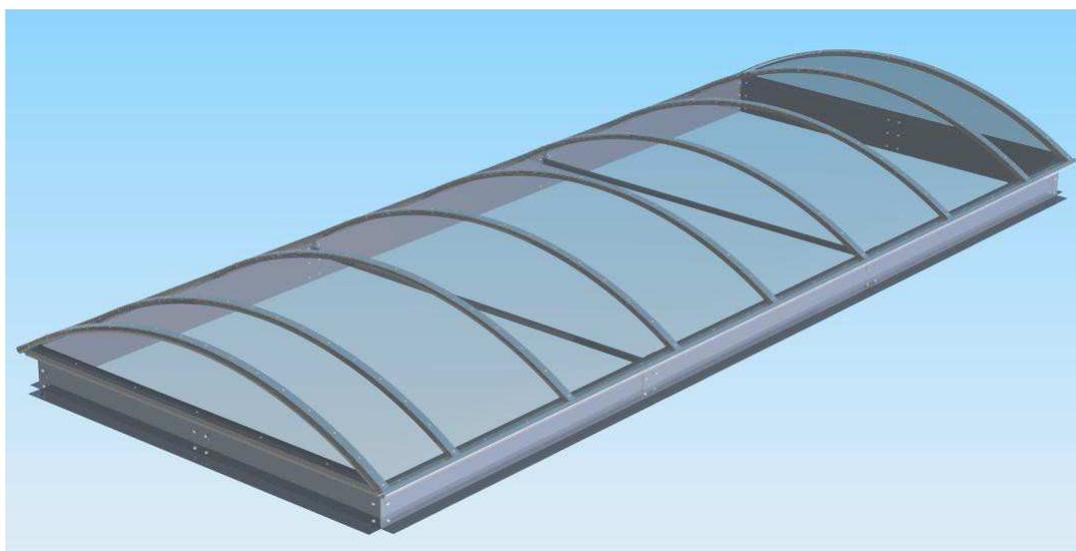


OPERATIONS AND MAINTENANCE MANUAL

Roof skylights and segmented skylights with mcr-PROLIGHT smoke exhaust and ventilation units



- Roof skylights; segmented skylights
- Smoke exhaust and ventilation units in roof skylights



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WARNING

Thermal valves in vents with pneumatic control are not armed for transport safety reasons.

Such vents are NOT ready for operations.

Arm the thermal valve and screw in CO₂ fuse (see section 9.1).

1. INTRODUCTION.

The present Operations and Maintenance Manual describes the purpose, design, operating principles, correct assembling, and support of mcr-PROLIGHT system roof skylights and segmented skylights comprising the smoke exhaust and ventilation dampers. Furthermore, the documentation includes additional data on operations, maintenance, and warranty conditions.

Not only will the consistency with the recommendations contained in this Manual ensure regular functioning of the systems designed for smoke exhaust and/or ventilation, but also guarantee safety to the users.

WARNING

All the works connected with assembling, operations, maintenance, and service support of vents and skylights should be conducted in compliance with occupational health and safety rules. Applicable personal protections should be used, including mostly protections from fall from a different level. High-rise works, works on electric systems, etc., should be conducted by competent personnel only.

2. PURPOSE OF SKYLIGHTS.

mcr-PROLIGHT-system roof skylights and skylights are facilities to be installed on the roofs which top the production plants, warehouses, sport halls, shopping areas, stair wells in residential buildings, communication roads in public buildings, etc., wherever daylight is required as additional lighting. Roof skylights and skylights may be equipped with smoke exhaust vents, smoke exhaust and ventilation flaps.

Vents are installed in mcr-PROLIGHT-system roof skylights and skylights as:

- Smoke vents for evacuation of fumes, fire gases, and thermal energy from closed spaces (production plants, warehouses, public buildings, etc.) to the outside of the premises in case of fire, hence contributing to protection of life and property thanks to:
 - Maintenance of low smoke level on the escape routes;
 - Assistance in fire fighting and extinguishing procedures by means of a bottom layer featuring low smoke level;
 - Protection of structural elements and equipment inside the building, and
 - Reduction in fire damages produced by smoke, hot fire gases, and thermal decomposition products.
- Ventilation flaps and smoke exhaust and ventilation dampers used as daily natural ventilation facilities.

Smoke vents in roof skylights and skylights are integral parts of smoke control systems which include other components manufactured by MERCOR SA, such as e.g.: mcr-PROLIGHT and mcr-PROLIGHT PLUS spot smoke vents, mcr-PROSMOKE smoke curtains, mcr 9705 and mcr 0204 smoke control units, mcrR0424-48 extension modules, mcr-OSO system smoke exhaust and air admission windows, mcr-LAM louvered smoke exhaust vents, and mcr-LAM N air admission vents.

mcr-PROLIGHT system roof skylights and skylights with smoke vents, smoke exhaust and ventilation dampers and/or ventilation flaps are adapted to the installation on flat and pitched roofs covered with building felt, PVC membrane, roofing sheet, roofing tiles, or other materials.

mcr-PROLIGHT system roof skylights and skylights with smoke vents, smoke exhaust and ventilation flaps are manufactured using the "Set of products for manufacturing mcr-PROLIGHT system roof skylights and skylights with air admission and smoke exhaust functions". The set has acquired the Certificate of Conformity No. ITB-539/W

in compliance with the requirements defined in the Technical Approval No. AT-15-5661/2012 issued by Building Research Institute in Warsaw.

3. GENERAL DESIGN AND TYPES OF DEVICES.

mcr-PROLIGHT system roof skylights or skylights comprise the components specified below:

1. Base;
2. Dome, and
3. Vents with control elements (models with smoke exhaust or ventilation dampers).

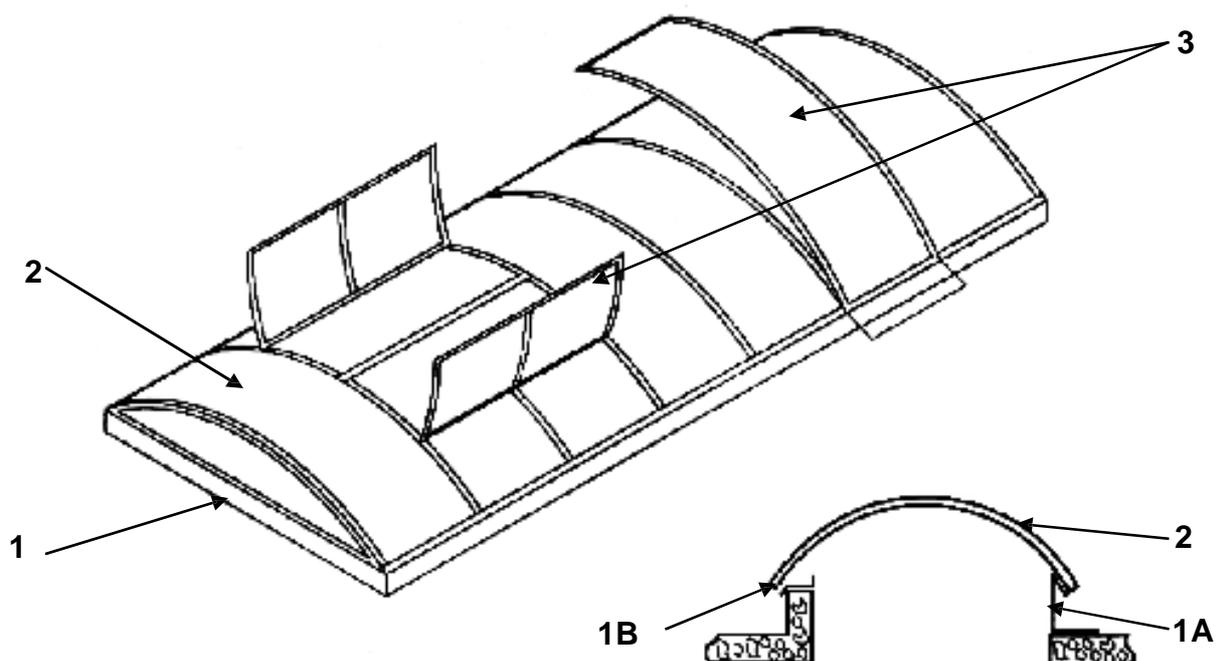


Fig. 1. Example of roof skylight design: arched roof skylight.

The base (1) of the roof skylights is made of zinc-coated steel sheet 1.25 through 5 mm thick; available are length modules as follows: 1,000; 1,250; 2,500 and 3,000 mm. Typically, two main types of base are used: standard type (1A) designed for installation on roof structural elements or overlay type (1B) designed for installation on the existing curb. A standard base may be typically 300 mm or 500 mm high.

Standard base is equipped with the bottom shelf for fixing the base to the trimmer or roof structure. Modular bases are connected to each other by means of screws. The base is fixed to the support by means of self-tapping bolts, screws, or expansion plugs depending on the supporting structure material. Standard bases are stiffened every 2,500 through 3,000 mm by means of braces made of cold-formed steel profiles placed on the base top and, as an option, on the base bottom. In the case of overlays, the curb should be equipped with suitable bracing.

Standard bases may be equipped with anti-burglar bars or safety nets resistant to no more than 1,200 J impact of a large soft body. Given the sag, use of such nets is limited to the maximum base span of 3.6 m (maximum sag: about 45 cm under the point of fixing). Thermal insulation of the skylight base is not included in the set and the customer should supply it individually.

