

Passive solutions for mitigation of condensation

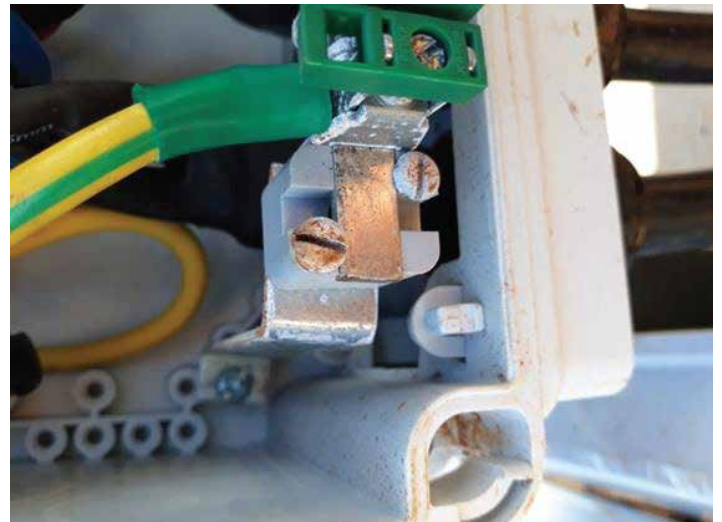
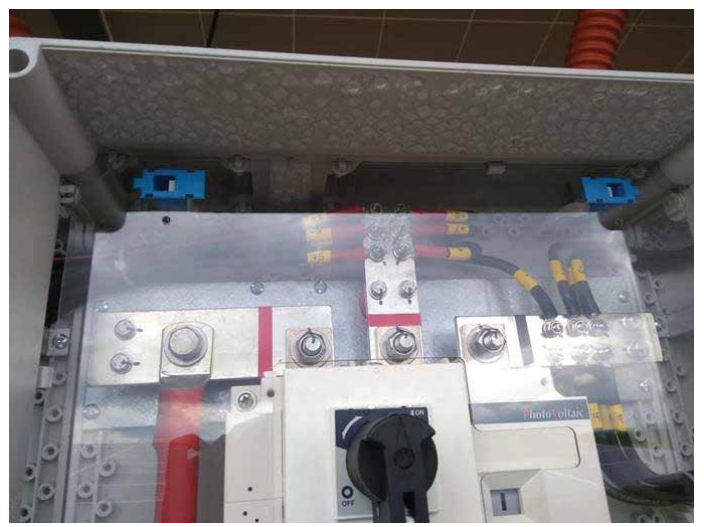
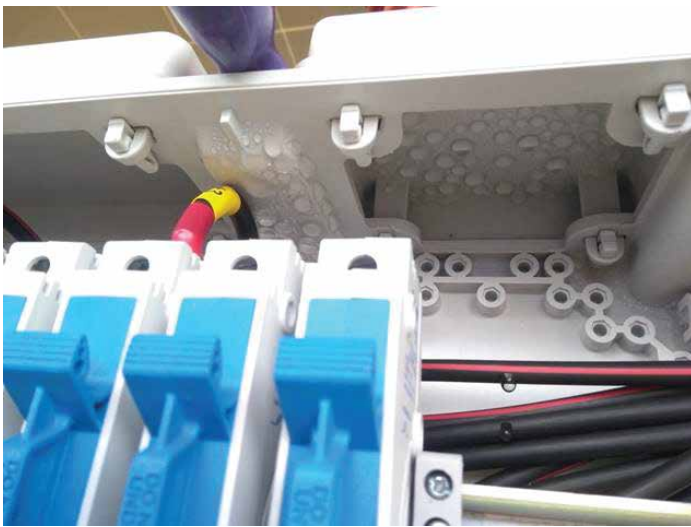
NEW



Electrical installation presents great demands on enclosure technology, especially when it is installed outside. It is also true for thermoplastic enclosures with high degree of protection, which are particularly well-suited for outdoor installations.

