534	7 695	15	49
	6			11 543	28	58			11 543	29	58			11 543	33	60
	8			15 391	50	65			15 391	51	65			15 391	59	67
	10			19 238	77	71			19 238	79	71			19 238	93	73
850	4	0.859	0.568	8 176	12	47	0.893	0.568	8 176	13	48	0.935	0.568	8 176	15	50
	6			12 264	28	58			12 264	29	58			12 264	33	60
	8			16 353	50	65			16 353	51	66			16 353	59	68
	10			20 441	77	71			20 441	79	72			20 441	93	74
900	4	0.909	0.601	8 657	12	48	0.945	0.601	8 657	13	48	0.990	0.601	8 657	15	50
	6			12 986	28	58			12 986	29	58			12 986	33	60
	8			17 315	50	66			17 315	51	66			17 315	59	68
	10			21 643	77	71			21 643	79	72			21 643	93	74

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
	250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40
		6			4 055	27	52			4 055	30	54			4 504	24	51
		8			5 407	49	60			5 407	54	61			6 005	43	58
		10			6 759	76	66			6 759	84	67			7 506	66	64
	300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41
		6			4 866	27	53			4 866	30	54			5 404	24	51
		8			6 489	49	61			6 489	54	62			7 206	43	59
		10			8 111	76	66			8 111	84	68			9 007	66	65
	350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41
		6			5 678	27	54			5 678	30	55			6 305	24	52
		8			7 570	49	61			7 570	54	63			8 407	43	60
		10			9 463	76	67			9 463	84	68			10 508	66	65
	400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42
		6			6 489	27	54			6 489	30	56			7 206	24	53
		8			8 652	49	62			8 652	54	63			9 608	43	60
		10			10 814	76	68			10 814	84	69			12 010	66	66
	450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43
		6			7 300	27	55			7 300	30	56			8 106	24	53
		8			9 733	49	62			9 733	54	64			10 809	43	61
		10			12 166	76	68			12 166	84	70			13 511	66	66
	500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43
		6			8 111	27	55			8 111	30	57			9 007	24	54
		8			10 814	49	63			10 814	54	64			12 010	43	61
		10			13 518	76	69			13 518	84	70			15 012	66	67
	550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43
		6			8 922	27	56			8 922	30	57			9 908	24	54
		8			11 896	49	63			11 896	54	65			13 211	43	62
		10			14 870	76	69			14 870	84	70			16 513	66	67
	600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44
		6			9 733	27	56			9 733	30	57			10 809	24	54
		8			12 977	49	64			12 977	54	65			14 412	43	62
		10			16 222	76	69			16 222	84	71			18 014	66	68
	650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44
		6			10 544	27	56			10 544	30	58			11 709	24	55
		8			14 059	49	64			14 059	54	65			15 612	43	62
		10			17 573	76	70			17 573	84	71			19 516	66	68
	700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44
		6			11 355	27	57			11 355	30	58			12 610	24	55
		8			15 140	49	64			15 140	54	66			16 813	43	63
		10			18 925	76	70			18 925	84	71			21 017	66	68
	750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45
		6			12 166	27	57			12 166	30	58			13 511	24	55
		8			16 222	49	65			16 222	54	66			18 014	43	63
		10			20 277	76	70			20 277	84	72			22 518	66	69
	800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45
		6			12 977	27	57			12 977	30	59			14 412	24	56
		8			17 303	49	65			17 303	54	66			19 215	43	63
		10			21 629	76	71			21 629	84	72			24 019	66	69
	850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45
		6			13 788	27	58			13 788	30	59			15 312	24	56
		8			18 384	49	65			18 384	54	66			20 416	43	63
		10			22 981	76	71			22 981	84	72			25 520	66	69
	900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46
		6			14 599	27	58			14 599	30	59			16 213	24	56
		8			19 466	49	65			19 466	54	67			21 617	43	64
		10			24 332	76	71			24 332	84	73			27 022	66	69

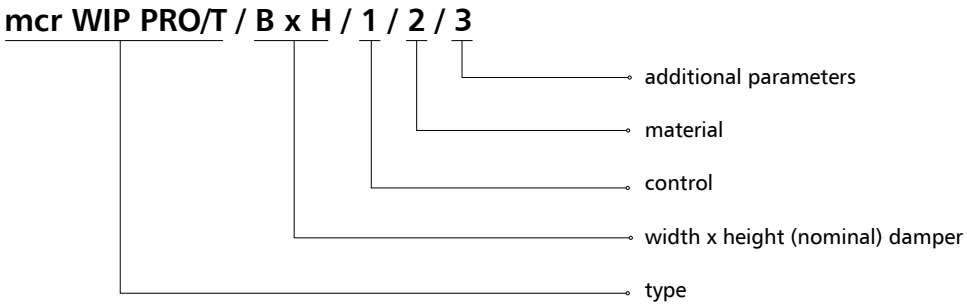
The mcr WIP PRO/T fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

12.7 | Estimated weights of mcr WIP PRO/T dampers [kg]

height H [mm]	width B [mm]											
	110	150	200	250	300	350	400	500	600	700	800	900
263	3	4	5	7	8	9	11	14	16	19	22	25
300	3	4	6	8	9	11	12	16	19	22	25	29
400	4	6	8	12	12	15	17	21	25	30	34	38
500	5	8	10	13	16	18	21	27	32	37	43	48
600	7	9	12	16	19	22	25	32	38	45	51	58
700	8	11	15	18	22	26	30	37	45	52	60	68
800	9	12	17	21	25	30	34	43	51	60	69	77
900	10	14	19	24	29	34	38	48	58	68	77	87
1000	11	16	21	27	32	37	43	54	64	75	86	97
1100	13	17	23	29	35	41	47	59	71	83	95	106
1250	14	20	27	33	40	47	54	67	81	94	108	128

The table shows the weights of dampers with RST-KW1 trigger control mechanisms or actuators

12.8 | Marking



1 - control:

» **KW1 trigger control mechanism**

KW1/S – thermal trigger
KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
KW1/24I – thermal trigger + "pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
KW1/24P – thermal trigger + "break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)
KW1/230I – thermal trigger + "pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
KW1/230P – thermal trigger + "break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger control mechanism**

BF24-T, BF24-TN – actuator with a return spring, U = 24 V AC/DC
BF230-T, BF230-TN – actuator with a return spring, U = 230 V AC
BF24TL-T-ST, BF24TL-TN-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
BF24-T-ST, BF24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL24-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN24-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
MF24T1 – thermal trigger
MF230T1 – thermal trigger + limit switch (open/closed blade signal)
MLF24T1 – thermal trigger
MF230T1 – thermal trigger + limit switch (open/closed blade signal)
QT.Ex 24-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
QT.Ex 230-FT.Ex – explosion proof actuator with a return spring in the Ex version, U = 230 V AC/DC

2 - material:

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - additional parameters :

» **Thermoelectric and thermal triggers**
[no symbol] – 72°C trigger
ZBAT95 – thermoelectric trigger for 95°C
T93-95 – thermal trigger for 95°C
T2-95 (MLF/ MF) – thermal trigger for 95°C
FT.Ex-72 – thermoelectric trigger for 72°C
FT.Ex-95 – thermoelectric trigger for 95°C

» **Damper axis of rotation**
[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**
[no symbol] – left damper
KP – right damper
LC - actuator long casing

» **Damper casing**
BU - earth pin

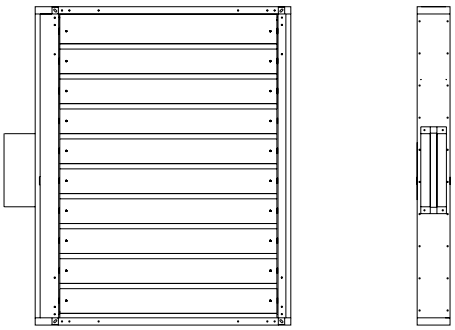
NOTE: **separate additional parameters entered with the "/" sign example marking:**

mcr WIP PRO/T 400 x 400 BFL24-T
EI120 louvered cut-off damper with a 24 V actuator with limit switches.

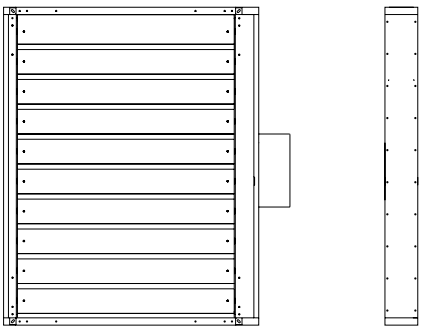
12.8.1 | Design standard

» mcr WIP PRO/T damper with actuator

» left damper standard



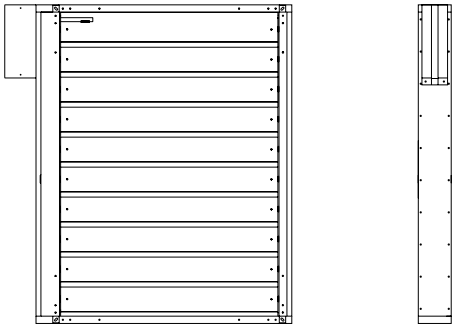
» right damper



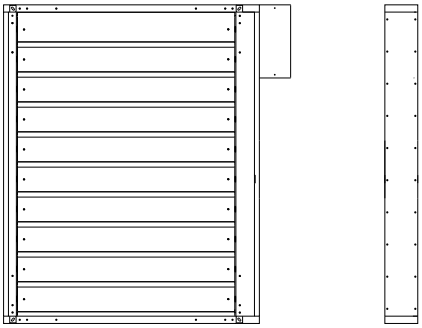
installation in reversed horizontal and vertical position possible

» mcr WIP PRO/T damper with KW1 mechanism

» left damper standard



» right damper



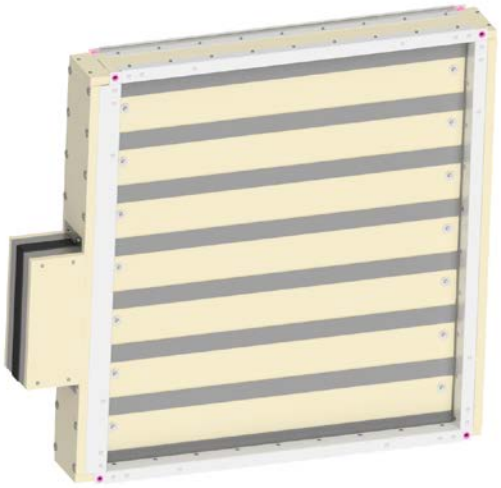
installation in reversed horizontal and vertical position possible

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

BIM CAD

downloadable models
on the website
under the designer zone tab



2334-CPR-0014

CTO S.A.

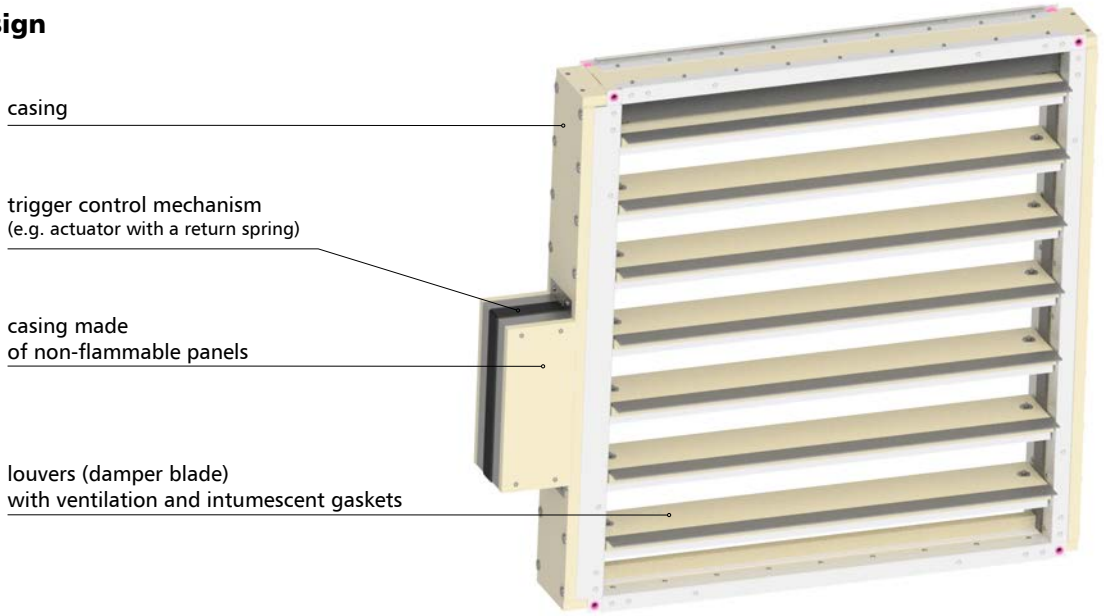
HYGIENIC CERTIFICATE

» **EIS120, E_{600} 120**
» Fire resistance class: EI120 (v_{ew} i↔o)S1000C_{10000}AAmulti, EI120 (v_{ed} h_{od} i↔o)S1000C_{10000}AAmulti, EI120(v_{edw} i↔o)S1000C_{10000}AAmulti.
» Certificate of constancy of performance 2434-CPR-0031.
» Dampers certified for compliance with EN 12101-8.
» Dampers rated under EN 13501-4 and tested under EN 1366-10.
» Narrow louvered smoke control dampers for fire ventilation systems.
» Certified installation on smoke ventilation ducts.
» Dampers certified for installation in batteries.
» Permitted operation with both vertical and horizontal axis of rotation.

13.1| Application

mcr WIP PRO/V, mcr WIP PRO/V-M multi-blade smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr WIP PRO/V dampers are used in fire ventilation systems, while dampers marked as mcr WIP PRO/V-M are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 12 m/s. Due to their design, mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the smoke control damper. Dampers may be installed in smoke extract ducts, shafts and at system ends.

13.2| Design



mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

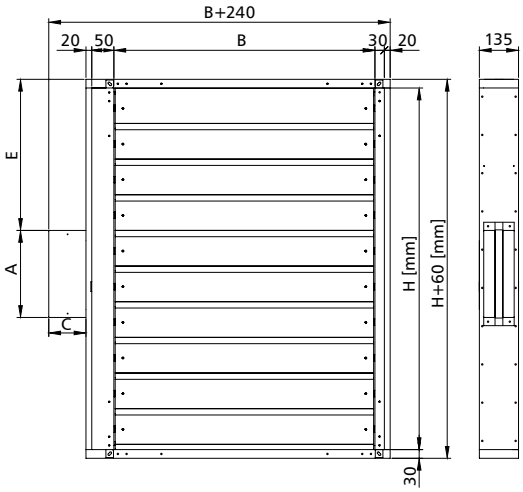
The multi-blade mcr WIP PRO/V, mcr WIP PRO/V-M damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panels, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a sleeve installed on the vertical side H of the fire damper casing.

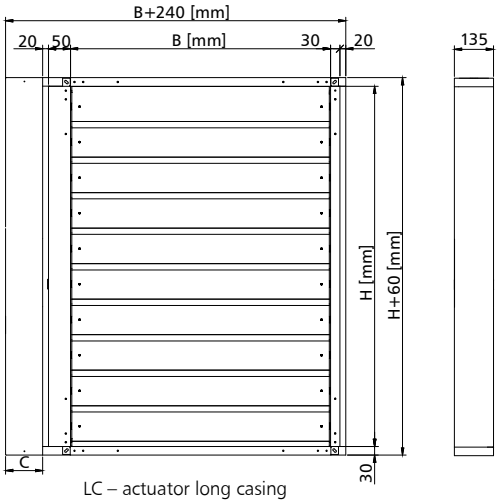
13.3 | Versions

13.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the smoke control damper louvers are opened in the fire compartment area and closed in the other areas - the smoke control damper is released remotely by feeding the supply voltage to the trigger control mechanism.

mcr WIP PRO/V, mcr WIP PRO/V-M smoke control damper are equipped with a trigger control mechanism in the form of a BE, BEE, BEN, MLE or ME axial actuator without the return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN, MLE or ME series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator.
mcr WIP PRO/V, mcr WIP PRO/V-M smoke control dampers with BE, BEE, BEN, MLE or ME actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may be opened/closed manually using a key.





LC – actuator long casing

insert symmetrically against the wall axis

dimensions in [mm]

mechanism	A	C	E
BE, BEE, BEN, ME, MLE	298	120	formula

for an even number of blades
E [mm] = (H/2 - 123) + 30
for an odd number of blades
E [mm] = (H/2 - 61,5) + 30

Number of blades = H/123

13.4 | Dimensions

» **Rectangular dampers:**

» nominal width B: from 110 mm to 1250 mm
» nominal height H from 270 mm to 1250 mm
» maximum single damper cross-section surface up to 1.5625 m²
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

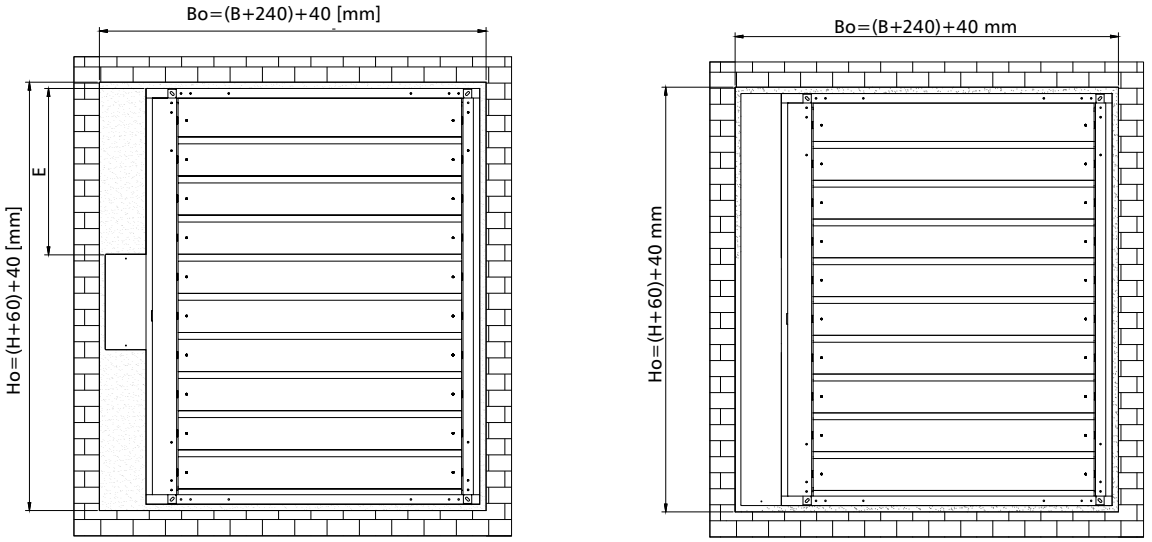
13.5 | Installation

mcr WIP PRO/V rectangular dampers are rated EI120(v_{ew} i↔o)S1000C_{10000}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm. The mcr WIP PRO/V rectangular dampers are rated EI120(v_{ew} i↔o)S1000C_{10000}AAmulti if installed in yielding wall/shaft partitions made from gypsum board panels with the thickness of at least 125 mm.
mcr WIP PRO/V rectangular dampers are rated EI120(v_{ed} h_{od} i↔o)S1000C_{10000}AAmulti if installed in a fireproof duct compliant with EN 1366-8 or EN 1366-9, with fire resistances equal to or lesser than the fire resistance of the damper.
Rectangular dampers mcr WIP PRO/V have been classified in the EI120(v_{edw} i↔o)S1000C_{10000}AAmulti class when installed in solid building shafts, masonry shafts made of blocks, bricks, or hollow blocks, and flexible walls/shafts made of plasterboard with a minimum thickness of 125 mm and a fire resistance of the damper rating of at least EI120. The battery (set) composed of up to 4 rectangular dampers is rated EI120(v_{ew} i→o)S1500C_{10000}AAmulti if installed in solid partitions, partitions made of concrete, bricks or hollow bricks.
mcr WIP PRO/V rectangular dampers are rated E_{600} 120 (v_{ed} i↔o) S1000C_{10000}AA single in single-zone fire ventilation systems.

* The above mentioned installation must be clearly specified in the design documentation and communicated to the manufacturer when placing the order. The dimensions of the damper BxH (width x height), which is to be installed with a vertical rotation axis, should be provided as if for a damper with a horizontal rotation axis (the power and control mechanism is mounted on the H dimension) with an indication of vertical axis installation.

13.5.1 | Preparation of installation openings

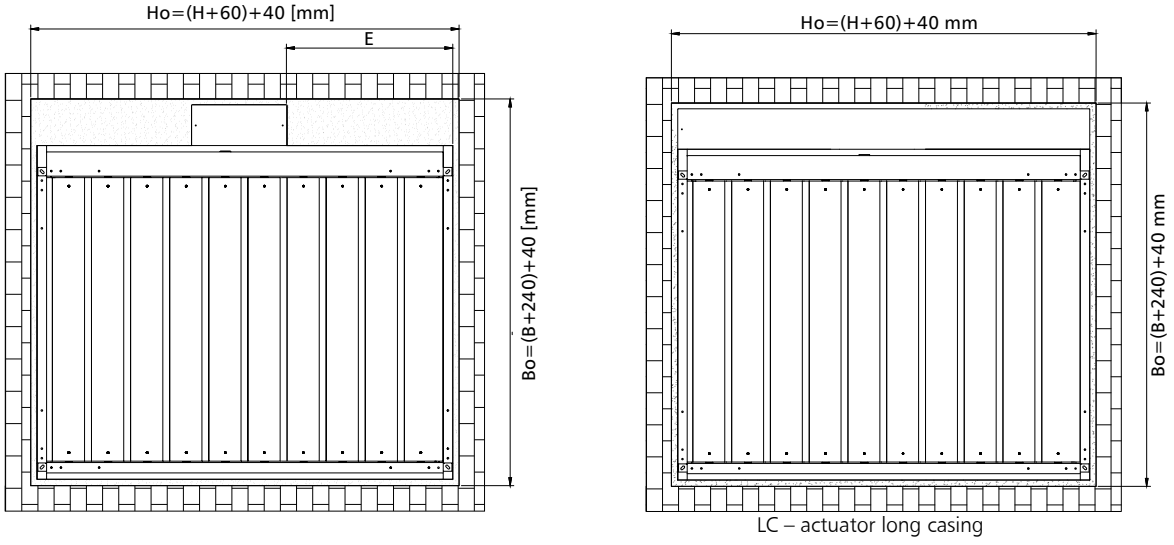
The minimum dimensions of the installation opening that permits correct installation of the mcr WIP PRO/V, mcr WIP PRO/V-M damper is:
Preferred
Bo = (B + 240) + 40 mm
Ho = (H + 60) + 40 mm



v_{ew} damper with a horizontal rotation axis: 110 x 270 to 900 x 1250 [mm], also applicable for versions with LC casing

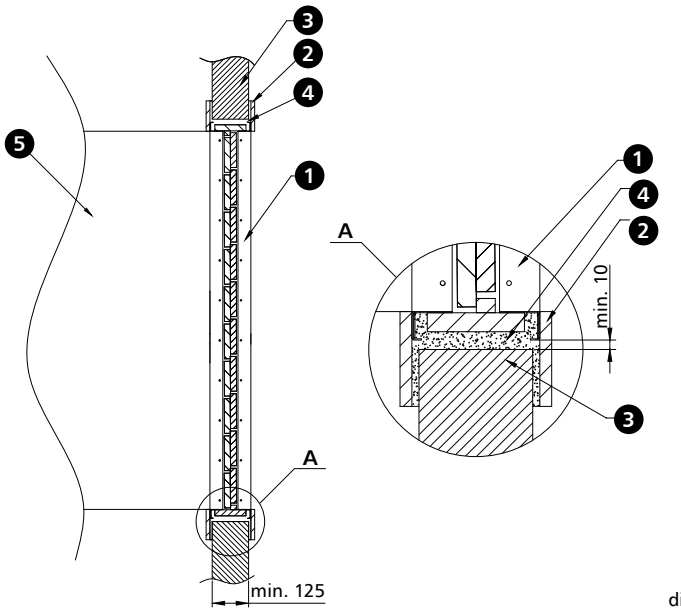
Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

mechanism	for an even number of blades	for an odd number of blades
BE, BEE, BEN	E [mm] = (H/2 - 123) + 30	E [mm] = (H/2 - 61,5) + 30



v_{ew} damper with a vertical rotation axis: 110 x 270 to 1250 x 1250 [mm], also applicable for versions with LC casing

13.5.2 | Sample installation in concrete block or full brick walls

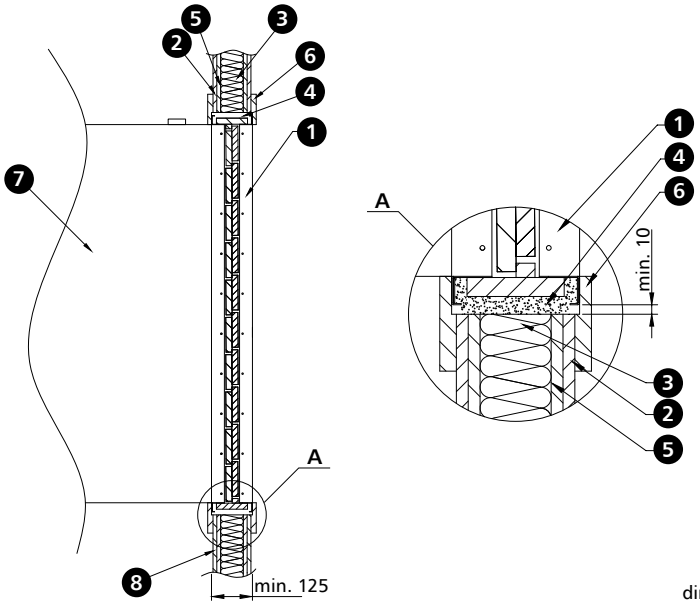


dimensions in [mm]

1. mcr WIP PRO/V or mcr WIP PRO/V-M smoke control damper
2. gypsum board trim 100 x 12.5 mm
3. solid wall
4. assembly mortar*
5. smoke ventilation duct

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

13.5.3 | Sample installation in light walls

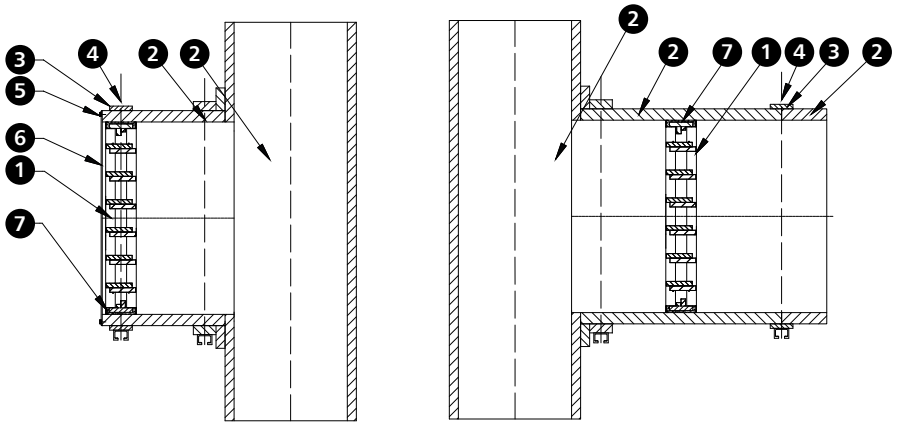


dimensions in [mm]

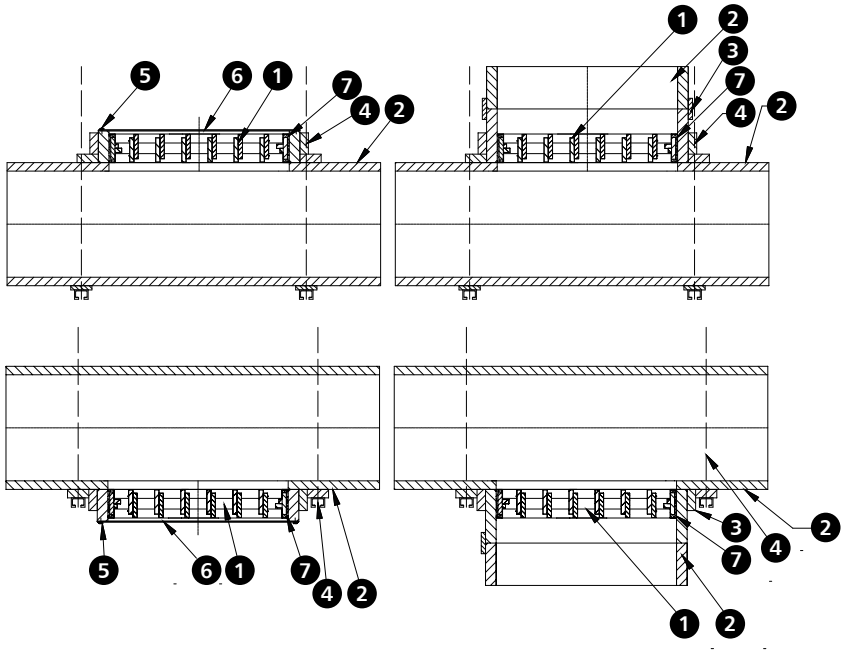
1. mcr WIP PRO/V or mcr WIP PRO/V-M smoke control damper
2. gypsum board 12.5 mm
3. mineral wool with a density of at least 80 kg/m^3, A1 class
4. installation grout*
5. structural profile
6. gypsum board trim 100 x 12.5 mm
7. smoke ventilation duct
8. gypsum board light wall

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

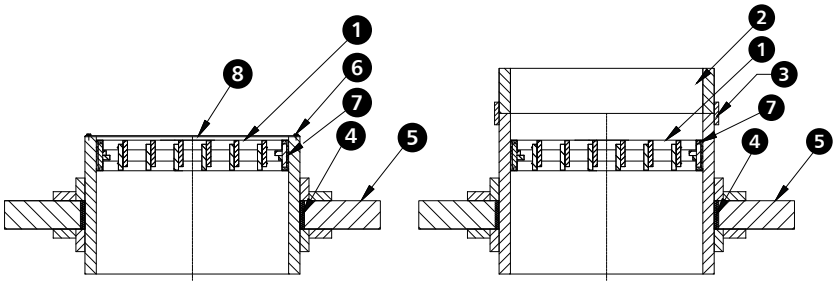
13.5.4.1 | Sample installation in fire ventilation system ducts



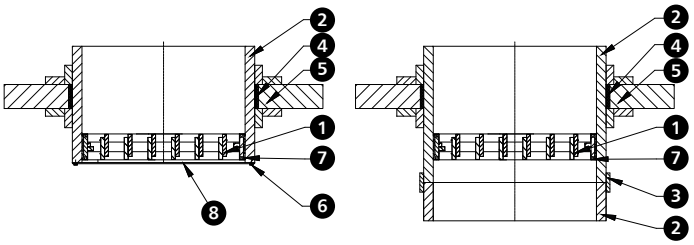
1. mcr WIP PRO/V or mcr WIP PRO/V-M BxH smoke control damper
2. Multi-zone smoke extract duct – e.g. made of fire-proof boards
3. A strip of fire-proof board along the entire length of the BxH side
4. Installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)
7. System duct sealing



1. mcr WIP PRO/V or mcr WIP PRO/V-M BxH smoke control damper
2. Multi-zone smoke extract duct – e.g. made of fire-proof boards
3. A strip of fire-proof board along the entire length of the BxH side
4. Installation hangers system
5. M10 x 20 bolt
6. MWB system grille (optional)
7. System duct sealing

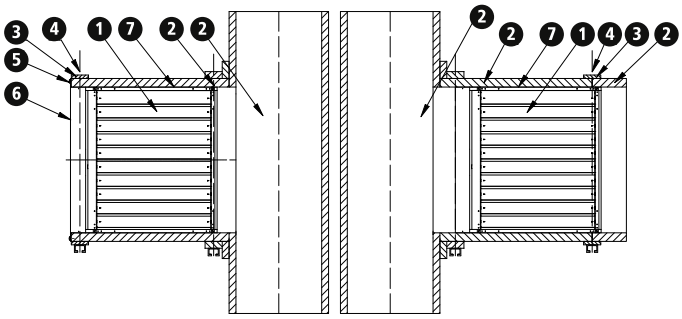


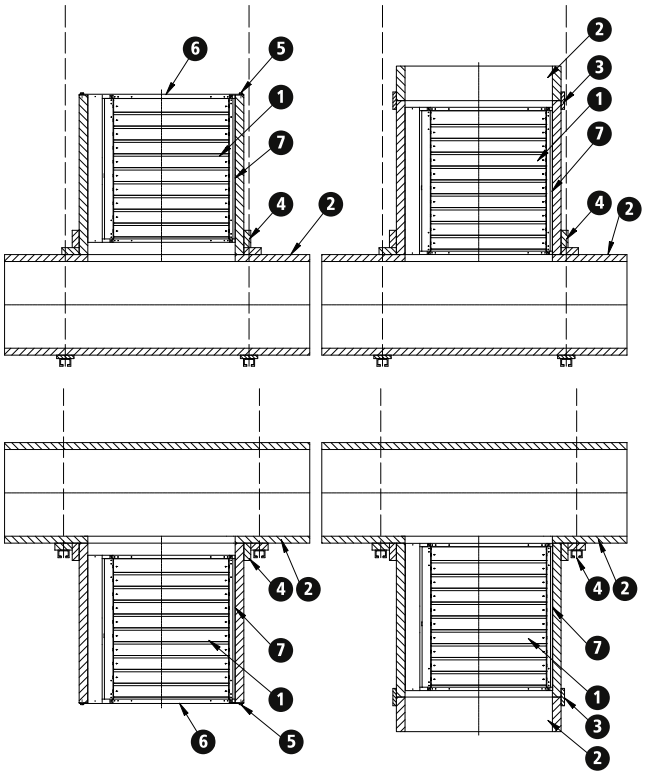
1. mcr WIP PRO/V or mcr WIP PRO/V-M BxH smoke control damper
2. Multi-zone smoke extract duct – e.g. made of fire-proof boards
3. A strip of fire-proof board along the entire length of the BxH side
4. Installation hangers system
5. Floor slab
6. M10 x 20 bolt
7. System duct sealing
8. MWB system grille (optional)



1. mcr WIP PRO/V or mcr WIP PRO/V-M BxH smoke control damper
2. Multi-zone smoke extract duct – e.g. made of fire-proof boards
3. A strip of fire-proof board along the entire length of the BxH side
4. Fireproof duct installation penetration system.
5. Floor slab
6. M10 x 20 bolt
7. System duct sealing
8. MWB system grille (optional)

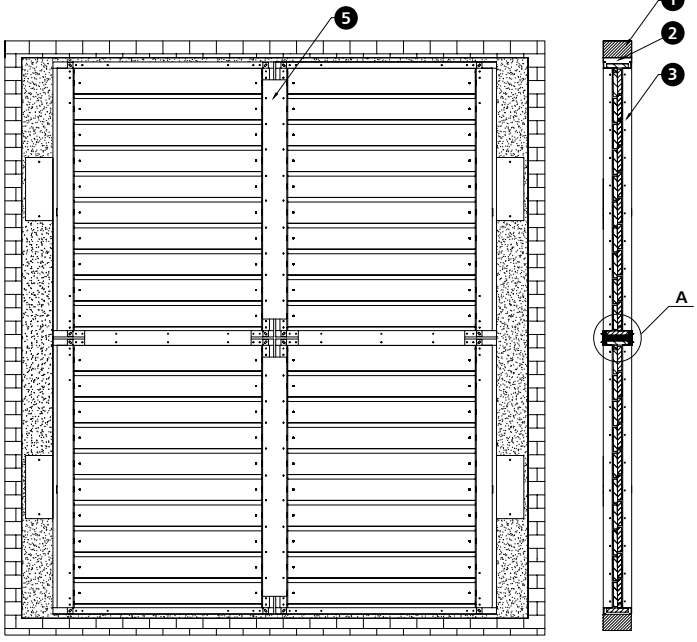
13.5.4.2 | Sample installation in fire ventilation system ducts with LC casing

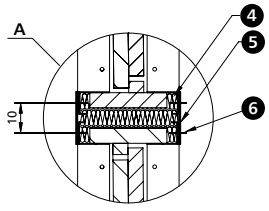




1. mcr WIP PRO/V or mcr WIP PRO/V-M BxH smoke control damper with LC casing
2. multi-zone smoke extract duct – e.g. made of fi re-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. MWB system grille
7. system duct sealing

13.5.5 | Sample modular installation



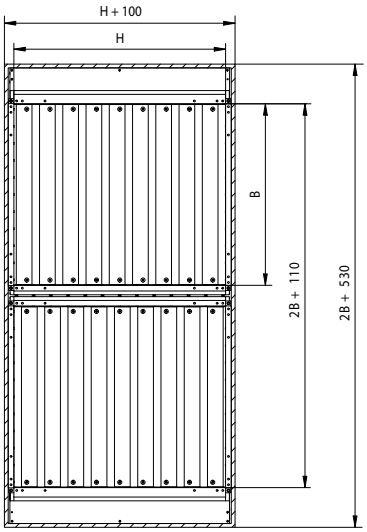


1. e.g. masonry wall
2. assembly mortar*
3. mcr WIP PRO/V or mcr WIP PRO/V-M damper module
4. mineral wool with a density of at least 80 kg/m³, A1 class
5. steel installation element
6. ST8 x 16 screw

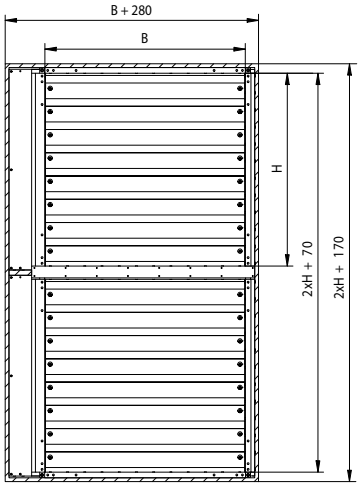
dimensions in [mm]

* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.
Also applicable for versions with LC casing

13.5.5.1 | Modular installation – 1x2



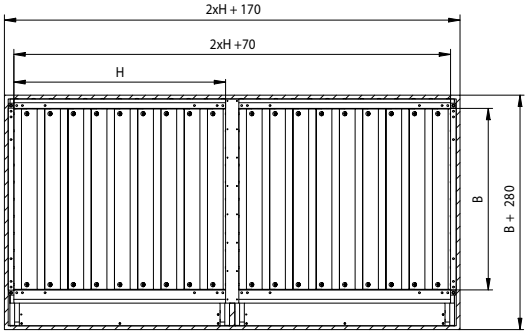
» vertical



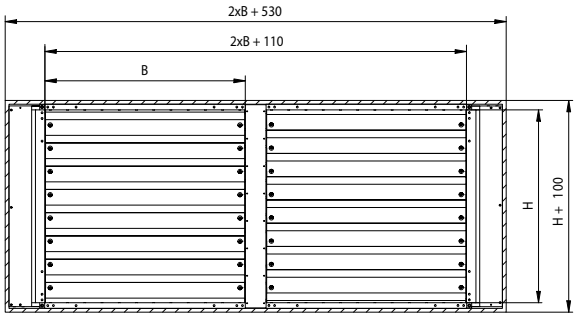
dimensions in [mm]

» horizontal

13.5.5.2 | Modular installation – 2x1



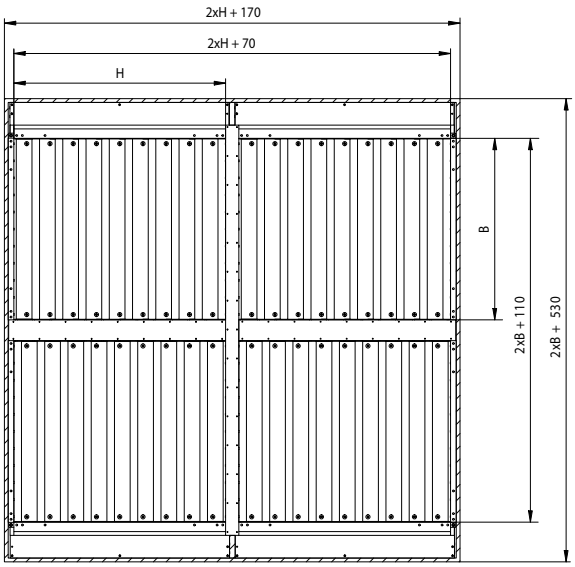
» vertical



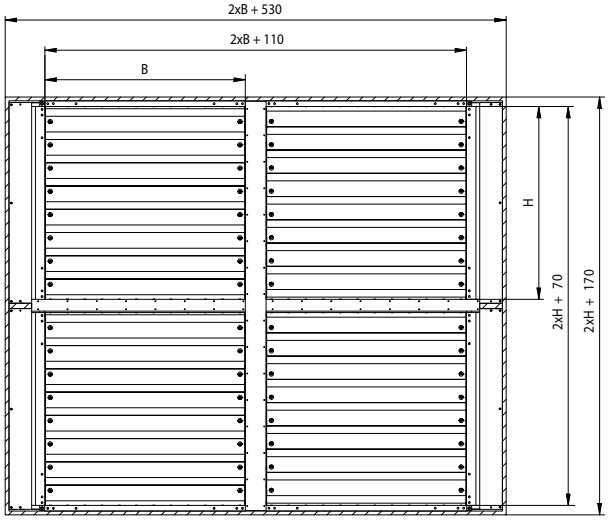
dimensions in [mm]

» horizontal

13.5.5.3 | Modular installation – 2x2



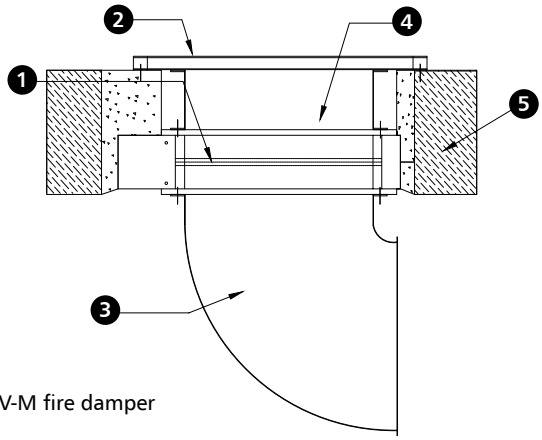
» vertical



dimensions in [mm]

» horizontal

»Example applications - installation with a masking element



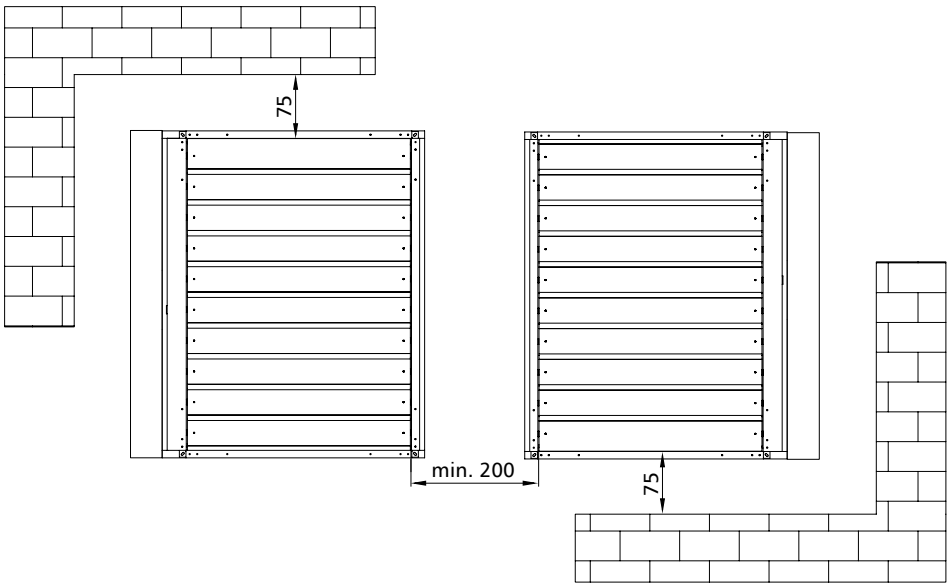
1. mcr WIP PRO/V or mcr WIP PRO/V-M fire damper
2. masking element
3. smoke ventilation duct
4. duct - ventilation straight connection piece
5. wall, floor slab

If a mcr WIP PRO/V, mcr WIP PRO/V-M damper is used, thanks to the shutters (no single-blade partition) it is possible to use the space in front of and behind the damper for such system elements as a masking grille or a rectangular silencer or to route a duct along the wall using a duct bend or reduction.

»Damper installation with a vertical louver rotation axis

The damper can operate with a vertical louver rotation axis with a top or bottom-mounted mechanism.

»Minimum distance between systems and partitions



dimensions in [mm]

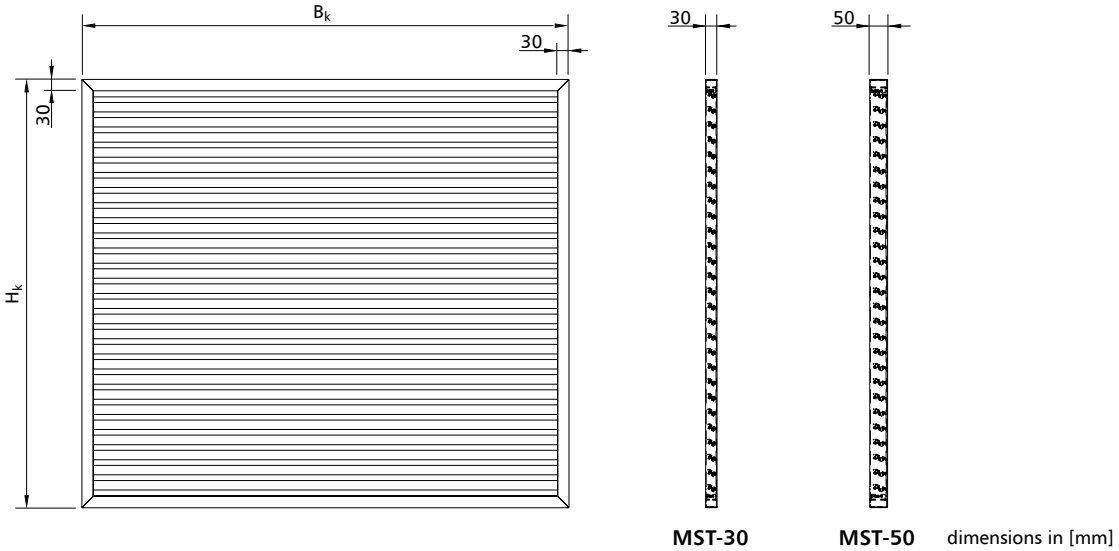
13.5.6 | MST system masking grilles



MST system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility.

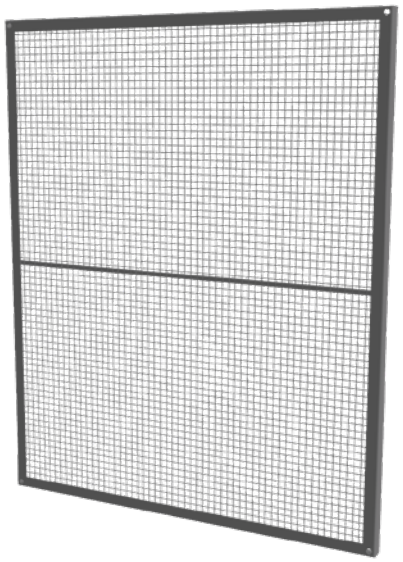
Bolts embedded in the body are used to attach the masking grille body. After installation, an outer frame is mounted on the masking grille body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

dimensions:
» nominal width Bk: from 200 mm to 1500 mm
» nominal height Hk from 200 mm to 1500 mm
» nominal thickness G 30 and 50 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



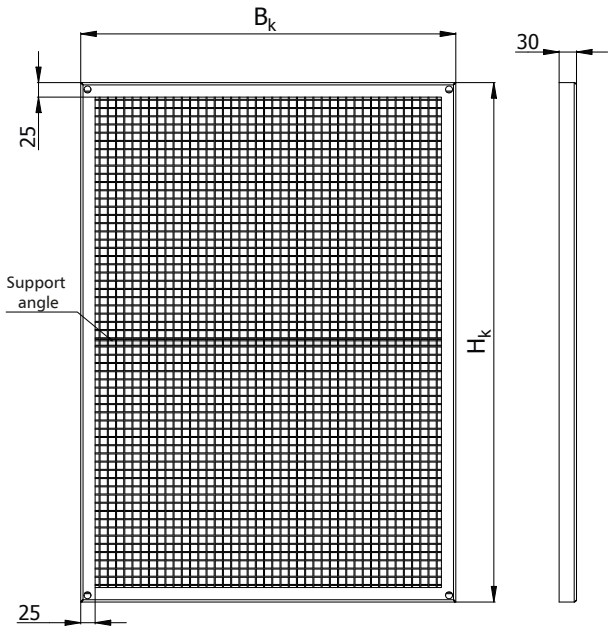
MST-30 **MST-50** dimensions in [mm]

13.5.7 | MWP mesh cover



The MWP mesh cover may be supplied together with the damper by the damper manufacturer. System masking grilles, dedicated especially for commercial premises with high architectonical and service requirements allows for covering the damper with any additional masking grille while fulfilling the fire rating requirements of the mcr WIP damper. With a wall thickness greater than 200 mm, system and non-system grilles can be applied directly to the wall.

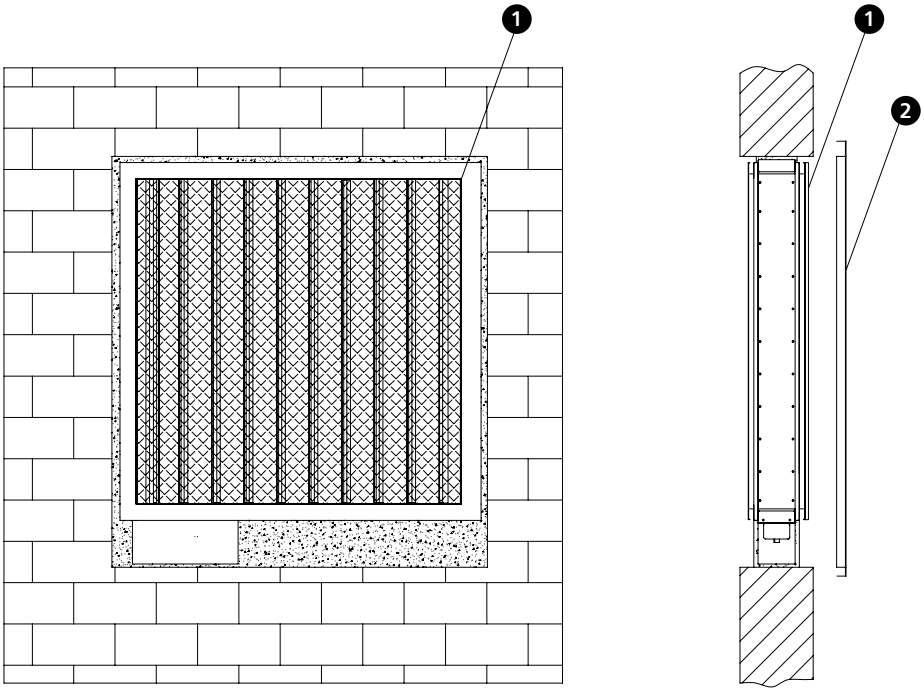
dimensions:
» nominal width Bk: from 200 mm to 1300 mm
» nominal height Hk from 200 mm to 1300 mm
» nominal thickness 30 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.



dimensions in [mm]

Number of support angles	Height [mm] - Hk	
	from	to
1	850	1300
0	200	849

» sample installation



1. MWP mesh cover
2. decorative grille (any, e.g. as indicated by the architect)

13.6 | mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	270 S_k [m²]	270 S_e [m²]	270 Q [m³/h]	270 d_p [PA]	270 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]
	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
	250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39
		6			918	30	47			918	30	48			918	36	50
		8			1 224	53	55			1 224	54	55			1 224	63	57
		10			1 530	82	61			1 530	85	61			1 530	99	63
	300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40
		6			1 102	30	48			1 102	30	49			1 102	36	51
		8			1 469	53	56			1 469	54	56			1 469	63	58
		10			1 836	82	62			1 836	85	62			1 836	99	64
	350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41
		6			1 285	30	49			1 285	30	49			1 285	36	51
		8			1 714	53	56			1 714	54	57			1 714	63	59
		10			2 142	82	62			2 142	85	63			2 142	99	65
	400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41
		6			1 469	30	49			1 469	30	50			1 469	36	52
		8			1 958	53	57			1 958	54	57			1 958	63	59
		10			2 448	82	63			2 448	84	63			2 448	99	65
	450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42
		6			1 652	30	50			1 652	30	50			1 652	36	52
		8			2 203	53	57			2 203	54	58			2 203	63	60
		10			2 754	82	63			2 754	84	64			2 754	99	66
	500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42
		6			1 836	30	50			1 836	30	51			1 836	36	53
		8			2 448	53	58			2 448	54	58			2 448	63	60
		10			3 060	82	64			3 060	85	64			3 060	99	66
	550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43
		6			2 020	4	24			2 020	30	51			2 020	36	53
		8			2 693	7	31			2 693	54	59			2 693	63	61
		10			3 366	10	37			3 366	84	65			3 366	99	67
	600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43
		6			2 203	30	51			2 203	30	52			2 203	36	54
		8			2 938	53	59			2 938	54	59			2 938	63	61
		10			3 672	82	65			3 672	85	65			3 672	99	67
	650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43
		6			2 387	30	52			2 387	30	52			2 387	36	54
		8			3 182	53	59			3 182	54	59			3 182	63	62
		10			3 978	82	65			3 978	85	65			3 978	99	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]		height H [mm]															
		270					300					350					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44
		6			2 570	30	52			2 570	30	52			2 570	36	54
		8			3 427	53	59			3 427	54	60			3 427	63	62
		10			4 284	82	65			4 284	85	66			4 284	99	68
	750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44
		6			2 754	30	52			2 754	30	53			2 754	36	55
		8			3 672	53	60			3 672	54	60			3 672	63	62
		10			4 590	82	66			4 590	85	66			4 590	99	68
	800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44
		6			2 938	30	52			2 938	30	53			2 938	36	55
		8			3 917	53	60			3 917	54	60			3 917	63	62
		10			4 896	82	66			4 896	84	66			4 896	99	68
	850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45
		6			3 121	30	53			3 121	30	53			3 121	36	55
		8			4 162	53	60			4 162	54	61			4 162	63	63
		10			5 202	82	66			5 202	84	66			5 202	99	68
	900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45
		6			3 305	30	53			3 305	30	53			3 305	36	55
		8			4 406	53	60			4 406	54	61			4 406	63	63
		10			5 508	82	66			5 508	84	67			5 508	99	69
	950	4	0.257	0.162	2 326	13	43	0.285	0.162	2 326	18	47	0.333	0.162	2 326	25	51
		6			3 488	30	53			3 488	41	57			3 488	57	62
		8			4 651	53	61			4 651	72	65			4 651	102	69
		10			5 814	82	67			5 814	113	71			5 814	159	75
	1000	4	0.270	0.170	2 448	13	43	0.300	0.170	2 448	18	47	0.350	0.170	2 448	25	51
		6			3 672	30	53			3 672	41	58			3 672	57	62
		8			4 896	53	61			4 896	72	65			4 896	102	70
		10			6 120	82	67			6 120	113	71			6 120	159	75
	1050	4	0.284	0.179	2 570	13	43	0.315	0.179	2 570	18	47	0.368	0.179	2 570	25	52
		6			3 856	30	54			3 856	41	58			3 856	57	62
		8			5 141	53	61			5 141	72	65			5 141	102	70
		10			6 426	82	67			6 426	113	71			6 426	159	76
	1100	4	0.297	0.187	2 693	13	43	0.330	0.187	2 693	18	47	0.385	0.187	2 693	25	52
		6			4 039	30	54			4 039	41	58			4 039	57	62
		8			5 386	53	61			5 386	72	65			5 386	102	70
		10			6 732	82	67			6 732	113	71			6 732	159	76
	1150	4	0.311	0.196	2 815	13	43	0.345	0.196	2 815	18	48	0.403	0.196	2 815	25	52
		6			4 223	30	54			4 223	41	58			4 223	57	63
		8			5 630	53	62			5 630	72	66			5 630	102	70
		10			7 038	82	67			7 038	113	71			7 038	159	76
	1200	4	0.324	0.204	2 938	13	44	0.360	0.204	2 938	18	48	0.420	0.204	2 938	25	52
		6			4 406	30	54			4 406	41	58			4 406	57	63
		8			5 875	53	62			5 875	72	66			5 875	102	70
		10			7 344	82	68			7 344	113	72			7 344	159	76
	1250	4	0.338	0.213	3 060	13	44	0.375	0.213	3 060	18	48	0.438	0.213	3 060	25	52
		6			4 590	30	54			4 590	41	59			4 590	57	63
		8			6 120	53	62			6 120	72	66			6 120	102	70
		10			7 650	82	68			7 650	113	72			7 650	159	76

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	390 S_k [m²]	390 S_e [m²]	390 Q [m³/h]	390 d_p [PA]	390 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]	520 S_k [m²]	520 S_e [m²]	520 Q [m³/h]	520 d_p [PA]	520 L_{WA} [dB]
	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
	250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39
		6			1 366	27	48			1 366	31	50			1 814	27	49
		8			1 822	47	55			1 822	55	57			2 419	48	57
		10			2 277	74	61			2 277	86	63			3 024	75	63
	300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39
		6			1 639	27	49			1 639	31	51			2 177	27	50
		8			2 186	47	56			2 186	55	58			2 903	48	57
		10			2 732	74	62			2 732	86	64			3 629	75	63
	350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40
		6			1 913	27	49			1 913	31	51			2 540	27	51
		8			2 550	47	57			2 550	55	59			3 387	48	58
		10			3 188	74	63			3 188	86	65			4 234	75	64
	400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41
		6			2 186	27	50			2 186	31	52			2 903	27	51
		8			2 915	47	57			2 915	55	59			3 871	48	59
		10			3 643	74	63			3 643	86	65			4 838	75	65
	450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41
		6			2 459	27	50			2 459	31	52			3 266	27	52
		8			3 279	47	58			3 279	55	60			4 355	48	59
		10			4 099	74	64			4 099	86	66			5 443	75	65
	500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42
		6			2 732	27	51			2 732	31	53			3 629	27	52
		8			3 643	47	58			3 643	55	60			4 838	48	60
		10			4 554	74	64			4 554	86	66			6 048	75	66
	550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42
		6			3 006	27	51			3 006	31	53			3 992	27	53
		8			4 008	47	59			4 008	55	61			5 322	48	60
		10			5 009	74	65			5 009	86	67			6 653	75	66
	600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42
		6			3 279	27	52			3 279	31	54			4 355	27	53
		8			4 372	47	59			4 372	55	61			5 806	48	61
		10			5 465	74	65			5 465	86	67			7 258	75	66
	650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43
		6			3 552	27	52			3 552	31	54			4 717	27	53
		8			4 736	47	59			4 736	55	61			6 290	48	61
		10			5 920	74	65			5 920	86	67			7 862	75	67

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	390 S_k [m²]	390 S_e [m²]	390 Q [m³/h]	390 d_p [PA]	390 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]	520 S_k [m²]	520 S_e [m²]	520 Q [m³/h]	520 d_p [PA]	520 L_{WA} [dB]
	700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43
		6			3 825	27	52			3 825	31	54			5 080	27	54
		8			5 100	47	60			5 100	55	62			6 774	48	61
		10			6 376	74	66			6 376	86	68			8 467	75	67
	750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43
		6			4 099	27	53			4 099	31	55			5 443	27	54
		8			5 465	47	60			5 465	55	62			7 258	48	61
		10			6 831	74	66			6 831	86	68			9 072	75	67
	800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43
		6			4 372	27	53			4 372	31	54			5 806	27	54
		8			5 829	47	60			5 829	55	61			7 741	48	61
		10			7 286	74	66			7 286	86	67			9 677	75	67
	850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43
		6			4 645	27	53			4 645	31	54			6 169	27	54
		8			6 193	47	61			6 193	55	61			8 225	48	61
		10			7 742	74	66			7 742	86	67			10 282	75	67
	900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43
		6			4 918	27	53			4 918	31	54			6 532	27	54
		8			6 558	47	61			6 558	55	61			8 709	48	61
		10			8 197	74	67			8 197	86	67			10 886	75	67
	950	4	0.371	0.240	3 461	12	43	0.428	0.240	3 461	18	49	0.494	0.319	4 596	12	44
		6			5 192	27	54			5 192	41	59			6 895	27	55
		8			6 922	47	61			6 922	74	67			9 193	48	62
		10			8 653	74	67			8 653	115	73			11 491	75	68
	1000	4	0.390	0.253	3 643	12	43	0.450	0.253	3 643	18	49	0.520	0.336	4 838	12	45
		6			5 465	27	54			5 465	41	60			7 258	27	55
		8			7 286	47	61			7 286	74	67			9 677	48	63
		10			9 108	74	67			9 108	115	73			12 096	75	69
	1050	4	0.410	0.266	3 825	12	43	0.473	0.266	3 825	18	49	0.546	0.353	5 080	12	45
		6			5 738	27	54			5 738	41	60			7 620	27	55
		8			7 651	47	62			7 651	74	67			10 161	48	63
		10			9 563	74	67			9 563	115	73			12 701	75	69
	1100	4	0.429	0.278	4 008	12	44	0.495	0.278	4 008	18	49	0.572	0.370	5 322	12	45
		6			6 011	27	54			6 011	41	60			7 983	27	56
		8			8 015	47	62			8 015	74	67			10 644	48	63
		10			10 019	74	68			10 019	115	73			13 306	75	69
	1150	4	0.449	0.291	4 190	12	44	0.518	0.291	4 190	18	50	0.598	0.386	5 564	12	45
		6			6 285	27	54			6 285	41	60			8 346	27	56
		8			8 379	47	62			8 379	74	68			11 128	48	63
		10			10 474	74	68			10 474	115	73			13 910	75	69
	1200	4	0.468	0.304	4 372	12	44	0.540	0.304	4 372	18	50	0.624	0.403	5 806	12	45
		6			6 558	27	55			6 558	41	60			8 709	27	56
		8			8 744	47	62			8 744	74	68			11 612	48	64
		10			10 930	74	68			10 930	115	74			14 515	75	69
	1250	4	0.488	0.316	4 554	12	44	0.563	0.316	4 554	18	50	0.650	0.420	6 048	12	46
		6			6 831	27	55			6 831	41	61			9 072	27	56
		8			9 108	47	62			9 108	74	68			12 096	48	64
		10			11 385	74	68			11 385	115	74			15 120	75	70

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
110		4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
150		4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
200		4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
250		4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40
		6			1 814	29	50			2 263	26	50			2 263	27	50
		8			2 419	51	57			3 017	46	57			3 017	48	58
		10			3 024	79	63			3 771	72	63			3 771	76	64
300		4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41
		6			2 177	29	51			2 715	26	50			2 715	27	51
		8			2 903	51	58			3 620	46	58			3 620	48	59
		10			3 629	79	64			4 525	72	64			4 525	76	64
350		4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41
		6			2 540	29	51			3 168	26	51			3 168	27	52
		8			3 387	51	59			4 224	46	58			4 224	48	59
		10			4 234	79	65			5 279	72	64			5 279	76	65
400		4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42
		6			2 903	29	52			3 620	26	52			3 620	27	52
		8			3 871	51	59			4 827	46	59			4 827	48	60
		10			4 838	79	65			6 034	72	65			6 034	76	66
450		4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42
		6			3 266	29	52			4 073	26	52			4 073	27	53
		8			4 355	51	60			5 430	46	60			5 430	48	60
		10			5 443	79	66			6 788	72	65			6 788	76	66
500		4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43
		6			3 629	29	53			4 525	26	53			4 525	27	53
		8			4 838	51	60			6 034	46	60			6 034	48	61
		10			6 048	79	66			7 542	72	66			7 542	76	67
550		4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43
		6			3 992	29	53			4 978	26	53			4 978	27	54
		8			5 322	51	61			6 637	46	60			6 637	48	61
		10			6 653	79	67			8 296	72	66			8 296	76	67
600		4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44
		6			4 355	29	54			5 430	26	53			5 430	27	54
		8			5 806	51	61			7 240	46	61			7 240	48	62
		10			7 258	79	67			9 050	72	67			9 050	76	67
650		4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44
		6			4 717	29	54			5 883	26	54			5 883	27	54
		8			6 290	51	62			7 844	46	61			7 844	48	62
		10			7 862	79	67			9 805	72	67			9 805	76	68

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
700		4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44
		6			5 080	29	54			6 335	26	54			6 335	27	55
		8			6 774	51	62			8 447	46	61			8 447	48	62
		10			8 467	79	68			10 559	72	67			10 559	76	68
750		4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44
		6			5 443	29	55			6 788	26	54			6 788	27	55
		8			7 258	51	62			9 050	46	62			9 050	48	63
		10			9 072	79	68			11 313	72	68			11 313	76	68
800		4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44
		6			5 806	29	55			7 240	26	55			7 240	27	55
		8			7 741	51	62			9 654	46	62			9 654	48	63
		10			9 677	79	68			12 067	72	68			12 067	76	68
850		4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44
		6			6 169	29	55			7 693	26	55			7 693	27	55
		8			8 225	51	63			10 257	46	62			10 257	48	63
		10			10 282	79	69			12 821	72	68			12 821	76	68
900		4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44
		6			6 532	29	56			8 145	26	52			8 145	27	55
		8			8 709	51	63			10 860	46	60			10 860	48	63
		10			10 886	79	69			13 576	72	65			13 576	76	68
950		4	0.523	0.319	4 596	15	47	0.608	0.398	5 732	11	45	0.618	0.398	5 732	12	46
		6			6 895	33	57			8 598	26	55			8 598	27	56
		8			9 193	58	65			11 464	46	63			11 464	48	64
		10			11 491	91	71			14 330	72	69			14 330	76	69
1000		4	0.550	0.336	4 838	15	47	0.640	0.419	6 034	11	45	0.650	0.419	6 034	12	46
		6			7 258	33	58			9 050	26	56			9 050	27	56
		8			9 677	58	65			12 067	46	63			12 067	48	64
		10			12 096	91	71			15 084	72	69			15 084	76	70
1050		4	0.578	0.353	5 080	15	47	0.672	0.440	6 335	11	45	0.683	0.440	6 335	12	46
		6			7 620	33	58			9 503	26	56			9 503	27	57
		8			10 161	58	65			12 671	46	63			12 671	48	64
		10			12 701	91	71			15 838	72	69			15 838	76	70
1100		4	0.605	0.370	5 322	15	48	0.704	0.461	6 637	11	45	0.715	0.461	6 637	12	46
		6			7 983	33	58			9 955	26	56			9 955	27	57
		8			10 644	58	66			13 274	46	63			13 274	48	64
		10			13 306	91	71			16 592	72	69			16 592	76	70
1150		4	0.633	0.386	5 564	15	48	0.736	0.482	6 939	11	46	0.748	0.482	6 939	12	46
		6			8 346	33	58			10 408	26	56			10 408	27	57
		8			11 128	58	66			13 877	46	64			13 877	48	64
		10			13 910	91	72			17 347	72	69			17 347	76	70
1200		4	0.660	0.403	5 806	15	48	0.768	0.503	7 240	11	46	0.780	0.503	7 240	12	47
		6			8 709	33	58			10 860	26	56			10 860	27	57
		8			11 612	58	66			14 481	46	64			14 481	48	65
		10			14 515	91	72			18 101	72	70			18 101	76	70
1250		4	0.688	0.420	6 048	15	48	0.800	0.524	7 542	11	46	0.813	0.524	7 542	12	47
		6			9 072	33	59			11 313	26	57			11 313	27	57
		8			12 096	58	66			15 084	46	64			15 084	48	65
		10			15 120	91	72			18 855	72	70			18 855	76	71

B – nominal width [mm]
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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	760 S_k [m²]	760 S_e [m²]	760 Q [m³/h]	760 d_p [PA]	760 L_{WA} [dB]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]
	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
	250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38
		6			2 263	30	52			2 711	28	51			2 711	22	49
		8			3 017	54	59			3 614	50	59			3 614	40	56
		10			3 771	85	65			4 518	78	65			4 518	62	62
	300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39
		6			2 715	30	53			3 253	28	52			3 253	22	49
		8			3 620	54	60			4 337	50	60			4 337	40	57
		10			4 525	85	66			5 422	78	66			5 422	62	63
	350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39
		6			3 168	30	53			3 795	28	53			3 795	22	50
		8			4 224	54	61			5 060	50	60			5 060	40	57
		10			5 279	85	66			6 325	78	66			6 325	62	63
	400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40
		6			3 620	30	54			4 337	28	53			4 337	22	51
		8			4 827	54	61			5 783	50	61			5 783	40	58
		10			6 034	85	67			7 229	78	67			7 229	62	64
	450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41
		6			4 073	30	54			4 879	28	54			4 879	22	51
		8			5 430	54	62			6 506	50	61			6 506	40	59
		10			6 788	85	68			8 132	78	67			8 132	62	64
	500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41
		6			4 525	30	55			5 422	28	54			5 422	22	52
		8			6 034	54	62			7 229	50	62			7 229	40	59
		10			7 542	85	68			9 036	78	68			9 036	62	65
	550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41
		6			4 978	30	55			5 964	28	55			5 964	22	52
		8			6 637	54	63			7 952	50	62			7 952	40	59
		10			8 296	85	68			9 940	78	68			9 940	62	65
	600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42
		6			5 430	30	56			6 506	28	55			6 506	22	52
		8			7 240	54	63			8 675	50	63			8 675	40	60
		10			9 050	85	69			10 843	78	69			10 843	62	66
	650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42
		6			5 883	30	56			7 048	28	56			7 048	22	53
		8			7 844	54	63			9 397	50	63			9 397	40	60
		10			9 805	85	69			11 747	78	69			11 747	62	66

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			700					760					800				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42
		6			6 335	30	56			7 590	28	56			7 590	22	53
		8			8 447	54	64			10 120	50	63			10 120	40	61
		10			10 559	85	69			12 650	78	69			12 650	62	66
	750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43
		6			6 788	30	56			8 132	28	56			8 132	22	53
		8			9 050	54	64			10 843	50	64			10 843	40	61
		10			11 313	85	70			13 554	78	69			13 554	62	67
	800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43
		6			7 240	30	55			8 675	28	56			8 675	22	54
		8			9 654	54	62			11 566	50	64			11 566	40	61
		10			12 067	85	67			14 458	78	70			14 458	62	67
	850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43
		6			7 693	30	57			9 217	28	57			9 217	22	54
		8			10 257	54	65			12 289	50	64			12 289	40	61
		10			12 821	85	70			15 361	78	70			15 361	62	67
	900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44
		6			8 145	30	57			9 759	28	57			9 759	22	54
		8			10 860	54	65			13 012	50	64			13 012	40	62
		10			13 576	85	71			16 265	78	70			16 265	62	67
	950	4	0.665	0.398	5 732	15	49	0.722	0.477	6 867	11	45	0.760	0.477	6 867	13	48
		6			8 598	35	59			10 301	25	56			10 301	30	58
		8			11 464	62	67			13 735	44	63			13 735	53	66
		10			14 330	97	73			17 168	69	69			17 168	83	71
	1000	4	0.700	0.419	6 034	15	49	0.760	0.502	7 229	11	45	0.800	0.502	7 229	13	48
		6			9 050	35	59			10 843	25	56			10 843	30	58
		8			12 067	62	67			14 458	44	63			14 458	53	66
		10			15 084	97	73			18 072	69	69			18 072	83	72
	1050	4	0.735	0.440	6 335	15	49	0.798	0.527	7 590	11	46	0.840	0.527	7 590	13	48
		6			9 503	35	60			11 385	25	56			11 385	30	59
		8			12 671	62	67			15 180	44	64			15 180	53	66
		10			15 838	97	73			18 976	69	69			18 976	83	72
	1100	4	0.770	0.461	6 637	15	49	0.836	0.552	7 952	11	46	0.880	0.552	7 952	13	48
		6			9 955	35	60			11 928	25	56			11 928	30	59
		8			13 274	62	67			15 903	44	64			15 903	53	66
		10			16 592	97	73			19 879	69	70			19 879	83	72
	1150	4	0.805	0.482	6 939	15	50	0.874	0.577	8 313	11	46	0.920	0.577	8 313	13	48
		6			10 408	35	60			12 470	25	56			12 470	30	59
		8			13 877	62	68			16 626	44	64			16 626	53	66
		10			17 347	97	73			20 783	69	70			20 783	83	72
	1200	4	0.840	0.503	7 240	15	50	0.912	0.602	8 675	11	46	0.960	0.602	8 675	13	49
		6			10 860	35	60			13 012	25	57			13 012	30	59
		8			14 481	62	68			17 349	44	64			17 349	53	67
		10			18 101	97	74			21 686	69	70			21 686	83	72
	1250	4	0.875	0.524	7 542	15	50	0.950	0.628	9 036	11	46	1.000	0.628	9 036	13	49
		6			11 313	35	60			13 554	25	57			13 554	30	59
		8			15 084	62	68			18 072	44	64			18 072	53	67
		10			18 855	97	74			22 590	69	70			22 590	83	73

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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	890 S_k [m²]	890 S_e [m²]	890 Q [m³/h]	890 d_p [PA]	890 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]
	110	4	0.098	0.064	927	13	38	0.099	0.064	927	13	39	0.105	0.064	927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8			1 853	51	56			1 853	53	57			1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
	150	4	0.134	0.088	1 264	13	40	0.135	0.088	1 264	13	40	0.143	0.088	1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8			2 527	51	58			2 527	53	58			2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
	200	4	0.178	0.117	1 685	13	41	0.180	0.117	1 685	13	41	0.190	0.117	1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8			3 370	51	59			3 370	53	59			3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
	250	4	0.223	0.146	2 106	13	42	0.225	0.146	2 106	13	42	0.238	0.146	2 106	14	43
		6			3 159	29	52			3 159	30	53			3 159	32	54
		8			4 212	51	60			4 212	53	60			4 212	57	61
		10			5 265	79	66			5 265	83	66			5 265	89	67
	300	4	0.267	0.176	2 527	13	43	0.270	0.176	2 527	13	43	0.285	0.176	2 527	14	44
		6			3 791	29	53			3 791	30	54			3 791	32	55
		8			5 054	51	61			5 054	53	61			5 054	57	62
		10			6 318	79	66			6 318	83	67			6 318	89	68
	350	4	0.312	0.205	2 948	13	43	0.315	0.205	2 948	13	44	0.333	0.205	2 948	14	45
		6			4 423	29	54			4 423	30	54			4 423	32	55
		8			5 897	51	61			5 897	53	62			5 897	57	63
		10			7 371	79	67			7 371	83	68			7 371	89	69
	400	4	0.356	0.234	3 370	13	44	0.360	0.234	3 370	13	44	0.380	0.234	3 370	14	45
		6			5 054	29	54			5 054	30	55			5 054	32	56
		8			6 739	51	62			6 739	53	62			6 739	57	63
		10			8 424	79	68			8 424	83	68			8 424	89	69
	450	4	0.401	0.263	3 791	13	44	0.405	0.263	3 791	13	45	0.428	0.263	3 791	14	46
		6			5 686	29	55			5 686	30	55			5 686	32	56
		8			7 582	51	62			7 582	53	63			7 582	57	64
		10			9 477	79	68			9 477	83	69			9 477	89	70
	500	4	0.445	0.293	4 212	13	45	0.450	0.293	4 212	13	45	0.475	0.293	4 212	14	46
		6			6 318	29	55			6 318	30	56			6 318	32	57
		8			8 424	51	63			8 424	53	63			8 424	57	64
		10			10 530	79	69			10 530	83	69			10 530	89	70
	550	4	0.490	0.322	4 633	13	45	0.495	0.322	4 633	13	46	0.523	0.322	4 633	14	47
		6			6 950	29	56			6 950	30	56			6 950	32	57
		8			9 266	51	63			9 266	53	64			9 266	57	65
		10			11 583	79	69			11 583	83	70			11 583	89	70
	600	4	0.534	0.351	5 054	13	46	0.540	0.351	5 054	13	46	0.570	0.351	5 054	14	47
		6			7 582	29	56			7 582	30	57			7 582	32	58
		8			10 109	51	64			10 109	53	64			10 109	57	65
		10			12 636	79	69			12 636	83	70			12 636	89	71
	650	4	0.579	0.380	5 476	13	46	0.585	0.380	5 476	13	46	0.618	0.380	5 476	14	47
		6			8 213	29	56			8 213	30	57			8 213	32	58
		8			10 951	51	64			10 951	53	65			10 951	57	65
		10			13 689	79	70			13 689	83	70			13 689	89	71

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			890					900					950				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	700	4	0.623	0.410	5 897	13	46	0.630	0.410	5 897	13	47	0.665	0.410	5 897	14	48
		6			8 845	29	57			8 845	30	57			8 845	32	58
		8			11 794	51	64			11 794	53	65			11 794	57	66
		10			14 742	79	70			14 742	83	71			14 742	89	72
	750	4	0.668	0.439	6 318	13	47	0.675	0.439	6 318	13	47	0.713	0.439	6 318	14	48
		6			9 477	29	57			9 477	30	58			9 477	32	59
		8			12 636	51	65			12 636	53	65			12 636	57	66
		10			15 795	79	70			15 795	83	71			15 795	89	72
	800	4	0.712	0.468	6 739	13	47	0.720	0.468	6 739	13	47	0.760	0.468	6 739	14	48
		6			10 109	29	57			10 109	30	58			10 109	32	59
		8			13 478	51	65			13 478	53	65			13 478	57	66
		10			16 848	79	71			16 848	83	71			16 848	89	72
	850	4	0.757	0.497	7 160	13	47	0.765	0.497	7 160	13	48	0.808	0.497	7 160	14	49
		6			10 741	29	58			10 741	30	58			10 741	32	59
		8			14 321	51	65			14 321	53	66			14 321	57	67
		10			17 901	79	71			17 901	83	71			17 901	89	72
	900	4	0.801	0.527	7 582	13	47	0.810	0.527	7 582	13	48	0.855	0.527	7 582	14	49
		6			11 372	29	58			11 372	30	58			11 372	32	59
		8			15 163	51	65			15 163	53	66			15 163	57	67
		10			18 954	79	71			18 954	83	72			18 954	89	73
	950	4	0.846	0.556	8 003	11	46	0.855	0.556	8 003	12	47	0.903	0.556	8 003	14	49
		6			12 004	25	57			12 004	26	57			12 004	32	60
		8			16 006	45	64			16 006	47	65			16 006	57	67
		10			20 007	70	70			20 007	74	70			20 007	89	73
	1000	4	0.890	0.585	8 424	11	46	0.900	0.585	8 424	12	47	0.950	0.585	8 424	14	49
		6			12 636	25	57			12 636	26	57			12 636	32	60
		8			16 848	45	64			16 848	47	65			16 848	57	67
		10			21 060	70	70			21 060	74	71			21 060	89	73
	1050	4	0.935	0.614	8 845	11	46	0.945	0.614	8 845	12	47	0.998	0.614	8 845	14	49
		6			13 268	25	57			13 268	26	58			13 268	32	60
		8			17 690	45	65			17 690	47	65			17 690	57	67
		10			22 113	70	70			22 113	74	71			22 113	89	73
	1100	4	0.979	0.644	9 266	11	47	0.990	0.644	9 266	12	47	1.045	0.644	9 266	14	50
		6			13 900	25	57			13 900	26	58			13 900	32	60
		8			18 533	45	65			18 533	47	65			18 533	57	68
		10			23 166	70	71			23 166	73	71			23 166	89	74
	1150	4	1.024	0.673	9 688	11	47	1.035	0.673	9 688	12	47	1.093	0.673	9 688	14	50
		6			14 531	25	57			14 531	26	58			14 531	32	60
		8			19 375	45	65			19 375	47	65			19 375	57	68
		10			24 219	70	71			24 219	74	71			24 219	89	74
	1200	4	1.068	0.702	10 109	11	47	1.080	0.702	10 109	12	48	1.140	0.702	10 109	14	50
		6			15 163	25	58			15 163	26	58			15 163	32	61
		8			20 218	45	65			20 218	47	66			20 218	57	68
		10			25 272	70	71			25 272	74	71			25 272	89	74
	1250	4	1.113	0.731	10 530	11	47	1.125	0.731	10 530	12	48	1.188	0.731	10 530	14	50
		6			15 795	25	58			15 795	26	58			15 795	32	61
		8			21 060	45	65			21 060	47	66			21 060	57	68
		10			26 325	70	71			26 325	74	72			26 325	89	74