Roof skylight dome (2) is made of transparent filling supported on aluminium profile structure: load-bearing profiles (under the polycarbonate) and clamp profiles (above the polycarbonate). The edging strip profile is installed along the skylight at the edge of the polycarbonate.

Cellular polycarbonate 10 mm, 16 mm, 20 mm, and 25 mm thick, equipped with optional polyester panel under the polycarbonate in order to achieve $B_{ROOF}(t1)$ class of roof skylight, is a standard type of filling of the skylight and smoke vent domes. Other types are made of solid polycarbonate or acrylic panels.

The dome is fixed to the base by means of joints (machine bolts; metal screws; self-tapping metal screws; pop rivets). It may be equipped with additional supports of the skylight load-bearing profiles, made of steel sections, as well as with dome longitudinal bracing made of steel or aluminium sections.

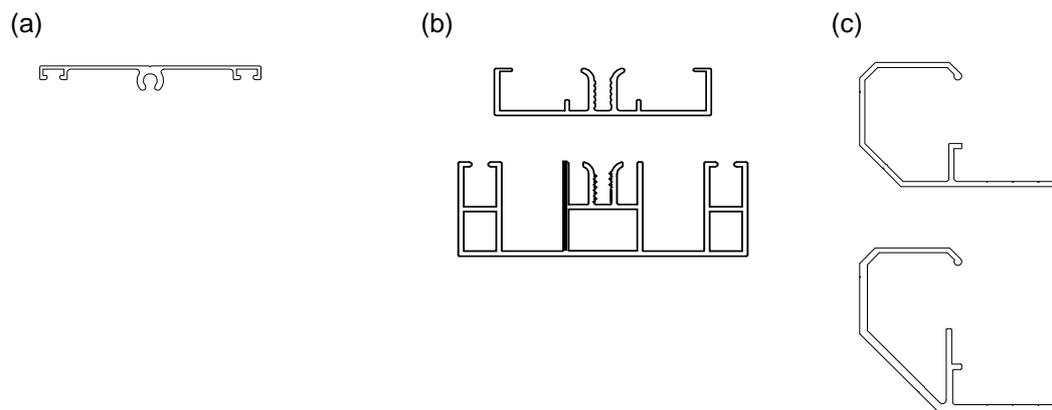


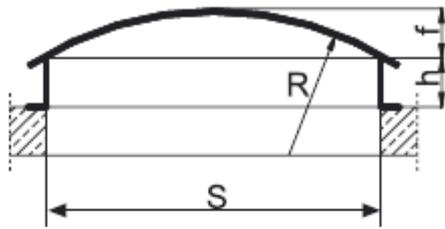
Fig. 2. Main shapes of aluminium profiles used in mcr-PROLIGHT system roof skylights: (a) clamp profile; (b) load-bearing profiles, and (c) edging strip profile.

Smoke vents and/or ventilation flaps (3) may be installed on the dome. The vents may be single or double-leaf facilities. Vent leaf is opened by means of pneumatic actuator (CO_2 : smoke exhaust; compressed air: ventilation) or electric actuators (24 V DC: smoke exhaust or smoke exhaust and ventilation; 230 V~: ventilation).

Smoke vents may be initiated either manually by the user or automatically by means of thermal valves installed in the vents, mcr-type smoke control units, or fire signalling units.

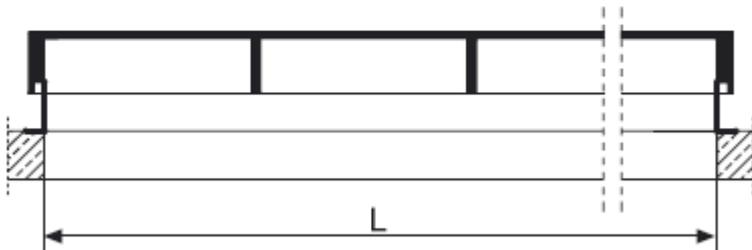
Roof skylight types:

Fig. 3. Schematic diagram of arched roof skylight.



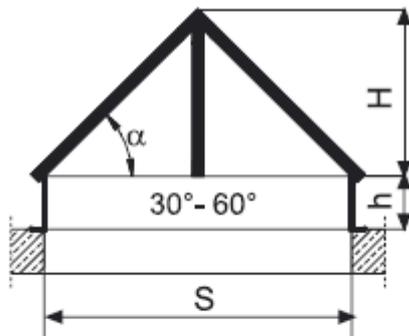
cross section

- R: skylight radius (dependent on filling material)
- S: skylight span (0.5 m to 7 m)
- L: skylight length (no limits)
- f: skylight rise (dependent on radius and span)
- h: base height (standard: 300 mm and 500 mm)

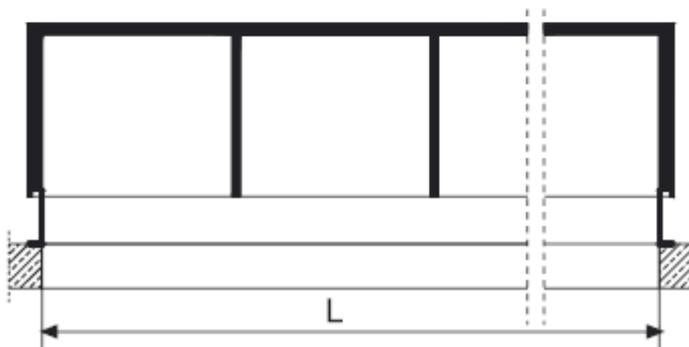


longitudinal section

Fig. 4. Schematic diagram of triangle roof skylight.

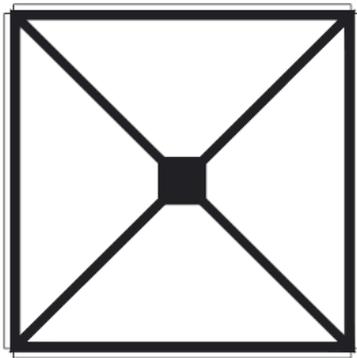


cross section

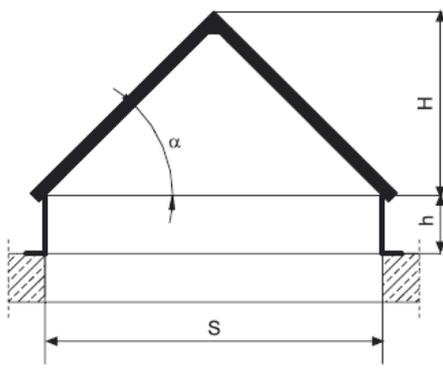


- α : skylight wall inclination angle (standard: 30° or 45°)
- S: skylight span (0.5 m to 7 m)
- L: skylight length (no limits)
- H: skylight rise (dependent on radius and span)
- h: base height (standard: 300 mm and 500 mm)

Fig. 5. Schematic diagram of pyramid skylight.



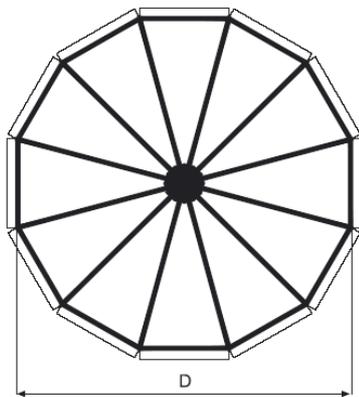
top view



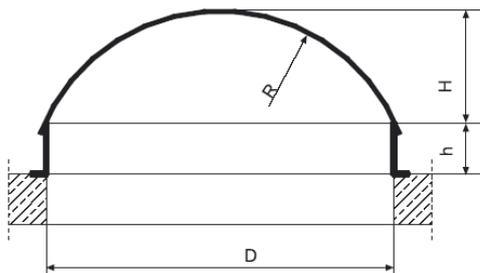
cross-section

α : skylight wall inclination angle (standard: 30° or 45°)
 S: skylight span (0.5 m to 7 m)
 H: skylight rise (dependent on radius and span)
 h: base height (standard: 300 mm and 500 mm)

Fig. 6. Schematic diagram of igloo skylight.



top view



cross-section

R: dome radius (dependent on filling material)
 D: skylight diameter (0.5 m to 7 m)
 H: skylight rise (dependent on radius and span)
 h: base height (standard: 300 mm and 500 mm)

Fig. 7. Structure of the filling of mcr-PROLIGHT system roof skylight or skylight dome, Class B_{ROOF(t1)}.

