

A full-page background image showing a paraglider in silhouette against a bright blue sky with scattered white clouds. The paraglider is positioned in the center, with their canopy spread wide, creating a large, curved shape.

BEMO STANDING SEAM ASSEMBLY GUIDE

VERSION 2023-1

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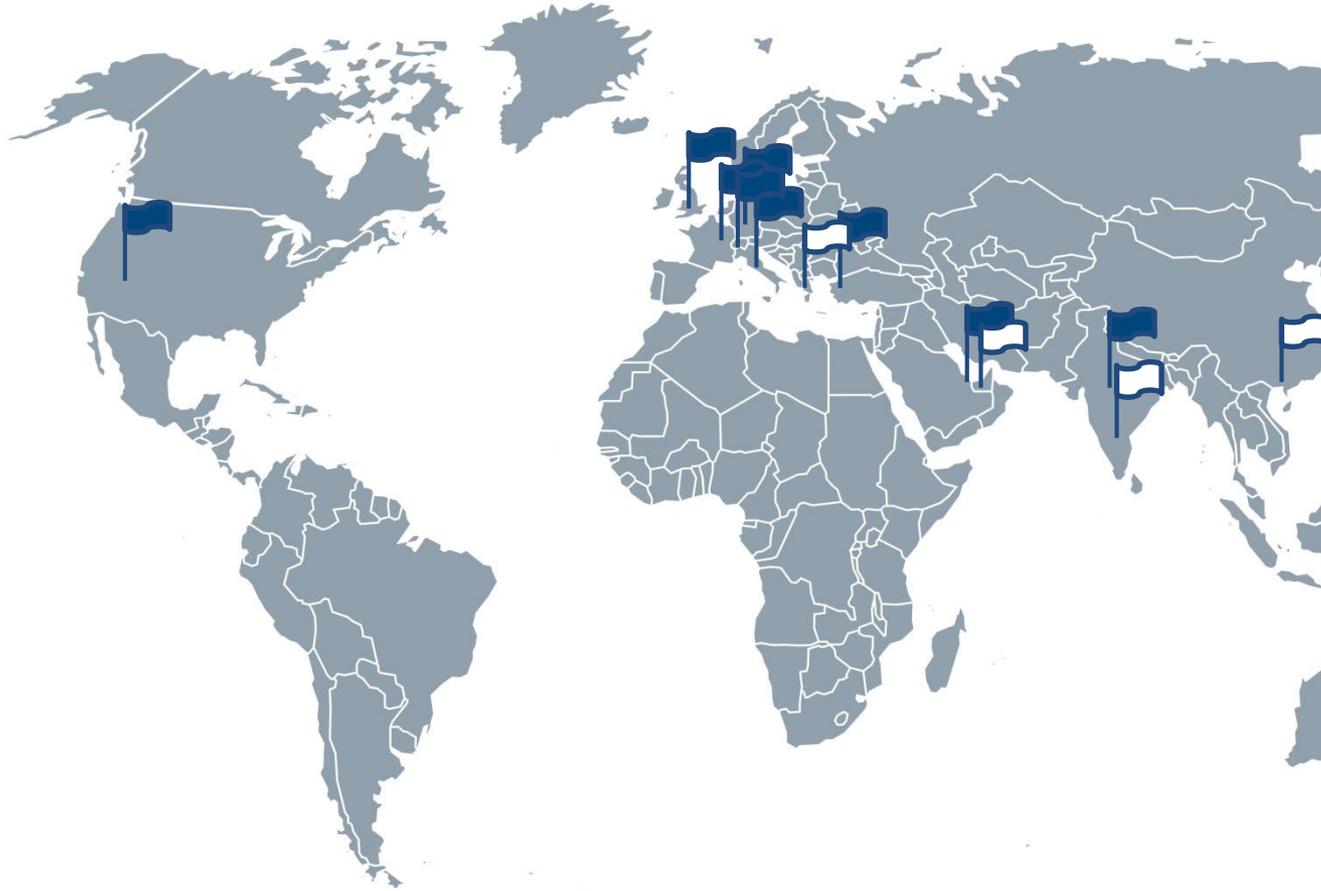
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2.0 International structure of the BEMO Group Production Centers / Service Centers



Sales- / Production centres

BEMO Germany
BEMO USA
BEMO UK
BEMO Turkey
BEMO Qatar
BEMO India (FP)

BEMO Sales Offices

Milan, Italy
Mulhouse, France
Amstetten, Austria

Partners

Lindner LSG, Middle East
Aditya Profiles Ltd., India
Laser Soleil Ltd., Thailand
Jacaranda Ltd., Hongkong
Ergomar, Greece + Cyprus

3.0 Together we are strong Partners around the globe



4.0 Introduction-instructions to be followed

This installation manual is designed to provide information on the transporting, unloading, onsite storage and installation of BEMO profiled panels, along with their respective fittings and accessories.

Ensure that all sites carry permit no. Z-14.1-182 for Aluminium or Z-14.1-640 for Steel (or your local equivalent). The person in immediate charge of installation procedures should be provided with a copy of this documentation. This permit (or your local equivalent) should contain details of important precautions to be observed - along with those already listed in these fitting instructions - by all installation personnel.

It is assumed that all persons concerned are familiar with the relevant planning-authority regulations, codes of professional conduct and so on. Note that there is a contractual obligation to ensure the BEMO profiled panels are ONLY installed by specialist firms that have been duly approved by the manufacturer or its authorized agents.

The examples given in these fitting instructions refer to normal conditions and are based on the manufacturer's own experience and those of firms that install the panels. They are correct to the best of our knowledge, but do not release the installer in any way from the obligation to carry out all pertinent checks and inspections.

No claims regarding defects, faults or incompleteness can be accepted in the case of failure to observe this condition. In order to ensure that the installation work proceeds smoothly, from both a technical and organizational point of view, we recommend that each product should have its corresponding layout sketch, list of materials, set of structural calculations and detailed installation plan.

We can provide these planning and quantity-surveying services, as an optional extra, for installation firms that lack the corresponding technical facilities.

4.0 Introduction

BEMO profiled panels have been specially developed both for sloping flat roofs and pitched roofs.

BEMO profiled panels can be made to size in long sections either before shipment or onsite, or - in special cases - on the roof directly. Panel runs of up to 100 meters (328 feet) and more are no problem for the BEMO system.

The BEMO bracket system makes due allowance for the longitudinal expansion of the material used (see Table 2.1) and enables a large degree of warp-free expansion. Plus the concealed attachment fittings do not penetrate the roof skin and therefore guarantee maximum protection against leaks.

A special feature of BEMO profiled panels (applicable to roof gradients of less than 1.5°) is their precision-machined beading, which permits gradients of 0.5° .

A prerequisite here is that the profiled panels must be fitted without side impact and that all sections of flashing fitted to the roof surface must be soldered or welded into place.

The min. slope must be guaranteed also after deflection of the load bearing construction.

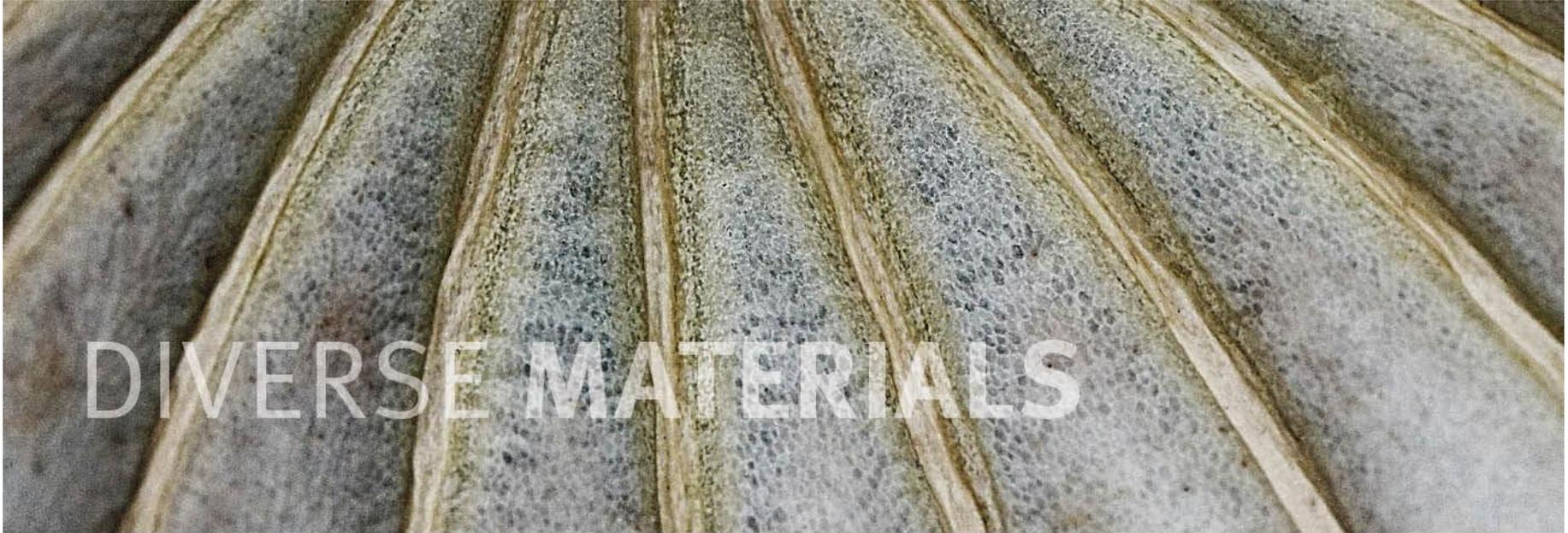
BEMO highly recommend in general to use an 3-D scan of the load bearing construction.

If you intend to install a roof of this type, please contact our Technical Department in order to clarify the individual details of the operation.

Care should be taken to ensure that the lengthways expansion of the BEMO profiled panels is not negatively affected, including when they are fitted alongside other components.

5.0 Variety of materials

All available building metals for each application



5.0 Materials

Self-supporting profiled panels can - depending on their dimensions and thickness - form single-shell structural spans of up to four meters (approx. 13 feet), with flexible insulating material added if required. Non-self-supporting BEMO profiled panels are made for roofs with a substructure designed to bear the weight of people walking on top. They should be used either in conjunction with this type of load-bearing structure or according to the requirements established by the corresponding structural calculations.

Profiled panels can be made of a variety of different materials. The following materials have all been used to date in the fabrication of BEMO profiled panels:



Aluminum



Stainless steel



Steel



Copper



Titanium zinc



COR-TEN Steel

Special criteria need to be taken into account whenever copper or zinc is used.

Copper, for example, can only be used in conjunction with BEMO Brass halters or BEMO Thermal halters made of GFK. Normal BEMO Aluminium halters can be used with all other materials (please refer also to Table 5.1).

Neither BEMO nor its licensees can accept any claims whatsoever from processing companies or third parties if it has not issued any express information in writing concerning the construction / installation of a particular material.

Zinc must be treated with an appropriate protective coating on the underside whenever it is fitted to a non-ventilated roof.

Please do not hesitate to contact one of our applications consultants if you have any queries in this respect.

5.0 Materials

5.1 Metallic-structure combinations

When different metals come into contact with one another in the presence of an electrolyte, the galvanic element that forms can lead to electrochemical corrosion.

The electrolyte in question can be - for example - condensation water or structural moisture.

Parts made of certain metals should therefore not be allowed to touch each other.

Ways to avoid direct contact include the application of suitable coatings, or the interspersing of such materials as plastic or natural-rubber sheeting.

The table shows which combinations are possible (+) and which ones are not (-):

Possible metallic-structure combinations:

	Al	Pb	Cu	Zn	S.S.	St	Explanation:
Al	+	+	-	+	+	+	Al = Aluminium
Pb	+	+	+	+	+	+	Pb = Lead
Cu	-	+	+	-	+	-	Cu = Copper
Zn	+	+	-	+	+	+	Zn = Zink
S.S.	+	+	+	+	+	+	S.S. = Stainless Steel
St	+	+	-	+	+	+	St = Galvanized Steel

5.0 Materials

5.2 Heat-induced expansion of materials

All materials, metals included, change with respect to their original length when subjected to fluctuations in temperature. This change depends on the expansion coefficient of the material, the differences in temperature involved and the length of the component concerned.