The external influences like intense sun rays, rapid temperature changes such as between day and night and high humidity can cause condensation to form on the walls of closed boxes on the inner surfaces in otherwise hermetically sealed enclosures.

The consequences may be corrosion, short circuits or other damage that may severely hinder the proper functioning of the electrical installation including complete equipment failure in some cases. To prevent such problems, targeted action needs to be taken.



How and when does condensed water occur in enclosures with high degree of protection and what states the safety standard IEC 60 364-5-52?

Condensation in enclosures particularly arises with outdoor installations. By large temperature fluctuations (day/night, changing weather, intensive solar irradiation) or load change of the operational funds condensation can form in closed enclosures on the inner surfaces.

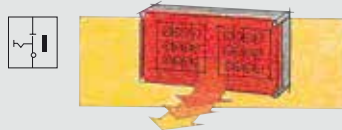
In order to prevent consequences such as corrosion, electrical short-circuits and possibly a complete equipment failure, purposeful measures are necessary.

1. HOW does condensed water forming occur?

The degree of saturation of water in air (air humidity) is dependent on temperature.

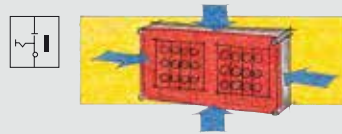
In case of high temperature difference between exterior and interior air of the enclosure, condensation begins within the enclosure.

Example: Change of load in processing



System switched on.

The internal temperature is usually higher than the external temperature due to the power dissipation of the built-in devices.



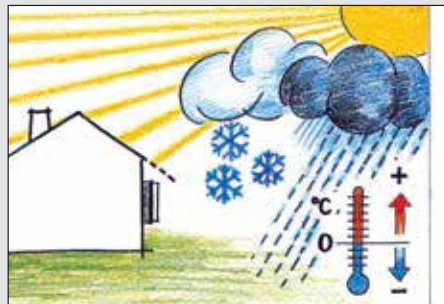
The warm air inside the enclosure attempts to accumulate moisture, which enters from outside through the seal as the enclosures are not gas-tight.



System switched off.

The internal temperature is reduced by cooling down the system e.g. by switching off the loads. The cooler air emits moisture which is collected as condensed water on the cooling inner surfaces.

2. WHERE does condensed water forming occur?



Condensation forms particularly in areas where large temperature fluctuations are expected, (= 'sweating' enclosures): e.g. with protected outdoor installations or unprotected outdoor installations.

In the internal area e.g. in the proximity of large gates, in car washes, kitchens etc.