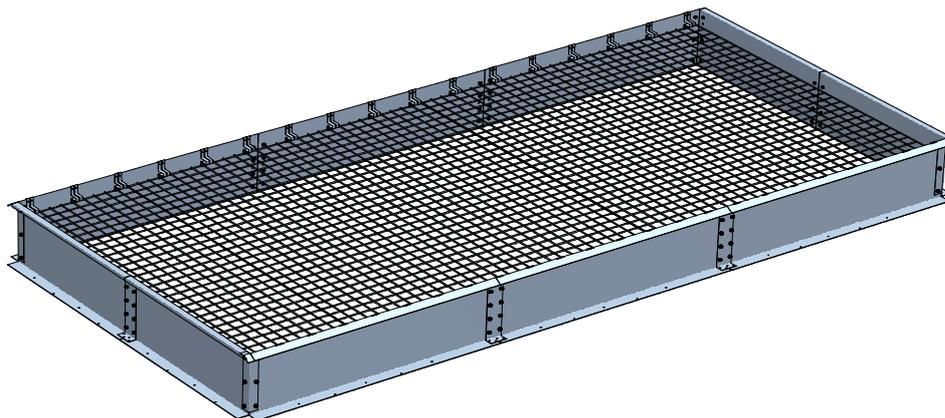
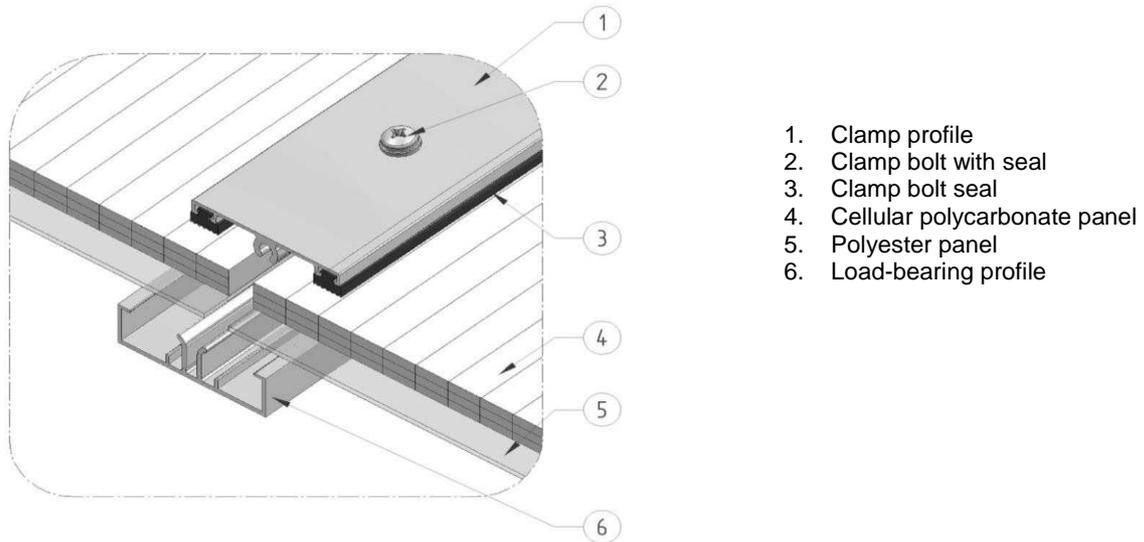


Fig. 8. mcr-PROLIGHT system roof skylight or skylight base with safety net.
Warning: mind the net sag (not shown above).

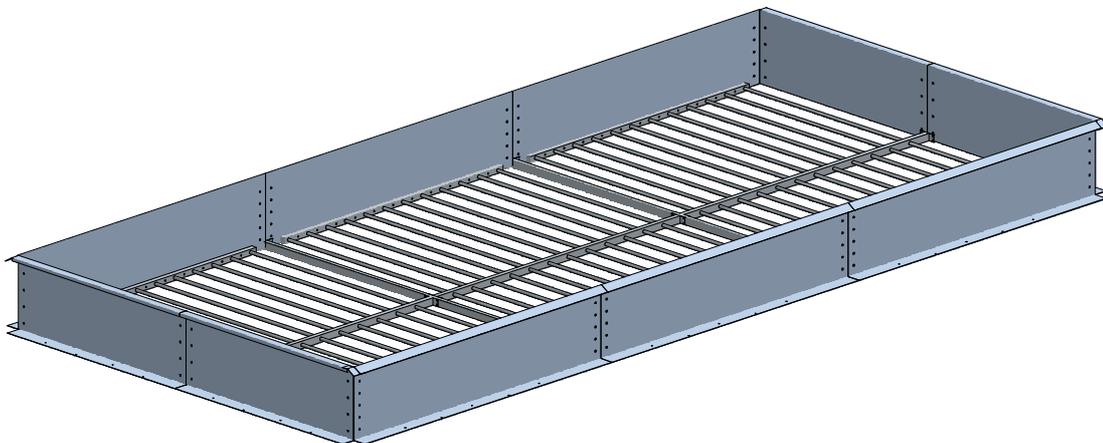


Fig. 9. mcr-PROLIGHT system roof skylight or skylight base with anti-burglar bars.

4. TRANSPORT and DELIVERY.

The elements of the "Set of products for manufacturing mcr-PROLIGHT system roof skylights and skylights with air admission and smoke exhaust functions" are delivered on site as detached components (elements of the base; dome aluminium profiles; overlay vents; filling [polycarbonate]; vent control system elements, and joints). This results from roof skylight sizes as well as from the need to protect individual vent elements from damages during the transport and to ensure road traffic safety. Unloading should be monitored by a person authorised by the manufacturer. For unloading, use commonly available appliances (such as e.g. fork lift trucks with forks adapted to pallets; cranes equipped with lifting slings and cross-beams) or unload by hand. Special attention must be given to the protection of roof skylight elements from damages.

5. ROOF SKYLIGHT ASSEMBLING.

Roof skylight assembling is a procedure having an impact on regular operations of this product. Assembling should be carried out by MERCOR or a duly authorised company.

Roof skylight assembling should be conducted in compliance with "**Roof Skylight Assembling Manual**" issued by Mercor SA.

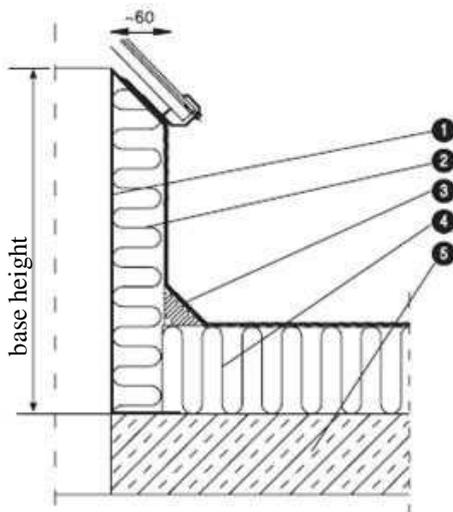
6. ROOF SKYLIGHT BASE DETAILING WORKS.

Good quality of detailing works on the base of a roof skylight requires the waterproofing to be rolled up either on the top shelf of the skylight base with thermal insulation (in the case of standard base) or on the existing curb (in the case of overlay base). Detailing works are to be conducted in compliance with manufacturer's guidelines and good roofing practice.

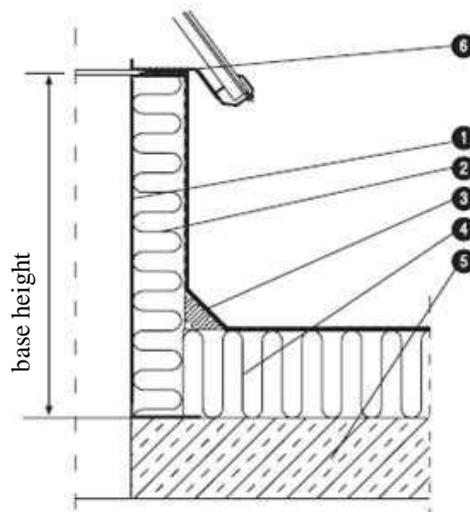
Roof skylight dome or overlay base may be then installed on such standard base or pre-treated curb, respectively.

Fig. 10. Steel base on reinforced concrete structure.