The change in length can be calculated using this formula:

$$DI = l_0 \cdot \alpha \cdot (t_2 - t_1)$$

DI	Change of length (in mm)
l_0	Length of component (in meters)
α (mm/mK) =	Expansion coefficient(mm/mK)
$(t_2 - t_1)$ =	Temperature difference (K or °C)

Expansion coefficient (mm/mK) between - 20° and + 80° for different materials

Material	Expansion coefficient at (mm/mK)
Aluminium	0,024
Structural steel	0,012
Lead	0,029
Bronze	0,018
Cast iron	0,0104
Copper	0,017
Brass	0,019
Stainless steel	1.4301 0,016
PVC	0,080
Quartz glass	0,0005
Silver	0,020
Titanium zinc	0,022
Zinc	0,029
Concrete	0,012
Tin	0,023
Brickwork	0,005

Source: ZVSHK (1985), p. 34

6.0 Profiles and forms



VARIABLE FORMS

6.1 The Panel N50

Minimal seam and economical



- Panel width: 333 mm, 429 mm, 529 mm, 600 mm
- Variable panels: 100 mm to 800 mm
- Rib: parallel to panel curvature, centered and straight, no ribs
- Capillary groove: integrated into all panels



6.2 The Panel N65

High bearing capacity and less roof pitch



Panel width: 305 mm, 333 mm, 400 mm, 500 mm, 600 mm

Variable panels: 100 mm to 1000 mm

Rib: parallel to panel curvature, centered and straight, no ribs

Capillary groove : integrated into all panels

Bead rubber seal: possible for all N65 panels

6.3 The Panel VF65

For walkable roof coverings



Panel width: 305 mm, 333 mm, 400 mm, 434 mm,
500 mm, 600 mm

Variable panels: 120 mm to 800 mm

Rib: parallel to panel curvature, centered and
straight, no ribs

Capillary groove: integrated into all panels

6.4 BEMO Standing seam panels curved

For seamless transitions between roof and facade



Smooth curving and crimp curving is possible for all standing seam panels (straight, tapered or MONRO).



6.5 BEMO Standing Seam Panels Tapered



Panel: N50 (min. width: 100 mm, max. width: 800 mm)
N65 (min. width: 100 mm, max. width: 1000 mm)
VF65 (min. width: 200 mm, max. width: 800 mm)

Min. panel length: 3 000 mm

Rib: parallel to panel curvature, centered and straight, no ribs

Capillary groove : integrated into all panels

6.6 BEMO Standing Seam Panels MONRO / FREEFORM



Panel: N50 (min. width: 100 mm, max. width: 800 mm)
N65 (min. width: 100 mm, max. width: 1000 mm)
VF65 (min. width: 200 mm, max. width: 800 mm)

Min. panel length: 3 000 mm

Rib: parallel to panel curvature, centered and straight, no ribs

Capillary groove : integrated into all panels

7.0 Curved BEMO panels

All BEMO panels, can be curved (see Table 7.1).

Our portable curving machine allows this operation to be performed onsite without any problem, thus ensuring that the radius of each section exactly matches the corresponding onsite installation requirements.

Table 7.1

	convex							
Profile	305	305 VF	333	333 VF	400	400 VF	500	500 VF
Material								
Aluminium stucco	1,0	4,0	1,0	4,0	1,0	4,0	1,0	4,0
Aluminium mill finish	2,0	6,0	2,0	6,0	2,0	6,0	2,0	6,0
Aluminium coated	1,0	4,0	1,0	4,0	1,0	4,0	1,0	4,0
Steel galvanized	9,0	15,0	9,0	15,0	9,0	15,0	9,0	15,0
Stainless steel, t= 0,60 mm	9,0	15,0	9,0	15,0	9,0	15,0	9,0	15,0
Titanium zinc nature	3,0	10,0	3,0	10,0	3,0	10,0	3,0	10,0
Titanium zinc pre weathered	4,0	12,0	4,0	12,0	4,0	12,0	4,0	12,0
Copper	5,0	12,5	5,0	12,5	5,0	12,5	5,0	12,5
	concave							
Profile	305	305 VF	333	333 VF	400	400 VF	500	500 VF
Material								
Aluminium stucco	9,0	15,0	9,0	15,0	9,0	15,0	9,0	15,0
Aluminium mill finish	10,0	16,0	10,0	16,0	10,0	16,0	10,0	16,0
Aluminium coated	9,5	15,5	9,5	15,5	9,5	15,5	9,5	15,5
Steel galvanized	14,0	18,0	14,0	18,0	14,0	18,0	14,0	18,0
Stainless steel, t= 0,60 mm	14,0	18,0	14,0	18,0	14,0	18,0	14,0	18,0
Titanium zinc nature	15,0	20,0	15,0	20,0	15,0	20,0	15,0	20,0
Titanium zinc pre weathered	16,0	21,0	16,0	21,0	16,0	21,0	16,0	21,0
Copper	17,0	22,0	17,0	22,0	17,0	22,0	17,0	22,0

8.0 Transport, storage, checking

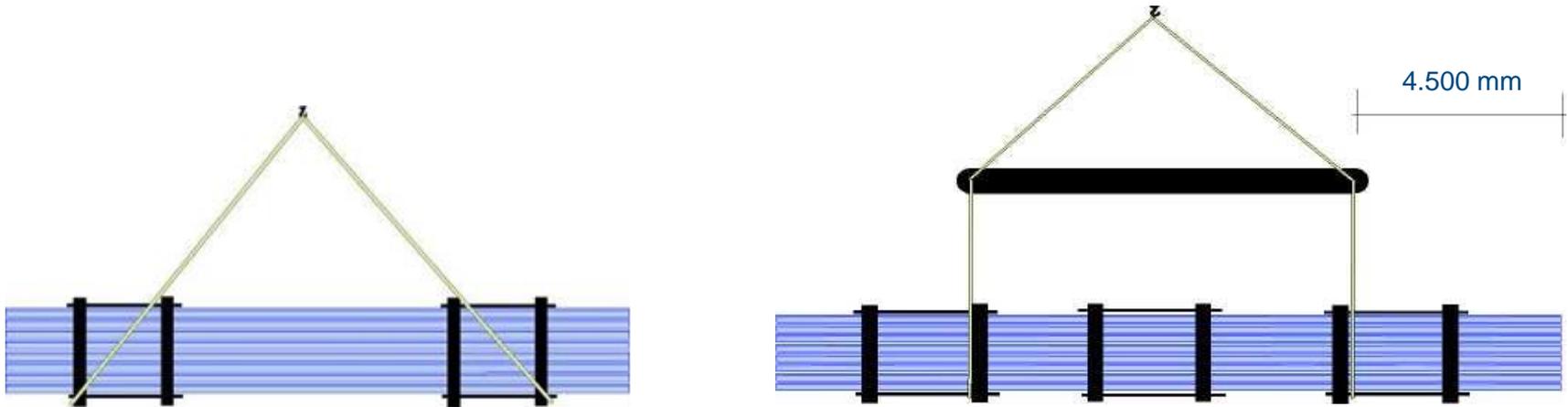
8.1. Transport and unloading

The customer should take care to ensure that the following points are observed:

- The delivery date is normally to be agreed on in consultation with the supplier.
- In the event of a truck arriving late, the supplier should be advised immediately once a pre-agreed period to allow for unforeseen delays has elapsed. We cannot accept cost claims for delays caused by circumstances beyond our control (please see General German Freight Forwarding Conditions (ADSp) or Incoterms 2010).
- The access route to the point of delivery must be suitable for large heavy-goods vehicles.
- Check that there is sufficient all-round clearance - especially where long or wide oversized loads are involved.
- Note that the freight forwarder may have to check the access routes at the customer's expense.
- Each pallet can weigh up to 3.5 metric tons - so please use a crane of adequate lifting capacity.
- Suitable load-handling devices - such as cranes, stacker trucks, ceiling hoists, lifting gear, etc. are to be provided onsite by the customer.
- The maximum load at each lifting point must not exceed 0.8 metric tons.
- Do not allow the load to swing out by more than 4.500 mm (approx. 15 feet) from the base of the crane (2.500 mm / approx. 8 feet in the case of zinc and copper).
- The number of lifting straps should be adequate for the length of the component being handled.
- Note that a large number of lifting straps are required when unloading curved profiled panels.

8.0 Transport, storage, checking

8.1. Transport and unloading

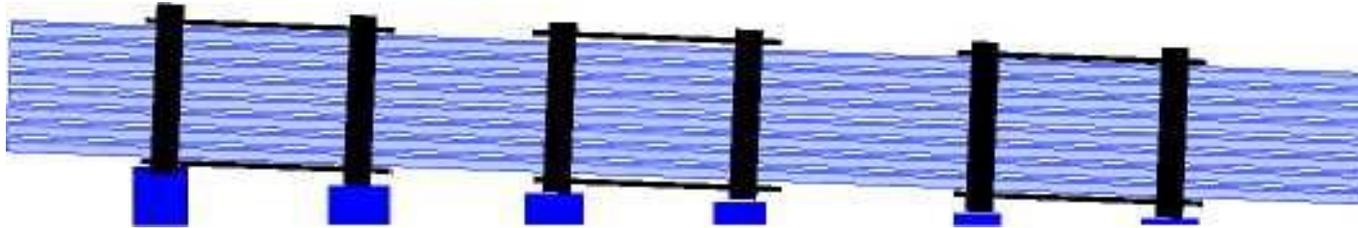


Note: BEMO panels have several different types of flanged edge, so the final fitting position should be taken into account when storing the sections on the roof. This will prevent the sections having to be turned around at a later stage.

The onsite roll forming and curving of BEMO panels is governed by our "General Terms of Roll Forming and Curving", which are available on request or can be downloaded at our website www.bemo.com

8.0 Transport, storage, checking

8.2 Onsite storage



When storing packed profiled panels on the roof of the building, take its load-bearing capacity into account.

- Arrange the pallets so that rainwater can run out (e.g. by resting the pallets on wooden blocks so that they lie at an angle).
- Make sure that air can circulate if the profiled panels are covered up. This will prevent staining caused by trapped humidity.
- Pallets and individual profiled panels should be protected from the wind and from sliding out of place.
- When unpacking items that have been stored in a sloping position, note that the profiled panels can drop out sideways or slide out suddenly in the direction of the incline.
- Protect strip lights from dirt and direct sunlight when they are stacked for storage, and cover with opaque tarpaulins or plastic sheeting. This avoids the "magnifying-glass effect", which can lead to cracking or discoloration.

The installer of the profiled panels bears sole responsibility for their correct fastening and/or support. BEMO cannot be held responsible for any damage caused by faulty fastening and/or support and accept no claims for such damage.

8.0 Transport, storage, checking

8.3 Goods IN inspection

The installer should check all profiled panels and accessories supplied against their corresponding delivery notes in order to ensure that each shipment is complete and that no item of material or packaging is missing or damaged.

If any discrepancies are detected, please inform the carrier and/or onsite roll-forming operatives AT ONCE and submit the corresponding duly countersigned written report. Note that we can accept no liability for late claims.

Permitted length tolerances for BEMO profiled panels at a production temperature of **+ 20° C**:

Minus tolerance: 5 mm

Plus tolerance: 3 mm

Per meter of length up to a maximum of 20 mm

9.0 Guidelines for installation and fitting

9.1 Preparations

Before installation work starts, you are recommended to check all the onsite measurements of the preliminary works against the details shown in the approved plans.

Take steps to ensure that the minimum amount of incline in the area of the eaves is observed.

Failure to fulfill this condition can be caused, for example, by irregularities in the substructure. This problem can be remedied using lower attachment fittings, Z-spacers or extra planking.

For controlling the as-built situation and measurements of preinstalled works, BEMO recommend to make an 3-D scan.

Details of all deviations in this respect should be submitted to the client in the form of a written report complying with DIN 1961 (contract procedure for building works), part B, section 4 subsection 3 (or your local equivalent).