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1010					1050					1100				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0.111	0.073	1 058	12	38	0.116	0.073	1 058	13	39	0.121	0.073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0.152	0.100	1 443	12	40	0.158	0.100	1 443	13	40	0.165	0.100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0.202	0.134	1 924	12	41	0.210	0.134	1 924	13	41	0.220	0.134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
	250	4	0.253	0.167	2 405	12	42	0.263	0.167	2 405	13	42	0.275	0.167	2 405	15	44
		6			3 607	28	53			3 607	29	53			3 607	33	55
		8			4 810	50	60			4 810	51	60			4 810	59	62
		10			6 012	77	66			6 012	79	66			6 012	93	68
	300	4	0.303	0.200	2 886	12	43	0.315	0.200	2 886	13	43	0.330	0.200	2 886	15	45
		6			4 329	28	53			4 329	29	54			4 329	33	56
		8			5 772	50	61			5 772	51	61			5 772	59	63
		10			7 214	77	67			7 214	79	67			7 214	93	69
	350	4	0.354	0.234	3 367	12	43	0.368	0.234	3 367	13	44	0.385	0.234	3 367	15	46
		6			5 050	28	54			5 050	29	54			5 050	33	56
		8			6 733	50	62			6 733	51	62			6 733	59	64
		10			8 417	77	67			8 417	79	68			8 417	93	70
	400	4	0.404	0.267	3 848	12	44	0.420	0.267	3 848	13	44	0.440	0.267	3 848	15	46
		6			5 772	28	55			5 772	29	55			5 772	33	57
		8			7 695	50	62			7 695	51	62			7 695	59	64
		10			9 619	77	68			9 619	79	68			9 619	93	70
	450	4	0.455	0.301	4 329	12	45	0.473	0.301	4 329	13	45	0.495	0.301	4 329	15	47
		6			6 493	28	55			6 493	29	55			6 493	33	57
		8			8 657	50	63			8 657	51	63			8 657	59	65
		10			10 822	77	68			10 822	79	69			10 822	93	71
	500	4	0.505	0.334	4 810	12	45	0.525	0.334	4 810	13	45	0.550	0.334	4 810	15	47
		6			7 214	28	56			7 214	29	56			7 214	33	58
		8			9 619	50	63			9 619	51	63			9 619	59	65
		10			12 024	77	69			12 024	79	69			12 024	93	71
	550	4	0.556	0.367	5 291	12	45	0.578	0.367	5 291	13	46	0.605	0.367	5 291	15	48
		6			7 936	28	56			7 936	29	56			7 936	33	58
		8			10 581	50	63			10 581	51	64			10 581	59	66
		10			13 226	77	69			13 226	79	70			13 226	93	72
	600	4	0.606	0.401	5 772	12	46	0.630	0.401	5 772	13	46	0.660	0.401	5 772	15	48
		6			8 657	28	56			8 657	29	57			8 657	33	59
		8			11 543	50	64			11 543	51	64			11 543	59	66
		10			14 429	77	70			14 429	79	70			14 429	93	72
	650	4	0.657	0.434	6 252	12	46	0.683	0.434	6 252	13	46	0.715	0.434	6 252	15	48
		6			9 379	28	57			9 379	29	57			9 379	33	59
		8			12 505	50	64			12 505	51	65			12 505	59	67
		10			15 631	77	70			15 631	79	70			15 631	93	72

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1010 S_k [m²]	1010 S_e [m²]	1010 Q [m³/h]	1010 d_p [PA]	1010 L_{WA} [dB]	1050 S_k [m²]	1050 S_e [m²]	1050 Q [m³/h]	1050 d_p [PA]	1050 L_{WA} [dB]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1100 L_{WA} [dB]
	700	4	0.707	0.468	6 733	12	46	0.735	0.468	6 733	13	47	0.770	0.468	6 733	15	49
		6			10 100	28	57			10 100	29	57			10 100	33	59
		8			13 467	50	65			13 467	51	65			13 467	59	67
		10			16 834	77	70			16 834	79	71			16 834	93	73
	750	4	0.758	0.501	7 214	12	47	0.788	0.501	7 214	13	47	0.825	0.501	7 214	15	49
		6			10 822	28	57			10 822	29	58			10 822	33	60
		8			14 429	50	65			14 429	51	65			14 429	59	67
		10			18 036	77	71			18 036	79	71			18 036	93	73
	800	4	0.808	0.534	7 695	12	47	0.840	0.534	7 695	13	47	0.880	0.534	7 695	15	49
		6			11 543	28	58			11 543	29	58			11 543	33	60
		8			15 391	50	65			15 391	51	65			15 391	59	67
		10			19 238	77	71			19 238	79	71			19 238	93	73
	850	4	0.859	0.568	8 176	12	47	0.893	0.568	8 176	13	48	0.935	0.568	8 176	15	50
		6			12 264	28	58			12 264	29	58			12 264	33	60
		8			16 353	50	65			16 353	51	66			16 353	59	68
		10			20 441	77	71			20 441	79	72			20 441	93	74
	900	4	0.909	0.601	8 657	12	48	0.945	0.601	8 657	13	48	0.990	0.601	8 657	15	50
		6			12 986	28	58			12 986	29	58			12 986	33	60
		8			17 315	50	66			17 315	51	66			17 315	59	68
		10			21 643	77	71			21 643	79	72			21 643	93	74
	950	4	0.960	0.635	9 138	11	46	0.998	0.635	9 138	13	48	1.045	0.635	9 138	15	50
		6			13 707	25	57			13 707	29	59			13 707	33	61
		8			18 276	44	64			18 276	51	66			18 276	59	68
		10			22 846	69	70			22 846	79	72			22 846	93	74
	1000	4	1.010	0.668	9 619	11	46	1.050	0.668	9 619	13	48	1.100	0.668	9 619	15	50
		6			14 429	25	57			14 429	29	59			14 429	33	61
		8			19 238	44	65			19 238	51	66			19 238	59	68
		10			24 048	69	70			24 048	79	72			24 048	93	74
	1050	4	1.061	0.701	10 100	11	47	1.103	0.701	10 100	13	49	1.155	0.701	10 100	15	51
		6			15 150	25	57			15 150	29	59			15 150	33	61
		8			20 200	44	65			20 200	51	67			20 200	59	69
		10			25 250	69	71			25 250	79	72			25 250	93	74
	1100	4	1.111	0.735	10 581	11	47	1.155	0.735	10 581	13	49	1.210	0.735	10 581	15	51
		6			15 872	25	57			15 872	29	59			15 872	33	61
		8			21 162	44	65			21 162	51	67			21 162	59	69
		10			26 453	69	71			26 453	79	73			26 453	93	75
	1150	4	1.162	0.768	11 062	11	47	1.208	0.768	11 062	13	49	1.265	0.768	11 062	15	51
		6			16 593	25	58			16 593	29	60			16 593	33	62
		8			22 124	44	65			22 124	51	67			22 124	59	69
		10			27 655	69	71			27 655	79	73			27 655	93	75
	1200	4	1.212	0.802	11 543	11	47	1.260	0.802	11 543	13	49	1.320	0.802	11 543	15	51
		6			17 315	25	58			17 315	29	60			17 315	33	62
		8			23 086	44	65			23 086	51	67			23 086	59	69
		10			28 858	69	71			28 858	79	73			28 858	93	75
	1250	4	1.263	0.835	12 024	11	47	1.313	0.835	12 024	13	49	1.375	0.835	12 024	15	51
		6			18 036	25	58			18 036	29	60			18 036	33	62
		8			24 048	44	66			24 048	51	67			24 048	59	69
		10			30 060	69	71			30 060	79	73			30 060	93	75

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
	250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40
		6			4 055	27	52			4 055	30	54			4 504	24	51
		8			5 407	49	60			5 407	54	61			6 005	43	58
		10			6 759	76	66			6 759	84	67			7 506	66	64
	300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41
		6			4 866	27	53			4 866	30	54			5 404	24	51
		8			6 489	49	61			6 489	54	62			7 206	43	59
		10			8 111	76	66			8 111	84	68			9 007	66	65
	350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41
		6			5 678	27	54			5 678	30	55			6 305	24	52
		8			7 570	49	61			7 570	54	63			8 407	43	60
		10			9 463	76	67			9 463	84	68			10 508	66	65
	400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42
		6			6 489	27	54			6 489	30	56			7 206	24	53
		8			8 652	49	62			8 652	54	63			9 608	43	60
		10			10 814	76	68			10 814	84	69			12 010	66	66
	450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43
		6			7 300	27	55			7 300	30	56			8 106	24	53
		8			9 733	49	62			9 733	54	64			10 809	43	61
		10			12 166	76	68			12 166	84	70			13 511	66	66
	500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43
		6			8 111	27	55			8 111	30	57			9 007	24	54
		8			10 814	49	63			10 814	54	64			12 010	43	61
		10			13 518	76	69			13 518	84	70			15 012	66	67
	550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43
		6			8 922	27	56			8 922	30	57			9 908	24	54
		8			11 896	49	63			11 896	54	65			13 211	43	62
		10			14 870	76	69			14 870	84	70			16 513	66	67
	600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44
		6			9 733	27	56			9 733	30	57			10 809	24	54
		8			12 977	49	64			12 977	54	65			14 412	43	62
		10			16 222	76	69			16 222	84	71			18 014	66	68
	650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44
		6			10 544	27	56			10 544	30	58			11 709	24	55
		8			14 059	49	64			14 059	54	65			15 612	43	62
		10			17 573	76	70			17 573	84	71			19 516	66	68

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44
		6			11 355	27	57			11 355	30	58			12 610	24	55
		8			15 140	49	64			15 140	54	66			16 813	43	63
		10			18 925	76	70			18 925	84	71			21 017	66	68
	750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45
		6			12 166	27	57			12 166	30	58			13 511	24	55
		8			16 222	49	65			16 222	54	66			18 014	43	63
		10			20 277	76	70			20 277	84	72			22 518	66	69
	800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45
		6			12 977	27	57			12 977	30	59			14 412	24	56
		8			17 303	49	65			17 303	54	66			19 215	43	63
		10			21 629	76	71			21 629	84	72			24 019	66	69
	850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45
		6			13 788	27	58			13 788	30	59			15 312	24	56
		8			18 384	49	65			18 384	54	66			20 416	43	63
		10			22 981	76	71			22 981	84	72			25 520	66	69
	900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46
		6			14 599	27	58			14 599	30	59			16 213	24	56
		8			19 466	49	65			19 466	54	67			21 617	43	64
		10			24 332	76	71			24 332	84	73			27 022	66	69
	950	4	1.074	0.713	10 274	11	47	1.140	0.713	10 274	13	49	1.188	0.792	11 409	11	47
		6			15 411	24	57			15 411	30	60			17 114	24	57
		8			20 547	43	65			20 547	54	67			22 818	43	65
		10			25 684	67	70			25 684	84	73			28 523	66	71
	1000	4	1.130	0.751	10 814	11	47	1.200	0.751	10 814	13	50	1.250	0.834	12 010	11	47
		6			16 222	24	57			16 222	30	60			18 014	24	58
		8			21 629	43	65			21 629	54	68			24 019	43	65
		10			27 036	67	71			27 036	84	73			30 024	66	71
	1050	4	1.187	0.789	11 355	11	47	1.260	0.789	11 355	13	50	1.313	0.876	12 610	11	47
		6			17 033	24	58			17 033	30	60			18 915	24	58
		8			22 710	43	65			22 710	54	68			25 220	43	65
		10			28 388	67	71			28 388	84	74			31 525	66	71
	1100	4	1.243	0.826	11 896	11	47	1.320	0.826	11 896	13	50	1.375	0.917	13 211	11	47
		6			17 844	24	58			17 844	30	61			19 816	24	58
		8			23 792	43	65			23 792	54	68			26 421	43	65
		10			29 740	67	71			29 740	84	74			33 026	66	71
	1150	4	1.300	0.864	12 437	11	47	1.380	0.864	12 437	13	50	1.438	0.959	13 811	11	48
		6			18 655	24	58			18 655	30	61			20 717	24	58
		8			24 873	43	65			24 873	54	68			27 622	43	66
		10			31 091	67	71			31 091	84	74			34 528	66	71
	1200	4	1.356	0.901	12 977	11	48	1.440	0.901	12 977	13	50	1.500	1.001	14 412	11	48
		6			19 466	24	58			19 466	30	61			21 617	24	58
		8			25 955	43	66			25 955	54	68			28 823	43	66
		10			32 443	67	71			32 443	84	74			36 029	66	72
	1250	4	1.413	0.939	13 518	11	48	1.500	0.939	13 518	13	51	1.563	1.043	15 012	11	48
		6			20 277	24	58			20 277	30	61			22 518	24	59
		8			27 036	43	66			27 036	54	69			30 024	43	66
		10			33 795	67	72			33 795	84	74			37 530	66	72

The WIP PRO/V fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

13.7 | Estimated weights of mcr WIP PRO/V, mcr WIP PRO/V-M dampers [kg]

height H [mm]	width B [mm]														
	110	150	200	250	300	350	400	500	600	700	800	900	1000	1100	1250
263	3	4	5	7	8	9	11	14	16	19	22	25	28	31	34
300	3	4	6	8	9	11	12	16	19	22	25	29	33	37	41
400	4	6	8	12	12	15	17	21	25	30	34	38	42	46	50
500	5	8	10	13	16	18	21	27	32	37	43	48	53	58	63
600	7	9	12	16	19	22	25	32	38	45	51	58	65	72	79
700	8	11	15	18	22	26	30	37	45	52	60	68	76	84	92
800	9	12	17	21	25	30	34	43	51	60	69	77	85	93	101
900	10	14	19	24	29	34	38	48	58	68	77	87	97	107	117
1000	11	16	21	27	32	37	43	54	64	75	86	97	108	119	130
1100	13	17	23	29	35	41	47	59	71	83	95	106	117	128	139
1250	14	20	27	33	40	47	54	67	81	94	108	122	136	150	164

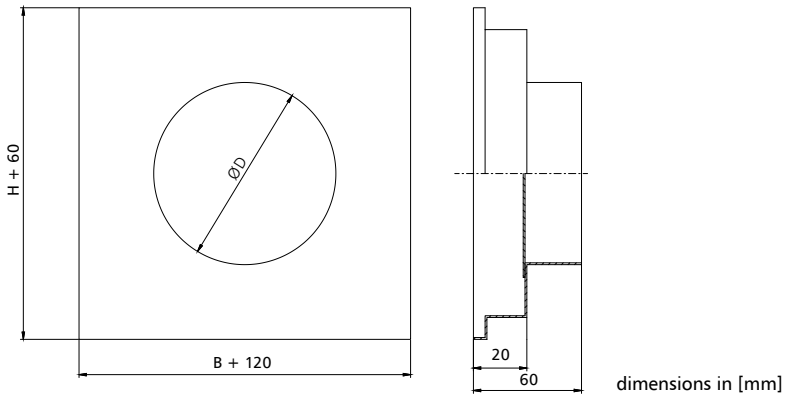
The table shows the weights of dampers with RST-KW1 trigger control mechanisms or actuators.

13.8 | Accessories

13.8.1 | mcr KRP connection stub

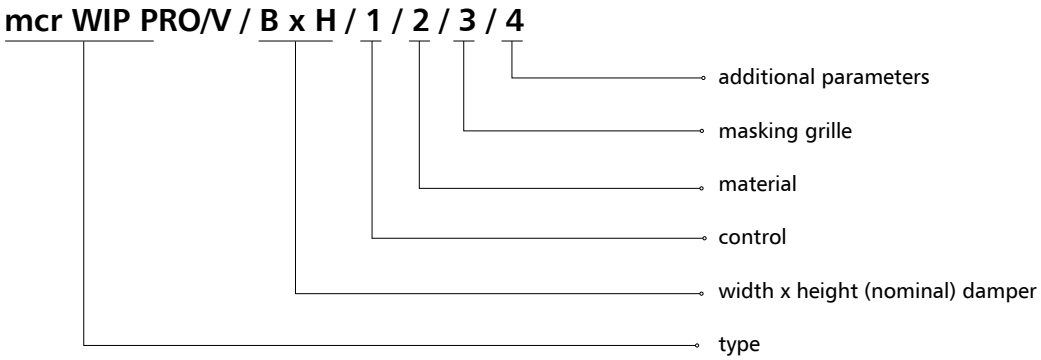
mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:
BxH - damper dimensions [mm]
ØD - diameter of the connection duct [mm]



dimensions in [mm]

13.9 | Marking



1 - control:

» **trigger and control mechanism, axial actuator**

BE24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC/DC
BEE24 – actuator without a return spring, U = 24 V AC/DC
BEE230 – actuator without a return spring, U = 230 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BEN230 – actuator without a return spring, U = 230 V AC/DC
MLE24 – actuator without a return spring, U = 24 V AC/DC
MLE230 – actuator without a return spring, U = 230 V AC
ME24 – actuator without a return spring, U = 24 V AC/DC
ME230 – actuator without a return spring, U = 230 V AC

2 - material:

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - masking element:

MSTx1 – single masking grille
MSTx2 – two masking grilles
MWPx1 – single mesh cover
MWPx2 – two mesh cover

4 - additional parameters :

» **Damper axis of rotation**

[no symbol] – horizontal axis of rotation
PP_D – vertical axis of rotation – mechanism at the bottom of the damper
PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**

[no symbol] – left damper
KP – right damper
LC – actuator long casing

» **Damper casing**

BU - earth pin

NOTE: **separate additional parameters entered with the "/" sign example marking:**

mcr WIP PRO/V 400 x 400 BLE24

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr WIP PROV/V, mcr WIP PROV/V-M | Multi-blade smoke control dampers for multi-compartment and single-compartment fire ventilation systems

BIM CAD

downloadable models
on the website
under the designer zone tab



CE
2334-CPR-0014

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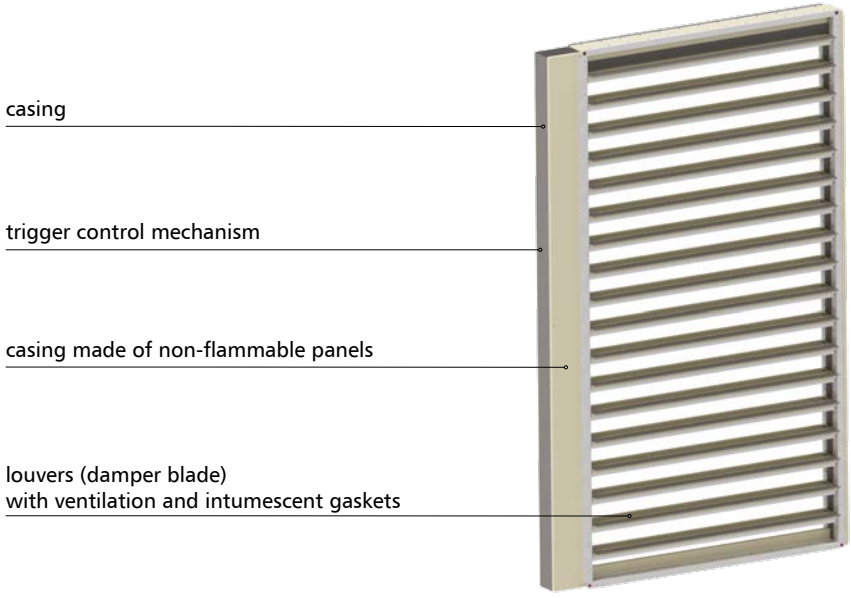
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» **EIS120, EIS90, EIS60 E_{600} 120**
» Fire resistance class: EI120 (v_{ed} i↔o)S1000C_{10000}AAmulti, EI90 (v_{ed} i↔o)S1000C_{10000}AAmulti, EI60 (v_{ed} i↔o)S1000C_{10000}AAmulti.
» Certificate of constancy of performance 2434-CPR-0374/W
» Dampers certified for compliance with EN 12101-8.
» Dampers rated under EN 13501-4 and tested under EN 1366-10.
» Narrow louvered smoke control dampers for fire ventilation systems.
» Certified installation on/in multi-compartment and single-compartment fire ventilation system ducts.
» Certified installation including a masking grille.
» Option of mounting dampers in modules (damper next to damper, damper above damper).

14.1| Application

mcr WIP PROV/V, mcr WIP PROV/V-M multi-blade smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr WIP PROV/V dampers are used in fire ventilation systems, while dampers marked as mcr WIP PROV/V-M are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 12 m/s. Due to their design, mcr WIP PROV/V, mcr WIP PROV/V-M fire dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the smoke control damper. Dampers may be installed in smoke extract ducts, shafts and at system ends.

14.2| Design



mcr WIP PROV/V, mcr WIP PROV/V-M | Multi-blade smoke control dampers for multi-compartment and single-compartment fire ventilation systems

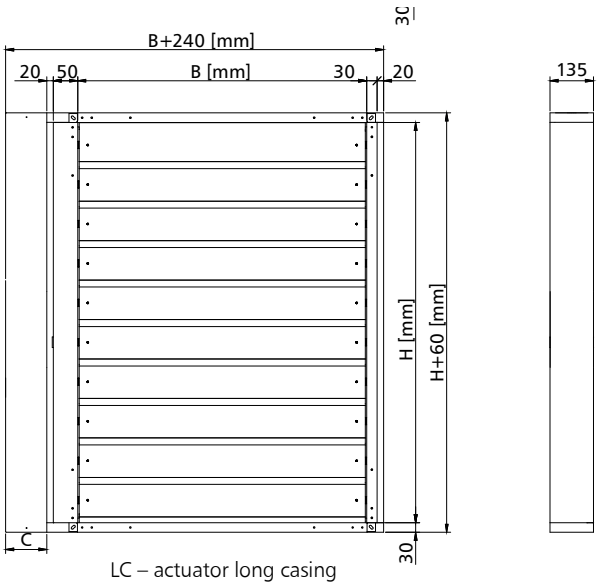
The multi-blade mcr WIP PROV/V damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. On the vertical side H, intumescent and ventilation gaskets are installed on the inside. The vertical edge with the actuator is protected by a fire resistant panel. The actuator cover is mounted on the side H of the damper. Each damper blade is made of two fire resistant panels, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples on both sides, along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a brass sleeve installed on the vertical side H of the fire damper casing.

14.3 | Versions

14.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the smoke control damper louvers are opened in the fire compartment area and closed in the other areas - the smoke control damper is released remotely by feeding the supply voltage to the trigger control mechanism.

mcr WIP PROV/V, mcr WIP PROV/V-M smoke control damper are equipped with a trigger control mechanism in the form of a BE, BEE, BEN, MLE, ME axial actuator without the return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN, MLE, ME series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator. mcr WIP PROV/V, mcr WIP PROV/V-M smoke control dampers with BE, BEE, BEN, MLE, ME actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may also be opened/closed manually using a key.



LC – actuator long casing

dimensions in [mm]

mechanism	C
BE, BEE, BEN, MLE, ME	120

14.4 | Dimensions

» **Rectangular dampers::**

» snominal width B: from 110 mm to 1200 mm
» nominal height H: from 270 mm to 2300 mm
» maximum single damper cross-section surface up to 2.76 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

14.5 | Installation

mcr WIP PROV/V rectangular dampers (with grille) are rated EI120(v_{ed} i↔o)S1000C_{10000}AAmulti if installed in/on building shafts made of blocks, bricks, hollow bricks, slabs or solid materials.

mcr WIP PROV/V rectangular dampers are rated EI120(v_{ed} i↔o)S1000C_{10000}AAmulti if installed in/on vertical/horizontal smoke exhaust ducts in accordance with EN 1366-8 or EN 1366-9, with a min. wall thickness of 50 mm.

mcr WIP PROV/V damper modules (damper next to damper, damper above damper) are rated EI120(v_{ed} i↔o)S1000C_{10000}AAmulti if installed in/on building shafts made of blocks, bricks, hollow bricks, slabs or solid materials.

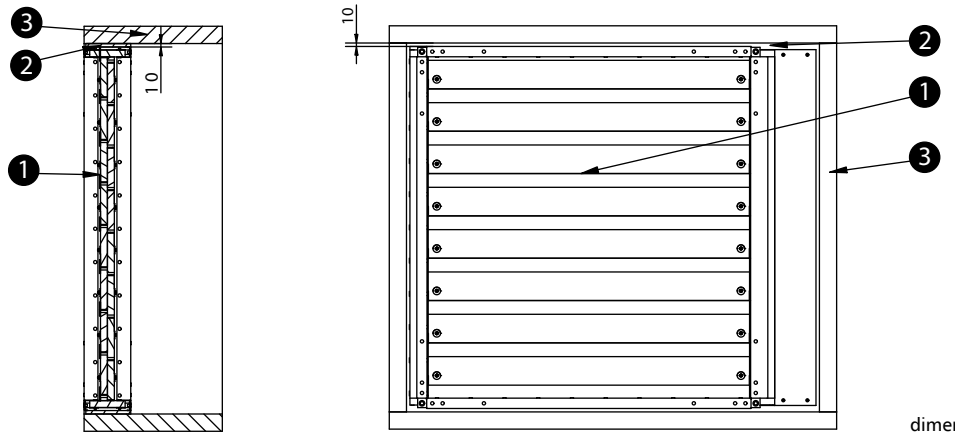
mcr WIP PROV/V damper modules (damper next to damper, damper above damper) are rated EI120(v_{ed} i↔o)S1000C_{10000}AAmulti when installed on vertical smoke exhaust ducts in accordance with EN 1366-8 or EN 1366-9, with a min. wall thickness of 50 mm.

mcr WIP PROV/V rectangular dampers are rated E600120(v_{ed} i↔o)S1000C_{10000}AAsingle in single-zone fire ventilation systems.

14.5.1 | Preparation of installation openings

The recommended size of the opening enabling correct installation of the mcr WIP PRO/V damper depends on the method and location of installation.
For a damper mounted on a horizontal section of a duct made of fire resistant panels, a gap of at least 10 mm should be left in its clearance on each side of the damper and filled around its perimeter with masonry mortar.
For a damper mounted on a horizontal section of a duct made of fire resistant panels "butt-on" to the duct wall, the damper should be sealed at the point of contact between the collar and the wall, and enclosed around the perimeter with board trims and sealed with assembly mortar.

» **installation in the opening clearance**

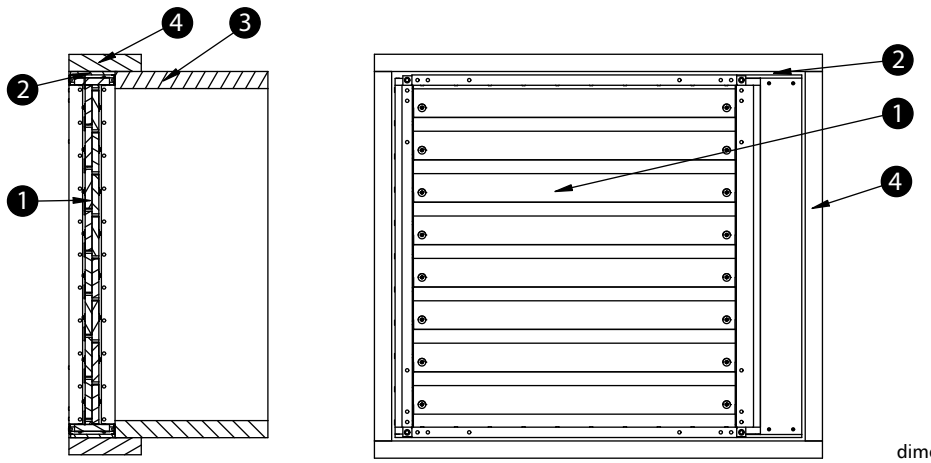


1. damper
2. masonry mortar*
3. duct

dimensions in [mm]

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

» **“butt-on” installation**



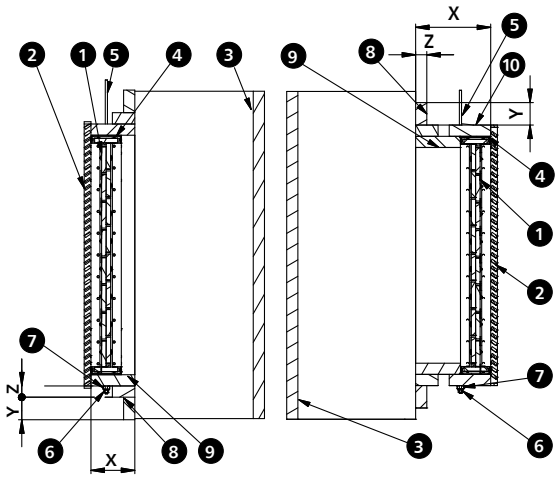
1. damper
2. masonry mortar*
3. duct
4. trim

dimensions in [mm]

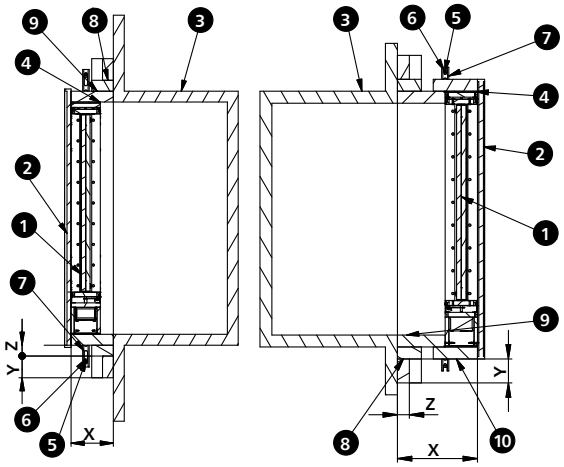
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.2 | Example installation on a vertical, solid or brick building shaft

» vertical section



» top view

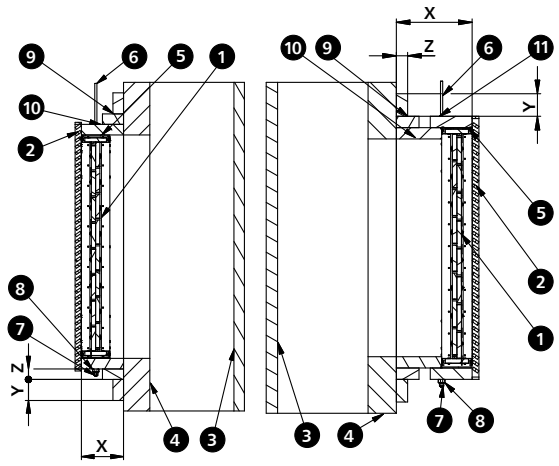


X - min. 135 mm
Y - min. 40mm - board trim
Z - min. 50mm - board trim

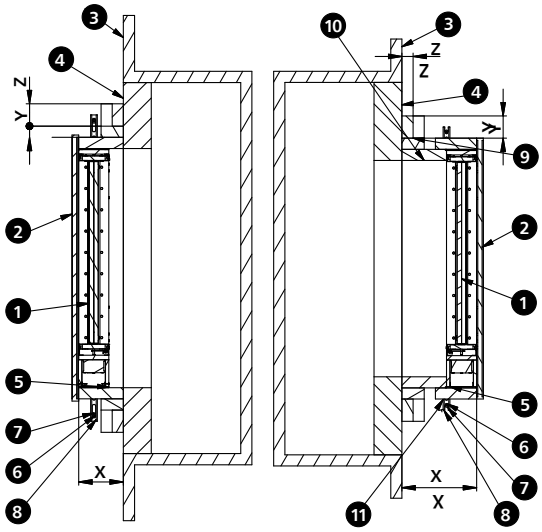
1. mcr WIP PROV damper
2. masking grille
3. construction shaft
4. masonry mortar*
5. suspension system - rod
6. suspension system, fastening according to EN 1366-8
7. suspension system - horizontal element
8. fire resistant panel elements
9. horizontal section of the duct made of fire resistant panels
10. fire resistant panel trim

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

» vertical section



» top view

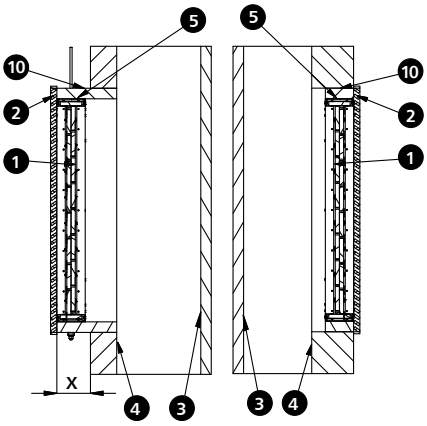


X - min. 135 mm
Y - min. 40mm - board trim
Z - min. 50mm - board trim

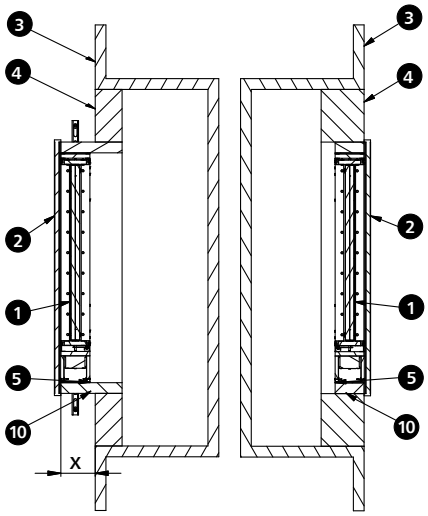
1. mcr WIP PROV damper
2. masking grille
3. construction shaft
4. closing wall of the shaft
5. masonry mortar*
6. suspension system, fastening
7. suspension system - horizontal element
8. suspension system, fastening
9. fire resistant panel elements
10. horizontal section of the duct made of fire resistant panels acc. to EN 1366-8
11. .fire resistant panel trim

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

» vertical section



» top view



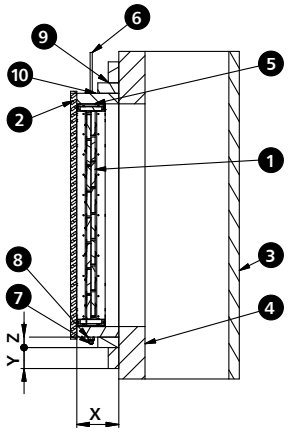
X – min. 135mm

1. mcr WIP PROV/V damper
2. masking grille
3. construction shaft
4. closing wall of the shaft
5. masonry mortar*
10. horizontal section of the duct made of fire resistant panels acc. to EN 1366-8

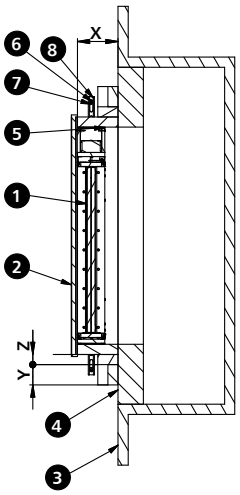
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.3 | Sample installation on a vertical building shaft made of boards

» vertical section



» top view



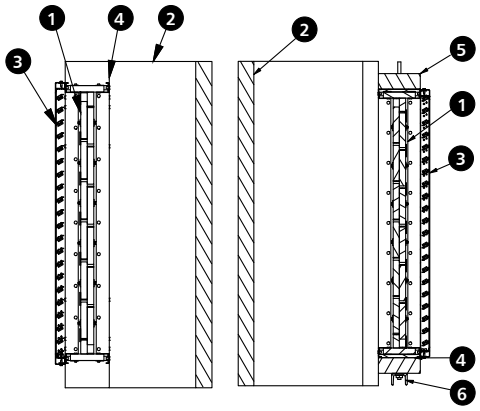
X - min. 135 mm
Y - min. 40mm - board trim
Z - min. 50mm - board trim

1. mcr WIP PROV damper
2. masking grille
3. construction shaft
4. closing wall of the shaft
5. masonry mortar*
6. suspension system, fastening
7. suspension system - horizontal element
8. suspension system, fastening
9. fire resistant panel elements
10. horizontal section of the duct made of fire resistant panels acc. to EN 1366-8

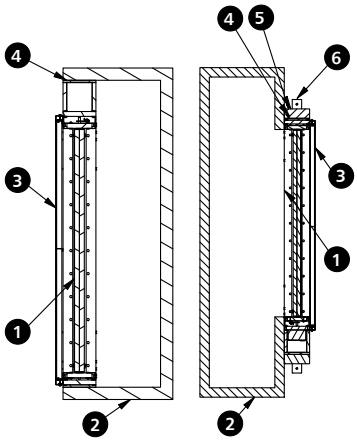
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.4 | Sample installation in/on a vertical fire ventilation duct or in/on an air supply duct

» vertical section



» top view

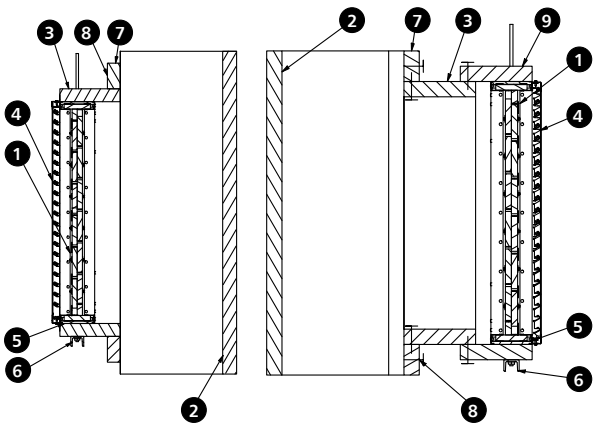


1. mcr WIP PROV damper
2. self-supporting, board duct
3. masking grille
4. masonry mortar*
5. board mounting trim
6. suspension system

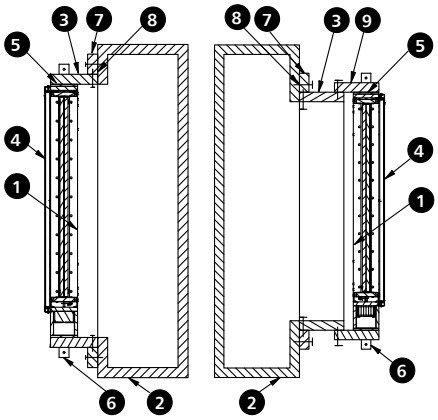
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.5 | Sample installation in/on a horizontal branch/section from a vertical fire ventilation duct or on an air supply duct

» vertical section



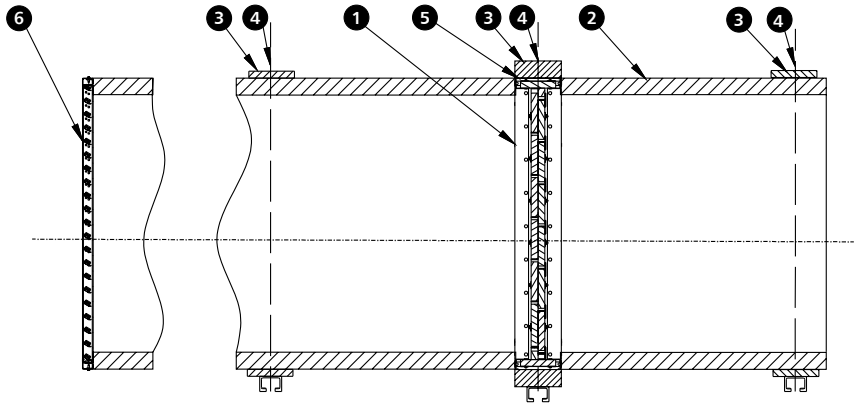
» top view



1. mcr WIP PROV damper
2. self-supporting, board duct
3. duct horizontal section
4. masking grille
5. masonry mortar*
6. suspension system
7. additional mounting trim
8. connectors - e.g. screws
9. trim around the damper circumference

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.6 | Sample installation in a horizontal section of a fire ventilation duct or an air supply duct

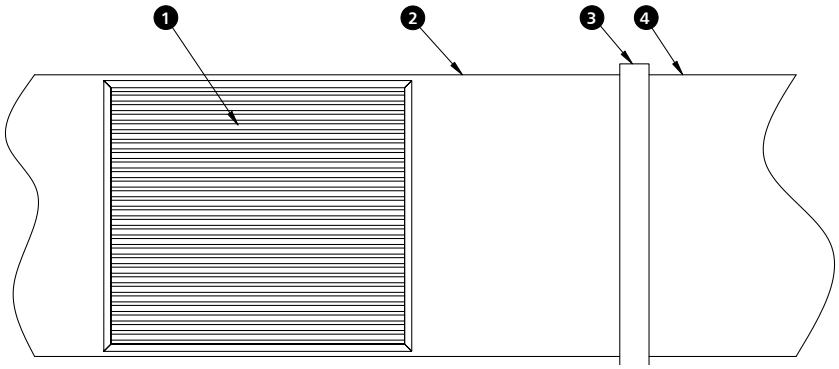


1. mcr WIP PROV damper
2. self-supporting duct
3. system trims of duct section or trim for damper casing
4. suspension system
5. masonry mortar*
6. masking grille at the damper or at the end of the installation

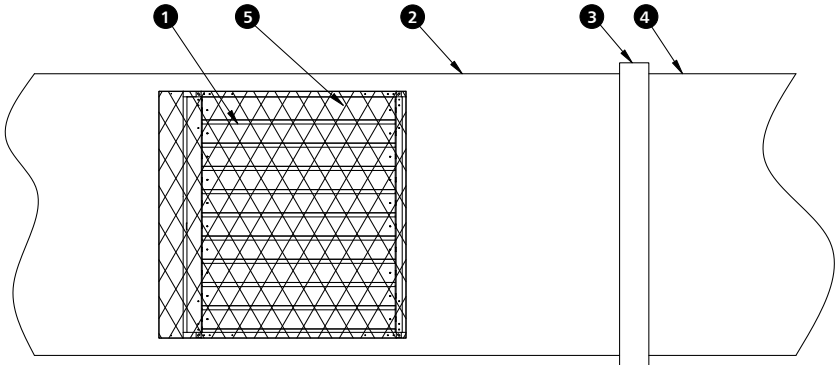
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.7 | Sample installation in the side wall of a horizontal section of a fire ventilation duct or an air supply duct

» **with a lamella masking grille type MST**



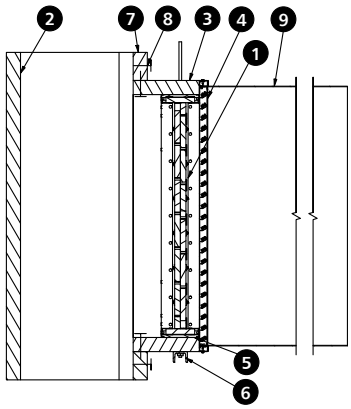
» **with a mesh masking grille type MWP**



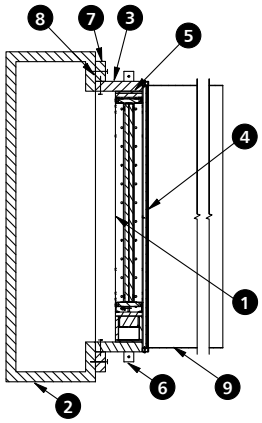
1. masking grille
2. duct horizontal section
3. trims - connecting duct sections
4. duct horizontal section
5. mcr WIP PROV damper

14.5.8 | Sample installation on a horizontal branch/section from a vertical fire ventilation duct - connection to a steel duct

» vertical section



» top view

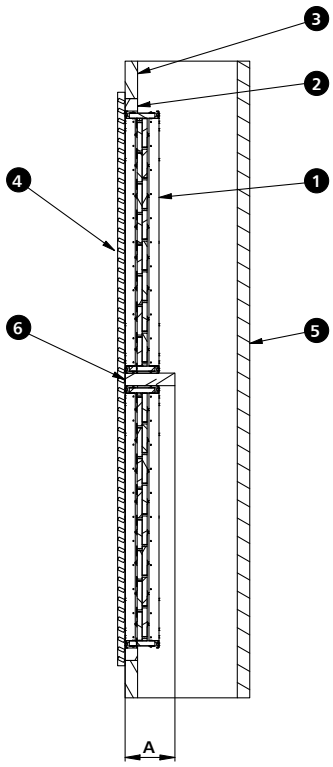


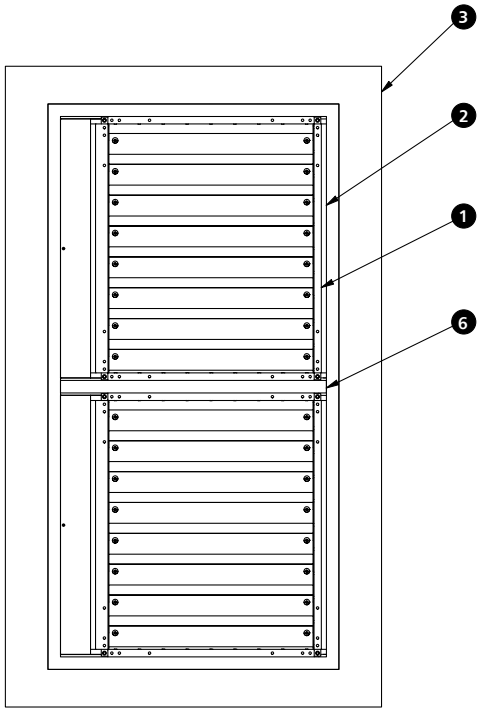
1. mcr WIP PROV damper
2. self-supporting duct
3. horizontal section of the duct (damper casing)
4. masking grille
5. masonry mortar*
6. suspension system
7. additional mounting trim
8. connectors - e.g. screws
9. horizontal steel duct

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.9 | Sample installation on/in the wall of a vertical fire ventilation duct or an air supply duct - damper above damper

» in the duct clearance

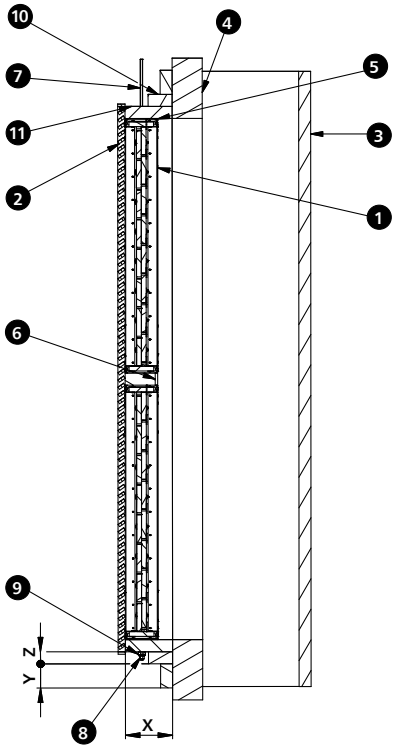


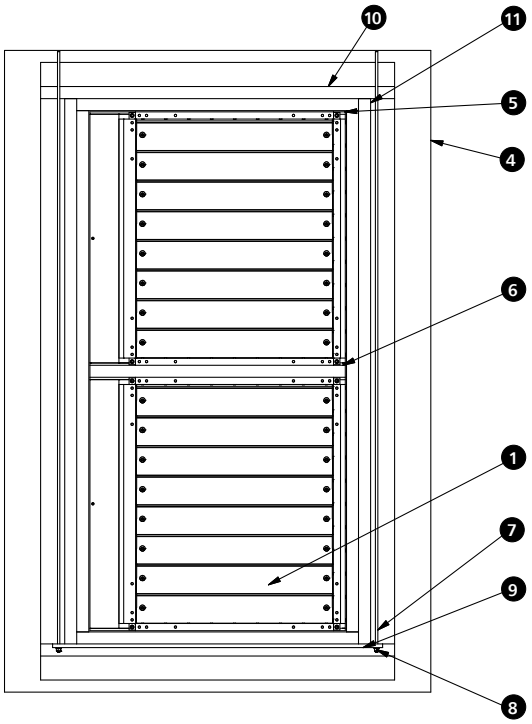


1. mcr WIP PROV damper
2. masonry mortar*
3. duct or shaft wall
4. masking grille
5. vertical duct or shaft
6. fire board strip, min. 50mm thick, width A, min. 135mm, placed between the dampers, sealed with masonry mortar

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

» on the shaft





X - min. 135mm
Y - min. 40 mm
- board trim
Z - min. 50 mm
- board trim

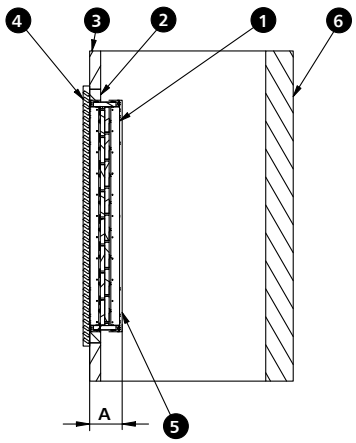
1. mcr WIP PROV damper
2. masking grille
3. shaft wall
4. shaft wall
5. masonry mortar*
6. fire board strip, min. 50mm thick, width A, min. 135mm, placed between the dampers, sealed with masonry mortar
7. suspension system
8. suspension system
9. suspension system
10. board trims
11. section of the duct made of panels acc. to EN 1366-8

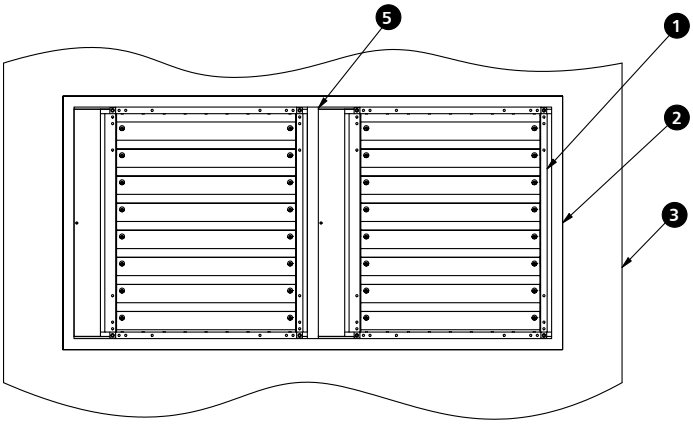
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

14.5.10 | Sample installation in the side wall of a horizontal section of a fire ventilation duct or an air supply duct

» in the duct clearance

The dampers can be mounted in the following configuration: left - left damper, left - right damper or right - left damper.



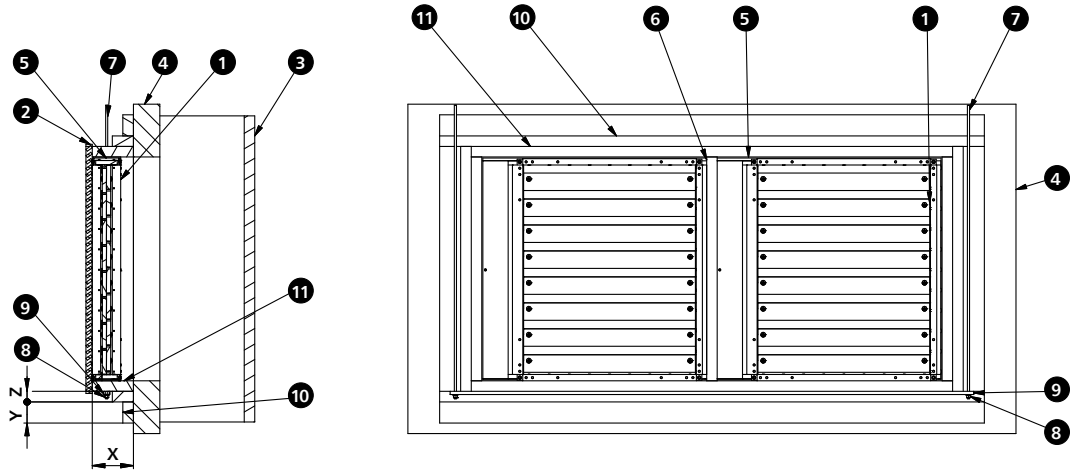


1. mcr WIP PROV damper
2. masonry mortar*
3. duct wall
4. masking grille
5. fire board strip, min. 50mm thick, width A, min. 135mm, placed between the dampers, sealed with masonry mortar
6. duct wall

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

» on the shaft

The dampers can be mounted in the following configuration: left - left damper, left - right damper or right - left damper.

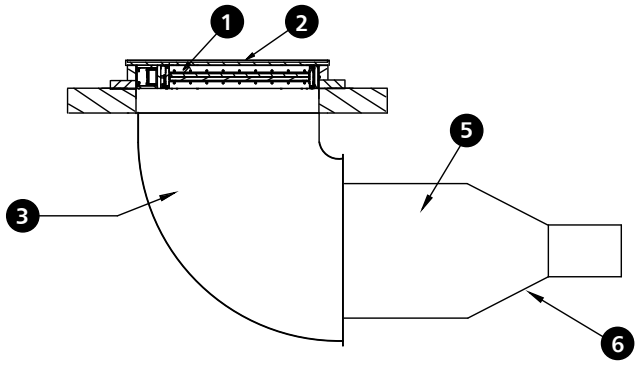


X - min. 135 mm
Y - min. 40mm - board trim
Z - min. 50mm - board trim

1. mcr WIP PROV damper
2. masking grille
3. shaft wall
4. shaft wall
5. masonry mortar*
6. fire board strip, min. 50mm thick, width A, min. 135mm, placed between the dampers, sealed with masonry mortar
7. suspension system
8. suspension system
9. suspension system
10. board trims
11. section of the duct made of panels

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters no worse than the recommended solutions and with appropriate approval documents confirming the appropriate fire resistance class.

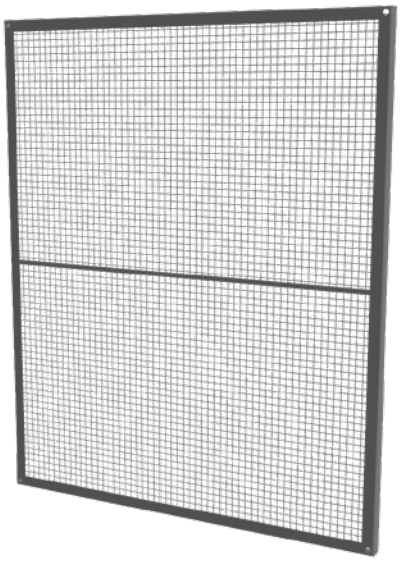
» Sample installation for non-standard applications



1. mcr WIP PROV damper
2. masking grille
3. smoke exhaust duct
4. duct reduction
5. duct narrowing

mcr WIP PROV/V, mcr WIP PROV/V-M multi-blade smoke control damper, thanks to its design, is adapted for installation in places where non-standard solutions are used. Installation can be performed in places where such elements as a bend, duct narrowing or reduction will be downstream of the smoke control damper. This allows for optimal use of space and ensures adequate airflow, and the damper itself allows for flexible adjustment to various ventilation system configurations.

14.5.11 | MWP mesh masking grille



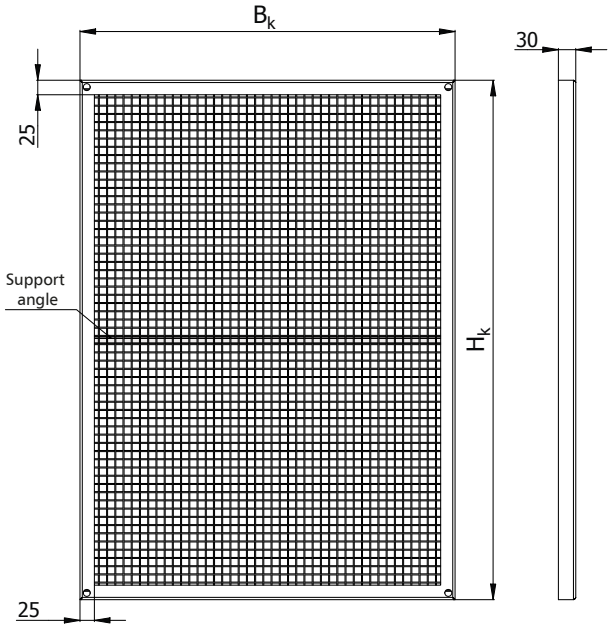
The MWP mesh masking grille is supplied together with the mcr WIP PROV damper by the damper manufacturer. The grille and its installation at the damper or at the end of the installation where the damper is installed is required for the damper to obtain the EIS120 class. In the absence of a masking grille, the damper has a resistance of EIS60 or EIS 90. In the event of additional architectural requirements, the design of the system masking grilles allows the damper and grille to be covered with additional masking grilles, or the system MWP grille to be replaced with any steel masking grille.

Legend:

mcr MWP / B x H / X

- grille type
- width x height
- additional parameters

X - colour code
[no symbol] - RAL9010
RALXXXX - selected colour code from the RAL palette
NONE - masking grille not painted



dimensions in [mm]

Number of support angles	Height [mm] - Hk	
	from	to
3	1850	2350
2	1350	1849
1	850	1349
0	200	849

14.5.12 | MST lamella masking grille



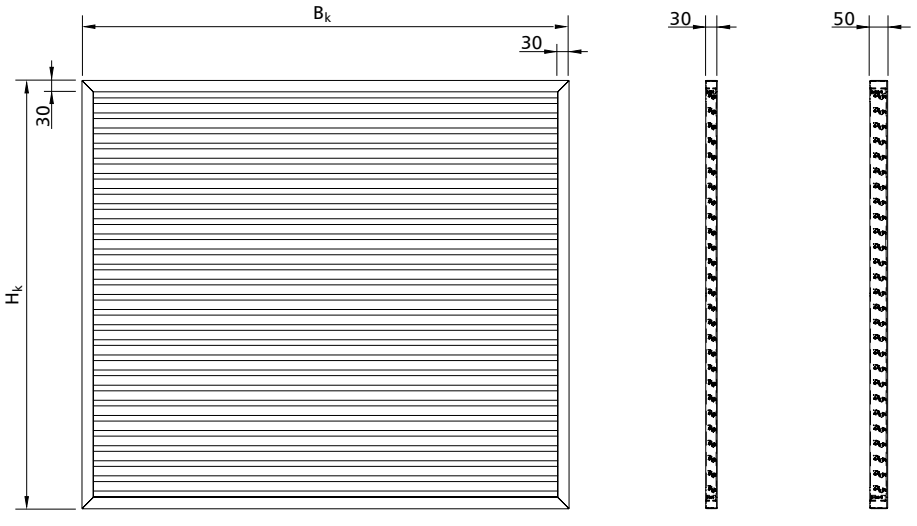
An alternative solution to the MWP mesh masking grid is the MST lamella masking grid. The grille is available in two versions: MST-30 and MST-50.
The grille consists of an internal body, which is attached to the wall with screws, and an external masking frame, which is put on the body after its assembly. The solution makes the mounting screws invisible, which guarantees a highly aesthetic solution. The cover grille is painted in RAL 9010 as standard. It can be painted in any RAL colour upon request or left unpainted.

Legend:

mcr MST / B x H / X

- X – additional parameters
- B x H – width x height
- mcr MST / – grille type

X - colour code
[no symbol] - RAL9010
RALXXXX - selected colour code from the RAL palette
NONE - masking grille not painted



MST-30 **MST-50** dimensions in [mm]

14.6 | mcr WIP PROV/V, mcr WIP PROV/V-M rectangular damper technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			270					300					350				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
	250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39
		6			918	30	47			918	30	48			918	36	50
		8			1 224	53	55			1 224	54	55			1 224	63	57
		10			1 530	82	61			1 530	85	61			1 530	99	63
	300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40
		6			1 102	30	48			1 102	30	49			1 102	36	51
		8			1 469	53	56			1 469	54	56			1 469	63	58
		10			1 836	82	62			1 836	85	62			1 836	99	64
	350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41
		6			1 285	30	49			1 285	30	49			1 285	36	51
		8			1 714	53	56			1 714	54	57			1 714	63	59
		10			2 142	82	62			2 142	85	63			2 142	99	65
	400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41
		6			1 469	30	49			1 469	30	50			1 469	36	52
		8			1 958	53	57			1 958	54	57			1 958	63	59
		10			2 448	82	63			2 448	84	63			2 448	99	65
	450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42
		6			1 652	30	50			1 652	30	50			1 652	36	52
		8			2 203	53	57			2 203	54	58			2 203	63	60
		10			2 754	82	63			2 754	84	64			2 754	99	66
	500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42
		6			1 836	30	50			1 836	30	51			1 836	36	53
		8			2 448	53	58			2 448	54	58			2 448	63	60
		10			3 060	82	64			3 060	85	64			3 060	99	66
	550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43
		6			2 020	4	24			2 020	30	51			2 020	36	53
		8			2 693	7	31			2 693	54	59			2 693	63	61
		10			3 366	10	37			3 366	84	65			3 366	99	67
	600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43
		6			2 203	30	51			2 203	30	52			2 203	36	54
		8			2 938	53	59			2 938	54	59			2 938	63	61
		10			3 672	82	65			3 672	85	65			3 672	99	67
	650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43
		6			2 387	30	52			2 387	30	52			2 387	36	54
		8			3 182	53	59			3 182	54	59			3 182	63	62
		10			3 978	82	65			3 978	85	65			3 978	99	67

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	270 S_k [m²]	270 S_e [m²]	270 Q [m³/h]	270 d_p [PA]	270 L_{WA} [dB]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]
	700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44
		6			2 570	30	52			2 570	30	52			2 570	36	54
		8			3 427	53	59			3 427	54	60			3 427	63	62
		10			4 284	82	65			4 284	85	66			4 284	99	68
	750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44
		6			2 754	30	52			2 754	30	53			2 754	36	55
		8			3 672	53	60			3 672	54	60			3 672	63	62
		10			4 590	82	66			4 590	85	66			4 590	99	68
	800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44
		6			2 938	30	52			2 938	30	53			2 938	36	55
		8			3 917	53	60			3 917	54	60			3 917	63	62
		10			4 896	82	66			4 896	84	66			4 896	99	68
	850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45
		6			3 121	30	53			3 121	30	53			3 121	36	55
		8			4 162	53	60			4 162	54	61			4 162	63	63
		10			5 202	82	66			5 202	84	66			5 202	99	68
	900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45
		6			3 305	30	53			3 305	30	53			3 305	36	55
		8			4 406	53	60			4 406	54	61			4 406	63	63
		10			5 508	82	66			5 508	84	67			5 508	99	69
	950	4	0.257	0.162	2 326	13	43	0.285	0.162	2 326	18	47	0.333	0.162	2 326	25	51
		6			3 488	30	53			3 488	41	57			3 488	57	62
		8			4 651	53	61			4 651	72	65			4 651	102	69
		10			5 814	82	67			5 814	113	71			5 814	159	75
	1000	4	0.270	0.170	2 448	13	43	0.300	0.170	2 448	18	47	0.350	0.170	2 448	25	51
		6			3 672	30	53			3 672	41	58			3 672	57	62
		8			4 896	53	61			4 896	72	65			4 896	102	70
		10			6 120	82	67			6 120	113	71			6 120	159	75
	1050	4	0.284	0.179	2 570	13	43	0.315	0.179	2 570	18	47	0.368	0.179	2 570	25	52
		6			3 856	30	54			3 856	41	58			3 856	57	62
		8			5 141	53	61			5 141	72	65			5 141	102	70
		10			6 426	82	67			6 426	113	71			6 426	159	76
	1100	4	0.297	0.187	2 693	13	43	0.330	0.187	2 693	18	47	0.385	0.187	2 693	25	52
		6			4 039	30	54			4 039	41	58			4 039	57	62
		8			5 386	53	61			5 386	72	65			5 386	102	70
		10			6 732	82	67			6 732	113	71			6 732	159	76
	1150	4	0.311	0.196	2 815	13	43	0.345	0.196	2 815	18	48	0.403	0.196	2 815	25	52
		6			4 223	30	54			4 223	41	58			4 223	57	63
		8			5 630	53	62			5 630	72	66			5 630	102	70
		10			7 038	82	67			7 038	113	71			7 038	159	76
	1200	4	0.324	0.204	2 938	13	44	0.360	0.204	2 938	18	48	0.420	0.204	2 938	25	52
		6			4 406	30	54			4 406	41	58			4 406	57	63
		8			5 875	53	62			5 875	72	66			5 875	102	70
		10			7 344	82	68			7 344	113	72			7 344	159	76
	1250	4	0.338	0.213	3 060	13	44	0.375	0.213	3 060	18	48	0.438	0.213	3 060	25	52
		6			4 590	30	54			4 590	41	59			4 590	57	63
		8			6 120	53	62			6 120	72	66			6 120	102	70
		10			7 650	82	68			7 650	113	72			7 650	159	76

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		390					450					520				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
	6			601	27	44			601	31	46			798	27	46
	8			802	47	52			802	55	54			1 064	48	53
	10			1 002	74	58			1 002	86	60			1 331	75	59
150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
	6			820	27	46			820	31	48			1 089	27	47
	8			1 093	47	53			1 093	55	55			1 452	48	54
	10			1 366	74	59			1 366	86	61			1 814	75	60
200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
	6			1 093	27	47			1 093	31	49			1 452	27	48
	8			1 457	47	54			1 457	55	56			1 935	48	56
	10			1 822	74	60			1 822	86	62			2 419	75	62
250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39
	6			1 366	27	48			1 366	31	50			1 814	27	49
	8			1 822	47	55			1 822	55	57			2 419	48	57
	10			2 277	74	61			2 277	86	63			3 024	75	63
300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39
	6			1 639	27	49			1 639	31	51			2 177	27	50
	8			2 186	47	56			2 186	55	58			2 903	48	57
	10			2 732	74	62			2 732	86	64			3 629	75	63
350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40
	6			1 913	27	49			1 913	31	51			2 540	27	51
	8			2 550	47	57			2 550	55	59			3 387	48	58
	10			3 188	74	63			3 188	86	65			4 234	75	64
400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41
	6			2 186	27	50			2 186	31	52			2 903	27	51
	8			2 915	47	57			2 915	55	59			3 871	48	59
	10			3 643	74	63			3 643	86	65			4 838	75	65
450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41
	6			2 459	27	50			2 459	31	52			3 266	27	52
	8			3 279	47	58			3 279	55	60			4 355	48	59
	10			4 099	74	64			4 099	86	66			5 443	75	65
500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42
	6			2 732	27	51			2 732	31	53			3 629	27	52
	8			3 643	47	58			3 643	55	60			4 838	48	60
	10			4 554	74	64			4 554	86	66			6 048	75	66
550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42
	6			3 006	27	51			3 006	31	53			3 992	27	53
	8			4 008	47	59			4 008	55	61			5 322	48	60
	10			5 009	74	65			5 009	86	67			6 653	75	66
600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42
	6			3 279	27	52			3 279	31	54			4 355	27	53
	8			4 372	47	59			4 372	55	61			5 806	48	61
	10			5 465	74	65			5 465	86	67			7 258	75	66
650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43
	6			3 552	27	52			3 552	31	54			4 717	27	53
	8			4 736	47	59			4 736	55	61			6 290	48	61
	10			5 920	74	65			5 920	86	67			7 862	75	67

B – nominal width [mm]
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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		390					450					520				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43
	6			3 825	27	52			3 825	31	54			5 080	27	54
	8			5 100	47	60			5 100	55	62			6 774	48	61
	10			6 376	74	66			6 376	86	68			8 467	75	67
750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43
	6			4 099	27	53			4 099	31	55			5 443	27	54
	8			5 465	47	60			5 465	55	62			7 258	48	61
	10			6 831	74	66			6 831	86	68			9 072	75	67
800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43
	6			4 372	27	53			4 372	31	54			5 806	27	54
	8			5 829	47	60			5 829	55	61			7 741	48	61
	10			7 286	74	66			7 286	86	67			9 677	75	67
850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43
	6			4 645	27	53			4 645	31	54			6 169	27	54
	8			6 193	47	61			6 193	55	61			8 225	48	61
	10			7 742	74	66			7 742	86	67			10 282	75	67
900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43
	6			4 918	27	53			4 918	31	54			6 532	27	54
	8			6 558	47	61			6 558	55	61			8 709	48	61
	10			8 197	74	67			8 197	86	67			10 886	75	67
950	4	0.371	0.240	3 461	12	43	0.428	0.240	3 461	18	49	0.494	0.319	4 596	12	44
	6			5 192	27	54			5 192	41	59			6 895	27	55
	8			6 922	47	61			6 922	74	67			9 193	48	62
	10			8 653	74	67			8 653	115	73			11 491	75	68
1000	4	0.390	0.253	3 643	12	43	0.450	0.253	3 643	18	49	0.520	0.336	4 838	12	45
	6			5 465	27	54			5 465	41	60			7 258	27	55
	8			7 286	47	61			7 286	74	67			9 677	48	63
	10			9 108	74	67			9 108	115	73			12 096	75	69
1050	4	0.410	0.266	3 825	12	43	0.473	0.266	3 825	18	49	0.546	0.353	5 080	12	45
	6			5 738	27	54			5 738	41	60			7 620	27	55
	8			7 651	47	62			7 651	74	67			10 161	48	63
	10			9 563	74	67			9 563	115	73			12 701	75	69
1100	4	0.429	0.278	4 008	12	44	0.495	0.278	4 008	18	49	0.572	0.370	5 322	12	45
	6			6 011	27	54			6 011	41	60			7 983	27	56
	8			8 015	47	62			8 015	74	67			10 644	48	63
	10			10 019	74	68			10 019	115	73			13 306	75	69
1150	4	0.449	0.291	4 190	12	44	0.518	0.291	4 190	18	50	0.598	0.386	5 564	12	45
	6			6 285	27	54			6 285	41	60			8 346	27	56
	8			8 379	47	62			8 379	74	68			11 128	48	63
	10			10 474	74	68			10 474	115	73			13 910	75	69
1200	4	0.468	0.304	4 372	12	44	0.540	0.304	4 372	18	50	0.624	0.403	5 806	12	45
	6			6 558	27	55			6 558	41	60			8 709	27	56
	8			8 744	47	62			8 744	74	68			11 612	48	64
	10			10 930	74	68			10 930	115	74			14 515	75	69
1250	4	0.488	0.316	4 554	12	44	0.563	0.316	4 554	18	50	0.650	0.420	6 048	12	46
	6			6 831	27	55			6 831	41	61			9 072	27	56
	8			9 108	47	62			9 108	74	68			12 096	48	64
	10			11 385	74	68			11 385	115	74			15 120	75	70

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
	110	4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
	150	4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
	200	4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
	250	4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40
		6			1 814	29	50			2 263	26	50			2 263	27	50
		8			2 419	51	57			3 017	46	57			3 017	48	58
		10			3 024	79	63			3 771	72	63			3 771	76	64
	300	4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41
		6			2 177	29	51			2 715	26	50			2 715	27	51
		8			2 903	51	58			3 620	46	58			3 620	48	59
		10			3 629	79	64			4 525	72	64			4 525	76	64
	350	4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41
		6			2 540	29	51			3 168	26	51			3 168	27	52
		8			3 387	51	59			4 224	46	58			4 224	48	59
		10			4 234	79	65			5 279	72	64			5 279	76	65
	400	4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42
		6			2 903	29	52			3 620	26	52			3 620	27	52
		8			3 871	51	59			4 827	46	59			4 827	48	60
		10			4 838	79	65			6 034	72	65			6 034	76	66
	450	4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42
		6			3 266	29	52			4 073	26	52			4 073	27	53
		8			4 355	51	60			5 430	46	60			5 430	48	60
		10			5 443	79	66			6 788	72	65			6 788	76	66
	500	4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43
		6			3 629	29	53			4 525	26	53			4 525	27	53
		8			4 838	51	60			6 034	46	60			6 034	48	61
		10			6 048	79	66			7 542	72	66			7 542	76	67
	550	4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43
		6			3 992	29	53			4 978	26	53			4 978	27	54
		8			5 322	51	61			6 637	46	60			6 637	48	61
		10			6 653	79	67			8 296	72	66			8 296	76	67
	600	4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44
		6			4 355	29	54			5 430	26	53			5 430	27	54
		8			5 806	51	61			7 240	46	61			7 240	48	62
		10			7 258	79	67			9 050	72	67			9 050	76	67
	650	4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44
		6			4 717	29	54			5 883	26	54			5 883	27	54
		8			6 290	51	62			7 844	46	61			7 844	48	62
		10			7 862	79	67			9 805	72	67			9 805	76	68

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]	640 S_k [m²]	640 S_e [m²]	640 Q [m³/h]	640 d_p [PA]	640 L_{WA} [dB]	650 S_k [m²]	650 S_e [m²]	650 Q [m³/h]	650 d_p [PA]	650 L_{WA} [dB]
700		4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44
		6			5 080	29	54			6 335	26	54			6 335	27	55
		8			6 774	51	62			8 447	46	61			8 447	48	62
		10			8 467	79	68			10 559	72	67			10 559	76	68
750		4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44
		6			5 443	29	55			6 788	26	54			6 788	27	55
		8			7 258	51	62			9 050	46	62			9 050	48	63
		10			9 072	79	68			11 313	72	68			11 313	76	68
800		4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44
		6			5 806	29	55			7 240	26	55			7 240	27	55
		8			7 741	51	62			9 654	46	62			9 654	48	63
		10			9 677	79	68			12 067	72	68			12 067	76	68
850		4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44
		6			6 169	29	55			7 693	26	55			7 693	27	55
		8			8 225	51	63			10 257	46	62			10 257	48	63
		10			10 282	79	69			12 821	72	68			12 821	76	68
900		4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44
		6			6 532	29	56			8 145	26	52			8 145	27	55
		8			8 709	51	63			10 860	46	60			10 860	48	63
		10			10 886	79	69			13 576	72	65			13 576	76	68
950		4	0.523	0.319	4 596	15	47	0.608	0.398	5 732	11	45	0.618	0.398	5 732	12	46
		6			6 895	33	57			8 598	26	55			8 598	27	56
		8			9 193	58	65			11 464	46	63			11 464	48	64
		10			11 491	91	71			14 330	72	69			14 330	76	69
1000		4	0.550	0.336	4 838	15	47	0.640	0.419	6 034	11	45	0.650	0.419	6 034	12	46
		6			7 258	33	58			9 050	26	56			9 050	27	56
		8			9 677	58	65			12 067	46	63			12 067	48	64
		10			12 096	91	71			15 084	72	69			15 084	76	70
1050		4	0.578	0.353	5 080	15	47	0.672	0.440	6 335	11	45	0.683	0.440	6 335	12	46
		6			7 620	33	58			9 503	26	56			9 503	27	57
		8			10 161	58	65			12 671	46	63			12 671	48	64
		10			12 701	91	71			15 838	72	69			15 838	76	70
1100		4	0.605	0.370	5 322	15	48	0.704	0.461	6 637	11	45	0.715	0.461	6 637	12	46
		6			7 983	33	58			9 955	26	56			9 955	27	57
		8			10 644	58	66			13 274	46	63			13 274	48	64
		10			13 306	91	71			16 592	72	69			16 592	76	70
1150		4	0.633	0.386	5 564	15	48	0.736	0.482	6 939	11	46	0.748	0.482	6 939	12	46
		6			8 346	33	58			10 408	26	56			10 408	27	57
		8			11 128	58	66			13 877	46	64			13 877	48	64
		10			13 910	91	72			17 347	72	69			17 347	76	70
1200		4	0.660	0.403	5 806	15	48	0.768	0.503	7 240	11	46	0.780	0.503	7 240	12	47
		6			8 709	33	58			10 860	26	56			10 860	27	57
		8			11 612	58	66			14 481	46	64			14 481	48	65
		10			14 515	91	72			18 101	72	70			18 101	76	70
1250		4	0.688	0.420	6 048	15	48	0.800	0.524	7 542	11	46	0.813	0.524	7 542	12	47
		6			9 072	33	59			11 313	26	57			11 313	27	57
		8			12 096	58	66			15 084	46	64			15 084	48	65
		10			15 120	91	72			18 855	72	70			18 855	76	71

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	760 S_k [m²]	760 S_e [m²]	760 Q [m³/h]	760 d_p [PA]	760 L_{WA} [dB]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]
	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
	250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38
		6			2 263	30	52			2 711	28	51			2 711	22	49
		8			3 017	54	59			3 614	50	59			3 614	40	56
		10			3 771	85	65			4 518	78	65			4 518	62	62
	300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39
		6			2 715	30	53			3 253	28	52			3 253	22	49
		8			3 620	54	60			4 337	50	60			4 337	40	57
		10			4 525	85	66			5 422	78	66			5 422	62	63
	350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39
		6			3 168	30	53			3 795	28	53			3 795	22	50
		8			4 224	54	61			5 060	50	60			5 060	40	57
		10			5 279	85	66			6 325	78	66			6 325	62	63
	400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40
		6			3 620	30	54			4 337	28	53			4 337	22	51
		8			4 827	54	61			5 783	50	61			5 783	40	58
		10			6 034	85	67			7 229	78	67			7 229	62	64
	450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41
		6			4 073	30	54			4 879	28	54			4 879	22	51
		8			5 430	54	62			6 506	50	61			6 506	40	59
		10			6 788	85	68			8 132	78	67			8 132	62	64
	500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41
		6			4 525	30	55			5 422	28	54			5 422	22	52
		8			6 034	54	62			7 229	50	62			7 229	40	59
		10			7 542	85	68			9 036	78	68			9 036	62	65
	550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41
		6			4 978	30	55			5 964	28	55			5 964	22	52
		8			6 637	54	63			7 952	50	62			7 952	40	59
		10			8 296	85	68			9 940	78	68			9 940	62	65
	600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42
		6			5 430	30	56			6 506	28	55			6 506	22	52
		8			7 240	54	63			8 675	50	63			8 675	40	60
		10			9 050	85	69			10 843	78	69			10 843	62	66
	650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42
		6			5 883	30	56			7 048	28	56			7 048	22	53
		8			7 844	54	63			9 397	50	63			9 397	40	60
		10			9 805	85	69			11 747	78	69			11 747	62	66