Simple base



Overlay base

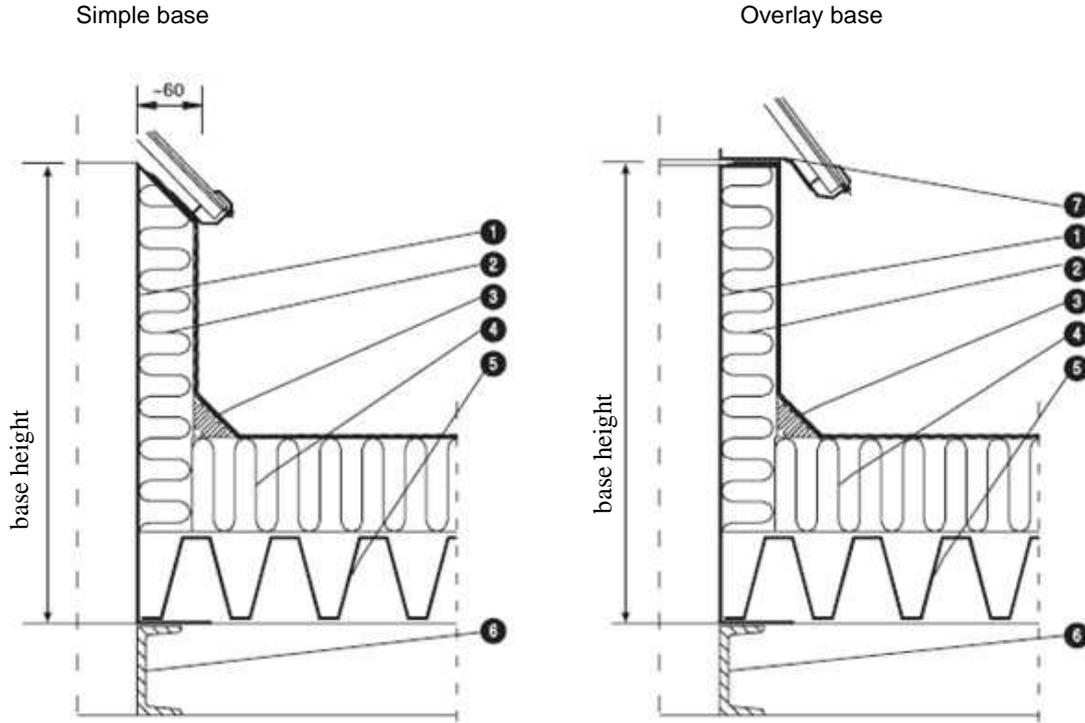


1. Skylight steel base
2. Base thermal insulation

3. Roofing paper or membrane details
4. Roof thermal insulation

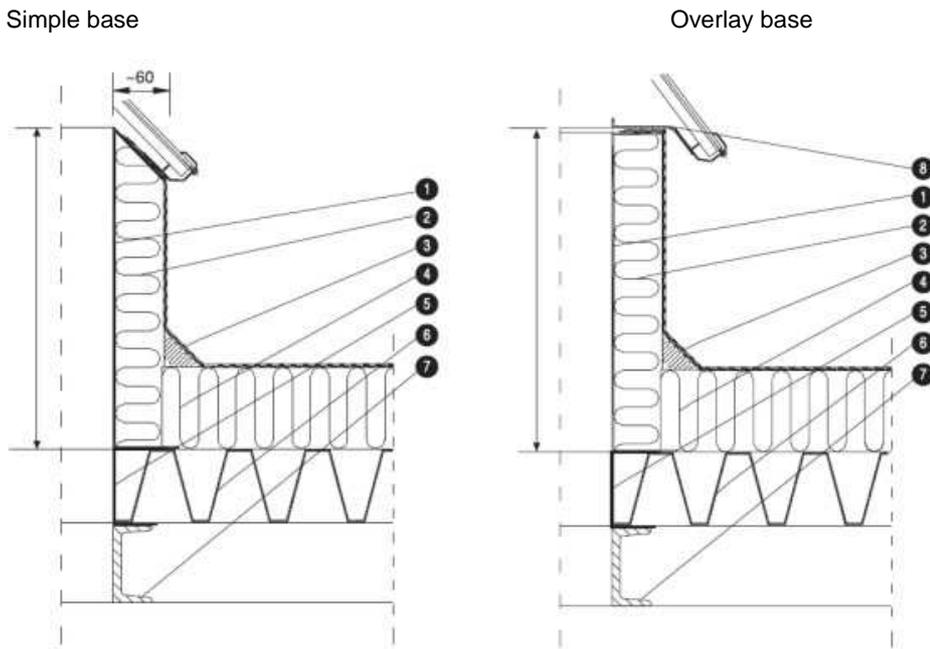
5. Reinforced concrete slab
6. Overlay

Fig. 11. Steel base on steel structure.



- | | | |
|--------------------------------------|----------------------------|-------------------------------|
| 1. Skylight steel base | 4. Roof thermal insulation | 6. Supporting steel structure |
| 2. Base thermal insulation | 5. Roofing sheet | 7. Overlay |
| 3. Roofing paper or membrane details | | |

Fig. 12. Steel base on steel structure.

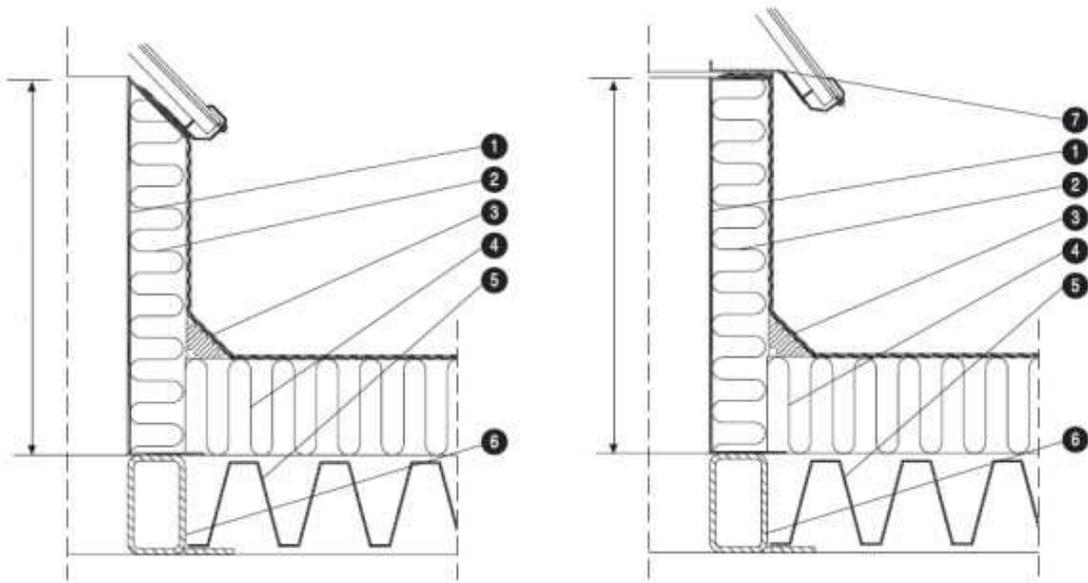


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|------------------------------|-------------------------------|-------------------------------|
| 1. Skylight steel structure | 4. Roof thermal insulation | 7. Supporting steel structure |
| 2. Base thermal insulation | 5. Additional detailing works | 8. Overlay |
| 3. Roofing paper or membrane | 6. Roofing sheet | |

Fig. 13. Steel base on steel structure.

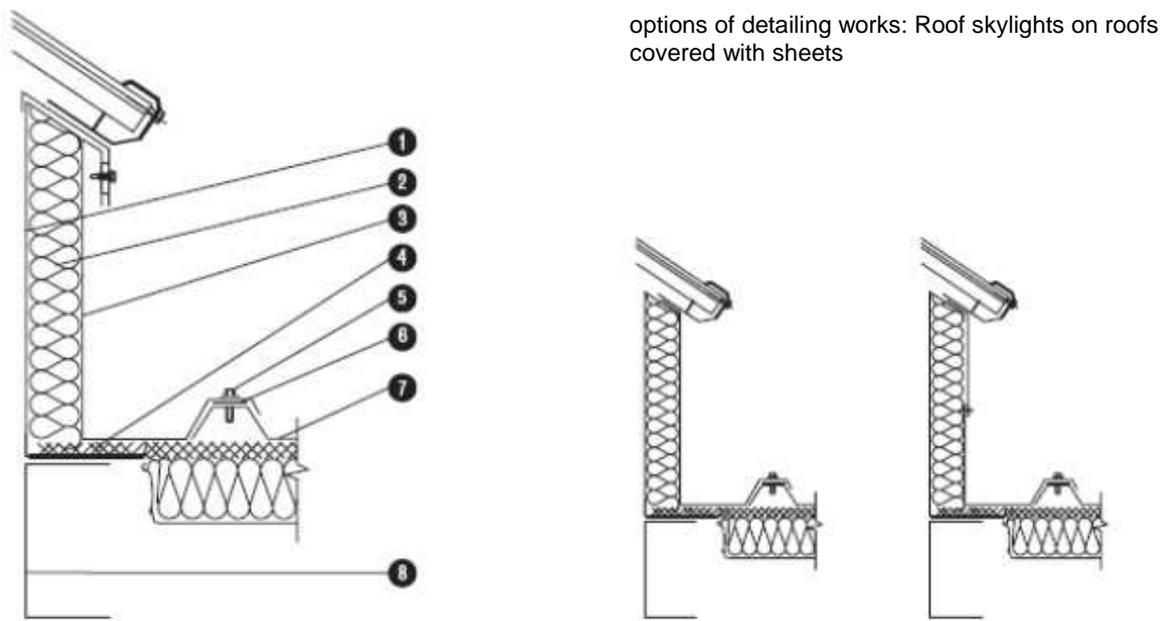
Simple base

Overlay base



- | | | |
|------------------------------------|----------------------------|-------------------------------|
| 1. Skylight steel base | 4. Roof thermal insulation | 6. Supporting steel structure |
| 2. Base thermal insulation | 5. Roofing sheet | 7. Overlay |
| 3. Building felt or membrane cover | | |

Fig. 13. Steel base on steel structure: system roof, aluminium detailing.



options of detailing works: Roof skylights on roofs covered with sheets

- | | | |
|----------------------------|----------------------------|---------------------------------|
| 1. Skylight steel base | 2. Base thermal insulation | 3. External aluminium detailing |
| 4. Roof thermal insulation | 5. System bolt | 6. System seal |
| 5. Roof cover sheet | 6. Supporting structure | |

Fig. 14. Steel base on steel structure: system roof, aluminium detailing.