9.0 Guidelines for installation and fitting

9.2 Corrosion prevention

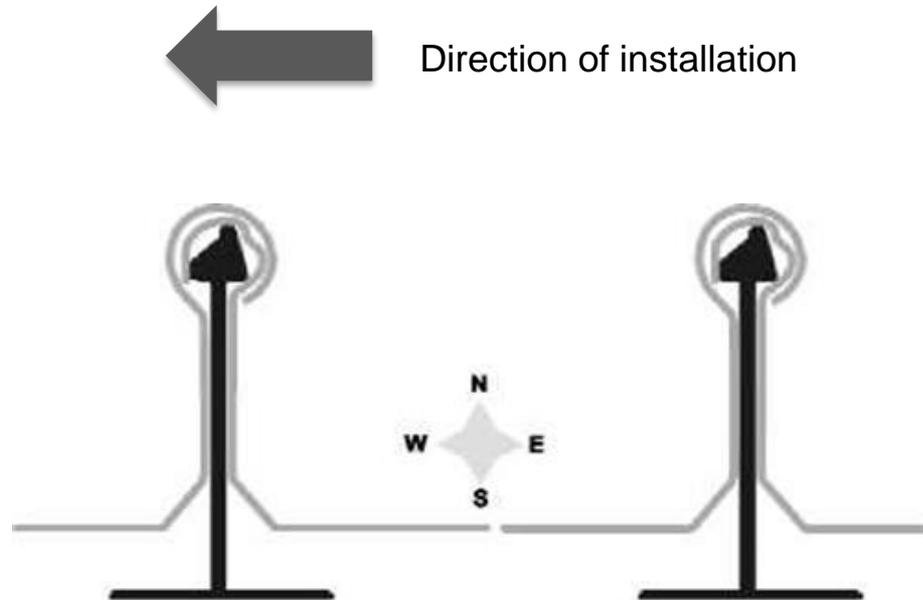
Contact corrosion is an important factor to be taken into account where structures consisting of different materials are concerned.

- See table 5.1 on page 10 for details of different metallic-structure combinations.
- Painted coatings should be tested for compatibility, before application, with the materials with which they are going to come in to contact.
- Wet concrete and Aluminium should not normally come into contact without an interspersed layer of another material.
- When combining metal with wood, special care should be taken if the wood has been treated with a chlorine-naphthalene-based product, a substance containing salts of copper/mercury, or fluorine-based compounds.

Strips of bitumen, plastic sheeting or cork tiles are all suitable as intermediate layers designed to prevent the accumulation of moisture

9.0 Guidelines for installation and fitting

9.3 Distribution and fitting of halters



In this example, installation work proceeds from right to left – against the direction of the main airflow.

9.0 Guidelines for installation and fitting

9.3 Distribution and fitting of halters

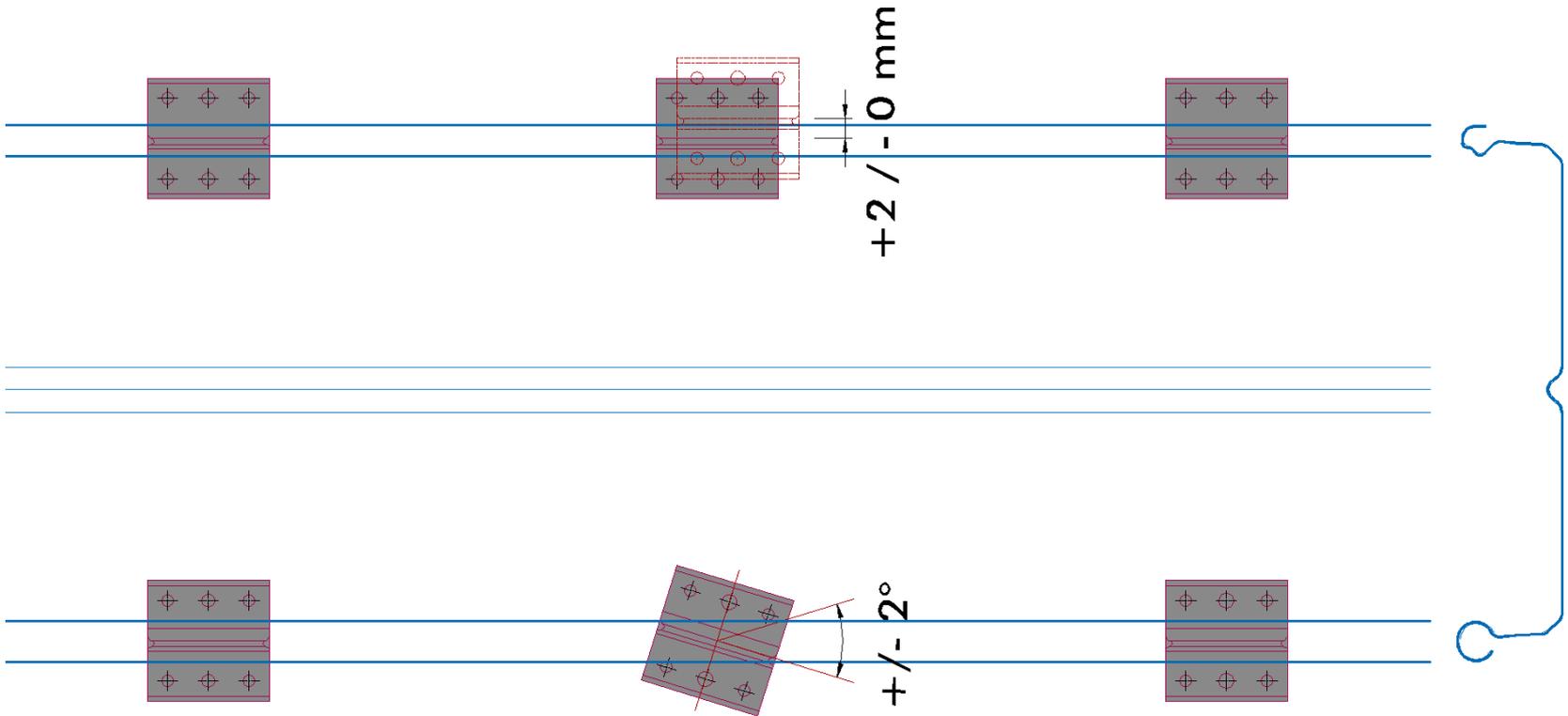
- Before installation work starts, measure the roof and wall surfaces against the preliminary plans and assign the corresponding points so that the position of items that penetrate the roof or wall - such as smoke and heat outlet systems, dome skylights, flue conduits and so on - match those given in the layout plan.
- Normal practice is to install from verge to verge, with the small flange pointing in the direction of installation and the large flange then covering its smaller counterpart.
- Ensure that the direction of installation is observed for the fitting attachments (i.e. it should match that of the BEMO profiled panels). When doing so, the long side of the retainer head should be fitted facing away from the BEMO web (see Fig. 1)
- When positioning the brackets, be sure to observe at least the nominal fitting width of the panels or warp-free expansion cannot be guaranteed; on the other hand, it is possible for the brackets be "pulled" by up to 3 mm.
- This amount of "pull" (3 mm) is actually an advantage where curved roofs are concerned.
- Start by attaching the brackets in the eaves and on the ridge of the roof. Run a tight guideline from one attachment point to the other and install the intermediate BEMO brackets along it. Ensure that they are in perfect alignment and that they are positioned in accordance with the structural specifications of the layout plan. Observe the corresponding supplier's instruction when handling attachment elements such as screws, bolts and rivets. This point is of particular importance where drill-hole diameters and torque settings are concerned. Ensure that at least two fasteners are used for each bracket.
- In the case of tight radiuses or extra-long panel runs, the edges of the bracket head should also be chamfered to prevent tipping.

IMPORTANT: DO NOT use power-actuated fasteners for the direct fixing of attachment fittings.

9.0 Guidelines for installation and fitting

9.3.1 Allowable fixing tolerances of BEMO halter

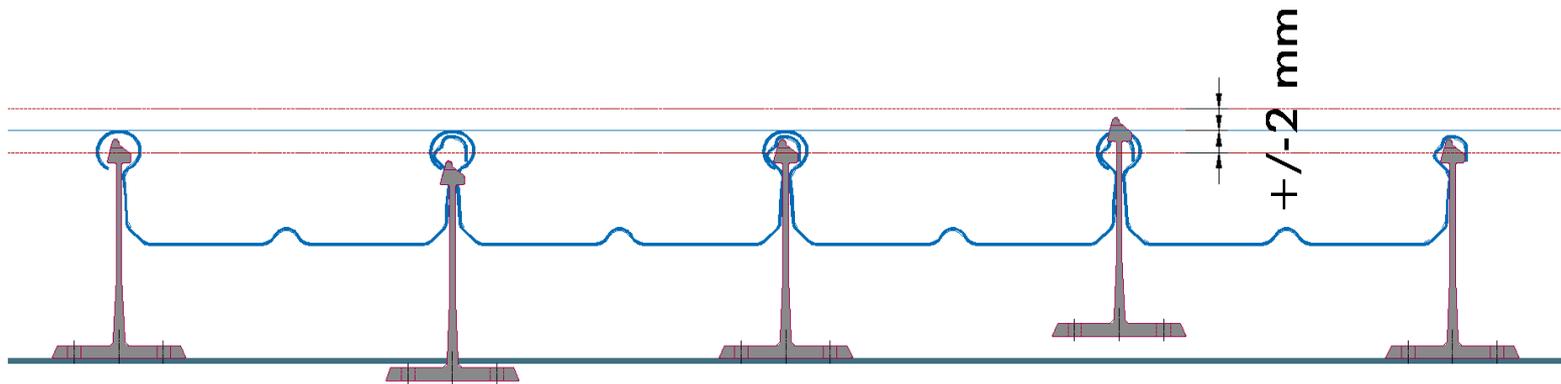
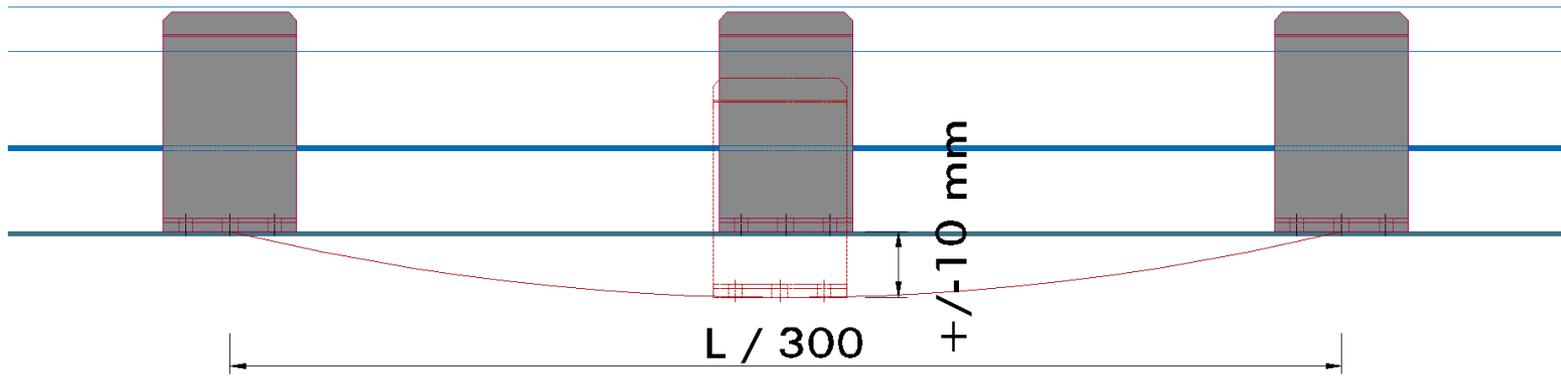
Tolerances of grid-line fixing a halter line



9.0 Guidelines for installation and fitting

9.3.2 Allowable fixing tolerances of BEMO halter

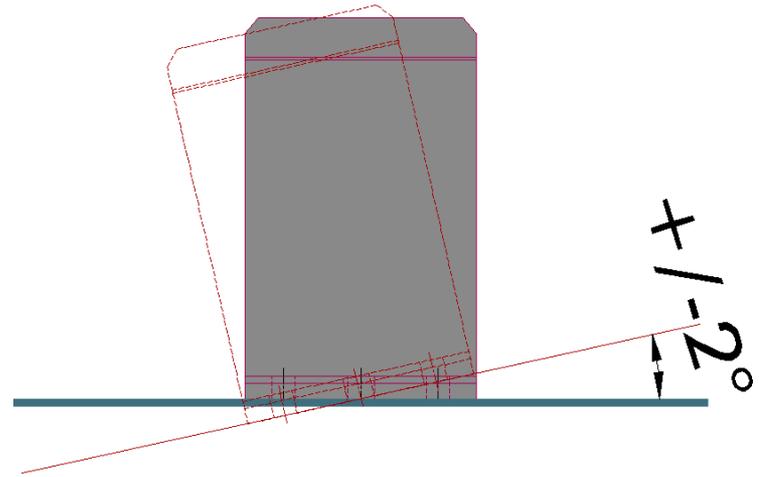
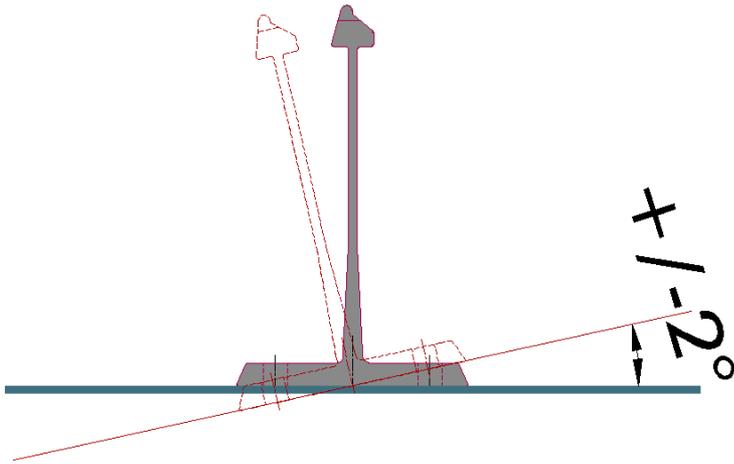
Tolerances of level fixing a halter line