3. WHAT states the safety regulation IEC 60 364-5-52?

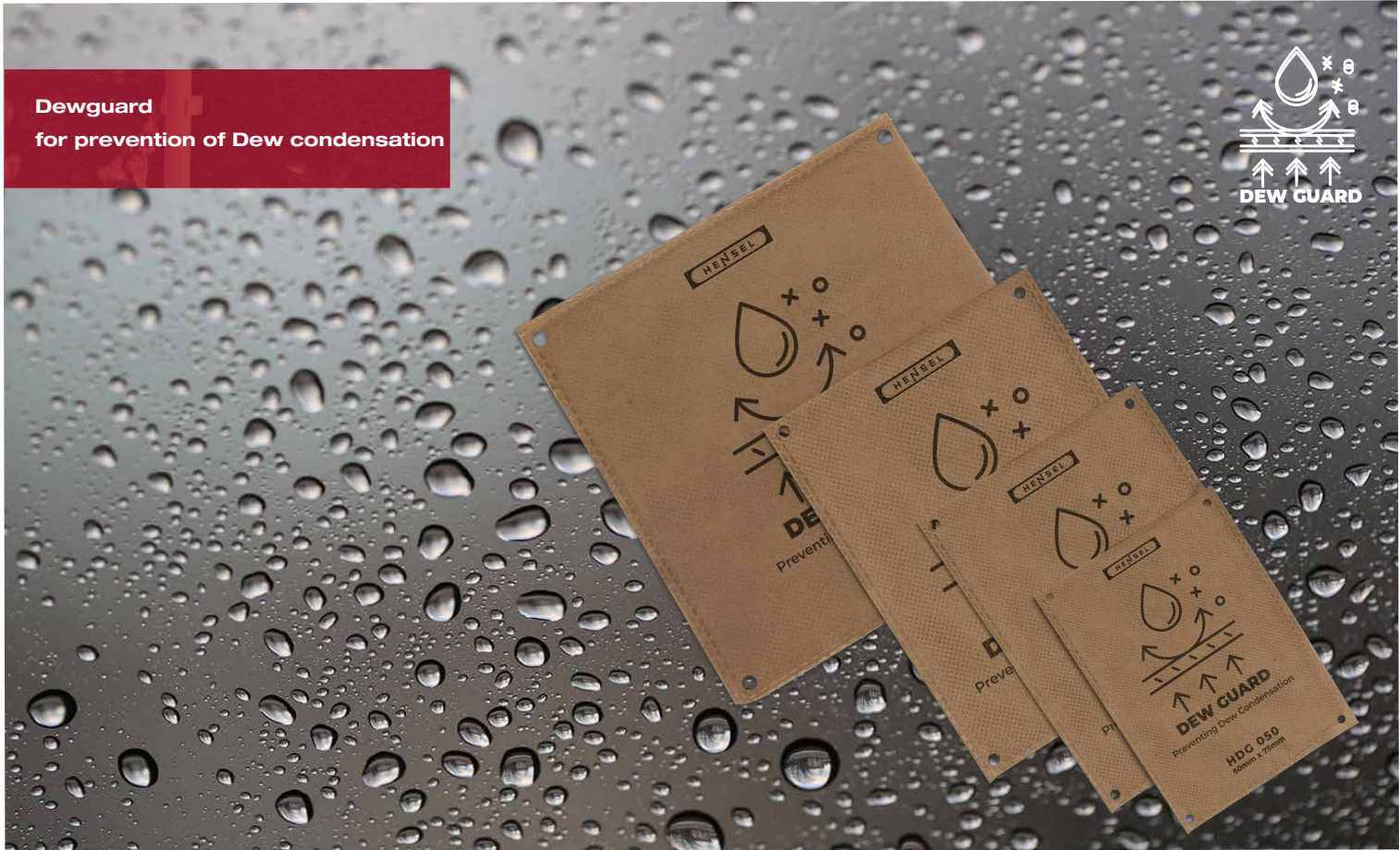
IEC 60 364-5-52 »Erection of low-voltage installations«, chapter 52: wiring systems, clause 522.3.2 stipulates:

”If water can accumulate or condensation of water can form within wiring systems, precautions for the water evacuation must be taken.“

For example :

The standard for cable junction boxes specifies a condensation hole in the size of \varnothing 5 mm.

**Dewguard
for prevention of Dew condensation**



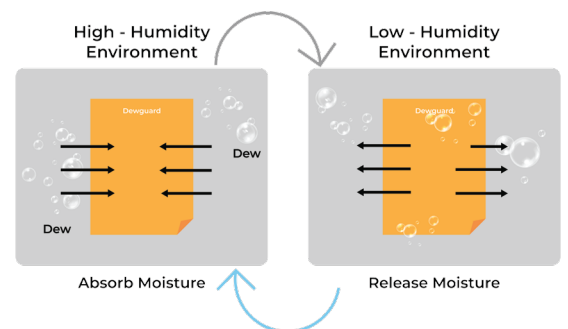
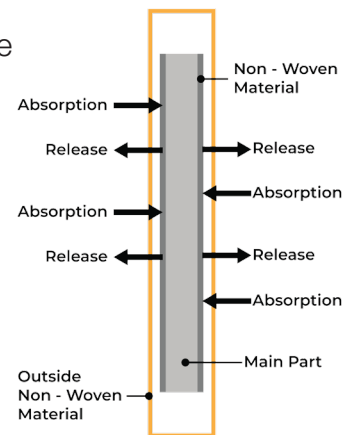
- Dew Guard is a thin sheet made from synthetic rubber and a super absorbent polymer and covered by a non woven fabric.
- Dew Guard absorbs moisture during high humidity and releases moisture during low humidity.
- This reversibility ensures that a constant level of humidity is maintained in the enclosed space.
- Due to this, the product continues to be in function over a large period of time and protects against condensation.