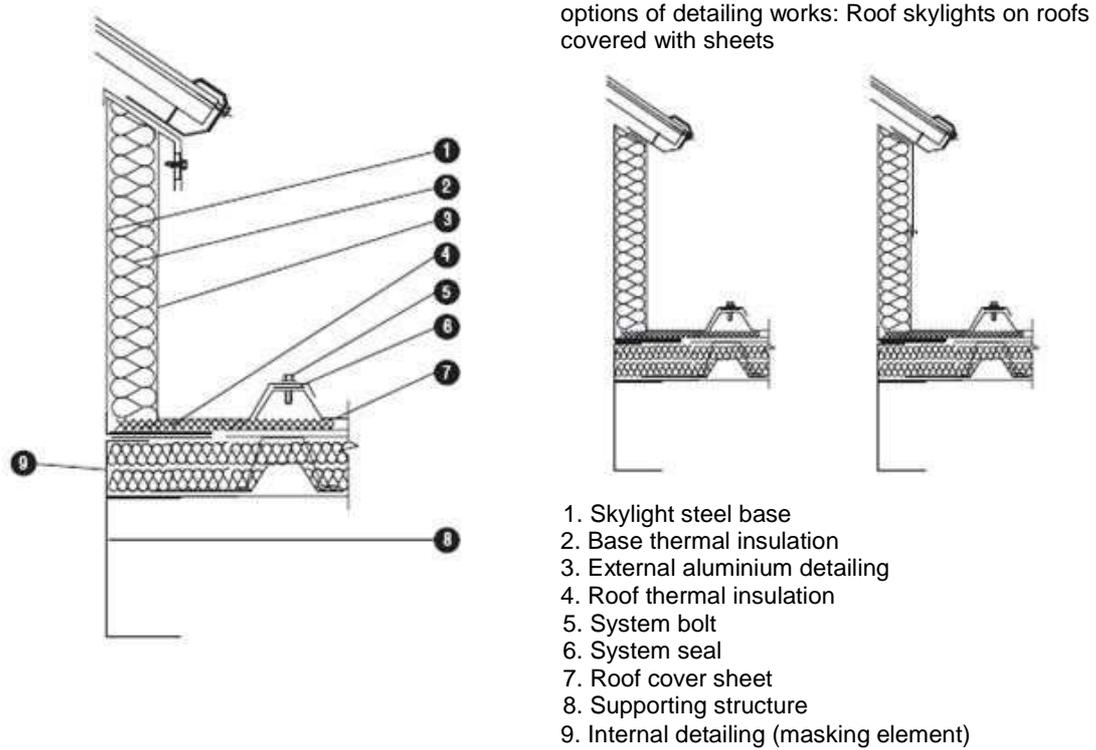
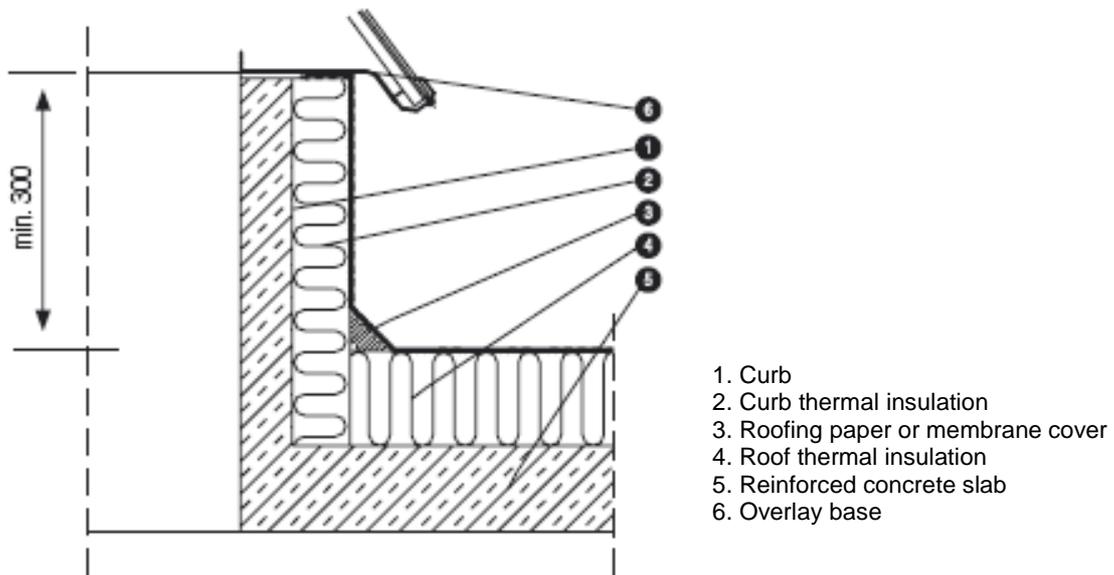


Fig. 15. Steel base on concrete, steel, or timber curb.



7. WIND DEFLECTORS.

Made of aluminium sheet elements, the wind deflectors increase the active area of smoke vents. They may be painted in any RAL colour chart. Their heights depend on type and size of the vent and amount to 100 through 450 mm. Given that wind deflector and vent sizes must be matched, the products should be adjusted to each other.

Shown below are the methods of installation of the wind deflectors depending on the vent type:

1-leaf vents: Wind deflector's screen the inlet hole; each baffle screens 1/3 of the vent length and half of the vent width. Wind deflector's wind screens should be fixed to the brackets which are welded onto the vent base. Use supplied M6x16 screws, M6 nuts with polyamide inserts, M6 rough pads (two sets per bracket), and special rectangular pads (two sizes).

2-leaf vents: Wind deflector's screen the width of the inlet hole on both sides of the gutter. Baffle wind screens should be fixed to the brackets which are welded onto the vent base. Use supplied M6x16 screws, M6 nuts with polyamide inserts, and M6 rough pads (two sets per bracket). A "fore-bracket" will be delivered if the baffle is more than 300 mm high. The fore-bracket should be installed once the wind screen is set: fix it to the baffle and onto the skylight clamp profile on the vent front side (sheetmetal screws with cylindrical head, \varnothing 5.5 + pad with seal).

Fig. 16. Wind deflectors on 2-leaf vent mounted on roof skylight.

1. Vent
2. Wind screen
3. Wind deflector's bracket
4. Bolting
5. Rectangular pad

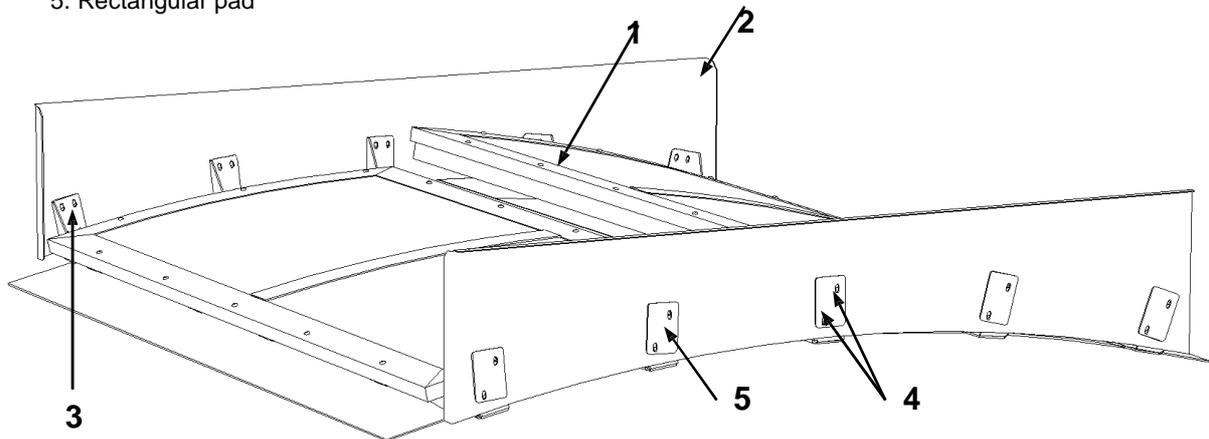
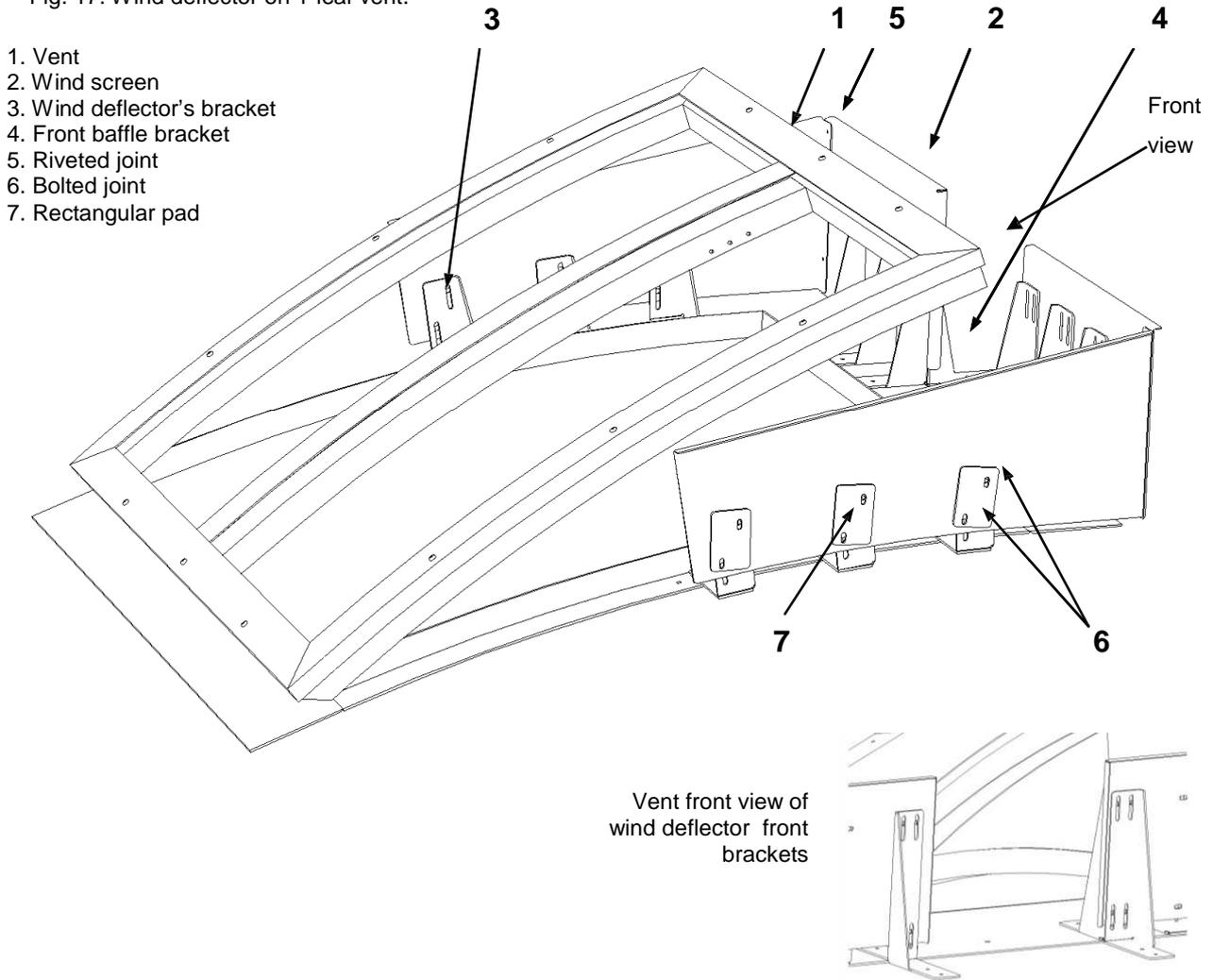