9.0 Guidelines for installation and fitting

9.3.3 Allowable fixing tolerances of BEMO halter

Tolerances in rectangular fixing per halter on surface



9.0 Guidelines for installation and fitting

9.4 Fitting recommendations

Recommended procedure:

- DO NOT walk directly on any section in the area of the eaves or ridge that lacks a weight-bearing substructure such as heat insulation, a Top-hat, Z-spacer or wooden planking beneath the BEMO panel runs.
- Areas of the roof that are used frequently during the installation stage (e.g. for transporting material) should be protected with temporary catwalks (e.g. wooden planks). These catwalks can be secured with clamps to prevent them slipping out of place.
- When installing curved panel runs, note that the first halter to be fixed should be the one located at the high-point of the curve. Then clip the halter into place one by one, working downwards from the top of the curve.

Basic rule:

Each section MUST be flanged immediately after fitting. Only in this way can the weight-bearing specifications of the structure and wind protection be guaranteed.

9.0 Guidelines for installation and fitting

9.5 Fitting procedure

If verge boards are fitted:

- Start by fitting the row of verge board clips.
- Close the large flange of the first section with the folding machine. This allows the verge U-profile section and verge board to be positioned and secured. The folding machine should be guided by hand to prevent tipping.
- Skip points 1 to 2 if BEMO end panel runs are being fitted.
- Push the BEMO panel runs into place until they engage with the previously-installed brackets.
Engaging the assembly in position.
- Make the support- / fixpoint (see section 9.6).
- Lock-seam the BEMO panel runs together (see section 9.7).

9.0 Guidelines for installation and fitting

9.6 Support- / Fixpoints

- The purpose of the support- / fixpoint is to prevent the components slipping out of place and to prevent expansion in the same direction as the sections.
- Each BEMO panel must be assigned its own support- / fixpoint unless the assembly plan indicates otherwise.
- Note that the place where the panel joins an item that penetrates the roof is, by definition, a support- / fixpoint. Do not use a second support- / fixpoint in this case.
- If the support- / fixpoint does not lie exactly on the ridge, but (for example) in the center of the roof, always take into account the longitudinal expansion of the BEMO panel runs from the support- / fixpoint to the ridge when designing the covering for the ridge.
- The following configurations are just recommendations, an structural calculation of the support- / fixpoint is a must!

Each BEMO panel must have one support- / fixpoint ONLY.



9.0 Guidelines for installation and fitting

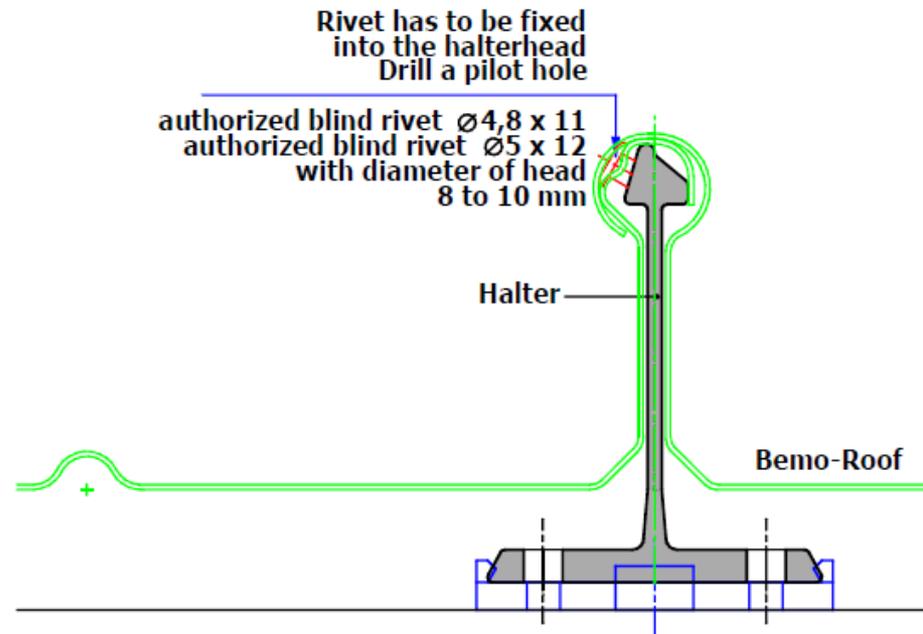
9.6.1 Support- / Fixpoints

The following configuration is normally sufficient for roof gradients of $< 20^\circ$ and panel lengths < 30.000 mm:

- Drill a blind hole into the small flange in the bracket head to take the corresponding rivet.
- Fit a rivet of 11-12 mm in length. The head of the rivet is concealed by the large flange of the following panel run.

- Rivets:

Approved rivets A/E	4,8 x 11 mm
Approved rivets A/E	5,0 x 12 mm
with head diameter of	8,0 – 10 mm

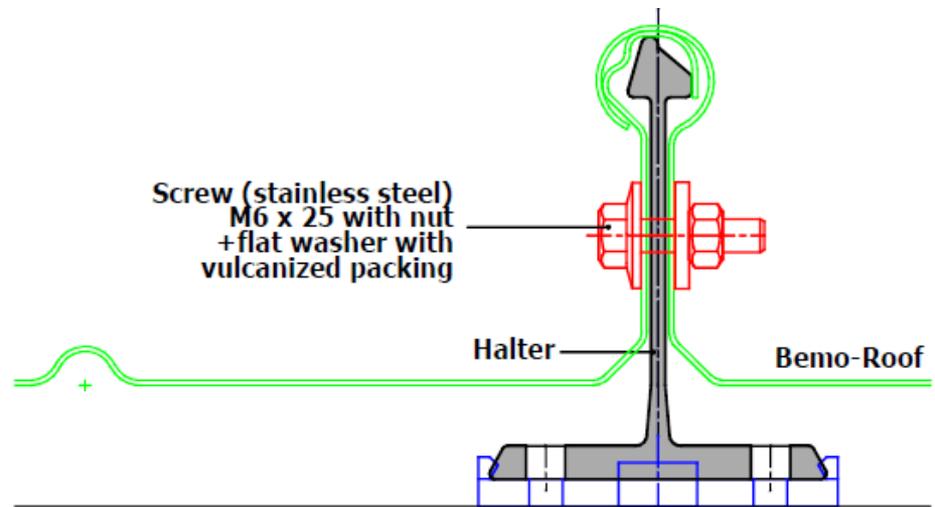


9.0 Guidelines for installation and fitting

9.6.2 Support- / Fixpoints

The following configuration is normally sufficient for roof gradients of $> 20^\circ$ and panel lengths > 30.000 mm:

- Screw the BEMO panel to the halter after folding.
- Use a stainless steel M6 x 25 bolt with corresponding nut and vulcanized rubber washer.
- We normally recommend securing the support- /fixpoint halter to the substructure with at least four fasteners.
- If thin-walled metal sheets with trapezoidal corrugations are fitted, we recommend the use of a sheet-steel underlay of $t = 2.0$ mm in the same width as the metal sheet bead.



9.0 Folding the BEMO panel

9.7 Lock-seaming the BEMO panel

Before the lock-seaming operation begins, check that all the small flanges in the bracket head are correctly engaged. Inspect the machine, paying particular attention to the following points:

- The clamp adjustment setting. It must be possible to close the machine completely.
- Adjust the guide- and side-rollers so that there is no play.
- Check the state of the flanging rollers -they must be free of metal swarf and other debris (especially if you intend to handle coated materials).
- Note that BEMO can supply you with special plastic rollers that are designed specifically for handling coated sections. The folding procedure can be carried out in either direction, although it is only possible to work in the direction of the overlapping section once the joint has been formed.
- Note that you may need a second person to guide the machine if the roof is uneven or irregularly shaped.

If this is the case ensure that only ONE person is supported at any one time by the sections being folded.

There are two ways of "threading" the folding machine:

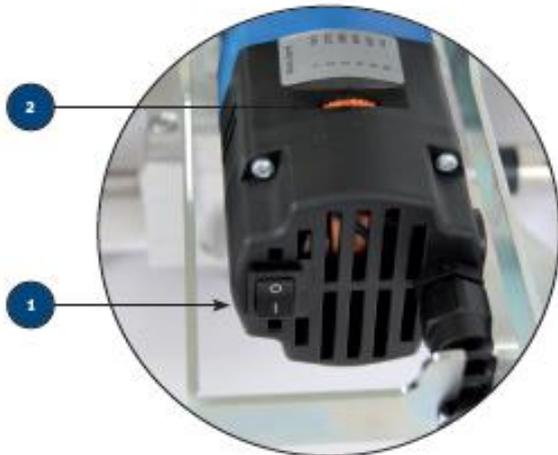
- Pre-fold the first 200-300 mm of the edge with a pair of BEMO hand folding pliers, position the machine, close the clamp and start the machine in jog mode.
- Position the machine at about 600-800 mm from the end of the panel run, facing towards the same end and keeping the clamp tensioned when doing so. Start the machine in jog mode and close the clamp completely as the machine moves. Finish the flange seam as far as the end of the panel run. Place the machine on the finished flange seam, start again in jog mode and lock-seam the rest of the panel run.

GENERAL NOTE: NEVER STEP OR WALK INSIDE THE BEMO PANEL WHICH IS UNDER SEAMING PROCESS !!!

9.0 Folding the BEMO panel

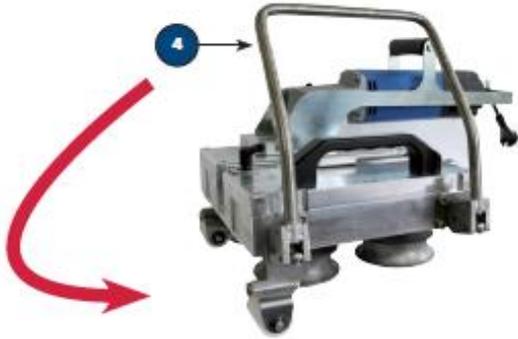
9.7.1 Seaming Machine

- 1 On/Off switch
- 2 Speed pre-adjustment 1 (slow) / 6 (fast)
- 3 Seaming rolls
- 4 Lever for opening and closing the seaming appliance
- 5 Bearing rolls (adjustment for profile N50 and N65)
- 6 Lever to set the machine distance plate
- 7 Interlock switch



9.0 Folding the BEMO panel

9.7.2 Operation of Seaming Machine



1. How to open the seaming machine:
Turn the lever (4) to the left side.



2. How to place seaming machine on the seam:
First prepare the seam with the handseaming tool. Then place the open machine on the seam, so that bearing rolls (5) have contact with the sheet and the seaming rolls (3) are enclosing the big eye. By using the lever (6) you can move the distance plate to regulate the gap. This enables to adjust the thickness of the seam (up to 2 mm).