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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	760 S_k [m²]	760 S_e [m²]	760 Q [m³/h]	760 d_p [PA]	760 L_{WA} [dB]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]
	700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42
		6			6 335	30	56			7 590	28	56			7 590	22	53
		8			8 447	54	64			10 120	50	63			10 120	40	61
		10			10 559	85	69			12 650	78	69			12 650	62	66
	750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43
		6			6 788	30	56			8 132	28	56			8 132	22	53
		8			9 050	54	64			10 843	50	64			10 843	40	61
		10			11 313	85	70			13 554	78	69			13 554	62	67
	800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43
		6			7 240	30	55			8 675	28	56			8 675	22	54
		8			9 654	54	62			11 566	50	64			11 566	40	61
		10			12 067	85	67			14 458	78	70			14 458	62	67
	850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43
		6			7 693	30	57			9 217	28	57			9 217	22	54
		8			10 257	54	65			12 289	50	64			12 289	40	61
		10			12 821	85	70			15 361	78	70			15 361	62	67
	900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44
		6			8 145	30	57			9 759	28	57			9 759	22	54
		8			10 860	54	65			13 012	50	64			13 012	40	62
		10			13 576	85	71			16 265	78	70			16 265	62	67
	950	4	0.665	0.398	5 732	15	49	0.722	0.477	6 867	11	45	0.760	0.477	6 867	13	48
		6			8 598	35	59			10 301	25	56			10 301	30	58
		8			11 464	62	67			13 735	44	63			13 735	53	66
		10			14 330	97	73			17 168	69	69			17 168	83	71
	1000	4	0.700	0.419	6 034	15	49	0.760	0.502	7 229	11	45	0.800	0.502	7 229	13	48
		6			9 050	35	59			10 843	25	56			10 843	30	58
		8			12 067	62	67			14 458	44	63			14 458	53	66
		10			15 084	97	73			18 072	69	69			18 072	83	72
	1050	4	0.735	0.440	6 335	15	49	0.798	0.527	7 590	11	46	0.840	0.527	7 590	13	48
		6			9 503	35	60			11 385	25	56			11 385	30	59
		8			12 671	62	67			15 180	44	64			15 180	53	66
		10			15 838	97	73			18 976	69	69			18 976	83	72
	1100	4	0.770	0.461	6 637	15	49	0.836	0.552	7 952	11	46	0.880	0.552	7 952	13	48
		6			9 955	35	60			11 928	25	56			11 928	30	59
		8			13 274	62	67			15 903	44	64			15 903	53	66
		10			16 592	97	73			19 879	69	70			19 879	83	72
	1150	4	0.805	0.482	6 939	15	50	0.874	0.577	8 313	11	46	0.920	0.577	8 313	13	48
		6			10 408	35	60			12 470	25	56			12 470	30	59
		8			13 877	62	68			16 626	44	64			16 626	53	66
		10			17 347	97	73			20 783	69	70			20 783	83	72
	1200	4	0.840	0.503	7 240	15	50	0.912	0.602	8 675	11	46	0.960	0.602	8 675	13	49
		6			10 860	35	60			13 012	25	57			13 012	30	59
		8			14 481	62	68			17 349	44	64			17 349	53	67
		10			18 101	97	74			21 686	69	70			21 686	83	72
	1250	4	0.875	0.524	7 542	15	50	0.950	0.628	9 036	11	46	1.000	0.628	9 036	13	49
		6			11 313	35	60			13 554	25	57			13 554	30	59
		8			15 084	62	68			18 072	44	64			18 072	53	67
		10			18 855	97	74			22 590	69	70			22 590	83	73

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	890 S_k [m²]	890 S_e [m²]	890 Q [m³/h]	890 d_p [PA]	890 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]
110		4	0.098	0.064	927	13	38	0.099	0.064	927	13	39	0.105	0.064	927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8			1 853	51	56			1 853	53	57			1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
150		4	0.134	0.088	1 264	13	40	0.135	0.088	1 264	13	40	0.143	0.088	1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8			2 527	51	58			2 527	53	58			2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
200		4	0.178	0.117	1 685	13	41	0.180	0.117	1 685	13	41	0.190	0.117	1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8			3 370	51	59			3 370	53	59			3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
250		4	0.223	0.146	2 106	13	42	0.225	0.146	2 106	13	42	0.238	0.146	2 106	14	43
		6			3 159	29	52			3 159	30	53			3 159	32	54
		8			4 212	51	60			4 212	53	60			4 212	57	61
		10			5 265	79	66			5 265	83	66			5 265	89	67
300		4	0.267	0.176	2 527	13	43	0.270	0.176	2 527	13	43	0.285	0.176	2 527	14	44
		6			3 791	29	53			3 791	30	54			3 791	32	55
		8			5 054	51	61			5 054	53	61			5 054	57	62
		10			6 318	79	66			6 318	83	67			6 318	89	68
350		4	0.312	0.205	2 948	13	43	0.315	0.205	2 948	13	44	0.333	0.205	2 948	14	45
		6			4 423	29	54			4 423	30	54			4 423	32	55
		8			5 897	51	61			5 897	53	62			5 897	57	63
		10			7 371	79	67			7 371	83	68			7 371	89	69
400		4	0.356	0.234	3 370	13	44	0.360	0.234	3 370	13	44	0.380	0.234	3 370	14	45
		6			5 054	29	54			5 054	30	55			5 054	32	56
		8			6 739	51	62			6 739	53	62			6 739	57	63
		10			8 424	79	68			8 424	83	68			8 424	89	69
450		4	0.401	0.263	3 791	13	44	0.405	0.263	3 791	13	45	0.428	0.263	3 791	14	46
		6			5 686	29	55			5 686	30	55			5 686	32	56
		8			7 582	51	62			7 582	53	63			7 582	57	64
		10			9 477	79	68			9 477	83	69			9 477	89	70
500		4	0.445	0.293	4 212	13	45	0.450	0.293	4 212	13	45	0.475	0.293	4 212	14	46
		6			6 318	29	55			6 318	30	56			6 318	32	57
		8			8 424	51	63			8 424	53	63			8 424	57	64
		10			10 530	79	69			10 530	83	69			10 530	89	70
550		4	0.490	0.322	4 633	13	45	0.495	0.322	4 633	13	46	0.523	0.322	4 633	14	47
		6			6 950	29	56			6 950	30	56			6 950	32	57
		8			9 266	51	63			9 266	53	64			9 266	57	65
		10			11 583	79	69			11 583	83	70			11 583	89	70
600		4	0.534	0.351	5 054	13	46	0.540	0.351	5 054	13	46	0.570	0.351	5 054	14	47
		6			7 582	29	56			7 582	30	57			7 582	32	58
		8			10 109	51	64			10 109	53	64			10 109	57	65
		10			12 636	79	69			12 636	83	70			12 636	89	71
650		4	0.579	0.380	5 476	13	46	0.585	0.380	5 476	13	46	0.618	0.380	5 476	14	47
		6			8 213	29	56			8 213	30	57			8 213	32	58
		8			10 951	51	64			10 951	53	65			10 951	57	65
		10			13 689	79	70			13 689	83	70			13 689	89	71

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	890 S_k [m²]	890 S_e [m²]	890 Q [m³/h]	890 d_p [PA]	890 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]
700		4	0.623	0.410	5 897	13	46	0.630	0.410	5 897	13	47	0.665	0.410	5 897	14	48
		6			8 845	29	57			8 845	30	57			8 845	32	58
		8			11 794	51	64			11 794	53	65			11 794	57	66
		10			14 742	79	70			14 742	83	71			14 742	89	72
750		4	0.668	0.439	6 318	13	47	0.675	0.439	6 318	13	47	0.713	0.439	6 318	14	48
		6			9 477	29	57			9 477	30	58			9 477	32	59
		8			12 636	51	65			12 636	53	65			12 636	57	66
		10			15 795	79	70			15 795	83	71			15 795	89	72
800		4	0.712	0.468	6 739	13	47	0.720	0.468	6 739	13	47	0.760	0.468	6 739	14	48
		6			10 109	29	57			10 109	30	58			10 109	32	59
		8			13 478	51	65			13 478	53	65			13 478	57	66
		10			16 848	79	71			16 848	83	71			16 848	89	72
850		4	0.757	0.497	7 160	13	47	0.765	0.497	7 160	13	48	0.808	0.497	7 160	14	49
		6			10 741	29	58			10 741	30	58			10 741	32	59
		8			14 321	51	65			14 321	53	66			14 321	57	67
		10			17 901	79	71			17 901	83	71			17 901	89	72
900		4	0.801	0.527	7 582	13	47	0.810	0.527	7 582	13	48	0.855	0.527	7 582	14	49
		6			11 372	29	58			11 372	30	58			11 372	32	59
		8			15 163	51	65			15 163	53	66			15 163	57	67
		10			18 954	79	71			18 954	83	72			18 954	89	73
950		4	0.846	0.556	8 003	11	46	0.855	0.556	8 003	12	47	0.903	0.556	8 003	14	49
		6			12 004	25	57			12 004	26	57			12 004	32	60
		8			16 006	45	64			16 006	47	65			16 006	57	67
		10			20 007	70	70			20 007	74	70			20 007	89	73
1000		4	0.890	0.585	8 424	11	46	0.900	0.585	8 424	12	47	0.950	0.585	8 424	14	49
		6			12 636	25	57			12 636	26	57			12 636	32	60
		8			16 848	45	64			16 848	47	65			16 848	57	67
		10			21 060	70	70			21 060	74	71			21 060	89	73
1050		4	0.935	0.614	8 845	11	46	0.945	0.614	8 845	12	47	0.998	0.614	8 845	14	49
		6			13 268	25	57			13 268	26	58			13 268	32	60
		8			17 690	45	65			17 690	47	65			17 690	57	67
		10			22 113	70	70			22 113	74	71			22 113	89	73
1100		4	0.979	0.644	9 266	11	47	0.990	0.644	9 266	12	47	1.045	0.644	9 266	14	50
		6			13 900	25	57			13 900	26	58			13 900	32	60
		8			18 533	45	65			18 533	47	65			18 533	57	68
		10			23 166	70	71			23 166	73	71			23 166	89	74
1150		4	1.024	0.673	9 688	11	47	1.035	0.673	9 688	12	47	1.093	0.673	9 688	14	50
		6			14 531	25	57			14 531	26	58			14 531	32	60
		8			19 375	45	65			19 375	47	65			19 375	57	68
		10			24 219	70	71			24 219	74	71			24 219	89	74
1200		4	1.068	0.702	10 109	11	47	1.080	0.702	10 109	12	48	1.140	0.702	10 109	14	50
		6			15 163	25	58			15 163	26	58			15 163	32	61
		8			20 218	45	65			20 218	47	66			20 218	57	68
		10			25 272	70	71			25 272	74	71			25 272	89	74
1250		4	1.113	0.731	10 530	11	47	1.125	0.731	10 530	12	48	1.188	0.731	10 530	14	50
		6			15 795	25	58			15 795	26	58			15 795	32	61
		8			21 060	45	65			21 060	47	66			21 060	57	68
		10			26 325	70	71			26 325	74	72			26 325	89	74

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1010 S_k [m²]	1010 S_e [m²]	1010 Q [m³/h]	1010 d_p [PA]	1010 L_{WA} [dB]	1050 S_k [m²]	1050 S_e [m²]	1050 Q [m³/h]	1050 d_p [PA]	1050 L_{WA} [dB]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1100 L_{WA} [dB]
	110	4	0.111	0.073	1 058	12	38	0.116	0.073	1 058	13	39	0.121	0.073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0.152	0.100	1 443	12	40	0.158	0.100	1 443	13	40	0.165	0.100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0.202	0.134	1 924	12	41	0.210	0.134	1 924	13	41	0.220	0.134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
	250	4	0.253	0.167	2 405	12	42	0.263	0.167	2 405	13	42	0.275	0.167	2 405	15	44
		6			3 607	28	53			3 607	29	53			3 607	33	55
		8			4 810	50	60			4 810	51	60			4 810	59	62
		10			6 012	77	66			6 012	79	66			6 012	93	68
	300	4	0.303	0.200	2 886	12	43	0.315	0.200	2 886	13	43	0.330	0.200	2 886	15	45
		6			4 329	28	53			4 329	29	54			4 329	33	56
		8			5 772	50	61			5 772	51	61			5 772	59	63
		10			7 214	77	67			7 214	79	67			7 214	93	69
	350	4	0.354	0.234	3 367	12	43	0.368	0.234	3 367	13	44	0.385	0.234	3 367	15	46
		6			5 050	28	54			5 050	29	54			5 050	33	56
		8			6 733	50	62			6 733	51	62			6 733	59	64
		10			8 417	77	67			8 417	79	68			8 417	93	70
	400	4	0.404	0.267	3 848	12	44	0.420	0.267	3 848	13	44	0.440	0.267	3 848	15	46
		6			5 772	28	55			5 772	29	55			5 772	33	57
		8			7 695	50	62			7 695	51	62			7 695	59	64
		10			9 619	77	68			9 619	79	68			9 619	93	70
	450	4	0.455	0.301	4 329	12	45	0.473	0.301	4 329	13	45	0.495	0.301	4 329	15	47
		6			6 493	28	55			6 493	29	55			6 493	33	57
		8			8 657	50	63			8 657	51	63			8 657	59	65
		10			10 822	77	68			10 822	79	69			10 822	93	71
	500	4	0.505	0.334	4 810	12	45	0.525	0.334	4 810	13	45	0.550	0.334	4 810	15	47
		6			7 214	28	56			7 214	29	56			7 214	33	58
		8			9 619	50	63			9 619	51	63			9 619	59	65
		10			12 024	77	69			12 024	79	69			12 024	93	71
	550	4	0.556	0.367	5 291	12	45	0.578	0.367	5 291	13	46	0.605	0.367	5 291	15	48
		6			7 936	28	56			7 936	29	56			7 936	33	58
		8			10 581	50	63			10 581	51	64			10 581	59	66
		10			13 226	77	69			13 226	79	70			13 226	93	72
	600	4	0.606	0.401	5 772	12	46	0.630	0.401	5 772	13	46	0.660	0.401	5 772	15	48
		6			8 657	28	56			8 657	29	57			8 657	33	59
		8			11 543	50	64			11 543	51	64			11 543	59	66
		10			14 429	77	70			14 429	79	70			14 429	93	72
	650	4	0.657	0.434	6 252	12	46	0.683	0.434	6 252	13	46	0.715	0.434	6 252	15	48
		6			9 379	28	57			9 379	29	57			9 379	33	59
		8			12 505	50	64			12 505	51	65			12 505	59	67
		10			15 631	77	70			15 631	79	70			15 631	93	72

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1010					1050					1100				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	700	4	0.707	0.468	6 733	12	46	0.735	0.468	6 733	13	47	0.770	0.468	6 733	15	49
		6			10 100	28	57			10 100	29	57			10 100	33	59
		8			13 467	50	65			13 467	51	65			13 467	59	67
		10			16 834	77	70			16 834	79	71			16 834	93	73
	750	4	0.758	0.501	7 214	12	47	0.788	0.501	7 214	13	47	0.825	0.501	7 214	15	49
		6			10 822	28	57			10 822	29	58			10 822	33	60
		8			14 429	50	65			14 429	51	65			14 429	59	67
		10			18 036	77	71			18 036	79	71			18 036	93	73
	800	4	0.808	0.534	7 695	12	47	0.840	0.534	7 695	13	47	0.880	0.534	7 695	15	49
		6			11 543	28	58			11 543	29	58			11 543	33	60
		8			15 391	50	65			15 391	51	65			15 391	59	67
		10			19 238	77	71			19 238	79	71			19 238	93	73
	850	4	0.859	0.568	8 176	12	47	0.893	0.568	8 176	13	48	0.935	0.568	8 176	15	50
		6			12 264	28	58			12 264	29	58			12 264	33	60
		8			16 353	50	65			16 353	51	66			16 353	59	68
		10			20 441	77	71			20 441	79	72			20 441	93	74
	900	4	0.909	0.601	8 657	12	48	0.945	0.601	8 657	13	48	0.990	0.601	8 657	15	50
		6			12 986	28	58			12 986	29	58			12 986	33	60
		8			17 315	50	66			17 315	51	66			17 315	59	68
		10			21 643	77	71			21 643	79	72			21 643	93	74
	950	4	0.960	0.635	9 138	11	46	0.998	0.635	9 138	13	48	1.045	0.635	9 138	15	50
		6			13 707	25	57			13 707	29	59			13 707	33	61
		8			18 276	44	64			18 276	51	66			18 276	59	68
		10			22 846	69	70			22 846	79	72			22 846	93	74
	1000	4	1.010	0.668	9 619	11	46	1.050	0.668	9 619	13	48	1.100	0.668	9 619	15	50
		6			14 429	25	57			14 429	29	59			14 429	33	61
		8			19 238	44	65			19 238	51	66			19 238	59	68
		10			24 048	69	70			24 048	79	72			24 048	93	74
	1050	4	1.061	0.701	10 100	11	47	1.103	0.701	10 100	13	49	1.155	0.701	10 100	15	51
		6			15 150	25	57			15 150	29	59			15 150	33	61
		8			20 200	44	65			20 200	51	67			20 200	59	69
		10			25 250	69	71			25 250	79	72			25 250	93	74
	1100	4	1.111	0.735	10 581	11	47	1.155	0.735	10 581	13	49	1.210	0.735	10 581	15	51
		6			15 872	25	57			15 872	29	59			15 872	33	61
		8			21 162	44	65			21 162	51	67			21 162	59	69
		10			26 453	69	71			26 453	79	73			26 453	93	75
	1150	4	1.162	0.768	11 062	11	47	1.208	0.768	11 062	13	49	1.265	0.768	11 062	15	51
		6			16 593	25	58			16 593	29	60			16 593	33	62
		8			22 124	44	65			22 124	51	67			22 124	59	69
		10			27 655	69	71			27 655	79	73			27 655	93	75
	1200	4	1.212	0.802	11 543	11	47	1.260	0.802	11 543	13	49	1.320	0.802	11 543	15	51
		6			17 315	25	58			17 315	29	60			17 315	33	62
		8			23 086	44	65			23 086	51	67			23 086	59	69
		10			28 858	69	71			28 858	79	73			28 858	93	75
	1250	4	1.263	0.835	12 024	11	47	1.313	0.835	12 024	13	49	1.375	0.835	12 024	15	51
		6			18 036	25	58			18 036	29	60			18 036	33	62
		8			24 048	44	66			24 048	51	67			24 048	59	69
		10			30 060	69	71			30 060	79	73			30 060	93	75

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
	250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40
		6			4 055	27	52			4 055	30	54			4 504	24	51
		8			5 407	49	60			5 407	54	61			6 005	43	58
		10			6 759	76	66			6 759	84	67			7 506	66	64
	300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41
		6			4 866	27	53			4 866	30	54			5 404	24	51
		8			6 489	49	61			6 489	54	62			7 206	43	59
		10			8 111	76	66			8 111	84	68			9 007	66	65
	350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41
		6			5 678	27	54			5 678	30	55			6 305	24	52
		8			7 570	49	61			7 570	54	63			8 407	43	60
		10			9 463	76	67			9 463	84	68			10 508	66	65
	400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42
		6			6 489	27	54			6 489	30	56			7 206	24	53
		8			8 652	49	62			8 652	54	63			9 608	43	60
		10			10 814	76	68			10 814	84	69			12 010	66	66
	450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43
		6			7 300	27	55			7 300	30	56			8 106	24	53
		8			9 733	49	62			9 733	54	64			10 809	43	61
		10			12 166	76	68			12 166	84	70			13 511	66	66
	500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43
		6			8 111	27	55			8 111	30	57			9 007	24	54
		8			10 814	49	63			10 814	54	64			12 010	43	61
		10			13 518	76	69			13 518	84	70			15 012	66	67
	550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43
		6			8 922	27	56			8 922	30	57			9 908	24	54
		8			11 896	49	63			11 896	54	65			13 211	43	62
		10			14 870	76	69			14 870	84	70			16 513	66	67
	600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44
		6			9 733	27	56			9 733	30	57			10 809	24	54
		8			12 977	49	64			12 977	54	65			14 412	43	62
		10			16 222	76	69			16 222	84	71			18 014	66	68
	650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44
		6			10 544	27	56			10 544	30	58			11 709	24	55
		8			14 059	49	64			14 059	54	65			15 612	43	62
		10			17 573	76	70			17 573	84	71			19 516	66	68

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1130 S_k [m²]	1130 S_e [m²]	1130 Q [m³/h]	1130 d_p [PA]	1130 L_{WA} [dB]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
	700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44
		6			11 355	27	57			11 355	30	58			12 610	24	55
		8			15 140	49	64			15 140	54	66			16 813	43	63
		10			18 925	76	70			18 925	84	71			21 017	66	68
	750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45
		6			12 166	27	57			12 166	30	58			13 511	24	55
		8			16 222	49	65			16 222	54	66			18 014	43	63
		10			20 277	76	70			20 277	84	72			22 518	66	69
	800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45
		6			12 977	27	57			12 977	30	59			14 412	24	56
		8			17 303	49	65			17 303	54	66			19 215	43	63
		10			21 629	76	71			21 629	84	72			24 019	66	69
	850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45
		6			13 788	27	58			13 788	30	59			15 312	24	56
		8			18 384	49	65			18 384	54	66			20 416	43	63
		10			22 981	76	71			22 981	84	72			25 520	66	69
	900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46
		6			14 599	27	58			14 599	30	59			16 213	24	56
		8			19 466	49	65			19 466	54	67			21 617	43	64
		10			24 332	76	71			24 332	84	73			27 022	66	69
	950	4	1.074	0.713	10 274	11	47	1.140	0.713	10 274	13	49	1.188	0.792	11 409	11	47
		6			15 411	24	57			15 411	30	60			17 114	24	57
		8			20 547	43	65			20 547	54	67			22 818	43	65
		10			25 684	67	70			25 684	84	73			28 523	66	71
	1000	4	1.130	0.751	10 814	11	47	1.200	0.751	10 814	13	50	1.250	0.834	12 010	11	47
		6			16 222	24	57			16 222	30	60			18 014	24	58
		8			21 629	43	65			21 629	54	68			24 019	43	65
		10			27 036	67	71			27 036	84	73			30 024	66	71
	1050	4	1.187	0.789	11 355	11	47	1.260	0.789	11 355	13	50	1.313	0.876	12 610	11	47
		6			17 033	24	58			17 033	30	60			18 915	24	58
		8			22 710	43	65			22 710	54	68			25 220	43	65
		10			28 388	67	71			28 388	84	74			31 525	66	71
	1100	4	1.243	0.826	11 896	11	47	1.320	0.826	11 896	13	50	1.375	0.917	13 211	11	47
		6			17 844	24	58			17 844	30	61			19 816	24	58
		8			23 792	43	65			23 792	54	68			26 421	43	65
		10			29 740	67	71			29 740	84	74			33 026	66	71
	1150	4	1.300	0.864	12 437	11	47	1.380	0.864	12 437	13	50	1.438	0.959	13 811	11	48
		6			18 655	24	58			18 655	30	61			20 717	24	58
		8			24 873	43	65			24 873	54	68			27 622	43	66
		10			31 091	67	71			31 091	84	74			34 528	66	71
	1200	4	1.356	0.901	12 977	11	48	1.440	0.901	12 977	13	50	1.500	1.001	14 412	11	48
		6			19 466	24	58			19 466	30	61			21 617	24	58
		8			25 955	43	66			25 955	54	68			28 823	43	66
		10			32 443	67	71			32 443	84	74			36 029	66	72

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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1300 L_{WA} [dB]	1350 S_k [m²]	1350 S_e [m²]	1350 Q [m³/h]	1350 d_p [PA]	1350 L_{WA} [dB]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]	1400 L_{WA} [dB]
	110	4	0.143	0.090	1 299	12	40	0.149	0.092	1 323	13	40	0.154	0.099	1 430	12	41
		6			1 948	27	51			1 984	28	51			2 146	26	51
		8			2 598	48	58			2 645	50	59			2 861	46	59
		10			3 247	75	64			3 307	78	64			3 576	72	65
	150	4	0.195	0.123	1 771	12	41	0.203	0.125	1 804	13	41	0.210	0.135	1 950	12	41
		6			2 657	27	51			2 705	28	52			2 926	26	52
		8			3 542	48	58			3 607	50	59			3 901	46	59
		10			4 428	75	65			4 509	78	65			4 876	72	65
	200	4	0.260	0.164	2 362	12	41	0.270	0.167	2 405	13	42	0.280	0.181	2 601	12	42
		6			3 542	27	52			3 607	28	52			3 901	26	53
		8			4 723	48	58			4 810	50	59			5 201	46	59
		10			5 904	75	65			6 012	78	66			6 502	72	66
	250	4	0.325	0.205	2 952	12	42	0.338	0.209	3 006	13	42	0.350	0.226	3 251	12	43
		6			4 428	27	53			4 509	28	53			4 876	26	53
		8			5 904	48	58			6 012	50	59			6 502	46	59
		10			7 380	75	66			7 515	78	66			8 127	72	66
	300	4	0.390	0.246	3 542	12	43	0.405	0.251	3 607	13	43	0.420	0.271	3 901	12	43
		6			5 314	27	53			5 411	28	53			5 851	26	54
		8			7 085	48	59			7 214	50	59			7 802	46	59
		10			8 856	75	66			9 018	78	67			9 752	72	67
	350	4	0.455	0.287	4 133	12	43	0.473	0.292	4 208	13	43	0.490	0.316	4 551	12	44
		6			6 199	27	54			6 313	28	54			6 827	26	54
		8			8 266	48	59			8 417	50	59			9 102	46	59
		10			10 332	75	67			10 521	78	67			11 378	72	68
	400	4	0.520	0.328	4 723	12	44	0.540	0.334	4 810	13	44	0.560	0.361	5 201	12	44
		6			7 085	27	54			7 214	28	55			7 802	26	55
		8			9 446	48	59			9 619	50	59			10 403	46	59
		10			11 808	75	68			12 024	78	68			13 003	72	68
	450	4	0.585	0.369	5 314	12	44	0.608	0.376	5 411	13	45	0.630	0.406	5 851	12	45
		6			7 970	27	55			8 116	28	55			8 777	26	55
		8			10 627	48	59			10 822	50	59			11 703	46	59
		10			13 284	75	68			13 527	78	69			14 629	72	69
	500	4	0.650	0.410	5 904	12	45	0.675	0.418	6 012	13	45	0.700	0.452	6 502	12	46
		6			8 856	27	55			9 018	28	56			9 752	26	56
		8			11 808	48	59			12 024	50	59			13 003	46	59
		10			14 760	75	69			15 030	78	69			16 254	72	69
	550	4	0.715	0.451	6 494	12	46	0.743	0.459	6 613	13	46	0.770	0.497	7 152	12	46
		6			9 742	27	56			9 920	28	56			10 728	26	57
		8			12 989	48	59			13 226	50	59			14 304	46	59
		10			16 236	75	69			16 533	78	70			17 879	72	70
	600	4	0.780	0.492	7 085	12	46	0.810	0.501	7 214	13	46	0.840	0.542	7 802	12	47
		6			10 627	27	57			10 822	28	57			11 703	26	57
		8			14 170	48	59			14 429	50	59			15 604	46	59
		10			17 712	75	70			18 036	78	70			19 505	72	71
	650	4	0.845	0.533	7 675	12	47	0.878	0.543	7 816	13	47	0.910	0.587	8 452	12	47
		6			11 513	27	57			11 723	28	58			12 678	26	58
		8			15 350	48	59			15 631	50	59			16 904	46	60
		10			19 188	75	71			19 539	78	71			21 130	72	71

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1300 L_{WA} [dB]	1350 S_k [m²]	1350 S_e [m²]	1350 Q [m³/h]	1350 d_p [PA]	1350 L_{WA} [dB]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]	1400 L_{WA} [dB]
	700	4	0.910	0.574	8 266	12	47	0.945	0.585	8 417	13	48	0.945	0.585	9 102	12	48
		6			12 398	27	58			12 625	28	58			13 653	26	58
		8			16 531	48	59			16 834	50	59			18 204	46	60
		10			20 664	75	71			21 042	78	71			22 756	72	72
	750	4	0.975	0.615	8 856	12	48	1.013	0.626	9 018	13	48	1.013	0.626	9 752	12	49
		6			13 284	27	58			13 527	28	59			14 629	26	59
		8			17 712	48	59			18 036	50	59			19 505	46	60
		10			22 140	75	72			22 545	78	72			24 381	72	72
	800	4	1.040	0.656	9 446	12	49	1.080	0.668	9 619	13	49	1.080	0.668	10 403	12	49
		6			14 170	27	59			14 429	28	59			15 604	26	60
		8			18 893	48	59			19 238	50	59			20 805	46	60
		10			23 616	75	72			24 048	78	73			26 006	72	73
	850	4	1.105	0.697	10 037	12	49	1.148	0.710	10 220	13	49	1.148	0.710	11 053	12	50
		6			15 055	27	60			15 331	28	60			16 579	26	60
		8			20 074	48	59			20 441	50	59			22 105	46	60
		10			25 092	75	73			25 551	78	73			27 632	72	74
	900	4	1.170	0.738	10 627	12	50	1.215	0.752	10 822	13	50	1.215	0.752	11 703	12	50
		6			15 941	27	60			16 232	28	60			17 554	26	61
		8			21 254	48	59			21 643	50	60			23 406	46	60
		10			26 568	75	74			27 054	78	74			29 257	72	74
	950	4	1.235	0.779	11 218	12	50	1.283	0.793	11 423	13	51	1.283	0.793	12 353	12	51
		6			16 826	27	61			17 134	28	61			18 530	26	61
		8			22 435	48	59			22 846	50	60			24 706	46	60
		10			28 044	75	74			28 557	78	74			30 883	72	75
	1000	4	1.300	0.820	11 808	12	51	1.350	0.835	12 024	13	51	1.350	0.835	13 003	12	52
		6			17 712	27	61			18 036	28	62			19 505	26	62
		8			23 616	48	59			24 048	50	60			26 006	46	60
		10			29 520	75	75			30 060	78	75			32 508	72	75
	1050	4	1.365	0.861	12 398	12	52	1.418	0.877	12 625	13	52	1.418	0.877	13 653	12	52
		6			18 598	27	62			18 938	28	62			20 480	26	63
		8			24 797	48	59			25 250	50	60			27 307	46	60
		10			30 996	75	75			31 563	78	76			34 133	72	76
	1100	4	1.430	0.902	12 989	12	52	1.485	0.919	13 226	13	52	1.485	0.919	14 304	12	53
		6			19 483	27	63			19 840	28	63			21 455	26	63
		8			25 978	48	59			26 453	50	60			28 607	46	60
		10			32 472	75	76			33 066	78	76			35 759	72	76
	1150	4	1.495	0.943	13 579	12	53	1.553	0.960	13 828	13	53	1.553	0.960	14 954	12	53
		6			20 369	27	63			20 741	28	63			22 431	26	64
		8			27 158	48	60			27 655	50	60			29 907	46	60
		10			33 948	75	76			34 569	78	77			37 384	72	77
	1200	4	1.560	0.984	14 170	12	53	1.620	1.002	14 429	13	54	1.620	1.002	15 604	12	54
		6			21 254	27	64			21 643	28	64			23 406	26	64
		8			28 339	48	60			28 858	50	60			31 208	46	60
		10			35 424	75	77			36 072	78	77			39 010	72	78

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1450					1500					1550				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
110	4	0.160	0.099	1 430	12	41	0.165	0.108	1 562	11	41	0.171	0.108	1 562	12	42
	6			2 146	28	52			2 343	25	52			2 343	27	52
	8			2 861	50	59			3 124	44	59			3 124	47	60
	10			3 576	77	65			3 905	69	65			3 905	74	66
150	4	0.218	0.135	1 950	12	42	0.225	0.148	2 130	11	42	0.233	0.148	2 130	12	42
	6			2 926	28	52			3 195	25	53			3 195	27	53
	8			3 901	50	59			4 260	44	60			4 260	47	60
	10			4 876	77	66			5 324	69	66			5 324	74	66
200	4	0.290	0.181	2 601	12	42	0.300	0.197	2 840	11	43	0.310	0.197	2 840	12	43
	6			3 901	28	53			4 260	25	53			4 260	27	53
	8			5 201	50	59			5 679	44	60			5 679	47	60
	10			6 502	77	66			7 099	69	66			7 099	74	67
250	4	0.363	0.226	3 251	12	43	0.375	0.247	3 550	11	43	0.388	0.247	3 550	12	43
	6			4 876	28	53			5 324	25	54			5 324	27	54
	8			6 502	50	59			7 099	44	60			7 099	47	60
	10			8 127	77	67			8 874	69	67			8 874	74	67
300	4	0.435	0.271	3 901	12	43	0.450	0.296	4 260	11	44	0.465	0.296	4 260	12	44
	6			5 851	28	54			6 389	25	54			6 389	27	55
	8			7 802	50	59			8 519	44	60			8 519	47	60
	10			9 752	77	67			10 649	69	68			10 649	74	68
350	4	0.508	0.316	4 551	12	44	0.525	0.345	4 969	11	44	0.543	0.345	4 969	12	45
	6			6 827	28	55			7 454	25	55			7 454	27	55
	8			9 102	50	59			9 939	44	60			9 939	47	60
	10			11 378	77	68			12 424	69	68			12 424	74	69
400	4	0.580	0.361	5 201	12	45	0.600	0.394	5 679	11	45	0.620	0.394	5 679	12	45
	6			7 802	28	55			8 519	25	56			8 519	27	56
	8			10 403	50	60			11 359	44	60			11 359	47	60
	10			13 003	77	69			14 198	69	69			14 198	74	69
450	4	0.653	0.406	5 851	12	45	0.675	0.444	6 389	11	46	0.698	0.444	6 389	12	46
	6			8 777	28	56			9 584	25	56			9 584	27	56
	8			11 703	50	60			12 779	44	60			12 779	47	60
	10			14 629	77	69			15 973	69	69			15 973	74	70
500	4	0.725	0.452	6 502	12	46	0.750	0.493	7 099	11	46	0.775	0.493	7 099	12	46
	6			9 752	28	56			10 649	25	57			10 649	27	57
	8			13 003	50	60			14 198	44	60			14 198	47	60
	10			16 254	77	70			17 748	69	70			17 748	74	70
550	4	0.798	0.497	7 152	12	46	0.825	0.542	7 809	11	47	0.853	0.542	7 809	12	47
	6			10 728	28	57			11 714	25	57			11 714	27	58
	8			14 304	50	60			15 618	44	60			15 618	47	60
	10			17 879	77	70			19 523	69	71			19 523	74	71
600	4	0.870	0.542	7 802	12	47	0.900	0.592	8 519	11	47	0.930	0.592	8 519	12	48
	6			11 703	28	58			12 779	25	58			12 779	27	58
	8			15 604	50	60			17 038	44	60			17 038	47	60
	10			19 505	77	71			21 298	69	71			21 298	74	71
650	4	0.943	0.587	8 452	12	48	0.975	0.641	9 229	11	48	1.008	0.641	9 229	12	48
	6			12 678	28	58			13 843	25	58			13 843	27	59
	8			16 904	50	60			18 458	44	60			18 458	47	60
	10			21 130	77	71			23 072	69	72			23 072	74	72

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B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1450					1500					1550				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	700	4	1.015	0.632	9 102	12	48	1.050	0.690	9 939	11	49	1.085	0.690	9 939	12	49
		6			13 653	28	59			14 908	25	59			14 908	27	59
		8			18 204	50	60			19 878	44	60			19 878	47	61
		10			22 756	77	72			24 847	69	72			24 847	74	73
	750	4	1.088	0.677	9 752	12	49	1.125	0.740	10 649	11	49	1.163	0.740	10 649	12	49
		6			14 629	28	59			15 973	25	60			15 973	27	60
		8			19 505	50	60			21 298	44	60			21 298	47	61
		10			24 381	77	73			26 622	69	73			26 622	74	73
	800	4	1.160	0.722	10 403	12	49	1.200	0.789	11 359	11	50	1.240	0.789	11 359	12	50
		6			15 604	28	60			17 038	25	60			17 038	27	61
		8			20 805	50	60			22 717	44	60			22 717	47	61
		10			26 006	77	73			28 397	69	74			28 397	74	74
	850	4	1.233	0.768	11 053	12	50	1.275	0.838	12 069	11	50	1.318	0.838	12 069	12	51
		6			16 579	28	61			18 103	25	61			18 103	27	61
		8			22 105	50	60			24 137	44	60			24 137	47	61
		10			27 632	77	74			30 172	69	74			30 172	74	74
	900	4	1.305	0.813	11 703	12	51	1.350	0.887	12 779	11	51	1.395	0.887	12 779	12	51
		6			17 554	28	61			19 168	25	61			19 168	27	62
		8			23 406	50	60			25 557	44	60			25 557	47	61
		10			29 257	77	74			31 946	69	75			31 946	74	75
	950	4	1.378	0.858	12 353	12	51	1.425	0.937	13 488	11	52	1.473	0.937	13 488	12	52
		6			18 530	28	62			20 233	25	62			20 233	27	62
		8			24 706	50	60			26 977	44	61			26 977	47	61
		10			30 883	77	75			33 721	69	75			33 721	74	76
	1000	4	1.450	0.903	13 003	12	52	1.500	0.986	14 198	11	52	1.550	0.986	14 198	12	52
		6			19 505	28	62			21 298	25	63			21 298	27	63
		8			26 006	50	60			28 397	44	61			28 397	47	61
		10			32 508	77	76			35 496	69	76			35 496	74	76
	1050	4	1.523	0.948	13 653	12	52	1.575	1.035	14 908	11	53	1.628	1.035	14 908	12	53
		6			20 480	28	63			22 362	25	63			22 362	27	63
		8			27 307	50	60			29 817	44	61			29 817	47	61
		10			34 133	77	76			37 271	69	76			37 271	74	77
	1100	4	1.595	0.993	14 304	12	53	1.650	1.085	15 618	11	53	1.705	1.085	15 618	12	54
		6			21 455	28	63			23 427	25	64			23 427	27	64
		8			28 607	50	60			31 236	44	61			31 236	47	61
		10			35 759	77	77			39 046	69	77			39 046	74	77
	1150	4	1.668	1.038	14 954	12	54	1.725	1.134	16 328	11	54	1.783	1.134	16 328	12	54
		6			22 431	28	64			24 492	25	64			24 492	27	65
		8			29 907	50	60			32 656	44	61			32 656	47	61
		10			37 384	77	77			40 820	69	78			40 820	74	78
	1200	4	1.740	1.084	15 604	12	54	1.800	1.183	17 038	11	55	1.860	1.183	17 038	12	55
		6			23 406	28	65			25 557	25	65			25 557	27	65
		8			31 208	50	61			34 076	44	61			34 076	47	61
		10			39 010	77	78			42 595	69	78			42 595	74	79

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1600 S_k [m²]	1600 S_e [m²]	1600 Q [m³/h]	1600 d_p [PA]	1600 L_{WA} [dB]	1650 S_k [m²]	1650 S_e [m²]	1650 Q [m³/h]	1650 d_p [PA]	1650 L_{WA} [dB]	1700 S_k [m²]	1700 S_e [m²]	1700 Q [m³/h]	1700 d_p [PA]	1700 L_{WA} [dB]
	110	4	0.176	0.106	1 522	13	42	0.182	0.118	1 693	11	42	0.187	0.118	1 693	12	43
		6			2 283	30	53			2 540	26	53			2 540	27	53
		8			3 044	53	60			3 387	46	60			3 387	49	61
		10			3 806	83	66			4 233	71	66			4 233	76	67
	150	4	0.240	0.144	2 076	13	43	0.248	0.160	2 309	11	43	0.255	0.160	2 309	12	43
		6			3 114	30	53			3 464	26	53			3 464	27	54
		8			4 152	53	60			4 618	46	60			4 618	49	61
		10			5 189	83	67			5 773	71	67			5 773	76	67
	200	4	0.320	0.192	2 768	13	43	0.330	0.214	3 079	11	43	0.340	0.214	3 079	12	44
		6			4 152	30	54			4 618	26	54			4 618	27	54
		8			5 535	53	60			6 157	46	61			6 157	49	61
		10			6 919	83	67			7 697	71	67			7 697	76	68
	250	4	0.400	0.240	3 460	13	44	0.413	0.267	3 848	11	44	0.425	0.267	3 848	12	44
		6			5 189	30	54			5 773	26	55			5 773	27	55
		8			6 919	53	60			7 697	46	61			7 697	49	61
		10			8 649	83	68			9 621	71	68			9 621	76	68
	300	4	0.480	0.288	4 152	13	44	0.495	0.321	4 618	11	45	0.510	0.321	4 618	12	45
		6			6 227	30	55			6 927	26	55			6 927	27	56
		8			8 303	53	60			9 236	46	61			9 236	49	61
		10			10 379	83	68			11 545	71	69			11 545	76	69
	350	4	0.560	0.336	4 843	13	45	0.578	0.374	5 388	11	45	0.595	0.374	5 388	12	46
		6			7 265	30	56			8 082	26	56			8 082	27	56
		8			9 687	53	60			10 776	46	61			10 776	49	61
		10			12 109	83	69			13 469	71	69			13 469	76	69
	400	4	0.640	0.384	5 535	13	46	0.660	0.428	6 157	11	46	0.680	0.428	6 157	12	46
		6			8 303	30	56			9 236	26	56			9 236	27	57
		8			11 071	53	60			12 315	46	61			12 315	49	61
		10			13 838	83	69			15 394	71	70			15 394	76	70
	450	4	0.720	0.432	6 227	13	46	0.743	0.481	6 927	11	46	0.765	0.481	6 927	12	47
		6			9 341	30	57			10 391	26	57			10 391	27	57
		8			12 455	53	61			13 854	46	61			13 854	49	61
		10			15 568	83	70			17 318	71	70			17 318	76	71
	500	4	0.800	0.481	6 919	13	47	0.825	0.535	7 697	11	47	0.850	0.535	7 697	12	47
		6			10 379	30	57			11 545	26	58			11 545	27	58
		8			13 838	53	61			15 394	46	61			15 394	49	61
		10			17 298	83	71			19 242	71	71			19 242	76	71
	550	4	0.880	0.529	7 611	13	47	0.908	0.588	8 466	11	48	0.935	0.588	8 466	12	48
		6			11 417	30	58			12 700	26	58			12 700	27	58
		8			15 222	53	61			16 933	46	61			16 933	49	61
		10			19 028	83	71			21 166	71	71			21 166	76	72
	600	4	0.960	0.577	8 303	13	48	0.990	0.641	9 236	11	48	1.020	0.641	9 236	12	49
		6			12 455	30	58			13 854	26	59			13 854	27	59
		8			16 606	53	61			18 472	46	61			18 472	49	61
		10			20 758	83	72			23 090	71	72			23 090	76	72
	650	4	1.040	0.625	8 995	13	49	1.073	0.695	10 006	11	49	1.105	0.695	10 006	12	49
		6			13 492	30	59			15 009	26	59			15 009	27	60
		8			17 990	53	61			20 012	46	61			20 012	49	61
		10			22 487	83	72			25 015	71	73			25 015	76	73

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1600 S_k [m²]	1600 S_e [m²]	1600 Q [m³/h]	1600 d_p [PA]	1600 L_{WA} [dB]	1650 S_k [m²]	1650 S_e [m²]	1650 Q [m³/h]	1650 d_p [PA]	1650 L_{WA} [dB]	1700 S_k [m²]	1700 S_e [m²]	1700 Q [m³/h]	1700 d_p [PA]	1700 L_{WA} [dB]
	700	4	1.120	0.673	9 687	13	49	1.155	0.748	10 776	11	49	1.190	0.748	10 776	12	50
		6			14 530	30	60			16 163	26	60			16 163	27	60
		8			19 374	53	61			21 551	46	61			21 551	49	61
		10			24 217	83	73			26 939	71	73			26 939	76	74
	750	4	1.200	0.721	10 379	13	50	1.238	0.802	11 545	11	50	1.275	0.802	11 545	12	50
		6			15 568	30	60			17 318	26	61			17 318	27	61
		8			20 758	53	61			23 090	46	61			23 090	49	61
		10			25 947	83	74			28 863	71	74			28 863	76	74
	800	4	1.280	0.769	11 071	13	50	1.320	0.855	12 315	11	51	1.360	0.855	12 315	12	51
		6			16 606	30	61			18 472	26	61			18 472	27	61
		8			22 141	53	61			24 630	46	61			24 630	49	62
		10			27 677	83	74			30 787	71	74			30 787	76	75
	850	4	1.360	0.817	11 763	13	51	1.403	0.909	13 085	11	51	1.445	0.909	13 085	12	52
		6			17 644	30	61			19 627	26	62			19 627	27	62
		8			23 525	53	61			26 169	46	61			26 169	49	62
		10			29 407	83	75			32 711	71	75			32 711	76	75
	900	4	1.440	0.865	12 455	13	52	1.485	0.962	13 854	11	52	1.530	0.962	13 854	12	52
		6			18 682	30	62			20 781	26	62			20 781	27	63
		8			24 909	53	61			27 708	46	61			27 708	49	62
		10			31 136	83	75			34 636	71	76			34 636	76	76
	950	4	1.520	0.913	13 146	13	52	1.568	1.016	14 624	11	52	1.615	1.016	14 624	12	53
		6			19 720	30	63			21 936	26	63			21 936	27	63
		8			26 293	53	61			29 248	46	61			29 248	49	62
		10			32 866	83	76			36 560	71	76			36 560	76	76
	1000	4	1.600	0.961	13 838	13	53	1.650	1.069	15 394	11	53	1.700	1.069	15 394	12	53
		6			20 758	30	63			23 090	26	64			23 090	27	64
		8			27 677	53	61			30 787	46	61			30 787	49	62
		10			34 596	83	76			38 484	71	77			38 484	76	77
	1050	4	1.680	1.009	14 530	13	53	1.733	1.122	16 163	11	54	1.785	1.122	16 163	12	54
		6			21 795	30	64			24 245	26	64			24 245	27	64
		8			29 061	53	61			32 327	46	62			32 327	49	62
		10			36 326	83	77			40 408	71	77			40 408	76	78
	1100	4	1.760	1.057	15 222	13	54	1.815	1.176	16 933	11	54	1.870	1.176	16 933	12	55
		6			22 833	30	64			25 399	26	65			25 399	27	65
		8			30 444	53	61			33 866	46	62			33 866	49	62
		10			38 056	83	78			42 332	71	78			42 332	76	78
	1150	4	1.840	1.105	15 914	13	55	1.898	1.229	17 703	11	55	1.955	1.229	17 703	12	55
		6			23 871	30	65			26 554	26	65			26 554	27	66
		8			31 828	53	61			35 405	46	62			35 405	49	62
		10			39 785	83	78			44 257	71	79			44 257	76	79
	1200	4	1.920	1.153	16 606	13	55	1.980	1.283	18 472	11	55	2.040	1.283	18 472	12	56
		6			24 909	30	66			27 708	26	66			27 708	27	66
		8			33 212	53	61			36 945	46	62			36 945	49	62
		10			41 515	83	79			46 181	71	79			46 181	76	79

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1750					1800					1850				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																
110	4	0.193	0.127	1 823	11	43	0.198	0.127	1 825	12	43	0.204	0.136	1 956	11	43
	6			2 735	25	53			2 737	26	54			2 934	24	54
	8			3 646	44	61			3 650	47	61			3 912	43	62
	10			4 558	69	67			4 562	73	67			4 891	67	67
150	4	0.263	0.173	2 486	11	43	0.270	0.173	2 488	12	44	0.278	0.185	2 668	11	44
	6			3 729	25	54			3 732	26	54			4 001	24	55
	8			4 972	44	61			4 977	47	61			5 335	43	62
	10			6 215	69	67			6 221	73	68			6 669	67	68
200	4	0.350	0.230	3 315	11	44	0.360	0.230	3 318	12	44	0.370	0.247	3 557	11	45
	6			4 972	25	55			4 977	26	55			5 335	24	55
	8			6 630	44	61			6 636	47	61			7 114	43	62
	10			8 287	69	68			8 294	73	68			8 892	67	69
250	4	0.438	0.288	4 144	11	45	0.450	0.288	4 147	12	45	0.463	0.309	4 446	11	45
	6			6 215	25	55			6 221	26	56			6 669	24	56
	8			8 287	44	61			8 294	47	61			8 892	43	62
	10			10 359	69	69			10 368	73	69			11 115	67	69
300	4	0.525	0.345	4 972	11	45	0.540	0.346	4 977	12	46	0.555	0.371	5 335	11	46
	6			7 458	25	56			7 465	26	56			8 003	24	56
	8			9 945	44	61			9 953	47	62			10 670	43	62
	10			12 431	69	69			12 442	73	69			13 338	67	70
350	4	0.613	0.403	5 801	11	46	0.630	0.403	5 806	12	46	0.648	0.432	6 224	11	46
	6			8 702	25	56			8 709	26	57			9 337	24	57
	8			11 602	44	61			11 612	47	62			12 449	43	62
	10			14 503	69	70			14 515	73	70			15 561	67	70
400	4	0.700	0.460	6 630	11	46	0.720	0.461	6 636	12	47	0.740	0.494	7 114	11	47
	6			9 945	25	57			9 953	26	57			10 670	24	58
	8			13 260	44	61			13 271	47	62			14 227	43	62
	10			16 574	69	70			16 589	73	71			17 784	67	71
450	4	0.788	0.518	7 458	11	47	0.810	0.518	7 465	12	47	0.833	0.556	8 003	11	48
	6			11 188	25	58			11 197	26	58			12 004	24	58
	8			14 917	44	61			14 930	47	62			16 006	43	62
	10			18 646	69	71			18 662	73	71			20 007	67	72
500	4	0.875	0.576	8 287	11	48	0.900	0.576	8 294	12	48	0.925	0.618	8 892	11	48
	6			12 431	25	58			12 442	26	59			13 338	24	59
	8			16 574	44	61			16 589	47	62			17 784	43	62
	10			20 718	69	72			20 736	73	72			22 230	67	72
550	4	0.963	0.633	9 116	11	48	0.990	0.634	9 124	12	49	1.018	0.679	9 781	11	49
	6			13 674	25	59			13 686	26	59			14 672	24	59
	8			18 232	44	62			18 248	47	62			19 562	43	62
	10			22 790	69	72			22 810	73	72			24 453	67	73
600	4	1.050	0.691	9 945	11	49	1.080	0.691	9 953	12	49	1.110	0.741	10 670	11	49
	6			14 917	25	59			14 930	26	60			16 006	24	60
	8			19 889	44	62			19 907	47	62			21 341	43	62
	10			24 862	69	73			24 883	73	73			26 676	67	73
650	4	1.138	0.748	10 773	11	49	1.170	0.749	10 783	12	50	1.203	0.803	11 560	11	50
	6			16 160	25	60			16 174	26	60			17 339	24	61
	8			21 547	44	62			21 565	47	62			23 119	43	62
	10			26 933	69	73			26 957	73	74			28 899	67	74

B – nominal width [mm]
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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1750 S_k [m²]	1750 S_e [m²]	1750 Q [m³/h]	1750 d_p [PA]	1750 L_{WA} [dB]	1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1800 L_{WA} [dB]	1850 S_k [m²]	1850 S_e [m²]	1850 Q [m³/h]	1850 d_p [PA]	1850 L_{WA} [dB]
	700	4	1.225	0.806	11 602	11	50	1.260	0.806	11 612	12	50	1.295	0.865	12 449	11	51
		6			17 403	25	61			17 418	26	61			18 673	24	61
		8			23 204	44	62			23 224	47	62			24 898	43	62
		10			29 005	69	74			29 030	73	74			31 122	67	74
	750	4	1.313	0.863	12 431	11	51	1.350	0.864	12 442	12	51	1.388	0.926	13 338	11	51
		6			18 646	25	61			18 662	26	61			20 007	24	62
		8			24 862	44	62			24 883	47	62			26 676	43	62
		10			31 077	69	74			31 104	73	75			33 345	67	75
	800	4	1.400	0.921	13 260	11	51	1.440	0.922	13 271	12	52	1.480	0.988	14 227	11	52
		6			19 889	25	62			19 907	26	62			21 341	24	62
		8			26 519	44	62			26 542	47	62			28 454	43	62
		10			33 149	69	75			33 178	73	75			35 568	67	76
	850	4	1.488	0.978	14 088	11	52	1.530	0.979	14 100	12	52	1.573	1.050	15 116	11	52
		6			21 132	25	62			21 151	26	63			22 675	24	63
		8			28 176	44	62			28 201	47	62			30 233	43	63
		10			35 221	69	76			35 251	73	76			37 791	67	76
	900	4	1.575	1.036	14 917	11	52	1.620	1.037	14 930	12	53	1.665	1.112	16 006	11	53
		6			22 375	25	63			22 395	26	63			24 008	24	64
		8			29 834	44	62			29 860	47	62			32 011	43	63
		10			37 292	69	76			37 325	73	77			40 014	67	77
	950	4	1.663	1.093	15 746	11	53	1.710	1.094	15 759	12	53	1.758	1.173	16 895	11	54
		6			23 619	25	64			23 639	26	64			25 342	24	64
		8			31 491	44	62			31 519	47	62			33 790	43	63
		10			39 364	69	77			39 398	73	77			42 237	67	77
	1000	4	1.750	1.151	16 574	11	54	1.800	1.152	16 589	12	54	1.850	1.235	17 784	11	54
		6			24 862	25	64			24 883	26	64			26 676	24	65
		8			33 149	44	62			33 178	47	62			35 568	43	63
		10			41 436	69	77			41 472	73	78			44 460	67	78
	1050	4	1.838	1.209	17 403	11	54	1.890	1.210	17 418	12	54	1.943	1.297	18 673	11	55
		6			26 105	25	65			26 127	26	65			28 010	24	65
		8			34 806	44	62			34 836	47	62			37 346	43	63
		10			43 508	69	78			43 546	73	78			46 683	67	79
	1100	4	1.925	1.266	18 232	11	55	1.980	1.267	18 248	12	55	2.035	1.359	19 562	11	55
		6			27 348	25	65			27 372	26	66			29 344	24	66
		8			36 464	44	62			36 495	47	63			39 125	43	63
		10			45 580	69	79			45 619	73	79			48 906	67	79
	1150	4	2.013	1.324	19 061	11	55	2.070	1.325	19 077	12	56	2.128	1.420	20 452	11	56
		6			28 591	25	66			28 616	26	66			30 677	24	67
		8			38 121	44	62			38 154	47	63			40 903	43	63
		10			47 651	69	79			47 693	73	79			51 129	67	80
	1200	4	2.100	1.381	19 889	11	56	2.160	1.382	19 907	12	56	2.220	1.482	21 341	11	57
		6			29 834	25	66			29 860	26	67			32 011	24	67
		8			39 779	44	62			39 813	47	63			42 682	43	63
		10			49 723	69	80			49 766	73	80			53 352	67	80

B – nominal width [mm]
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S_e – damper active cross-section [m²]

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1900					1950					2000				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0.209	0.136	1 956	11	44	0.215	0.136	1 956	12	44	0.220	0.145	2 088	11	44
		6			2 934	26	54			2 934	27	55			3 132	25	55
		8			3 912	45	62			3 912	48	62			4 175	44	63
		10			4 891	71	68			4 891	75	68			5 219	69	68
	150	4	0.285	0.185	2 668	11	44	0.293	0.185	2 668	12	45	0.300	0.198	2 847	11	45
		6			4 001	26	55			4 001	27	55			4 270	25	56
		8			5 335	45	62			5 335	48	62			5 694	44	63
		10			6 669	71	68			6 669	75	69			7 117	69	69
	200	4	0.380	0.247	3 557	11	45	0.390	0.247	3 557	12	45	0.400	0.264	3 796	11	46
		6			5 335	26	56			5 335	27	56			5 694	25	56
		8			7 114	45	62			7 114	48	62			7 592	44	63
		10			8 892	71	69			8 892	75	69			9 490	69	69
	250	4	0.475	0.309	4 446	11	46	0.488	0.309	4 446	12	46	0.500	0.330	4 745	11	46
		6			6 669	26	56			6 669	27	56			7 117	25	57
		8			8 892	45	62			8 892	48	62			9 490	44	63
		10			11 115	71	69			11 115	75	70			11 862	69	70
	300	4	0.570	0.371	5 335	11	46	0.585	0.371	5 335	12	46	0.600	0.395	5 694	11	47
		6			8 003	26	57			8 003	27	57			8 541	25	57
		8			10 670	45	62			10 670	48	62			11 388	44	63
		10			13 338	71	70			13 338	75	70			14 234	69	71
	350	4	0.665	0.432	6 224	11	47	0.683	0.432	6 224	12	47	0.700	0.461	6 643	11	47
		6			9 337	26	57			9 337	27	58			9 964	25	58
		8			12 449	45	62			12 449	48	63			13 285	44	63
		10			15 561	71	71			15 561	75	71			16 607	69	71
	400	4	0.760	0.494	7 114	11	47	0.780	0.494	7 114	12	48	0.800	0.527	7 592	11	48
		6			10 670	26	58			10 670	27	58			11 388	25	59
		8			14 227	45	62			14 227	48	63			15 183	44	63
		10			17 784	71	71			17 784	75	72			18 979	69	72
	450	4	0.855	0.556	8 003	11	48	0.878	0.556	8 003	12	48	0.900	0.593	8 541	11	48
		6			12 004	26	59			12 004	27	59			12 811	25	59
		8			16 006	45	62			16 006	48	63			17 081	44	63
		10			20 007	71	72			20 007	75	72			21 352	69	72
	500	4	0.950	0.618	8 892	11	49	0.975	0.618	8 892	12	49	1.000	0.659	9 490	11	49
		6			13 338	26	59			13 338	27	59			14 234	25	60
		8			17 784	45	62			17 784	48	63			18 979	44	63
		10			22 230	71	72			22 230	75	73			23 724	69	73
	550	4	1.045	0.679	9 781	11	49	1.073	0.679	9 781	12	49	1.100	0.725	10 439	11	50
		6			14 672	26	60			14 672	27	60			15 658	25	60
		8			19 562	45	62			19 562	48	63			20 877	44	63
		10			24 453	71	73			24 453	75	73			26 096	69	74
	600	4	1.140	0.741	10 670	11	50	1.170	0.741	10 670	12	50	1.200	0.791	11 388	11	50
		6			16 006	26	60			16 006	27	61			17 081	25	61
		8			21 341	45	63			21 341	48	63			22 775	44	63
		10			26 676	71	74			26 676	75	74			28 469	69	74
	650	4	1.235	0.803	11 560	11	50	1.268	0.803	11 560	12	51	1.300	0.857	12 336	11	51
		6			17 339	26	61			17 339	27	61			18 505	25	62
		8			23 119	45	63			23 119	48	63			24 673	44	63
		10			28 899	71	74			28 899	75	74			30 841	69	75

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	1900 L_{WA} [dB]	1950 S_k [m²]	1950 S_e [m²]	1950 Q [m³/h]	1950 d_p [PA]	1950 L_{WA} [dB]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]	2000 L_{WA} [dB]
700		4	1.330	0.865	12 449	11	51	1.365	0.865	12 449	12	51	1.400	0.923	13 285	11	51
		6			18 673	26	61			18 673	27	62			19 928	25	62
		8			24 898	45	63			24 898	48	63			26 571	44	63
		10			31 122	71	75			31 122	75	75			33 214	69	75
750		4	1.425	0.926	13 338	11	51	1.463	0.926	13 338	12	52	1.500	0.989	14 234	11	52
		6			20 007	26	62			20 007	27	62			21 352	25	63
		8			26 676	45	63			26 676	48	63			28 469	44	63
		10			33 345	71	75			33 345	75	76			35 586	69	76
800		4	1.520	0.988	14 227	11	52	1.560	0.988	14 227	12	52	1.600	1.054	15 183	11	53
		6			21 341	26	63			21 341	27	63			22 775	25	63
		8			28 454	45	63			28 454	48	63			30 367	44	63
		10			35 568	71	76			35 568	75	76			37 958	69	77
850		4	1.615	1.050	15 116	11	53	1.658	1.050	15 116	12	53	1.700	1.120	16 132	11	53
		6			22 675	26	63			22 675	27	64			24 198	25	64
		8			30 233	45	63			30 233	48	63			32 265	44	63
		10			37 791	71	77			37 791	75	77			40 331	69	77
900		4	1.710	1.112	16 006	11	53	1.755	1.112	16 006	12	54	1.800	1.186	17 081	11	54
		6			24 008	26	64			24 008	27	64			25 622	25	64
		8			32 011	45	63			32 011	48	63			34 163	44	63
		10			40 014	71	77			40 014	75	77			42 703	69	78
950		4	1.805	1.173	16 895	11	54	1.853	1.173	16 895	12	54	1.900	1.252	18 030	11	54
		6			25 342	26	64			25 342	27	65			27 045	25	65
		8			33 790	45	63			33 790	48	63			36 060	44	64
		10			42 237	71	78			42 237	75	78			45 076	69	78
1000		4	1.900	1.235	17 784	11	54	1.950	1.235	17 784	12	55	2.000	1.318	18 979	11	55
		6			26 676	26	65			26 676	27	65			28 469	25	66
		8			35 568	45	63			35 568	48	63			37 958	44	64
		10			44 460	71	78			44 460	75	79			47 448	69	79
1050		4	1.995	1.297	18 673	11	55	2.048	1.297	18 673	12	55	2.100	1.384	19 928	11	56
		6			28 010	26	66			28 010	27	66			29 892	25	66
		8			37 346	45	63			37 346	48	63			39 856	44	64
		10			46 683	71	79			46 683	75	79			49 820	69	79
1100		4	2.090	1.359	19 562	11	56	2.145	1.359	19 562	12	56	2.200	1.450	20 877	11	56
		6			29 344	26	66			29 344	27	67			31 316	25	67
		8			39 125	45	63			39 125	48	63			41 754	44	64
		10			48 906	71	79			48 906	75	80			52 193	69	80
1150		4	2.185	1.420	20 452	11	56	2.243	1.420	20 452	12	57	2.300	1.516	21 826	11	57
		6			30 677	26	67			30 677	27	67			32 739	25	67
		8			40 903	45	63			40 903	48	63			43 652	44	64
		10			51 129	71	80			51 129	75	80			54 565	69	81
1200		4	2.280	1.482	21 341	11	57	2.340	1.482	21 341	12	57	2.400	1.582	22 775	11	57
		6			32 011	26	67			32 011	27	68			34 163	25	68
		8			42 682	45	63			42 682	48	64			45 550	44	64
		10			53 352	71	81			53 352	75	81			56 938	69	81

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	2050 S_k [m²]	2050 S_e [m²]	2050 Q [m³/h]	2050 d_p [PA]	2050 L_{WA} [dB]	2100 S_k [m²]	2100 S_e [m²]	2100 Q [m³/h]	2100 d_p [PA]	2100 L_{WA} [dB]	2150 S_k [m²]	2150 S_e [m²]	2150 Q [m³/h]	2150 d_p [PA]	2150 L_{WA} [dB]
	110	4	0.226	0.153	2 202	10	45	0.231	0.154	2 219	11	45	0.237	0.154	2 219	11	45
		6			3 303	23	55			3 329	24	56			3 329	25	56
		8			4 404	42	63			4 438	43	63			4 438	45	63
		10			5 504	65	69			5 548	67	69			5 548	71	69
	150	4	0.308	0.209	3 002	10	45	0.315	0.210	3 026	11	45	0.323	0.210	3 026	11	46
		6			4 504	23	56			4 539	24	56			4 539	25	57
		8			6 005	42	63			6 052	43	63			6 052	45	63
		10			7 506	65	69			7 565	67	69			7 565	71	70
	200	4	0.410	0.278	4 003	10	46	0.420	0.280	4 035	11	46	0.430	0.280	4 035	11	46
		6			6 005	23	56			6 052	24	57			6 052	25	57
		8			8 006	42	63			8 070	43	63			8 070	45	64
		10			10 008	65	70			10 087	67	70			10 087	71	70
	250	4	0.513	0.348	5 004	10	46	0.525	0.350	5 044	11	47	0.538	0.350	5 044	11	47
		6			7 506	23	57			7 565	24	57			7 565	25	58
		8			10 008	42	63			10 087	43	63			10 087	45	64
		10			12 510	65	70			12 609	67	71			12 609	71	71
	300	4	0.615	0.417	6 005	10	47	0.630	0.420	6 052	11	47	0.645	0.420	6 052	11	48
		6			9 007	23	58			9 078	24	58			9 078	25	58
		8			12 010	42	63			12 105	43	63			12 105	45	64
		10			15 012	65	71			15 131	67	71			15 131	71	72
	350	4	0.718	0.487	7 006	10	48	0.735	0.490	7 061	11	48	0.753	0.490	7 061	11	48
		6			10 508	23	58			10 592	24	59			10 592	25	59
		8			14 011	42	63			14 122	43	63			14 122	45	64
		10			17 514	65	72			17 653	67	72			17 653	71	72
	400	4	0.820	0.556	8 006	10	48	0.840	0.560	8 070	11	48	0.860	0.560	8 070	11	49
		6			12 010	23	59			12 105	24	59			12 105	25	59
		8			16 013	42	63			16 140	43	63			16 140	45	64
		10			20 016	65	72			20 174	67	72			20 174	71	73
	450	4	0.923	0.626	9 007	10	49	0.945	0.630	9 078	11	49	0.968	0.630	9 078	11	49
		6			13 511	23	59			13 618	24	60			13 618	25	60
		8			18 014	42	63			18 157	43	64			18 157	45	64
		10			22 518	65	73			22 696	67	73			22 696	71	73
	500	4	1.025	0.695	10 008	10	49	1.050	0.701	10 087	11	50	1.075	0.701	10 087	11	50
		6			15 012	23	60			15 131	24	60			15 131	25	61
		8			20 016	42	63			20 174	43	64			20 174	45	64
		10			25 020	65	73			25 218	67	74			25 218	71	74
	550	4	1.128	0.765	11 009	10	50	1.155	0.771	11 096	11	50	1.183	0.771	11 096	11	51
		6			16 513	23	61			16 644	24	61			16 644	25	61
		8			22 018	42	63			22 192	43	64			22 192	45	64
		10			27 522	65	74			27 740	67	74			27 740	71	74
	600	4	1.230	0.834	12 010	10	51	1.260	0.841	12 105	11	51	1.290	0.841	12 105	11	51
		6			18 014	23	61			18 157	24	62			18 157	25	62
		8			24 019	42	63			24 209	43	64			24 209	45	64
		10			30 024	65	74			30 262	67	75			30 262	71	75
	650	4	1.333	0.904	13 010	10	51	1.365	0.911	13 113	11	51	1.398	0.911	13 113	11	52
		6			19 516	23	62			19 670	24	62			19 670	25	62
		8			26 021	42	63			26 227	43	64			26 227	45	64
		10			32 526	65	75			32 783	67	75			32 783	71	76

mcr WIP PROV/V, mcr WIP PROV/V-M | Multi-blade smoke control dampers for multi-compartment and single-compartment fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			2050					2100					2150				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	700	4	1.435	0.973	14 011	10	52	1.470	0.981	14 122	11	52	1.505	0.981	14 122	11	52
		6			21 017	23	62			21 183	24	63			21 183	25	63
		8			28 022	42	64			28 244	43	64			28 244	45	64
		10			35 028	65	76			35 305	67	76			35 305	71	76
	750	4	1.538	1.043	15 012	10	52	1.575	1.051	15 131	11	53	1.613	1.051	15 131	11	53
		6			22 518	23	63			22 696	24	63			22 696	25	64
		8			30 024	42	64			30 262	43	64			30 262	45	64
		10			37 530	65	76			37 827	67	77			37 827	71	77
	800	4	1.640	1.112	16 013	10	53	1.680	1.121	16 140	11	53	1.720	1.121	16 140	11	54
		6			24 019	23	64			24 209	24	64			24 209	25	64
		8			32 026	42	64			32 279	43	64			32 279	45	64
		10			40 032	65	77			40 349	67	77			40 349	71	77
	850	4	1.743	1.182	17 014	10	54	1.785	1.191	17 148	11	54	1.828	1.191	17 148	11	54
		6			25 520	23	64			25 722	24	64			25 722	25	65
		8			34 027	42	64			34 296	43	64			34 296	45	64
		10			42 534	65	77			42 871	67	78			42 871	71	78
	900	4	1.845	1.251	18 014	10	54	1.890	1.261	18 157	11	54	1.935	1.261	18 157	11	55
		6			27 022	23	65			27 235	24	65			27 235	25	65
		8			36 029	42	64			36 314	43	64			36 314	45	64
		10			45 036	65	78			45 392	67	78			45 392	71	79
	950	4	1.948	1.321	19 015	10	55	1.995	1.331	19 166	11	55	2.043	1.331	19 166	11	55
		6			28 523	23	65			28 749	24	66			28 749	25	66
		8			38 030	42	64			38 331	43	64			38 331	45	64
		10			47 538	65	79			47 914	67	79			47 914	71	79
	1000	4	2.050	1.390	20 016	10	55	2.100	1.401	20 174	11	56	2.150	1.401	20 174	11	56
		6			30 024	23	66			30 262	24	66			30 262	25	67
		8			40 032	42	64			40 349	43	64			40 349	45	65
		10			50 040	65	79			50 436	67	79			50 436	71	80
	1050	4	2.153	1.460	21 017	10	56	2.205	1.471	21 183	11	56	2.258	1.471	21 183	11	57
		6			31 525	23	67			31 775	24	67			31 775	25	67
		8			42 034	42	64			42 366	43	64			42 366	45	65
		10			52 542	65	80			52 958	67	80			52 958	71	80
	1100	4	2.255	1.529	22 018	10	57	2.310	1.541	22 192	11	57	2.365	1.541	22 192	11	57
		6			33 026	23	67			33 288	24	67			33 288	25	68
		8			44 035	42	64			44 384	43	64			44 384	45	65
		10			55 044	65	80			55 480	67	81			55 480	71	81
	1150	4	2.358	1.599	23 018	10	57	2.415	1.611	23 201	11	57	2.473	1.611	23 201	11	58
		6			34 528	23	68			34 801	24	68			34 801	25	68
		8			46 037	42	64			46 401	43	64			46 401	45	65
		10			57 546	65	81			58 001	67	81			58 001	71	82
	1200	4	2.460	1.668	24 019	10	58	2.520	1.681	24 209	11	58	2.580	1.681	24 209	11	58
		6			36 029	23	68			36 314	24	69			36 314	25	69
		8			48 038	42	64			48 419	43	64			48 419	45	65
		10			60 048	65	82			60 523	67	82			60 523	71	82

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			2200					2250					2300				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	110	4	0.242	0.154	2 219	12	45	0.248	0.163	2 351	11	46	0.253	0.163	2 351	12	46
		6			3 329	27	56			3 526	25	57			3 526	26	57
		8			4 438	47	64			4 701	44	64			4 701	46	64
		10			5 548	74	69			5 877	69	70			5 877	72	70
	150	4	0.330	0.210	3 026	12	46	0.338	0.223	3 205	11	46	0.345	0.223	3 205	12	47
		6			4 539	27	57			4 808	25	57			4 808	26	57
		8			6 052	47	64			6 411	44	64			6 411	46	64
		10			7 565	74	70			8 014	69	70			8 014	72	71
	200	4	0.440	0.280	4 035	12	47	0.450	0.297	4 274	11	47	0.460	0.297	4 274	12	47
		6			6 052	27	57			6 411	25	58			6 411	26	58
		8			8 070	47	64			8 548	44	64			8 548	46	64
		10			10 087	74	71			10 685	69	71			10 685	72	71
	250	4	0.550	0.350	5 044	12	47	0.563	0.371	5 342	11	48	0.575	0.371	5 342	12	48
		6			7 565	27	58			8 014	25	58			8 014	26	59
		8			10 087	47	64			10 685	44	64			10 685	46	65
		10			12 609	74	71			13 356	69	72			13 356	72	72
	300	4	0.660	0.420	6 052	12	48	0.675	0.445	6 411	11	48	0.690	0.445	6 411	12	48
		6			9 078	27	59			9 616	25	59			9 616	26	59
		8			12 105	47	64			12 822	44	64			12 822	46	65
		10			15 131	74	72			16 027	69	72			16 027	72	72
	350	4	0.770	0.490	7 061	12	48	0.788	0.519	7 479	11	49	0.805	0.519	7 479	12	49
		6			10 592	27	59			11 219	25	59			11 219	26	60
		8			14 122	47	64			14 959	44	64			14 959	46	65
		10			17 653	74	72			18 698	69	73			18 698	72	73
	400	4	0.880	0.560	8 070	12	49	0.900	0.594	8 548	11	49	0.920	0.594	8 548	12	50
		6			12 105	27	60			12 822	25	60			12 822	26	60
		8			16 140	47	64			17 096	44	64			17 096	46	65
		10			20 174	74	73			21 370	69	73			21 370	72	74
	450	4	0.990	0.630	9 078	12	50	1.013	0.668	9 616	11	50	1.035	0.668	9 616	12	50
		6			13 618	27	60			14 424	25	61			14 424	26	61
		8			18 157	47	64			19 233	44	64			19 233	46	65
		10			22 696	74	74			24 041	69	74			24 041	72	74
	500	4	1.100	0.701	10 087	12	50	1.125	0.742	10 685	11	51	1.150	0.742	10 685	12	51
		6			15 131	27	61			16 027	25	61			16 027	26	62
		8			20 174	47	64			21 370	44	65			21 370	46	65
		10			25 218	74	74			26 712	69	74			26 712	72	75
	550	4	1.210	0.771	11 096	12	51	1.238	0.816	11 753	11	51	1.265	0.816	11 753	12	51
		6			16 644	27	62			17 630	25	62			17 630	26	62
		8			22 192	47	64			23 507	44	65			23 507	46	65
		10			27 740	74	75			29 383	69	75			29 383	72	75
	600	4	1.320	0.841	12 105	12	51	1.350	0.890	12 822	11	52	1.380	0.890	12 822	12	52
		6			18 157	27	62			19 233	25	62			19 233	26	63
		8			24 209	47	64			25 644	44	65			25 644	46	65
		10			30 262	74	75			32 054	69	76			32 054	72	76
	650	4	1.430	0.911	13 113	12	52	1.463	0.965	13 890	11	52	1.495	0.965	13 890	12	53
		6			19 670	27	63			20 835	25	63			20 835	26	63
		8			26 227	47	64			27 780	44	65			27 780	46	65
		10			32 783	74	76			34 726	69	76			34 726	72	77

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	2200 S_k [m²]	2200 S_e [m²]	2200 Q [m³/h]	2200 d_p [PA]	2200 L_{WA} [dB]	2250 S_k [m²]	2250 S_e [m²]	2250 Q [m³/h]	2250 d_p [PA]	2250 L_{WA} [dB]	2300 S_k [m²]	2300 S_e [m²]	2300 Q [m³/h]	2300 d_p [PA]	2300 L_{WA} [dB]
	700	4	1.540	0.981	14 122	12	53	1.575	1.039	14 959	11	53	1.610	1.039	14 959	12	53
		6			21 183	27	63			22 438	25	64			22 438	26	64
		8			28 244	47	64			29 917	44	65			29 917	46	65
		10			35 305	74	77			37 397	69	77			37 397	72	77
	750	4	1.650	1.051	15 131	12	53	1.688	1.113	16 027	11	54	1.725	1.113	16 027	12	54
		6			22 696	27	64			24 041	25	64			24 041	26	65
		8			30 262	47	65			32 054	44	65			32 054	46	65
		10			37 827	74	77			40 068	69	77			40 068	72	78
	800	4	1.760	1.121	16 140	12	54	1.800	1.187	17 096	11	54	1.840	1.187	17 096	12	54
		6			24 209	27	65			25 644	25	65			25 644	26	65
		8			32 279	47	65			34 191	44	65			34 191	46	65
		10			40 349	74	78			42 739	69	78			42 739	72	78
	850	4	1.870	1.191	17 148	12	54	1.913	1.261	18 164	11	55	1.955	1.261	18 164	12	55
		6			25 722	27	65			27 246	25	65			27 246	26	66
		8			34 296	47	65			36 328	44	65			36 328	46	65
		10			42 871	74	78			45 410	69	79			45 410	72	79
	900	4	1.980	1.261	18 157	12	55	2.025	1.336	19 233	11	55	2.070	1.336	19 233	12	56
		6			27 235	27	66			28 849	25	66			28 849	26	66
		8			36 314	47	65			38 465	44	65			38 465	46	65
		10			45 392	74	79			48 082	69	79			48 082	72	79
	950	4	2.090	1.331	19 166	12	56	2.138	1.410	20 301	11	56	2.185	1.410	20 301	12	56
		6			28 749	27	66			30 452	25	67			30 452	26	67
		8			38 331	47	65			40 602	44	65			40 602	46	65
		10			47 914	74	79			50 753	69	80			50 753	72	80
	1000	4	2.200	1.401	20 174	12	56	2.250	1.484	21 370	11	57	2.300	1.484	21 370	12	57
		6			30 262	27	67			32 054	25	67			32 054	26	67
		8			40 349	47	65			42 739	44	65			42 739	46	65
		10			50 436	74	80			53 424	69	80			53 424	72	81
	1050	4	2.310	1.471	21 183	12	57	2.363	1.558	22 438	11	57	2.415	1.558	22 438	12	57
		6			31 775	27	67			33 657	25	68			33 657	26	68
		8			42 366	47	65			44 876	44	65			44 876	46	65
		10			52 958	74	81			56 095	69	81			56 095	72	81
	1100	4	2.420	1.541	22 192	12	57	2.475	1.632	23 507	11	58	2.530	1.632	23 507	12	58
		6			33 288	27	68			35 260	25	68			35 260	26	69
		8			44 384	47	65			47 013	44	65			47 013	46	66
		10			55 480	74	81			58 766	69	82			58 766	72	82
	1150	4	2.530	1.611	23 201	12	58	2.588	1.707	24 575	11	58	2.645	1.707	24 575	12	59
		6			34 801	27	69			36 863	25	69			36 863	26	69
		8			46 401	47	65			49 150	44	65			49 150	46	66
		10			58 001	74	82			61 438	69	82			61 438	72	82
	1200	4	2.640	1.681	24 209	12	59	2.700	1.781	25 644	11	59	2.760	1.781	25 644	12	59
		6			36 314	27	69			38 465	25	70			38 465	26	70
		8			48 419	47	65			51 287	44	65			51 287	46	66
		10			60 523	74	82			64 109	69	83			64 109	72	83

The WIP PROV/V fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

14.7 | Estimated weights of mcr WIP PROV/V, mcr WIP PROV/V-M dampers [kg]

height H [mm] \ width B [mm]	110	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150
263	10	11	12	13	14	14	15	16	17	18	19	20	20	21	22	23	24	25	26	26	27	28
300	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
400	11	12	14	15	16	18	19	20	21	23	24	25	27	28	29	31	32	33	34	36	37	38
500	12	13	15	17	18	20	21	23	25	26	28	30	31	33	34	36	38	39	41	43	44	46
600	13	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	47	49	51	53
700	13	15	18	20	22	24	27	29	31	34	36	38	40	43	45	47	49	52	54	56	59	61
800	14	16	19	21	24	27	29	32	34	37	40	42	45	47	50	53	55	58	60	63	66	68
900	15	17	20	23	26	29	32	35	38	41	44	47	49	52	55	58	61	64	67	70	73	76
1000	16	18	21	25	28	31	34	38	41	44	47	51	54	57	60	64	67	70	73	77	80	83
1100	16	19	23	26	30	34	37	41	44	48	51	55	59	62	66	69	73	76	80	84	87	91
1200	17	20	24	28	32	36	40	44	47	51	55	59	63	67	71	75	79	83	86	90	94	98
1250	17	21	25	29	33	37	41	45	49	53	57	61	65	69	73	78	82	86	90	94	98	102
1300	18	21	25	30	34	38	42	47	51	55	59	63	68	72	76	80	85	89	93	97	101	106
1400	18	22	27	31	36	40	45	49	54	59	63	68	72	77	81	86	90	95	99	104	109	113
1500	19	23	28	33	38	43	47	52	57	62	67	72	77	82	86	91	96	101	106	111	116	121
1600	20	24	29	34	40	45	50	55	60	66	71	76	81	86	92	97	102	107	112	118	123	128
1700	21	25	31	36	42	47	53	58	64	69	75	80	86	91	97	102	108	113	119	125	130	136
1800	21	26	32	38	44	49	55	61	67	73	79	85	90	96	102	108	114	120	125	131	137	143
1900	22	27	33	39	46	52	58	64	70	76	83	89	95	101	107	113	120	126	132	138	144	151
2000	23	28	34	41	47	54	60	67	73	80	86	93	99	106	112	119	125	132	138	145	151	158
2100	23	29	36	43	49	56	63	70	77	84	90	97	104	111	118	125	131	138	145	152	159	165
2200	24	30	37	44	51	59	66	73	80	87	94	101	109	116	123	130	137	144	151	159	166	173
2300	25	31	38	46	53	61	68	76	83	91	98	106	113	121	128	136	143	151	158	165	173	180

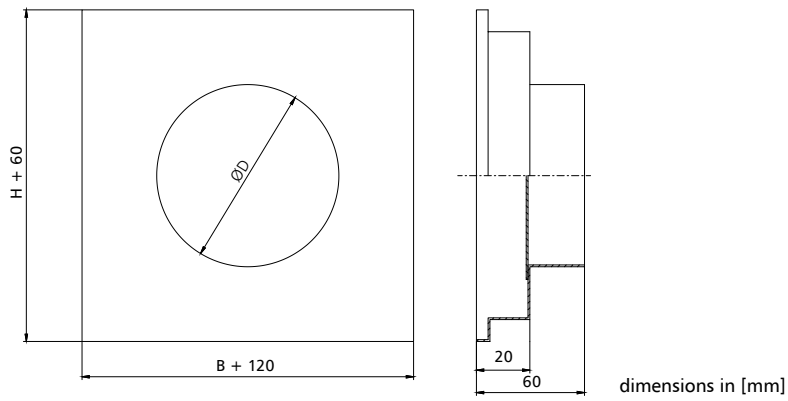
The table shows the weights of dampers with RST-KW1 trigger control mechanisms or actuators.