Product Features

- Absorbs moisture without any saturation, even in high humidity,
- Absorbency of 0.8g (H₂O) / 1g (product) @25 deg C and 95% RH or higher.
- Can be used for a long period of time thanks to its humidity absorption / release function.
- Works between a large temperature range of -30 deg C to +90 deg C.
- Halogen and silicon free
- Environment friendly and can be disposed of in regular trash.

Caution

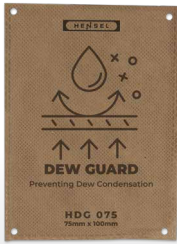
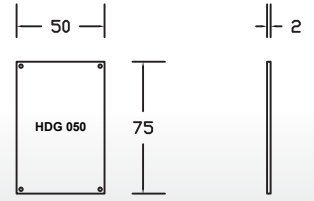
- To be used in enclosed / airtight spaces only
- Not to be soaked in water





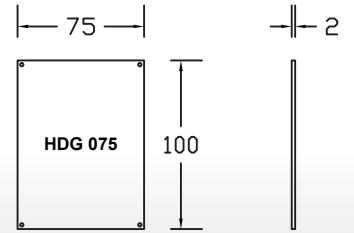
HDG 050
Dew guard

50mm x 75mm x 2mm
For use with
DK / kF / KV / FP / Mi range



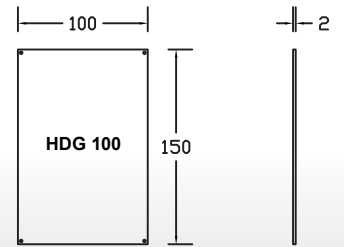
HDG 075
Dew guard

75mm x 100mm x 2mm
For use with
DK / kF / KV / FP / Mi range



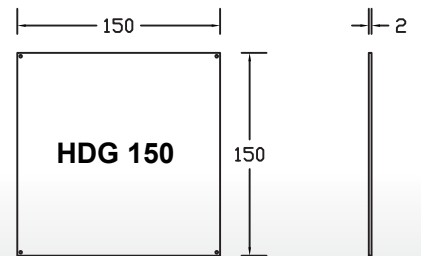
HDG 100
Dew guard

100mm x 150mm x 2mm
For use with
FP 02XX / 03XX / 04XX
Mi 04XX / 06XX / 08XX

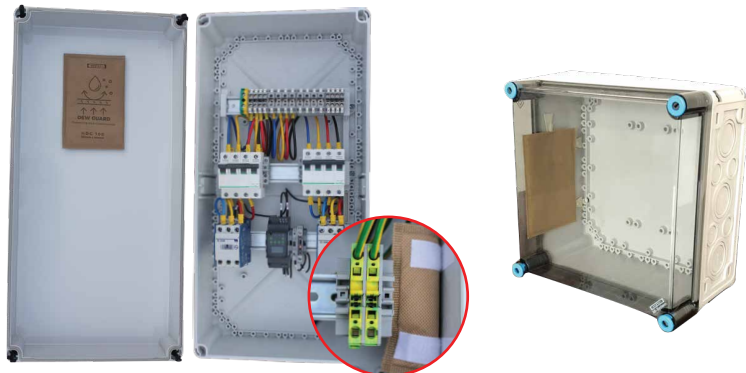


HDG 150
Dew guard

150mm x 150mm x 2mm
For use with
FP 03XX / 04XX
Mi 04XX / 06XX / 08XX



Fixation by means of a hook or
Velcro in the inner wall of a sealed enclosure



Application :
In enclosed spaces where
a risk of condensation exists



Waterproof - for encapsulation
for outdoor installation and use in harsh environmental conditions with risk of condensation and ingress of water as well as for ground installation without traffic loads

ISO-FILL BRW is a re-enterable cold curing 2-component nonurethane encapsulating gel. Unlike other pouring compounds, ISO-FILL BRW is free of isocyanates, epoxides, and silicones and contains no hazardous substances.