3. How to close the seaming machine:
Close the lever (4).

9.0 Folding the BEMO panel

9.7.2 Operation of Seaming Machine



4. Changing the rollers:

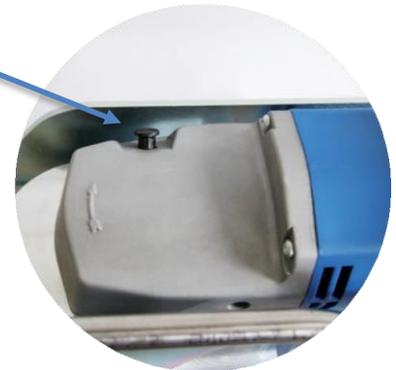
- Unscrew the nuts
- Change the rolls into plastic rollers
- Fasten the nuts
- WARNING: use self-locking nuts

General:

- With coated material use in any case plastic rolls.
- Take care that the size of the eye is 21 mm - 23 mm.
- WARNING: Machine is running autonomous. Don't walk nearby in the sheet.
- The ideal speed is 4-5.
- To assure a long machine life please clean the machine before and after every using process.
- Oil the machine frequently.
- Any questions – please contact BEMO.

IMPORTANT NOTE.

- Do not push the inter- lock switch (7) when the nuts be tightened for the rollers!



9.0 Folding the BEMO panel

9.8 Unfolding the BEMO panel

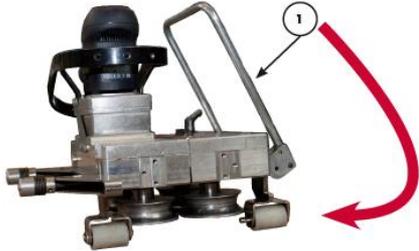
BEMO supplies a special opening device for unfolding closed seams.

- Use a pair of pliers, a plumber's wrench or a large screwdriver to open the large flange slightly.
- Fit the unfolding device to the rear of the folding machine and adjust to the corresponding height
- Start the folding machine in jog mode.

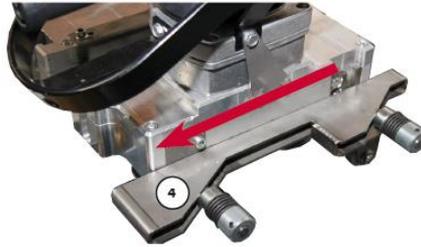


9.0 Folding the BEMO TOP & AKKORD rail

9.9 Lock-seaming the rails



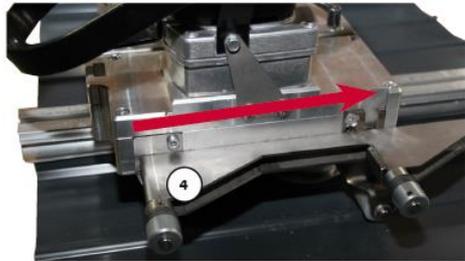
1. How to open the seaming machine:
Turn the lever (4) to the right side.



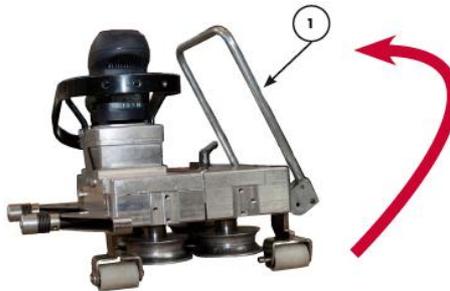
2. BEMO-TOP & AKKORD machines
For these machines, the tense slide (4) must also be opened to allow the necessary attachment width.



3. Place the seaming machine on the flange
First, the seam must be folded around 300 mm with the manual folding pliers. Place the machine in the open position over the flange so that the support rollers (2), setting the height for the 50s and 65s profile possible, sit up and the forming rollers (3) enclose the flanges.



4. BEMO-TOP & AKKORD machines
For these machines must first the tense slide (4) closed (pushed back).



5. How to close the seaming machine:
Turn the lever (4) to the left side.

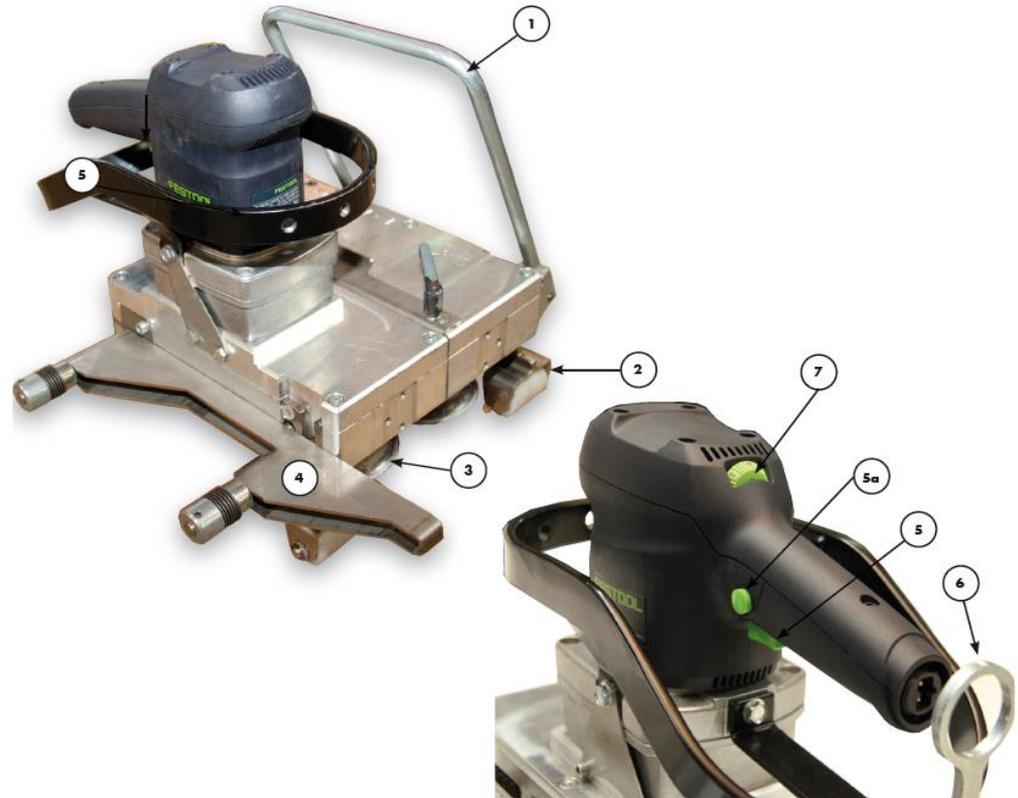
General

- Be sure to use steel rollers for the TOP & AKKORD rail seaming!
- The machine runs independently.
- The ideal speed setting is level 4-5.
- Please clean the machine before and after each use to ensure a long operability.
- Please oil the machine regularly.
- **Do not walk in the standing seam panel!**
- **Install the sliding stop according structural requests!**

9.0 Folding the BEMO TOP & AKKORD rail

9.9.1 Seaming Machine

- ① Lever for opening and closing the seaming appliance
- ② Bearing rolls (adjustment for profile N50 and N65)
- ③ Seaming rolls
- ④ Tense slide
- ⑤ On/Off switch
- ⑤a Switch for permanent run
- ⑥ Cable guide
- ⑦ Speed pre-adjustment 1 (slow) / 6 (fast)



10.0 Forming the eaves

- The L-section water drip is riveted to the attachment point in the eaves in such a way that the BEMO panel overhangs the gutter section by about 15-20 mm.
- Secure wherever possible between each reinforcement with a 4.8 x 10 Aluminium or Stainless-steel blind rivets (Stainless-steel rivets for copper).
- To allow for the varying amounts of expansion on different lengths of BEMO panels - or strip lights - split the gutter section and leave an air gap of about 5 mm at the join.
- As a safeguard against running water on roof gradients of less than 12, fold the water-carrying surface downwards once the L-section water drip has been riveted into place. Use for this the special BEMO pliers or a similar tool.
- If eaves seals are to be installed, fit them consecutively in the direction of installation between the BEMO panel runs and the L-section water drip.

10.0 Forming the eaves

10.1 Main Items

Thermal expansion of building materials

All materials, including metals, are subject to linear expansion and contraction as a consequence of changes in temperature. The amount of expansion/contraction depends on coefficients of expansion, temperature differentials and the length of the component.

Changes in length can be calculated in accordance with the following formula:

$$\Delta I = I_0 \times \alpha_t (t_2 - t_1)$$

- ΔI = Change in length in mm
- I_0 = Component length (m)
- α_t = Coefficient of expansion (mm/mK)
- $(t_2 - t_1)$ = Temperature differential (K or C)

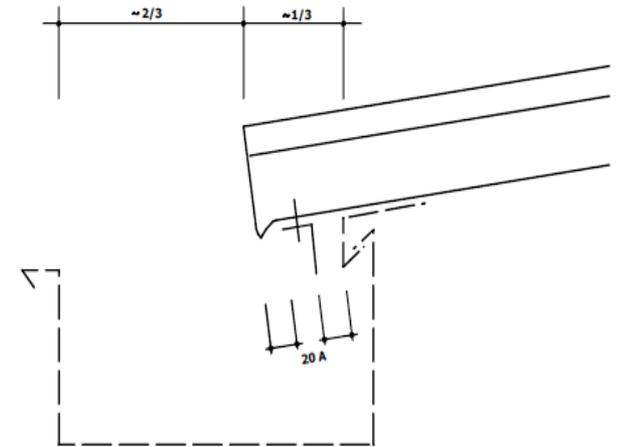
Source: ZVSHK (10/98) p. 44-45

Coefficients of expansion (mm/mK)

Between -20° to +80° for various materials

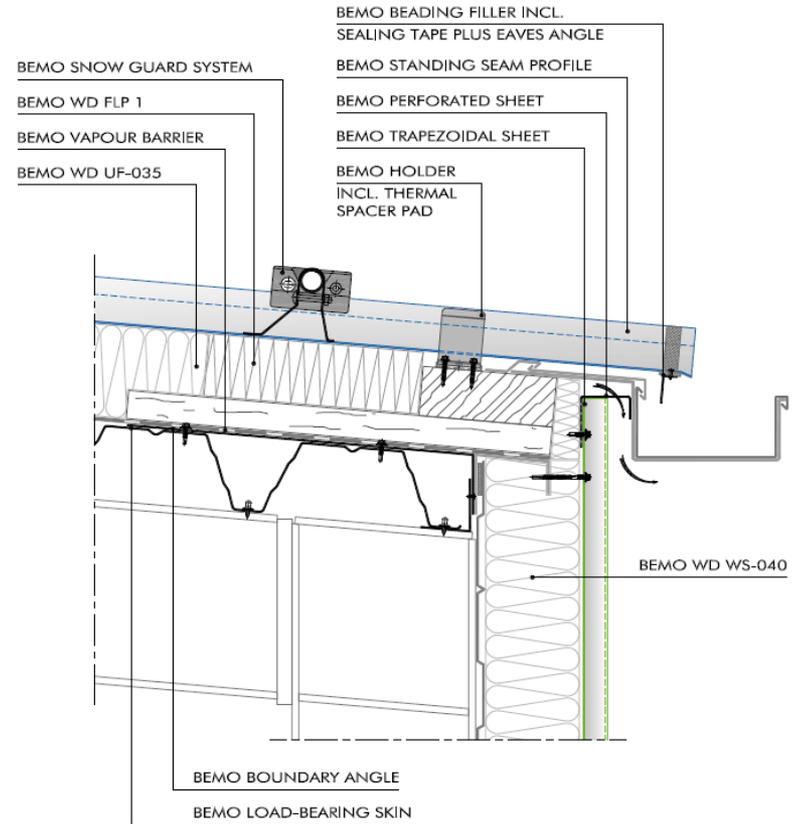
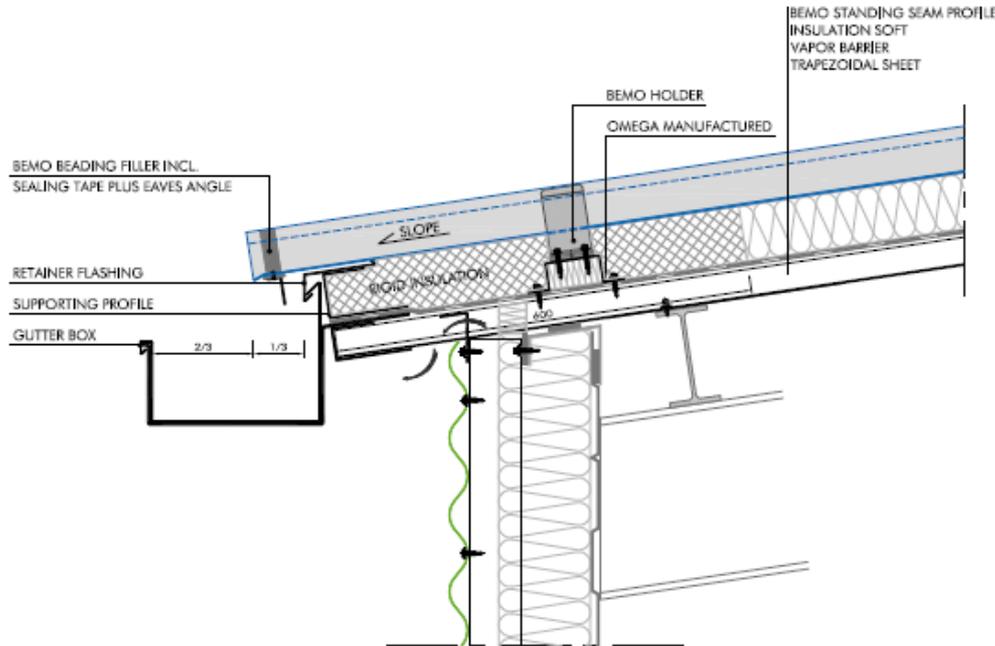
Material	Coefficient of expansion α_t (mm/mK)
Aluminium	0,024
Structural steel	0,012
Lead	0,029
Bronze	0,018
Cast iron	0,0104
Copper	0,017
Brass	0,019
Stainless steell 14301	0,016
PVC	0,080
Quartz glass	0,0005
Silver	0,020
Titanium zinc	0,022
Zinc	0,029
Concrete	0,012
Tin	0,023
Brickwork	0,005