14.8 | Accessories

14.8.1 | mcr KRP connection stub

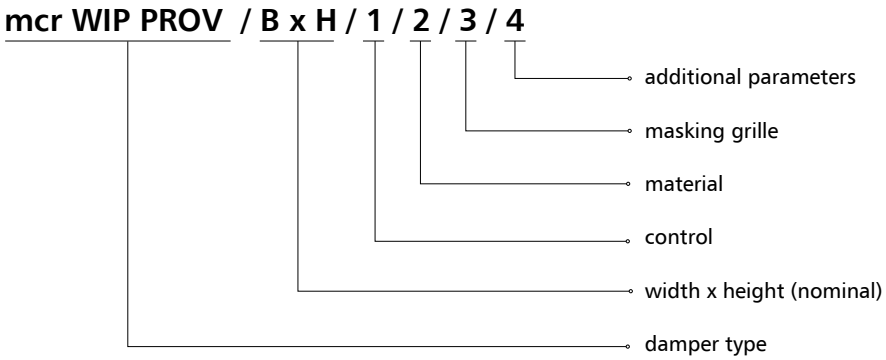
mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end" pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:
BxH - damper dimensions [mm]
ØD - diameter of the connection duct [mm]



dimensions in [mm]

14.9 | Marking



1 - control:

» **trigger and control mechanism, axial actuator**

BE24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC/DC
BEE24 – actuator without a return spring, U = 24 V AC/DC
BEE230 – actuator without a return spring, U = 230 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BEN230 – actuator without a return spring, U = 230 V AC/DC
MLE24 – actuator without a return spring, U = 24 V AC/DC
MLE230 – actuator without a return spring, U = 230 V AC/DC
ME24 – actuator without a return spring, U = 24 V AC/DC
ME230 – actuator without a return spring, U = 230 V AC/DC

2 - material:

[no symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KKM – special damper design - damper and its components made of stainless steel, damper partition sleeves additionally secured
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured

3 - masking grille:

MSTx1 – masking grille
MSTx2 – masking grille
MWPx1 – mesh masking grille
MWPx2 – two mesh masking grilles

4 - additional parameters:

» **Damper axis of rotation**

[no symbol] – horizontal axis of rotation

» **Damper casing**

BU – earth pin

Note: **separate additional parameters entered with the "/" sign**

example marking:

mcr WIP PROV/V 400 x 400 BLE24
EIS120 louvered smoke ventilation damper with a 24 V actuator with limit switches.

Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

downloadable models
on the website
under the designer zone tab



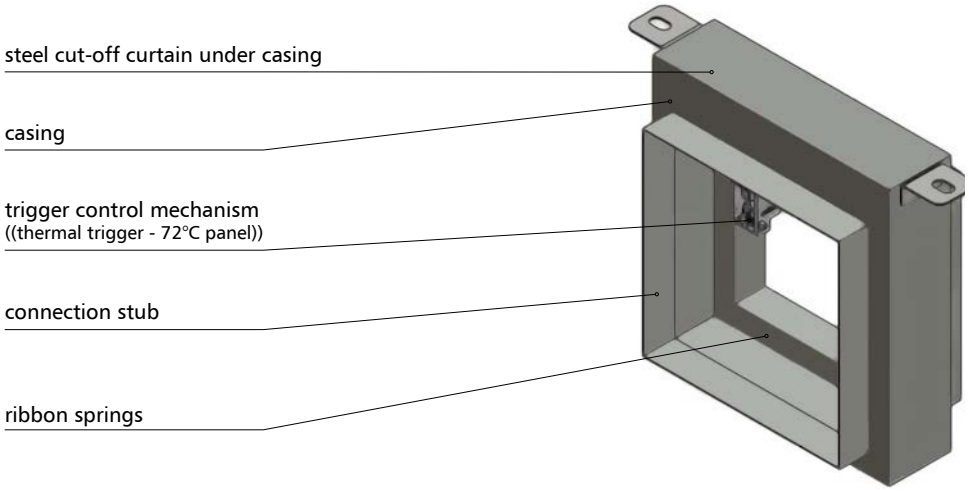
0832-CPR-P0001

» **E120**
» Fire resistance class: E120 (v_e h_o i↔o).
» Certificate of constancy of performance 0832-CPR-P0001.
» Dampers certified for compliance with EN 15650.
» Dampers qualified under EN 13501-3 and tested under EN 1366-2.
» Narrow cut-off dampers with a stainless steel curtain with a large active surface.

15.1| Application

The mcr FS fire dampers with a thermal trigger are used in vertical construction partitions to allow the air to flow through. The purpose of the dampers is to maintain the fire resistance of the partition in which they are installed.
During normal operation, the dampers are opened. The dampers switch to safe mode (close):
» automatically, by means of thermal trigger tripping at 72°C,
» manually (in test mode), by pressing the manual release button (trigger control mechanism),
» remotely, by means of EM electromagnetic trigger tripping (optional).
Admissible flow velocity in the connected duct is 15 m/s. Dampers with EM electromagnetic triggers (optional) close as a result of cutting the power supply as a result of the action of return springs in the damper. The dampers open upon the application of the power supply to trigger terminals and upon manual lifting of the steel curtain.
Dampers with a thermal trigger control mechanism close as a result of the drive spring action in the damper, activated by the triggering of the thermal trigger or manually, by pressing the dedicated button on the panel. Dampers are opened manually, by lifting the steel curtain and locking it in the trigger control mechanism clamps.
mcr FS dampers may also be used in the systems which are protecting egress routes from smoke, in which case they remain open during the fire and ensure a supply of fresh air to egress routes. If the fire develops further, the dampers are automatically closed as a result of thermal trigger tripping to prevent fire spreading.

15.2| Design



mcr FS dampers consist of a double casing with a rectangular cross-section, a moving blade in the form of a falling foldable curtain and a trigger control mechanism (panel), which is activated remotely or automatically when the thermal trigger is tripped. The damper casing is made of galvanized steel sheets. The casing total length is 90 mm for rectangular dampers and 92 mm for circular dampers. On two sides, each damper is equipped with a connection stub with the length of 38 mm for rectangular dampers and 60 mm for circular dampers. The damper blade is made of steel sheets. The steel flat bar on the casing exterior is installed to tighten the device after its activation.

The mechanism of the mcr FS dampers, which moves the curtain, consists of two ribbon springs, placed inside of the damper sides, along its height. If the allowed temperature is exceeded in the casing, the trigger control mechanism is triggered and the spring-powered curtain is lowered. It is possible to equip the damper with an EM mechanism for remote control.

15.3 | Versions

15.3.1 | mcr FS I/F – cut-off fire damper for E120(v_e h_o i↔o) rigid walls and floor slabs



insert symmetrically against the wall axis

The mcr FS I/F damper is suitable for installation in rigid walls.

The stainless steel cut-off curtain falls when 72°C is exceeded or if the voltage is removed from the EM trigger control mechanism (optional).

The damper may be equipped with a MSSP curtain closing limit switch or a MSDP curtain closing and opening limit switch.

15.3.2 | mcr FS DWFX-C – cut-off damper for E120(v_e i↔o) light walls



insert symmetrically against the wall axis

The mcr FS DWFX-C damper is suitable for installation in newly built light walls

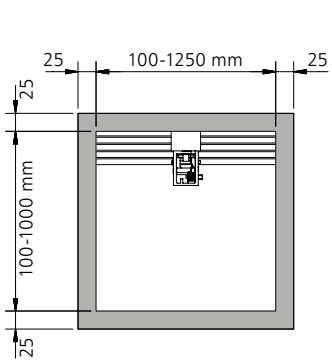
The stainless steel cut-off curtain falls when 72°C is exceeded or if the voltage is removed from the EM trigger control mechanism (optional).

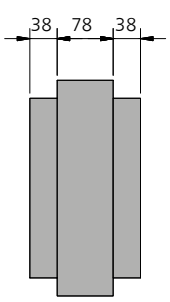
The damper may be equipped with a MSSP curtain closing limit switch or a MSDP curtain closing and opening limit switch.

15.4 | Dimensions

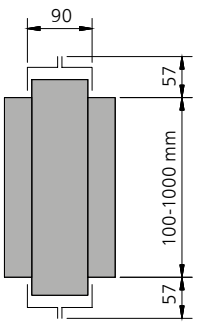
mcr FS dampers are manufactured in three series:

» **101 series** (rectangular dampers) with a curtain located partly in the air stream – from 100 x 100 mm to 1250 x 1000 mm.

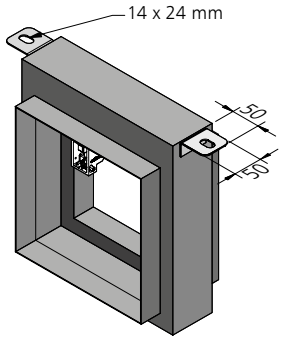




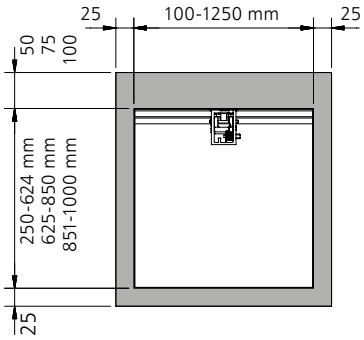
IF

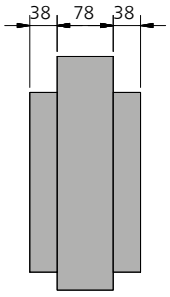


DWFX-C

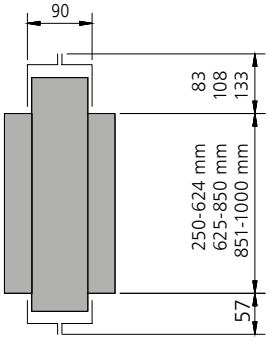


» **201 series** (rectangular dampers) with a curtain located outside the air stream – from 100 x 250 mm to 1250 x 1000 mm.

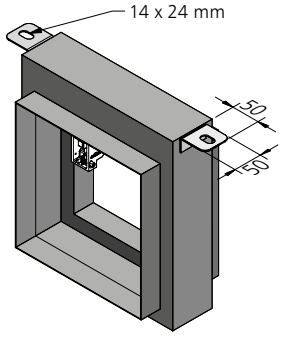




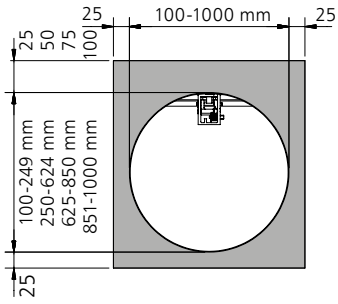
IF

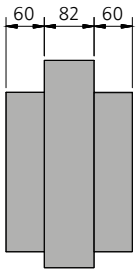


DWFX-C

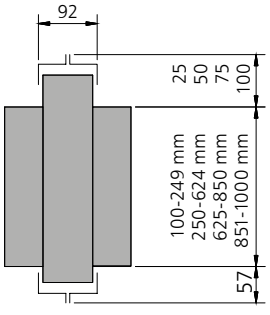


» **301 series** (circular dampers) with a curtain located outside the air flow – from D100 to D1000 mm.

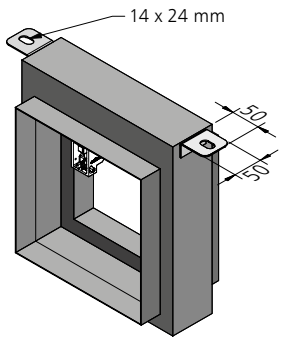




IF



DWFX-C



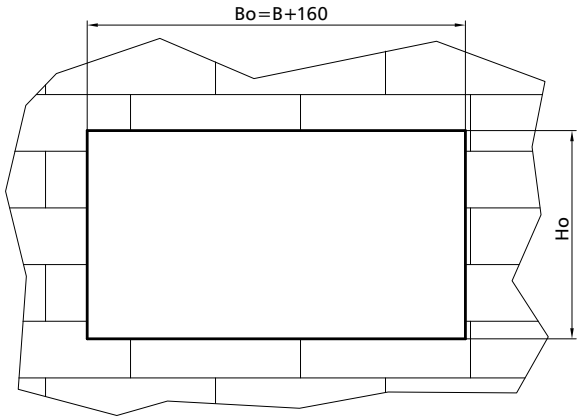
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

15.5 | Installation

mcr FS I/F dampers are rated E120(v_e h_o i↔o) if installed in partitions made of concrete, full bricks or aerated concrete blocks with a thickness of at least 110 mm and concrete floor slabs with a thickness of at least 150 mm.
mcr FS DWFX-C dampers are rated E120(v_e i↔o) if installed in light walls with gypsum boards on a steel framework with the thickness of at least 125 mm.

15.5.1 | Preparation of installation openings

» mcr FS I/F version – preferred opening

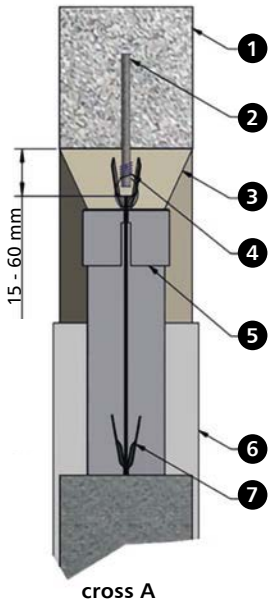


» mcr FS DWFX-C version

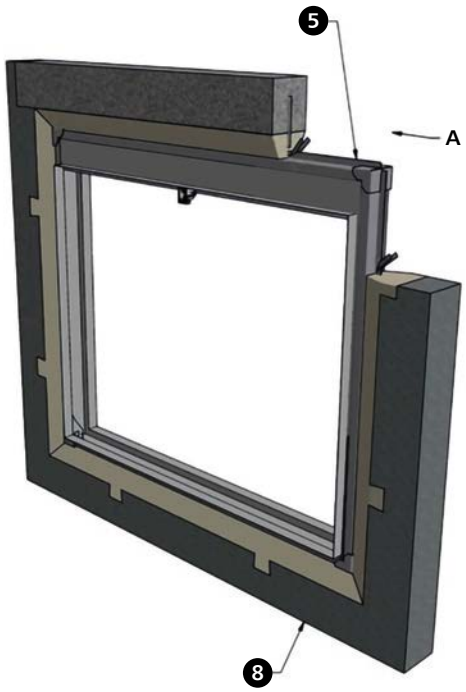
Dampers are installed during the construction of the gypsum board wall (the damper is embedded in the board wall).

Ho = H + 160* dla mcr FS 101 I/F
Ho = H + 180* dla mcr FS 201 I/F 250 - 624 mm
Ho = H + 205* dla mcr FS 201 I/F 625 - 850 mm
Ho = H + 230* dla mcr FS 201 I/F 851 - 1000 mm
* applies also to mcr FS 301 I/F

15.5.2 | Sample installation of mcr FS I/F dampers



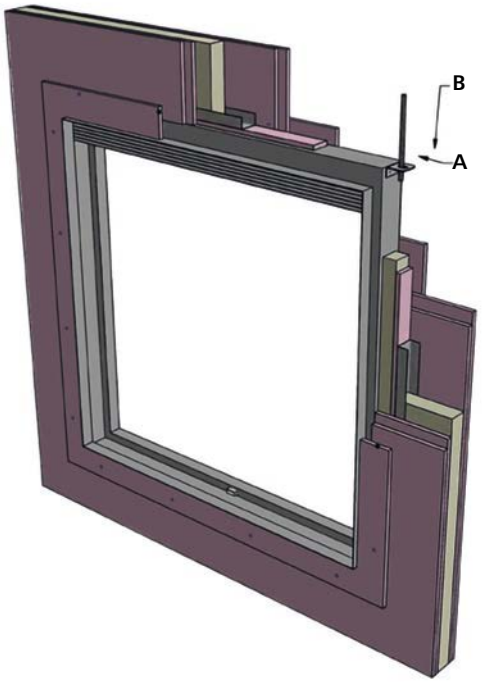
cross A

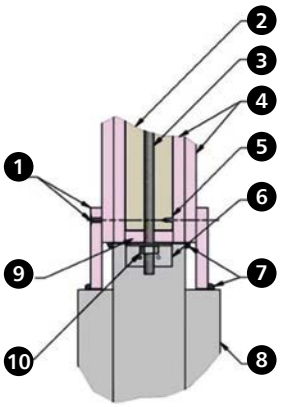


1. lintel
2. steel anchors ∅ min. 6.5 mm
3. assembly mortar*
4. steel wire ∅ 1.5 mm binding the anchors with frame runners
5. installation frame
6. mcr FS fire damper
7. frame runners - for bending sideways and downwards
8. rigid partition

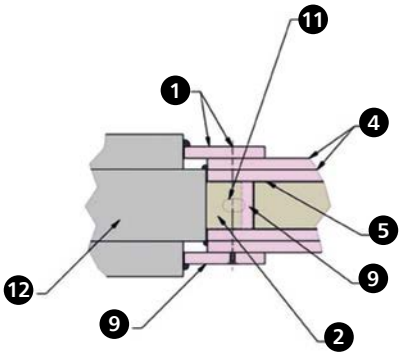
* Recommended damper installation in a wet system is based on assembly mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied.

15.5.3 | Sample installation of mcr FS DWFX-C dampers





cross-section A



cross-section A

1. 12.5 x 100 mm circumferential gypsum board trim fixed to the gypsum board wall through a UD50 profile with 300 mm bolts
2. mineral wool 33 kg/m^3
3. M10 rod (pin)
4. gypsum boards 2 x 12.5 mm
5. UD50 profile
6. angle profile welded to both ends of the casing
7. low-expansion intumescent compound around the damper, on both sides
8. damper casing
9. gypsum board trim 12.5 mm
10. M10 nut
11. angle profile with an opening
12. mcr FS fire damper

15.6 | mcr FS curtain dampers technical parameters

» damper active surface in relation to the B and H nominal and Bz and Hz total dimensions

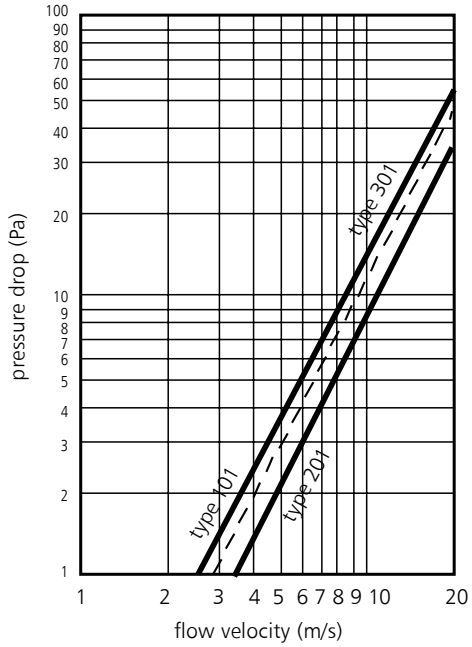
101 series														
H \ B	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250	
100	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	**150**
200	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.25	**250**
300	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.37	**350**
400	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.39	0.43	0.47	0.49	**450**
500	0.04	0.09	0.14	0.19	0.24	0.29	0.34	0.39	0.44	0.49	0.54	0.59	0.62	**550**
600	0.05	0.11	0.17	0.23	0.29	0.35	0.41	0.47	0.53	0.59	0.65	0.71	0.74	**650**
700	0.05	0.12	0.19	0.26	0.33	0.40	0.47	0.54	0.61	0.68	0.75	0.82	0.85	**750**
800	0.04	0.12	0.20	0.28	0.36	0.44	0.52	0.60	0.68	0.76	0.84	0.92	0.96	**850**
900	0.04	0.13	0.22	0.31	0.40	0.49	0.58	0.67	0.76	0.85	0.94	1.03	1.07	**950**
1000	0.03	0.13	0.23	0.33	0.43	0.53	0.63	0.73	0.83	0.93	1.03	1.13	1.18	**1050**
	150	**250**	**350**	**450**	**550**	**650**	**750**	**850**	**950**	**1050**	**1150**	**1250**	**1300**	Bz \ Hz

201 series														
H \ B	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250	
250	0.03	0.05	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25	0.28	0.30	0.31	**325**
300	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.38	**375**
400	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48	0.50	**475**
500	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.63	**575**
600	0.06	0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.54	0.60	0.66	0.72	0.75	**675**
700	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70	0.77	0.84	0.88	**800**
800	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	0.80	0.88	0.96	1.00	**900**
900	0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90	0.99	1.08	1.13	**1025**
1000	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.25	**1125**
	150	**250**	**350**	**450**	**550**	**650**	**750**	**850**	**950**	**1050**	**1150**	**1250**	**1300**	Bz \ Hz

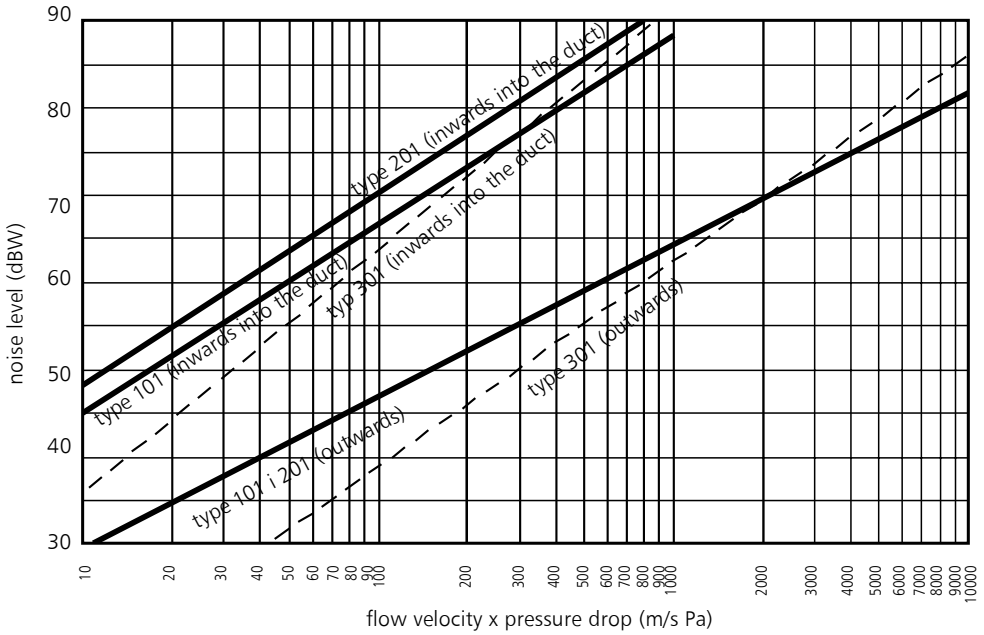
301 series										
D	**100**	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1000**
Active surface	100	200	300	400	500	600	700	800	900	1000
Hz	150	250	375	475	575	675	800	900	1025	1125
Bz	150	250	350	450	550	650	750	850	950	1050

The mcr FS fire damper selection program is available at **www.mercor.com.pl**, in the Designer Zone.

15.6.1 | Flow characteristics



pressure drop (Pa) and flow velocity (m/s)



flow velocity (m/s) x pressure drop (Pa) and noise level (dBW)

» acoustic power spectrum for mcr FS dampers (outside)

frequency	Hz	63	125	250	500	1k	2k	3k	4k
type 101	dB	10	7	3	9	13	20	30	33
type 201	dB	10	7	3	9	13	20	30	33
type 301	dB	13	10	3	7	11	12	26	42

» acoustic power spectrum for mcr FS dampers (inside the duct)

frequency	Hz	63	125	250	500	1k	2k	3k	4k
type 101	dB	4	12	16	18	22	20	32	38
type 201	dB	4	11	17	19	22	30	33	40
type 301	dB	4	10	16	18	21	24	30	38

15.7 | Weights of mcr FS curtain dampers

approximate damper weights [kg]																			
active opening dimensions Ø(mm)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
101 series/DWFX-C	1.6	2.1	2.8	3.5	4.2	5.0	5.7	6.9	7.5	8.6	9.5	10.9	12.0	13.1	13.8	15.2	16.7	18.1	19.0
101 series/ I/F	3.8	4.6	5.7	6.8	8.0	9.2	10.7	11.8	12.9	14.1	15.8	17.9	19.1	20.2	21.4	23.3	25.2	27.4	29.2
201 series/DWFX-C	-	-	-	4.1	4.6	5.4	6.0	7.1	8.0	9.3	10.5	12.1	12.7	14.4	16.0	17.5	19.0	20.5	22.0
201 series/ I/F	-	-	-	7.4	8.5	9.6	10.4	12.6	13.8	15.3	16.8	18.0	20.3	21.7	23.6	25.5	27.6	29.8	31.0
301 series/DWFX-C	2.3	3.0	4.0	5.4	6.5	7.6	8.8	10.2	11.7	13.2	14.9	16.9	18.7	20.5	22.4	24.5	26.7	28.8	31.0
301 series/ I/F	4.4	5.5	6.9	9.0	10.4	11.7	13.6	15.5	16.5	18.5	20.3	22.2	42.5	27.8	30.4	32.8	35.2	38.9	42.0

15.8 | Options

15.8.1 | EM trigger control mechanism

» mechanism operation description:
The EM mechanism is designed to operate mcr FS transfer dampers. Once power supply voltage is removed, the mechanism lock is released, which causes steel cord movement and damper operation. The mechanism is not equipped with a drive (return) spring. That spring is installed directly on the damper.

» versions:
EM24 – mechanism supplied with a 24 V AC/DC voltage – released by the removal of the power supply voltage
EM240 – mechanism supplied with a 230 V AC voltage – released by the removal of the power supply voltage

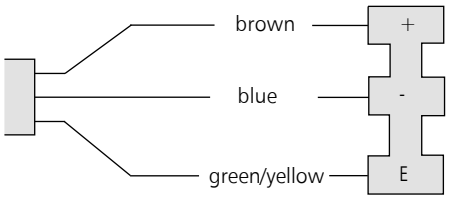
specifications

	EM24	EM240
power supply voltage	24 V AC / DC	230 V AC 50 Hz
rated current	120 m A	10 m A
electrical connection	wire 3 x 0.75 mm²	
weight	1.6 kg	1.6 kg

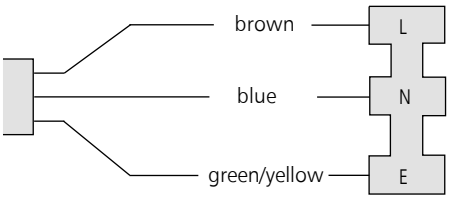
» mechanism electrical diagram

» power supply:
brown wire – "+" supply or "L" blue
wire – mass "-" or "N" green-yellow
wire – ground "E"

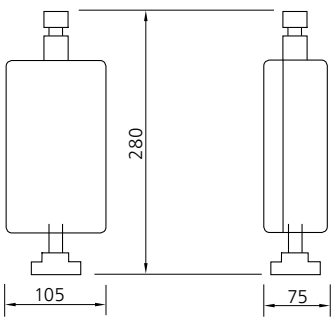
» 24 V AC/DC



» 230 V AC



» mechanism dimensions



15.8.2 | MSSP and MSDP independent limit switches

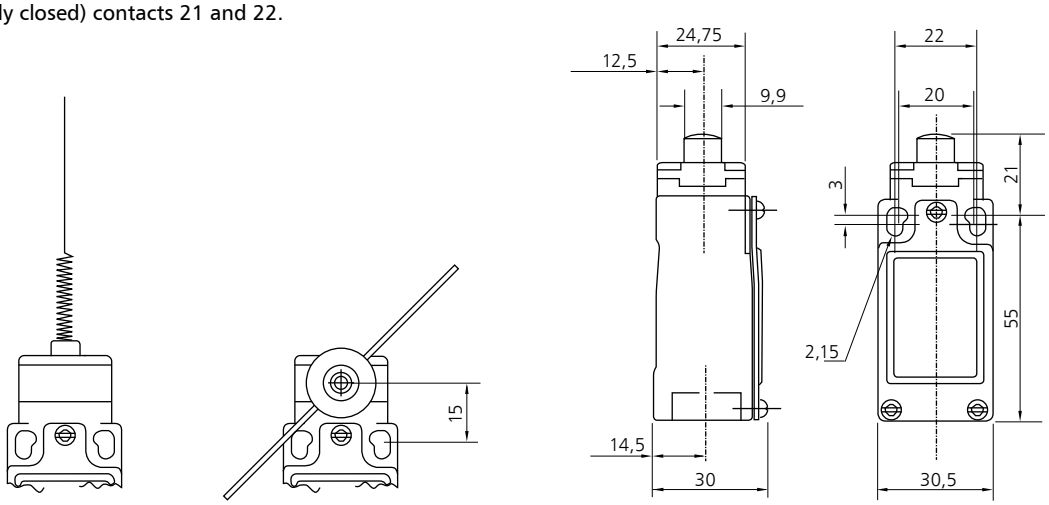
» mechanism operation description:
The limit switch is used to signal the position of the fire damper blade.

» versions:
MSSP – single switch – closed damper blade signaling.
MSDP – assembly of two switches – closed and open damper blade signaling.

specifications

service life	5 000 000 cycles
limit switch operating temperature	-25°C do +85°C
service life	5 000 000 cycles
voltage	300 V AC i 250 V DC
current	10 A
limit switch operating temperature	-25°C do +85°C
service life	5 000 000 cycles

» mechanism electrical diagram:
MSSP – single limit switch, closed damper signaling:
MSDP – two limit switches:
» NO (normally open) contacts 13 and 14
» NC (normally closed) contacts 21 and 22.



15.9 | Marking

mcr FS 201 / IF / B x H / MSSP

- MSSP – accessories
- B x H – active opening dimensions
- 201 – damper type

type:
mcr FS 101 - square or rectangular damper with a curtain located partly in the air stream
mcr FS 201 - square or rectangular damper with a curtain located outside the air stream
mcr FS 301 - circular damper with a curtain located outside the air stream
+ IF - installation frame for rigid partitions
+ DWFX-C - frame for installation before the assembly of dry partition walls

accessories:
MSSP - single limit switch (closed damper signaling)
MSDP - two single limit switches (closed and open damper signaling)
EM24 - electromagnetic trigger (24V AC/DC power supply voltage)
EM240 - electromagnetic trigger (230 V AC power supply voltage)

downloadable models
on the website
under the designer zone tab



» **EIS180**
» Fire resistance class: EI180 (v_{ed} i↔o)S1500C_{300}AAmulti.
» Certificate of constancy of performance.
» Dampers certified for compliance with EN 12101-8.
» Dampers rated under EN 13501-4 and tested under EN 1366-10.
» Smoke door dampers resistance independent of airflow direction and installation side.
» Large active area, small resistances.
» Certified installation with a system grille in set.

16.1| Application

mcr DOR smoke door dampers are intended for installation in automatically operated fire ventilation systems. The devices are used in fire ventilation systems. The dampers prevent fire, smoke and fire gases from spreading to the adjacent zones. During normal system operation, the damper blade is closed. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 15 m/s.

16.2| Design



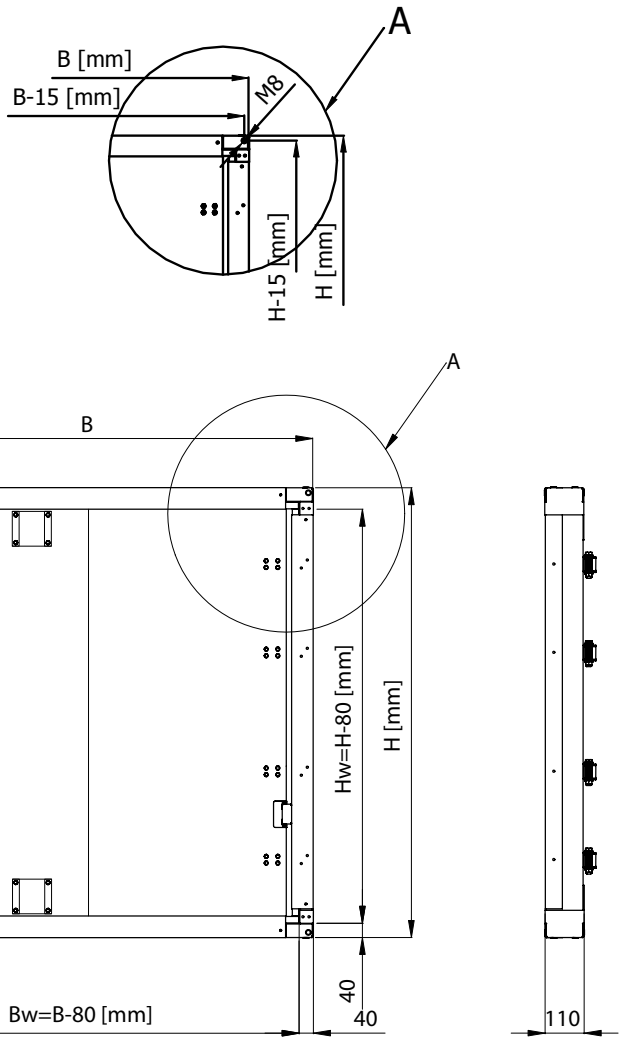
mcr DOR smoke door dampers consist of a casing with a rectangular cross-section composed of fire-proof boards, a moving damper blade in the form of two wings and an automatically activated trigger and control mechanism. Special design casing with impregnated fire-proof boards are used in chemically aggressive environments. The damper casing total thickness is 110 mm. The damper blade is made of a fire-proof panel. At the corners and along the entire perimeter of the casing, there are steel reinforcements with a rivet nut system, enabling the installation of masking grilles and frames for connecting steel ventilation ducts.

16.3 | Versions

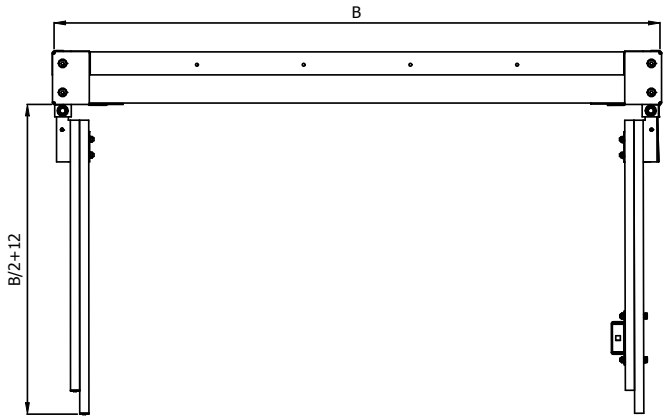
16.3.1 | Opening with the trigger and control mechanism

During normal operation, the fire damper blade remains closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments remain closed – the blades are operated remotely by supplying power.

mcr DOR dampers are equipped with a EM24D-type trigger and control mechanisms, supplied with 24 V AC/DC or 230 V AC. Dampers are equipped with limit switches used to monitor the position of the damper blade. The trigger and control mechanism is located inside the damper casing.
The dampers open as the result of power voltage supply to the trigger and control mechanism (current pulse of at least 5 s). Closing the damper blade after its tripping is possible manually, provided that there is no power supply to the trigger and control mechanism.



16.4 | Dimensions

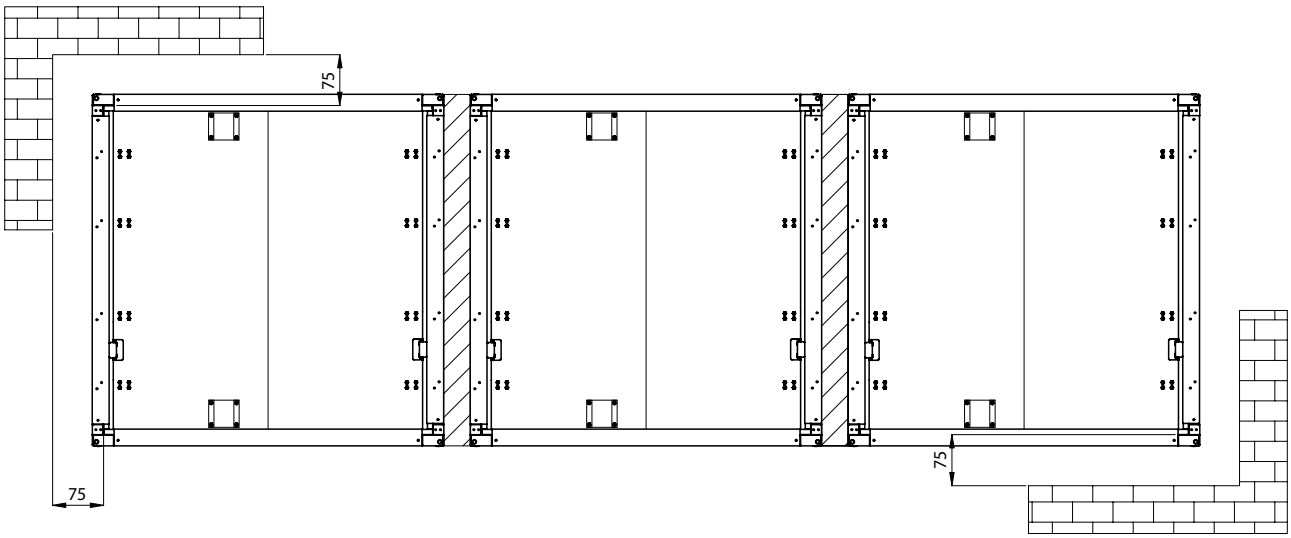


Rectangular dampers:

- nominal width B: from 480 mm to 1330 mm (Bw from 400 mm to 1250 mm)
- nominal height H: from 380 mm to 1330 mm (Hw from 300 mm to 1250 mm)
- maximum cross-section surface of one damper up to 1.77 m^2
- the damper blade, regardless of the dimensions of the BxH damper, does not protrude beyond the device casing on one side
- the open damper blade (wings) does not protrude outside the B dimension of the device casing

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

Minimum distance between systems and partitions



dimensions in [mm]

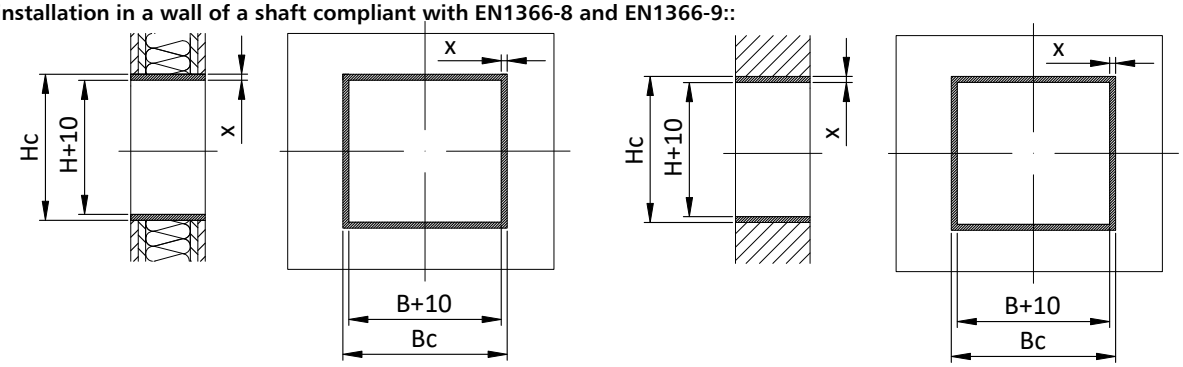
16.5 | Installation

mcr DOR door-type smoke exhaust dampers are rated EI180(v_{ed} i↔o) S1500 C_{300} AA multi multi if installed on fireproof ducts classified according to EN 1366-8 and EN 1366-9.

16.5.1 | Preparation of installation openings

Minimum dimensions of the installation opening that permits correct installation of the damper depending on division element installation manner:

» **for installation in a wall of a shaft compliant with EN1366-8 and EN1366-9::**

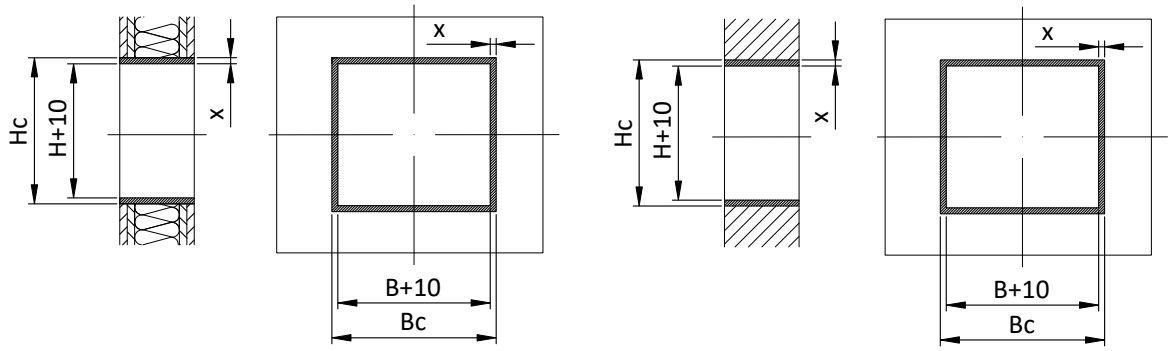


shaft wall thickness ≥110 mm
Hc = H+10
Bc = B+10

shaft wall thickness <110 mm
Hc = H+10+2X+L
Bc = B+10+2X+L

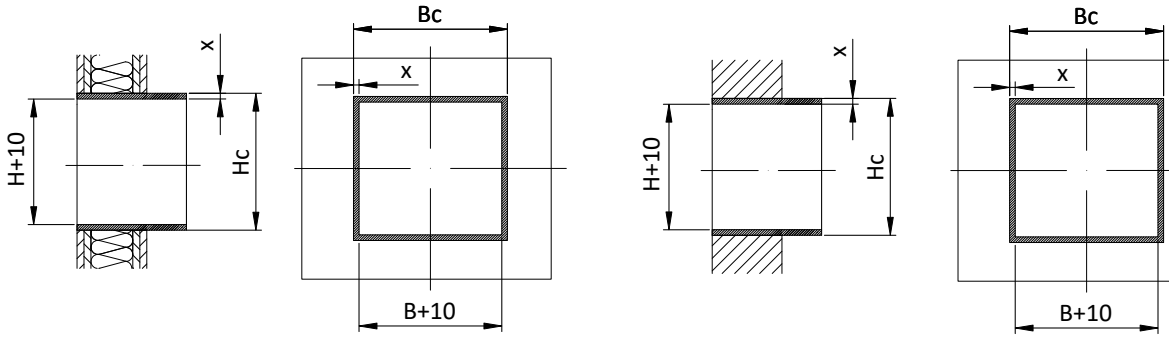
where
X = thickness of the fire-proof board trim used,
10 – installation clearance (5 mm per side) between the damper and the trim,
L – installation clearance between the trim and the wall/shaft, resulting from installation technology.
Thickness of the trim used depends on the resistance that needs to be obtained for the fire division (shaft wall),

» **dinstallation in a wall of any shaft with a fire resistance or any fire dividing wall:**



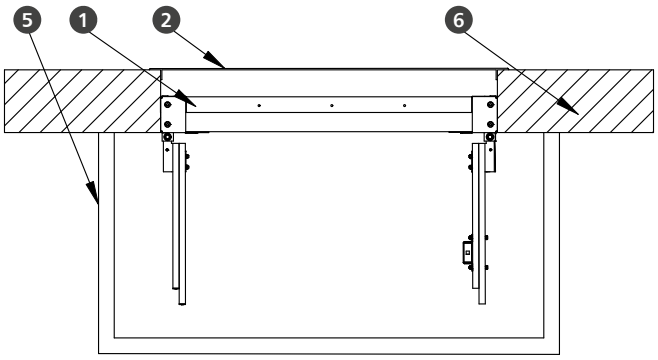
Hc = H+10+2X+L
Bc = B+10+2X+L
where
X = thickness of the fire-proof board trim used,
10 – installation clearance (5 mm per side) between the damper and the trim,
L – installation clearance between the trim and the wall/shaft, resulting from installation technology.
Thickness of the trim used depends on the resistance that needs to be obtained for the fire division (shaft wall),

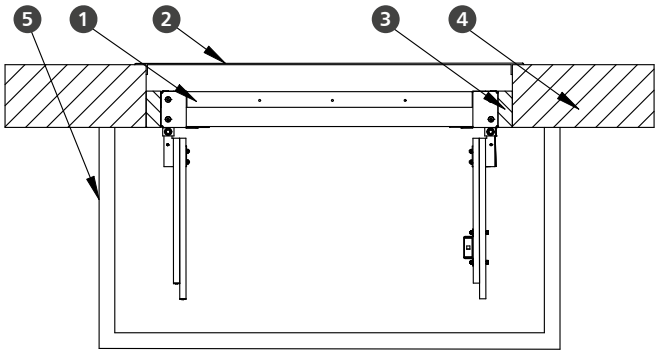
» **for installation in a fireproof duct compliant with EN1366-8 and EN1366-9, penetrating the wall:**



Hc=H+10+2X
where
X = duct wall thickness, e.g. made of fire-proof boards
10 – installation clearance (5 mm per side) between the damper and the net dimension of the duct. Duct board thickness depends on the solution manufacturer.

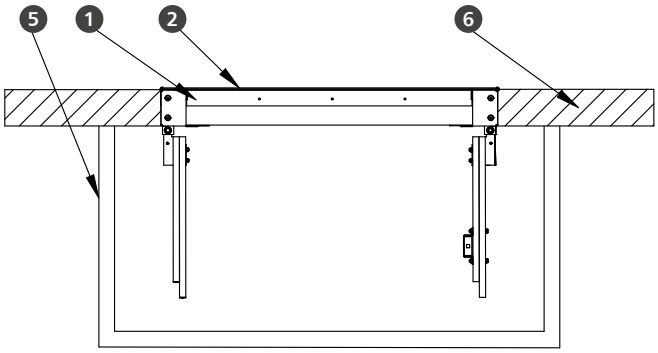
16.5.2 | Damper installation in shaft walls >110 mm

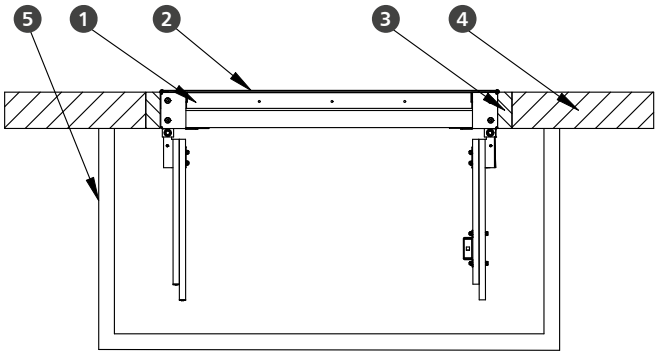




1. mcr DOR BxH smoke door damper
2. masking grille
3. a strip of fire-proof board along the entire length of the BxH side
4. Shaft wall
5. Vertical fire ventilation shaft
6. Wall of a shaft compliant with EN1366-8 or EN1366-9

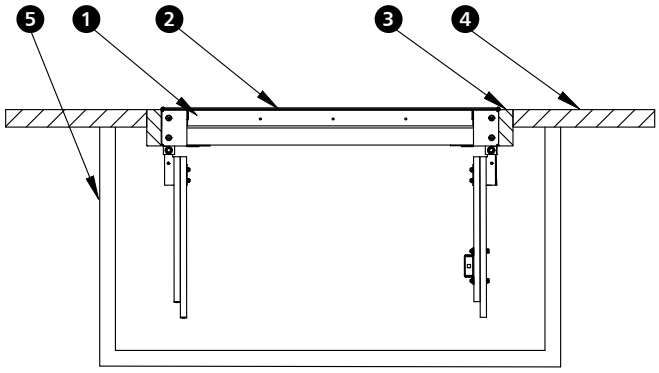
16.5.3 | Damper installation in shafts with a thickness of 110 mm





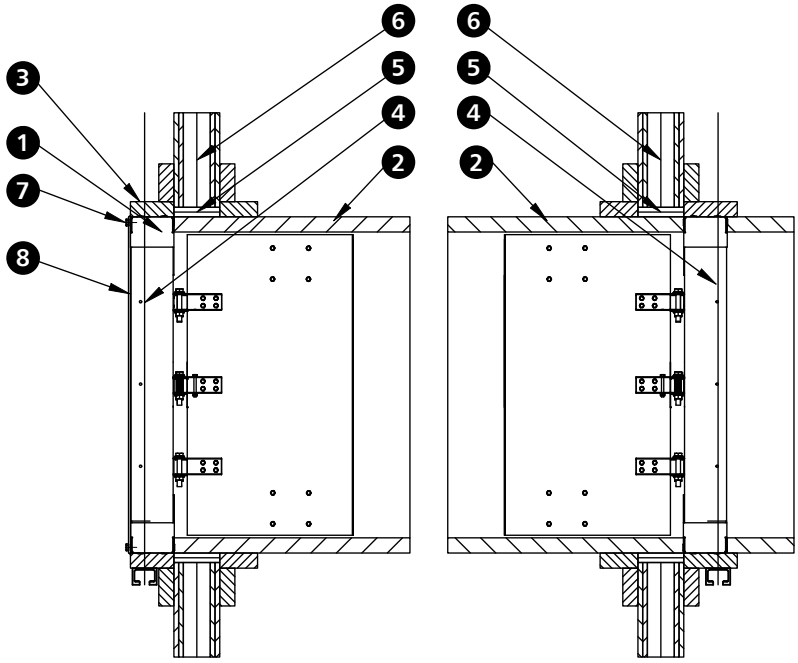
1. mcr DOR BxH smoke door damper
2. masking grille
3. a strip of fire-proof board along the entire length of the BxH side
4. Wall of a shaft compliant with EN1366-8 or EN1366-9
5. Vertical fire ventilation shaft

16.5.4 | Damper installation in shafts with a thickness <110 mm



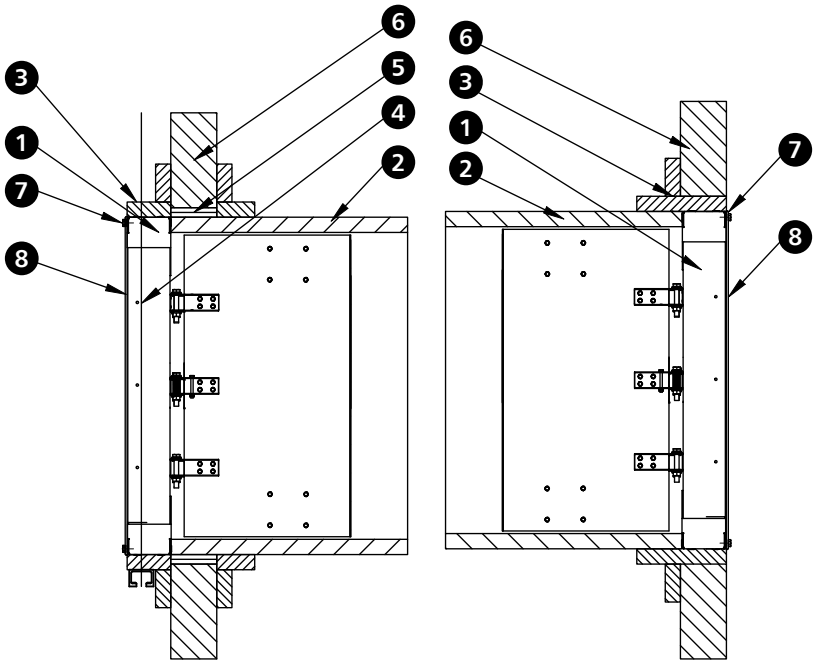
1. mcr DOR BxH smoke door damper
2. masking grille
3. a strip of fire-proof board along the entire length of the BxH side
4. Wall of a shaft compliant with EN1366-8 or EN1366-9
5. Vertical fire ventilation shaft

16.5.5 | Damper installation in light walls (plasterboard)



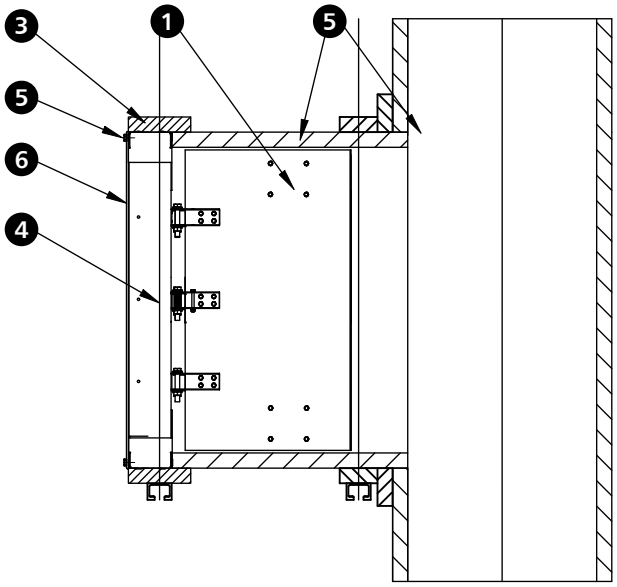
1. mcr DOR BxH smoke door damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability
5. fireproof duct installation penetration system
6. plasterboard wall
7. M10 x 20 bolt
8. masking grille

16.5.6 | Damper installation in solid walls



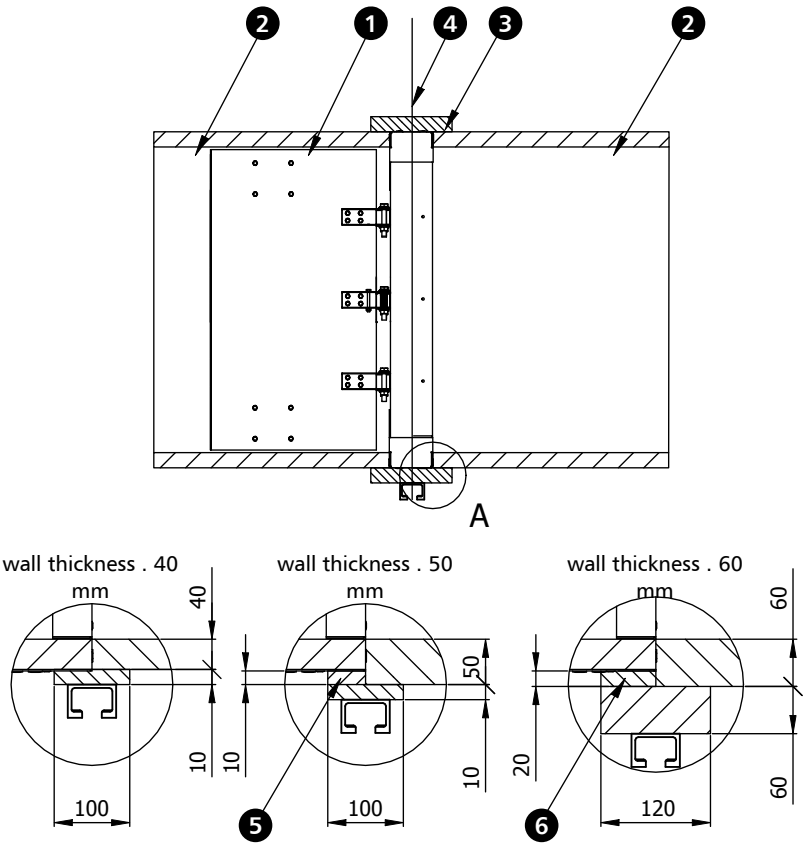
1. mcr DOR BxH smoke door damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability
5. fireproof duct installation penetration system
6. solid wall
7. M10 x 20 bolt
8. masking grille

16.5.7 | Damper installation on horizontal ducts



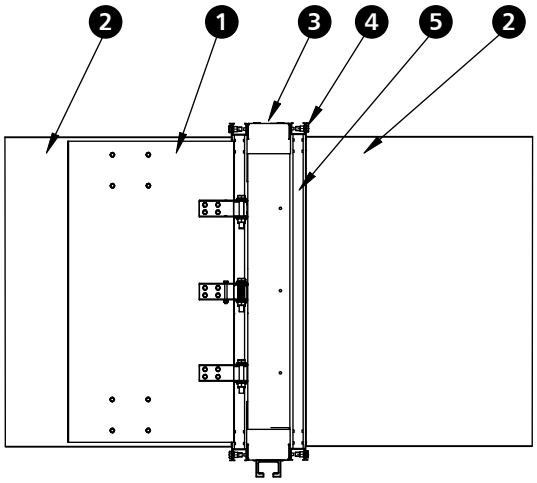
1. mcr DOR BxH smoke door damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. M10 x 20 bolt
6. masking grille

16.5.8 | Damper connection with a multi-compartment duct, e.g. made of fire-proof boards with various wall thickness



1. mcr DOR BxH smoke door damper
2. multi-compartment smoke extract duct made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system
5. a strip of fire-proof board along the entire length of the BxH side with the dimensions 10 x 50 mm
6. a strip of fire-proof board along the entire length of the BxH side with the dimensions 20 x 60 mm

16.5.9 | Damper connection with single-compartment duct, e.g. made of metal sheets



1. mcr DOR BxH smoke door damper
2. single-compartment smoke extract duct – metal sheets
3. installation hangers system
4. M10 x 20 bolt
5. RB mounting frame

Where a damper is installed in a duct connected on two sides, an inspection access allowing for the damper blade to be accessed freely for the purpose of closing it should be made from the side of the tripping and control mechanism.

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

16.6 | mcr DOR rectangular dampers technical parameters

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]										
		300					350					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	400	4	0.120	0.107	1 538	3	20	0.140	0.126	1 812	3	21
		6			2 307	4	24			2 717	3	24
		8			3 076	5	27			3 623	4	28
		10			3 845	6	31			4 529	6	31
	450	4	0.135	0.121	1 740	3	20	0.158	0.142	2 049	3	21
		6			2 609	3	24			3 074	3	24
		8			3 479	5	28			4 098	4	28
		10			4 349	6	31			5 123	6	31
	500	4	0.150	0.135	1 941	3	21	0.175	0.159	2 287	3	21
		6			2 912	3	24			3 430	3	25
		8			3 882	4	28			4 573	4	28
		10			4 853	6	31			5 717	6	31
	550	4	0.165	0.149	2 143	3	21	0.193	0.175	2 762	3	22
		6			3 214	3	25			4 143	3	25
		8			4 285	4	28			5 524	4	28
		10			5 357	6	32			6 905	5	32
	600	4	0.180	0.163	2 344	3	22	0.210	0.192	2 762	3	22
		6			3 516	3	25			4 143	3	25
		8			4 689	4	28			5 524	4	28
		10			5 861	6	32			6 905	5	32
	650	4	0.195	0.177	2 546	3	22	0.228	0.208	3 000	3	22
		6			3 819	3	25			4 499	3	25
		8			5 092	4	29			5 999	4	29
		10			6 365	6	32			7 499	5	32
	700	4	0.210	0.191	2 748	3	22	0.245	0.225	3 237	3	23
		6			4 121	3	25			4 856	3	26
		8			5 495	4	29			6 474	4	29
		10			6 869	6	32			8 093	5	32