The hydrophobic properties of the resin are excellent. Therefore it is especially suitable in low voltage applications, especially in cable junction boxes, to avoid damages by moisture and breakdown of insulation.

This gel can also be used in telecommunication and for the sealing of many other electronic parts, especially where no mechanical stress is allowed (even at very low temperature, $T_g < -50^\circ\text{C}$).

For changing the installation or for repairing purposes the resin can be removed very easy.

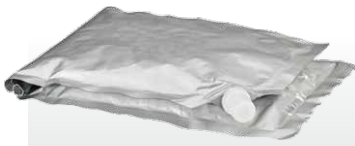
ISO-FILL BRW has a medium viscosity while pouring. The cured product shows good adhesion to metals, minerals and many plastics.

The gel comes in two versions:

1. Pre-filled two component packs in small volumes upto 1200 ml
2. Larger packs of 2liters,5liters and 10 liters where the two components are packed separately in stainless steel drums and PET bottles with gloves and mixing stick.

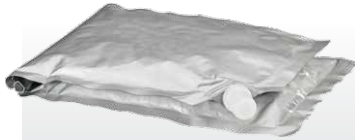
Benefits :

- 2 liters,5liters and 10 liters packs can be used in smaller quantities depending on requirement
- Soft and removable.
- Free of halogens, silicon, isocynates, epoxides. Non toxic and can be disposed of with normal waste.



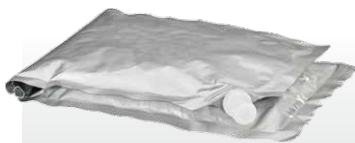
GH 0350
sealing compound

Set sealing compound, 350 ml
for WP 0202 x
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C



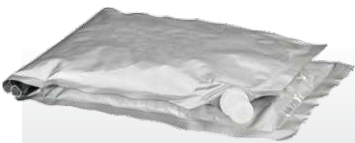
GH 500
sealing compound

Set sealing compound, 500 ml
for WP 040x x
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C



GH 850
sealing compound

Set sealing compound, 850 ml
for WP 060x x
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C



GH 1200
sealing compound

Set sealing compound, 1200 ml
for WP 10xx x
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C

NEW



GHL 2000
sealing compound

Set sealing compound, 2000 ml
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C
mixing ratio 1 : 1



GHL 5000
sealing compound

Set sealing compound, 5000 ml
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C
mixing ratio 1 : 1



GHL 10000
sealing compound

Set sealing compound, 10,000 ml
sealing compound for refilling after changes or repairs
durability of sealing compound to processing ≥ 12 months at a storage temperature of 5 - 50 °C
mixing ratio 1 : 1



Pressure compensation device for M 12 / M 40 knockouts
DA 284 (Article No.28406.0-00)
DA 284 (Article No. 28405.0-00)

IP
66/67

- for the reduction of condensation by pressure compensation in power distribution systems
- ISO thread M 12 x 1.5 / M 40 x 1.5
- with counter nut
- for indoor (normal environment and/or protected outdoor) and outdoor installation (harsh environment and/or outdoor)
- ambient temperature - 35 °C to + 70 °C
- technical changes reserved
- Colour: grey, RAL 7035

Ventilation cable gland for M 12 / M 16 / M 20 knockouts

DAK 284 (Article No. 28410.0-00)
DAK 284 (Article No. 28411.0-00)
DAK 284 (Article No. 28412.0-00)