Table: Coefficient of expansion Source: ZVSHK (10/98) p. 44-45



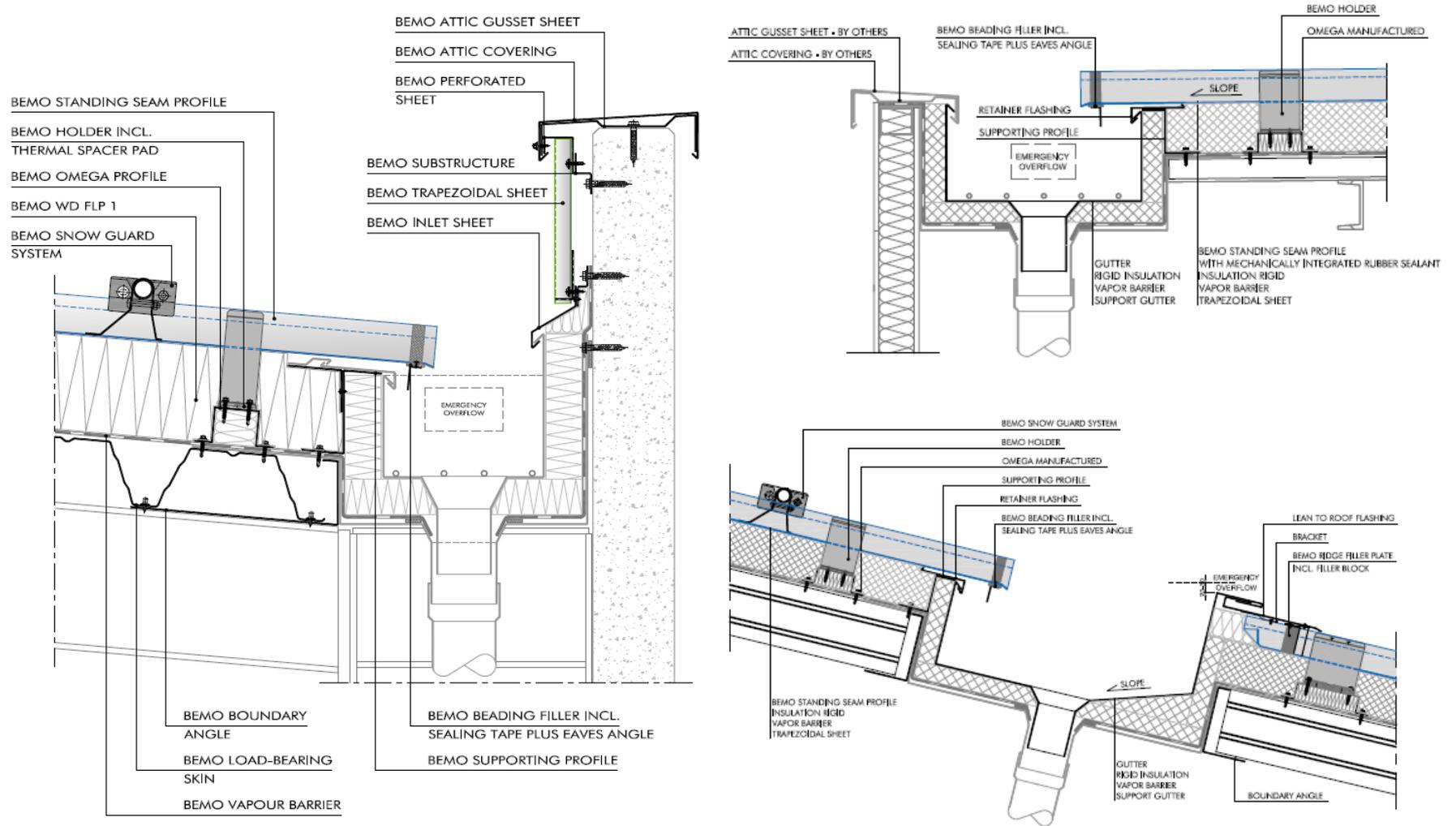
10.0 Forming the eaves

10.2 External Box Gutter



10.0 Forming the eaves

10.3 Internal Gutters



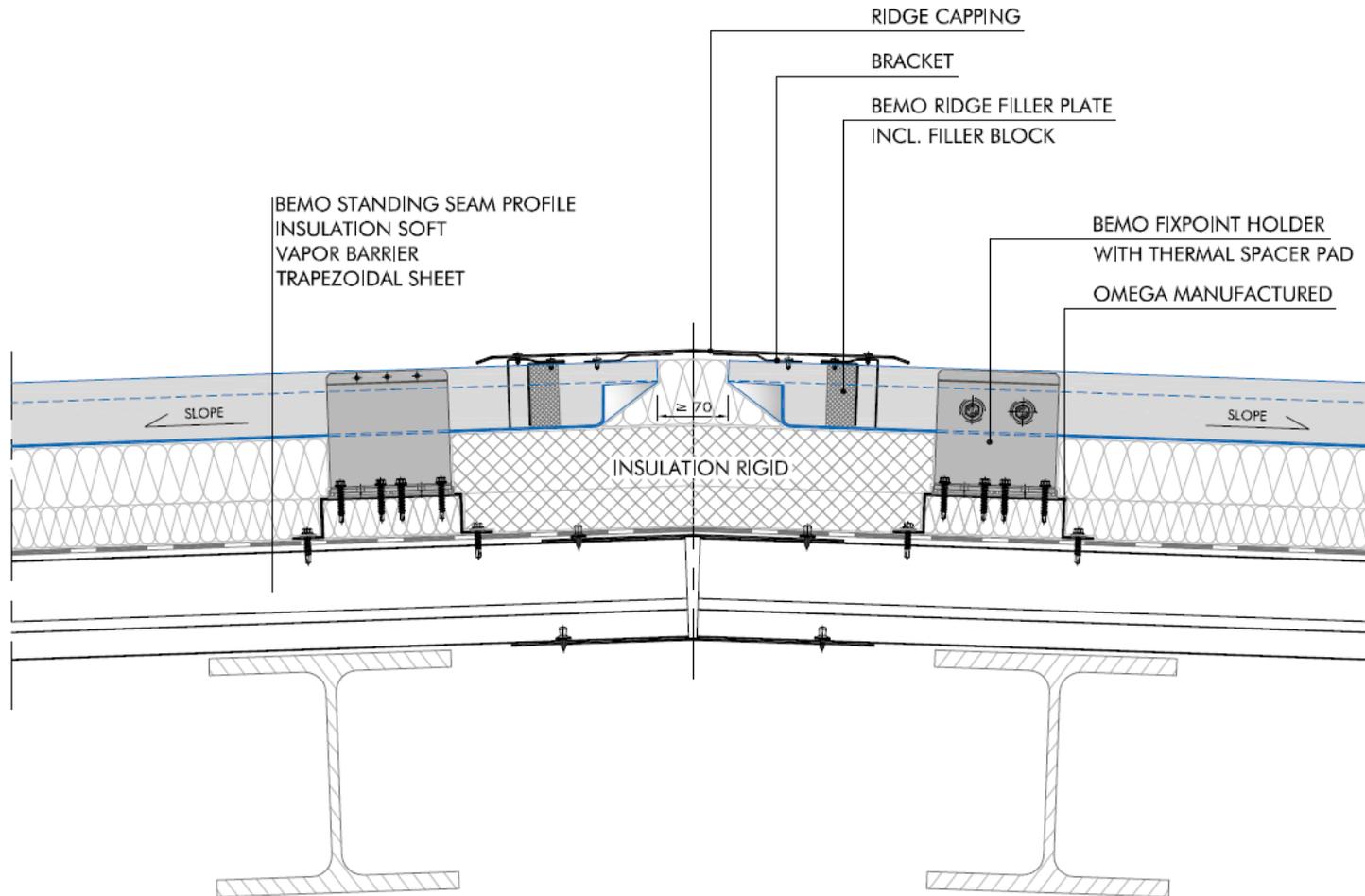
11.0 Forming the ridge

- Fold up the water-bearing surface of the BEMO panel with the corresponding BEMO bending tool. Ensure when doing so that the pinched seams on the webs are pulled right up to the top.
- Align the terminating plates flush with the previously inserted filler blocks and engage with the BEMO panel. Secure the top support sections with a rivet in each flange.
- The ridge filler plates should be installed in ~ 100 - 150 mm distance to the end of the BEMO panel – please check for this your shop drawings and size of cover flashing.
- Fit the hook-in strip for the cover.
- Fit the cover plate with sliding seams at the joints.
- If the support point of the BEMO panel is in the center of the roof or coincides with an item that penetrates the roof - rather than being on the ridge itself - this should be taken into account when designing the ridge layout. In cases such as these, work must be carried out using longer hook-in supports and the distance between the BEMO panel and the join or end should be sufficient to allow for the longitudinal expansion of the BEMO panel.

Note: To avoid damage to the ridge, we recommend fitting a section of walk-on thermal insulation equal to half (or better still the entire) width of the panel.

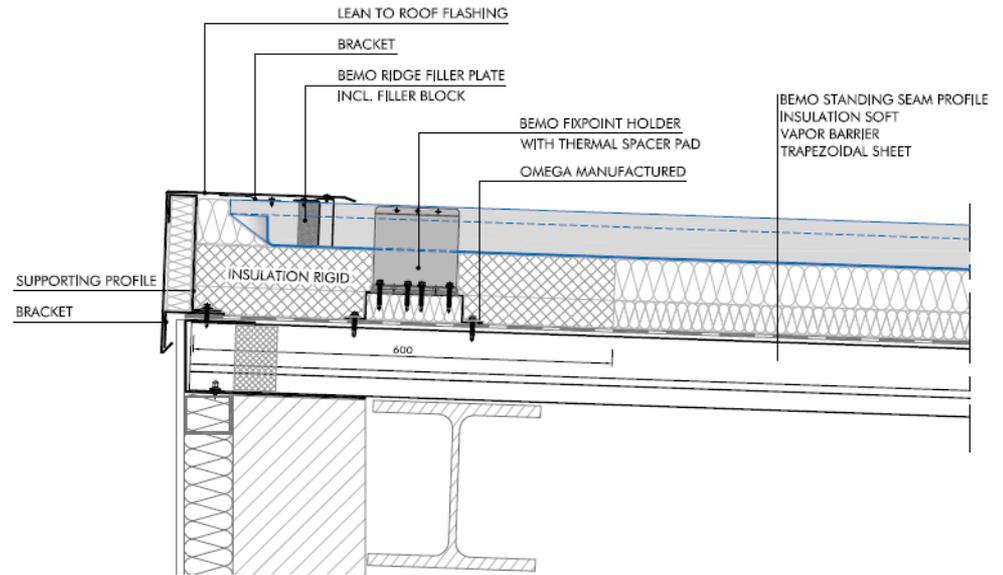
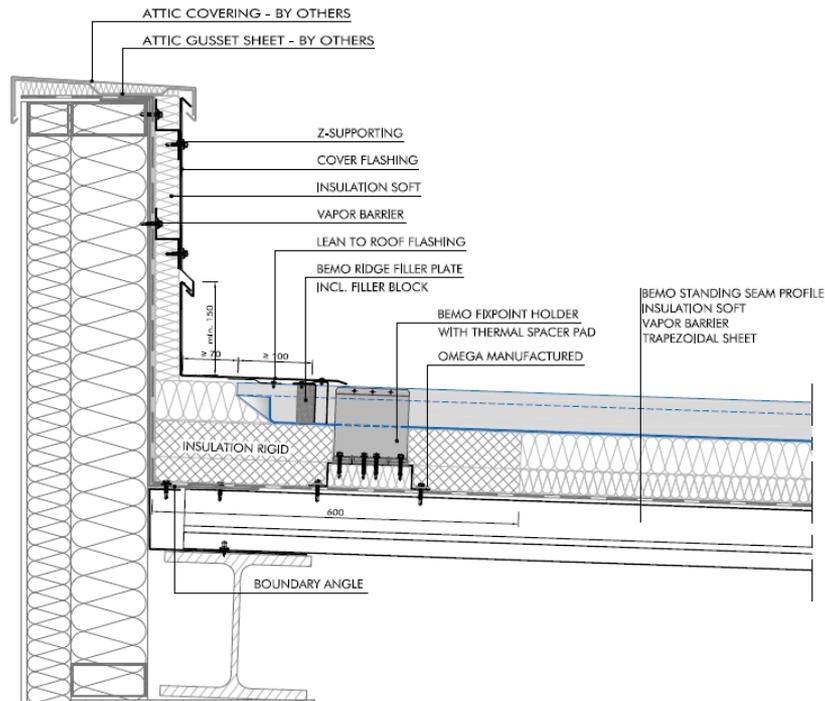
11.0 Forming the ridge