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	height H_w [mm]	v [m/s]	300 S_k [m²]	300 S_e [m²]	300 Q [m³/h]	300 d_p [PA]	300 L_{WA} [dB]	350 S_k [m²]	350 S_e [m²]	350 Q [m³/h]	350 d_p [PA]	350 L_{WA} [dB]
750	750	4	0.225	0.205	2 949	3	22	0.263	0.241	3 475	3	23
		6			4 424	3	26			5 212	3	26
		8			5 898	4	29			6 949	4	29
		10			7 373	6	32			8 687	5	32
800	800	4	0.240	0.219	3 151	3	23	0.280	0.258	3 712	3	23
		6			4 726	3	26			5 568	3	26
		8			6 301	4	29			7 425	4	29
		10			7 877	5	33			9 281	5	33
850	850	4	0.255	0.233	3 352	3	23	0.298	0.274	3 950	2	23
		6			5 028	3	26			5 925	3	26
		8			6 705	4	29			7 900	4	29
		10			8 381	5	33			9 875	5	33
900	900	4	0.270	0.247	3 554	3	23	0.315	0.291	4 188	2	24
		6			5 331	3	26			6 281	3	26
		8			7 108	4	30			8 375	4	30
		10			8 885	5	33			10 469	5	33
950	950	4	0.285	0.261	3 756	3	23	0.333	0.307	4 425	2	24
		6			5 633	3	26			6 638	3	27
		8			7 511	4	30			8 850	4	30
		10			9 389	5	33			11 063	5	33
1000	1000	4	0.300	0.275	3 957	3	23	0.350	0.324	3 237	2	24
		6			5 936	3	27			4 856	3	27
		8			7 914	4	30			6 474	4	30
		10			9 893	5	33			8 093	5	33
1050	1050	4	0.315	0.289	4 159	3	24	0.368	0.340	3 475	2	24
		6			6 238	3	27			5 212	3	27
		8			8 317	4	30			6 949	4	30
		10			10 397	5	33			8 687	5	33
1100	1100	4	0.330	0.303	4 360	3	24	0.385	0.357	3 712	2	24
		6			6 540	3	27			5 568	3	27
		8			8 721	4	30			7 425	4	30
		10			10 901	5	33			9 281	5	33
1150	1150	4	0.345	0.317	4 562	3	24	0.403	0.373	3 950	2	25
		6			6 843	3	27			5 925	3	27
		8			9 124	4	30			7 900	4	30
		10			11 405	5	34			9 875	5	34
1200	1200	4	0.360	0.331	4 764	3	24	0.420	0.390	4 188	2	25
		6			7 145	3	27			6 281	3	27
		8			9 527	4	30			8 375	4	31
		10			11 909	5	34			10 469	5	34
1250	1250	4	0.375	0.345	4 965	3	24	0.438	0.406	4 425	2	25
		6			7 448	3	27			6 638	3	28
		8			9 930	4	31			8 850	4	31
		10			12 413	5	34			11 063	5	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]																			
		400					450					500					550				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
400	4	0.160	0.145	2 085	3	21	0.180	0.164	2 359	3	21	0.200	0.183	2 632	3	22	0.220	0.202	2 906	3	22
	6			3 128	3	24			3 538	3	25			3 948	3	25			4 359	3	25
	8			4 170	4	28			4 717	4	28			5 265	4	28			5 812	4	28
	10			5 213	6	31			5 897	6	31			6 581	5	32			7 265	5	32
450	4	0.180	0.164	2 359	3	21	0.203	0.185	2 668	3	22	0.225	0.207	2 978	3	22	0.248	0.228	3 288	2	23
	6			3 538	3	25			4 002	3	25			4 467	3	25			4 931	3	25
	8			4 717	4	28			5 337	4	28			5 956	4	28			6 575	4	29
	10			5 897	6	31			6 671	5	32			7 445	5	32			8 219	5	32
500	4	0.200	0.183	2 632	3	22	0.225	0.207	2 978	3	22	0.250	0.231	3 324	2	23	0.275	0.255	3 669	2	23
	6			3 948	3	25			4 467	3	25			4 985	3	25			5 504	3	26
	8			5 265	4	28			5 956	4	28			6 647	4	29			7 338	4	29
	10			6 581	5	32			7 445	5	32			8 309	5	32			9 173	5	32
550	4	0.220	0.202	2 906	3	22	0.248	0.228	3 288	2	23	0.275	0.255	4 015	2	23	0.303	0.281	4 432	2	23
	6			4 359	3	25			4 931	3	25			6 022	3	26			6 648	3	26
	8			5 812	4	28			6 575	4	29			8 029	4	29			8 865	4	29
	10			7 265	5	32			8 219	5	32			10 037	5	32			11 081	5	32
600	4	0.240	0.221	3 180	3	22	0.270	0.250	3 597	2	23	0.300	0.279	4 015	2	23	0.330	0.308	4 432	2	24
	6			4 769	3	25			5 396	3	26			6 022	3	26			6 648	3	26
	8			6 359	4	29			7 194	4	29			8 029	4	29			8 865	4	29
	10			7 949	5	32			8 993	5	32			10 037	5	32			11 081	5	32
650	4	0.260	0.240	3 453	2	23	0.293	0.271	3 907	2	23	0.325	0.303	4 360	2	23	0.358	0.334	4 814	2	24
	6			5 180	3	26			5 860	3	26			6 540	3	26			7 221	3	26
	8			6 906	4	29			7 813	4	29			8 721	4	29			9 628	4	29
	10			8 633	5	32			9 767	5	32			10 901	5	32			12 035	5	32
700	4	0.280	0.259	3 727	2	23	0.315	0.293	4 216	2	23	0.350	0.327	4 706	2	24	0.385	0.361	5 196	2	24
	6			5 590	3	26			6 324	3	26			7 059	3	26			7 793	3	27
	8			7 453	4	29			8 433	4	29			9 412	4	29			10 391	4	30
	10			9 317	5	32			10 541	5	32			11 765	5	32			12 989	5	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	v [m/s]	height H_w [mm] 400 S_k [m²]	400 S_e [m²]	400 Q [m³/h]	400 d_p [PA]	400 L_{WA} [dB]	450 S_k [m²]	450 S_e [m²]	450 Q [m³/h]	450 d_p [PA]	450 L_{WA} [dB]	500 S_k [m²]	500 S_e [m²]	500 Q [m³/h]	500 d_p [PA]	500 L_{WA} [dB]	550 S_k [m²]	550 S_e [m²]	550 Q [m³/h]	550 d_p [PA]	550 L_{WA} [dB]
750	4	0.300	0.278	4 000	2	23	0.338	0.314	4 526	2	24	0.375	0.351	5 052	2	24	0.413	0.387	5 577	2	24
	6			6 000	3	26			6 789	3	26			7 577	3	27			8 366	3	27
	8			8 001	4	29			9 052	4	29			10 103	4	30			11 154	4	30
	10			10 001	5	32			11 315	5	32			12 629	5	33			13 943	5	33
800	4	0.320	0.297	4 274	2	24	0.360	0.336	4 836	2	23	0.400	0.375	5 397	2	24	0.440	0.414	5 959	2	25
	6			6 411	3	26			7 253	3	26			8 096	3	27			8 938	3	27
	8			8 548	4	29			9 671	4	29			10 794	4	29			11 917	4	30
	10			10 685	5	33			12 089	5	32			13 493	5	32			14 897	5	33
850	4	0.340	0.316	4 548	2	24	0.383	0.357	5 145	2	23	0.425	0.399	5 743	2	24	0.468	0.440	6 340	2	25
	6			6 821	3	26			7 718	3	26			8 614	3	26			9 510	3	27
	8			9 095	4	30			10 290	4	29			11 485	4	29			12 681	4	30
	10			11 369	5	33			12 863	5	32			14 357	5	32			15 851	4	33
900	4	0.360	0.335	4 821	2	24	0.405	0.379	5 455	2	23	0.450	0.423	6 088	2	24	0.495	0.467	6 722	2	25
	6			7 232	3	27			8 182	3	26			9 132	3	26			10 083	3	27
	8			9 642	4	30			10 909	4	28			12 177	4	29			13 444	4	30
	10			12 053	5	33			13 637	5	31			15 221	5	32			16 805	4	33
950	4	0.380	0.354	5 095	2	24	0.428	0.400	5 764	2	23	0.475	0.447	6 434	2	24	0.523	0.493	6 722	2	25
	6			7 642	3	27			8 646	3	25			9 651	3	26			10 083	3	28
	8			10 189	4	30			11 529	4	28			12 868	4	29			13 444	4	30
	10			12 737	5	33			14 411	5	31			16 085	5	32			16 805	4	33
1000	4	0.400	0.373	3 727	2	24	0.450	0.422	4 216	2	23	0.500	0.471	4 706	2	24	0.550	0.520	5 196	2	25
	6			5 590	3	27			6 324	3	26			7 059	3	26			7 793	3	28
	8			7 453	4	30			8 433	4	29			9 412	4	29			10 391	4	31
	10			9 317	5	33			10 541	5	32			11 765	4	32			12 989	4	33
1050	4	0.420	0.392	4 000	2	25	0.473	0.443	4 526	2	23	0.525	0.495	5 052	2	24	0.578	0.546	5 577	2	26
	6			6 000	3	27			6 789	3	26			7 577	3	26			8 366	3	28
	8			8 001	4	30			9 052	4	29			10 103	4	29			11 154	3	31
	10			10 001	5	33			11 315	5	32			12 629	4	32			13 943	4	33
1100	4	0.440	0.411	4 274	2	25	0.495	0.465	4 836	2	23	0.550	0.519	5 397	2	24	0.605	0.573	5 959	2	26
	6			6 411	3	27			7 253	3	25			8 096	3	26			8 938	3	28
	8			8 548	4	30			9 671	4	28			10 794	4	29			11 917	3	31
	10			10 685	5	33			12 089	5	31			13 493	4	32			14 897	4	34
1150	4	0.460	0.430	4 548	2	25	0.518	0.486	5 145	2	23	0.575	0.543	5 743	2	24	0.633	0.599	6 340	2	26
	6			6 821	3	28			7 718	3	25			8 614	3	26			9 510	3	28
	8			9 095	4	31			10 290	4	28			11 485	4	29			12 681	3	31
	10			11 369	5	34			12 863	5	31			14 357	4	32			15 851	4	34
1200	4	0.480	0.449	4 821	2	25	0.540	0.508	5 455	2	23	0.600	0.567	6 088	2	24	0.660	0.626	6 722	2	26
	6			7 232	3	28			8 182	3	25			9 132	3	26			10 083	3	28
	8			9 642	4	31			10 909	4	28			12 177	4	29			13 444	3	31
	10			12 053	5	34			13 637	5	31			15 221	4	32			16 805	4	34
1250	4	0.500	0.468	6 736	2	25	0.563	0.529	5 764	2	23	0.625	0.591	6 434	2	24	0.688	0.652	6 722	2	26
	6			10 104	3	28			8 646	3	25			9 651	3	26			10 083	3	29
	8			13 473	4	31			11 529	4	28			12 868	4	29			13 444	3	31
	10			16 841	5	34			14 411	4	31			16 085	4	32			16 805	4	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]																			
		600					650					700					750				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
400	4	0.240	0.221	3 180	3	22	0.260	0.240	3 453	2	23	0.280	0.259	3 727	2	23	0.300	0.278	4 000	2	23
	6			4 769	3	25			5 180	3	26			5 590	3	26			6 000	3	26
	8			6 359	4	29			6 906	4	29			7 453	4	29			8 001	4	29
	10			7 949	5	32			8 633	5	32			9 317	5	32			10 001	5	32
450	4	0.270	0.250	3 597	2	23	0.293	0.271	3 907	2	23	0.315	0.293	4 216	2	23	0.338	0.314	4 526	2	24
	6			5 396	3	26			5 860	3	26			6 324	3	26			6 789	3	26
	8			7 194	4	29			7 813	4	29			8 433	4	29			9 052	4	29
	10			8 993	5	32			9 767	5	32			10 541	5	32			11 315	5	32
500	4	0.300	0.279	4 015	2	23	0.325	0.303	4 360	2	23	0.350	0.327	4 706	2	24	0.375	0.351	5 052	2	24
	6			6 022	3	26			6 540	3	26			7 059	3	26			7 577	3	27
	8			8 029	4	29			8 721	4	29			9 412	4	29			10 103	4	30
	10			10 037	5	32			10 901	5	32			11 765	5	32			12 629	5	33
550	4	0.330	0.308	4 850	2	24	0.358	0.334	5 268	2	24	0.385	0.361	5 196	2	24	0.413	0.387	5 577	2	24
	6			7 275	3	26			7 901	3	26			7 793	3	27			8 366	3	27
	8			9 700	4	29			10 535	4	29			10 391	4	30			11 154	4	30
	10			12 125	5	32			13 169	5	32			12 989	5	33			13 943	5	33
600	4	0.360	0.337	4 850	2	24	0.390	0.366	5 268	2	24	0.420	0.395	5 685	2	24	0.450	0.424	6 103	2	25
	6			7 275	3	26			7 901	3	27			8 528	3	27			9 154	3	27
	8			9 700	4	29			10 535	4	30			11 370	4	30			12 205	4	30
	10			12 125	5	32			13 169	5	33			14 213	5	33			15 257	4	33
650	4	0.390	0.366	5 268	2	24	0.423	0.397	5 721	2	24	0.455	0.429	6 175	2	25	0.488	0.460	6 628	2	25
	6			7 901	3	27			8 582	3	27			9 262	3	27			9 942	3	27
	8			10 535	4	30			11 442	4	30			12 349	4	30			13 257	4	30
	10			13 169	5	33			14 303	5	33			15 437	4	33			16 571	4	33
700	4	0.420	0.395	5 685	2	24	0.455	0.429	6 175	2	25	0.490	0.463	6 664	2	25	0.525	0.497	7 154	2	25
	6			8 528	3	27			9 262	3	27			9 996	3	27			10 731	3	28
	8			11 370	4	30			12 349	4	30			13 329	4	30			14 308	3	30
	10			14 213	5	33			15 437	4	33			16 661	4	33			17 885	4	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]																			
		600					650					700					750				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
750	4	0,450	0,424	6 103	2	25	0,488	0,460	6 628	2	25	0,525	0,497	7 154	2	25	0,563	0,533	7 680	2	25
	6			9 154	3	27			9 942	3	27			10 731	3	28			11 519	3	28
	8			12 205	4	30			13 257	4	30			14 308	3	30			15 359	3	30
	10			15 257	4	33			16 571	4	33			17 885	4	33			19 199	4	33
800	4	0,480	0,453	6 520	2	25	0,520	0,492	7 082	2	25	0,560	0,531	7 644	2	23	0,600	0,570	8 205	2	26
	6			9 780	3	27			10 623	3	27			11 465	3	25			12 308	3	28
	8			13 041	4	30			14 164	3	30			15 287	3	28			16 410	3	31
	10			16 301	4	33			17 705	4	33			19 109	4	30			20 513	4	33
850	4	0,510	0,482	6 938	2	25	0,553	0,523	7 536	2	25	0,595	0,565	8 133	2	26	0,638	0,606	8 731	2	26
	6			10 407	3	27			11 303	3	27			12 200	3	28			13 096	3	28
	8			13 876	4	30			15 071	3	30			16 266	3	31			17 461	3	31
	10			17 345	4	33			18 839	4	33			20 333	4	33			21 827	4	33
900	4	0,540	0,511	7 356	2	25	0,585	0,555	7 989	2	25	0,630	0,599	8 623	2	26	0,675	0,643	9 256	2	26
	6			11 033	3	25			11 984	3	27			12 934	3	28			13 884	3	28
	8			14 711	3	28			15 978	3	30			17 245	3	31			18 513	3	31
	10			18 389	4	30			19 973	4	32			21 557	4	33			23 141	4	34
950	4	0,570	0,540	7 773	2	26	0,618	0,586	8 443	2	25	0,665	0,633	9 112	2	26	0,713	0,679	9 782	2	26
	6			11 660	3	28			12 664	3	27			13 668	3	28			14 673	3	29
	8			15 546	3	31			16 885	3	30			18 225	3	31			19 564	3	31
	10			19 433	4	33			21 107	4	32			22 781	4	34			24 455	4	34
1000	4	0,600	0,569	5 685	2	24	0,650	0,618	6 175	2	24	0,700	0,667	6 664	2	25	0,750	0,716	7 154	2	27
	6			8 528	3	26			9 262	3	27			9 996	3	27			10 731	3	29
	8			11 370	3	29			12 349	3	29			13 329	3	29			14 308	3	31
	10			14 213	4	32			15 437	4	32			16 661	4	32			17 885	4	34
1050	4	0,630	0,598	6 103	2	24	0,683	0,649	6 628	2	25	0,735	0,701	7 154	2	25	0,788	0,752	7 680	2	27
	6			9 154	3	27			9 942	3	27			10 731	3	27			11 519	3	29
	8			12 205	3	29			13 257	3	29			14 308	3	30			15 359	3	31
	10			15 257	4	32			16 571	4	32			17 885	4	32			19 199	4	34
1100	4	0,660	0,627	6 520	2	25	0,715	0,681	7 082	2	25	0,770	0,735	7 644	2	23	0,825	0,789	8 205	2	27
	6			9 780	3	27			10 623	3	27			11 465	3	25			12 308	3	29
	8			13 041	3	30			14 164	3	29			15 287	3	27			16 410	3	31
	10			16 301	4	32			17 705	4	32			19 109	4	29			20 513	4	34
1150	4	0,690	0,656	6 938	2	25	0,748	0,712	7 536	2	25	0,805	0,769	8 133	2	26	0,863	0,825	8 731	2	26
	6			10 407	3	27			11 303	3	27			12 200	3	28			13 096	3	28
	8			13 876	3	30			15 071	3	29			16 266	3	30			17 461	3	30
	10			17 345	4	32			18 839	4	32			20 333	4	33			21 827	4	33
1200	4	0,720	0,685	7 356	2	25	0,780	0,744	7 989	2	25	0,840	0,803	11 560	2	26	0,900	0,862	9 256	2	26
	6			11 033	3	25			11 984	3	27			17 340	3	28			13 884	3	28
	8			14 711	3	28			15 978	3	29			23 121	3	30			18 513	3	30
	10			18 389	4	30			19 973	4	32			28 901	4	33			23 141	4	33
1250	4	0,750	0,714	7 773	2	25	0,813	0,775	8 443	2	25	0,875	0,837	12 050	2	26	0,938	0,898	9 782	2	26
	6			11 660	3	28			12 664	3	27			18 075	3	28			14 673	3	28
	8			15 546	3	30			16 885	3	29			24 100	3	30			19 564	3	31
	10			19 433	4	33			21 107	4	32			30 125	4	33			24 455	4	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]																			
		800					850					900					950				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
400	4	0,320	0,297	20 212	2	24	0,340	0,316	22 203	2	24	0,360	0,335	24 196	2	24	0,380	0,354	26 191	2	24
	6			24 551	3	26			26 483	3	26			28 475	3	27			30 508	3	27
	8			28 983	4	29			30 942	4	30			33 000	4	30			35 123	4	30
	10			33 167	5	33			35 213	5	33			37 382	5	33			39 632	5	33
450	4	0,360	0,336	23 382	2	24	0,383	0,357	25 657	2	24	0,405	0,379	27 936	2	24	0,428	0,400	30 218	2	25
	6			28 206	3	27			30 394	3	27			32 655	3	27			34 964	3	27
	8			33 156	4	30			35 357	4	30			37 676	4	30			40 072	4	30
	10			37 845	5	33			40 131	5	33			42 562	5	33			45 088	5	33
500	4	0,400	0,375	26 621	2	24	0,425	0,399	29 184	2	24	0,450	0,423	31 752	2	25	0,475	0,447	34 326	2	25
	6			31 927	3	27			34 375	3	27			36 908	3	27			39 496	3	27
	8			37 394	4	30			39 840	4	30			42 421	4	30			45 092	4	30
	10			42 586	5	33			45 114	5	33			47 807	5	33			50 612	5	33
550	4	0,440	0,414	29 922	2	25	0,468	0,440	32 776	2	25	0,495	0,467	35 638	2	25	0,523	0,493	38 508	2	25
	6			35 708	3	27			38 420	3	27			41 228	3	27			44 099	3	28
	8			41 689	4	30			44 383	4	30			47 230	4	30			50 179	4	30
	10			47 384	5	33			50 155	4	33			53 114	4	33			56 198	4	33
600	4	0,480	0,453	33 279	2	25	0,510	0,482	36 428	2	25	0,540	0,511	39 588	2	25	0,570	0,540	42 756	2	26
	6			39 545	3	27			42 522	3	27			45 609	3	28			48 766	3	28
	8			46 039	4	30			48 982	4	30			52 098	3	30			55 328	3	31
	10			52 234	4	33			55 251	4	33			58 477	4	33			61 844	4	33
650	4	0,520	0,492	34 338	2	25	0,553	0,523	35 303	2	25	0,585	0,555	36 170	2	25	0,618	0,586	36 951	2	25
	6			40 650	3	27			41 059	3	27			41 522	3	27			41 997	3	27
	8			47 208	3	30			47 177	3	30			47 308	3	30			47 524	3	30
	10			53 474	4	33			53 126	4	33			53 010	4	32			53 028	4	32
700	4	0,560	0,531	37 574	2	25	0,595	0,565	38 609	2	26	0,630	0,599	39 539	2	26	0,665	0,633	40 379	2	26
	6			44 332	3	28			44 758	3	28			45 246	3	28			45 750	3	28
	8			51 368	3	30			51 311	3	31			51 433	3	31			51 652	3	31
	10			58 102	4	33			57 694	4	33			57 544	4	33			57 543	4	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	height H_w [mm]	v [m/s]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]	850 S_k [m²]	850 S_e [m²]	850 Q [m³/h]	850 d_p [PA]	850 L_{WA} [dB]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	950 S_k [m²]	950 S_e [m²]	950 Q [m³/h]	950 d_p [PA]	950 L_{WA} [dB]
750		4	0.600	0.570	40 850	2	26	0.638	0.606	41 955	2	26	0.675	0.643	42 949	2	26	0.713	0.679	43 848	2	26
		6			48 055	3	28			48 498	3	28			49 011	3	28			49 544	3	29
		8			55 568	3	31			55 484	3	31			55 598	3	31			55 818	3	31
		10			62 769	4	33			62 301	4	33			62 116	4	34			62 096	4	34
800		4	0.640	0.609	44 166	2	26	0.680	0.648	45 340	2	26	0.720	0.687	46 398	2	26	0.760	0.726	47 355	2	27
		6			51 816	3	28			52 275	3	28			52 813	3	29			53 375	3	29
		8			59 806	3	31			59 695	3	31			59 800	3	31			60 022	3	31
		10			67 474	4	33			66 945	4	34			66 724	4	34			66 684	4	34
850		4	0.680	0.648	47 517	2	26	0.723	0.689	48 761	2	26	0.765	0.731	49 883	2	26	0.808	0.772	50 898	2	26
		6			55 612	3	28			56 088	3	28			56 651	3	28			57 242	3	28
		8			64 080	3	31			63 940	3	30			64 036	3	30			64 260	3	30
		10			72 213	4	33			71 624	4	33			71 367	4	33			71 306	4	33
900		4	0.720	0.687	50 903	2	26	0.765	0.731	52 217	2	26	0.810	0.775	53 402	2	26	0.855	0.819	54 476	2	26
		6			59 443	3	28			59 935	3	28			60 523	3	28			61 142	3	28
		8			68 387	3	31			68 219	3	31			68 306	3	31			68 531	3	30
		10			76 986	4	33			76 335	4	33			76 042	4	33			75 960	4	33
950		4	0.760	0.726	54 320	2	26	0.808	0.772	55 704	2	26	0.855	0.819	56 953	2	26	0.903	0.865	58 085	2	26
		6			63 305	3	28			63 814	3	28			64 426	3	28			65 073	3	28
		8			72 725	3	31			72 529	3	31			72 606	3	31			72 832	3	31
		10			81 789	4	33			81 076	4	33			80 747	4	33			80 645	4	33
1000		4	0.800	0.765	40 094	2	27	0.850	0.814	41 103	2	27	0.900	0.863	42 014	2	27	0.950	0.912	42 840	2	27
		6			46 638	3	29			47 003	3	29			47 445	3	29			47 914	3	29
		8			53 506	3	31			53 351	3	31			53 397	3	32			53 555	3	32
		10			60 120	4	34			59 582	4	34			59 328	4	34			59 243	4	34
1050		4	0.840	0.804	43 417	2	27	0.893	0.855	44 496	2	27	0.945	0.907	45 472	2	27	0.998	0.958	46 357	2	28
		6			50 415	3	29			50 799	3	29			51 268	3	29			51 767	3	30
		8			57 768	3	31			57 588	3	32			57 629	3	32			57 791	3	32
		10			64 853	4	34			64 259	4	34			63 973	4	34			63 871	4	34
1100		4	0.880	0.843	46 773	2	27	0.935	0.897	47 923	2	27	0.990	0.951	48 964	2	28	1.045	1.005	49 908	2	28
		6			54 226	3	29			54 628	3	29			55 124	3	30			55 653	3	30
		8			62 061	3	32			61 857	3	32			61 892	3	32			62 057	3	32
		10			69 616	4	34			68 966	4	34			68 648	4	34			68 528	4	34
1150		4	0.920	0.882	50 162	2	26	0.978	0.938	51 383	2	26	1.035	0.995	52 488	2	26	1.093	1.051	53 491	2	26
		6			58 067	3	28			58 488	3	28			59 010	3	28			59 569	3	28
		8			66 385	3	30			66 157	3	30			66 184	3	30			66 353	3	30
		10			74 410	4	33			73 703	4	32			73 351	4	32			73 214	4	32
1200		4	0.960	0.921	53 582	2	26	1.020	0.980	54 874	2	26	1.080	1.039	56 043	2	26	1.140	1.098	57 104	2	26
		6			61 939	3	28			62 378	3	28			62 926	3	28			63 514	3	28
		8			70 738	3	30			70 485	3	30			70 505	3	30			70 676	3	30
		10			79 232	4	33			78 467	4	33			78 083	4	33			77 926	4	32
1250		4	1.000	0.960	57 031	2	26	1.063	1.021	58 393	2	26	1.125	1.083	59 627	2	26	1.188	1.144	60 747	2	26
		6			65 839	3	28			66 296	3	28			66 871	3	28			67 488	3	28
		8			75 119	3	30			74 840	3	30			74 853	3	30			75 027	3	30
		10			84 082	4	33			83 258	4	33			82 840	4	33			82 665	4	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	height H_w [mm]	v [m/s]	1000					1050					1100					1150				
			S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
400		4	0.400	0.373	28 190	2	24	0.420	0.392	30 194	2	25	0.440	0.411	32 203	2	25	0.460	0.430	34 220	2	25
		6			32 569	3	27			34 653	3	27			36 756	3	27			38 876	3	28
		8			37 293	4	30			39 498	4	30			41 732	4	30			43 989	4	31
		10			41 939	5	33			44 291	5	33			46 677	5	33			49 092	5	34
450		4	0.450	0.422	32 506	2	25	0.473	0.443	34 799	2	25	0.495	0.465	37 100	2	25	0.518	0.486	39 409	2	25
		6			37 307	3	27			39 677	3	27			42 069	3	28			44 481	3	28
		8			42 523	4	30			45 015	4	30			47 542	4	31			50 097	4	31
		10			47 682	5	33			50 329	5	33			53 016	5	33			55 738	5	34
500		4	0.500	0.471	36 907	2	25	0.525	0.495	39 495	2	25	0.550	0.519	42 091	2	25	0.575	0.543	44 697	2	26
		6			42 125	3	28			44 785	3	28			47 470	3	28			50 179	3	28
		8			47 827	4	30			50 611	4	31			53 433	4	31			56 288	4	31
		10			53 495	4	33			56 438	4	33			59 429	4	34			62 459	4	34
550		4	0.550	0.520	41 385	2	25	0.578	0.546	44 271	2	26	0.605	0.573	47 167	2	26	0.633	0.599	50 074	2	26
		6			47 016	3	28			49 969	3	28			52 952	3	28			55 960	3	28
		8			53 201	4	31			56 278	3	31			59 399	3	31			62 556	3	31
		10			59 372	4	33			62 615	4	33			65 911	4	34			69 251	4	34
600		4	0.600	0.569	45 934	2	26	0.630	0.598	49 122	2	26	0.660	0.627	52 321	2	26	0.690	0.656	55 531	2	26
		6			51 976	3	28			55 225	3	28			58 507	3	28			61 818	3	29
		8			58 639	3	31			62 011	3	31			65 434	3	31			68 897	3	31
		10			65 311	4	33			68 854	4	34			72 458	4	34			76 111	4	34
650		4	0.650	0.618	37 661	2	25	0.683	0.649	38 310	2	25	0.715	0.681	38 907	2	25	0.748	0.712	39 460	2	25
		6			42 466	3	27			42 922	3	27			43 360	3	27			43 779	3	27
		8			47 785	3	30			48 070	3	29			48 365	3	29			48 663	3	29
		10			53 128	4	32			53 277	4	32			53 458	4	32			53 658	4	32
700		4	0.700	0.667	41 142	2	26	0.735	0.701	41 840	2	26	0.770	0.735	42 483	2	27	0.805	0.769	43 078	2	27
		6			46 250	3	28			46 736	3	29			47 204	3	29			47 652	3	29
		8			51 922	3	31			52 219	3	31			52 529	3	31			52 843	3	31
		10			57 633	4	34			57 780	4	34			57 963	4	34			58 169	4	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	height H_w [mm]	v [m/s]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]	1050 S_k [m²]	1050 S_e [m²]	1050 Q [m³/h]	1050 d_p [PA]	1050 L_{WA} [dB]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1100 L_{WA} [dB]	1150 S_k [m²]	1150 S_e [m²]	1150 Q [m³/h]	1150 d_p [PA]	1150 L_{WA} [dB]
750		4	0.750	0.716	44 664	2	27	0.788	0.752	45 412	2	27	0.825	0.789	46 100	2	27	0.863	0.825	46 738	2	27
		6			50 074	3	29			50 590	3	29			51 088	3	29			51 566	3	29
		8			56 097	3	31			56 406	3	31			56 731	3	31			57 062	3	32
		10			62 176	4	34			62 321	4	34			62 505	4	34			62 716	4	34
800		4	0.800	0.765	48 225	2	27	0.840	0.804	47 122	2	27	0.880	0.843	49 166	2	27	0.920	0.882	50 435	2	27
		6			53 935	3	29			52 581	3	29			54 419	3	29			55 516	3	29
		8			60 308	3	31			58 730	3	31			60 380	3	32			61 316	3	32
		10			66 755	4	34			64 996	4	34			66 493	4	34			67 298	4	34
850		4	0.850	0.814	51 822	2	26	0.893	0.855	50 058	2	26	0.935	0.897	52 232	2	26	0.978	0.938	54 169	2	26
		6			57 832	3	28			55 798	3	28			57 750	3	28			59 502	3	28
		8			64 554	3	30			62 278	3	30			64 026	3	30			65 605	3	30
		10			71 367	4	33			68 894	4	33			70 476	4	33			71 912	4	32
900		4	0.900	0.863	55 453	2	26	0.945	0.907	52 993	2	26	0.990	0.951	55 296	2	26	1.035	0.995	57 937	2	26
		6			61 761	3	28			59 014	3	28			61 079	3	28			63 520	3	28
		8			68 833	3	30			65 823	3	30			67 670	3	30			69 925	3	30
		10			76 010	4	33			72 790	4	33			74 457	4	33			76 558	4	33
950		4	0.950	0.912	59 116	2	26	0.998	0.958	55 929	2	26	1.045	1.005	58 361	2	26	1.093	1.051	61 737	2	26
		6			65 723	3	28			62 228	3	28			64 407	3	28			67 571	3	28
		8			73 142	3	30			69 368	3	30			71 312	3	30			74 276	3	30
		10			80 684	4	33			76 683	4	33			78 435	4	33			81 233	4	33
1000		4	1.000	0.961	43 592	2	28	1.050	1.010	41 446	2	28	1.100	1.059	42 082	2	28	1.150	1.108	45 507	2	28
		6			48 385	3	30			46 012	3	30			46 461	3	30			49 729	3	30
		8			53 775	3	32			51 196	3	32			51 471	3	32			54 591	3	32
		10			59 263	4	34			56 515	4	34			56 647	4	35			59 644	4	35
1050		4	1.050	1.010	47 163	2	28	1.103	1.061	45 035	2	28	1.155	1.113	45 716	2	28	1.208	1.164	49 215	2	28
		6			52 270	3	30			49 896	3	30			50 375	3	30			53 705	3	30
		8			58 021	3	32			55 423	3	32			55 714	3	32			58 883	3	32
		10			63 883	4	34			61 102	4	35			61 237	4	35			64 273	4	35
1100		4	1.100	1.059	50 768	2	28	1.155	1.113	46 760	2	28	1.210	1.167	48 798	2	28	1.265	1.221	52 958	2	29
		6			56 186	3	30			51 915	3	30			53 735	3	30			57 713	3	30
		8			62 297	3	32			57 783	3	32			59 400	3	32			63 205	3	33
		10			68 533	4	35			63 821	4	35			65 270	4	35			68 930	4	35
1150		4	1.150	1.108	54 405	2	26	1.208	1.164	49 711	2	26	1.265	1.221	51 878	2	26	1.323	1.277	56 733	2	25
		6			60 133	3	27			55 157	3	27			57 091	3	27			61 751	3	27
		8			66 602	3	30			61 366	3	30			63 082	3	30			67 556	3	29
		10			73 210	4	32			67 761	4	32			69 296	4	32			73 614	4	32
1200		4	1.200	1.157	58 072	2	26	1.260	1.216	52 660	2	26	1.320	1.275	54 957	2	26	1.380	1.334	60 538	2	26
		6			64 110	3	28			58 396	3	28			60 445	3	28			65 818	3	28
		8			70 935	3	30			64 944	3	30			66 759	3	30			71 934	3	30
		10			77 914	4	32			71 695	4	32			73 317	4	32			78 324	4	32
1250		4	1.250	1.206	61 769	2	26	1.313	1.267	55 607	2	26	1.375	1.329	58 034	2	26	1.438	1.390	64 371	2	26
		6			68 114	3	28			61 633	3	28			63 796	3	28			69 912	3	28
		8			75 295	3	30			68 518	3	30			70 433	3	30			76 338	3	30
		10			82 644	4	32			75 625	4	32			77 332	4	32			83 059	4	32

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]		height H_w [mm]										
		1200					1250					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	400	4	0.480	0.449	36 243	2	25	0.500	0.468	38 275	2	25
		6			41 010	3	28			43 158	3	28
		8			46 268	4	31			48 564	4	31
		10			51 532	5	34			53 993	5	34
	450	4	0.540	0.508	41 727	2	25	0.563	0.529	44 053	2	26
		6			46 911	3	28			49 356	3	28
		8			52 675	4	31			55 275	4	31
		10			58 488	5	34			61 263	4	34
	500	4	0.600	0.567	47 312	2	26	0.625	0.591	49 938	2	26
		6			52 907	3	28			55 653	3	28
		8			59 170	4	31			62 077	4	31
		10			65 522	4	34			68 613	4	34
	550	4	0.660	0.626	52 991	2	26	0.688	0.652	55 920	2	26
		6			58 990	3	28			62 040	3	29
		8			65 745	3	31			68 961	3	31
		10			72 629	4	34			76 039	4	34
	600	4	0.720	0.685	58 754	2	26	0.750	0.714	61 989	2	27
		6			65 153	3	29			68 511	3	29
		8			72 395	3	31			75 923	3	31
		10			79 806	4	34			83 537	4	34
	650	4	0.780	0.744	39 974	2	25	0.813	0.775	40 455	2	25
		6			44 180	3	27			44 563	3	27
		8			48 960	3	29			49 253	3	29
		10			53 869	4	32			54 088	4	32
	700	4	0.840	0.803	43 632	2	27	0.875	0.837	44 150	2	27
		6			48 082	3	29			48 492	3	29
		8			53 157	3	32			53 468	3	32
		10			58 388	4	34			58 616	4	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

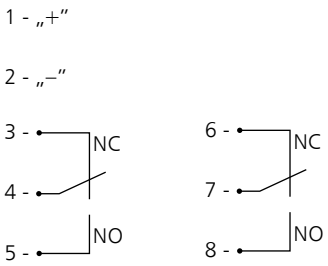
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B_w [mm]	v [m/s]	height H_w [mm] 1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1250 S_k [m²]	1250 S_e [m²]	1250 Q [m³/h]	1250 d_p [PA]	1250 L_{WA} [dB]
750	4	0.900	0.862	47 331	2	27	0.938	0.898	47 886	2	27
	6			52 023	3	29			52 461	3	29
	8			57 393	3	32			57 721	3	32
	10			62 943	4	34			63 179	4	34
800	4	0.960	0.921	51 068	2	28	1.000	0.960	51 070	2	28
	6			56 002	3	30			55 878	3	30
	8			61 665	3	32			61 421	3	32
	10			67 532	4	34			67 188	4	34
850	4	1.020	0.980	54 841	2	26	1.063	1.021	54 254	2	26
	6			60 016	3	28			59 292	3	28
	8			65 970	3	30			65 117	3	30
	10			72 153	4	32			71 191	4	32
900	4	1.080	1.039	58 649	2	26	1.125	1.083	57 438	2	26
	6			58 606	3	28			62 706	3	28
	8			64 851	3	30			68 811	3	30
	10			69 972	4	33			75 192	4	32
950	4	1.140	1.098	62 488	2	26	1.188	1.144	60 621	2	26
	6			68 141	3	28			66 118	3	28
	8			74 675	3	30			72 503	3	30
	10			81 487	4	33			79 189	4	33
1000	4	1.200	1.157	43 219	2	28	1.250	1.206	43 732	2	29
	6			47 308	3	30			47 707	3	30
	8			52 043	3	32			52 331	3	33
	10			56 989	4	35			57 183	4	35
1050	4	1.260	1.216	46 936	2	29	1.313	1.267	47 486	2	29
	6			51 281	3	30			51 707	3	31
	8			56 322	3	33			56 628	3	33
	10			61 594	4	35			61 798	4	35
1100	4	1.320	1.275	50 689	2	29	1.375	1.329	50 687	2	29
	6			55 289	3	31			55 153	3	31
	8			60 633	3	33			60 367	3	33
	10			66 231	4	35			65 854	4	35
1150	4	1.380	1.334	54 478	2	25	1.438	1.390	53 886	2	25
	6			59 330	3	27			58 595	3	27
	8			64 975	3	29			64 102	3	29
	10			70 897	4	32			69 904	4	32
1200	4	1.440	1.393	58 299	2	26	1.500	1.452	57 084	2	26
	6			57 945	3	27			62 034	3	27
	8			63 891	3	30			67 831	3	30
	10			68 758	4	32			73 947	4	32
1250	4	1.500	1.452	62 151	2	26	1.563	1.513	60 280	2	26
	6			67 503	3	28			65 471	3	28
	8			73 747	3	30			71 556	3	30
	10			80 312	4	32			77 984	4	32

16.7 | Trigger control mechanisms – specifications and connections diagram

execution type	EM24D + WK2
limit switch	250 V AC / 5A
rated voltage	24 V DC / pulse
power consumption	max 5 W

» electrical connections diagram for mcr DOR EM24D + WK2 damper



NOTE: the position of limit switches in standby

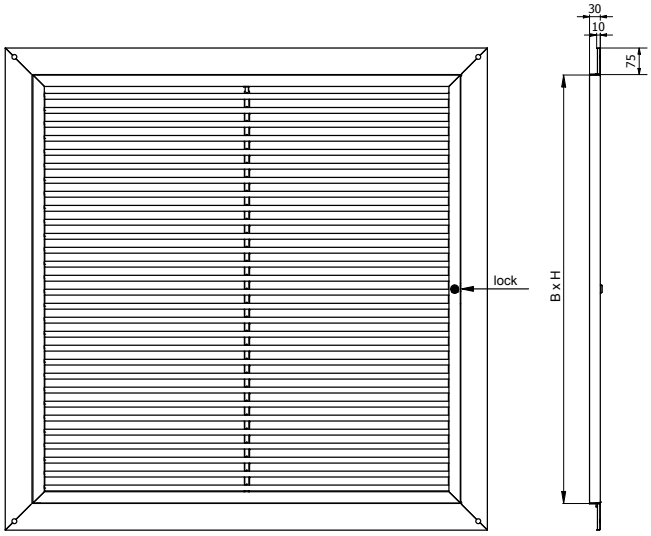
If the MP 230/24 element is used, the damper may be controlled (supplied) with 230 V AC voltage.

16.8 | Estimated weight of the mcr DOR rectangular dampers

		Width B [mm]															
		500	550	600	650	700	750	800	850	900	950	1 000	1050	1 100	1150	1 200	1250
Height H [mm]	400	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	17
	450	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
	500	10	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21
	550	10	11	12	13	13	14	15	16	17	17	18	19	20	21	21	22
	600	11	12	13	14	14	15	16	17	18	19	19	20	21	22	23	24
	650	12	13	14	14	15	16	17	18	19	20	21	22	23	23	24	25
	700	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	750	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	800	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
	850	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31
	900	15	17	18	19	20	21	22	24	25	26	27	28	29	31	32	33
	950	16	17	19	20	21	22	24	25	26	27	28	30	31	32	33	35
	1000	17	18	19	21	22	23	25	26	27	28	30	31	32	34	35	36
	1050	18	19	20	22	23	24	26	27	28	30	31	32	34	35	36	38
	1100	18	20	21	23	24	25	27	28	29	31	32	34	35	36	38	39
	1150	19	21	22	23	25	26	28	29	31	32	34	35	36	38	39	41
	1200	20	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42
	1250	21	22	24	25	27	28	30	31	33	35	36	38	39	41	42	44

16.9 | Accessories

16.9.1 | MWD grille



dimensions in [mm]

WD system masking grilles are designed to fulfill either supply or exhaust function. They allow for an aesthetic system termination. They come with adjustable louvers that cover the damper, reducing its visibility. The masking grille body is fixed to the damper using bolts or a latch system. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).
dimensions:
» nominal width B: from 200 to 1250 mm
» nominal height H from 200 mm to 1250 mm
» nominal thickness G 10 mm

Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.

Marking:

mcr MWD / B x H / 1

- 1 – additional parameters
- B x H – width x height
- MWD – grille type

16.9.2 | MWD grille technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_e – grille active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

			height H [mm]											
			200			300			400			500		
		v [m/s]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]
width B [mm]	200	4	0.015	210	12	0.028	403	10	0.041	596	9	0.055	789	9
		6		315	27		605	23		894	21		1 184	20
		8		420	49		806	41		1 192	37		1 578	35
		10		526	76		1 008	64		1 490	58		1 973	54
	300	4	0.028	402	10	0.051	734	8	0.074	1 067	7	0.097	1 400	7
		6		603	23		1 102	19		1 601	17		2 100	15
		8		804	41		1 469	33		2 134	29		2 799	27
		10		1 004	64		1 836	52		2 668	46		3 499	42
	400	4	0.041	593	9	0.074	1 066	7	0.107	1 538	6	0.140	2 010	6
		6		890	21		1 598	17		2 307	14		3 015	13
		8		1 187	37		2 131	29		3 076	26		4 020	23
		10		1 483	58		2 664	46		3 845	40		5 026	36
	500	4	0.055	785	9	0.097	1 397	7	0.140	2 009	6	0.182	2 621	5
		6		1 177	20		2 095	15		3 013	13		3 931	12
		8		1 570	35		2 794	27		4 018	23		5 242	21
		10		1 962	55		3 492	42		5 022	36		6 552	33
	600	4	0.068	976	8	0.120	1 728	6	0.172	2 480	5	0.224	3 231	5
		6		1 464	19		2 592	14		3 720	12		4 847	11
		8		1 953	33		3 456	26		4 959	22		6 463	19
		10		2 441	52		4 320	40		6 199	34		8 078	30
	700	4	0.081	1 168	8	0.143	2 059	6	0.205	2 951	5	0.267	3 842	5
		6		1 752	18		3 089	14		4 426	12		5 763	10
		8		2 336	32		4 118	25		5 901	21		7 684	18
		10		2 920	50		5 148	38		7 376	32		9 605	29
	800	4	0.094	1 359	8	0.166	2 390	6	0.238	3 421	5	0.309	4 452	4
		6		2 039	18		3 586	13		5 132	11		6 679	10
		8		2 719	31		4 781	24		6 843	20		8 905	17
		10		3 398	49		5 976	37		8 554	31		11 131	27
	900	4	0.108	1 551	8	0.189	2 722	6	0.270	3 892	5	0.352	5 063	4
		6		2 326	17		4 082	13		5 838	11		7 595	9
		8		3 102	31		5 443	23		7 785	19		10 126	17
		10		3 877	48		6 804	36		9 731	30		12 658	26
	1000	4	0.121	1 742	8	0.212	3 053	6	0.303	4 363	5	0.394	5 674	4
		6		2 614	17		4 579	13		6 545	10		8 510	9
		8		3 485	30		6 106	23		8 726	19		11 347	16
		10		4 356	47		7 632	35		10 908	29		14 184	25
	1100	4	0.134	1 934	7	0.235	3 384	6	0.336	4 834	5	0.436	6 284	4
		6		2 901	17		5 076	12		7 251	10		9 426	9
		8		3 868	30		6 768	22		9 668	18		12 568	16
		10		4 835	47		8 460	35		12 085	28		15 710	25
	1200	4	0.148	2 125	7	0.258	3 715	5	0.368	5 305	4	0.479	6 895	4
		6		3 188	17		5 573	12		7 957	10		10 342	9
		8		4 251	30		7 430	22		10 610	18		13 789	16
		10		5 314	46		9 288	34		13 262	28		17 237	24
	1300	4	0.161	2 317	7	0.281	4 046	5	0.401	5 776	4	0.521	7 505	4
		6		3 475	16		6 070	12		8 664	10		11 258	9
		8		4 634	29		8 093	21		11 552	18		15 011	15
		10		5 792	46		10 116	34		14 440	27		18 763	24
	1400	4	0.174	2 508	7	0.304	4 378	5	0.434	6 247	4	0.564	8 116	4
		6		3 763	16		6 566	12		9 370	10		12 174	8
		8		5 017	29		8 755	21		12 493	17		16 232	15
		10		6 271	45		10 944	33		15 617	27		20 290	23

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_e – grille active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B [mm]	v [m/s]	height H [mm] 600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]
200	4	0.068	982	8	0.082	1 175	8	0.095	1 368	8	0.108	1 558	8
	6		1 473	19		1 763	18		2 052	18		2 337	17
	8		1 964	33		2 350	32		2 736	31		3 116	31
	10		2 455	52		2 938	50		3 420	49		3 895	48
300	4	0.120	1 732	6	0.143	2 065	6	0.167	2 398	6	0.189	2 726	6
	6		2 598	14		3 097	14		3 596	13		4 089	13
	8		3 465	25		4 130	24		4 795	24		5 452	23
	10		4 331	40		5 162	38		5 994	37		6 815	36
400	4	0.172	2 483	5	0.205	2 955	5	0.238	3 427	5	0.270	3 894	5
	6		3 724	12		4 432	12		5 141	11		5 841	11
	8		4 965	22		5 910	21		6 854	20		7 788	19
	10		6 206	34		7 387	32		8 568	31		9 734	30
500	4	0.225	3 233	5	0.267	3 845	5	0.310	4 457	4	0.352	5 062	4
	6		4 849	11		5 767	10		6 685	10		7 592	9
	8		6 466	19		7 690	18		8 914	17		10 123	17
	10		8 082	30		9 612	28		11 142	27		12 654	26
600	4	0.277	3 983	4	0.329	4 735	4	0.381	5 486	4	0.433	6 229	4
	6		5 975	10		7 102	9		8 230	9		9 344	9
	8		7 966	18		9 469	17		10 973	16		12 459	15
	10		9 958	28		11 837	26		13 716	25		15 574	24
700	4	0.329	4 733	4	0.391	5 625	4	0.453	6 516	4	0.514	7 397	4
	6		7 100	9		8 437	9		9 774	8		11 096	8
	8		9 467	17		11 249	16		13 032	15		14 795	14
	10		11 833	26		14 062	24		16 290	23		18 493	22
800	4	0.381	5 484	4	0.452	6 515	4	0.524	7 546	3	0.595	8 565	3
	6		8 225	9		9 772	8		11 318	8		12 848	8
	8		10 967	16		13 029	15		15 091	14		17 130	13
	10		13 709	25		16 286	23		18 864	22		21 413	21
900	4	0.433	6 234	4	0.514	7 404	4	0.596	8 575	3	0.676	9 733	3
	6		9 351	9		11 107	8		12 863	7		14 599	7
	8		12 468	15		14 809	14		17 150	13		19 466	13
	10		15 584	24		18 511	22		21 438	21		24 332	20
1000	4	0.485	6 984	4	0.576	8 294	3	0.667	9 605	3	0.757	10 901	3
	6		10 476	8		12 442	8		14 407	7		16 351	7
	8		13 968	15		16 589	14		19 210	13		21 802	12
	10		17 460	23		20 736	21		24 012	20		27 252	19
1100	4	0.537	7 734	4	0.638	9 184	3	0.739	10 634	3	0.838	12 069	3
	6		11 601	8		13 776	7		15 952	7		18 103	7
	8		15 468	14		18 369	13		21 269	12		24 137	12
	10		19 336	22		22 961	21		26 586	19		30 172	18
1200	4	0.589	8 484	3	0.700	10 074	3	0.810	11 664	3	0.919	13 236	3
	6		12 727	8		15 111	7		17 496	7		19 855	6
	8		16 969	14		20 148	13		23 328	12		26 473	11
	10		21 211	22		25 186	20		29 160	19		33 091	18
1300	4	0.641	9 235	3	0.761	10 964	3	0.882	12 694	3	1.000	14 404	3
	6		13 852	8		16 446	7		19 040	7		21 606	6
	8		18 469	14		21 928	13		25 387	12		28 809	11
	10		23 087	21		27 410	20		31 734	18		36 011	17
1400	4	0.693	9 985	3	0.823	11 854	3	0.953	13 723	3	1.081	15 572	3
	6		14 977	8		17 781	7		20 585	6		23 358	6
	8		19 970	13		23 708	12		27 446	11		31 144	11
	10		24 962	21		29 635	19		34 308	18		38 930	17

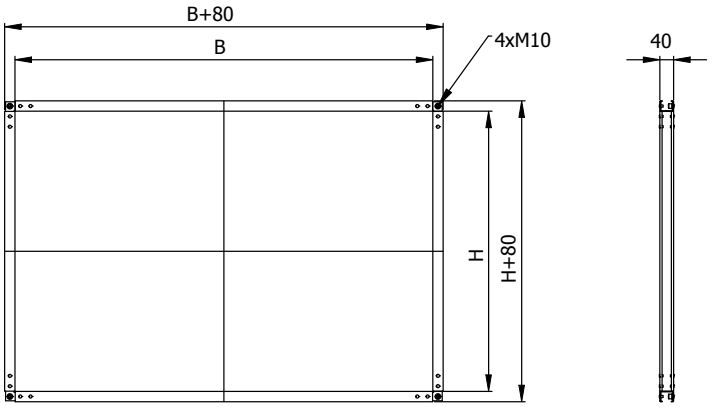
B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_e – grille active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B [mm]	height H [mm]	v [m/s]	1000			1100			1200			1300			1400		
			S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]	S_e [m²]	Q [m³/h]	d_p [PA]
200		4	0.122	1 751	8	0.135	1 944	7	0.148	2 137	7	0.162	2 330	7	0.175	2 523	7
		6		2 627	17		2 916	17		3 205	16		3 495	16		3 784	16
		8		3 502	30		3 888	30		4 274	29		4 660	29		5 046	29
		10		4 378	47		4 860	46		5 342	46		5 825	45		6 307	45
300		4	0.212	3 059	6	0.236	3 391	5	0.259	3 724	5	0.282	4 056	5	0.305	4 389	5
		6		4 588	13		5 087	12		5 586	12		6 085	12		6 584	12
		8		6 117	22		6 782	22		7 448	22		8 113	21		8 778	21
		10		7 646	35		8 478	34		9 310	34		10 141	33		10 973	33
400		4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4	0.434	6 255	4
		6		6 549	10		7 258	10		7 966	10		8 675	10		9 383	10
		8		8 732	19		9 677	18		10 621	18		11 566	17		12 511	17
		10		10 915	29		12 096	28		13 277	28		14 458	27		15 638	27
500		4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4	0.564	8 122	4
		6		8 510	9		9 428	9		10 346	9		11 264	9		12 182	8
		8		11 347	16		12 571	16		13 795	15		15 019	15		16 243	15
		10		14 184	25		15 714	25		17 244	24		18 774	24		20 304	23
600		4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3	0.694	9 988	3
		6		10 472	8		11 599	8		12 727	8		13 854	8		14 982	8
		8		13 962	15		15 466	14		16 969	14		18 472	14		19 976	13
		10		17 453	23		19 332	22		21 211	22		23 090	21		24 970	21
700		4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3	0.823	11 854	3
		6		12 433	8		13 770	7		15 107	7		16 444	7		17 781	7
		8		16 577	14		18 360	13		20 143	13		21 925	13		23 708	12
		10		20 722	21		22 950	21		25 178	20		27 407	20		29 635	19
800		4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3	0.953	13 720	3
		6		14 394	7		15 941	7		17 487	7		19 034	7		20 580	6
		8		19 192	13		21 254	12		23 316	12		25 379	12		27 441	11
		10		23 990	20		26 568	19		29 146	19		31 723	18		34 301	18
900		4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3	1.082	15 587	3
		6		16 356	7		18 112	7		19 868	6		21 624	6		23 380	6
		8		21 807	12		24 149	12		26 490	11		28 832	11		31 173	11
		10		27 259	19		30 186	18		33 113	18		36 040	17		38 966	17
1000		4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3	1.212	17 453	3
		6		18 317	7		20 282	6		22 248	6		24 214	6		26 179	6
		8		24 422	12		27 043	11		29 664	11		32 285	11		34 906	10
		10		30 528	18		33 804	18		37 080	17		40 356	17		43 632	16
1100		4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3	1.342	19 319	2
		6		20 278	6		22 453	6		24 628	6		26 803	6		28 979	6
		8		27 037	11		29 938	11		32 838	10		35 738	10		38 638	10
		10		33 797	18		37 422	17		41 047	16		44 672	16		48 298	15
1200		4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2	1.471	21 185	2
		6		22 239	6		24 624	6		27 009	6		29 393	6		31 778	5
		8		29 652	11		32 832	10		36 012	10		39 191	10		42 371	10
		10		37 066	17		41 040	16		45 014	16		48 989	15		52 963	15
1300		4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2	1.601	23 052	2
		6		24 201	6		26 795	6		29 389	6		31 983	5		34 577	5
		8		32 268	11		35 726	10		39 185	10		42 644	10		46 103	9
		10		40 334	17		44 658	16		48 982	15		53 305	15		57 629	14
1400		4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2	1.730	24 918	2
		6		26 162	6		28 966	6		31 769	5		34 573	5		37 377	5
		8		34 883	10		38 621	10		42 359	10		46 097	9		49 836	9
		10		43 603	16		48 276	16		52 949	15		57 622	14		62 294	14

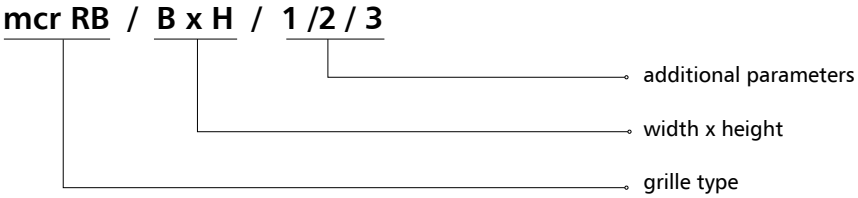
16.9.3 | RB connecting subframe



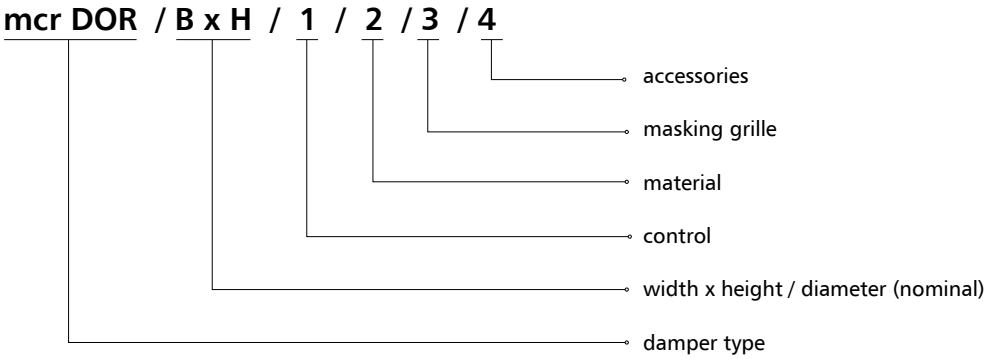
mcr RB connection frames are used to connect a steel ventilation duct to the damper. The connection may be made using bolts in the corners of the frame, as well as using latches/hasps for ventilation ducts or self-drilling screws.

Dimensions:
» nominal width B: from 200 to 1200 mm
» nominal height H from 200 mm to 800 mm
» nominal thickness G 40 mm
Apart from the standard dimensions, masking grilles may be manufactured with intermediate dimensions.

Marking:



16.10 | Marking



1 – control:
» **trigger control mechanism**
EM 24 D – electromagnetically powered and tripped trigger and control mechanism

2 – material
[no symbol] – galvanized steel, Zn 275 g/m² coating
KN – stainless steel
KK – 1.4404 acid-proof steel

3 – masking grille
MWDx1 – single masking grille
MWDx2 – two masking grilles

4 – additional accessories
MP230/24 – 230 V to 24 V transformation module
WK2 - limit switch (closed blade signal)

5 – additional parameters
» **Damper casing**
BU - earth pin

NOTE: **separate additional parameters entered with the "/" sign example marking:**

mcr DOR 400 x 400 / EM 24 D / WK1
The mcr DOR smoke door damper for fire ventilation systems is equipped with a limit switch.

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

BIM CAD

downloadable models
on the website
under the designer zone tab



CE

CTO S.A.

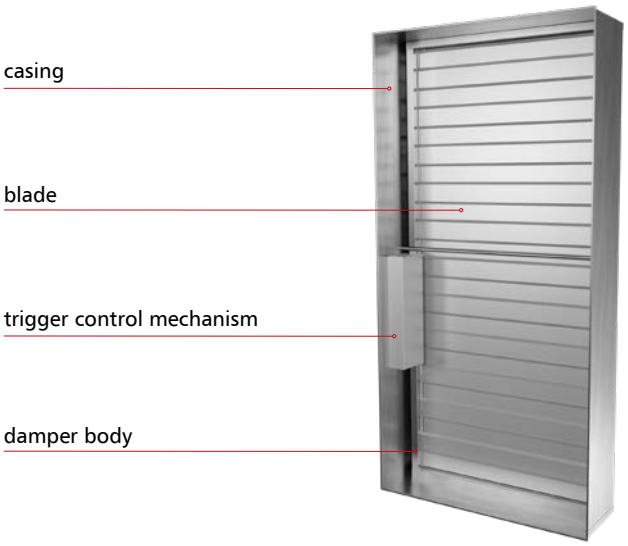
HYGIENIC CERTIFICATE

» **EIS120, E600**
» Fire resistance class: EI120 (v_{ew} i→o)S1000C_{10000}AAmulti.
» Certificate of constancy of performance 2434-CPR-0240
» Dampers certified for compliance with EN 12101-8
» Dampers rated under EN 13501-4 and tested under EN 1366-10
» Dedicated for application in smoke removal and air supply shafts
» Large active area, small resistances, quick installation
» Certified installation with a system grille in set as per EN 12101-8

17.1| Application

The mcr WIP LD smoke control dampers are intended for installation in manually or automatically operated fire ventilation systems. The devices are used in fire ventilation systems or in mixed fire and comfort ventilation systems (smoke evacuation or air supply systems). The dampers prevent fire, smoke and fire gases from spreading to the adjacent compartments. During normal system operation, the damper blades are closed. The smoke control dampers blades in the fire compartment are opened, whereas in other areas the blades are closed.

17.2| Design

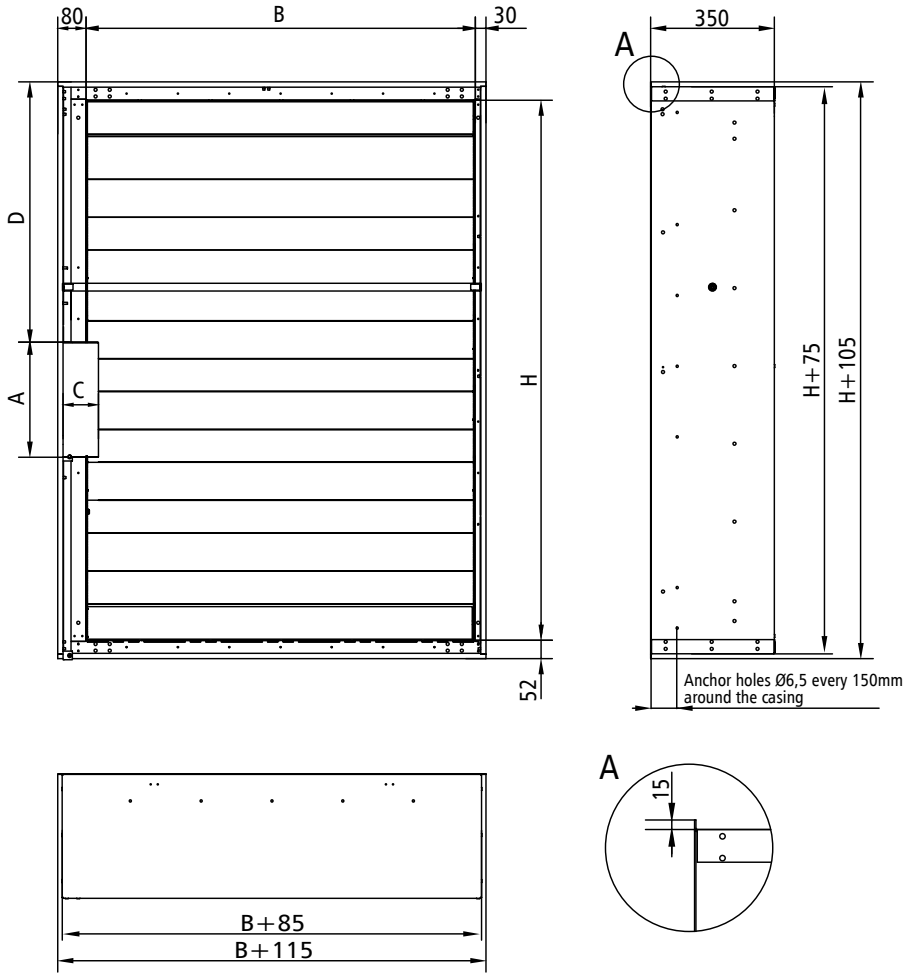


mcr WIP LD smoke control dampers consist of a casing with a rectangular cross-section, multiple moving damper blades – louvers rotating around their own axes – and a remotely activated trigger and control mechanism, which is installed inside the damper clearance. The damper casing is made of galvanized steel sheets. The damper is also provided with a connection flange on one side. The other end is the so-called “bare-end”. The damper casing total length is 350 mm. Damper louvers are made of galvanized steel sheets or stainless steel. The damper blades revolve on their own axes, which consist of steel pins. A ventilation gasket is provided on the blades to ensure that the damper is “cold” sealed.

17.3 | Versions

17.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the smoke control dampers louvers are opened in the fire compartment area and closed in the other areas - the smoke control dampers is released remotely by feeding the supply voltage to the trigger control mechanism. mcr WIP LD smoke control dampers are equipped with a trigger control mechanism in the form of a BE, BEE, BEN, MLE or ME axial actuator without a return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN, MLE or ME series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator. Smoke control dampers with BE, BEE, BEN, MLE or ME actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may be opened/closed manually using a key.



mechanism	A	C	D
BE, BEE, BEN, ME, MLE	325	100	formula

for dimension H<599	for dimension H>599
D [mm] = H/2 - 168,75	D [mm] = H/2 - 38,75

17.4 | Dimensions

» nominal width B: from 300 mm to 1100 mm
» nominal height H from 600 mm to 2300 mm
» maximum single damper cross-section surface up to 2.53 m^2

Apart from the standard dimensions, smoke control dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 636-654...

17.5 | Installation

» mcr WIP LD rectangular dampers are rated EI120(v_{ew} i→o)S 1000C_{10000}AAmulti if installed in yielding wall/shaft partitions made from gypsum board panels with the thickness of at least 125 mm.

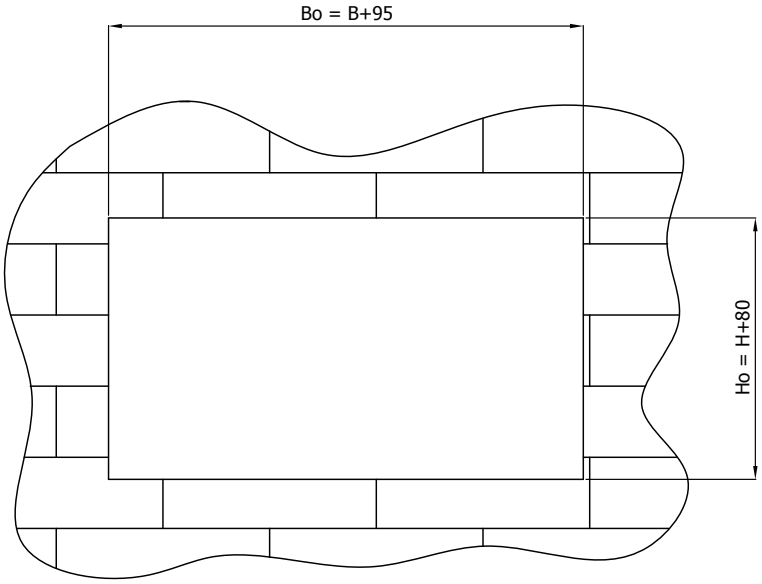
» mcr WIP LD rectangular dampers are rated EI120(v_{ew} i→o)S 1000C_{10000}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm.

» mcr WIP LD rectangular dampers are rated E600(v_{ew} i→o)S 1000C_{10000}AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm.

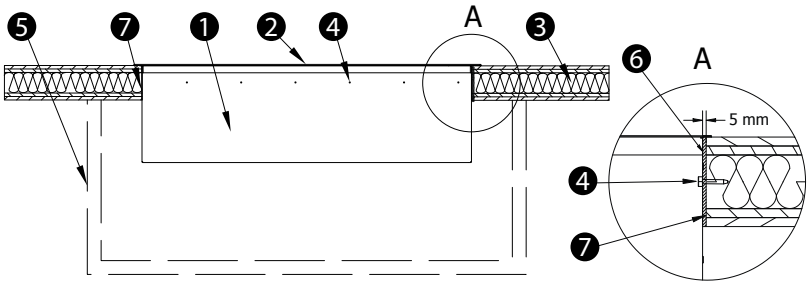
17.5.1 | Preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP damper is:

Preferred
Bo = (B+95) mm
Ho = (H+85) mm



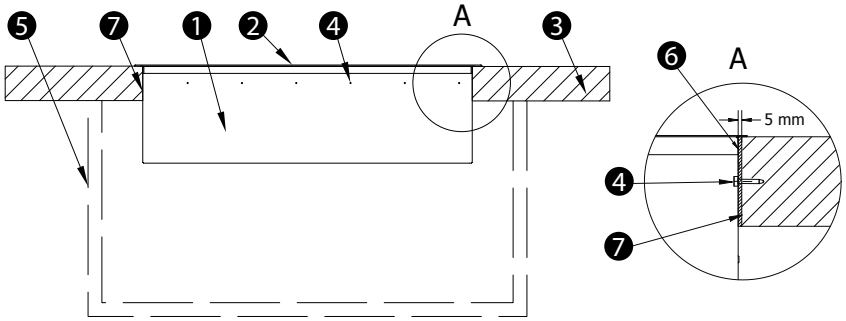
17.5.2 | Installation in light shaft walls



1. mcr WIP LD BxH smoke damper
2. MWS system grille (optional)
3. GK shaft wall
4. Installation anchors
5. Vertical fire ventilation shaft
6. Mounting gap*
7. Assembly mortar*

* The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

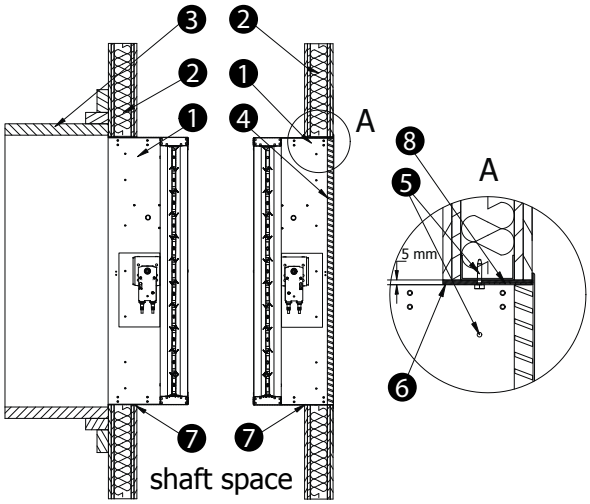
17.5.3 | Installation in shaft walls



1. mcr WIP LD BxH smoke damper
2. MWS system grille (optional)
3. GB shaft wall
4. Installation anchors
5. Vertical fire ventilation shaft
6. Mounting gap*
7. Assembly mortar*

* The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

17.5.4 | Sample installation in light walls and with multi-compartment ducts or grilles



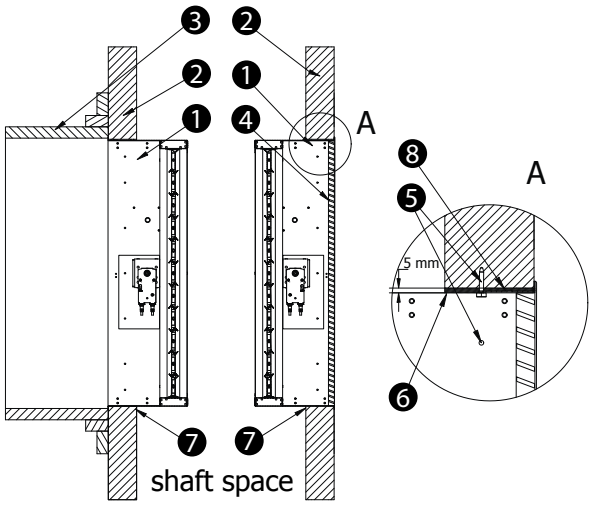
1. mcr WIP LD BxH smoke damper
2. Plasterboard wall
3. Multi-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.

** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

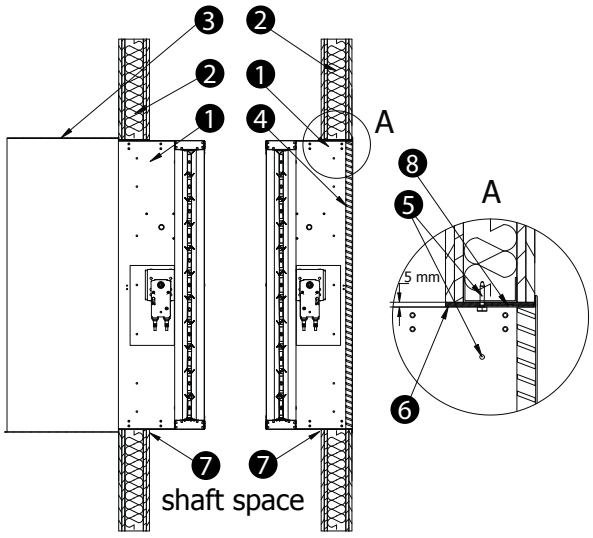
17.5.5 | Installation in concrete walls and with multi-compartment ducts or grilles



1. mcr WIP LD BxH smoke damper
2. Solid wall
3. Multi-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.
** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.
*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

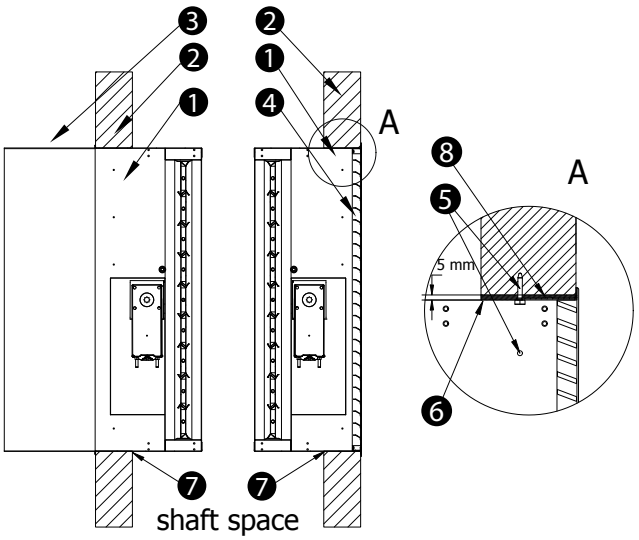
17.5.6 | Sample installation in light walls and with single-compartment ducts or grilles



1. mcr WIP LD BxH smoke damper
2. Plasterboard wall
3. Single-compartment smoke extract duct – e.g. made of metal sheets*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.
** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.
*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

17.5.7 | Sample installation in concrete or masonry walls and with single-compartment ducts or grilles



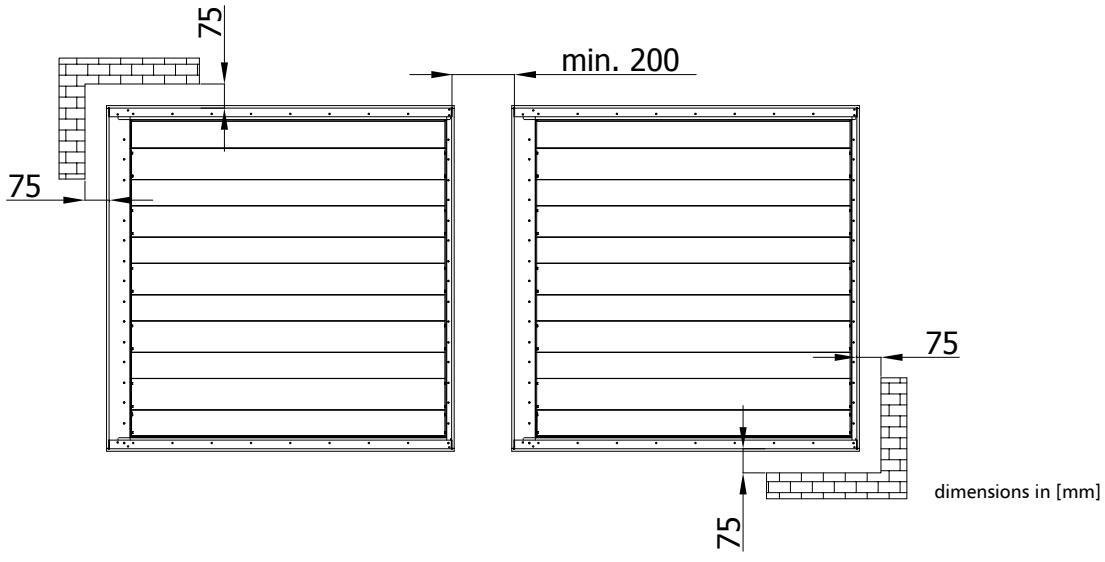
1. mcr WIP LD BxH smoke damper
2. Solid wall
3. Single-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.

** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

» Minimum distance between systems and partitions



17.6 | mcr WIP LD rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	600 L_{WA} [dB]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]
300		4	0,18	0,15	2 151	5	30	0,21	0,17	2 510	5	30	0,24	0,20	2 868	5	31
		6			3 227	12	41			3 765	11	41			4 303	11	41
		8			4 303	21	48			5 020	20	48			5 737	19	48
		10			5 378	32	54			6 275	31	54			7 171	30	54
350		4	0,21	0,17	2 510	5	30	0,25	0,20	2 928	5	31	0,28	0,23	3 347	5	32
		6			3 765	11	41			4 392	11	41			5 020	10	41
		8			5 020	20	48			5 856	19	48			6 693	19	49
		10			6 275	31	54			7 321	30	54			8 366	29	55
400		4	0,24	0,20	2 868	5	31	0,28	0,23	3 347	5	32	0,32	0,27	3 825	5	32
		6			4 303	11	41			5 020	11	42			5 737	10	41
		8			5 737	20	49			6 693	19	49			7 649	19	50
		10			7 171	31	55			8 366	30	55			9 562	29	55
450		4	0,27	0,22	3 227	5	31	0,32	0,26	3 765	5	32	0,36	0,30	4 303	5	33
		6			4 841	11	42			5 647	11	42			6 454	10	42
		8			6 454	20	50			7 530	19	50			8 605	19	50
		10			8 068	31	55			9 412	30	55			10 757	29	56
500		4	0,30	0,25	3 586	5	32	0,35	0,29	4 183	5	33	0,40	0,33	4 781	5	33
		6			5 378	11	42			6 275	11	43			7 171	10	42
		8			7 171	20	50			8 366	19	50			9 562	19	51
		10			8 964	31	56			10 458	30	56			11 952	29	56
550		4	0,33	0,27	3 944	5	32	0,39	0,32	4 602	5	33	0,44	0,37	5 259	5	34
		6			5 916	11	43			6 902	11	43			7 888	10	43
		8			7 888	20	50			9 203	19	50			10 518	19	51
		10			9 860	31	56			11 504	30	56			13 147	29	56
600		4	0,36	0,30	4 303	5	33	0,42	0,35	5 020	5	33	0,48	0,40	5 737	5	34
		6			6 454	11	43			7 530	11	44			8 605	10	43
		8			8 605	19	50			10 040	19	51			11 474	19	51
		10			10 757	30	56			12 550	30	57			14 342	29	57
650		4	0,39	0,32	4 661	5	33	0,46	0,38	5 438	5	34	0,52	0,43	6 215	5	34
		6			6 992	11	43			8 157	10	43			9 323	10	43
		8			9 323	19	50			10 876	19	51			12 430	19	52
		10			11 653	30	56			13 595	29	57			15 538	29	57
700		4	0,42	0,35	5 020	5	33	0,49	0,41	5 856	5	34	0,56	0,46	6 693	4	32
		6			7 530	11	44			8 785	10	43			10 040	10	44
		8			10 040	19	51			11 713	19	51			13 386	18	51
		10			12 550	30	57			14 641	29	57			16 733	28	57
750		4	0,45	0,37	5 378	5	34	0,53	0,44	6 275	5	34	0,60	0,50	7 171	4	32
		6			8 068	11	44			9 412	10	43			10 757	10	44
		8			10 757	19	51			12 550	19	52			14 342	18	52
		10			13 446	30	57			15 687	29	57			17 928	28	57
800		4	0,48	0,40	5 737	5	34	0,56	0,46	6 693	4	32	0,64	0,53	7 649	4	32
		6			8 605	10	43			10 040	7	39			11 474	10	44
		8			11 474	19	51			13 386	11	45			15 299	18	52
		10			14 342	29	57			16 733	28	57			19 123	28	58
850		4	0,51	0,42	6 096	4	31	0,60	0,49	7 111	4	32	0,68	0,56	8 127	4	33
		6			9 143	10	43			10 667	10	44			12 191	10	45
		8			12 191	18	51			14 223	18	52			16 255	17	51
		10			15 239	28	57			17 779	28	57			20 318	27	57
900		4	0,54	0,45	6 454	4	32	0,63	0,52	7 530	4	32	0,72	0,60	8 605	4	33
		6			9 681	10	44			11 295	10	44			12 908	10	45
		8			12 908	18	51			15 060	17	51			17 211	17	52
		10			16 135	28	57			18 824	27	57			21 514	27	58
950		4	0,57	0,47	6 813	4	32	0,67	0,55	7 948	4	32	0,76	0,63	9 084	4	33
		6			10 219	10	44			11 922	10	44			13 625	10	44
		8			13 625	18	51			15 896	17	51			18 167	17	52
		10			17 032	28	57			19 870	27	57			22 709	27	58
1000		4	0,60	0,50	7 171	4	32	0,70	0,58	8 366	4	33	0,80	0,66	9 562	4	33
		6			10 757	10	44			12 550	10	45			14 342	9	44
		8			14 342	18	52			16 733	17	52			19 123	17	52
		10			17 928	28	57			20 916	27	58			23 904	26	58
1050		4	0,63	0,52	7 530	4	32	0,74	0,61	8 785	4	33	0,84	0,70	10 040	4	34
		6			11 295	10	44			13 177	10	45			15 060	9	44
		8			15 060	18	52			17 569	17	52			20 079	17	52
		10			18 824	28	58			21 962	27	58			25 099	26	58
1100		4	0,66	0,55	7 888	4	33	0,77	0,64	9 203	4	34	0,88	0,73	10 518	4	34
		6			11 832	10	45			13 805	10	45			15 777	9	44
		8			15 777	18	52			18 406	17	52			21 036	17	53
		10			19 721	28	58			23 008	27	58			26 294	26	58

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	900 L_{WA} [dB]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1000 L_{WA} [dB]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]	1100 L_{WA} [dB]
	300	4	0,27	0,22	3 227	5	31	0,30	0,25	3 586	5	32	0,33	0,27	3 944	6,25	35
		6			4 841	10	41			5 378	10	41			5 916	13	44
		8			6 454	19	49			7 171	19	49			7 888	24	53
		10			8 068	29	54			8 964	29	55			9 860	36	58
	350	4	0,32	0,26	3 765	4	29	0,35	0,29	4 183	4	30	0,39	0,32	4 602	5	33
		6			5 647	10	41			6 275	10	42			6 902	13	45
		8			7 530	18	49			8 366	18	49			9 203	23	53
		10			9 412	28	55			10 458	28	55			11 504	35	58
	400	4	0,36	0,30	4 303	4	30	0,40	0,33	4 781	4	30	0,44	0,37	5 259	5	34
		6			6 454	10	42			7 171	10	42			7 888	13	46
		8			8 605	18	49			9 562	18	50			10 518	23	53
		10			10 757	28	55			11 952	28	56			13 147	35	59
	450	4	0,41	0,34	4 841	4	30	0,45	0,37	5 378	4	31	0,50	0,41	5 916	5	34
		6			7 261	10	42			8 068	10	43			8 874	13	46
		8			9 681	17	49			10 757	17	50			11 832	21	53
		10			12 101	27	55			13 446	27	56			14 791	34	59
	500	4	0,45	0,37	5 378	4	31	0,50	0,42	5 976	4	31	0,55	0,46	6 574	5	35
		6			8 068	10	43			8 964	10	43			9 860	13	47
		8			10 757	17	50			11 952	17	50			13 147	21	53
		10			13 446	27	56			14 940	27	56			16 434	34	59
	550	4	0,50	0,41	5 916	4	31	0,55	0,46	6 574	4	32	0,61	0,50	7 231	5	35
		6			8 874	10	43			9 860	10	44			10 846	13	47
		8			11 832	17	50			13 147	17	51			14 462	21	54
		10			14 791	27	56			16 434	27	57			18 077	34	60
	600	4	0,54	0,45	6 454	4	32	0,60	0,50	7 171	4	32	0,66	0,55	7 888	5	35
		6			9 681	10	44			10 757	10	44			11 832	13	47
		8			12 908	17	50			14 342	17	51			15 777	21	54
		10			16 135	27	56			17 928	27	57			19 721	34	60
	650	4	0,59	0,49	6 992	4	32	0,65	0,54	7 769	4	32	0,72	0,59	8 546	5	36
		6			10 488	10	44			11 653	10	44			12 819	13	48
		8			13 984	17	51			15 538	17	51			17 091	21	55
		10			17 480	27	57			19 422	27	57			21 364	34	61
	700	4	0,63	0,52	7 530	4	32	0,70	0,58	8 366	4	33	0,77	0,64	9 203	5	36
		6			11 295	9	43			12 550	9	43			13 805	11	47
		8			15 060	17	51			16 733	17	52			18 406	21	55
		10			18 824	26	57			20 916	26	57			23 008	33	60
	750	4	0,68	0,56	8 068	4	33	0,75	0,62	8 964	4	33	0,83	0,68	9 860	5	36
		6			12 101	9	43			13 446	9	44			14 791	11	47
		8			16 135	17	51			17 928	17	52			19 721	21	55
		10			20 169	26	57			22 410	26	57			24 651	33	61
	800	4	0,72	0,60	8 605	4	33	0,80	0,66	9 562	4	33	0,88	0,73	10 518	5	37
		6			12 908	9	43			14 342	9	44			15 777	11	47
		8			17 211	17	52			19 123	17	52			21 036	21	55
		10			21 514	26	57			23 904	26	58			26 294	33	61
	850	4	0,77	0,63	9 143	4	33	0,85	0,71	10 159	4	34	0,94	0,78	11 175	5	37
		6			13 715	9	44			15 239	9	44			16 763	11	47
		8			18 287	17	52			20 318	17	52			22 350	21	56
		10			22 858	26	57			25 398	26	58			27 938	33	61
	900	4	0,81	0,67	9 681	4	33	0,90	0,75	10 757	4	34	0,99	0,82	11 832	5	37
		6			14 522	9	44			16 135	9	44			17 749	11	48
		8			19 362	17	52			21 514	16	52			23 665	20	55
		10			24 203	26	58			26 892	25	58			29 581	31	61
	950	4	0,86	0,71	10 219	4	34	0,95	0,79	11 354	4	34	1,05	0,87	12 490	5	37
		6			15 328	9	44			17 032	9	45			18 735	11	48
		8			20 438	16	52			22 709	16	52			24 980	19	55
		10			25 547	25	57			28 386	25	58			31 225	31	61
	1000	4	0,90	0,75	10 757	4	34	1,00	0,83	11 952	4	34	1,10	0,91	13 147	5	38
		6			16 135	9	44			17 928	9	45			19 721	11	48
		8			21 514	15	51			23 904	15	51			26 294	19	55
		10			26 892	24	57			29 880	24	58			32 868	30	61
	1050	4	0,95	0,78	11 295	4	34	1,05	0,87	12 550	4	35	1,16	0,96	13 805	5	38
		6			16 942	9	45			18 824	9	45			20 707	11	48
		8			22 589	15	51			25 099	15	52			27 609	19	55
		10			28 237	24	57			31 374	24	58			34 511	30	61
	1100	4	0,99	0,82	11 832	4	35	1,10	0,91	13 147	4	35	1,21	1,00	14 462	5	38
		6			17 749	9	45			19 721	9	45			21 693	11	49
		8			23 665	15	52			26 294	15	52			28 924	19	55
		10			29 581	24	58			32 868	24	58			36 155	30	61

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1200 L_{WA} [dB]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1300 L_{WA} [dB]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]	1400 L_{WA} [dB]
	300	4	0,36	0,30	4 303	5	33	0,39	0,32	4 661	5	33	0,42	0,35	5 020	5	33
		6			6 454	9	40			6 992	9	40			7 530	8	40
		8			8 605	18	49			9 323	18	49			10 040	17	49
		10			10 757	28	55			11 653	27	55			12 550	26	55
	350	4	0,42	0,35	5 020	3,5	29	0,46	0,38	5 438	3,25	28	0,49	0,41	5 856	3	27
		6			7 530	10	42			8 157	9	42			8 785	9	42
		8			10 040	17	49			10 876	17	49			11 713	16	49
		10			12 550	27	55			13 595	26	55			14 641	25	55
	400	4	0,48	0,40	5 737	3,5	29	0,52	0,43	6 215	3,25	29	0,56	0,46	6 693	3	28
		6			8 605	10	42			9 323	9	42			10 040	9	42
		8			11 474	17	50			12 430	17	50			13 386	16	50
		10			14 342	27	56			15 538	26	56			16 733	25	56
	450	4	0,54	0,45	6 454	3,5	30	0,59	0,49	6 992	3,25	29	0,63	0,52	7 530	3	28
		6			9 681	10	43			10 488	9	43			11 295	9	43
		8			12 908	16	49			13 984	15	49			15 060	14	49
		10			16 135	25	55			17 480	24	55			18 824	23	55
	500	4	0,60	0,50	7 171	3,5	30	0,65	0,54	7 769	3,25	30	0,70	0,58	8 366	3	29
		6			10 757	10	43			11 653	9	43			12 550	9	43
		8			14 342	16	50			15 538	15	49			16 733	14	49
		10			17 928	25	56			19 422	24	56			20 916	23	55
	550	4	0,66	0,55	7 888	3,5	31	0,72	0,59	8 546	3,25	30	0,77	0,64	9 203	3	29
		6			11 832	10	44			12 819	9	44			13 805	9	44
		8			15 777	16	50			17 091	15	50			18 406	14	49
		10			19 721	25	56			21 364	24	56			23 008	23	56
	600	4	0,72	0,60	8 605	3,5	31	0,78	0,65	9 323	3,25	30	0,84	0,70	10 040	3	30
		6			12 908	10	44			13 984	9	44			15 060	9	44
		8			17 211	16	51			18 645	16	51			20 079	15	51
		10			21 514	26	57			23 306	25	57			25 099	24	57
	650	4	0,78	0,65	9 323	3,5	31	0,85	0,70	10 099	3,25	31	0,91	0,76	10 876	3	30
		6			13 984	10	44			15 149	9	44			16 314	9	44
		8			18 645	16	51			20 199	16	51			21 753	15	51
		10			23 306	26	57			25 249	25	57			27 191	24	57
	700	4	0,84	0,70	10 040	3,5	32	0,91	0,76	10 876	3,25	31	0,98	0,81	11 713	3	30
		6			15 060	8	43			16 314	8	42			17 569	7	41
		8			20 079	16	52			21 753	16	51			23 426	15	51
		10			25 099	24	57			27 191	23	57			29 282	22	56
	750	4	0,90	0,75	10 757	3,5	32	0,98	0,81	11 653	3,25	31	1,05	0,87	12 550	3	31
		6			16 135	8	43			17 480	8	42			18 824	7	42
		8			21 514	16	52			23 306	16	52			25 099	15	52
		10			26 892	24	57			29 133	23	57			31 374	22	57
	800	4	0,96	0,80	11 474	3,5	32	1,04	0,86	12 430	3,25	32	1,12	0,93	13 386	3	31
		6			17 211	9	44			18 645	8	44			20 079	8	44
		8			22 948	16	52			24 860	16	52			26 772	15	52
		10			28 685	25	58			31 075	24	58			33 466	23	58
	850	4	1,02	0,85	12 191	4	34	1,11	0,92	13 207	4	35	1,19	0,99	14 223	4	35
		6			18 287	9	44			19 810	8	44			21 334	8	44
		8			24 382	17	53			26 414	16	53			28 446	16	53
		10			30 478	25	58			33 017	25	58			35 557	24	58
	900	4	1,08	0,90	12 908	4	35	1,17	0,97	13 984	4	35	1,26	1,05	15 060	4	35
		6			19 362	9	44			20 976	8	44			22 589	8	44
		8			25 816	15	52			27 968	15	52			30 119	14	52
		10			32 270	24	58			34 960	23	58			37 649	22	57
	950	4	1,14	0,95	13 625	4	35	1,24	1,03	14 761	4	35	1,33	1,10	15 896	4	35
		6			20 438	9	45			22 141	8	45			23 844	8	45
		8			27 251	14	51			29 521	14	51			31 792	13	51
		10			34 063	23	57			36 902	22	57			39 740	21	57
	1000	4	1,20	1,00	14 342	4	35	1,30	1,08	15 538	4	35	1,40	1,16	16 733	4	36
		6			21 514	9	45			23 306	8	45			25 099	8	45
		8			28 685	14	51			31 075	13	50			33 466	12	50
		10			35 856	22	57			38 844	21	57			41 832	20	57
	1050	4	1,26	1,05	15 060	4	35	1,37	1,13	16 314	4	36	1,47	1,22	17 569	4	36
		6			22 589	9	45			24 472	8	45			26 354	8	45
		8			30 119	14	51			32 629	13	51			35 139	12	50
		10			37 649	22	58			40 786	21	57			43 924	20	57
	1100	4	1,32	1,10	15 777	4	36	1,43	1,19	17 091	4	36	1,54	1,28	18 406	4	37
		6			23 665	9	45			25 637	8	45			27 609	8	45
		8			31 553	14	51			34 183	13	51			36 812	12	51
		10			39 442	22	58			42 728	21	57			46 015	20	57