IP
66/67



- thread M12 x 1.5 / M16 x 1.5 / M20 x 1.5
- 0.5 - 3mm with lock nut
- plastic, light grey
- Diameter 12.3mm / 16.3mm / 20.3mm
- Operating / storage temperature -20 to +80°C (-4 to +176°F)
Clamping range 4 - 8mm / 4 - 8mm / O



Drainage Device
DD 084 (Article No. 08410.0-00)

IP
66/67/69

- thread M50 x 1.5 with nut (wrench size 60mm, housing 50mm)
- 6Nm max.
- plastic according to UL94 V-0, umbra grey, weather proof and UV light
- resistant according UL746C (f1)
- -45 to +70°C (-49 to +158°F)
- Material adheres to limit values in accordance with RoHS3

Pressure compensation element





KBM 20 Combi climate gland M20

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 20 x 1.5
- sealing range: Ø 6-13 mm
- bore-hole: Ø 20.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, one combi climate gland M20 must be used per 6 litres (6000 cm³) of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.
- Number of necessary combi climate glands M20 ≥ 3 pieces.



KBM 25 Combi climate gland M25

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 25 x 1.5
- sealing range: Ø 9-17 mm
- bore-hole: Ø 25.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M25 must be used per 11 litres (11000 cm³)** of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12,393 litres.
- Number of necessary combi climate glands M25 ≥ 2 pieces.



KBM 32 Combi climate gland M32

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 32 x 1.5
- sealing range: Ø 13-21 mm
- bore-hole: Ø 32.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M32 must be used per 13 litres (13000 cm³)** of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12,393 litres.
- Number of necessary combi climate glands M32 ≥ 1 piece.



VSB 13 Sealing plug

- diameter: 13 mm
- for sealing combi climate glands M20 or M25, which are not used for cable entry
- material: thermoplastic
- colour: RAL 3000 red



VSB 21 Sealing plug

- diameter: 21 mm
- for sealing combi climate glands M25 or M32, which are not used for cable entry
- material: thermoplastic
- colour: RAL 3000 red



KBS 20 Combi climate gland M20

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 20 x 1.5
- sealing range: Ø 6-13 mm
- bore-hole: Ø 20.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M20 must be used per 6 litres (6000 cm³)** of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.
- Number of necessary combi climate glands M20 ≥ 3 pieces.



KBS 25 Combi climate gland M25

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 25 x 1.5
- sealing range: Ø 9-17 mm
- bore-hole: Ø 25.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M25 must be used per 11 litres (11000 cm³)** of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.
- Number of necessary combi climate glands M25 ≥ 2 pieces



KBS 32 Combi climate gland M32

- glow wire test IEC 60 695-2-11 960° C
- ISO thread: M 32 x 1.5
- sealing range: Ø 13-21 mm
- bore-hole: Ø 32.5 mm
- wall thickness: to 3.5 mm
- In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M32 must be used per 13 litres (13000 cm³)** of enclosure volume.
- Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.
- Number of necessary combi climate glands M32 ≥ 1 piece.



VSB 13 Sealing plug

- diameter: 13 mm
- for sealing combi climate glands M20 or M25, which are not used for cable entry
- material: thermoplastic
- colour: RAL 3000 red



VSB 21 Sealing plug

- diameter: 21 mm
- for sealing combi climate glands M25 or M32, which are not used for cable entry
- material: thermoplastic
- colour: RAL 3000 red



Mi DB 15 Canopy for box wall 150 mm

- with fixing wedges and seal
- suitable for outdoor installation, UV resistant



material	stainless steel powder-coated
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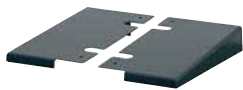


Mi DB 30 Canopy for 300 mm box walls

- with fixing wedges and seal
- suitable for outdoor installation, UV resistant

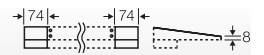


material	stainless steel powder-coated
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Mi DB 01 Canopy end plate

- for canopies FP DB xx and Mi DB xx



material	stainless steel powder-coated
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Application :



Canopy



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Industrial Electrical Power Distribution Systems

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