11.1 Ridge Detail



11.0 Forming the ridge

11.2 Pitch Roof Detail



12.0 Forming the verge

If verge profiles are fitted:

- Start by fitting the row of verge profiles.
- Close the large flange of the first panel with the folding machine. This allows the verge profile section to be positioned and secured.

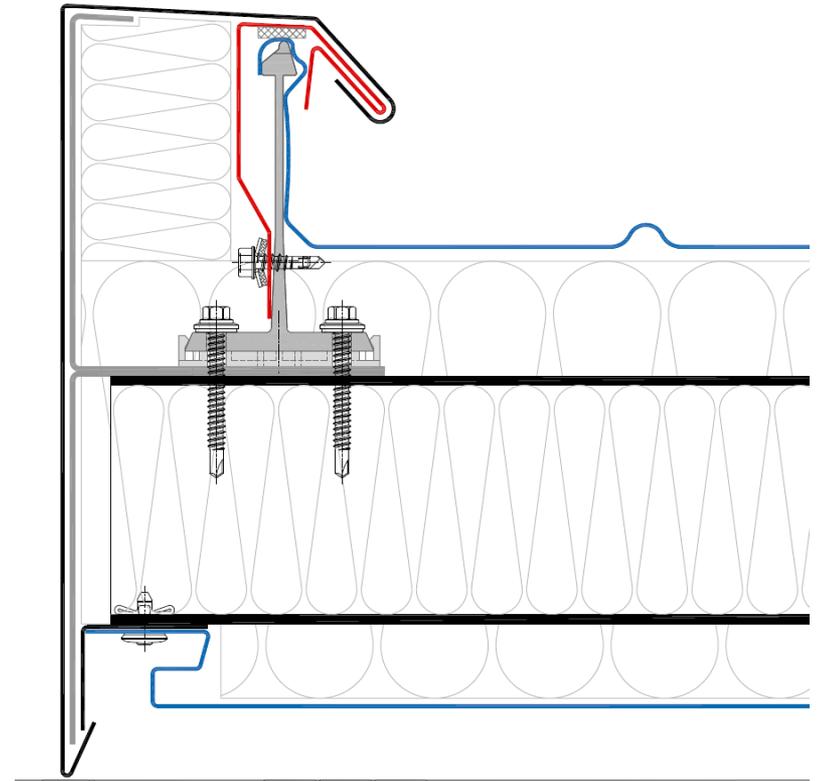
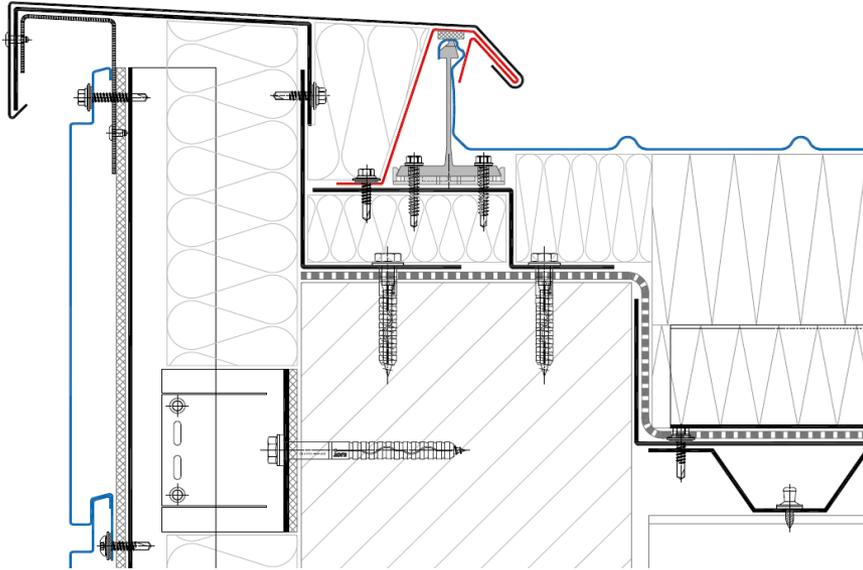
Skip points 1 to 2 if BEMO connection panels are being fitted:

- Hook the edged-to-size connecting flashing or BEMO connection panel sheet into the standard BEMO panel and secure it on the other side in such a way that allows the edge to expand. Form the sliding seams at the joints.
- Shut off the opening at the eaves with a corresponding edge section.

Note: **The longitudinal expansion of the BEMO sections MUST NOT be hindered by the edge sections.**