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			1500					1600					1700				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	300	4	0,45	0,37	5 378	5	34	0,48	0,40	5 737	5	34	0,51	0,42	6 096	5	34
		6			8 068	8	39			8 605	7	38			9 143	7	38
		8			10 757	17	49			11 474	16	49			12 191	16	49
		10			13 446	25	55			14 342	25	55			15 239	24	55
	350	4	0,53	0,44	6 275	2,75	27	0,56	0,46	6 693	2,5	26	0,60	0,49	7 111	2,25	25
		6			9 412	9	42			10 040	9	42			10 667	8	41
		8			12 550	16	49			13 386	15	49			14 223	15	49
		10			15 687	24	55			16 733	24	55			17 779	23	55
	400	4	0,60	0,50	7 171	2,75	27	0,64	0,53	7 649	2,5	26	0,68	0,56	8 127	2,25	25
		6			10 757	9	42			11 474	9	42			12 191	8	42
		8			14 342	16	50			15 299	15	50			16 255	15	49
		10			17 928	24	56			19 123	24	55			20 318	23	55
	450	4	0,68	0,56	8 068	2,75	28	0,72	0,60	8 605	2,5	27	0,77	0,63	9 143	2,25	26
		6			12 101	9	43			12 908	9	43			13 715	8	43
		8			16 135	13	48			17 211	13	48			18 287	12	47
		10			20 169	22	55			21 514	21	54			22 858	20	54
	500	4	0,75	0,62	8 964	2,75	28	0,80	0,66	9 562	2,5	27	0,85	0,71	10 159	2,25	26
		6			13 446	9	43			14 342	9	43			15 239	8	43
		8			17 928	13	49			19 123	13	48			20 318	12	48
		10			22 410	22	55			23 904	21	55			25 398	20	55
	550	4	0,83	0,68	9 860	2,75	29	0,88	0,73	10 518	2,5	28	0,94	0,78	11 175	2,25	26
		6			14 791	9	44			15 777	9	44			16 763	8	43
		8			19 721	13	49			21 036	13	49			22 350	12	48
		10			24 651	22	56			26 294	21	55			27 938	20	55
	600	4	0,90	0,75	10 757	2,75	29	0,96	0,80	11 474	2,5	28	1,02	0,85	12 191	2,25	27
		6			16 135	9	44			17 211	9	44			18 287	8	44
		8			21 514	15	51			22 948	14	50			24 382	14	50
		10			26 892	23	57			28 685	23	57			30 478	22	56
	650	4	0,98	0,81	11 653	2,75	29	1,04	0,86	12 430	2,5	28	1,11	0,92	13 207	2,25	27
		6			17 480	9	44			18 645	9	44			19 810	8	44
		8			23 306	15	51			24 860	14	51			26 414	14	51
		10			29 133	23	57			31 075	23	57			33 017	22	57
	700	4	1,05	0,87	12 550	2,75	30	1,12	0,93	13 386	2,5	29	1,19	0,99	14 223	2,25	28
		6			18 824	7	41			20 079	6	40			21 334	6	39
		8			25 099	15	51			26 772	14	51			28 446	14	51
		10			31 374	21	56			33 466	20	56			35 557	19	55
	750	4	1,13	0,93	13 446	2,75	30	1,20	1,00	14 342	2,5	29	1,28	1,06	15 239	2,25	28
		6			20 169	7	41			21 514	6	40			22 858	6	39
		8			26 892	15	52			28 685	14	51			30 478	14	51
		10			33 615	21	56			35 856	20	56			38 097	19	56
	800	4	1,20	1,00	14 342	2,75	30	1,28	1,06	15 299	2,5	29	1,36	1,13	16 255	2,25	28
		6			21 514	8	44			22 948	8	44			24 382	7	43
		8			28 685	15	52			30 597	14	52			32 509	14	51
		10			35 856	22	57			38 246	22	57			40 637	21	57
	850	4	1,28	1,06	15 239	4	35	1,36	1,13	16 255	4	36	1,45	1,20	17 271	4	36
		6			22 858	8	44			24 382	8	44			25 906	7	44
		8			30 478	16	53			32 509	16	53			34 541	15	53
		10			38 097	24	58			40 637	23	58			43 177	23	58
	900	4	1,35	1,12	16 135	4	36	1,44	1,20	17 211	4	36	1,53	1,27	18 287	4	36
		6			24 203	8	44			25 816	8	44			27 430	7	44
		8			32 270	14	51			34 422	13	51			36 573	13	51
		10			40 338	21	57			43 027	21	57			45 716	20	57
	950	4	1,43	1,18	17 032	4	36	1,52	1,26	18 167	4	36	1,62	1,34	19 302	4	36
		6			25 547	8	44			27 251	8	44			28 954	7	44
		8			34 063	12	51			36 334	12	50			38 605	11	50
		10			42 579	20	57			45 418	19	57			48 256	18	56
	1000	4	1,50	1,25	17 928	4	36	1,60	1,33	19 123	4	36	1,70	1,41	20 318	4	37
		6			26 892	8	45			28 685	8	44			30 478	7	44
		8			35 856	11	49			38 246	11	49			40 637	10	48
		10			44 820	19	56			47 808	18	56			50 796	17	55
	1050	4	1,58	1,31	18 824	4	36	1,68	1,39	20 079	4	37	1,79	1,48	21 334	4	37
		6			28 237	8	45			30 119	8	45			32 001	7	45
		8			37 649	11	50			40 159	11	49			42 669	10	48
		10			47 061	19	57			50 198	18	56			53 336	17	56
	1100	4	1,65	1,37	19 721	4	37	1,76	1,46	21 036	4	37	1,87	1,55	22 350	4	37
		6			29 581	8	45			31 553	8	45			33 525	7	45
		8			39 442	11	50			42 071	11	49			44 700	10	49
		10			49 302	19	57			52 589	18	56			55 876	17	56

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1800 L_{WA} [dB]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	1900 L_{WA} [dB]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]	2000 L_{WA} [dB]
	300	4	0,54	0,45	6 454	5	34	0,57	0,47	6 813	5	35	0,60	0,50	7 171	5	35
		6			9 681	6	37			10 219	6	36			10 757	5	35
		8			12 908	15	49			13 625	15	49			14 342	14	48
		10			16 135	23	54			17 032	22	54			17 928	22	54
	350	4	0,63	0,52	7 530	2	23	0,67	0,55	7 948	1,75	22	0,70	0,58	8 366	1,5	20
		6			11 295	8	41			11 922	8	41			12 550	8	41
		8			15 060	14	49			15 896	14	48			16 733	13	48
		10			18 824	22	54			19 870	21	54			20 916	21	54
	400	4	0,72	0,60	8 605	2	24	0,76	0,63	9 084	1,75	22	0,80	0,66	9 562	1,5	21
		6			12 908	8	42			13 625	8	42			14 342	8	41
		8			17 211	14	49			18 167	14	49			19 123	13	49
		10			21 514	22	55			22 709	21	55			23 904	21	55
	450	4	0,81	0,67	9 681	2	24	0,86	0,71	10 219	1,75	23	0,90	0,75	10 757	1,5	21
		6			14 522	8	42			15 328	8	42			16 135	8	42
		8			19 362	11	47			20 438	10	46			21 514	10	45
		10			24 203	19	54			25 547	18	53			26 892	17	53
	500	4	0,90	0,75	10 757	2	25	0,95	0,79	11 354	1,75	23	1,00	0,83	11 952	1,5	21
		6			16 135	8	43			17 032	8	43			17 928	8	42
		8			21 514	11	47			22 709	10	46			23 904	10	46
		10			26 892	19	54			28 386	18	54			29 880	17	53
	550	4	0,99	0,82	11 832	2	25	1,05	0,87	12 490	1,75	24	1,10	0,91	13 147	1,5	22
		6			17 749	8	43			18 735	8	43			19 721	8	43
		8			23 665	11	47			24 980	10	47			26 294	10	46
		10			29 581	19	55			31 225	18	54			32 868	17	54
	600	4	1,08	0,90	12 908	2	26	1,14	0,95	13 625	1,75	24	1,20	1,00	14 342	1,5	22
		6			19 362	8	44			20 438	8	43			21 514	8	43
		8			25 816	13	50			27 251	13	50			28 685	12	49
		10			32 270	21	56			34 063	20	56			35 856	20	56
	650	4	1,17	0,97	13 984	2	26	1,24	1,03	14 761	1,75	24	1,30	1,08	15 538	1,5	23
		6			20 976	8	44			22 141	8	44			23 306	8	44
		8			27 968	13	50			29 521	13	50			31 075	12	50
		10			34 960	21	57			36 902	20	56			38 844	20	56
	700	4	1,26	1,05	15 060	2	26	1,33	1,10	15 896	1,75	25	1,40	1,16	16 733	1,5	23
		6			22 589	5	38			23 844	5	37			25 099	4	36
		8			30 119	13	51			31 792	13	50			33 466	12	50
		10			37 649	18	55			39 740	17	54			41 832	16	54
	750	4	1,35	1,12	16 135	2	27	1,43	1,18	17 032	1,75	25	1,50	1,25	17 928	1,5	23
		6			24 203	5	38			25 547	5	37			26 892	4	36
		8			32 270	13	51			34 063	13	51			35 856	12	50
		10			40 338	18	55			42 579	17	55			44 820	16	54
	800	4	1,44	1,20	17 211	2	27	1,52	1,26	18 167	1,75	25	1,60	1,33	19 123	1,5	24
		6			25 816	7	43			27 251	7	43			28 685	7	43
		8			34 422	13	51			36 334	13	51			38 246	12	51
		10			43 027	20	57			45 418	19	57			47 808	19	56
	850	4	1,53	1,27	18 287	4	36	1,62	1,34	19 302	4	36	1,70	1,41	20 318	4	37
		6			27 430	7	43			28 954	7	43			30 478	7	43
		8			36 573	15	53			38 605	15	53			40 637	15	53
		10			45 716	22	58			48 256	22	58			50 796	21	58
	900	4	1,62	1,34	19 362	4	36	1,71	1,42	20 438	4	37	1,80	1,49	21 514	4	37
		6			29 043	7	44			30 657	7	43			32 270	7	43
		8			38 724	12	51			40 876	12	50			43 027	11	50
		10			48 406	19	57			51 095	18	56			53 784	18	56
	950	4	1,71	1,42	20 438	4	37	1,81	1,50	21 573	4	37	1,90	1,58	22 709	4	37
		6			30 657	7	44			32 360	7	44			34 063	7	43
		8			40 876	11	49			43 147	10	49			45 418	9	48
		10			51 095	18	56			53 933	17	55			56 772	16	55
	1000	4	1,80	1,49	21 514	4	37	1,90	1,58	22 709	4	37	2,00	1,66	23 904	4	37
		6			32 270	7	44			34 063	7	44			35 856	7	44
		8			43 027	9	47			45 418	8	46			47 808	8	45
		10			53 784	16	55			56 772	15	54			59 760	14	54
	1050	4	1,89	1,57	22 589	4	37	2,00	1,66	23 844	4	37	2,10	1,74	25 099	4	38
		6			33 884	7	44			35 766	7	44			37 649	7	44
		8			45 179	9	48			47 688	8	47			50 198	8	46
		10			56 473	16	55			59 611	15	55			62 748	14	54
	1100	4	1,98	1,64	23 665	4	38	2,09	1,73	24 980	4	38	2,20	1,83	26 294	4	38
		6			35 497	7	45			37 470	7	45			39 442	7	44
		8			47 330	9	48			49 959	8	47			52 589	8	46
		10			59 162	16	55			62 449	15	55			65 736	14	54

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

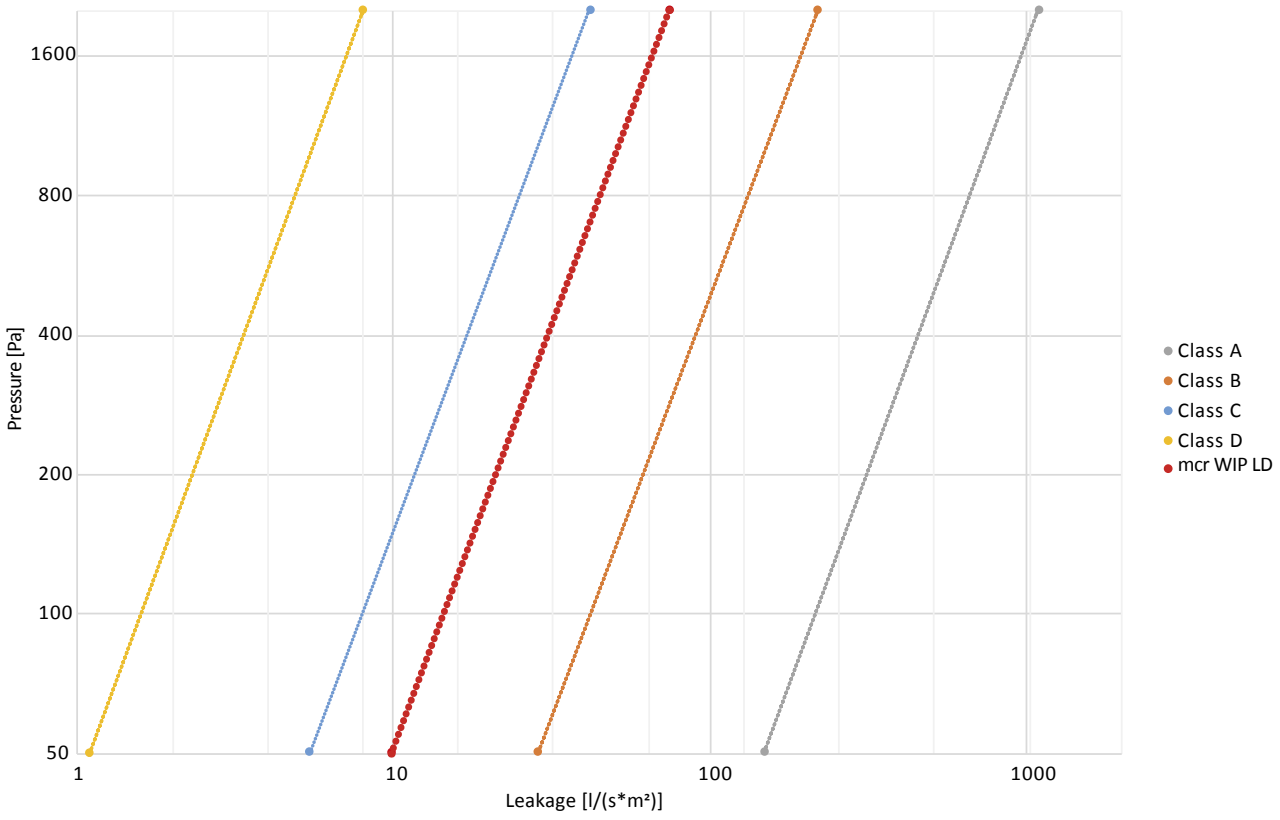
width B [mm]	v [m/s]	height H [mm] 2100 S_k [m²]	2100 S_e [m²]	2100 Q [m³/h]	2100 d_p [PA]	2100 L_{WA} [dB]	2200 S_k [m²]	2200 S_e [m²]	2200 Q [m³/h]	2200 d_p [PA]	2200 L_{WA} [dB]	2300 S_k [m²]	2300 S_e [m²]	2300 Q [m³/h]	2300 d_p [PA]	2300 L_{WA} [dB]
300	4	0,63	0,52	7 530	5	35	0,66	0,55	7 888	5	35	0,69	0,57	8 247	5	36
	6			11 295	5	34			11 832	4	32			12 370	4	31
	8			15 060	14	48			15 777	13	48			16 494	13	47
	10			18 824	21	54			19 721	20	53			20 617	19	53
350	4	0,74	0,61	8 785	1,25	18	0,77	0,64	9 203	1	15	0,81	0,67	9 621	0,75	12
	6			13 177	7	41			13 805	7	40			14 432	7	40
	8			17 569	13	48			18 406	12	47			19 243	12	47
	10			21 962	20	54			23 008	19	53			24 053	18	53
400	4	0,84	0,70	10 040	1,25	18	0,88	0,73	10 518	1	16	0,92	0,76	10 996	0,75	12
	6			15 060	7	41			15 777	7	41			16 494	7	41
	8			20 079	13	48			21 036	12	48			21 992	12	48
	10			25 099	20	54			26 294	19	54			27 490	18	54
450	4	0,95	0,78	11 295	1,25	19	0,99	0,82	11 832	1	16	1,04	0,86	12 370	0,75	13
	6			16 942	7	42			17 749	7	42			18 555	7	41
	8			22 589	9	44			23 665	8	43			24 741	7	42
	10			28 237	16	52			29 581	15	51			30 926	14	51
500	4	1,05	0,87	12 550	1,25	19	1,10	0,91	13 147	1	17	1,15	0,95	13 745	0,75	13
	6			18 824	7	42			19 721	7	42			20 617	7	42
	8			25 099	9	45			26 294	8	44			27 490	7	43
	10			31 374	16	53			32 868	15	52			34 362	14	51
550	4	1,16	0,96	13 805	1,25	20	1,21	1,00	14 462	1	17	1,27	1,05	15 119	0,75	13
	6			20 707	7	43			21 693	7	42			22 679	7	42
	8			27 609	9	45			28 924	8	44			30 239	7	43
	10			34 511	16	53			36 155	15	52			37 798	14	52
600	4	1,26	1,05	15 060	1,25	20	1,32	1,10	15 777	1	17	1,38	1,15	16 494	0,75	14
	6			22 589	7	43			23 665	7	43			24 741	7	42
	8			30 119	12	49			31 553	11	49			32 988	11	48
	10			37 649	19	55			39 442	18	55			41 234	17	55
650	4	1,37	1,13	16 314	1,25	20	1,43	1,19	17 091	1	18	1,50	1,24	17 868	0,75	14
	6			24 472	7	43			25 637	7	43			26 802	7	43
	8			32 629	12	49			34 183	11	49			35 736	11	49
	10			40 786	19	56			42 728	18	55			44 671	17	55
700	4	1,47	1,22	17 569	1,25	21	1,54	1,28	18 406	1	18	1,61	1,34	19 243	0,75	15
	6			26 354	4	34			27 609	3	32			28 864	3	30
	8			35 139	12	50			36 812	11	49			38 485	11	49
	10			43 924	15	53			46 015	14	52			48 107	13	52
750	4	1,58	1,31	18 824	1,25	21	1,65	1,37	19 721	1	18	1,73	1,43	20 617	0,75	15
	6			28 237	4	34			29 581	3	33			30 926	3	30
	8			37 649	12	50			39 442	11	50			41 234	11	49
	10			47 061	15	53			49 302	14	53			51 543	13	52
800	4	1,68	1,39	20 079	1,25	21	1,76	1,46	21 036	1	19	1,84	1,53	21 992	0,75	15
	6			30 119	6	42			31 553	6	42			32 988	6	42
	8			40 159	12	50			42 071	11	50			43 983	11	49
	10			50 198	18	56			52 589	17	56			54 979	16	55
850	4	1,79	1,48	21 334	4	37	1,87	1,55	22 350	4	37	1,96	1,62	23 366	4	37
	6			32 001	6	43			33 525	6	42			35 049	6	42
	8			42 669	14	53			44 700	14	53			46 732	14	53
	10			53 336	21	58			55 876	20	58			58 415	20	58
900	4	1,89	1,57	22 589	4	37	1,98	1,64	23 665	4	37	2,07	1,72	24 741	4	37
	6			33 884	6	43			35 497	6	43			37 111	6	42
	8			45 179	11	50			47 330	10	49			49 481	10	49
	10			56 473	17	56			59 162	16	55			61 852	15	55
950	4	2,00	1,66	23 844	4	37	2,09	1,73	24 980	4	37	2,19	1,81	26 115	4	38
	6			35 766	6	43			37 470	6	43			39 173	6	42
	8			47 688	9	47			49 959	8	46			52 230	7	46
	10			59 611	15	54			62 449	14	54			65 288	13	53
1000	4	2,10	1,74	25 099	4	37	2,20	1,83	26 294	4	38	2,30	1,91	27 490	4	38
	6			37 649	6	43			39 442	6	43			41 234	6	43
	8			50 198	7	44			52 589	6	43			54 979	5	41
	10			62 748	13	53			65 736	12	52			68 724	11	51
1050	4	2,21	1,83	26 354	4	38	2,31	1,92	27 609	4	38	2,42	2,00	28 864	4	38
	6			39 531	6	44			41 414	6	43			43 296	6	43
	8			52 708	7	45			55 218	6	43			57 728	5	42
	10			65 885	13	53			69 023	12	52			72 160	11	51
1100	4	2,31	1,92	27 609	4	38	2,42	2,01	28 924	4	39	2,53	2,10	30 239	4	39
	6			41 414	6	44			43 386	6	44			45 358	6	43
	8			55 218	7	45			57 848	6	44			60 477	5	42
	10			69 023	13	53			72 310	12	53			75 596	11	52

17.7 | Damper active surface quick selection table [m2] (FREE AREA – APERTURE SIZES IN MM AND AREA IN MSQ)

Active surface a [m²]		Width Bo [mm]																
		395	445	495	545	595	645	695	745	795	845	895	945	995	1045	1095	1145	1195
Height Ho [mm]	680	0.18	0.21	0.24	0.27	0.3	0.33	0.36	0.39	0.42	0.45	0.48	0.51	0.54	0.57	0.6	0.63	0.66
	780	0.21	0.25	0.28	0.32	0.35	0.39	0.42	0.46	0.49	0.53	0.56	0.6	0.63	0.67	0.7	0.74	0.77
	880	0.24	0.28	0.32	0.36	0.4	0.44	0.48	0.52	0.56	0.6	0.64	0.68	0.72	0.76	0.8	0.84	0.88
	980	0.27	0.32	0.36	0.41	0.45	0.5	0.54	0.59	0.63	0.68	0.72	0.77	0.81	0.86	0.9	0.95	0.99
	1080	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	1.05	1.1
	1180	0.33	0.39	0.44	0.5	0.55	0.61	0.66	0.72	0.77	0.83	0.88	0.94	0.99	1.05	1.1	1.16	1.21
	1280	0.36	0.42	0.48	0.54	0.6	0.66	0.72	0.78	0.84	0.9	0.96	1.02	1.08	1.14	1.2	1.26	1.32
	1380	0.39	0.46	0.52	0.59	0.65	0.72	0.78	0.85	0.91	0.98	1.04	1.11	1.17	1.24	1.3	1.37	1.43
	1480	0.42	0.49	0.56	0.63	0.7	0.77	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	1.4	1.47	1.54
	1580	0.45	0.53	0.6	0.68	0.75	0.83	0.9	0.98	1.05	1.13	1.2	1.28	1.35	1.43	1.5	1.58	1.65
	1680	0.48	0.56	0.64	0.72	0.8	0.88	0.96	1.04	1.12	1.2	1.28	1.36	1.44	1.52	1.6	1.68	1.76
	1780	0.51	0.6	0.68	0.77	0.85	0.94	1.02	1.11	1.19	1.28	1.36	1.45	1.53	1.62	1.7	1.79	1.87
	1880	0.54	0.63	0.72	0.81	0.9	0.99	1.08	1.17	1.26	1.35	1.44	1.53	1.62	1.71	1.8	1.89	1.98
	1980	0.57	0.67	0.76	0.86	0.95	1.05	1.14	1.24	1.33	1.43	1.52	1.62	1.71	1.81	1.9	2	2.09
	2080	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2
	2180	0.63	0.74	0.84	0.95	1.05	1.16	1.26	1.37	1.47	1.58	1.68	1.79	1.89	2	2.1	2.21	2.31
	2280	0.66	0.77	0.88	0.99	1.1	1.21	1.32	1.43	1.54	1.65	1.76	1.87	1.98	2.09	2.2	2.31	2.42
	2380	0.69	0.81	0.92	1.04	1.15	1.27	1.38	1.5	1.61	1.73	1.84	1.96	2.07	2.19	2.3	2.42	2.53

Bo - hole width
Ho - hole height

17.8 | Sealed damper blade tightness according to EN1751



17.9 | Estimated weight of the mcr WIP LD dampers [kg]

Height H [mm]	Width B [mm]								
	300	400	500	600	700	800	900	1000	1100
600	20	22	25	28	31	33	36	39	41
700	22	24	28	30	33	36	38	41	42
800	24	27	30	32	35	38	41	43	44
900	26	29	32	35	37	40	43	46	47
1000	29	31	34	37	40	42	45	48	49
1100	31	33	37	39	42	45	47	50	51
1200	33	36	39	41	44	47	50	52	53
1300	35	38	41	43	46	49	52	55	56
1400	38	40	43	46	49	51	54	57	58
1500	40	42	46	48	51	54	56	59	60
1600	42	45	48	50	53	56	59	61	63
1700	44	47	50	52	55	58	61	64	65
1800	47	49	52	55	57	60	63	66	69
1900	49	51	55	57	60	63	65	68	71
2000	51	54	57	59	62	64	67	70	72
2100	52	55	58	60	63	65	68	71	75
2200	55	57	60	63	66	68	71	74	77
2300	56	59	62	65	68	70	73	76	79

17.10 | Accessories

17.10.1 | mcr MWS system masking element



MWS system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility. Bolts embedded in the damper are used to attach the masking grille body. After installation, an outer frame is mounted on the masking grille body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

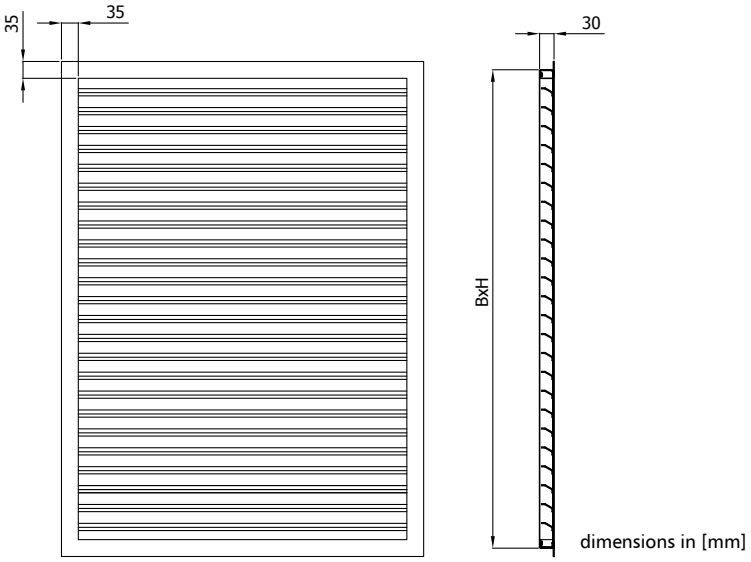
mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

Marking:

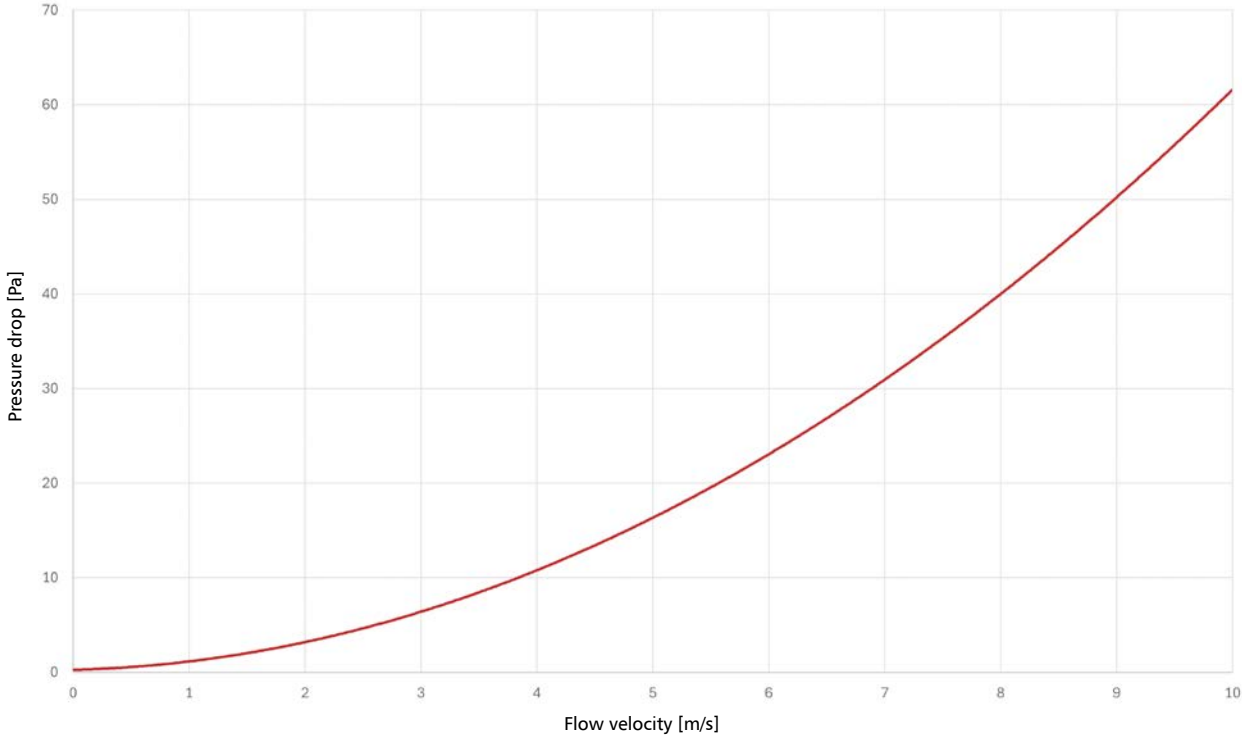
mcr MWS / B x H / X

- Additional parameters
- Width x height
- Damper type

X – material
[no symbol] – RAL9010
RALXXXX – selected color code from the RAL palette
NONE – unpainted masking element



»Pressure drop on masking grilles



17.10.2 | mcr MWS masking grilles technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]
300	4	0.21	0.11	1500	9	0.25	0.12	1800	10	0.28	0.14	2000	10
	6			2300	22			2700	23			3000	23
	8			3100	39			3500	39			4000	41
	10			3900	62			4400	62			5000	64
350	4	0.25	0.12	1800	10	0.28	0.14	2000	10	0.32	0.16	2300	10
	6			2700	22			3100	23			3400	22
	8			3600	40			4100	40			4600	41
	10			4400	60			5100	62			5700	62
400	4	0.28	0.14	2000	10	0.32	0.16	2300	10	0.36	0.18	2600	10
	6			3000	22			3500	23			3900	23
	8			4000	39			4600	40			5200	40
	10			5000	60			5800	63			6500	63
450	4	0.31	0.16	2200	9	0.36	0.18	2600	10	0.41	0.20	2900	10
	6			3400	22			3900	23			4400	23
	8			4500	39			5200	41			5800	40
	10			5600	61			6400	61			7300	64
500	4	0.34	0.17	2500	10	0.40	0.20	2800	10	0.45	0.22	3200	10
	6			3700	22			4300	23			4800	23
	8			5000	40			5700	40			6400	40
	10			6200	61			7100	62			8000	63
550	4	0.38	0.19	2700	10	0.43	0.22	3100	10	0.49	0.24	3500	10
	6			4100	22			4700	23			5300	23
	8			5400	38			6200	39			7000	40
	10			6800	61			7800	62			8800	63
600	4	0.41	0.20	3000	10	0.47	0.24	3400	10	0.53	0.27	3800	10
	6			4400	22			5100	23			5700	23
	8			5900	39			6800	40			7600	40
	10			7400	61			8500	63			9500	63
650	4	0.44	0.22	3200	10	0.51	0.25	3700	10	0.58	0.29	4100	10
	6			4800	22			5500	23			6200	23
	8			6400	39			7300	40			8200	40
	10			8000	61			9100	62			10300	63
700	4	0.47	0.24	3400	10	0.55	0.27	3900	10	0.62	0.31	4400	10
	6			5100	22			5900	23			6600	22
	8			6800	38			7800	39			8900	41
	10			8600	62			9800	62			11100	64
750	4	0.51	0.25	3700	10	0.58	0.29	4200	10	0.66	0.33	4700	10
	6			5500	22			6300	22			7100	23
	8			7300	39			8400	40			9500	41
	10			9100	60			10500	62			11800	63
800	4	0.54	0.27	3900	10	0.62	0.31	4500	10	0.71	0.35	5000	10
	6			5800	22			6700	22			7600	23
	8			7800	39			8900	40			10100	41
	10			9700	61			11200	63			12600	63
850	4	0.57	0.29	4100	10	0.66	0.33	4700	10	0.75	0.37	5300	10
	6			6200	22			7100	22			8000	23
	8			8300	39			9500	40			10700	41
	10			10300	61			11800	62			13300	63
900	4	0.60	0.30	4400	10	0.70	0.35	5000	10	0.79	0.39	5600	10
	6			6500	22			7500	22			8500	23
	8			8700	39			10000	40			11300	41
	10			10900	61			12500	62			14100	63
950	4	0.64	0.32	4600	10	0.73	0.37	5300	10	0.83	0.41	5900	10
	6			6900	22			7900	22			8900	23
	8			9200	39			10500	39			11900	41
	10			11500	61			13200	62			14900	64
1000	4	0.67	0.34	4800	10	0.77	0.38	5500	10	0.88	0.43	6300	10
	6			7200	22			8300	22			9400	23
	8			9700	39			11100	40			12500	40
	10			12100	61			13900	63			15600	63
1050	4	0.70	0.35	5100	10	0.81	0.40	5800	10	0.92	0.46	6600	10
	6			7600	22			8700	22			9800	23
	8			10100	39			11600	40			13100	40
	10			12700	61			14500	62			16400	63
1100	4	0.73	0.37	5300	10	0.85	0.42	6100	10	0.96	0.48	6900	10
	6			8000	22			9100	22			10300	23
	8			10600	39			12200	40			13700	40
	10			13300	61			15200	62			17100	63

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]
300		4	0.31	0.15	2200	10	0.34	0.17	2400	10	0.38	0.19	2700	11
		6			3300	23			3700	24			4000	23
		8			4400	40			4900	42			5300	41
		10			5600	65			6100	64			6700	66
350		4	0.36	0.18	2600	11	0.40	0.20	2800	10	0.44	0.21	3100	11
		6			3800	23			4200	23			4600	23
		8			5100	41			5600	41			6200	42
		10			6400	64			7100	66			7700	65
400		4	0.41	0.20	2900	10	0.45	0.22	3200	10	0.49	0.24	3500	11
		6			4300	23			4800	23			5200	23
		8			5800	41			6400	42			7000	42
		10			7200	63			8000	65			8700	65
450		4	0.45	0.22	3200	10	0.50	0.25	3600	11	0.55	0.27	3900	10
		6			4900	24			5400	24			5800	23
		8			6500	41			7100	41			7800	42
		10			8100	64			8900	65			9700	65
500		4	0.50	0.25	3600	10	0.56	0.27	3900	10	0.61	0.30	4300	10
		6			5400	23			5900	23			6500	24
		8			7200	42			7900	42			8600	42
		10			8900	64			9900	65			10800	66
550		4	0.55	0.27	3900	10	0.61	0.30	4300	10	0.67	0.33	4700	10
		6			5900	23			6500	24			7100	24
		8			7800	41			8600	41			9400	42
		10			9800	64			10800	65			11800	66
600		4	0.60	0.30	4300	10	0.66	0.33	4700	10	0.72	0.36	5100	10
		6			6400	23			7000	23			7700	24
		8			8500	41			9400	42			10200	42
		10			10600	64			11700	65			12800	65
650		4	0.65	0.32	4600	10	0.71	0.35	5100	11	0.78	0.38	5500	10
		6			6900	23			7600	23			8300	24
		8			9200	41			10100	41			11100	42
		10			11500	64			12700	65			13800	65
700		4	0.69	0.34	4900	10	0.77	0.38	5400	10	0.84	0.41	5900	10
		6			7400	23			8200	24			8900	24
		8			9900	41			10900	42			11900	42
		10			12300	64			13600	65			14800	65
750		4	0.74	0.37	5300	10	0.82	0.40	5800	10	0.90	0.44	6300	10
		6			7900	23			8700	23			9500	23
		8			10500	41			11600	41			12700	42
		10			13200	64			14500	65			15900	66
800		4	0.79	0.39	5600	10	0.87	0.43	6200	10	0.95	0.47	6800	11
		6			8400	23			9300	23			10100	23
		8			11200	41			12400	42			13500	42
		10			14000	64			15400	64			16900	66
850		4	0.84	0.41	5900	10	0.92	0.46	6600	11	1.01	0.50	7200	11
		6			8900	23			9800	23			10700	23
		8			11900	41			13100	41			14300	42
		10			14900	64			16400	65			17900	65
900		4	0.88	0.44	6300	10	0.98	0.48	6900	10	1.07	0.53	7600	11
		6			9400	23			10400	23			11400	24
		8			12600	41			13900	42			15100	42
		10			15700	64			17300	65			18900	65
950		4	0.93	0.46	6600	10	1.03	0.51	7300	10	1.13	0.55	8000	11
		6			9900	23			10900	23			12000	24
		8			13200	41			14600	41			16000	42
		10			16600	64			18200	64			19900	65
1000		4	0.98	0.48	7000	10	1.08	0.53	7700	10	1.18	0.58	8400	11
		6			10400	23			11500	23			12600	24
		8			13900	41			15300	41			16800	42
		10			17400	64			19200	65			21000	66
1050		4	1.03	0.51	7300	10	1.13	0.56	8000	10	1.24	0.61	8800	10
		6			11000	23			12100	23			13200	24
		8			14600	41			16100	42			17600	42
		10			18300	64			20100	65			22000	66
1100		4	1.07	0.53	7600	10	1.19	0.58	8400	10	1.30	0.64	9200	10
		6			11500	23			12600	23			13800	24
		8			15300	41			16800	41			18400	42
		10			19100	64			21000	65			23000	65

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]
300	4	0.41	0.20	2900	11	0.44	0.22	3100	10	0.48	0.23	3400	11
	6			4400	24			4700	24			5000	24
	8			5800	42			6300	43			6700	43
	10			7300	67			7800	66			8400	67
350	4	0.47	0.23	3300	10	0.51	0.25	3600	11	0.55	0.27	3900	11
	6			5000	24			5400	24			5800	24
	8			6700	42			7200	42			7700	42
	10			8400	67			9000	66			9700	67
400	4	0.54	0.26	3800	11	0.58	0.28	4100	11	0.62	0.30	4400	11
	6			5700	24			6100	24			6600	24
	8			7600	42			8200	43			8800	43
	10			9500	66			10200	66			10900	66
450	4	0.60	0.29	4200	10	0.65	0.32	4600	11	0.69	0.34	4900	11
	6			6300	23			6800	24			7300	24
	8			8500	43			9100	42			9800	43
	10			10600	66			11400	66			12200	66
500	4	0.66	0.32	4700	11	0.71	0.35	5000	10	0.77	0.38	5400	11
	6			7000	24			7600	24			8100	24
	8			9300	42			10100	43			10800	43
	10			11700	66			12600	66			13500	67
550	4	0.72	0.36	5100	10	0.78	0.38	5500	11	0.84	0.41	5900	11
	6			7700	24			8300	24			8900	24
	8			10200	42			11000	42			11800	43
	10			12800	66			13800	67			14800	67
600	4	0.79	0.39	5600	11	0.85	0.42	6000	11	0.91	0.45	6400	11
	6			8300	24			9000	24			9600	24
	8			11100	42			12000	43			12800	42
	10			13900	66			15000	67			16100	67
650	4	0.85	0.42	6000	11	0.92	0.45	6500	11	0.98	0.48	6900	11
	6			9000	24			9700	24			10400	24
	8			12000	42			12900	42			13900	43
	10			15000	66			16200	67			17300	66
700	4	0.91	0.45	6400	10	0.98	0.48	6900	10	1.06	0.52	7400	11
	6			9700	24			10400	24			11200	24
	8			12900	42			13900	43			14900	43
	10			16100	66			17400	67			18600	67
750	4	0.97	0.48	6900	11	1.05	0.52	7400	11	1.13	0.55	8000	11
	6			10300	24			11100	24			11900	24
	8			13800	42			14800	42			15900	43
	10			17200	66			18500	66			19900	67
800	4	1.04	0.51	7300	10	1.12	0.55	7900	11	1.20	0.59	8500	11
	6			11000	24			11800	24			12700	24
	8			14600	42			15800	42			16900	42
	10			18300	66			19700	66			21200	67
850	4	1.10	0.54	7800	11	1.19	0.58	8400	11	1.27	0.62	9000	11
	6			11700	24			12600	24			13500	24
	8			15500	42			16700	42			18000	43
	10			19400	66			20900	66			22500	67
900	4	1.16	0.57	8200	11	1.25	0.61	8900	11	1.35	0.66	9500	11
	6			12300	24			13300	24			14200	24
	8			16400	42			17700	42			19000	43
	10			20500	66			22100	66			23700	67
950	4	1.22	0.60	8700	11	1.32	0.65	9300	11	1.42	0.69	10000	11
	6			13000	24			14000	24			15000	24
	8			17300	42			18700	43			20000	43
	10			21600	66			23300	66			25000	67
1000	4	1.29	0.63	9100	11	1.39	0.68	9800	11	1.49	0.73	10500	11
	6			13600	24			14700	24			15800	24
	8			18200	42			19600	42			21000	43
	10			22700	66			24500	66			26300	67
1050	4	1.35	0.66	9500	10	1.46	0.71	10300	11	1.56	0.77	11000	11
	6			14300	24			15400	24			16500	24
	8			19100	42			20600	43			22100	43
	10			23800	66			25700	66			27600	67
1100	4	1.41	0.69	10000	11	1.52	0.75	10800	11	1.64	0.80	11500	11
	6			15000	24			16100	24			17300	24
	8			20000	42			21500	42			23100	43
	10			24900	66			26900	66			28800	66

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1500 S_k [m²]	1500 S_e [m²]	1500 Q [m³/h]	1500 d_p [PA]	1600 S_k [m²]	1600 S_e [m²]	1600 Q [m³/h]	1600 d_p [PA]	1700 S_k [m²]	1700 S_e [m²]	1700 Q [m³/h]	1700 d_p [PA]
300	4	0.51	0.25	3600	11	0.54	0.26	3800	11	0.57	0.28	4000	11
	6			5400	24			5700	24			6100	25
	8			7200	43			7600	43			8100	44
	10			9000	68			9500	67			10100	68
350	4	0.59	0.29	4100	11	0.62	0.30	4400	11	0.66	0.32	4700	11
	6			6200	24			6600	24			7000	24
	8			8300	43			8800	43			9300	43
	10			10300	67			11000	68			11600	67
400	4	0.66	0.32	4700	11	0.71	0.35	5000	11	0.75	0.37	5300	11
	6			7000	24			7500	25			7900	24
	8			9300	42			9900	43			10500	43
	10			11700	67			12400	67			13200	68
450	4	0.74	0.36	5200	11	0.79	0.39	5500	11	0.84	0.41	5900	11
	6			7800	24			8300	24			8800	24
	8			10400	43			11100	43			11800	44
	10			13000	67			13900	68			14700	68
500	4	0.82	0.40	5800	11	0.87	0.43	6100	11	0.92	0.45	6500	11
	6			8600	24			9200	24			9700	24
	8			11500	43			12300	43			13000	43
	10			14400	67			15300	67			16200	67
550	4	0.90	0.44	6300	11	0.95	0.47	6700	11	1.01	0.49	7100	11
	6			9500	24			10100	24			10700	24
	8			12600	43			13400	43			14200	43
	10			15800	67			16800	67			17800	68
600	4	0.97	0.48	6900	11	1.04	0.51	7300	11	1.10	0.54	7700	11
	6			10300	24			10900	24			11600	24
	8			13700	43			14600	43			15500	44
	10			17100	67			18200	67			19300	67
650	4	1.05	0.51	7400	11	1.12	0.55	7900	11	1.19	0.58	8300	11
	6			11100	24			11800	24			12500	24
	8			14800	43			15700	43			16700	43
	10			18500	67			19700	67			20900	68
700	4	1.13	0.55	7900	11	1.20	0.59	8500	11	1.28	0.62	9000	11
	6			11900	24			12700	24			13400	24
	8			15900	43			16900	43			17900	43
	10			19900	67			21100	67			22400	68
750	4	1.21	0.59	8500	11	1.28	0.63	9000	11	1.36	0.66	9600	11
	6			12700	24			13500	24			14400	24
	8			17000	43			18100	43			19100	43
	10			21200	67			22600	67			23900	67
800	4	1.28	0.63	9000	11	1.37	0.67	9600	11	1.45	0.71	10200	11
	6			13600	24			14400	24			15300	24
	8			18100	43			19200	43			20400	43
	10			22600	67			24000	67			25500	68
850	4	1.36	0.67	9600	11	1.45	0.71	10200	11	1.54	0.75	10800	11
	6			14400	24			15300	24			16200	24
	8			19200	43			20400	43			21600	43
	10			24000	67			25500	67			27000	68
900	4	1.44	0.70	10100	11	1.53	0.75	10800	11	1.63	0.79	11400	11
	6			15200	24			16200	24			17100	24
	8			20300	43			21500	43			22800	43
	10			25300	67			26900	67			28500	67
950	4	1.52	0.74	10700	11	1.62	0.79	11400	11	1.71	0.84	12000	11
	6			16000	24			17000	24			18000	24
	8			21400	43			22700	43			24100	43
	10			26700	67			28400	67			30100	68
1000	4	1.59	0.78	11200	11	1.70	0.83	11900	11	1.80	0.88	12600	11
	6			16800	24			17900	24			19000	24
	8			22500	43			23900	43			25300	43
	10			28100	67			29800	67			31600	67
1050	4	1.67	0.82	11800	11	1.78	0.87	12500	11	1.89	0.92	13300	11
	6			17700	24			18800	24			19900	24
	8			23500	43			25000	43			26500	43
	10			29400	67			31300	67			33200	68
1100	4	1.75	0.86	12300	11	1.86	0.91	13100	11	1.98	0.96	13900	11
	6			18500	24			19600	24			20800	24
	8			24600	43			26200	43			27800	43
	10			30800	67			32700	67			34700	68

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]
300	4	0.61	0.30	4300	11	0.64	0.31	4500	11	0.67	0.33	4700	11
	6			6400	24			6700	24			7100	25
	8			8500	43			9000	44			9400	43
	10			10700	68			11200	68			11800	68
350	4	0.70	0.34	4900	11	0.74	0.36	5200	11	0.78	0.38	5400	11
	6			7400	25			7800	25			8200	25
	8			9800	43			10300	43			10900	44
	10			12300	68			12900	68			13600	68
400	4	0.79	0.39	5600	11	0.84	0.41	5900	11	0.88	0.43	6200	11
	6			8300	24			8800	25			9200	24
	8			11100	43			11700	43			12300	44
	10			13900	68			14600	68			15400	68
450	4	0.89	0.43	6200	11	0.93	0.45	6500	11	0.98	0.48	6900	11
	6			9300	24			9800	24			10300	25
	8			12400	43			13100	44			13700	43
	10			15500	68			16400	68			17200	68
500	4	0.98	0.48	6900	11	1.03	0.50	7200	11	1.08	0.53	7600	11
	6			10300	24			10800	24			11400	25
	8			13700	43			14500	44			15200	44
	10			17200	68			18100	68			19000	68
550	4	1.07	0.52	7500	11	1.13	0.55	7900	11	1.19	0.58	8300	11
	6			11300	25			11900	25			12500	25
	8			15000	43			15800	43			16600	44
	10			18800	68			19800	68			20800	68
600	4	1.16	0.57	8200	11	1.23	0.60	8600	11	1.29	0.63	9000	11
	6			12200	24			12900	25			13500	24
	8			16300	43			17200	44			18100	44
	10			20400	68			21500	68			22600	68
650	4	1.26	0.61	8800	11	1.32	0.64	9300	11	1.39	0.68	9700	11
	6			13200	24			13900	24			14600	24
	8			17600	43			18600	44			19500	44
	10			22000	68			23200	68			24400	68
700	4	1.35	0.66	9500	11	1.42	0.69	10000	11	1.49	0.73	10500	11
	6			14200	24			14900	24			15700	25
	8			18900	43			19900	43			20900	44
	10			23600	68			24900	68			26200	68
750	4	1.44	0.70	10100	11	1.52	0.74	10600	11	1.60	0.78	11200	11
	6			15200	25			16000	25			16800	25
	8			20200	43			21300	44			22400	44
	10			25300	68			26600	68			28000	68
800	4	1.53	0.75	10800	11	1.62	0.79	11300	11	1.70	0.83	11900	11
	6			16100	24			17000	24			17900	25
	8			21500	43			22700	44			23800	44
	10			26900	68			28300	68			29800	68
850	4	1.63	0.79	11400	11	1.71	0.83	12000	11	1.80	0.88	12600	11
	6			17100	24			18000	24			18900	24
	8			22800	43			24000	43			25200	43
	10			28500	68			30000	68			31600	68
900	4	1.72	0.84	12100	11	1.81	0.88	12700	11	1.90	0.93	13300	11
	6			18100	24			19000	24			20000	25
	8			24100	43			25400	44			26700	44
	10			30100	68			31700	68			33400	68
950	4	1.81	0.88	12700	11	1.91	0.93	13400	11	2.01	0.98	14100	11
	6			19100	25			20100	25			21100	25
	8			25400	43			26800	44			28100	44
	10			31800	68			33500	68			35100	68
1000	4	1.90	0.93	13400	11	2.01	0.98	14100	11	2.11	1.03	14800	11
	6			20000	24			21100	24			22200	25
	8			26700	43			28100	43			29600	44
	10			33400	68			35200	68			36900	68
1050	4	2.00	0.97	14000	11	2.10	1.02	14800	11	2.21	1.08	15500	11
	6			21000	24			22100	24			23200	24
	8			28000	43			29500	44			31000	44
	10			35000	68			36900	68			38700	68
1100	4	2.09	1.02	14700	11	2.20	1.07	15400	11	2.31	1.13	16200	11
	6			22000	24			23200	25			24300	24
	8			29300	43			30900	44			32400	44
	10			36600	68			38600	68			40500	68

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

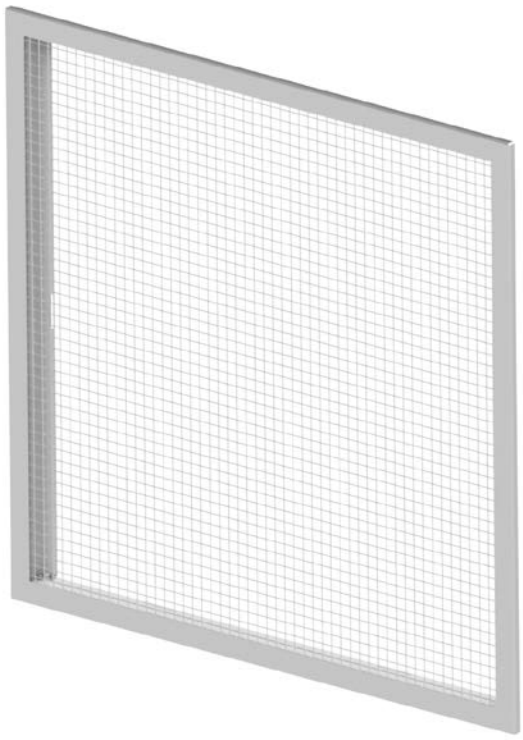
B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	2100 S_k [m²]	2100 S_e [m²]	2100 Q [m³/h]	2100 d_p [PA]	2200 S_k [m²]	2200 S_e [m²]	2200 Q [m³/h]	2200 d_p [PA]	2300 S_k [m²]	2300 S_e [m²]	2300 Q [m³/h]	2300 d_p [PA]
	300	4	0.71	0.34	4900	11	0.74	0.36	5200	11	0.77	0.37	5400	11
		6			7400	25			7800	25			8100	25
		8			9900	44			10300	44			10800	44
		10			12400	69			12900	68			13500	69
	350	4	0.81	0.40	5700	11	0.85	0.41	6000	11	0.89	0.43	6200	11
		6			8500	24			8900	24			9300	25
		8			11400	44			11900	44			12400	44
		10			14200	68			14900	69			15500	68
	400	4	0.92	0.45	6400	11	0.96	0.47	6700	11	1.01	0.49	7000	11
		6			9700	25			10100	25			10600	25
		8			12900	44			13500	44			14100	44
		10			16100	68			16900	69			17600	69
	450	4	1.03	0.50	7200	11	1.08	0.52	7500	11	1.12	0.55	7900	11
		6			10800	25			11300	25			11800	25
		8			14400	44			15100	44			15700	44
		10			18000	68			18800	68			19700	69
	500	4	1.14	0.55	8000	11	1.19	0.58	8300	11	1.24	0.60	8700	11
		6			11900	24			12500	25			13000	25
		8			15900	44			16600	44			17400	44
		10			19900	68			20800	68			21700	69
	550	4	1.24	0.60	8700	11	1.30	0.63	9100	11	1.36	0.66	9500	11
		6			13100	25			13700	25			14300	25
		8			17400	44			18200	44			19000	44
		10			21800	69			22800	69			23800	69
	600	4	1.35	0.66	9500	11	1.41	0.69	9900	11	1.48	0.72	10300	11
		6			14200	25			14800	25			15500	25
		8			18900	44			19800	44			20700	44
		10			23700	69			24700	68			25800	69
	650	4	1.46	0.71	10200	11	1.53	0.74	10700	11	1.59	0.77	11200	11
		6			15300	25			16000	25			16700	25
		8			20400	44			21400	44			22300	44
		10			25500	68			26700	68			27900	69
	700	4	1.57	0.76	11000	11	1.64	0.80	11500	11	1.71	0.83	12000	11
		6			16500	25			17200	25			18000	25
		8			21900	44			22900	44			23900	44
		10			27400	68			28700	69			29900	68
	750	4	1.67	0.81	11700	11	1.75	0.85	12300	11	1.83	0.89	12800	11
		6			17600	25			18400	25			19200	25
		8			23400	44			24500	44			25600	44
		10			29300	68			30600	68			32000	69
	800	4	1.78	0.87	12500	11	1.86	0.91	13000	11	1.95	0.95	13600	11
		6			18700	25			19600	25			20400	25
		8			25000	44			26100	44			27200	44
		10			31200	68			32600	68			34000	68
	850	4	1.89	0.92	13200	11	1.98	0.96	13800	11	2.06	1.00	14400	11
		6			19800	24			20800	25			21700	25
		8			26500	44			27700	44			28900	44
		10			33100	68			34600	69			36100	69
	900	4	2.00	0.97	14000	11	2.09	1.02	14600	11	2.18	1.06	15300	11
		6			21000	25			21900	25			22900	25
		8			28000	44			29200	44			30500	44
		10			35000	69			36600	69			38200	69
	950	4	2.10	1.02	14700	11	2.20	1.07	15400	11	2.30	1.12	16100	11
		6			22100	25			23100	25			24100	25
		8			29500	44			30800	44			32200	44
		10			36800	68			38500	68			40200	69
	1000	4	2.21	1.08	15500	11	2.31	1.12	16200	11	2.42	1.17	16900	11
		6			23200	25			24300	25			25400	25
		8			31000	44			32400	44			33800	44
		10			38700	68			40500	69			42300	69
	1050	4	2.32	1.13	16200	11	2.43	1.18	17000	11	2.53	1.23	17700	11
		6			24400	25			25500	25			26600	25
		8			32500	44			34000	44			35500	44
		10			40600	68			42500	69			44300	69
	1100	4	2.43	1.18	17000	11	2.54	1.23	17800	11	2.65	1.29	18600	11
		6			25500	25			26700	25			27800	25
		8			34000	44			35500	44			37100	44
		10			42500	68			44400	68			46400	69

17.10.3 | mcr MWSP system masking element



MWSP system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. Bolts embedded in the damper are used to attach the masking grille body. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

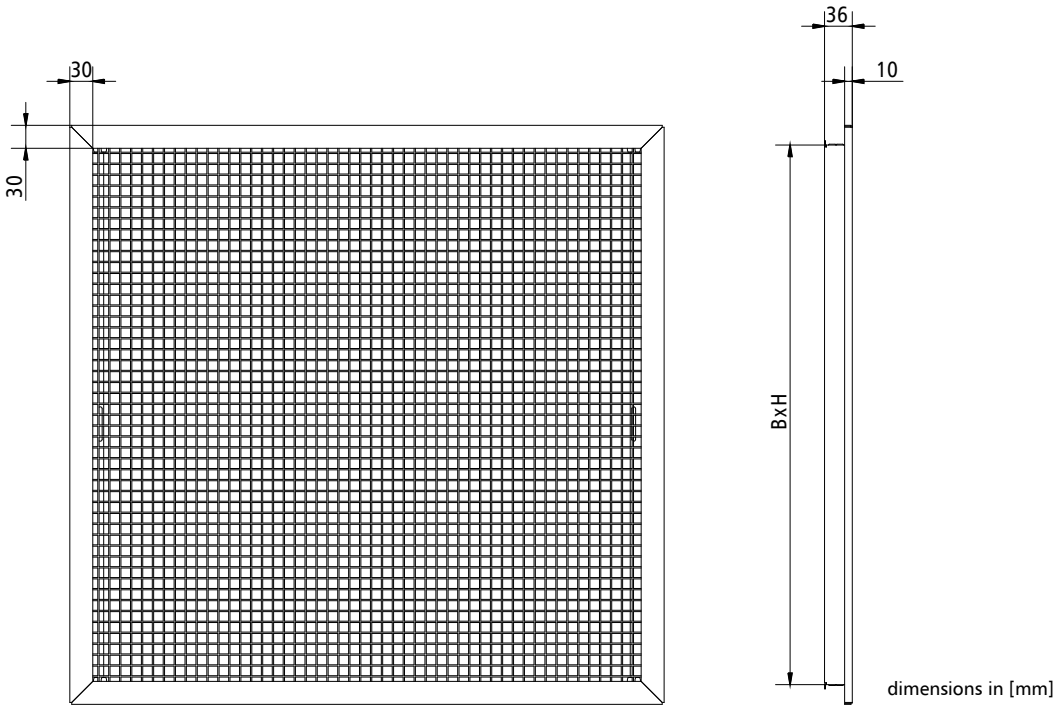
Marking:

mcr MWSP / B x H / X

- Additional parameters
- Width x height
- Damper type

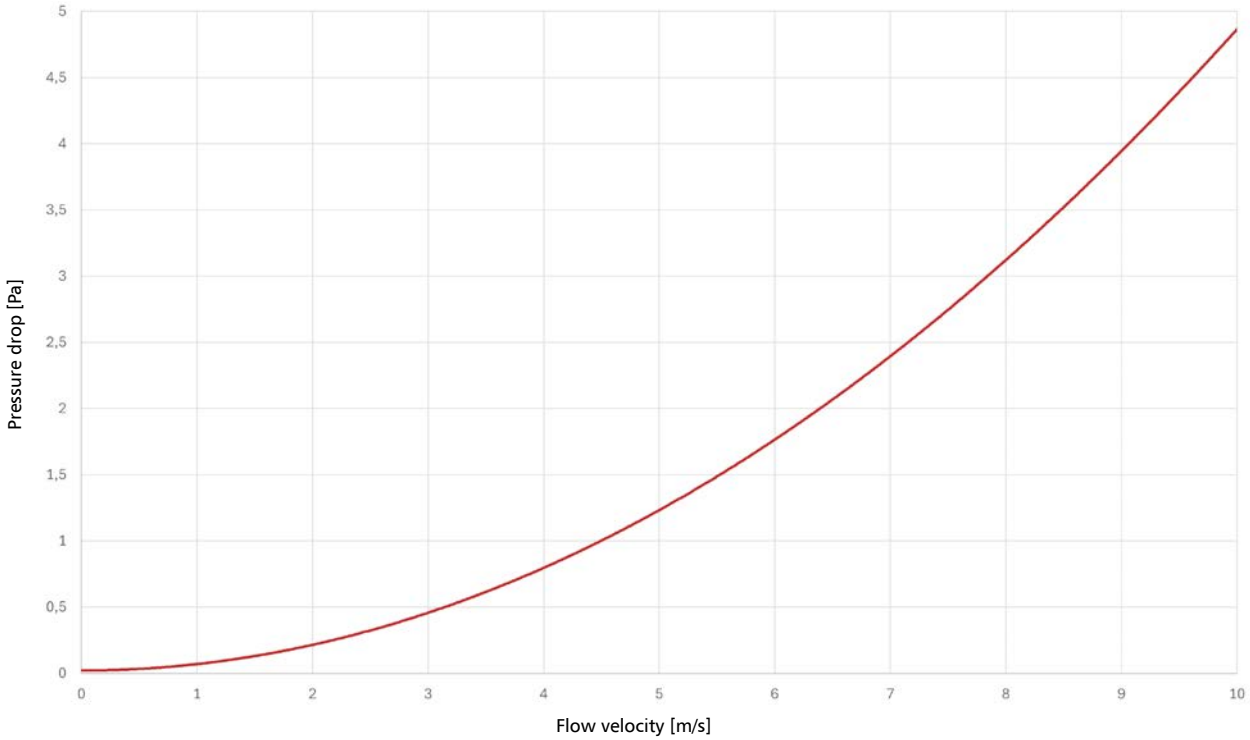
X – material
[no symbol] – RAL9010
RALXXXX – selected color code from the RAL palette
NONE – unpainted masking element

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems



dimensions in [mm]

» Pressure drop on masking grilles



mercor

17.10.4 | mcr MWSP masking grilles technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]
300	4	0.22	0.17	2500	1	0.254	0.20	2900	1	0.287	0.23	3200	1
	6			3700	2			4300	2			4900	2
	8			5000	3			5700	3			6500	3
	10			6200	5			7200	5			8100	5
350	4	0.25	0.20	2900	1	0.291	0.23	3300	1	0.330	0.26	3800	1
	6			4300	1			5000	1			5700	1
	8			5800	3			6700	3			7600	3
	10			7200	4			8300	4			9500	4
400	4	0.28	0.22	3200	1	0.329	0.26	3700	1	0.372	0.29	4200	1
	6			4800	2			5500	2			6300	2
	8			6400	3			7400	3			8400	3
	10			8000	5			9200	5			10500	5
450	4	0.32	0.25	3600	1	0.366	0.29	4200	1	0.415	0.33	4700	1
	6			5400	1			6300	2			7100	2
	8			7200	3			8300	3			9500	3
	10			9100	4			10400	4			11800	4
500	4	0.35	0.27	3900	1	0.404	0.31	4500	1	0.457	0.36	5100	1
	6			5900	2			6800	2			7700	2
	8			7900	3			9100	3			10300	3
	10			9800	5			11300	5			12800	5
550	4	0.38	0.30	4300	1	0.441	0.35	5000	1	0.500	0.39	5700	1
	6			6500	2			7500	2			8500	2
	8			8700	3			10000	3			11300	3
	10			10900	4			12500	4			14200	4
600	4	0.41	0.32	4700	1	0.479	0.37	5400	1	0.54	0.42	6100	1
	6			7000	2			8000	2			9100	2
	8			9300	3			10700	3			12200	3
	10			11600	5			13400	5			15200	5
650	4	0.45	0.35	5100	1	0.516	0.41	5800	1	0.585	0.46	6600	1
	6			7600	2			8800	2			9900	2
	8			10100	3			11700	3			13200	3
	10			12700	4			14600	5			16500	5
700	4	0.48	0.37	5400	1	0.554	0.43	6200	1	0.627	0.49	7000	1
	6			8100	2			9300	2			10500	2
	8			10800	3			12400	3			14000	3
	10			13500	5			15500	5			17600	5
750	4	0.51	0.40	5800	1	0.591	0.46	6700	1	0.670	0.53	7600	1
	6			8700	2			10000	2			11300	2
	8			11600	3			13400	3			15100	3
	10			14500	5			16700	5			18900	5
800	4	0.54	0.42	6100	1	0.629	0.49	7000	1	0.712	0.55	8000	1
	6			9200	2			10600	2			11900	2
	8			12200	3			14100	3			15900	3
	10			15300	5			17600	5			19900	5
850	4	0.58	0.45	6500	1	0.666	0.52	7500	1	0.755	0.59	8500	1
	6			9800	2			11300	2			12800	2
	8			13000	3			15000	3			17000	3
	10			16300	5			18800	5			21300	5
900	4	0.61	0.47	6800	1	0.704	0.55	7900	1	0.797	0.62	8900	1
	6			10200	2			11800	2			13400	2
	8			13700	3			15700	3			17800	3
	10			17100	5			19700	5			22300	5
950	4	0.64	0.50	7200	1	0.741	0.58	8300	1	0.840	0.66	9500	1
	6			10900	2			12500	2			14200	2
	8			14500	3			16700	3			18900	3
	10			18100	5			20900	5			23600	5
1000	4	0.67	0.52	7600	1	0.779	0.60	8700	1	0.882	0.68	9900	1
	6			11300	2			13100	2			14800	2
	8			15100	3			17400	3			19700	3
	10			18900	5			21800	5			24600	5
1050	4	0.71	0.55	8000	1	0.816	0.64	9200	1	0.925	0.72	10400	1
	6			12000	2			13800	2			15600	2
	8			15900	3			18400	3			20800	3
	10			19900	5			23000	5			26000	5
1100	4	0.74	0.58	8300	1	0.854	0.66	9500	1	0.967	0.75	10800	1
	6			12400	2			14300	2			16200	2
	8			16600	3			19100	3			21600	3
	10			20700	5			23900	5			27000	5

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]
300		4	0.321	0.25	3600	1	0.355	0.28	4000	1	0.389	0.30	4400	1
		6			5400	2			6000	2			6600	2
		8			7200	3			8000	3			8700	3
		10			9000	5			10000	5			10900	5
350		4	0.369	0.29	4200	1	0.407	0.32	4700	1	0.446	0.35	5100	1
		6			6300	1			7000	1			7700	1
		8			8400	3			9300	3			10200	3
		10			10600	4			11700	4			12800	4
400		4	0.416	0.32	4700	1	0.460	0.36	5200	1	0.504	0.39	5600	1
		6			7000	2			7700	2			8500	2
		8			9300	3			10300	3			11300	3
		10			11700	5			12900	5			14100	5
450		4	0.464	0.37	5300	1	0.512	0.40	5800	1	0.561	0.44	6400	1
		6			7900	2			8700	2			9600	2
		8			10600	3			11700	3			12800	3
		10			13200	4			14600	4			15900	4
500		4	0.511	0.40	5700	1	0.565	0.44	6300	1	0.619	0.48	6900	1
		6			8600	2			9500	2			10400	2
		8			11500	3			12700	3			13900	3
		10			14300	5			15800	5			17300	5
550		4	0.559	0.44	6300	1	0.617	0.49	7000	1	0.676	0.53	7700	1
		6			9500	2			10500	2			11500	2
		8			12700	3			14000	3			15300	3
		10			15800	4			17500	5			19100	5
600		4	0.606	0.47	6800	1	0.670	0.52	7500	1	0.734	0.57	8200	1
		6			10200	2			11200	2			12300	2
		8			13600	3			15000	3			16400	3
		10			17000	5			18700	5			20500	5
650		4	0.654	0.51	7400	1	0.722	0.57	8200	1	0.791	0.62	8900	1
		6			11100	2			12200	2			13400	2
		8			14800	3			16300	3			17900	3
		10			18500	5			20400	5			22300	5
700		4	0.701	0.54	7800	1	0.775	0.60	8700	1	0.849	0.66	9500	1
		6			11800	2			13000	2			14200	2
		8			15700	3			17300	3			19000	3
		10			19600	5			21600	5			23700	5
750		4	0.749	0.59	8400	1	0.827	0.65	9300	1	0.906	0.71	10200	1
		6			12700	2			14000	2			15300	2
		8			16900	3			18600	3			20400	3
		10			21100	5			23300	5			25500	5
800		4	0.796	0.62	8900	1	0.880	0.68	9800	1	0.964	0.75	10800	1
		6			13300	2			14700	2			16100	2
		8			17800	3			19600	3			21500	3
		10			22200	5			24600	5			26900	5
850		4	0.844	0.66	9500	1	0.932	0.73	10500	1	1.021	0.80	11500	1
		6			14200	2			15700	2			17200	2
		8			19000	3			21000	3			23000	3
		10			23700	5			26200	5			28700	5
900		4	0.891	0.69	9900	1	0.985	0.76	11000	1	1.079	0.84	12000	1
		6			14900	2			16500	2			18000	2
		8			19900	3			22000	3			24100	3
		10			24900	5			27500	5			30100	5
950		4	0.939	0.73	10600	1	1.037	0.81	11700	1	1.136	0.89	12800	1
		6			15800	2			17500	2			19100	2
		8			21100	3			23300	3			25500	3
		10			26400	5			29100	5			31900	5
1000		4	0.986	0.76	11000	1	1.090	0.84	12200	1	1.194	0.92	13300	1
		6			16500	2			18200	2			20000	2
		8			22000	3			24300	3			26600	3
		10			27500	5			30400	5			33300	5
1050		4	1.034	0.81	11600	1	1.142	0.89	12800	1	1.251	0.97	14000	1
		6			17400	2			19200	2			21000	2
		8			23200	3			25600	3			28100	3
		10			29000	5			32100	5			35100	5
1100		4	1.081	0.84	12100	1	1.195	0.93	13300	1	1.309	1.01	14600	1
		6			18100	2			20000	2			21900	2
		8			24100	3			26600	3			29200	3
		10			30200	5			33300	5			36500	5

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]
300	4	0.423	0.33	4800	1	0.456	0.36	5100	1	0.490	0.38	5500	1
	6			7100	2			7700	2			8300	2
	8			9500	3			10300	3			11000	3
	10			11900	5			12800	5			13800	5
350	4	0.485	0.39	5500	1	0.524	0.42	6000	1	0.563	0.45	6400	1
	6			8300	1			9000	2			9600	1
	8			11100	3			12000	3			12900	3
	10			13900	4			15000	4			16100	4
400	4	0.548	0.43	6100	1	0.591	0.46	6600	1	0.635	0.49	7100	1
	6			9200	2			9900	2			10700	2
	8			12300	3			13300	3			14200	3
	10			15300	5			16600	5			17800	5
450	4	0.610	0.48	6900	1	0.659	0.52	7500	1	0.708	0.56	8000	1
	6			10400	2			11200	2			12000	2
	8			13900	3			15000	3			16100	3
	10			17300	4			18700	4			20100	4
500	4	0.673	0.52	7500	1	0.726	0.56	8100	1	0.780	0.61	8700	1
	6			11300	2			12200	2			13100	2
	8			15000	3			16200	3			17400	3
	10			18800	5			20300	5			21800	5
550	4	0.735	0.58	8300	1	0.794	0.62	9000	1	0.853	0.67	9600	1
	6			12500	2			13500	2			14500	2
	8			16600	3			18000	3			19300	3
	10			20800	5			22400	5			24100	5
600	4	0.798	0.62	8900	1	0.861	0.67	9600	1	0.925	0.72	10300	1
	6			13400	2			14400	2			15500	2
	8			17800	3			19200	3			20700	3
	10			22300	5			24000	5			25800	5
650	4	0.860	0.67	9700	1	0.929	0.73	10500	1	0.998	0.78	11200	1
	6			14600	2			15700	2			16900	2
	8			19400	3			20900	3			22500	3
	10			24300	5			26200	5			28100	5
700	4	0.923	0.72	10300	1	0.996	0.77	11100	1	1.070	0.83	11900	1
	6			15400	2			16700	2			17900	2
	8			20600	3			22200	3			23900	3
	10			25700	5			27800	5			29800	5
750	4	0.985	0.77	11100	1	1.064	0.83	12000	1	1.143	0.89	12900	1
	6			16600	2			18000	2			19300	2
	8			22200	3			23900	3			25700	3
	10			27700	5			29900	5			32100	5
800	4	1.048	0.81	11700	1	1.131	0.88	12600	1	1.215	0.94	13500	1
	6			17500	2			18900	2			20300	2
	8			23400	3			25200	3			27100	3
	10			29200	5			31500	5			33900	5
850	4	1.110	0.87	12500	1	1.199	0.94	13500	1	1.288	1.00	14500	1
	6			18700	2			20200	2			21700	2
	8			24900	3			26900	3			28900	3
	10			31200	5			33700	5			36100	5
900	4	1.173	0.91	13100	1	1.266	0.98	14100	1	1.360	1.05	15100	1
	6			19600	2			21200	2			22700	2
	8			26100	3			28200	3			30300	3
	10			32700	5			35300	5			37900	5
950	4	1.235	0.96	13900	1	1.334	1.04	15000	1	1.433	1.12	16100	1
	6			20800	2			22400	2			24100	2
	8			27700	3			29900	3			32100	3
	10			34700	5			37400	5			40200	5
1000	4	1.298	1.00	14500	1	1.401	1.08	15600	1	1.505	1.16	16800	1
	6			21700	2			23400	2			25100	2
	8			28900	3			31200	3			33500	3
	10			36100	5			39000	5			41900	5
1050	4	1.360	1.06	15200	1	1.469	1.14	16500	1	1.578	1.23	17700	1
	6			22900	2			24700	2			26500	2
	8			30500	3			32900	3			35300	3
	10			38100	5			41100	5			44200	5
1100	4	1.423	1.10	15800	1	1.536	1.19	17100	1	1.650	1.28	18400	1
	6			23800	2			25700	2			27500	2
	8			31700	3			34200	3			36700	3
	10			39600	5			42800	5			45900	5

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

			height H_k [mm]											
			1500				1600				1700			
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
width B_k [mm]	300	4	0.524	0.41	5900	1	0.558	0.44	6300	1	0.592	0.46	6600	1
		6			8800	2			9400	2			10000	2
		8			11800	3			12500	3			13300	3
		10			14700	5			15700	5			16600	5
	350	4	0.601	0.48	6900	1	0.640	0.51	7300	1	0.679	0.54	7700	1
		6			10300	2			11000	2			11600	2
		8			13700	3			14600	3			15500	3
		10			17200	4			18300	4			19400	4
	400	4	0.679	0.53	7600	1	0.723	0.56	8100	1	0.767	0.60	8600	1
		6			11400	2			12100	2			12900	2
		8			15200	3			16200	3			17200	3
		10			19000	5			20200	5			21400	5
	450	4	0.756	0.60	8600	1	0.805	0.63	9100	1	0.854	0.67	9700	1
		6			12900	2			13700	2			14500	2
		8			17200	3			18300	3			19400	3
		10			21500	4			22800	4			24200	4
	500	4	0.834	0.65	9300	1	0.888	0.69	9900	1	0.942	0.73	10500	1
		6			14000	2			14900	2			15800	2
		8			18600	3			19800	3			21000	3
		10			23300	5			24800	5			26300	5
	550	4	0.911	0.72	10300	1	0.970	0.76	11000	1	1.029	0.81	11600	1
		6			15500	2			16400	2			17400	2
		8			20600	3			21900	3			23200	3
		10			25800	5			27400	5			29100	5
	600	4	0.989	0.77	11000	1	1.053	0.82	11700	1	1.117	0.86	12500	1
		6			16600	2			17600	2			18700	2
		8			22100	3			23500	3			24900	3
		10			27600	5			29400	5			31100	5
	650	4	1.066	0.83	12000	1	1.135	0.89	12800	1	1.204	0.94	13600	1
		6			18000	2			19200	2			20300	2
		8			24000	3			25600	3			27100	3
		10			30000	5			32000	5			33900	5
	700	4	1.144	0.89	12800	1	1.218	0.94	13600	1	1.292	1.00	14400	1
		6			19100	2			20400	2			21600	2
		8			25500	3			27100	3			28800	3
		10			31900	5			33900	5			36000	5
	750	4	1.221	0.95	13700	1	1.300	1.02	14600	1	1.379	1.08	15500	1
		6			20600	2			21900	2			23200	2
		8			27500	3			29200	3			31000	3
		10			34300	5			36500	5			38700	5
	800	4	1.299	1.00	14500	1	1.383	1.07	15400	1	1.467	1.13	16300	1
		6			21700	2			23100	2			24500	2
		8			28900	3			30800	3			32700	3
		10			36200	5			38500	5			40800	5
	850	4	1.376	1.07	15500	1	1.465	1.14	16400	1	1.554	1.21	17400	1
		6			23200	2			24700	2			26200	2
		8			30900	3			32900	3			34900	3
		10			38600	5			41100	5			43600	5
	900	4	1.454	1.12	16200	1	1.548	1.20	17200	1	1.642	1.27	18300	1
		6			24300	2			25800	2			27400	2
		8			32400	3			34500	3			36500	3
		10			40500	5			43100	5			45700	5
	950	4	1.531	1.19	17200	1	1.630	1.27	18300	1	1.729	1.35	19400	1
		6			25800	2			27400	2			29100	2
		8			34300	3			36500	3			38700	3
		10			42900	5			45700	5			48400	5
	1000	4	1.609	1.24	17900	1	1.713	1.32	19100	1	1.817	1.40	20200	1
		6			26900	2			28600	2			30300	2
		8			35800	3			38100	3			40400	3
		10			44800	5			47600	5			50500	5
	1050	4	1.686	1.31	18900	1	1.795	1.40	20100	1	1.904	1.48	21300	1
		6			28300	2			30100	2			32000	2
		8			37800	3			40200	3			42600	3
		10			47200	5			50200	5			53300	5
	1100	4	1.764	1.36	19600	1	1.878	1.45	20900	1	1.992	1.54	22100	1
		6			29400	2			31300	2			33200	2
		8			39200	3			41800	3			44300	3
		10			49100	5			52200	5			55400	5

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]
300	4	0.625	0.49	7000	1	0.659	0.51	7400	1	0.693	0.54	7800	1
	6			10500	2			11100	2			11700	2
	8			14000	3			14800	3			15600	3
	10			17600	5			18500	5			19400	5
350	4	0.718	0.57	8200	1	0.757	0.60	8600	1	0.795	0.63	9100	1
	6			12300	2			12900	2			13600	2
	8			16400	3			17300	3			18100	3
	10			20500	4			21600	4			22700	4
400	4	0.810	0.63	9100	1	0.854	0.66	9600	1	0.898	0.70	10000	1
	6			13600	2			14300	2			15100	2
	8			18100	3			19100	3			20100	3
	10			22700	5			23900	5			25100	5
450	4	0.903	0.71	10200	1	0.952	0.75	10800	1	1.000	0.79	11300	1
	6			15400	2			16200	2			17000	2
	8			20500	3			21600	3			22700	3
	10			25600	4			27000	4			28400	4
500	4	0.995	0.77	11100	1	1.049	0.81	11700	1	1.103	0.86	12300	1
	6			16700	2			17600	2			18500	2
	8			22200	3			23400	3			24600	3
	10			27800	5			29300	5			30800	5
550	4	1.088	0.85	12300	1	1.147	0.90	12900	1	1.205	0.95	13600	1
	6			18400	2			19400	2			20400	2
	8			24600	3			25900	3			27200	3
	10			30700	5			32400	5			34000	5
600	4	1.180	0.91	13200	1	1.244	0.96	13900	1	1.308	1.01	14600	1
	6			19700	2			20800	2			21900	2
	8			26300	3			27700	3			29200	3
	10			32900	5			34700	5			36500	5
650	4	1.273	1.00	14300	1	1.342	1.05	15100	1	1.410	1.10	15900	1
	6			21500	2			22700	2			23800	2
	8			28700	3			30200	3			31800	3
	10			35800	5			37800	5			39700	5
700	4	1.365	1.06	15200	1	1.439	1.11	16000	1	1.513	1.17	16800	1
	6			22800	2			24000	2			25300	2
	8			30400	3			32100	3			33700	3
	10			38000	5			40100	5			42100	5
750	4	1.458	1.14	16400	1	1.537	1.20	17300	1	1.615	1.26	18100	1
	6			24600	2			25900	2			27200	2
	8			32800	3			34500	3			36300	3
	10			41000	5			43200	5			45400	5
800	4	1.550	1.20	17300	1	1.634	1.26	18200	1	1.718	1.33	19100	1
	6			25900	2			27300	2			28700	2
	8			34500	3			36400	3			38200	3
	10			43100	5			45500	5			47800	5
850	4	1.643	1.28	18400	1	1.732	1.35	19400	1	1.820	1.42	20400	1
	6			27600	2			29100	2			30600	2
	8			36900	3			38800	3			40800	3
	10			46100	5			48500	5			51000	5
900	4	1.735	1.34	19300	1	1.829	1.41	20300	1	1.923	1.49	21400	1
	6			29000	2			30500	2			32100	2
	8			38600	3			40700	3			42800	3
	10			48300	5			50900	5			53500	5
950	4	1.828	1.42	20500	1	1.927	1.50	21600	1	2.025	1.58	22700	1
	6			30700	2			32400	2			34000	2
	8			41000	3			43200	3			45400	3
	10			51200	5			53900	5			56700	5
1000	4	1.920	1.48	21400	1	2.024	1.56	22500	1	2.128	1.64	23700	1
	6			32000	2			33800	2			35500	2
	8			42700	3			45000	3			47300	3
	10			53400	5			56300	5			59100	5
1050	4	2.013	1.56	22500	1	2.122	1.65	23700	1	2.230	1.73	24900	1
	6			33800	2			35600	2			37400	2
	8			45000	3			47500	3			49900	3
	10			56300	5			59300	5			62400	5
1100	4	2.105	1.63	23400	1	2.219	1.71	24700	1	2.333	1.80	25900	1
	6			35100	2			37000	2			38900	2
	8			46800	3			49300	3			51800	3
	10			58500	5			61700	5			64800	5

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

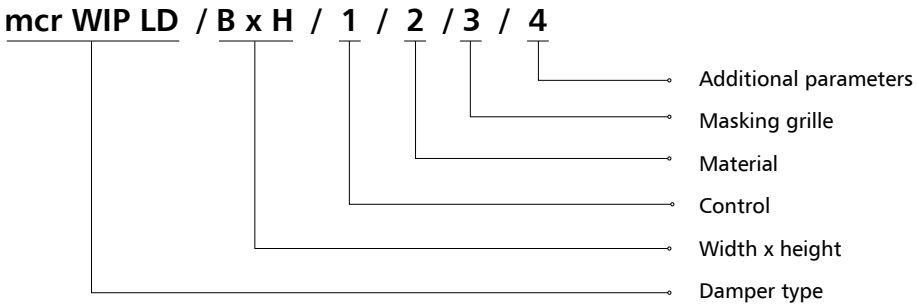
B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	2100 S_k [m²]	2100 S_e [m²]	2100 Q [m³/h]	2100 d_p [PA]	2200 S_k [m²]	2200 S_e [m²]	2200 Q [m³/h]	2200 d_p [PA]	2300 S_k [m²]	2300 S_e [m²]	2300 Q [m³/h]	2300 d_p [PA]
	300	4	0.727	0.57	8200	1	0.761	0.59	8500	1	0.794	0.62	8900	1
		6			12200	2			12800	2			13400	2
		8			16300	3			17100	3			17800	3
		10			20400	5			21300	5			22300	5
	350	4	0.834	0.66	9500	1	0.873	0.69	10000	1	0.912	0.72	10400	1
		6			14300	2			14900	2			15600	2
		8			19000	3			19900	3			20800	3
		10			23800	4			24900	4			26000	4
	400	4	0.942	0.73	10500	1	0.986	0.77	11000	1	1.029	0.80	11500	1
		6			15800	2			16500	2			17300	2
		8			21100	3			22000	3			23000	3
		10			26300	5			27600	5			28800	5
	450	4	1.049	0.83	11900	1	1.098	0.86	12400	1	1.147	0.90	13000	1
		6			17800	2			18700	2			19500	2
		8			23800	3			24900	3			26000	3
		10			29700	4			31100	4			32500	4
	500	4	1.157	0.90	12900	1	1.211	0.94	13500	1	1.264	0.98	14100	1
		6			19400	2			20300	2			21200	2
		8			25800	3			27000	3			28200	3
		10			32300	5			33800	5			35300	5
	550	4	1.264	0.99	14300	1	1.323	1.04	14900	1	1.382	1.08	15600	1
		6			21400	2			22400	2			23400	2
		8			28500	3			29900	3			31200	3
		10			35700	5			37300	5			39000	5
	600	4	1.372	1.06	15300	1	1.436	1.11	16000	1	1.499	1.16	16700	1
		6			22900	2			24000	2			25100	2
		8			30600	3			32000	3			33400	3
		10			38200	5			40000	5			41800	5
	650	4	1.479	1.16	16600	1	1.548	1.21	17400	1	1.617	1.26	18200	1
		6			25000	2			26100	2			27300	2
		8			33300	3			34800	3			36400	3
		10			41600	5			43500	5			45500	5
	700	4	1.587	1.23	17700	1	1.661	1.28	18500	1	1.734	1.34	19300	1
		6			26500	2			27700	2			29000	2
		8			35300	3			37000	3			38600	3
		10			44200	5			46200	5			48300	5
	750	4	1.694	1.32	19000	1	1.773	1.38	19900	1	1.852	1.44	20800	1
		6			28500	2			29900	2			31200	2
		8			38100	3			39800	3			41600	3
		10			47600	5			49800	5			52000	5
	800	4	1.802	1.39	20000	1	1.886	1.46	21000	1	1.969	1.52	21900	1
		6			30100	2			31500	2			32900	2
		8			40100	3			41900	3			43800	3
		10			50100	5			52400	5			54800	5
	850	4	1.909	1.49	21400	1	1.998	1.56	22400	1	2.087	1.62	23400	1
		6			32100	2			33600	2			35100	2
		8			42800	3			44800	3			46800	3
		10			53500	5			56000	5			58500	5
	900	4	2.017	1.56	22400	1	2.111	1.63	23500	1	2.204	1.70	24500	1
		6			33600	2			35200	2			36800	2
		8			44800	3			46900	3			49000	3
		10			56100	5			58700	5			61300	5
	950	4	2.124	1.65	23800	1	2.223	1.73	24900	1	2.322	1.80	26000	1
		6			35700	2			37300	2			39000	2
		8			47600	3			49800	3			52000	3
		10			59500	5			62200	5			65000	5
	1000	4	2.232	1.72	24800	1	2.336	1.80	26000	1	2.439	1.88	27100	1
		6			37200	2			38900	2			40700	2
		8			49600	3			51900	3			54200	3
		10			62000	5			64900	5			67800	5
	1050	4	2.339	1.82	26200	1	2.448	1.90	27400	1	2.557	1.99	28600	1
		6			39200	2			41100	2			42900	2
		8			52300	3			54700	3			57200	3
		10			65400	5			68400	5			71500	5
	1100	4	2.447	1.89	27200	1	2.561	1.98	28400	1	2.674	2.06	29700	1
		6			40800	2			42700	2			44600	2
		8			54400	3			56900	3			59400	3
		10			68000	5			71100	5			74300	5

17.11 | Marking



1 – control

» **trigger control mechanism**

BE24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC/DC
BEE24 – actuator without a return spring, U = 24 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BEE230 – actuator without a return spring, U = 230 V AC/DC
BEN230 – actuator without a return spring, U = 230 V AC/DC
MLE24 – actuator without a return spring, U = 24 V AC/DC
MLE230 – actuator without a return spring, U = 230 V AC
ME24 – actuator without a return spring, U = 24 V AC/DC
ME230 – actuator without a return spring, U = 230 V AC

2 – material

[no symbol] – galvanized steel, Zn 275 m^2 coating
KN – stainless steel
KK – 1.4404 acid-proof steel
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured or stainless steel

3 – masking grille

MWDx1 – single masking grille
MWDx2 – two masking grilles
MWSP – single masking grille

4 – additional parameters

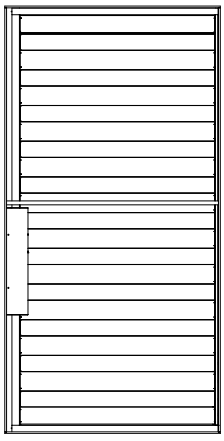
» **Damper axis of rotation**

[no symbol] – horizontal axis of rotation
[no symbol] – left damper
[no symbol] – not painted
RAL9005 – damper blades and internal casing from the side of the actuator are painted black

Note: **separate additional parameters entered with the "/" sign**
example marking: mcr WIP LD 400 x 600 BLE24
Multi-blade smoke control damper with a 24 V actuator with limit switches.