Fig. 17. Wind deflector on 1-leaf vent.



ATTENTION: Depending on vent type and size, aspect and type of brackets and wind deflectors may be different from the elements shown in the drawings.

8. VENT LEAF ADJUSTMENT.

(HOOKED BRACKET, EYE BOLTS, AND 'T' BOLTS)

Vent leaf is linked with actuator via the hooked bracket. The bracket is locked on the 'T' bolt or on a pin. Pneumatic actuators and electric spindle actuators are connected with the hooked bracket by means of an eye bolt which is screwed into the actuators piston rod / spindle. Vent leaf clearance is minimised by screwing in the eye bolt or adjusting the 'T' bolt. Eye bolt or 'T' bolt should be protected from undoing by means of a retaining nut. If an additional 230 V~ electric actuator is used for ventilation to co-operate with the pneumatic servomotor, the 'T' bolt will be screwed into the toothed bar or 230 V~ electric actuator spindle

Fig. 18. 'T' bolt.

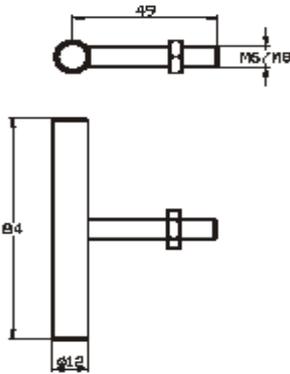


Fig. 19. Hooked bracket.

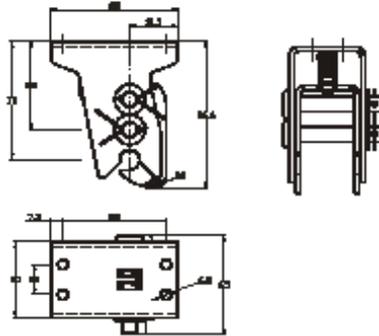


Fig. 20. Eye bolt.

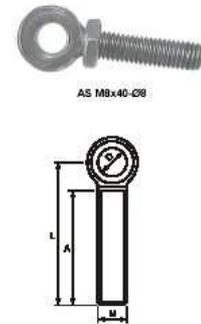


Fig. 21. Connection of actuator with hooked bracket.

1. Vent
2. Hooked bracket
3. Smoke exhaust actuator piston rod
4. Ventilation actuator bar
5. 'T' bolt



9. CONTROL.

Smoke vents and smoke & ventilation units make use of opening and closing mechanisms which compose the systems for smoke exhaust or exhaust & ventilation control. Depending on the type of components, smoke control systems may be:

- Pneumatic,
- Electric, or
- Pneumatic and electric (pneumatic part being responsible for smoke exhaust, electric part supporting the ventilation).

Depending on the method of control, smoke vents include pneumatic actuators with thermal valves, electric actuators, as well as pneumatic actuators and electric actuators as additional equipment for natural ventilation control.

The user must immediately notify the service support (see section 12) of any such failure of control system which prevents the vent leaf from closing.

In case of emergency the user can immediately close the vent leaf without waiting for the service team by switching the defective actuator off (e.g.: disconnect the eye bolt from the hooked bracket or undo the eye bolt from the actuator or disconnect E actuator from the fixing bracket), shut the leaf and lock it in closed position.

9.1. Pneumatic control.

Once smoke exhaust servomotor is installed inside the spreader boom, make all necessary connections of the pneumatic system and adjust the actuator. Connect the eye bolt of the pneumatic servomotor with hooked bracket pin and adjust so that the bracket is safely locked on the catch.

Pneumatic connections between the servomotors, thermal triggers, and other controls should be made of e.g. copper / steel pipe in the case of smoke exhaust systems or of flexible pipe in the case of ventilation control systems only.

Fig. 22. Ventilation system: method of connecting flexible pipes.

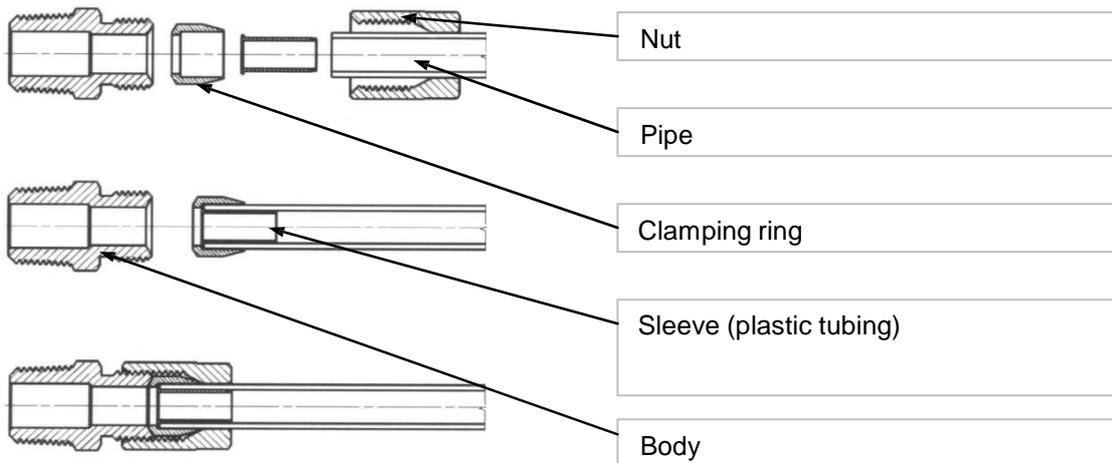
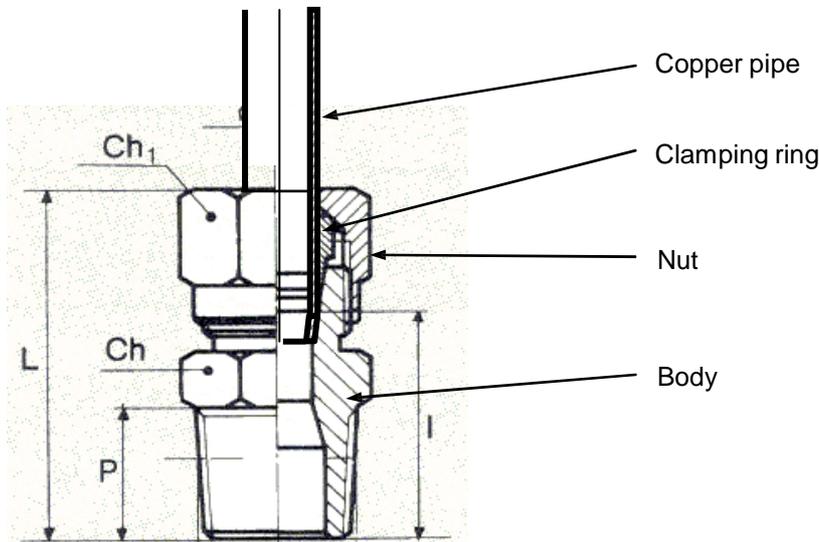


Fig. 23. Connection of union with copper pipe.