17.12 | Design standard

» Left damper



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

BIM CAD

downloadable models
on the website
under the designer zone tab



CE

CTO S.A.

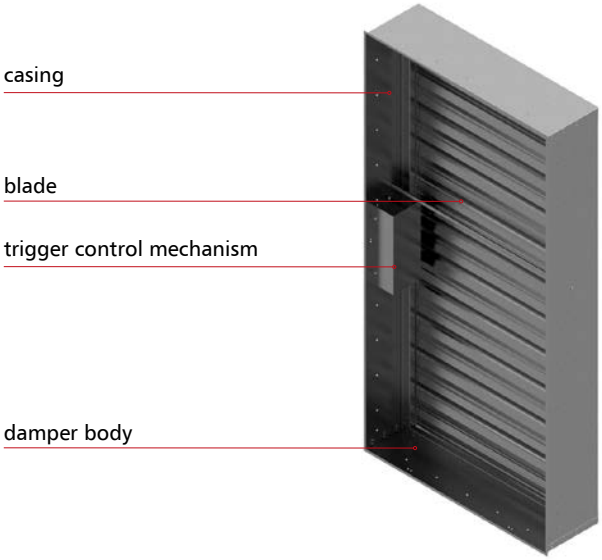
PZH
ATEST HIGIENICZNY

» **EIS120, E600**
» Fire resistance class: EI120 (v_{ew} i→o)S1500C_{10000}AA multi
» Fire resistance class: E120 (v_{ew} i↔o) S500 C_{10000}AA multi
» Certificate of constancy of performance 2434-CPR-0426
» Dampers certified for compliance with EN 12101-8
» Dampers rated under EN 13501-4 and tested under EN 1366-10
» Dedicated for application in smoke removal and air supply shafts
» Large active area, small resistances, quick installation
» Certified installation with a system grille in set as per EN 12101-8

18.1| Application

The mcr WIP LDX smoke control dampers are intended for installation in manually or automatically operated fire ventilation systems. The devices are used in fire ventilation systems or in mixed fire and comfort ventilation systems (smoke evacuation or air supply systems). The dampers prevent fire, smoke and fire gases from spreading to the adjacent compartments. During normal system operation, the damper blades are closed. The smoke control dampers blades in the fire compartment are opened, whereas in other areas the blades are closed.

18.2| Design

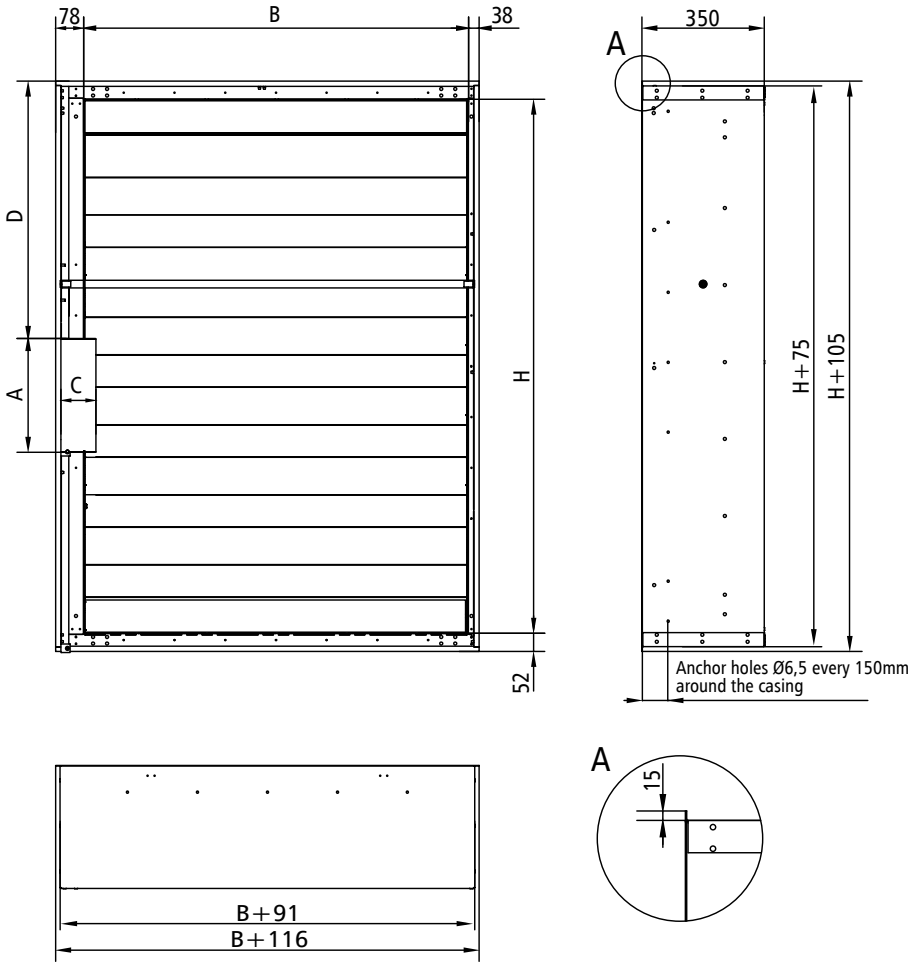


mcr WIP LDX smoke control dampers consist of a casing with a rectangular cross-section, multiple moving damper blades – louvers rotating around their own axes – and a remotely activated trigger and control mechanism, which is installed inside the damper clearance. The damper casing is made of galvanized steel sheets or stainless steel sheets. The damper is also provided with a connection flange on one side. The other end is the so-called "bare-end". The damper casing total length is 350 mm. Damper louvers are made of galvanized steel sheets. The damper blades revolve on their own axes, which consist of steel pins. A ventilation gasket is provided on the blades to ensure that the damper is "cold" sealed.

18.3 | Versions

18.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the smoke control dampers louvers are opened in the fire compartment area and closed in the other areas - the smoke control dampers is released remotely by feeding the supply voltage to the trigger control mechanism. mcr WIP LDX smoke control dampers are equipped with a trigger control mechanism in the form of a BE, BEE, BEN, MLE or ME axial actuator without a return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN, MLE or ME series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator. Smoke control dampers with BE, BEE, BEN, MLE or ME actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may be opened/closed manually using a key.



mechanism	A	C	D
BE, BEN	450	180	wzór

for dimension H<599	for dimension H>599
D [mm] = H/2 - 98,75	D [mm] = H/2 - 148,75

18.4 | Dimensions

» nominal width B: from 300 mm to 1100 mm
» nominal height H from 600 mm to 2300 mm
» maximum single damper cross-section surface up to 2.53 m^2

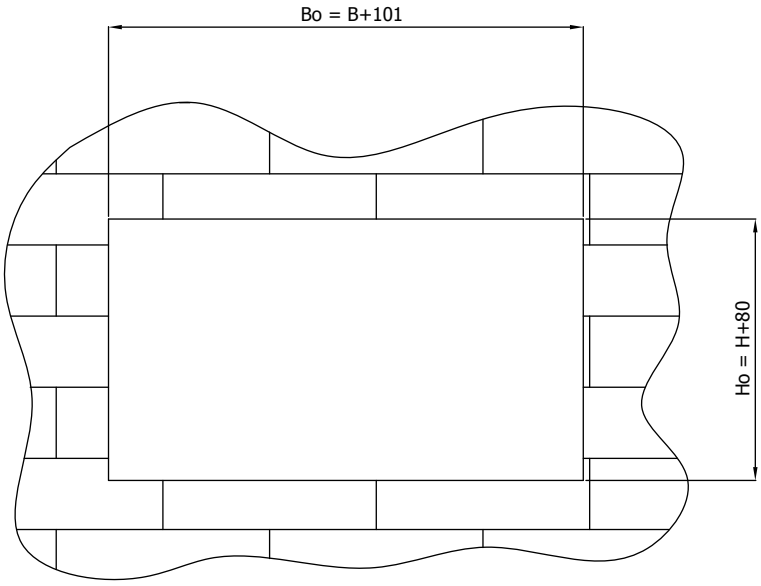
18.5 | Installation

» Rectangular fire dampers mcr WIP LDX have been classified as EI120 (V_{ew} i→o) S 1500 C_{10000} AA multi, E120 (V_{ew} i↔o) S 500 C_{10000} AA multi when installed in flexible wall/shaft partitions made of gypsum boards with a minimum thickness of 125 mm.
» Rectangular fire dampers mcr WIP LDX have been classified as EI120 (V_{ew} i→o) S 1500 C_{10000} AA multi, E120 (V_{ew} i↔o) S 500 C_{10000} AA multi when installed in rigid wall/shaft partitions made of concrete, brick, blocks, masonry, or prefabricated panels with a minimum thickness of 125 mm.
» Rectangular fire dampers mcr WIP LDX have been classified as E600 (V_{ew} i→o) S 1500 C_{10000} AA multi, E600 (V_{ew} i↔o) S 500 C_{10000} AA multi when installed in rigid wall/shaft partitions made of concrete, brick, blocks, masonry, or prefabricated panels with a minimum thickness of 125 mm.

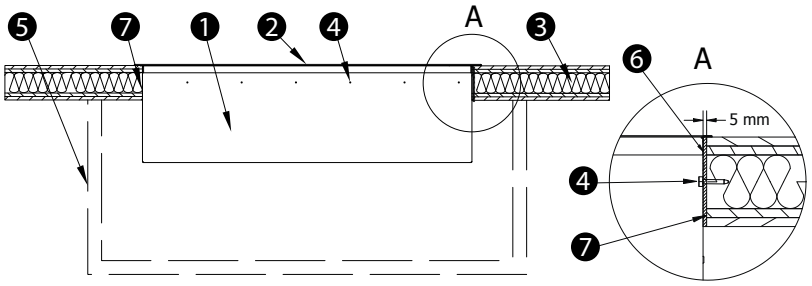
18.5.1 | Preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP damper is:

Preferred
Bo = (B+101) mm
Ho = (H+80) mm



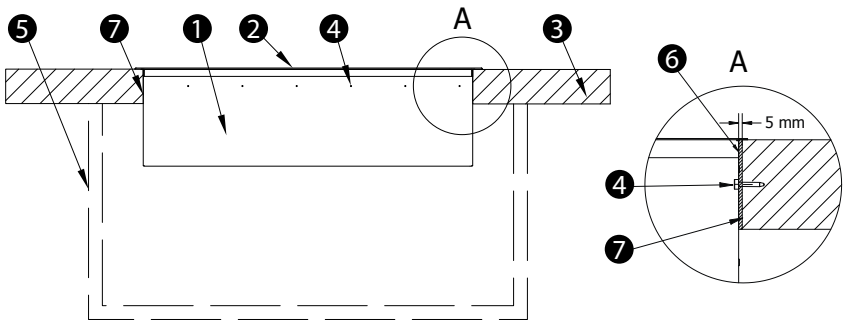
18.5.2 | Installation in light shaft walls



1. mcr WIP LDX BxH smoke damper
2. MWS system grille (optional)
3. GK shaft wall
4. Installation anchors
5. Vertical fire ventilation shaft
6. Mounting gap*
7. Assembly mortar*

* The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

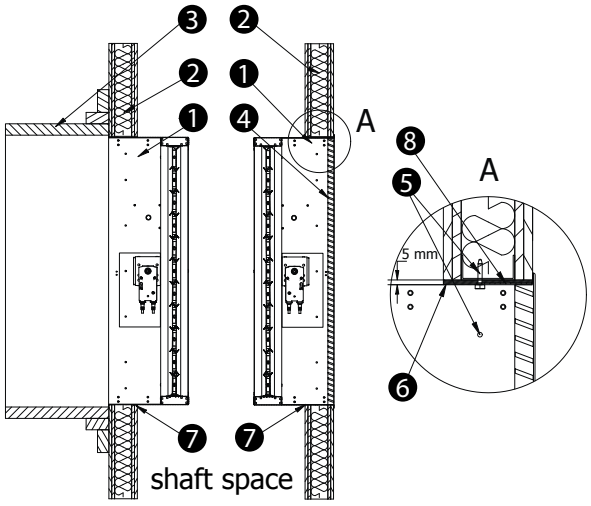
18.5.3 | Installation in shaft walls



1. mcr WIP LDX BxH smoke damper
2. MWS system grille (optional)
3. GB shaft wall
4. Installation anchors
5. Vertical fire ventilation shaft
6. Mounting gap*
7. Assembly mortar*

* The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

18.5.4 | Sample installation in light walls and with multi-compartment ducts or grilles



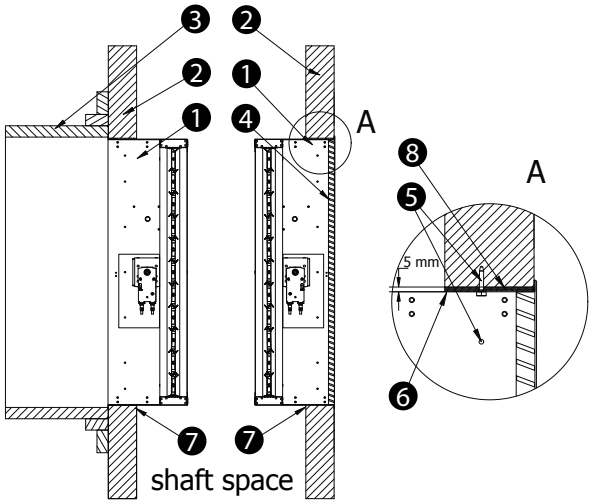
1. mcr WIP LDX BxH smoke damper
2. Plasterboard wall
3. Multi-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.

** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

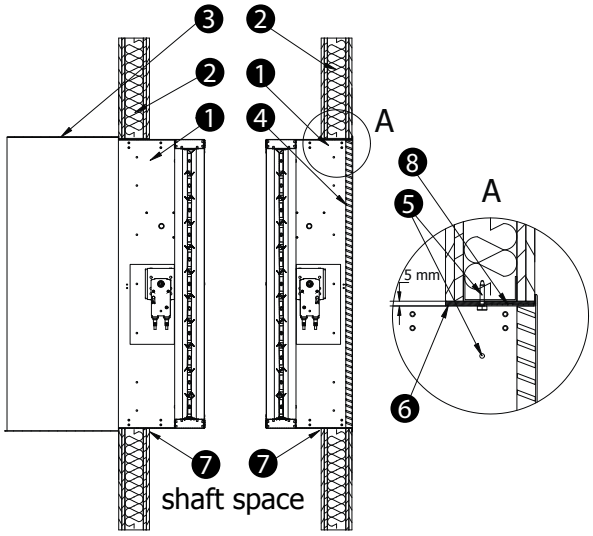
18.5.5 | Installation in concrete walls and with multi-compartment ducts or grilles



1. mcr WIP LDX BxH smoke damper
2. Solid wall
3. Multi-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.
** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.
*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

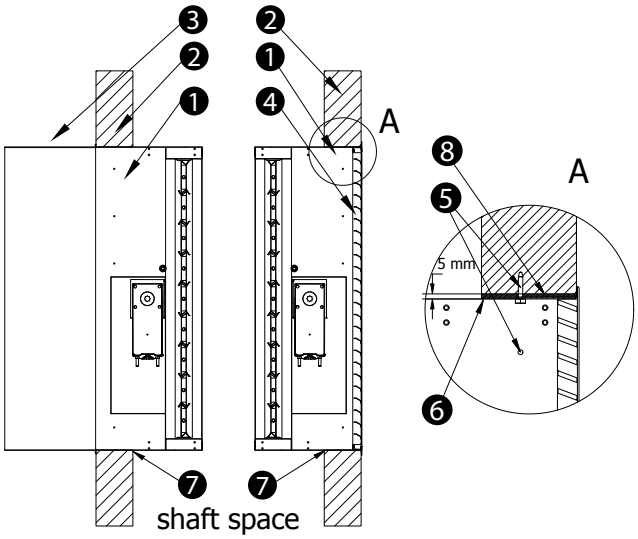
18.5.6 | Sample installation in light walls and with single-compartment ducts or grilles



1. mcr WIP LDX BxH smoke damper
2. Plasterboard wall
3. Single-compartment smoke extract duct – e.g. made of metal sheets*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.
** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.
*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

18.5.7 | Sample installation in concrete or masonry walls and with single-compartment ducts or grilles



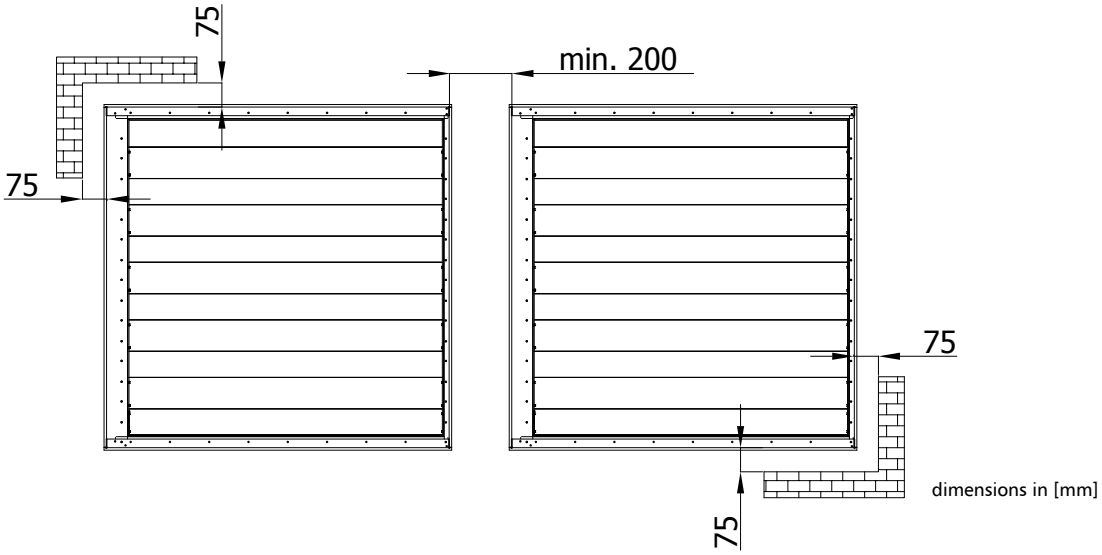
1. mcr WIP LDX BxH smoke damper
2. Solid wall
3. Single-compartment smoke extract duct – e.g. made of fire-proof boards*
4. MWS system grille (optional)
5. Installation anchors
6. Mounting gap**
7. Sealing***
8. Assembly mortar**

* Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.

** The installation gap between the wall and the damper must be sealed with a material (installation mortar) that ensures the appropriate fire resistance rating.

*** The seal between the lower edge of the damper and the wall must be made using a material (installation mortar) that ensures the appropriate fire resistance rating.

» Minimum distance between systems and partitions



18.6 | mcr WIP LDX rectangular dampers technical parameters

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]															
			600					700					800					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	300	4	0.18	0.10	1400	6	30	0.21	0.12	1800	5	29	0.24	0.15	2100	4	27
		6			2200	14	42			2700	11	40			3100	9	37
		8			2900	25	49			3500	19	46			4200	16	45
		10			3600	38	54			4400	30	52			5200	25	51
		15			5400	85	65			6600	68	63			7900	58	62
	350	4	0.21	0.12	1800	5	29	0.25	0.15	2200	4	27	0.28	0.18	2500	3	25
		6			2700	11	39			3200	9	37			3800	8	36
		8			3600	20	47			4300	16	45			5100	14	44
		10			4400	30	52			5400	25	51			6300	21	49
		15			6700	69	63			8100	56	61			9500	48	60
	400	4	0.24	0.15	2100	4	27	0.28	0.18	2500	3	25	0.32	0.21	3000	3	24
		6			3200	9	38			3800	8	36			4500	7	35
		8			4200	16	45			5100	14	43			6000	12	42
		10			5300	26	51			6400	21	49			7400	18	48
		15			7900	57	61			9500	47	60			11200	42	59
	450	4	0.27	0.17	2400	3	25	0.32	0.20	2900	3	24	0.36	0.24	3400	3	23
		6			3600	8	36			4400	7	35			5100	6	34
		8			4900	14	44			5900	12	43			6800	10	41
		10			6100	22	50			7300	18	48			8500	16	47
		15			9100	49	60			11000	42	59			12800	37	58
	500	4	0.30	0.19	2800	3	25	0.35	0.23	3300	3	23	0.40	0.27	3900	2	23
		6			4100	7	35			5000	6	34			5800	5	33
		8			5500	12	43			6600	11	41			7700	9	41
		10			6900	19	49			8300	17	47			9600	15	46
		15			10400	44	59			12400	38	58			14500	34	57
	550	4	0.33	0.21	3100	3	24	0.39	0.26	3700	2	23	0.44	0.30	4300	2	22
		6			4600	6	34			5500	5	33			6400	5	32
		8			6200	11	42			7400	10	41			8600	9	40
		10			7700	18	48			9200	15	47			10700	14	46
		15			11600	40	58			13900	35	57			16100	31	56
	600	4	0.36	0.24	3400	3	23	0.42	0.28	4100	2	22	0.48	0.33	4700	2	21
		6			5100	6	34			6100	5	33			7100	5	32
		8			6800	10	41			8200	9	40			9500	8	40
		10			8500	16	47			10200	14	46			11800	13	45
		15			12800	37	58			15300	32	57			17800	29	56
	650	4	0.39	0.26	3700	2	22	0.46	0.31	4500	2	22	0.52	0.36	5200	2	21
		6			5600	5	33			6700	5	32			7800	4	32
		8			7500	10	41			8900	9	40			10400	8	39
		10			9400	15	47			11200	14	46			12900	12	45
		15			14100	35	57			16700	30	56			19400	27	56
	700	4	0.42	0.28	4100	2	22	0.49	0.34	4800	2	21	0.56	0.39	5600	2	21
		6			6100	5	33			7300	5	32			8400	4	31
		8			8200	9	41			9700	8	40			11200	7	39
		10			10200	14	46			12100	13	45			14000	12	45
		15			15300	32	57			18200	29	56			21100	26	55

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	v [m/s]	600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	600 L_{WA} [dB]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	700 L_{WA} [dB]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]	800 L_{WA} [dB]
750		4	0.45	0.31	4400	2	22	0.53	0.36	5200	2	21	0.60	0.42	6100	2	21
		6			6600	5	33			7800	4	32			9100	4	31
		8			8800	9	40			10500	8	39			12100	7	39
		10			11000	14	46			13100	12	45			15100	11	45
		15			16500	31	56			19600	27	56			22700	25	55
800		4	0.48	0.33	4700	2	22	0.56	0.39	5600	2	21	0.64	0.45	6500	2	21
		6			7100	5	32			8400	4	31			9700	4	31
		8			9500	8	40			11200	7	39			13000	7	39
		10			11800	13	45			14000	12	45			16200	11	44
		15			17700	29	56			21100	26	55			24400	24	55
850		4	0.51	0.35	5100	2	22	0.60	0.42	6000	2	21	0.68	0.48	6900	2	20
		6			7600	4	32			9000	4	31			10400	4	31
		8			10100	8	39			12000	7	39			13900	7	38
		10			12700	13	45			15000	11	45			17300	10	44
		15			19000	28	56			22500	25	55			26000	23	55
900		4	0.54	0.37	5400	2	21	0.63	0.44	6400	2	21	0.72	0.51	7400	2	20
		6			8100	4	32			9600	4	31			11100	4	31
		8			10800	8	39			12800	7	39			14800	6	38
		10			13500	12	45			16000	11	45			18400	10	44
		15			20200	27	56			23900	24	55			27700	23	55
950		4	0.57	0.40	5700	2	21	0.67	0.47	6800	2	21	0.76	0.54	7800	2	20
		6			8600	4	32			10200	4	31			11700	4	31
		8			11400	7	39			13500	7	39			15600	6	38
		10			14300	12	45			16900	10	44			19600	10	44
		15			21400	26	55			25400	24	55			29300	22	55
1000		4	0.60	0.42	6000	2	21	0.70	0.50	7200	2	21	0.80	0.57	8300	2	20
		6			9100	4	32			10700	4	31			12400	3	31
		8			12100	7	39			14300	7	38			16500	6	38
		10			15100	11	45			17900	10	44			20700	10	44
		15			22700	25	55			26800	23	55			31000	21	55
1050		4	0.63	0.44	6400	2	21	0.74	0.52	7500	2	20	0.84	0.60	8700	1	20
		6			9600	4	31			11300	4	31			13100	3	31
		8			12800	7	39			15100	6	38			17400	6	38
		10			15900	11	45			18800	10	44			21800	9	44
		15			23900	25	55			28300	23	55			32600	21	54
1100		4	0.66	0.47	6700	2	21	0.77	0.55	7900	2	20	0.88	0.63	9100	1	20
		6			10100	4	31			11900	4	31			13700	3	31
		8			13400	7	39			15800	6	38			18300	6	38
		10			16800	11	45			19800	10	44			22900	9	44
		15			25100	24	55			29700	22	55			34300	21	54

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			900					1000					1100				
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	300	4			2400	4	26			2700	3	25			3100	3	25
		6			3600	8	36			4100	7	35			4600	7	35
		8	0.27	0.17	4800	14	44	0.30	0.19	5500	13	43	0.33	0.21	6100	12	42
		10			6100	23	50			6900	20	49			7700	18	48
		15			9100	51	60			10300	45	59			11500	41	59
	350	4			2900	3	24			3300	3	24			3700	3	23
		6			4400	7	35			4900	6	34			5500	6	34
		8	0.32	0.20	5800	12	42	0.35	0.23	6600	11	42	0.39	0.26	7400	10	41
		10			7300	19	48			8200	17	47			9200	16	47
		15			10900	42	59			12400	39	58			13800	35	58
	400	4			3400	3	23			3900	2	23			4300	2	22
		6			5100	6	34			5800	5	33			6400	5	33
		8	0.36	0.24	6800	10	41	0.40	0.27	7700	10	41	0.44	0.30	8600	9	40
		10			8500	16	47			9600	15	47			10700	14	46
		15			12800	37	58			14400	34	57			16100	32	57
	450	4			3900	2	22			4400	2	22			4900	2	22
		6			5900	5	33			6600	5	33			7300	5	32
		8	0.41	0.27	7800	9	41	0.45	0.31	8800	9	40	0.50	0.34	9800	8	40
		10			9800	15	46			11000	14	46			12200	13	45
		15			14700	33	57			16500	31	56			18400	29	56
	500	4			4400	2	22			5000	2	22			5500	2	21
		6			6600	5	32			7400	4	32			8300	4	32
		8	0.45	0.31	8800	9	40	0.50	0.34	9900	8	40	0.55	0.38	11000	8	39
		10			11000	14	46			12400	13	45			13800	12	45
		15			16500	30	56			18600	28	56			20600	26	56
	550	4			4900	2	21			5500	2	21			6100	2	21
		6			7400	5	32			8300	4	32			9200	4	31
		8	0.50	0.34	9800	8	40	0.55	0.38	11000	8	39	0.61	0.42	12200	7	39
		10			12300	13	45			13800	12	45			15300	11	45
		15			18400	28	56			20700	27	56			22900	25	55
	600	4			5400	2	21			6100	2	21			6700	2	20
		6			8100	4	32			9100	4	31			10100	4	31
		8	0.54	0.37	10800	8	39	0.60	0.42	12100	7	39	0.66	0.47	13400	7	38
		10			13500	12	45			15100	11	45			16800	11	44
		15			20200	27	55			22700	25	55			25200	24	55
	650	4			5900	2	21			6600	2	20			7300	2	20
		6			8800	4	31			9900	4	31			11000	4	31
		8	0.59	0.41	11800	7	39	0.65	0.46	13200	7	39	0.72	0.51	14700	6	38
		10			14700	11	45			16500	11	44			18300	10	44
		15			22100	25	55			24800	24	55			27500	23	55
	700	4			6400	2	21			7200	2	20			7900	2	20
		6			9600	4	31			10700	4	31			11900	3	31
		8	0.63	0.44	12800	7	39	0.70	0.50	14300	6	38	0.77	0.55	15900	6	38
		10			16000	11	44			17900	10	44			19800	10	44
		15			24000	24	55			26900	23	55			29800	22	55

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]															
			900					1000					1100					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	750	4	0.68	0.48	6900	2	20	0.75	0.54	7700	2	20	0.83	0.59	8500	1	20
		6			10300	4	31			11600	4	31			12800	3	31
		8			13800	7	39			15400	6	38			17100	6	38
		10			17200	10	44			19300	10	44			21400	9	44
		15			25800	23	55			28900	22	55			32000	21	54
	800	4	0.72	0.51	7400	2	20	0.80	0.57	8300	2	20	0.88	0.64	9100	1	20
		6			11100	4	31			12400	3	31			13700	3	30
		8			14800	6	38			16500	6	38			18300	6	38
		10			18500	10	44			20700	10	44			22900	9	44
		15			27700	23	55			31000	21	54			34300	20	54
	850	4	0.77	0.55	7900	2	20	0.85	0.61	8800	1	20	0.94	0.68	9800	1	20
		6			11800	3	31			13200	3	30			14600	3	30
		8			15800	6	38			17600	6	38			19500	6	38
		10			19700	10	44			22000	9	44			24400	9	44
		15			29500	22	55			33100	21	54			36600	20	54
	900	4	0.81	0.58	8400	2	20	0.90	0.65	9400	1	20	0.99	0.72	10400	1	20
		6			12600	3	31			14100	3	31			15500	3	30
		8			16700	6	38			18700	6	38			20700	6	38
		10			20900	9	44			23400	9	44			25900	9	44
		15			31400	21	54			35100	20	54			38900	19	54
	950	4	0.86	0.62	8900	1	20	0.95	0.69	9900	1	20	1.05	0.76	11000	1	20
		6			13300	3	31			14900	3	30			16500	3	30
		8			17700	6	38			19800	6	38			21900	5	38
		10			22200	9	44			24800	9	44			27400	8	44
		15			33300	21	54			37200	20	54			41100	19	54
	1000	4	0.90	0.65	9400	1	20	1.00	0.73	10500	1	20	1.10	0.80	11600	1	20
		6			14000	3	30			15700	3	30			17400	3	30
		8			18700	6	38			20900	5	38			23200	5	38
		10			23400	9	44			26200	9	44			28900	8	44
		15			35100	20	54			39300	19	54			43400	19	54
	1050	4	0.95	0.68	9900	1	20	1.05	0.77	11000	1	20	1.16	0.85	12200	1	20
		6			14800	3	30			16500	3	30			18300	3	30
		8			19700	6	38			22000	5	38			24400	5	38
		10			24700	9	44			27600	8	44			30500	8	44
		15			37000	20	54			41300	19	54			45700	18	54
	1100	4	0.99	0.72	10400	1	20	1.10	0.80	11600	1	20	1.21	0.89	12800	1	20
		6			15500	3	30			17400	3	30			19200	3	30
		8			20700	6	38			23200	5	38			25600	5	38
		10			25900	9	44			28900	8	44			32000	8	44
		15			38800	19	54			43400	19	54			48000	18	54

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]															
			1200					1300					1400					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	300	4	0.36	0.24	3400	3	24	0.39	0.26	3700	3	23	0.42	0.28	4000	2	23
		6			5100	6	34			5600	6	34			6100	5	34
		8			6800	11	42			7400	10	41			8100	10	41
		10			8500	17	48			9300	16	47			10100	15	47
		15			12700	38	58			14000	36	58			15200	34	57
	350	4	0.42	0.28	4100	2	23	0.46	0.31	4400	2	22	0.49	0.33	4800	2	22
		6			6100	5	33			6700	5	33			7200	5	32
		8			8100	9	41			8900	9	40			9600	8	40
		10			10200	15	47			11100	14	46			12100	13	46
		15			15200	33	57			16700	31	57			18100	30	56
	400	4	0.48	0.33	4700	2	22	0.52	0.36	5200	2	22	0.56	0.39	5600	2	21
		6			7100	5	32			7700	4	32			8400	4	32
		8			9400	8	40			10300	8	40			11200	8	39
		10			11800	13	46			12900	12	45			14000	12	45
		15			17700	29	56			19400	28	56			21000	27	56
	450	4	0.54	0.37	5400	2	21	0.59	0.41	5900	2	21	0.63	0.44	6400	2	21
		6			8100	4	32			8800	4	32			9600	4	31
		8			10800	8	39			11800	7	39			12700	7	39
		10			13500	12	45			14700	11	45			15900	11	45
		15			20200	27	56			22100	26	55			23900	25	55
	500	4	0.60	0.42	6100	2	21	0.65	0.46	6600	2	21	0.70	0.50	7100	2	20
		6			9100	4	31			9900	4	31			10700	4	31
		8			12100	7	39			13200	7	39			14300	7	39
		10			15100	11	45			16500	11	45			17900	10	44
		15			22700	25	55			24800	24	55			26800	23	55
	550	4	0.66	0.47	6700	2	20	0.72	0.51	7300	2	20	0.77	0.55	7900	2	20
		6			10100	4	31			11000	4	31			11900	4	31
		8			13400	7	39			14600	6	38			15800	6	38
		10			16800	11	44			18300	10	44			19800	10	44
		15			25200	24	55			27400	23	55			29700	22	55
	600	4	0.72	0.51	7400	2	20	0.78	0.56	8000	2	20	0.84	0.60	8700	1	20
		6			11100	4	31			12100	4	31			13000	3	31
		8			14800	6	38			16100	6	38			17400	6	38
		10			18400	10	44			20100	10	44			21700	9	44
		15			27700	23	55			30100	22	55			32600	21	54
	650	4	0.78	0.56	8000	2	20	0.85	0.61	8800	2	20	0.91	0.66	9500	1	20
		6			12100	3	31			13100	3	30			14200	3	30
		8			16100	6	38			17500	6	38			18900	6	38
		10			20100	10	44			21900	9	44			23700	9	44
		15			30200	22	55			32800	21	54			35500	20	54
	700	4	0.84	0.60	8700	1	20	0.91	0.66	9500	1	20	0.98	0.71	10200	1	20
		6			13100	3	31			14200	3	30			15400	3	30
		8			17400	6	38			19000	6	38			20500	6	38
		10			21800	9	44			23700	9	44			25600	9	44
		15			32600	21	54			35500	20	54			38400	20	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1200						1300					1400				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																	
750	4	0.90	0.65	9400	1	20	0.98	0.71	10200	1	20	1.05	0.77	11000	1	20
	6			14100	3	31			15300	3	30			16500	3	30
	8			18700	6	38			20400	6	38			22000	5	38
	10			23400	9	44			25500	9	44			27600	8	44
	15			35100	20	54			38200	20	54			41300	19	54
800	4	0.96	0.70	10000	1	20	1.04	0.76	10900	1	20	1.12	0.82	11800	1	20
	6			15000	3	30			16400	3	30			17700	3	30
	8			20100	6	38			21800	5	38			23600	5	38
	10			25100	9	44			27300	8	44			29500	8	44
	15			37600	20	54			40900	19	54			44200	19	54
850	4	1.02	0.74	10700	1	20	1.11	0.81	11600	1	20	1.19	0.87	12600	1	20
	6			16000	3	30			17500	3	30			18900	3	30
	8			21400	5	38			23300	5	38			25100	5	38
	10			26700	9	44			29100	8	44			31400	8	44
	15			40100	19	54			43600	19	54			47200	18	54
900	4	1.08	0.79	11400	1	20	1.17	0.86	12400	1	20	1.26	0.93	13300	1	20
	6			17000	3	30			18500	3	30			20000	3	30
	8			22700	5	38			24700	5	38			26700	5	38
	10			28400	8	44			30900	8	44			33400	8	44
	15			42600	19	54			46300	18	54			50100	18	54
950	4	1.14	0.83	12000	1	20	1.24	0.91	13100	1	20	1.33	0.98	14100	1	20
	6			18000	3	30			19600	3	30			21200	3	30
	8			24000	5	38			26100	5	38			28200	5	38
	10			30100	8	44			32700	8	44			35300	8	44
	15			45100	18	54			49000	18	54			53000	17	54
1000	4	1.20	0.88	12700	1	20	1.30	0.96	13800	1	20	1.40	1.03	14900	1	20
	6			19000	3	30			20700	3	30			22300	3	30
	8			25400	5	38			27600	5	38			29800	5	38
	10			31700	8	44			34500	8	44			37200	8	44
	15			47600	18	54			51700	18	54			55900	17	54
1050	4	1.26	0.93	13300	1	20	1.37	1.01	14500	1	20	1.47	1.09	15700	1	20
	6			20000	3	30			21800	3	30			23500	3	30
	8			26700	5	38			29000	5	38			31300	5	38
	10			33400	8	44			36300	8	44			39200	8	44
	15			50100	18	54			54400	17	54			58800	17	54
1100	4	1.32	0.97	14000	1	20	1.43	1.06	15200	1	20	1.54	1.14	16400	1	20
	6			21000	3	30			22800	3	30			24700	3	30
	8			28000	5	38			30500	5	38			32900	5	38
	10			35000	8	44			38100	8	44			41100	7	44
	15			52500	17	54			57100	17	54			61700	17	54

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

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S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]															
			1500					1600					1700					
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]	300	4	0.45	0.30	4400	2	23	0.48	0.33	4700	2	22	0.51	0.35	5000	2	22
		6			6600	5	33			7000	5	33			7500	5	32
		8			8700	9	40			9400	9	40			10000	8	40
		10			10900	14	46			11700	13	46			12600	13	46
		15			16400	32	57			17600	30	57			18800	29	56
	350	4	0.53	0.36	5200	2	22	0.56	0.39	5600	2	22	0.60	0.41	6000	2	21
		6			7800	5	32			8400	4	32			8900	4	32
		8			10400	8	40			11200	8	40			11900	7	39
		10			13000	13	46			14000	12	45			14900	12	45
		15			19500	28	56			20900	27	56			22400	26	56
	400	4	0.60	0.42	6000	2	21	0.64	0.45	6500	2	21	0.68	0.48	6900	2	21
		6			9100	4	32			9700	4	31			10400	4	31
		8			12100	7	39			12900	7	39			13800	7	39
		10			15100	11	45			16200	11	45			17300	11	45
		15			22600	26	55			24300	25	55			25900	24	55
	450	4	0.68	0.48	6900	2	21	0.72	0.51	7400	2	21	0.77	0.55	7900	2	21
		6			10300	4	31			11000	4	31			11800	4	31
		8			13700	7	39			14700	7	39			15700	6	38
		10			17200	11	45			18400	10	44			19600	10	44
		15			25700	24	55			27600	23	55			29400	22	55
	500	4	0.75	0.53	7700	2	20	0.80	0.57	8200	2	20	0.85	0.61	8800	2	20
		6			11500	4	31			12400	3	31			13200	3	31
		8			15400	6	38			16500	6	38			17600	6	38
		10			19200	10	44			20600	10	44			22000	9	44
		15			28900	22	55			30900	22	55			33000	21	55
	550	4	0.83	0.59	8500	2	20	0.88	0.63	9100	1	20	0.94	0.68	9700	1	20
		6			12800	3	31			13700	3	31			14600	3	31
		8			17100	6	38			18300	6	38			19500	6	38
		10			21300	9	44			22800	9	44			24300	9	44
		15			32000	21	55			34200	21	54			36500	20	54
	600	4	0.90	0.65	9400	1	20	0.96	0.70	10000	1	20	1.02	0.74	10700	1	20
		6			14000	3	30			15000	3	30			16000	3	30
		8			18700	6	38			20000	6	38			21400	6	38
		10			23400	9	44			25000	9	44			26700	9	44
		15			35100	20	54			37600	20	54			40000	19	54
	650	4	0.98	0.71	10200	1	20	1.04	0.76	10900	1	20	1.11	0.81	11600	1	20
		6			15300	3	30			16400	3	30			17400	3	30
		8			20400	6	38			21800	5	38			23200	5	38
		10			25500	9	44			27300	9	44			29100	8	44
		15			38200	20	54			40900	19	54			43600	19	54
	700	4	1.05	0.77	11000	1	20	1.12	0.82	11800	1	20	1.19	0.87	12600	1	20
		6			16500	3	30			17700	3	30			18800	3	30
		8			22000	5	38			23600	5	38			25100	5	38
		10			27600	9	44			29500	8	44			31400	8	44
		15			41300	19	54			44200	19	54			47100	18	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1500						1600					1700				
width B [mm]		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
	750	4	1.13	0.82	11900	1	20	1.20	0.88	12700	1	20	1.28	0.94	13500	1	20
		6			17800	3	30			19000	3	30			20300	3	30
		8			23700	5	38			25400	5	38			27000	5	38
		10			29600	8	44			31700	8	44			33800	8	44
		15			44400	19	54			47500	18	54			50600	18	54
	800	4	1.20	0.88	12700	1	20	1.28	0.94	13600	1	20	1.36	1.00	14400	1	20
		6			19000	3	30			20300	3	30			21700	3	30
		8			25400	5	38			27100	5	38			28900	5	38
		10			31700	8	44			33900	8	44			36100	8	44
		15			47600	18	54			50900	18	54			54200	17	54
	850	4	1.28	0.94	13500	1	20	1.36	1.00	14500	1	20	1.45	1.07	15400	1	20
		6			20300	3	30			21700	3	30			23100	3	30
		8			27000	5	38			28900	5	38			30800	5	38
		10			33800	8	44			36100	8	44			38500	8	44
		15			50700	18	54			54200	17	54			57700	17	54
	900	4	1.35	1.00	14300	1	20	1.44	1.07	15300	1	20	1.53	1.13	16300	1	20
		6			21500	3	30			23000	3	30			24500	3	30
		8			28700	5	38			30700	5	38			32700	5	38
		10			35900	8	44			38300	8	44			40800	7	44
		15			53800	17	54			57500	17	54			61200	17	54
	950	4	1.43	1.05	15200	1	20	1.52	1.13	16200	1	20	1.62	1.20	17300	1	20
		6			22800	3	30			24300	3	30			25900	3	30
		8			30300	5	38			32400	5	38			34600	5	38
		10			37900	8	44			40600	7	44			43200	7	44
		15			56900	17	54			60800	17	54			64800	17	54
	1000	4	1.50	1.11	16000	1	20	1.60	1.19	17100	1	20	1.70	1.27	18200	1	20
		6			24000	3	30			25700	3	30			27300	3	30
		8			32000	5	38			34200	5	38			36400	5	38
		10			40000	7	44			42800	7	44			45500	7	44
		15			60000	17	54			64200	17	54			68300	16	54
	1050	4	1.58	1.17	16800	1	20	1.68	1.25	18000	1	20	1.79	1.33	19200	1	20
		6			25300	3	30			27000	3	30			28700	3	31
		8			33700	5	38			36000	5	38			38300	5	38
		10			42100	7	44			45000	7	44			47900	7	44
		15			63100	17	54			67500	16	54			71900	16	54
	1100	4	1.65	1.23	17700	1	20	1.76	1.31	18900	1	20	1.87	1.40	20100	1	20
		6			26500	3	30			28300	3	30			30200	3	31
		8			35300	5	38			37800	5	38			40200	5	38
		10			44200	7	44			47200	7	44			50300	7	44
		15			66300	16	54			70800	16	54			75400	16	54

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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]	1800						1900						2000					
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]		S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]		S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
300	4	0.54	0.37	5300	2	22		0.57	0.39	5700	2	22		0.60	0.42	6000	2	22	
	6			8000	5	32				8500	4	32				9000	4	32	
	8			10700	8	40				11300	8	40				12000	8	40	
	10			13400	13	46				14200	12	46				15000	12	45	
	15			20100	28	56				21300	28	56				22500	27	56	
350	4	0.63	0.44	6300	2	21		0.67	0.47	6700	2	21		0.70	0.49	7100	2	21	
	6			9500	4	32				10100	4	32				10700	4	32	
	8			12700	7	39				13500	7	39				14200	7	39	
	10			15900	11	45				16800	11	45				17800	11	45	
	15			23800	25	56				25200	25	55				26700	24	55	
400	4	0.72	0.51	7300	2	21		0.76	0.54	7800	2	21		0.80	0.57	8200	2	20	
	6			11000	4	31				11700	4	31				12300	4	31	
	8			14700	7	39				15600	6	39				16400	6	39	
	10			18400	10	45				19500	10	45				20500	10	44	
	15			27500	23	55				29200	23	55				30800	22	55	
450	4	0.81	0.58	8300	2	20		0.86	0.61	8800	2	20		0.90	0.65	9300	1	20	
	6			12500	3	31				13300	3	31				14000	3	31	
	8			16700	6	38				17700	6	38				18700	6	38	
	10			20900	10	44				22100	9	44				23300	9	44	
	15			31300	22	55				33100	21	55				35000	21	55	
500	4	0.90	0.65	9300	1	20		0.95	0.69	9900	1	20		1.00	0.72	10400	1	20	
	6			14000	3	31				14800	3	31				15700	3	31	
	8			18700	6	38				19800	6	38				20900	6	38	
	10			23400	9	44				24700	9	44				26100	9	44	
	15			35000	21	55				37100	20	55				39100	20	54	
550	4	0.99	0.72	10300	1	20		1.05	0.76	10900	1	20		1.10	0.80	11500	1	20	
	6			15500	3	31				16400	3	31				17300	3	31	
	8			20700	6	38				21900	6	38				23100	5	38	
	10			25900	9	44				27400	9	44				28900	8	44	
	15			38800	20	54				41000	19	54				43300	19	54	
600	4	1.08	0.79	11300	1	20		1.14	0.83	12000	1	20		1.20	0.88	12700	1	20	
	6			17000	3	30				18000	3	30				19000	3	31	
	8			22700	5	38				24000	5	38				25300	5	38	
	10			28300	8	44				30000	8	44				31600	8	44	
	15			42500	19	54				45000	19	54				47500	18	54	
650	4	1.17	0.86	12300	1	20		1.24	0.91	13100	1	20		1.30	0.96	13800	1	20	
	6			18500	3	30				19600	3	30				20700	3	31	
	8			24700	5	38				26100	5	38				27500	5	38	
	10			30800	8	44				32600	8	44				34400	8	44	
	15			46300	18	54				48900	18	54				51600	18	54	
700	4	1.26	0.93	13300	1	20		1.33	0.98	14100	1	20		1.40	1.03	14900	1	20	
	6			20000	3	30				21200	3	30				22300	3	30	
	8			26700	5	38				28200	5	38				29800	5	38	
	10			33300	8	44				35300	8	44				37200	8	44	
	15			50000	18	54				52900	18	54				55800	17	54	

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1800						1900					2000				
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
width B [mm]																	
750	4	1.35	1.00	14300	1	20	1.43	1.05	15200	1	20	1.50	1.11	16000	1	20
	6			21500	3	30			22700	3	30			24000	3	30
	8			28700	5	38			30300	5	38			32000	5	38
	10			35800	8	44			37900	8	44			40000	8	44
	15			53700	17	54			56900	17	54			60000	17	54
800	4	1.44	1.06	15300	1	20	1.52	1.13	16200	1	20	1.60	1.19	17100	1	20
	6			23000	3	30			24300	3	30			25600	3	30
	8			30700	5	38			32400	5	38			34200	5	38
	10			38300	8	44			40500	7	44			42700	7	44
	15			57500	17	54			60800	17	54			64100	17	54
850	4	1.53	1.13	16300	1	20	1.62	1.20	17300	1	20	1.70	1.26	18200	1	20
	6			24500	3	30			25900	3	30			27300	3	31
	8			32700	5	38			34500	5	38			36400	5	38
	10			40800	7	44			43200	7	44			45500	7	44
	15			61200	17	54			64800	17	54			68300	16	54
900	4	1.62	1.20	17300	1	20	1.71	1.27	18300	1	20	1.80	1.34	19300	1	20
	6			26000	3	30			27500	3	31			29000	3	31
	8			34700	5	38			36600	5	38			38600	5	38
	10			43300	7	44			45800	7	44			48300	7	44
	15			65000	17	54			68700	16	54			72400	16	54
950	4	1.71	1.27	18300	1	20	1.81	1.35	19400	1	20	1.90	1.42	20400	1	20
	6			27500	3	31			29100	3	31			30600	3	31
	8			36700	5	38			38800	5	38			40900	5	38
	10			45800	7	44			48400	7	44			51100	7	44
	15			68700	16	54			72700	16	54			76600	16	55
1000	4	1.80	1.34	19300	1	20	1.90	1.42	20400	1	20	2.00	1.50	21500	1	20
	6			29000	3	31			30600	3	31			32300	3	31
	8			38600	5	38			40900	5	38			43100	4	38
	10			48300	7	44			51100	7	44			53800	7	44
	15			72500	16	54			76600	16	55			80800	16	55
1050	4	1.89	1.41	20300	1	20	2.00	1.49	21500	1	20	2.10	1.57	22600	1	20
	6			30500	3	31			32200	3	31			34000	2	31
	8			40600	5	38			43000	4	38			45300	4	38
	10			50800	7	44			53700	7	44			56600	7	44
	15			76200	16	54			80600	16	55			84900	15	55
1100	4	1.98	1.48	21300	1	20	2.09	1.57	22500	1	20	2.20	1.65	23800	1	20
	6			32000	3	31			33800	2	31			35600	2	31
	8			42600	4	38			45100	4	38			47500	4	38
	10			53300	7	44			56300	7	44			59400	7	44
	15			80000	16	55			84500	15	55			89100	15	55

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]																
	2100						2200					2300					
	v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	L_{WA} [dB]
300	4	0.63	0.44	6300	2	21	0.66	0.46	6700	2	22	0.69	0.48	7000	2	21
	6			9500	4	32			10000	4	32			10500	4	32
	8			12600	7	39			13300	7	39			14000	7	39
	10			15800	12	45			16600	11	45			17400	11	45
	15			23700	26	56			24900	25	56			26200	25	56
350	4	0.74	0.52	7500	2	21	0.77	0.55	7900	2	21	0.81	0.57	8300	2	21
	6			11200	4	31			11800	4	31			12400	4	31
	8			15000	7	39			15700	7	39			16500	6	39
	10			18700	10	45			19700	10	45			20600	10	45
	15			28100	24	55			29500	23	55			30900	22	55
400	4	0.84	0.60	8700	2	21	0.88	0.63	9100	2	20	0.92	0.66	9500	1	20
	6			13000	3	31			13600	3	31			14300	3	31
	8			17300	6	39			18200	6	39			19100	6	39
	10			21600	10	44			22700	9	44			23800	9	44
	15			32500	22	55			34100	21	55			35700	21	55
450	4	0.95	0.68	9800	1	20	0.99	0.72	10300	1	20	1.04	0.75	10800	1	20
	6			14700	3	31			15500	3	31			16200	3	31
	8			19600	6	38			20600	6	38			21600	6	38
	10			24600	9	44			25800	9	44			27000	9	44
	15			36800	20	55			38700	20	55			40500	20	55
500	4	1.05	0.76	11000	1	20	1.10	0.80	11500	1	20	1.15	0.84	12100	1	20
	6			16500	3	31			17300	3	31			18100	3	31
	8			22000	6	38			23100	5	38			24200	5	38
	10			27500	9	44			28800	9	44			30200	8	44
	15			41200	19	55			43300	19	55			45300	19	55
550	4	1.16	0.84	12200	1	20	1.21	0.89	12800	1	20	1.27	0.93	13400	1	20
	6			18200	3	31			19100	3	31			20000	3	31
	8			24300	5	38			25500	5	38			26700	5	38
	10			30400	8	44			31900	8	44			33400	8	44
	15			45600	19	54			47800	18	54			50100	18	54
600	4	1.26	0.92	13300	1	20	1.32	0.97	14000	1	20	1.38	1.02	14600	1	20
	6			20000	3	31			21000	3	31			22000	3	31
	8			26600	5	38			28000	5	38			29300	5	38
	10			33300	8	44			34900	8	44			36600	8	44
	15			49900	18	54			52400	18	54			54900	18	54
650	4	1.37	1.01	14500	1	20	1.43	1.06	15200	1	20	1.50	1.11	15900	1	20
	6			21700	3	30			22800	3	31			23900	3	31
	8			29000	5	38			30400	5	38			31800	5	38
	10			36200	8	44			38000	8	44			39800	8	44
	15			54300	18	54			57000	17	54			59700	17	54
700	4	1.47	1.09	15600	1	20	1.54	1.14	16400	1	20	1.61	1.19	17200	1	20
	6			23500	3	31			24600	3	31			25800	3	31
	8			31300	5	38			32800	5	38			34400	5	38
	10			39100	8	44			41100	8	44			43000	7	44
	15			58700	17	54			61600	17	54			64500	17	54

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

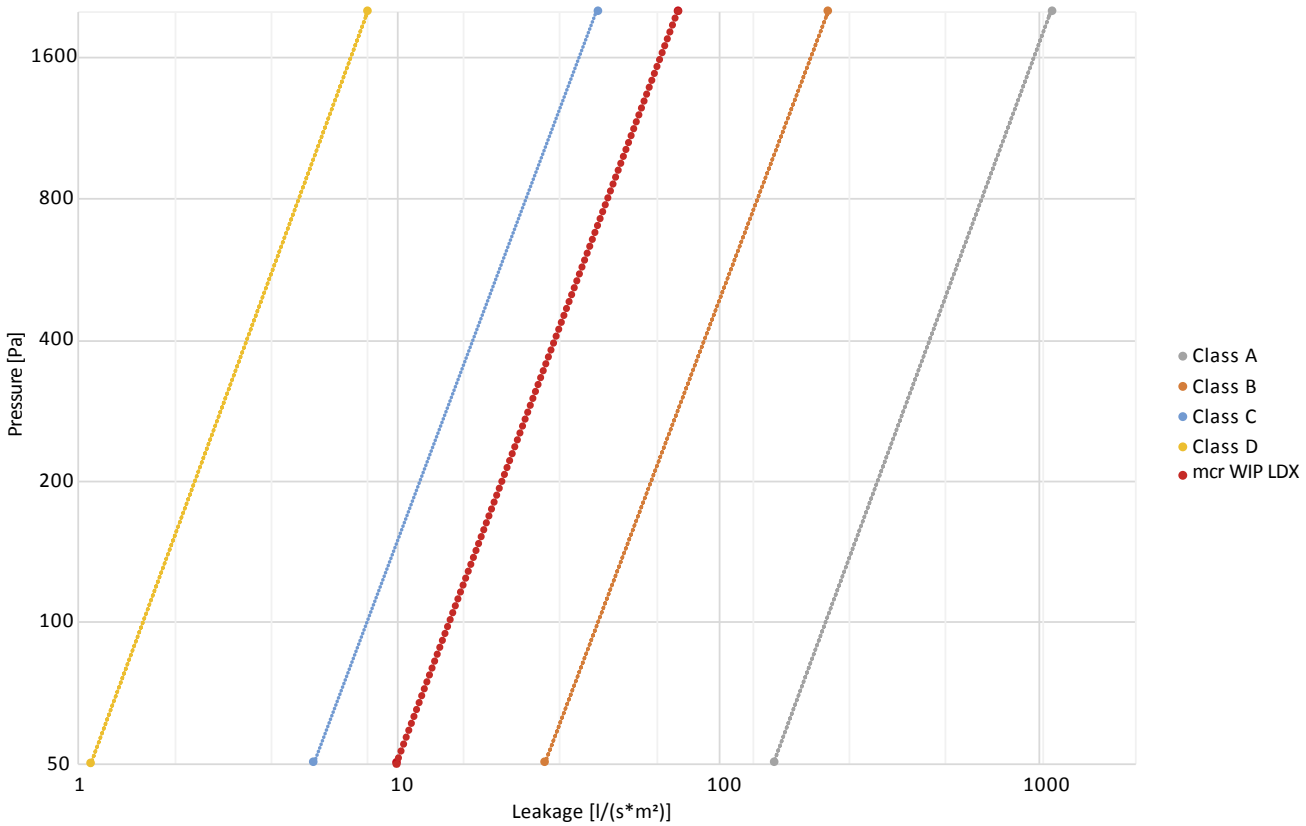
width B [mm]	height H [mm]	v [m/s]	2100 S_k [m²]	2100 S_e [m²]	2100 Q [m³/h]	2100 d_p [PA]	2100 L_{WA} [dB]	2200 S_k [m²]	2200 S_e [m²]	2200 Q [m³/h]	2200 d_p [PA]	2200 L_{WA} [dB]	2300 S_k [m²]	2300 S_e [m²]	2300 Q [m³/h]	2300 d_p [PA]	2300 L_{WA} [dB]
	750	4			16800	1	20			17600	1	20			18500	1	20
		6			25200	3	31			26500	3	31			27700	3	31
		8	1.58	1.17	33600	5	38	1.65	1.23	35300	5	38	1.73	1.28	36900	5	38
		10			42000	7	44			44100	7	44			46200	7	44
		15			63100	17	54			66200	17	54			69300	16	55
	800	4			18000	1	20			18900	1	20			19700	1	20
		6			27000	3	31			28300	3	31			29600	3	31
		8	1.68	1.25	36000	5	38	1.76	1.31	37700	5	38	1.84	1.37	39500	5	38
		10			45000	7	44			47200	7	44			49400	7	44
		15			67400	16	54			70700	16	54			74100	16	55
	850	4			19100	1	20			20100	1	20			21000	1	20
		6			28700	3	31			30100	3	31			31500	3	31
		8	1.79	1.33	38300	5	38	1.87	1.39	40200	5	38	1.96	1.46	42000	4	38
		10			47900	7	44			50200	7	44			52600	7	44
		15			71800	16	54			75300	16	55			78800	16	55
	900	4			20300	1	20			21300	1	20			22300	1	20
		6			30500	3	31			32000	3	31			33500	3	31
		8	1.89	1.41	40600	5	38	1.98	1.48	42600	4	38	2.07	1.55	44600	4	38
		10			50800	7	44			53300	7	44			55800	7	44
		15			76200	16	55			79900	16	55			83600	16	55
	950	4			21500	1	20			22500	1	20			23600	1	20
		6			32200	3	31			33800	2	31			35400	2	31
		8	2.00	1.49	43000	4	38	2.09	1.56	45100	4	38	2.19	1.64	47200	4	38
		10			53700	7	44			56300	7	44			58900	7	44
		15			80500	16	55			84500	16	55			88400	15	55
	1000	4			22600	1	20			23700	1	20			24900	1	20
		6			34000	2	31			35600	2	31			37300	2	31
		8	2.10	1.57	45300	4	38	2.20	1.65	47500	4	38	2.30	1.73	49700	4	38
		10			56600	7	44			59400	7	44			62100	7	44
		15			84900	16	55			89100	15	55			93200	15	55
	1050	4			23800	1	20			25000	1	20			26100	1	20
		6			35700	2	31			37500	2	31			39200	2	31
		8	2.21	1.65	47600	4	38	2.31	1.73	49900	4	38	2.42	1.81	52300	4	39
		10			59500	7	44			62400	7	44			65300	7	44
		15			89300	15	55			93600	15	55			98000	15	55
	1100	4			25000	1	20			26200	1	20			27400	1	21
		6			37500	2	31			39300	2	31			41100	2	31
		8	2.31	1.73	49900	4	38	2.42	1.82	52400	4	39	2.53	1.90	54800	4	39
		10			62400	7	44			65500	7	44			68500	7	44
		15			93700	15	55			98200	15	55			102800	15	55

18.7 | Damper active surface quick selection table [m2] (FREE AREA – APERTURE SIZES IN MM AND AREA IN MSQ)

Active surface a [m²]		Width Bo [mm]																
		395	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1195
Height Ho [mm]	680	0.18	0.21	0.24	0.27	0.3	0.33	0.36	0.39	0.42	0.45	0.48	0.51	0.54	0.57	0.6	0.63	0.66
	780	0.21	0.25	0.28	0.32	0.35	0.39	0.42	0.46	0.49	0.53	0.56	0.6	0.63	0.67	0.7	0.74	0.77
	880	0.24	0.28	0.32	0.36	0.4	0.44	0.48	0.52	0.56	0.6	0.64	0.68	0.72	0.76	0.8	0.84	0.88
	980	0.27	0.32	0.36	0.41	0.45	0.5	0.54	0.59	0.63	0.68	0.72	0.77	0.81	0.86	0.9	0.95	0.99
	1080	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	1.05	1.1
	1180	0.33	0.39	0.44	0.5	0.55	0.61	0.66	0.72	0.77	0.83	0.88	0.94	0.99	1.05	1.1	1.16	1.21
	1280	0.36	0.42	0.48	0.54	0.6	0.66	0.72	0.78	0.84	0.9	0.96	1.02	1.08	1.14	1.2	1.26	1.32
	1380	0.39	0.46	0.52	0.59	0.65	0.72	0.78	0.85	0.91	0.98	1.04	1.11	1.17	1.24	1.3	1.37	1.43
	1480	0.42	0.49	0.56	0.63	0.7	0.77	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	1.4	1.47	1.54
	1580	0.45	0.53	0.6	0.68	0.75	0.83	0.9	0.98	1.05	1.13	1.2	1.28	1.35	1.43	1.5	1.58	1.65
	1680	0.48	0.56	0.64	0.72	0.8	0.88	0.96	1.04	1.12	1.2	1.28	1.36	1.44	1.52	1.6	1.68	1.76
	1780	0.51	0.6	0.68	0.77	0.85	0.94	1.02	1.11	1.19	1.28	1.36	1.45	1.53	1.62	1.7	1.79	1.87
	1880	0.54	0.63	0.72	0.81	0.9	0.99	1.08	1.17	1.26	1.35	1.44	1.53	1.62	1.71	1.8	1.89	1.98
	1980	0.57	0.67	0.76	0.86	0.95	1.05	1.14	1.24	1.33	1.43	1.52	1.62	1.71	1.81	1.9	2	2.09
	2080	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2
	2180	0.63	0.74	0.84	0.95	1.05	1.16	1.26	1.37	1.47	1.58	1.68	1.79	1.89	2	2.1	2.21	2.31
	2280	0.66	0.77	0.88	0.99	1.1	1.21	1.32	1.43	1.54	1.65	1.76	1.87	1.98	2.09	2.2	2.31	2.42
	2380	0.69	0.81	0.92	1.04	1.15	1.27	1.38	1.5	1.61	1.73	1.84	1.96	2.07	2.19	2.3	2.42	2.53

Bo - hole width
Ho - hole height

18.8 | Sealed damper blade tightness according to EN1751



18.9 | Estimated weight of the mcr WIP LDX dampers [kg]

Height H [mm] \ Width B [mm]	300	400	500	600	700	800	900	1000	1100
600	24	26	29	31	34	36	39	41	43
700	26	28	31	34	36	39	41	44	46
800	28	31	33	36	39	42	44	47	50
900	30	33	36	39	42	45	47	50	53
1000	32	35	38	41	44	47	50	53	56
1100	34	38	41	44	47	50	53	57	59
1200	36	40	43	46	50	53	56	60	63
1300	39	42	46	49	52	56	59	63	66
1400	41	44	48	52	55	59	62	66	69
1500	43	47	50	54	58	62	65	69	73
1600	45	49	53	57	61	64	68	72	76
1700	47	51	55	59	63	67	71	75	79
1800	49	54	58	62	66	70	74	78	82
1900	52	56	60	65	69	73	77	82	86
2000	54	59	63	67	72	76	80	85	89
2100	57	61	66	70	75	79	83	88	92
2200	60	64	69	73	78	82	87	91	95
2300	62	67	71	76	80	85	90	94	99

18.10 | Accessories

18.10.1 | mcr MWS system masking element



MWS system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility. Bolts embedded in the damper are used to attach the masking grille body. After installation, an outer frame is mounted on the masking grille body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

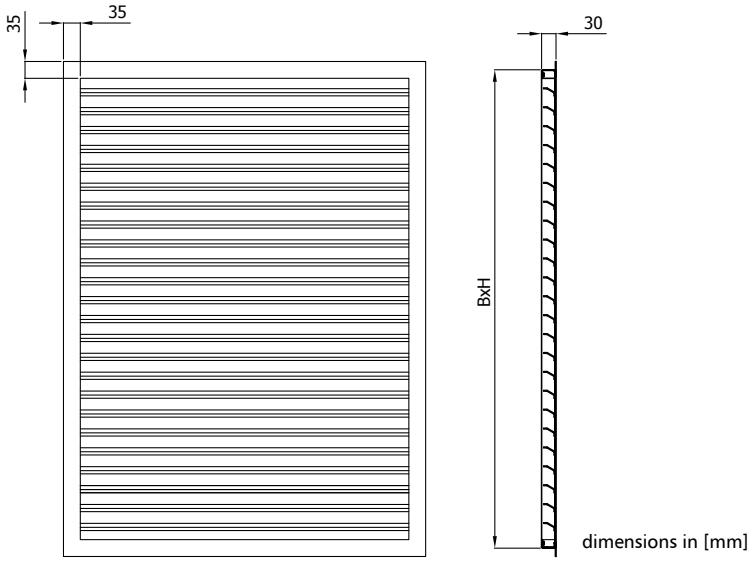
mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

Marking:

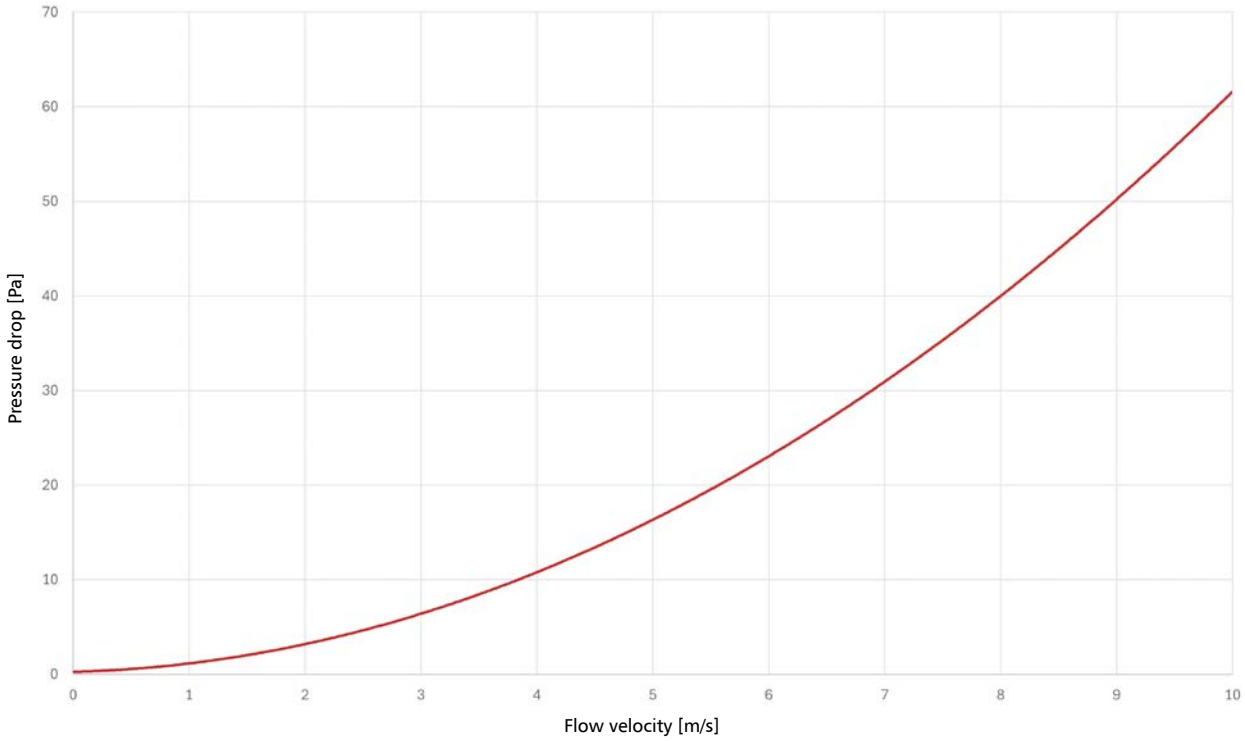
mcr MWS / B x H / X

- Additional parameters
- Width x height
- Damper type

X – material
[no symbol] – RAL9010
RALXXXX – selected color code from the RAL palette
NONE – unpainted masking element



»Pressure drop on masking grilles



18.10.2 | mcr MWS masking grilles technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]
300	4	0.21	0.11	1500	9	0.25	0.12	1800	10	0.28	0.14	2000	10
	6			2300	22			2700	23			3000	23
	8			3100	39			3500	39			4000	41
	10			3900	62			4400	62			5000	64
350	4	0.25	0.12	1800	10	0.28	0.14	2000	10	0.32	0.16	2300	10
	6			2700	22			3100	23			3400	22
	8			3600	40			4100	40			4600	41
	10			4400	60			5100	62			5700	62
400	4	0.28	0.14	2000	10	0.32	0.16	2300	10	0.36	0.18	2600	10
	6			3000	22			3500	23			3900	23
	8			4000	39			4600	40			5200	40
	10			5000	60			5800	63			6500	63
450	4	0.31	0.16	2200	9	0.36	0.18	2600	10	0.41	0.20	2900	10
	6			3400	22			3900	23			4400	23
	8			4500	39			5200	41			5800	40
	10			5600	61			6400	61			7300	64
500	4	0.34	0.17	2500	10	0.40	0.20	2800	10	0.45	0.22	3200	10
	6			3700	22			4300	23			4800	23
	8			5000	40			5700	40			6400	40
	10			6200	61			7100	62			8000	63
550	4	0.38	0.19	2700	10	0.43	0.22	3100	10	0.49	0.24	3500	10
	6			4100	22			4700	23			5300	23
	8			5400	38			6200	39			7000	40
	10			6800	61			7800	62			8800	63
600	4	0.41	0.20	3000	10	0.47	0.24	3400	10	0.53	0.27	3800	10
	6			4400	22			5100	23			5700	23
	8			5900	39			6800	40			7600	40
	10			7400	61			8500	63			9500	63
650	4	0.44	0.22	3200	10	0.51	0.25	3700	10	0.58	0.29	4100	10
	6			4800	22			5500	23			6200	23
	8			6400	39			7300	40			8200	40
	10			8000	61			9100	62			10300	63
700	4	0.47	0.24	3400	10	0.55	0.27	3900	10	0.62	0.31	4400	10
	6			5100	22			5900	23			6600	22
	8			6800	38			7800	39			8900	41
	10			8600	62			9800	62			11100	64
750	4	0.51	0.25	3700	10	0.58	0.29	4200	10	0.66	0.33	4700	10
	6			5500	22			6300	22			7100	23
	8			7300	39			8400	40			9500	41
	10			9100	60			10500	62			11800	63
800	4	0.54	0.27	3900	10	0.62	0.31	4500	10	0.71	0.35	5000	10
	6			5800	22			6700	22			7600	23
	8			7800	39			8900	40			10100	41
	10			9700	61			11200	63			12600	63
850	4	0.57	0.29	4100	10	0.66	0.33	4700	10	0.75	0.37	5300	10
	6			6200	22			7100	22			8000	23
	8			8300	39			9500	40			10700	41
	10			10300	61			11800	62			13300	63
900	4	0.60	0.30	4400	10	0.70	0.35	5000	10	0.79	0.39	5600	10
	6			6500	22			7500	22			8500	23
	8			8700	39			10000	40			11300	41
	10			10900	61			12500	62			14100	63
950	4	0.64	0.32	4600	10	0.73	0.37	5300	10	0.83	0.41	5900	10
	6			6900	22			7900	22			8900	23
	8			9200	39			10500	39			11900	41
	10			11500	61			13200	62			14900	64
1000	4	0.67	0.34	4800	10	0.77	0.38	5500	10	0.88	0.43	6300	10
	6			7200	22			8300	22			9400	23
	8			9700	39			11100	40			12500	40
	10			12100	61			13900	63			15600	63
1050	4	0.70	0.35	5100	10	0.81	0.40	5800	10	0.92	0.46	6600	10
	6			7600	22			8700	22			9800	23
	8			10100	39			11600	40			13100	40
	10			12700	61			14500	62			16400	63
1100	4	0.73	0.37	5300	10	0.85	0.42	6100	10	0.96	0.48	6900	10
	6			8000	22			9100	22			10300	23
	8			10600	39			12200	40			13700	40
	10			13300	61			15200	62			17100	63