Threaded connections of the union with valves, actuators, etc., should be sealed with suitable chemical preparations, such as e.g. Loctite 243 (recommended) or Teflon® tape to be wound onto the thread. Loctite 243 should be coated drop by drop (2-3) onto the thread. Once the threaded connection is tightened, Loctite 243 will set and seal the connection thus protecting it from uncontrolled loosening (which is important in the case of actuator connections). To undo such unions, the user is required to employ manual tools.

WARNING

For transport safety reasons, smoke vent thermal valve is not armed. Once the vent is fixed to the roof skylight, arm the thermal valve.

Thermal trigger fusing:

- Make sure whether, or not, the **striker tightening spring (1)** is unscrewed; if negative, it should be unscrewed home by hand.
- Install **alcohol fuse (2)** in the seat of gas flow regulator placing its pointed tip towards the body; tighten the phial press bolt by hand.
- Place the **valve slider (4)**.
- Manually tighten the striker spring home by means of the screw (1).
- Make sure whether, or not, the fuse striker is hidden. The seal must be present in the fuse seat.
- Screw in **CO₂ cartridge (3)** by hand.

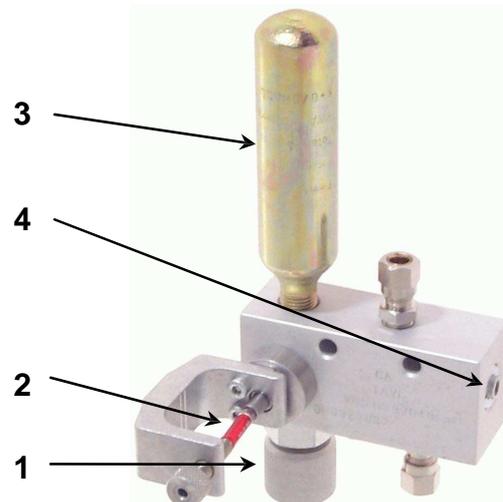


Fig. 24. Thermal valve.

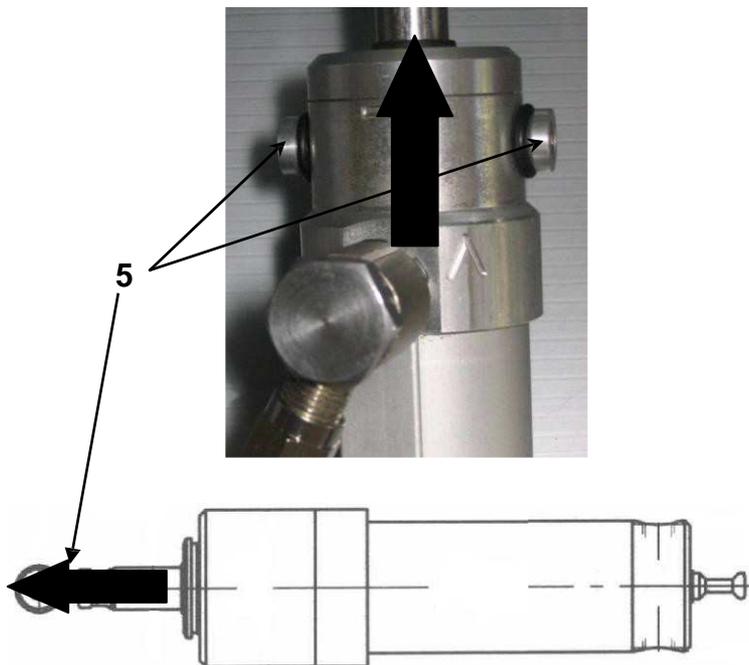


Fig. 25. Pneumatic actuator: direction of releasing the lock.

Smoke exhaust pneumatic actuators are equipped with internal locks which prevent completely open vent leaves from closing. Shown below is the method of closing the vent leaves following the emergency opening when the systems have no remote closing option:

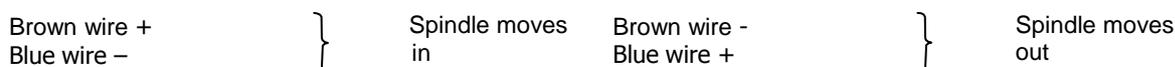
1. Decompress CO₂: unscrew the fuse from thermal valve or alarm box (**Warning: High pressure; undo slowly since the fuse may defrost**).
2. Release **actuators locks (5)**: lift them in the same direction as actuator working movement (follow the arrow - see Fig. 25).
3. Lower the vent leaf.
4. Check the leaf closing condition.
5. Repeat steps 2 through 4 in the case of two-leaf vents.
6. Place a new CO₂ fuse inside thermal valve or alarm box.
7. In case of need replace thermal fuse [alcohol fuse (2)].

9.2. Electric control.

Install the smoke exhaust electric actuator on the spreader boom, make all necessary electric connections, and adjust the actuator: connect the electric actuator eye bolt with the hooked bracket bolt and make suitable adjustment to get the bracket reliably latched on the catch as well as to make simultaneously the electric actuator switch off once the vent is closed thanks to the limit switch rather than to the overload switch.

Once the actuator is adjusted, tighten the actuator-spreader boom connection using 10 Nm torque and lock the eye bolt with the nut. Protect the threaded connections with Loctite 243 or similar sealant.

Method of connecting mcr-W actuator (wire poles):



mcr9705 and mcr0204 smoke exhaust and ventilation control units inclusive of mcrR0424 and/or mcrR0448 extension modules should be used for the purpose of control and power supply of mcr-W electric actuators of mcr-PROLIGHT vents.

We recommend no more than 30° deflection of the vent leaf with 24V actuator, which corresponds to the opening time of about 20 sec.

9.3. Ventilation function.

There are two embodiments:

- Pneumatic servomotors with applicable systems, or
- An additional 230 V~ electric actuator (see the figure below).

Ventilation electric actuator is not factory installed for transport reasons. It should be mounted inside the top spreader boom in the existing holes, using ST12-1/8 bolts (Exxx-230 actuator) or screw bolts (JMB actuators) delivered together with the actuator. ST12 screws should be protected from undoing by means of Loctite 243 or similar sealant.

Actuator has a T-shaped screw which should be installed instead of the eye bolt. Hooked bracket should be locked on the 'T' screw.

We recommend using a weather automatic control unit, such as e.g. mcrP054, in the ventilation control system. With this unit, the system will close open vents in case of strong wind or rainfall and hence, protect user's property and vent structures from damages.

Fig. 26. Ventilation control actuator.



Fig. 27. 'T' bolt.

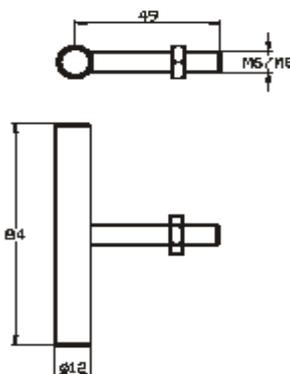


Fig. 28. ST12-1/8 screw.

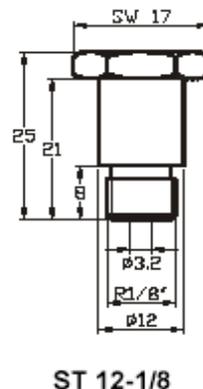
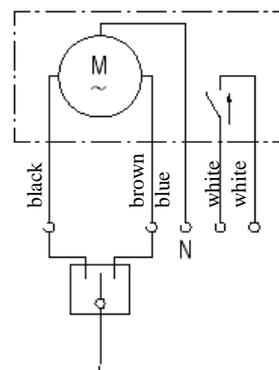


Fig. 29. 230 V AC ventilation electric actuator: Circuit diagram.

a/

Exxx - 230 V type actuator has two circuits:

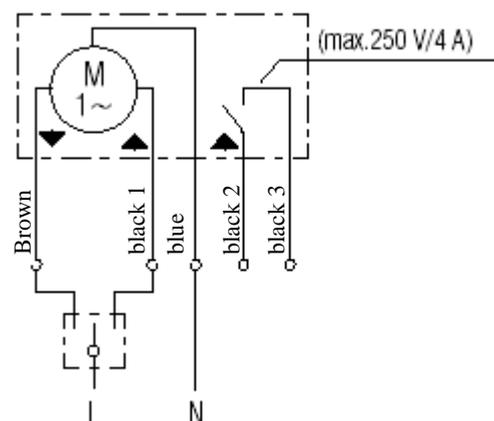
- operating: movement sense control (black / brown - blue wires);
- signalling (wires: 2 x white wires; actuator opening signalling: neutral contact).



b/

JMBB-500-300-LA type actuator has two circuits:

- operating: movement sense control (wires: brown / black 1 - blue),
- signalling (wires: black 2 / black 3; actuator opening signalling: neutral contact).



11. MAINTENANCE OF ROOF SKYLIGHTS.

During the operations, ensure regular maintenance and service reviews of the equipment. Service support and maintenance works are conducted by a team authorised by MERCOR SA. The time between the service reviews is 6 months. Between individual reviews, we recommend the works specified below:

1. Inspection of electric wiring condition, specifically with regard to mechanical damages.
2. Inspection of pneumatic connection condition, specifically with regard to mechanical damages.
3. Inspection of hooked brackets (should be entirely closed and unobstructed).
4. Inspection of seals.
5. Regular cleaning of polycarbonate panel surface:
Use a sponge or soft fabric as well as lukewarm water with common household mild cleansers. Do not scrub the panels with brushes or sharp things. Do not use abrasive materials, strong alkaline substances, solvents, etc. If doubtful, try a cleanser on a sample or small area.
6. Due to natural environmental processes, water vapours may condensate inside the polycarbonate panel cells. Condensation appears mostly as a mist or even visible drops in case of high moistness. After a certain time, moisture content inside the cells will equal the one in the outdoor air provided that suitable air change is ensured by way of diffusion between the cells and the outdoor space, and the symptoms will disappear.

Water vapour condensation has no impact on material service life or product quality.

WARNING

Do not use salt for snow removal from the roofs with mcr-PROLIGHT system roof skylights or skylights. Salt may decolour and damage aluminium profiles or polycarbonate panels. Such damages will make the warranty null and void.

12. TERMS AND CONDITIONS OF WARRANTY AND SERVICE SUPPORT.

1. MERCOR SA provides a 12-month warranty on the quality of the unit, beginning from the date of its purchase, unless the contract provides otherwise.
2. If during the warranty period any physical defects of the units shall be revealed, MERCOR SA agrees to remove them no later than 21 days from the date of receipt of written notification, subject to par. 5.
3. In the case of defects caused by improper operation of the unit, or for other reasons specified in par. 6, the Buyer / Holder of the warranty will be charged for their removal.
4. Liability covered by the warranty only applies to those defects that arise from causes inherent in the devices sold.
5. MERCOR SA reserves the right to extend the time to repair in case of complex repairs or those requiring the purchase of any custom subassemblies [components] or spare parts.
6. The warranty does not cover:
 - equipment damages or failures caused by improper operation, tampering, lack of maintenance or lack of periodic inspections;
 - damages to the units arising from causes other than those attributable to MERCOR SA, and in particular, acts of God, in the form of: torrential rain, flooding, hurricane, inundation, lightning, power surges in the electrical grid, explosion, hail, collapse of an air vehicle, fire, avalanches, landslides, and any consequential damages resulting from the above-mentioned reasons. The torrential rain means a rain with a performance ratio of at least 4, as set by IMGW (Institute of Meteorology and Water Management). If the ratio referred to in the preceding sentence cannot be determined, the factual status and the extent of damages in their place of origin, which will provide for the operation of torrential rain will be taken into consideration. The hurricane means a wind speed of not less than 17.5 m/s (a damage shall be considered as caused by hurricane, if it was found in the immediate vicinity of the hurricane activity);
 - damages caused by failing the obligation to immediately report defects revealed;
 - coating deterioration caused by the natural process of aging (fading, oxidation);
 - defects caused by use of abrasive or harsh cleaning agents;
 - parts subject to normal wear and tear (e.g. seals), unless caused by a manufacturing defect;
 - damages caused by the action of external aggressive agents, and in particular chemical and biological, or whose origin is connected with production processes and activities carried out in the facility or the immediate vicinity, where the devices have been installed
 - contamination of chambers of structured polycarbonate plate with dust or bits or particles which effective diameter is smaller than 50 µm
 - condensation of steam inside chambers of structured polycarbonate, during exploitation.
7. Any defect covered by the warranty should be reported immediately to MERCOR SA or local Mercor's representative, that is, within 7 days from the date of its disclosure.
8. The Buyer/Holder of the warranty is required for proper operation, maintenance and conducting periodic (at least 2 times a year) service reviews.
9. The warranty expires with immediate effect in the event of:
 - when the Buyer/Holder of the warranty introduces any design changes on their own, without the prior agreement of the fact with MERCOR SA
 - the maintenance or periodic maintenance inspections were not performed on time or were executed by unauthorized persons or a service centre not authorized by MERCOR SA, or if the unit was improperly operated
 - any intervention of unauthorized personnel - outside activities which fall within the normal operation of the unit
10. In addition, in the cases referred to in par. 9, responsibility of MERCOR SA for the warranty is excluded.

In matters not covered by these warranty terms and conditions, the relevant provisions of the Civil Code shall be applicable.

Servicing

1. The devices should undergo maintenance inspections every 6 months during their entire life
2. Maintenance inspections should be carried out by companies with appropriate authorization of MERCOR SA
3. For servicing, please contact local Mercor's representative.

13. TECHNICAL APPROVAL and CERTIFICATE.



BUILDING RESEARCH INSTITUTE

00 – 611 WARSZAWA, ul. FILTROWA 1, Phone: (48 22) 825-04-71, (48 22) 825-76-55; Fax: (48 22) 825-52-86

Member of The European Union of Agreement – UEAtc
Member of The European Organisation for Technical Approvals – EOTA

Series: TECHNICAL APPROVALS

ITB TECHNICAL APPROVAL AT – 15-5661/2012

On the basis of the Regulation issued by the Minister of Infrastructure on 8 Nov., 2004, concerning the technical approvals and organisations authorised to issue technical approvals (Journal of Law No. 249, item 2497), as a result of the approval procedure conducted in the Building Research Institute in Warsaw, on request filed by:

MERCOR SA
ul. Grzegorza z Sanoka 2, 80-408 Gdańsk

It is hereby formally approved that the products specified below:

Sets of products for manufacturing mcrPROLIGHT system roof skylights and skylights with ventilation and smoke exhaust functions

are useful in civil engineering to the extent of, and in compliance with the rules defined in the Appendix which is an integral part of the present ITB Technical Approval.

Expiry date:
31 July, 2017



DIRECTOR
ppa. Executive Director of
Foreign Co-operation



Marek Karpoń

Appendix:
General and Technical Provisions

Warsaw, 31 July, 2012

The present Technical Approval No. ITB AT-15-5661/2012 is an amendment to the Technical Approval No. ITB AT-15-5661/2005. Document No. ITB AT-15-5661/2012 contains 60 pages. Text of this document must only be copied as a whole. Publication or distribution in any other form of the excerpts of the text of this Technical Approval shall require a written agreement with Building Research Institute (ITB).



DEPARTMENT
OF CERTIFICATION

BUILDING RESEARCH INSTITUTE
00 – 611 WARSZAWA, ul. FILTROWA 1
Phone: (48 22) 825-04-71, (48 22) 825-76-55; Fax: (48 22) 825-52-86
e-mail: certyfikacja@itb.pl, www.itb.pl



CERTIFICATE OF CONFORMITY
ITB-0539/W

It is hereby confirmed that:

SET OF PRODUCTS FOR MANUFACTURING mcr-PROLIGHT SYSTEM ROOF SKYLIGHTS AND SKYLIGHTS WITH VENTILATION AND SMOKE EXHAUST FUNCTIONS

- (1) Roof skylights and skylights with integrated smoke vents, designed for exhaust of fire-generated smoke, heat, and toxic substances:
- Class of roof resistance to the impact of external fire: B_{ROOF} (t1) according to ENV 1187:2004 and PN-EN 13501-5+A1:2010 Standards as well as on the basis of the Regulation issued by the Minister of Infrastructure on 12 April, 2002, concerning the technical conditions applicable to the buildings and locations thereof, Journal of Law No. 75, item 690, as amended
- Smoke vents integrated with roof skylights and skylights have been classified to the extent of:
- Reliability of operations under load – **SL 900** (with pneumatic servomotor)
 - **SL 650** (with electric servomotor)
 - Reliability of operations at **T (00)**
 - Reliability of operations under wind load of **WL 1500**
 - Reliability **Re 50**
 - Resistance to hot temperature **B 300**
- (2) Roof skylights and skylights with transparent filling (no integrated smoke vents) designed as additional source of daylight in the premises

Commercialised and manufactured by

MERCOR SA
ul. Grzegorza z Sanoka 2
80-408 Gdańsk
Production plant:
Zakład Produkcyjny
3A, Kwarcowa Street, Ciepłowo
83-031 Łęgowo

Comply with the requirements set out in the Technical Approval No. AT-15-5661/2012

The Manufacturer has implemented the corporate quality control system and conducts the tests on product samples taken at the production plant in compliance with the testing schedule

ITB Department of Certification has conducted initial type testing and initial audit of production plant and corporate quality control system, as well as monitors, evaluates, and accepts the corporate quality control.

The present certificate with regard to products covered by (1) is a document required under the Quality Evaluation System 1 in compliance with the Regulation issued by the Minister of Infrastructure on 11 August, 2004, concerning the methods of making statements of conformity of the building products as well as the methods of marking the products with "B" Logo (Journal of Law, No. 198, item 2041, as amended).

The present certificate with regard to products covered by (2) is a voluntary document. The process of voluntary certification has been conducted according to System 4 defined in ISO/IEC Guide 67 (adopted by ITB Department of Certification as System 1D).

Certificate of Conformity No. ITB-0539/W was issued for the first time on 01.07.2005. The present Certificate (updated on: 02.06.2010; 01.07.2011; 27.07.2011; 01.10.2011; 19.03.2012; 01.08.2012) may be applied only to the products which meet the requirements of the above mentioned technical specification, and shall be valid until 31.07.2017 unless the technical specification becomes invalid and unless the type of product, conditions and place of production or corporate quality control system are subject to essential changes.

MANAGER
Department of Certification

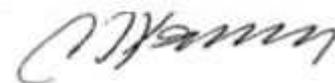


Barbara Dobosz



Warsaw, 1 August, 2011

EXECUTIVE DIRECTOR
Building Research Institute



Marek Kaproń