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B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]
300	4	0.31	0.15	2200	10	0.34	0.17	2400	10	0.38	0.19	2700	11
	6			3300	23			3700	24			4000	23
	8			4400	40			4900	42			5300	41
	10			5600	65			6100	64			6700	66
350	4	0.36	0.18	2600	11	0.40	0.20	2800	10	0.44	0.21	3100	11
	6			3800	23			4200	23			4600	23
	8			5100	41			5600	41			6200	42
	10			6400	64			7100	66			7700	65
400	4	0.41	0.20	2900	10	0.45	0.22	3200	10	0.49	0.24	3500	11
	6			4300	23			4800	23			5200	23
	8			5800	41			6400	42			7000	42
	10			7200	63			8000	65			8700	65
450	4	0.45	0.22	3200	10	0.50	0.25	3600	11	0.55	0.27	3900	10
	6			4900	24			5400	24			5800	23
	8			6500	41			7100	41			7800	42
	10			8100	64			8900	65			9700	65
500	4	0.50	0.25	3600	10	0.56	0.27	3900	10	0.61	0.30	4300	10
	6			5400	23			5900	23			6500	24
	8			7200	42			7900	42			8600	42
	10			8900	64			9900	65			10800	66
550	4	0.55	0.27	3900	10	0.61	0.30	4300	10	0.67	0.33	4700	10
	6			5900	23			6500	24			7100	24
	8			7800	41			8600	41			9400	42
	10			9800	64			10800	65			11800	66
600	4	0.60	0.30	4300	10	0.66	0.33	4700	10	0.72	0.36	5100	10
	6			6400	23			7000	23			7700	24
	8			8500	41			9400	42			10200	42
	10			10600	64			11700	65			12800	65
650	4	0.65	0.32	4600	10	0.71	0.35	5100	11	0.78	0.38	5500	10
	6			6900	23			7600	23			8300	24
	8			9200	41			10100	41			11100	42
	10			11500	64			12700	65			13800	65
700	4	0.69	0.34	4900	10	0.77	0.38	5400	10	0.84	0.41	5900	10
	6			7400	23			8200	24			8900	24
	8			9900	41			10900	42			11900	42
	10			12300	64			13600	65			14800	65
750	4	0.74	0.37	5300	10	0.82	0.40	5800	10	0.90	0.44	6300	10
	6			7900	23			8700	23			9500	23
	8			10500	41			11600	41			12700	42
	10			13200	64			14500	65			15900	66
800	4	0.79	0.39	5600	10	0.87	0.43	6200	10	0.95	0.47	6800	11
	6			8400	23			9300	23			10100	23
	8			11200	41			12400	42			13500	42
	10			14000	64			15400	64			16900	66
850	4	0.84	0.41	5900	10	0.92	0.46	6600	11	1.01	0.50	7200	11
	6			8900	23			9800	23			10700	23
	8			11900	41			13100	41			14300	42
	10			14900	64			16400	65			17900	65
900	4	0.88	0.44	6300	10	0.98	0.48	6900	10	1.07	0.53	7600	11
	6			9400	23			10400	23			11400	24
	8			12600	41			13900	42			15100	42
	10			15700	64			17300	65			18900	65
950	4	0.93	0.46	6600	10	1.03	0.51	7300	10	1.13	0.55	8000	11
	6			9900	23			10900	23			12000	24
	8			13200	41			14600	41			16000	42
	10			16600	64			18200	64			19900	65
1000	4	0.98	0.48	7000	10	1.08	0.53	7700	10	1.18	0.58	8400	11
	6			10400	23			11500	23			12600	24
	8			13900	41			15300	41			16800	42
	10			17400	64			19200	65			21000	66
1050	4	1.03	0.51	7300	10	1.13	0.56	8000	10	1.24	0.61	8800	10
	6			11000	23			12100	23			13200	24
	8			14600	41			16100	42			17600	42
	10			18300	64			20100	65			22000	66
1100	4	1.07	0.53	7600	10	1.19	0.58	8400	10	1.30	0.64	9200	10
	6			11500	23			12600	23			13800	24
	8			15300	41			16800	41			18400	42
	10			19100	64			21000	65			23000	65

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1200 S_k [m²]	1200 S_e [m²]	1200 Q [m³/h]	1200 d_p [PA]	1300 S_k [m²]	1300 S_e [m²]	1300 Q [m³/h]	1300 d_p [PA]	1400 S_k [m²]	1400 S_e [m²]	1400 Q [m³/h]	1400 d_p [PA]
300	4	0.41	0.20	2900	11	0.44	0.22	3100	10	0.48	0.23	3400	11
	6			4400	24			4700	24			5000	24
	8			5800	42			6300	43			6700	43
	10			7300	67			7800	66			8400	67
350	4	0.47	0.23	3300	10	0.51	0.25	3600	11	0.55	0.27	3900	11
	6			5000	24			5400	24			5800	24
	8			6700	42			7200	42			7700	42
	10			8400	67			9000	66			9700	67
400	4	0.54	0.26	3800	11	0.58	0.28	4100	11	0.62	0.30	4400	11
	6			5700	24			6100	24			6600	24
	8			7600	42			8200	43			8800	43
	10			9500	66			10200	66			10900	66
450	4	0.60	0.29	4200	10	0.65	0.32	4600	11	0.69	0.34	4900	11
	6			6300	23			6800	24			7300	24
	8			8500	43			9100	42			9800	43
	10			10600	66			11400	66			12200	66
500	4	0.66	0.32	4700	11	0.71	0.35	5000	10	0.77	0.38	5400	11
	6			7000	24			7600	24			8100	24
	8			9300	42			10100	43			10800	43
	10			11700	66			12600	66			13500	67
550	4	0.72	0.36	5100	10	0.78	0.38	5500	11	0.84	0.41	5900	11
	6			7700	24			8300	24			8900	24
	8			10200	42			11000	42			11800	43
	10			12800	66			13800	67			14800	67
600	4	0.79	0.39	5600	11	0.85	0.42	6000	11	0.91	0.45	6400	11
	6			8300	24			9000	24			9600	24
	8			11100	42			12000	43			12800	42
	10			13900	66			15000	67			16100	67
650	4	0.85	0.42	6000	11	0.92	0.45	6500	11	0.98	0.48	6900	11
	6			9000	24			9700	24			10400	24
	8			12000	42			12900	42			13900	43
	10			15000	66			16200	67			17300	66
700	4	0.91	0.45	6400	10	0.98	0.48	6900	10	1.06	0.52	7400	11
	6			9700	24			10400	24			11200	24
	8			12900	42			13900	43			14900	43
	10			16100	66			17400	67			18600	67
750	4	0.97	0.48	6900	11	1.05	0.52	7400	11	1.13	0.55	8000	11
	6			10300	24			11100	24			11900	24
	8			13800	42			14800	42			15900	43
	10			17200	66			18500	66			19900	67
800	4	1.04	0.51	7300	10	1.12	0.55	7900	11	1.20	0.59	8500	11
	6			11000	24			11800	24			12700	24
	8			14600	42			15800	42			16900	42
	10			18300	66			19700	66			21200	67
850	4	1.10	0.54	7800	11	1.19	0.58	8400	11	1.27	0.62	9000	11
	6			11700	24			12600	24			13500	24
	8			15500	42			16700	42			18000	43
	10			19400	66			20900	66			22500	67
900	4	1.16	0.57	8200	11	1.25	0.61	8900	11	1.35	0.66	9500	11
	6			12300	24			13300	24			14200	24
	8			16400	42			17700	42			19000	43
	10			20500	66			22100	66			23700	67
950	4	1.22	0.60	8700	11	1.32	0.65	9300	11	1.42	0.69	10000	11
	6			13000	24			14000	24			15000	24
	8			17300	42			18700	43			20000	43
	10			21600	66			23300	66			25000	67
1000	4	1.29	0.63	9100	11	1.39	0.68	9800	11	1.49	0.73	10500	11
	6			13600	24			14700	24			15800	24
	8			18200	42			19600	42			21000	43
	10			22700	66			24500	66			26300	67
1050	4	1.35	0.66	9500	10	1.46	0.71	10300	11	1.56	0.77	11000	11
	6			14300	24			15400	24			16500	24
	8			19100	42			20600	43			22100	43
	10			23800	66			25700	66			27600	67
1100	4	1.41	0.69	10000	11	1.52	0.75	10800	11	1.64	0.80	11500	11
	6			15000	24			16100	24			17300	24
	8			20000	42			21500	42			23100	43
	10			24900	66			26900	66			28800	66

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B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1500 S_k [m²]	1500 S_e [m²]	1500 Q [m³/h]	1500 d_p [PA]	1600 S_k [m²]	1600 S_e [m²]	1600 Q [m³/h]	1600 d_p [PA]	1700 S_k [m²]	1700 S_e [m²]	1700 Q [m³/h]	1700 d_p [PA]
300	4	0.51	0.25	3600	11	0.54	0.26	3800	11	0.57	0.28	4000	11
	6			5400	24			5700	24			6100	25
	8			7200	43			7600	43			8100	44
	10			9000	68			9500	67			10100	68
350	4	0.59	0.29	4100	11	0.62	0.30	4400	11	0.66	0.32	4700	11
	6			6200	24			6600	24			7000	24
	8			8300	43			8800	43			9300	43
	10			10300	67			11000	68			11600	67
400	4	0.66	0.32	4700	11	0.71	0.35	5000	11	0.75	0.37	5300	11
	6			7000	24			7500	25			7900	24
	8			9300	42			9900	43			10500	43
	10			11700	67			12400	67			13200	68
450	4	0.74	0.36	5200	11	0.79	0.39	5500	11	0.84	0.41	5900	11
	6			7800	24			8300	24			8800	24
	8			10400	43			11100	43			11800	44
	10			13000	67			13900	68			14700	68
500	4	0.82	0.40	5800	11	0.87	0.43	6100	11	0.92	0.45	6500	11
	6			8600	24			9200	24			9700	24
	8			11500	43			12300	43			13000	43
	10			14400	67			15300	67			16200	67
550	4	0.90	0.44	6300	11	0.95	0.47	6700	11	1.01	0.49	7100	11
	6			9500	24			10100	24			10700	24
	8			12600	43			13400	43			14200	43
	10			15800	67			16800	67			17800	68
600	4	0.97	0.48	6900	11	1.04	0.51	7300	11	1.10	0.54	7700	11
	6			10300	24			10900	24			11600	24
	8			13700	43			14600	43			15500	44
	10			17100	67			18200	67			19300	67
650	4	1.05	0.51	7400	11	1.12	0.55	7900	11	1.19	0.58	8300	11
	6			11100	24			11800	24			12500	24
	8			14800	43			15700	43			16700	43
	10			18500	67			19700	67			20900	68
700	4	1.13	0.55	7900	11	1.20	0.59	8500	11	1.28	0.62	9000	11
	6			11900	24			12700	24			13400	24
	8			15900	43			16900	43			17900	43
	10			19900	67			21100	67			22400	68
750	4	1.21	0.59	8500	11	1.28	0.63	9000	11	1.36	0.66	9600	11
	6			12700	24			13500	24			14400	24
	8			17000	43			18100	43			19100	43
	10			21200	67			22600	67			23900	67
800	4	1.28	0.63	9000	11	1.37	0.67	9600	11	1.45	0.71	10200	11
	6			13600	24			14400	24			15300	24
	8			18100	43			19200	43			20400	43
	10			22600	67			24000	67			25500	68
850	4	1.36	0.67	9600	11	1.45	0.71	10200	11	1.54	0.75	10800	11
	6			14400	24			15300	24			16200	24
	8			19200	43			20400	43			21600	43
	10			24000	67			25500	67			27000	68
900	4	1.44	0.70	10100	11	1.53	0.75	10800	11	1.63	0.79	11400	11
	6			15200	24			16200	24			17100	24
	8			20300	43			21500	43			22800	43
	10			25300	67			26900	67			28500	67
950	4	1.52	0.74	10700	11	1.62	0.79	11400	11	1.71	0.84	12000	11
	6			16000	24			17000	24			18000	24
	8			21400	43			22700	43			24100	43
	10			26700	67			28400	67			30100	68
1000	4	1.59	0.78	11200	11	1.70	0.83	11900	11	1.80	0.88	12600	11
	6			16800	24			17900	24			19000	24
	8			22500	43			23900	43			25300	43
	10			28100	67			29800	67			31600	67
1050	4	1.67	0.82	11800	11	1.78	0.87	12500	11	1.89	0.92	13300	11
	6			17700	24			18800	24			19900	24
	8			23500	43			25000	43			26500	43
	10			29400	67			31300	67			33200	68
1100	4	1.75	0.86	12300	11	1.86	0.91	13100	11	1.98	0.96	13900	11
	6			18500	24			19600	24			20800	24
	8			24600	43			26200	43			27800	43
	10			30800	67			32700	67			34700	68

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]
300	4	0.61	0.30	4300	11	0.64	0.31	4500	11	0.67	0.33	4700	11
	6			6400	24			6700	24			7100	25
	8			8500	43			9000	44			9400	43
	10			10700	68			11200	68			11800	68
350	4	0.70	0.34	4900	11	0.74	0.36	5200	11	0.78	0.38	5400	11
	6			7400	25			7800	25			8200	25
	8			9800	43			10300	43			10900	44
	10			12300	68			12900	68			13600	68
400	4	0.79	0.39	5600	11	0.84	0.41	5900	11	0.88	0.43	6200	11
	6			8300	24			8800	25			9200	24
	8			11100	43			11700	43			12300	44
	10			13900	68			14600	68			15400	68
450	4	0.89	0.43	6200	11	0.93	0.45	6500	11	0.98	0.48	6900	11
	6			9300	24			9800	24			10300	25
	8			12400	43			13100	44			13700	43
	10			15500	68			16400	68			17200	68
500	4	0.98	0.48	6900	11	1.03	0.50	7200	11	1.08	0.53	7600	11
	6			10300	24			10800	24			11400	25
	8			13700	43			14500	44			15200	44
	10			17200	68			18100	68			19000	68
550	4	1.07	0.52	7500	11	1.13	0.55	7900	11	1.19	0.58	8300	11
	6			11300	25			11900	25			12500	25
	8			15000	43			15800	43			16600	44
	10			18800	68			19800	68			20800	68
600	4	1.16	0.57	8200	11	1.23	0.60	8600	11	1.29	0.63	9000	11
	6			12200	24			12900	25			13500	24
	8			16300	43			17200	44			18100	44
	10			20400	68			21500	68			22600	68
650	4	1.26	0.61	8800	11	1.32	0.64	9300	11	1.39	0.68	9700	11
	6			13200	24			13900	24			14600	24
	8			17600	43			18600	44			19500	44
	10			22000	68			23200	68			24400	68
700	4	1.35	0.66	9500	11	1.42	0.69	10000	11	1.49	0.73	10500	11
	6			14200	24			14900	24			15700	25
	8			18900	43			19900	43			20900	44
	10			23600	68			24900	68			26200	68
750	4	1.44	0.70	10100	11	1.52	0.74	10600	11	1.60	0.78	11200	11
	6			15200	25			16000	25			16800	25
	8			20200	43			21300	44			22400	44
	10			25300	68			26600	68			28000	68
800	4	1.53	0.75	10800	11	1.62	0.79	11300	11	1.70	0.83	11900	11
	6			16100	24			17000	24			17900	25
	8			21500	43			22700	44			23800	44
	10			26900	68			28300	68			29800	68
850	4	1.63	0.79	11400	11	1.71	0.83	12000	11	1.80	0.88	12600	11
	6			17100	24			18000	24			18900	24
	8			22800	43			24000	43			25200	43
	10			28500	68			30000	68			31600	68
900	4	1.72	0.84	12100	11	1.81	0.88	12700	11	1.90	0.93	13300	11
	6			18100	24			19000	24			20000	25
	8			24100	43			25400	44			26700	44
	10			30100	68			31700	68			33400	68
950	4	1.81	0.88	12700	11	1.91	0.93	13400	11	2.01	0.98	14100	11
	6			19100	25			20100	25			21100	25
	8			25400	43			26800	44			28100	44
	10			31800	68			33500	68			35100	68
1000	4	1.90	0.93	13400	11	2.01	0.98	14100	11	2.11	1.03	14800	11
	6			20000	24			21100	24			22200	25
	8			26700	43			28100	43			29600	44
	10			33400	68			35200	68			36900	68
1050	4	2.00	0.97	14000	11	2.10	1.02	14800	11	2.21	1.08	15500	11
	6			21000	24			22100	24			23200	24
	8			28000	43			29500	44			31000	44
	10			35000	68			36900	68			38700	68
1100	4	2.09	1.02	14700	11	2.20	1.07	15400	11	2.31	1.13	16200	11
	6			22000	24			23200	25			24300	24
	8			29300	43			30900	44			32400	44
	10			36600	68			38600	68			40500	68

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

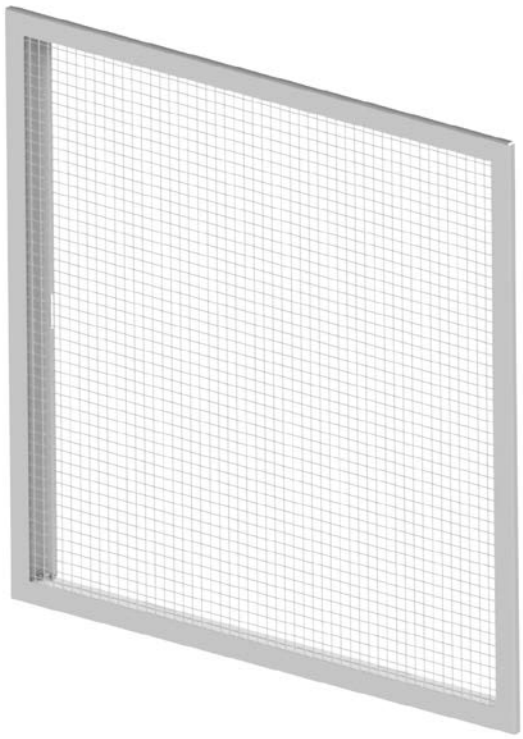
B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

			height H_k [mm]											
			2100				2200				2300			
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
width B_k [mm]	300	4	0.71	0.34	4900	11	0.74	0.36	5200	11	0.77	0.37	5400	11
		6			7400	25			7800	25			8100	25
		8			9900	44			10300	44			10800	44
		10			12400	69			12900	68			13500	69
	350	4	0.81	0.40	5700	11	0.85	0.41	6000	11	0.89	0.43	6200	11
		6			8500	24			8900	24			9300	25
		8			11400	44			11900	44			12400	44
		10			14200	68			14900	69			15500	68
	400	4	0.92	0.45	6400	11	0.96	0.47	6700	11	1.01	0.49	7000	11
		6			9700	25			10100	25			10600	25
		8			12900	44			13500	44			14100	44
		10			16100	68			16900	69			17600	69
	450	4	1.03	0.50	7200	11	1.08	0.52	7500	11	1.12	0.55	7900	11
		6			10800	25			11300	25			11800	25
		8			14400	44			15100	44			15700	44
		10			18000	68			18800	68			19700	69
	500	4	1.14	0.55	8000	11	1.19	0.58	8300	11	1.24	0.60	8700	11
		6			11900	24			12500	25			13000	25
		8			15900	44			16600	44			17400	44
		10			19900	68			20800	68			21700	69
	550	4	1.24	0.60	8700	11	1.30	0.63	9100	11	1.36	0.66	9500	11
		6			13100	25			13700	25			14300	25
		8			17400	44			18200	44			19000	44
		10			21800	69			22800	69			23800	69
	600	4	1.35	0.66	9500	11	1.41	0.69	9900	11	1.48	0.72	10300	11
		6			14200	25			14800	25			15500	25
		8			18900	44			19800	44			20700	44
		10			23700	69			24700	68			25800	69
	650	4	1.46	0.71	10200	11	1.53	0.74	10700	11	1.59	0.77	11200	11
		6			15300	25			16000	25			16700	25
		8			20400	44			21400	44			22300	44
		10			25500	68			26700	68			27900	69
	700	4	1.57	0.76	11000	11	1.64	0.80	11500	11	1.71	0.83	12000	11
		6			16500	25			17200	25			18000	25
		8			21900	44			22900	44			23900	44
		10			27400	68			28700	69			29900	68
	750	4	1.67	0.81	11700	11	1.75	0.85	12300	11	1.83	0.89	12800	11
		6			17600	25			18400	25			19200	25
		8			23400	44			24500	44			25600	44
		10			29300	68			30600	68			32000	69
	800	4	1.78	0.87	12500	11	1.86	0.91	13000	11	1.95	0.95	13600	11
		6			18700	25			19600	25			20400	25
		8			25000	44			26100	44			27200	44
		10			31200	68			32600	68			34000	68
	850	4	1.89	0.92	13200	11	1.98	0.96	13800	11	2.06	1.00	14400	11
		6			19800	24			20800	25			21700	25
		8			26500	44			27700	44			28900	44
		10			33100	68			34600	69			36100	69
	900	4	2.00	0.97	14000	11	2.09	1.02	14600	11	2.18	1.06	15300	11
		6			21000	25			21900	25			22900	25
		8			28000	44			29200	44			30500	44
		10			35000	69			36600	69			38200	69
	950	4	2.10	1.02	14700	11	2.20	1.07	15400	11	2.30	1.12	16100	11
		6			22100	25			23100	25			24100	25
		8			29500	44			30800	44			32200	44
		10			36800	68			38500	68			40200	69
	1000	4	2.21	1.08	15500	11	2.31	1.12	16200	11	2.42	1.17	16900	11
		6			23200	25			24300	25			25400	25
		8			31000	44			32400	44			33800	44
		10			38700	68			40500	69			42300	69
	1050	4	2.32	1.13	16200	11	2.43	1.18	17000	11	2.53	1.23	17700	11
		6			24400	25			25500	25			26600	25
		8			32500	44			34000	44			35500	44
		10			40600	68			42500	69			44300	69
	1100	4	2.43	1.18	17000	11	2.54	1.23	17800	11	2.65	1.29	18600	11
		6			25500	25			26700	25			27800	25
		8			34000	44			35500	44			37100	44
		10			42500	68			44400	68			46400	69

18.10.3 | mcr MWSP system masking element



MWSP system masking grilles are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. Bolts embedded in the damper are used to attach the masking grille body. Such a solution allows for installing the product even in the most visually-demanding applications. The masking grilles are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

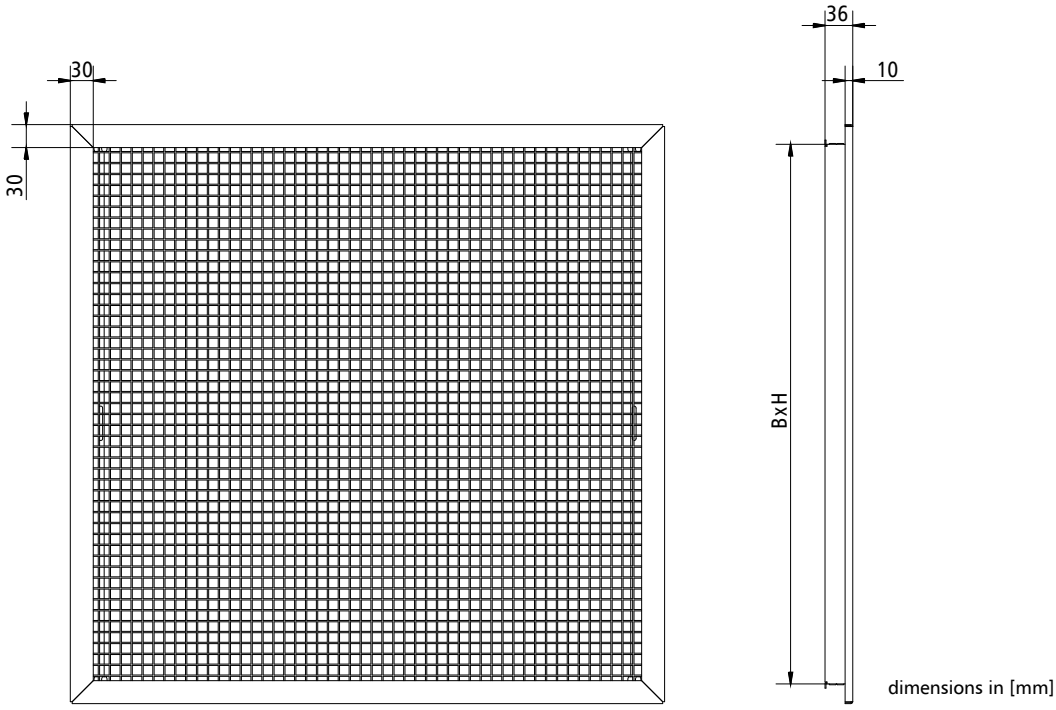
Marking:

mcr MWSP / B x H / X

- Additional parameters
- Width x height
- Damper type

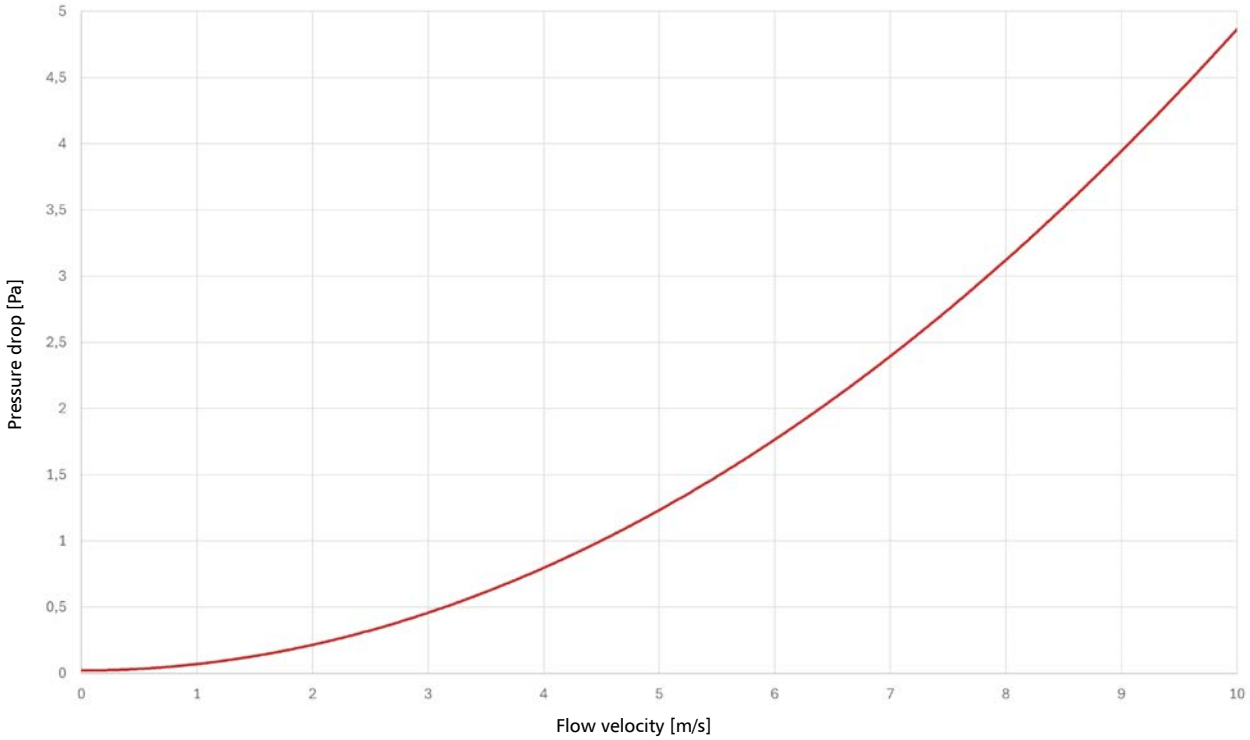
X – material
[no symbol] – RAL9010
RALXXXX – selected color code from the RAL palette
NONE – unpainted masking element

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems



dimensions in [mm]

» Pressure drop on masking grilles



18.10.4 | mcr MWSP masking grilles technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 600 S_k [m²]	600 S_e [m²]	600 Q [m³/h]	600 d_p [PA]	700 S_k [m²]	700 S_e [m²]	700 Q [m³/h]	700 d_p [PA]	800 S_k [m²]	800 S_e [m²]	800 Q [m³/h]	800 d_p [PA]
300	4	0.22	0.17	2500	1	0.254	0.20	2900	1	0.287	0.23	3200	1
	6			3700	2			4300	2			4900	2
	8			5000	3			5700	3			6500	3
	10			6200	5			7200	5			8100	5
350	4	0.25	0.20	2900	1	0.291	0.23	3300	1	0.330	0.26	3800	1
	6			4300	1			5000	1			5700	1
	8			5800	3			6700	3			7600	3
	10			7200	4			8300	4			9500	4
400	4	0.28	0.22	3200	1	0.329	0.26	3700	1	0.372	0.29	4200	1
	6			4800	2			5500	2			6300	2
	8			6400	3			7400	3			8400	3
	10			8000	5			9200	5			10500	5
450	4	0.32	0.25	3600	1	0.366	0.29	4200	1	0.415	0.33	4700	1
	6			5400	1			6300	2			7100	2
	8			7200	3			8300	3			9500	3
	10			9100	4			10400	4			11800	4
500	4	0.35	0.27	3900	1	0.404	0.31	4500	1	0.457	0.36	5100	1
	6			5900	2			6800	2			7700	2
	8			7900	3			9100	3			10300	3
	10			9800	5			11300	5			12800	5
550	4	0.38	0.30	4300	1	0.441	0.35	5000	1	0.500	0.39	5700	1
	6			6500	2			7500	2			8500	2
	8			8700	3			10000	3			11300	3
	10			10900	4			12500	4			14200	4
600	4	0.41	0.32	4700	1	0.479	0.37	5400	1	0.54	0.42	6100	1
	6			7000	2			8000	2			9100	2
	8			9300	3			10700	3			12200	3
	10			11600	5			13400	5			15200	5
650	4	0.45	0.35	5100	1	0.516	0.41	5800	1	0.585	0.46	6600	1
	6			7600	2			8800	2			9900	2
	8			10100	3			11700	3			13200	3
	10			12700	4			14600	5			16500	5
700	4	0.48	0.37	5400	1	0.554	0.43	6200	1	0.627	0.49	7000	1
	6			8100	2			9300	2			10500	2
	8			10800	3			12400	3			14000	3
	10			13500	5			15500	5			17600	5
750	4	0.51	0.40	5800	1	0.591	0.46	6700	1	0.670	0.53	7600	1
	6			8700	2			10000	2			11300	2
	8			11600	3			13400	3			15100	3
	10			14500	5			16700	5			18900	5
800	4	0.54	0.42	6100	1	0.629	0.49	7000	1	0.712	0.55	8000	1
	6			9200	2			10600	2			11900	2
	8			12200	3			14100	3			15900	3
	10			15300	5			17600	5			19900	5
850	4	0.58	0.45	6500	1	0.666	0.52	7500	1	0.755	0.59	8500	1
	6			9800	2			11300	2			12800	2
	8			13000	3			15000	3			17000	3
	10			16300	5			18800	5			21300	5
900	4	0.61	0.47	6800	1	0.704	0.55	7900	1	0.797	0.62	8900	1
	6			10200	2			11800	2			13400	2
	8			13700	3			15700	3			17800	3
	10			17100	5			19700	5			22300	5
950	4	0.64	0.50	7200	1	0.741	0.58	8300	1	0.840	0.66	9500	1
	6			10900	2			12500	2			14200	2
	8			14500	3			16700	3			18900	3
	10			18100	5			20900	5			23600	5
1000	4	0.67	0.52	7600	1	0.779	0.60	8700	1	0.882	0.68	9900	1
	6			11300	2			13100	2			14800	2
	8			15100	3			17400	3			19700	3
	10			18900	5			21800	5			24600	5
1050	4	0.71	0.55	8000	1	0.816	0.64	9200	1	0.925	0.72	10400	1
	6			12000	2			13800	2			15600	2
	8			15900	3			18400	3			20800	3
	10			19900	5			23000	5			26000	5
1100	4	0.74	0.58	8300	1	0.854	0.66	9500	1	0.967	0.75	10800	1
	6			12400	2			14300	2			16200	2
	8			16600	3			19100	3			21600	3
	10			20700	5			23900	5			27000	5

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

width B_k [mm]	height H_k [mm]	v [m/s]	900 S_k [m²]	900 S_e [m²]	900 Q [m³/h]	900 d_p [PA]	1000 S_k [m²]	1000 S_e [m²]	1000 Q [m³/h]	1000 d_p [PA]	1100 S_k [m²]	1100 S_e [m²]	1100 Q [m³/h]	1100 d_p [PA]
300		4	0.321	0.25	3600	1	0.355	0.28	4000	1	0.389	0.30	4400	1
		6			5400	2			6000	2			6600	2
		8			7200	3			8000	3			8700	3
		10			9000	5			10000	5			10900	5
350		4	0.369	0.29	4200	1	0.407	0.32	4700	1	0.446	0.35	5100	1
		6			6300	1			7000	1			7700	1
		8			8400	3			9300	3			10200	3
		10			10600	4			11700	4			12800	4
400		4	0.416	0.32	4700	1	0.460	0.36	5200	1	0.504	0.39	5600	1
		6			7000	2			7700	2			8500	2
		8			9300	3			10300	3			11300	3
		10			11700	5			12900	5			14100	5
450		4	0.464	0.37	5300	1	0.512	0.40	5800	1	0.561	0.44	6400	1
		6			7900	2			8700	2			9600	2
		8			10600	3			11700	3			12800	3
		10			13200	4			14600	4			15900	4
500		4	0.511	0.40	5700	1	0.565	0.44	6300	1	0.619	0.48	6900	1
		6			8600	2			9500	2			10400	2
		8			11500	3			12700	3			13900	3
		10			14300	5			15800	5			17300	5
550		4	0.559	0.44	6300	1	0.617	0.49	7000	1	0.676	0.53	7700	1
		6			9500	2			10500	2			11500	2
		8			12700	3			14000	3			15300	3
		10			15800	4			17500	5			19100	5
600		4	0.606	0.47	6800	1	0.670	0.52	7500	1	0.734	0.57	8200	1
		6			10200	2			11200	2			12300	2
		8			13600	3			15000	3			16400	3
		10			17000	5			18700	5			20500	5
650		4	0.654	0.51	7400	1	0.722	0.57	8200	1	0.791	0.62	8900	1
		6			11100	2			12200	2			13400	2
		8			14800	3			16300	3			17900	3
		10			18500	5			20400	5			22300	5
700		4	0.701	0.54	7800	1	0.775	0.60	8700	1	0.849	0.66	9500	1
		6			11800	2			13000	2			14200	2
		8			15700	3			17300	3			19000	3
		10			19600	5			21600	5			23700	5
750		4	0.749	0.59	8400	1	0.827	0.65	9300	1	0.906	0.71	10200	1
		6			12700	2			14000	2			15300	2
		8			16900	3			18600	3			20400	3
		10			21100	5			23300	5			25500	5
800		4	0.796	0.62	8900	1	0.880	0.68	9800	1	0.964	0.75	10800	1
		6			13300	2			14700	2			16100	2
		8			17800	3			19600	3			21500	3
		10			22200	5			24600	5			26900	5
850		4	0.844	0.66	9500	1	0.932	0.73	10500	1	1.021	0.80	11500	1
		6			14200	2			15700	2			17200	2
		8			19000	3			21000	3			23000	3
		10			23700	5			26200	5			28700	5
900		4	0.891	0.69	9900	1	0.985	0.76	11000	1	1.079	0.84	12000	1
		6			14900	2			16500	2			18000	2
		8			19900	3			22000	3			24100	3
		10			24900	5			27500	5			30100	5
950		4	0.939	0.73	10600	1	1.037	0.81	11700	1	1.136	0.89	12800	1
		6			15800	2			17500	2			19100	2
		8			21100	3			23300	3			25500	3
		10			26400	5			29100	5			31900	5
1000		4	0.986	0.76	11000	1	1.090	0.84	12200	1	1.194	0.92	13300	1
		6			16500	2			18200	2			20000	2
		8			22000	3			24300	3			26600	3
		10			27500	5			30400	5			33300	5
1050		4	1.034	0.81	11600	1	1.142	0.89	12800	1	1.251	0.97	14000	1
		6			17400	2			19200	2			21000	2
		8			23200	3			25600	3			28100	3
		10			29000	5			32100	5			35100	5
1100		4	1.081	0.84	12100	1	1.195	0.93	13300	1	1.309	1.01	14600	1
		6			18100	2			20000	2			21900	2
		8			24100	3			26600	3			29200	3
		10			30200	5			33300	5			36500	5

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]
S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]
Q – flow [m³/h]
d_p – pressure drop [Pa]

			height H_k [mm]											
			1200				1300				1400			
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
width B_k [mm]	300	4	0.423	0.33	4800	1	0.456	0.36	5100	1	0.490	0.38	5500	1
		6			7100	2			7700	2			8300	2
		8			9500	3			10300	3			11000	3
		10			11900	5			12800	5			13800	5
	350	4	0.485	0.39	5500	1	0.524	0.42	6000	1	0.563	0.45	6400	1
		6			8300	1			9000	2			9600	1
		8			11100	3			12000	3			12900	3
		10			13900	4			15000	4			16100	4
	400	4	0.548	0.43	6100	1	0.591	0.46	6600	1	0.635	0.49	7100	1
		6			9200	2			9900	2			10700	2
		8			12300	3			13300	3			14200	3
		10			15300	5			16600	5			17800	5
	450	4	0.610	0.48	6900	1	0.659	0.52	7500	1	0.708	0.56	8000	1
		6			10400	2			11200	2			12000	2
		8			13900	3			15000	3			16100	3
		10			17300	4			18700	4			20100	4
	500	4	0.673	0.52	7500	1	0.726	0.56	8100	1	0.780	0.61	8700	1
		6			11300	2			12200	2			13100	2
		8			15000	3			16200	3			17400	3
		10			18800	5			20300	5			21800	5
	550	4	0.735	0.58	8300	1	0.794	0.62	9000	1	0.853	0.67	9600	1
		6			12500	2			13500	2			14500	2
		8			16600	3			18000	3			19300	3
		10			20800	5			22400	5			24100	5
	600	4	0.798	0.62	8900	1	0.861	0.67	9600	1	0.925	0.72	10300	1
		6			13400	2			14400	2			15500	2
		8			17800	3			19200	3			20700	3
		10			22300	5			24000	5			25800	5
	650	4	0.860	0.67	9700	1	0.929	0.73	10500	1	0.998	0.78	11200	1
		6			14600	2			15700	2			16900	2
		8			19400	3			20900	3			22500	3
		10			24300	5			26200	5			28100	5
	700	4	0.923	0.72	10300	1	0.996	0.77	11100	1	1.070	0.83	11900	1
		6			15400	2			16700	2			17900	2
		8			20600	3			22200	3			23900	3
		10			25700	5			27800	5			29800	5
	750	4	0.985	0.77	11100	1	1.064	0.83	12000	1	1.143	0.89	12900	1
		6			16600	2			18000	2			19300	2
		8			22200	3			23900	3			25700	3
		10			27700	5			29900	5			32100	5
	800	4	1.048	0.81	11700	1	1.131	0.88	12600	1	1.215	0.94	13500	1
		6			17500	2			18900	2			20300	2
		8			23400	3			25200	3			27100	3
		10			29200	5			31500	5			33900	5
	850	4	1.110	0.87	12500	1	1.199	0.94	13500	1	1.288	1.00	14500	1
		6			18700	2			20200	2			21700	2
		8			24900	3			26900	3			28900	3
		10			31200	5			33700	5			36100	5
	900	4	1.173	0.91	13100	1	1.266	0.98	14100	1	1.360	1.05	15100	1
		6			19600	2			21200	2			22700	2
		8			26100	3			28200	3			30300	3
		10			32700	5			35300	5			37900	5
	950	4	1.235	0.96	13900	1	1.334	1.04	15000	1	1.433	1.12	16100	1
		6			20800	2			22400	2			24100	2
		8			27700	3			29900	3			32100	3
		10			34700	5			37400	5			40200	5
	1000	4	1.298	1.00	14500	1	1.401	1.08	15600	1	1.505	1.16	16800	1
		6			21700	2			23400	2			25100	2
		8			28900	3			31200	3			33500	3
		10			36100	5			39000	5			41900	5
	1050	4	1.360	1.06	15200	1	1.469	1.14	16500	1	1.578	1.23	17700	1
		6			22900	2			24700	2			26500	2
		8			30500	3			32900	3			35300	3
		10			38100	5			41100	5			44200	5
	1100	4	1.423	1.10	15800	1	1.536	1.19	17100	1	1.650	1.28	18400	1
		6			23800	2			25700	2			27500	2
		8			31700	3			34200	3			36700	3
		10			39600	5			42800	5			45900	5

mcr WIP LDX | Multi-blade smoke control damper for multi-zone fire ventilation systems

B_k – nominal width [mm]
H_k – nominal height [mm]
v – velocity [m/s]

S_e – masking grille active cross-section [m²]
S_k - duct cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

			height H_k [mm]											
			1500				1600				1700			
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
width B_k [mm]	300	4	0.524	0.41	5900	1	0.558	0.44	6300	1	0.592	0.46	6600	1
		6			8800	2			9400	2			10000	2
		8			11800	3			12500	3			13300	3
		10			14700	5			15700	5			16600	5
	350	4	0.601	0.48	6900	1	0.640	0.51	7300	1	0.679	0.54	7700	1
		6			10300	2			11000	2			11600	2
		8			13700	3			14600	3			15500	3
		10			17200	4			18300	4			19400	4
	400	4	0.679	0.53	7600	1	0.723	0.56	8100	1	0.767	0.60	8600	1
		6			11400	2			12100	2			12900	2
		8			15200	3			16200	3			17200	3
		10			19000	5			20200	5			21400	5
	450	4	0.756	0.60	8600	1	0.805	0.63	9100	1	0.854	0.67	9700	1
		6			12900	2			13700	2			14500	2
		8			17200	3			18300	3			19400	3
		10			21500	4			22800	4			24200	4
	500	4	0.834	0.65	9300	1	0.888	0.69	9900	1	0.942	0.73	10500	1
		6			14000	2			14900	2			15800	2
		8			18600	3			19800	3			21000	3
		10			23300	5			24800	5			26300	5
	550	4	0.911	0.72	10300	1	0.970	0.76	11000	1	1.029	0.81	11600	1
		6			15500	2			16400	2			17400	2
		8			20600	3			21900	3			23200	3
		10			25800	5			27400	5			29100	5
	600	4	0.989	0.77	11000	1	1.053	0.82	11700	1	1.117	0.86	12500	1
		6			16600	2			17600	2			18700	2
		8			22100	3			23500	3			24900	3
		10			27600	5			29400	5			31100	5
	650	4	1.066	0.83	12000	1	1.135	0.89	12800	1	1.204	0.94	13600	1
		6			18000	2			19200	2			20300	2
		8			24000	3			25600	3			27100	3
		10			30000	5			32000	5			33900	5
	700	4	1.144	0.89	12800	1	1.218	0.94	13600	1	1.292	1.00	14400	1
		6			19100	2			20400	2			21600	2
		8			25500	3			27100	3			28800	3
		10			31900	5			33900	5			36000	5
	750	4	1.221	0.95	13700	1	1.300	1.02	14600	1	1.379	1.08	15500	1
		6			20600	2			21900	2			23200	2
		8			27500	3			29200	3			31000	3
		10			34300	5			36500	5			38700	5
	800	4	1.299	1.00	14500	1	1.383	1.07	15400	1	1.467	1.13	16300	1
		6			21700	2			23100	2			24500	2
		8			28900	3			30800	3			32700	3
		10			36200	5			38500	5			40800	5
	850	4	1.376	1.07	15500	1	1.465	1.14	16400	1	1.554	1.21	17400	1
		6			23200	2			24700	2			26200	2
		8			30900	3			32900	3			34900	3
		10			38600	5			41100	5			43600	5
	900	4	1.454	1.12	16200	1	1.548	1.20	17200	1	1.642	1.27	18300	1
		6			24300	2			25800	2			27400	2
		8			32400	3			34500	3			36500	3
		10			40500	5			43100	5			45700	5
	950	4	1.531	1.19	17200	1	1.630	1.27	18300	1	1.729	1.35	19400	1
		6			25800	2			27400	2			29100	2
		8			34300	3			36500	3			38700	3
		10			42900	5			45700	5			48400	5
	1000	4	1.609	1.24	17900	1	1.713	1.32	19100	1	1.817	1.40	20200	1
		6			26900	2			28600	2			30300	2
		8			35800	3			38100	3			40400	3
		10			44800	5			47600	5			50500	5
	1050	4	1.686	1.31	18900	1	1.795	1.40	20100	1	1.904	1.48	21300	1
		6			28300	2			30100	2			32000	2
		8			37800	3			40200	3			42600	3
		10			47200	5			50200	5			53300	5
	1100	4	1.764	1.36	19600	1	1.878	1.45	20900	1	1.992	1.54	22100	1
		6			29400	2			31300	2			33200	2
		8			39200	3			41800	3			44300	3
		10			49100	5			52200	5			55400	5

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d_p – pressure drop [Pa]

width B_k [mm]	v [m/s]	height H_k [mm] 1800 S_k [m²]	1800 S_e [m²]	1800 Q [m³/h]	1800 d_p [PA]	1900 S_k [m²]	1900 S_e [m²]	1900 Q [m³/h]	1900 d_p [PA]	2000 S_k [m²]	2000 S_e [m²]	2000 Q [m³/h]	2000 d_p [PA]
300	4	0.625	0.49	7000	1	0.659	0.51	7400	1	0.693	0.54	7800	1
	6			10500	2			11100	2			11700	2
	8			14000	3			14800	3			15600	3
	10			17600	5			18500	5			19400	5
350	4	0.718	0.57	8200	1	0.757	0.60	8600	1	0.795	0.63	9100	1
	6			12300	2			12900	2			13600	2
	8			16400	3			17300	3			18100	3
	10			20500	4			21600	4			22700	4
400	4	0.810	0.63	9100	1	0.854	0.66	9600	1	0.898	0.70	10000	1
	6			13600	2			14300	2			15100	2
	8			18100	3			19100	3			20100	3
	10			22700	5			23900	5			25100	5
450	4	0.903	0.71	10200	1	0.952	0.75	10800	1	1.000	0.79	11300	1
	6			15400	2			16200	2			17000	2
	8			20500	3			21600	3			22700	3
	10			25600	4			27000	4			28400	4
500	4	0.995	0.77	11100	1	1.049	0.81	11700	1	1.103	0.86	12300	1
	6			16700	2			17600	2			18500	2
	8			22200	3			23400	3			24600	3
	10			27800	5			29300	5			30800	5
550	4	1.088	0.85	12300	1	1.147	0.90	12900	1	1.205	0.95	13600	1
	6			18400	2			19400	2			20400	2
	8			24600	3			25900	3			27200	3
	10			30700	5			32400	5			34000	5
600	4	1.180	0.91	13200	1	1.244	0.96	13900	1	1.308	1.01	14600	1
	6			19700	2			20800	2			21900	2
	8			26300	3			27700	3			29200	3
	10			32900	5			34700	5			36500	5
650	4	1.273	1.00	14300	1	1.342	1.05	15100	1	1.410	1.10	15900	1
	6			21500	2			22700	2			23800	2
	8			28700	3			30200	3			31800	3
	10			35800	5			37800	5			39700	5
700	4	1.365	1.06	15200	1	1.439	1.11	16000	1	1.513	1.17	16800	1
	6			22800	2			24000	2			25300	2
	8			30400	3			32100	3			33700	3
	10			38000	5			40100	5			42100	5
750	4	1.458	1.14	16400	1	1.537	1.20	17300	1	1.615	1.26	18100	1
	6			24600	2			25900	2			27200	2
	8			32800	3			34500	3			36300	3
	10			41000	5			43200	5			45400	5
800	4	1.550	1.20	17300	1	1.634	1.26	18200	1	1.718	1.33	19100	1
	6			25900	2			27300	2			28700	2
	8			34500	3			36400	3			38200	3
	10			43100	5			45500	5			47800	5
850	4	1.643	1.28	18400	1	1.732	1.35	19400	1	1.820	1.42	20400	1
	6			27600	2			29100	2			30600	2
	8			36900	3			38800	3			40800	3
	10			46100	5			48500	5			51000	5
900	4	1.735	1.34	19300	1	1.829	1.41	20300	1	1.923	1.49	21400	1
	6			29000	2			30500	2			32100	2
	8			38600	3			40700	3			42800	3
	10			48300	5			50900	5			53500	5
950	4	1.828	1.42	20500	1	1.927	1.50	21600	1	2.025	1.58	22700	1
	6			30700	2			32400	2			34000	2
	8			41000	3			43200	3			45400	3
	10			51200	5			53900	5			56700	5
1000	4	1.920	1.48	21400	1	2.024	1.56	22500	1	2.128	1.64	23700	1
	6			32000	2			33800	2			35500	2
	8			42700	3			45000	3			47300	3
	10			53400	5			56300	5			59100	5
1050	4	2.013	1.56	22500	1	2.122	1.65	23700	1	2.230	1.73	24900	1
	6			33800	2			35600	2			37400	2
	8			45000	3			47500	3			49900	3
	10			56300	5			59300	5			62400	5
1100	4	2.105	1.63	23400	1	2.219	1.71	24700	1	2.333	1.80	25900	1
	6			35100	2			37000	2			38900	2
	8			46800	3			49300	3			51800	3
	10			58500	5			61700	5			64800	5

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d_p – pressure drop [Pa]

			height H_k [mm]											
			2100				2200				2300			
		v [m/s]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]	S_k [m²]	S_e [m²]	Q [m³/h]	d_p [PA]
width B_k [mm]	300	4	0.727	0.57	8200	1	0.761	0.59	8500	1	0.794	0.62	8900	1
		6			12200	2			12800	2			13400	2
		8			16300	3			17100	3			17800	3
		10			20400	5			21300	5			22300	5
	350	4	0.834	0.66	9500	1	0.873	0.69	10000	1	0.912	0.72	10400	1
		6			14300	2			14900	2			15600	2
		8			19000	3			19900	3			20800	3
		10			23800	4			24900	4			26000	4
	400	4	0.942	0.73	10500	1	0.986	0.77	11000	1	1.029	0.80	11500	1
		6			15800	2			16500	2			17300	2
		8			21100	3			22000	3			23000	3
		10			26300	5			27600	5			28800	5
	450	4	1.049	0.83	11900	1	1.098	0.86	12400	1	1.147	0.90	13000	1
		6			17800	2			18700	2			19500	2
		8			23800	3			24900	3			26000	3
		10			29700	4			31100	4			32500	4
	500	4	1.157	0.90	12900	1	1.211	0.94	13500	1	1.264	0.98	14100	1
		6			19400	2			20300	2			21200	2
		8			25800	3			27000	3			28200	3
		10			32300	5			33800	5			35300	5
	550	4	1.264	0.99	14300	1	1.323	1.04	14900	1	1.382	1.08	15600	1
		6			21400	2			22400	2			23400	2
		8			28500	3			29900	3			31200	3
		10			35700	5			37300	5			39000	5
	600	4	1.372	1.06	15300	1	1.436	1.11	16000	1	1.499	1.16	16700	1
		6			22900	2			24000	2			25100	2
		8			30600	3			32000	3			33400	3
		10			38200	5			40000	5			41800	5
	650	4	1.479	1.16	16600	1	1.548	1.21	17400	1	1.617	1.26	18200	1
		6			25000	2			26100	2			27300	2
		8			33300	3			34800	3			36400	3
		10			41600	5			43500	5			45500	5
	700	4	1.587	1.23	17700	1	1.661	1.28	18500	1	1.734	1.34	19300	1
		6			26500	2			27700	2			29000	2
		8			35300	3			37000	3			38600	3
		10			44200	5			46200	5			48300	5
	750	4	1.694	1.32	19000	1	1.773	1.38	19900	1	1.852	1.44	20800	1
		6			28500	2			29900	2			31200	2
		8			38100	3			39800	3			41600	3
		10			47600	5			49800	5			52000	5
	800	4	1.802	1.39	20000	1	1.886	1.46	21000	1	1.969	1.52	21900	1
		6			30100	2			31500	2			32900	2
		8			40100	3			41900	3			43800	3
		10			50100	5			52400	5			54800	5
	850	4	1.909	1.49	21400	1	1.998	1.56	22400	1	2.087	1.62	23400	1
		6			32100	2			33600	2			35100	2
		8			42800	3			44800	3			46800	3
		10			53500	5			56000	5			58500	5
	900	4	2.017	1.56	22400	1	2.111	1.63	23500	1	2.204	1.70	24500	1
		6			33600	2			35200	2			36800	2
		8			44800	3			46900	3			49000	3
		10			56100	5			58700	5			61300	5
	950	4	2.124	1.65	23800	1	2.223	1.73	24900	1	2.322	1.80	26000	1
		6			35700	2			37300	2			39000	2
		8			47600	3			49800	3			52000	3
		10			59500	5			62200	5			65000	5
	1000	4	2.232	1.72	24800	1	2.336	1.80	26000	1	2.439	1.88	27100	1
		6			37200	2			38900	2			40700	2
		8			49600	3			51900	3			54200	3
		10			62000	5			64900	5			67800	5
	1050	4	2.339	1.82	26200	1	2.448	1.90	27400	1	2.557	1.99	28600	1
		6			39200	2			41100	2			42900	2
		8			52300	3			54700	3			57200	3
		10			65400	5			68400	5			71500	5
	1100	4	2.447	1.89	27200	1	2.561	1.98	28400	1	2.674	2.06	29700	1
		6			40800	2			42700	2			44600	2
		8			54400	3			56900	3			59400	3
		10			68000	5			71100	5			74300	5

18.11 | Marking

mcr WIP LDX / B x H / 1 / 2 / 3 / 4

- 4 – Additional parameters
- 3 – Masking grille
- 2 – Material
- 1 – Control
- B x H – Width x height
- mcr WIP LDX – Damper type

1 – control

» **trigger control mechanism**

BE24 – actuator without a return spring, U = 24 V AC/DC
BE230 – actuator without a return spring, U = 230 V AC/DC
BEN24 – actuator without a return spring, U = 24 V AC/DC
BEN230 – actuator without a return spring, U = 230 V AC/DC

2 – material

[no symbol] – galvanized steel, Zn 275 m^2 coating
KOM – special damper design - damper and its components made of galvanized steel, damper partition sleeves additionally secured or stainless steel

3 – masking grille

MWDx1 – single masking grille
MWDx2 – two masking grilles
MWSP – single masking grille

4 – additional parameters

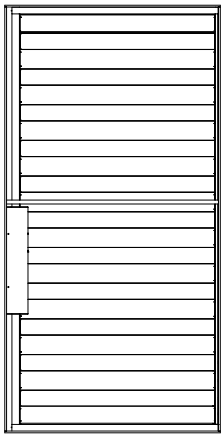
» **Damper axis of rotation**

[no symbol] – horizontal axis of rotation
[no symbol] – left damper
[no symbol] – not painted
RAL9005 – damper blades and internal casing from the side of the actuator are painted black

Note: **separate additional parameters entered with the "/" sign**
example marking: mcr WIP LDX 400 x 600 BE24
Multi-blade smoke control damper with a 24 V actuator with limit switches.

18.12 | Design standard

» Left damper



Chapter 19 - power supply and control (p. 386) contains the following information:
- technical specifications and connection diagrams **for the trigger control mechanisms supporting the damper.**

19.1 | Compatibility with smoke control dampers fire dampers – quick drive selection table

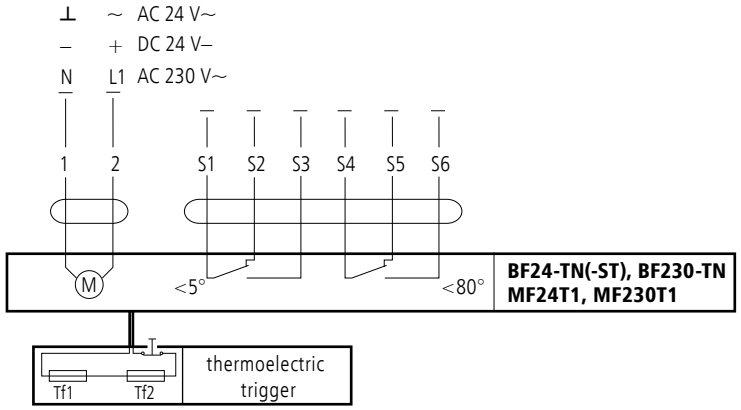
Smoke dampers fire dampers / Trigger control mechanisms	mcr FID B	mcr FID S/S c/P	mcr FID S/S p/P mcr FID S/S p/O	mcr FID S/V p/P mcr FID S/V-M p/P	mcr FID PRO	mcr FID WING	mcr FID 240L	mcr ZIPP	mcr WIP/S mcr WIP/T	mcr WIP PRO/S mcr WIP PRO/T	mcr WIP PRO/V mcr WIP PRO/V-M mcr WIP PROV	mcr DOR	mcr WIP LD	mcr WIP LDX
BFL24-T (-ST)		✓	✓		✓		✓		✓	✓				
BFL230-T		✓	✓		✓		✓		✓	✓				
BFN24-T (-ST)		✓	✓				✓		✓	✓				
BFN230-T		✓	✓				✓		✓	✓				
BE24	✓			✓							✓		✓	✓
BE230	✓			✓							✓		✓	✓
BEN24/BEE24	✓			✓							✓		✓	✓
BEN230/BEE230	✓			✓							✓		✓	✓
EXBF24-T		✓	✓		✓				✓	✓				
EXBF230-T		✓	✓		✓				✓	✓				
MF24T1			✓				✓		✓	✓				
MF230T1			✓				✓		✓	✓				
MLF24T1		✓			✓									
MLF230T1		✓			✓									
BF24TL-TN (-ST)		✓	✓		✓				✓	✓				
RST		✓	✓		✓	✓		✓						
RST/WK1		✓	✓		✓	✓		✓						
RST/WK2		✓	✓		✓									
RST-KW1/S		✓	✓		✓									
RST-KW1/S/WK2		✓	✓		✓					✓				
RST-KW1/24I		✓	✓		✓									
RST-KW1/24P		✓	✓		✓					✓				
RST-KW1/230I		✓	✓		✓									
RST-KW1/230P		✓	✓		✓					✓				
RST-EKI24								✓						
RST-EKP24								✓						
RST-EKI230								✓						
RST-EKP230								✓						
EM24D												✓		
MLE24	✓			✓							✓		✓	
MLE230	✓			✓							✓		✓	
QT.Ex24-FT.Ex		✓	✓		✓				✓	✓				
QT.Ex230-FT.Ex		✓	✓		✓				✓	✓				
ME24	✓			✓							✓		✓	
ME230	✓			✓							✓		✓	

19.2 | Actuators

19.2.1 | Electric actuators with a spring

Specifications	BF24-TN, MF24T1	BF230-TN, MF230T1
supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand: – for spring tensioning – for holding	 7 W 2 W	 8 W 3 W
sizing (apparent power)	10 VA	11 VA
protection class	III	II
ingress protection rating	IP 54	IP 54
auxiliary circuit breaker: – activation point	2 x EPU 3 (0,5) A 250 V 5°, 80°	2 x EPU 3 (0,5) A 250 V~ 5°, 80°
torque: - motor - return spring	 18 Nm 12 Nm	 18 Nm 12 Nm
cable connection: - motor (length: 0.9 m) - auxiliary circuit breaker	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²
operation time (0-90°): - motor - return spring	 120 s ~16 s	 120 s ~16 s
operating temperature – range	-30 ... +50°C	-30 ... +50°C
noise level: - motor - return spring	 max 45 dB (A) ~63 dB (A)	 max 45 dB (A) ~63 dB (A)

» electrical diagram for the BF...-T, MF...T series actuator:



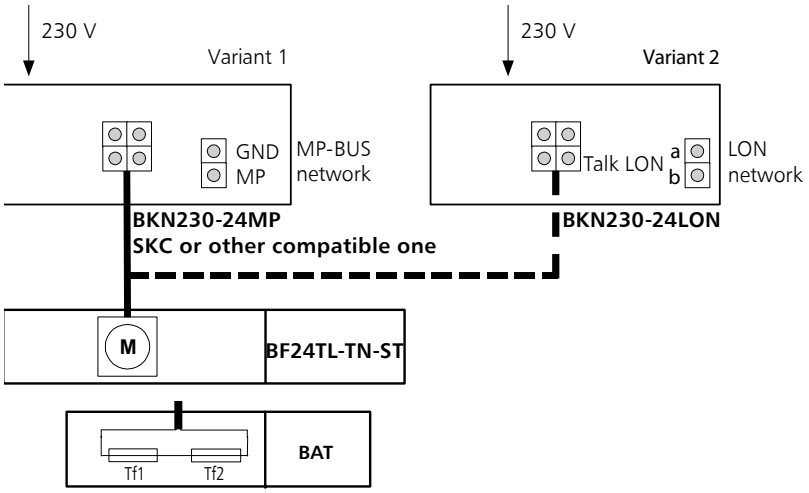
NOTE:
24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, a gap of at least 3 mm between the contacts (when off) is required in the switch.

It is possible to connect further drives in parallel. Check the power consumption.

NOTE:
Actuator limit switches positions are provided for the voltage-free position.

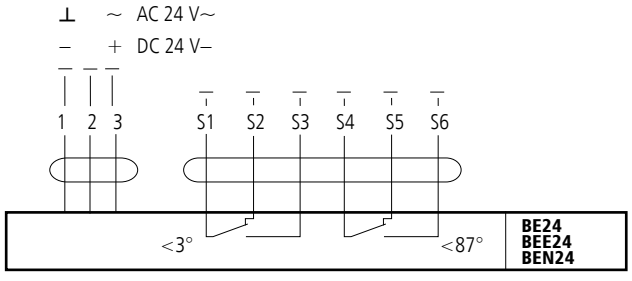
» electrical diagram for the BF24TL-T(-ST) and BF24TL(-ST) actuator:

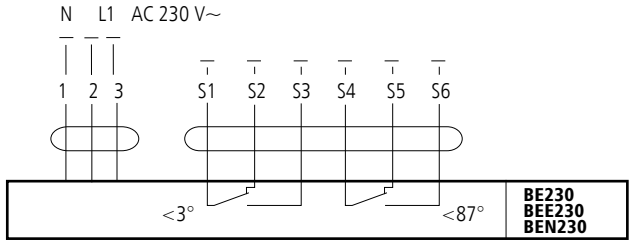


19.2.2 | Electric actuators without return springs

Specifications	BE24	BE230	BEE24	BEE230	BEN24	BEN230	MLE 24	MLE 230	ME24	ME230
supply	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
power demand: - during operation - for holding	12 W 0,5 W	8 W 0,5 W	5,5 W 0,1 W	3,5 W 0,4 W	3 W 0,1 W	4 W 0,4 W	8,2 W 3,5 W	5,2 W 3,5 W	6 W 1 W	6,5 W 1 W
sizing (apparent power)	18 VA	15 VA	5 VA	6 VA	6 VA	7 VA	10 VA	10 VA	10,5 VA	10,5 VA
protection class	III	II	III	II	III	II	II	II	III	II
ingress protection rating	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
auxiliary circuit breaker: – activation point	2 x SPDT 6 (1,5) A AC 250 V 5°, 80°	2 x SPDT 6 (1,5) A AC 250 V 5°, 80°	2xSPDT 3A AC 250V 5°, 80°	2xSPDT 3A AC 250V 5°, 80°	2xSPDT 3A AC 250V 5°, 80°	2xSPDT 3A AC 250V 5°, 80°	2 x SPDT 3 (1.5) A AC 250 V 5°, 85°	2 x SPDT 3 (1.5) A AC 250 V 5°, 85°	2 x SPDT 3 (1,5) A AC 250 V 5°, 85°	2 x SPDT 3 (1,5) A AC 250 V 5°, 85°
torque - motor	40 Nm	40 Nm	25 Nm	25 Nm	15 Nm	15 Nm	18 Nm	18 Nm	40 Nm	40 Nm
cable connection: - motor (length: 0.9 m) - auxiliary circuit breaker	2 x 0,75 mm² 6 x 0,75 mm²	2 x 0,75 mm² 6 x 0,75 mm²	2 x 0,75 mm² 6 x 0,75 mm²	2 x 0,75 mm² 6 x 0,75 mm²	2 x 0,75 mm² 6 x 0,75 mm²	2 x 0,75 mm² 6 x 0,75 mm²	3 x 0,75 mm² 6 x 0,75 mm²	3 x 0,75 mm² 6 x 0,75 mm²	3 x 0,75 mm² 6 x 0,75 mm²	3 x 0,75 mm² 6 x 0,75 mm²
operation time (0-90°) - motor	< 60 s for 90°	< 60 s for 90°	60 s for 90°	60 s for 90°	30 s for 90°	30 s for 90°	< 30 s for 90°	< 30 s for 90°	60 s for 90°	60 s for 90°
operating temperature – range	-30 ... +50°C	-30 ... +50°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-25 … +55°C	-25 … +55°C	-20… +50°C	-20… +50°C
noise level	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)	~40 dB (A)	~40 dB (A)	~50 dB (A)	~50 dB (A)

» electrical diagram for the BE, BLE series actuator:





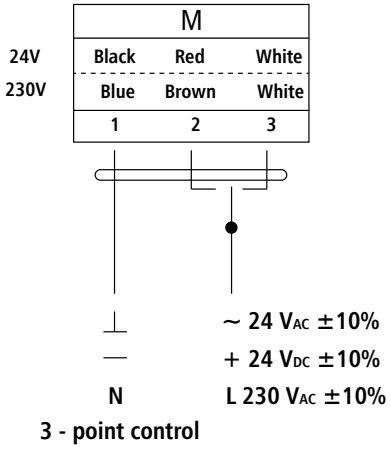
NOTE:
Engine operation control requires connection to a three-wire system.
The actuator rotation direction is changed by connecting supply voltage to the terminals no. 2 or no. 3, depending on the desired rotation direction.

NOTE: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, a gap of at least 3 mm between the contacts (when off) is required in the switch.
It is possible to connect further drives in parallel. Check the power consumption.

NOTE: Actuator limit switches positions are provided for the voltage-free position.

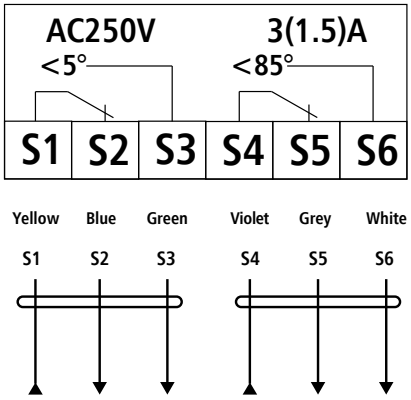
» electrical diagram MLE series actuator:

Supply control:



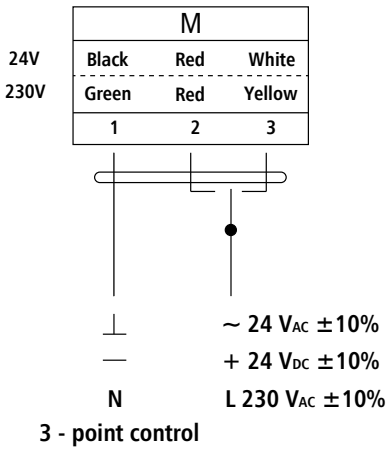
3 - point control

Aux switch:



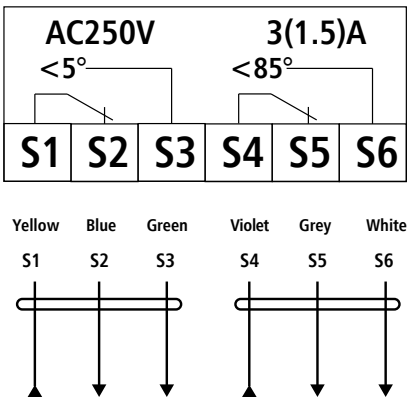
» electrical diagram ME series actuator::

Supply control:



3 - point control

Aux switch:

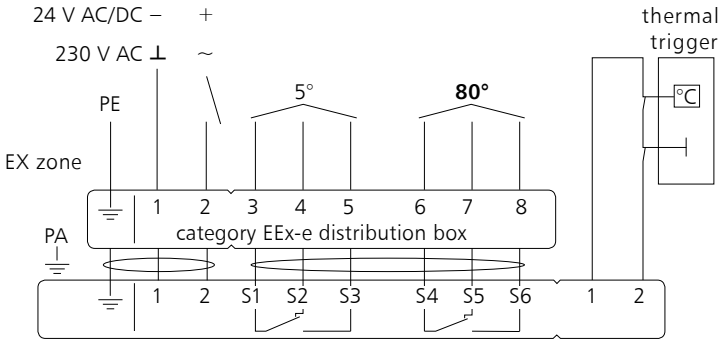


19.2.3 | Electric actuators without return springs

Specifications	EXBF B 001 2 ...0 N 000	EXBF A 001 2 ...0 N 000	QT.Ex24-FT.Ex	QT.Ex230-FT.Ex
zone	1, 2, 21, 22			
ATEX classification	II 2 GD EEx d IIC T6		II 2 GD Ex ia IIC T6.. T1	
supply	24 V AC ±20% 50/60 Hz / 24 V DC -10/+20%	230 V AC ±14% 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
power demand: - for spring tensioning - for holding	 7 W 2 W	 8 W 3 W	 20 W 5 W	 20 W 5 W
sizing (apparent power)	10 VA	11 VA	30 VA	30 VA
ingress protection rating	IP 66	IP 66	IP 66	IP 66
auxiliary circuit breaker: – activation point	2 x SPDT 6 A (3) max 250 V AC 5°, 80°	2 x SPDT 6 A (3) max 250 V AC 5°, 80°	2 x SPDT 3 (1,5) A AC 250 V 5°, 80°	2 x SPDT 3 (1,5) A AC 250 V 5°, 80°
torque: - motor - return spring	 18 Nm 12 Nm	 18 Nm 12 Nm	 18 Nm 18 Nm	 18 Nm 18 Nm
operation time (90°C): - motor - return spring	 150 s ~20 s	 150 s ~20 s	 15 s 3 s*/10 s	 15 s 3 s*/10 s
ambient temperature	-30 ... +50°C	-30 ... +50°C	-40… +70°C	-40… +70°C

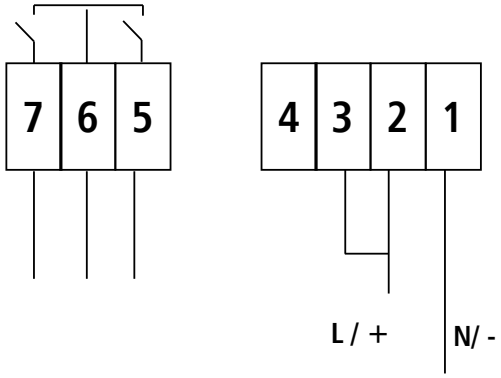
* time of 3s on request

» connection diagram for the EXBF and EXBF...-T actuators:



» connection diagram for the QT.Ex actuator:

Aux switch: **Supply control:**

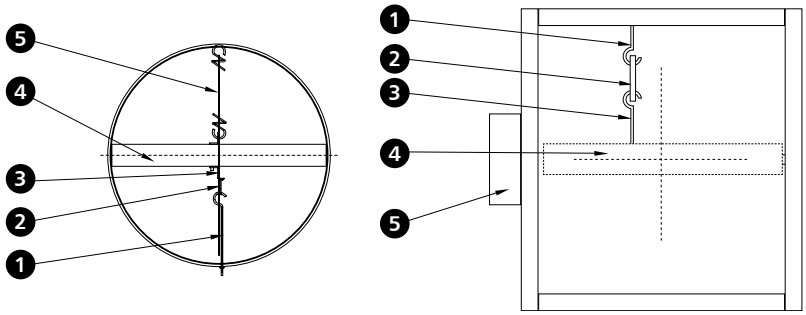


open **bridge 2 to 3+ power on**
close **power off, actuator closes by spring return**

19.3 | RST trigger and control mechanisms

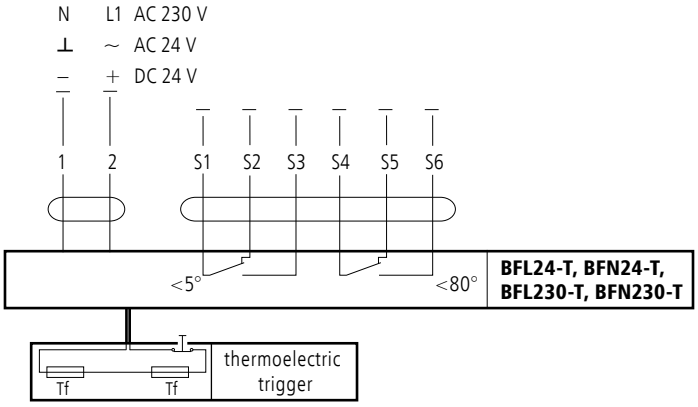
In the RST version, the WK1 limit switches are installed inside the damper's casing as independent assemblies. The thermal trigger is located on the damper blade. A drive spring is installed on the damper blade or its casing in a protective box.

1. movable hook with nut
2. thermal trigger
3. thermal trigger
4. fixed hook on the damper blade
5. drive spring



Specifications	BFL24-T	BFL230-T	BFN24-T	BFN230-T	MLF24T1	MLF230T1
supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand: - for spring tensioning - for holding	 2,5 W 0,7 W	 3,5 W 1,1 W	 4 W 1,4 W	 5 W 2,1 W	 5 W 2,5 W	 5 W 3 W
sizing (apparent power)	4 VA	6,5 VA	6 VA	10 VA	8 VA	8 VA
protection class	III	II	III	II	III	II
ingress protection rating	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
auxiliary circuit breaker: – activation point	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°	2 x SPDT 3 (0,5) A AC 250 V 5°, 80°
torque: - motor - return spring	 4 Nm 3 Nm	 4 Nm 3 Nm	 9 Nm 7 Nm	 9 Nm 7 Nm	 5 Nm 5 Nm	 5 Nm 5 Nm
cable connection: - motor (length: 0.9 m) - auxiliary circuit breaker	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²	 2 x 0,75 mm² 6 x 0,75 mm²
operation time (0-90°): - motor - return spring	 < 60 s ~20 s	 < 60 s ~20 s	 < 60 s ~20 s	 < 60 s ~20 s	 40-75s 20s	 40-75s 20s
operating temperature – range	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +50°C	-30 ... +50°C
noise level: - motor - return spring	 max 43 dB (A) ~62 dB (A)	 max 43 dB (A) ~62 dB (A)	 max 55 dB (A) ~67 dB (A)	 max 55 dB (A) ~67 dB (A)	 max 45 dB (A) ~62 dB (A)	 max 45 dB (A) ~62 dB (A)

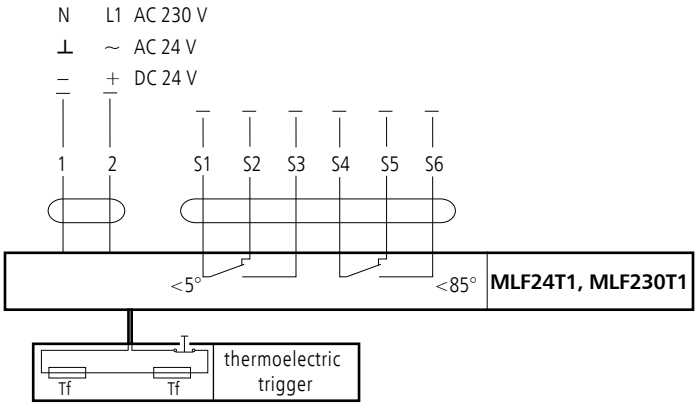
» electrical diagram for the BFL...-T, BFN...-T series actuator:



NOTE: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, a gap of at least 3 mm between the contacts (when off) is required in the switch.
It is possible to connect further drives in parallel. Check the power consumption.

NOTE: actuator limit switches positions are provided for the voltage-free position.

» electrical diagram for the MLF24T1, MLF230T1 series actuator:



NOTE: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, a gap of at least 3 mm between the contacts (when off) is required in the switch.
It is possible to connect further drives in parallel. Check the power consumption.

NOTE: actuator limit switches positions are provided for the voltage-free position.

» Independent damper limit switches - for the RST version

WK1 – limit switch (closed blade signal)
WK2 – limit switch (open/closed blade signal)

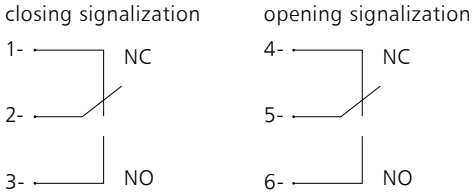
» Switch technical data

WK1 and WK2 limit switch	1xNO/1xNC SPDT 5 A, 230 V AC
limit switches operating temperature	-25 ... +85°C
casing	plastic

» Independent damper limit switches - for the RST version

WK1 – limit switch (closed blade signal)
WK2 – limit switch (open/closed blade signal)

» electric diagram for the WK1 and WK2 limit switches



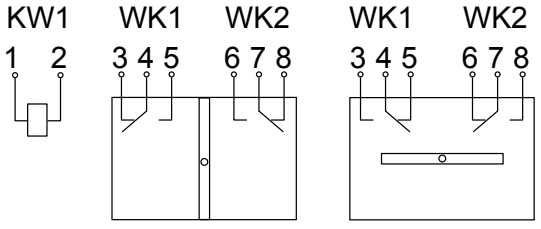
NOTE:
When closing the blade, the damper closing signalization switch is operated (terminal 2-3 is closed).

19.4 | RST-KW1 mechanisms

Specifications	RST-KW1/S	RST-KW1/S/WK2	RST-KW1/24I	RST-KW1/24P	RST-KW1/230I	RST-KW1/230P
rated voltage	–	–	24 V - 48 V DC	24 V - 48 V DC	230 AC	230 AC
power consumption	–	–	3,5 W	1,6 W	2 W	2 W
thermal trigger	74°C (optionally 95°C)					
connections - release switch	–	–	wire 0.6 m, 2 x 0.5 mm^2			
connections - limit switches	–	wire 0.6 m, 6 x 0.5 mm^2				
limit switch	–	2 x NO/NC 5A, 230 V AC				
operation time	max. 2 s					
mechanism operation control (closing)	-	-	voltage supply "impulse"	voltage disconnection "break"	voltage supply "impulse"	voltage disconnection "break"
mechanism operation control (opening)	manually	manually	manually	manually	manually	manually
impulse duration	max. 1 s					

» electrical collections description

KW1 mechanism power supply	WK1 limit switch	WK2 limit switch
Wire no. 1–2 white / red	Wire no. 3–4, NC type (normally closed) green / gray	Wire no. 6–7, NO type (normally open) brown / pink
	Wire no. 4–5, NO type (normally open) gray / blue	Wire no. 7–8, NC type (normally closed) pink / yellow



1. white
2. red
3. green
4. gray
5. blue
6. brown
7. pink
8. yellow

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