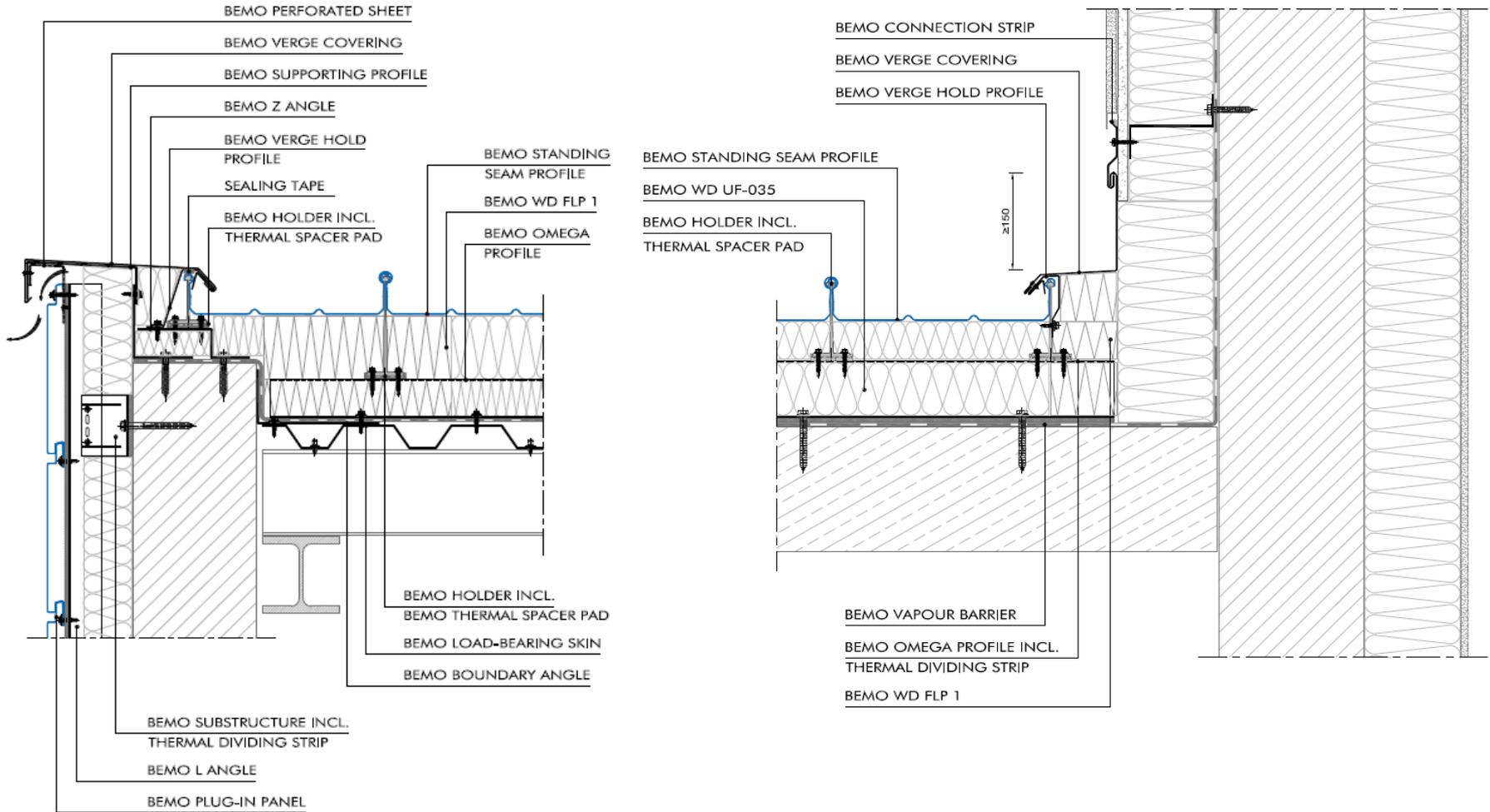
12.0 Forming the verge

12.1 Verge Support profile



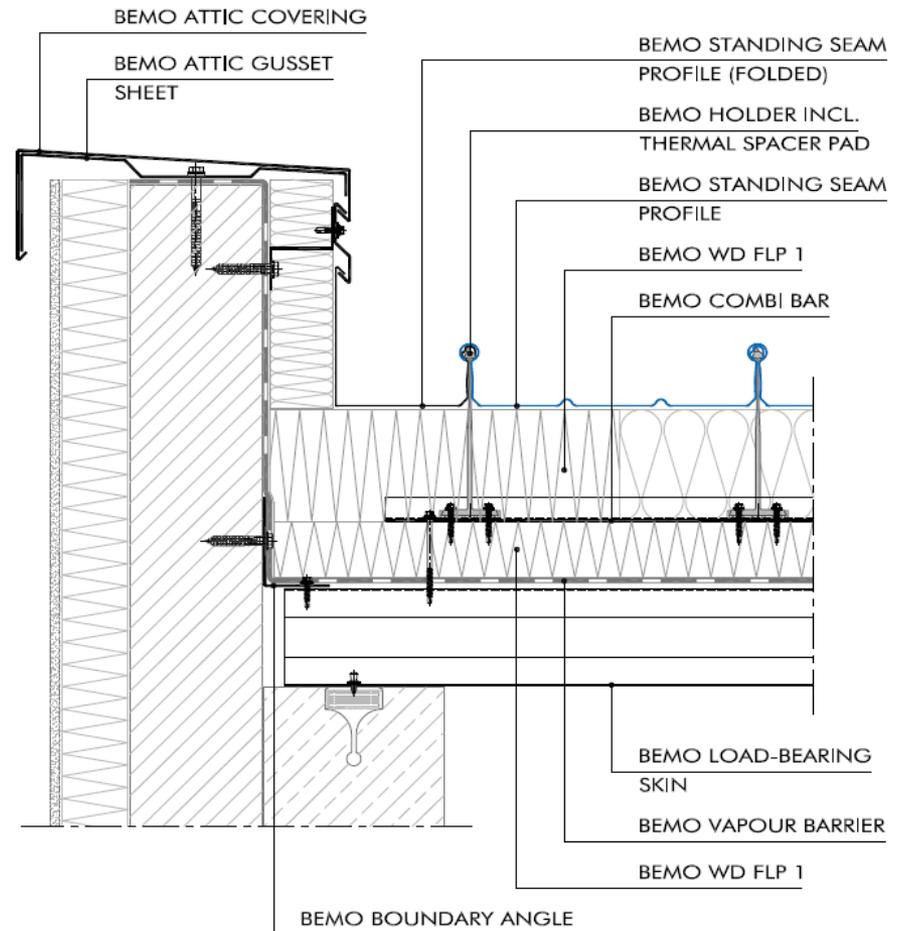
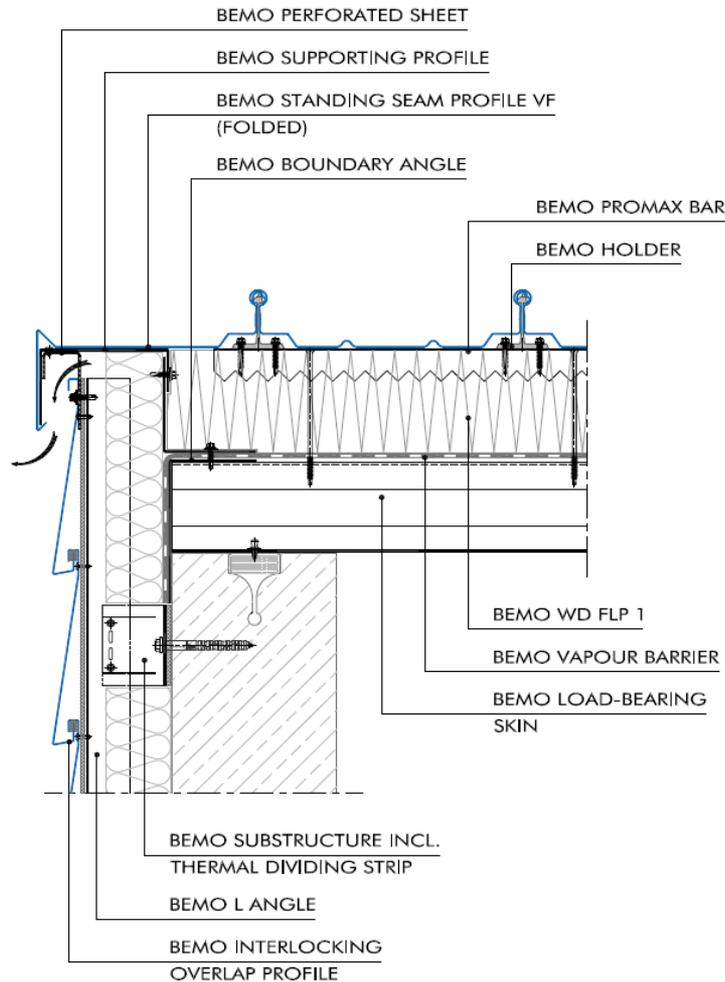
12.0 Forming the verge

12.2 Verge Detail - Flashing



12.0 Forming the verge

12.3 Verge Detail – BEMO Profile



13.0 Installation of BEMO panel strip lights

BEMO panel strip lights are normally supplied only in widths of 305 mm. Note that they are NOT designed to bear weight!

Only every 4th BEMO metal panel is allowed to be fitted with a BEMO panel strip light!

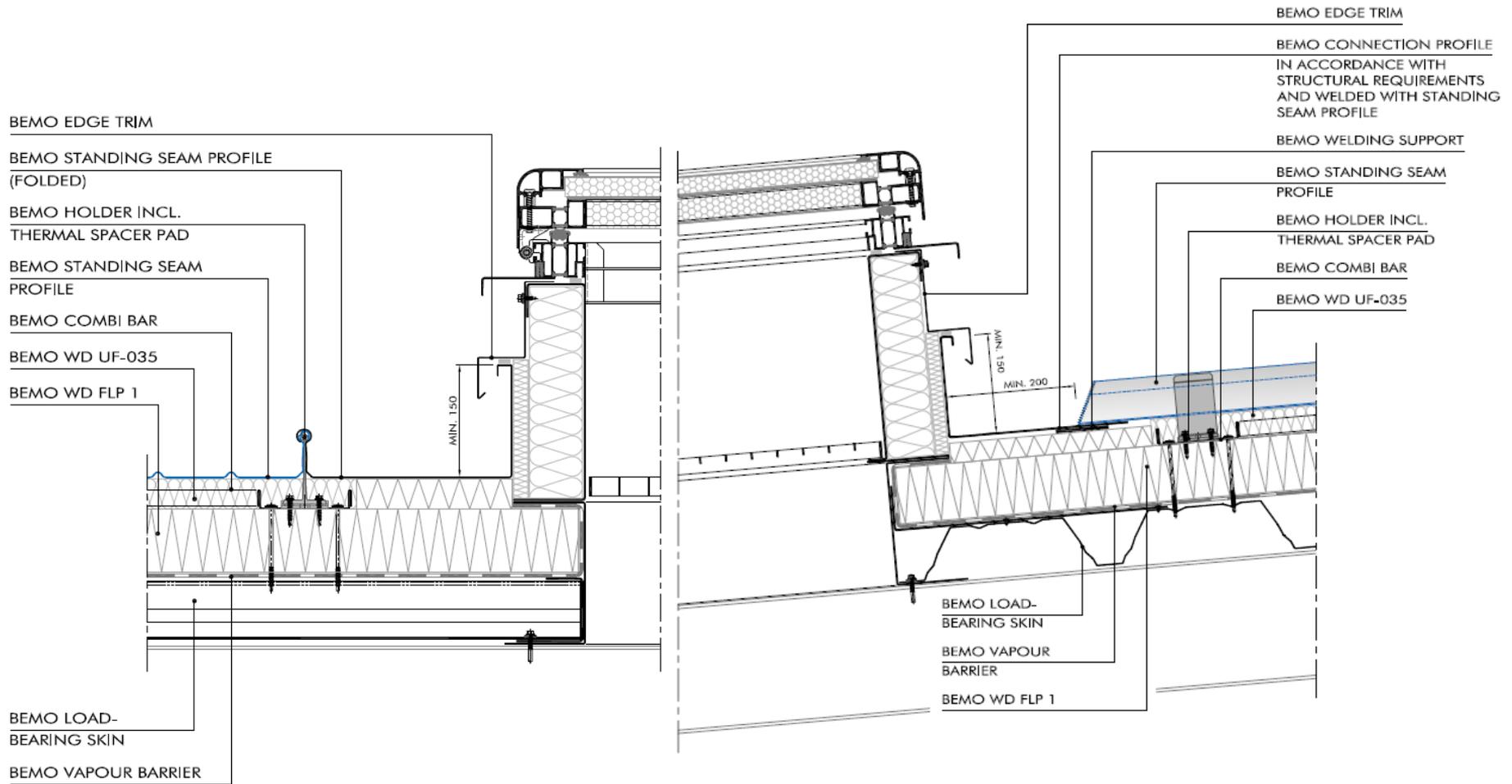
- Install BEMO panels on both sides of each lighting strip (observing the bracket spacing of 305 mm for BEMO panel strip-lights).
- Fold shut the large flange that borders onto the BEMO panel strip light.
- Align the BEMO panel strip light with the BEMO flanges on both sides.
- Push the BEMO panel strip light seal into place and fold using the corresponding set of rollers.
- The sealing strips are secured to the eaves and ridge with rivets to stop them slipping out of place as the rate of expansion of the lighting strips is about twice that of the BEMO metal panels, there must be a recess of about 40 mm in length at the riveting points in the flanges of the BEMO panel strip lights.
- The connecting panels must be matched onsite to the BEMO panel strip lights.

14.0 Items that penetrate the roof

- You are recommended to proceed with great care when making all other connections and all openings in the roof or the flashing that surrounds them.
- In the case of twin-shell, heat-insulated roofs it is particularly important to ensure a diffusion-proof join of the vapor seal at any points of penetration and to avoid cold bridges.
- Pay special attention to the way the metal sheets are processed and joined together.
- If welding is required, ensure that all welding points are clean, and (this applies especially to coated materials) rub down to bare metal an area of about 50 mm on either side of the welding point.
- Do not forget to re-coat with a protective paint when welding is completed.

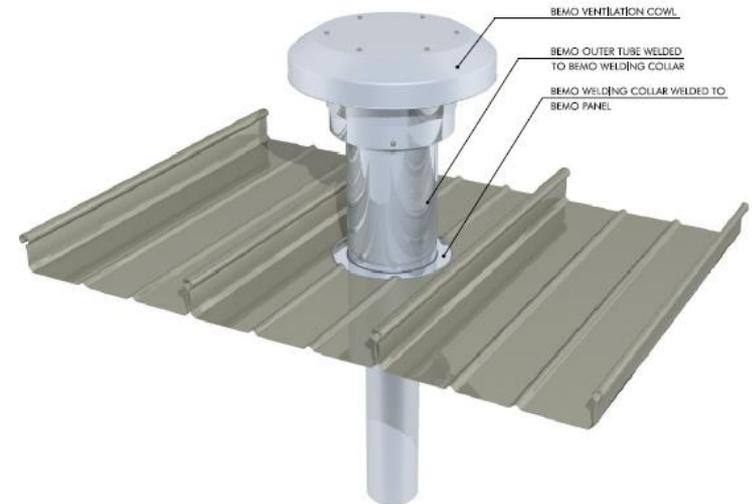
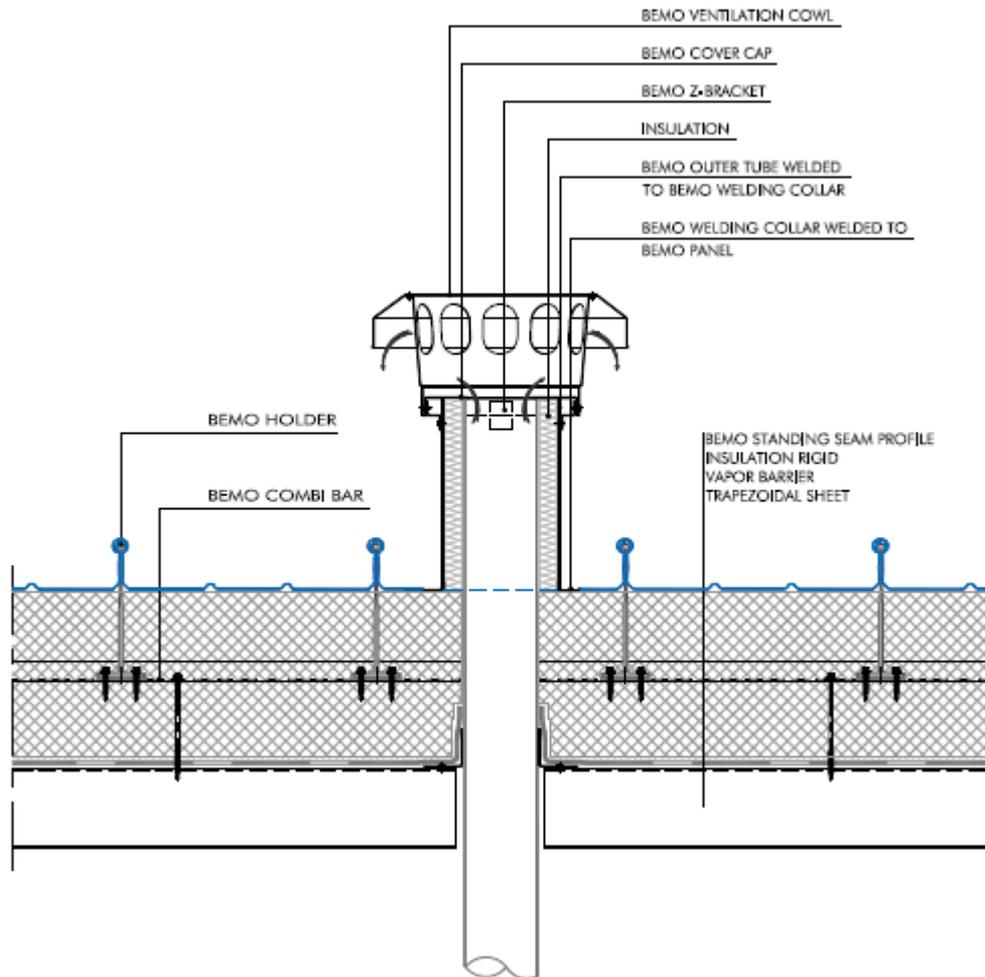
14.0 Items that penetrate the roof

14.1 Roof Penetration



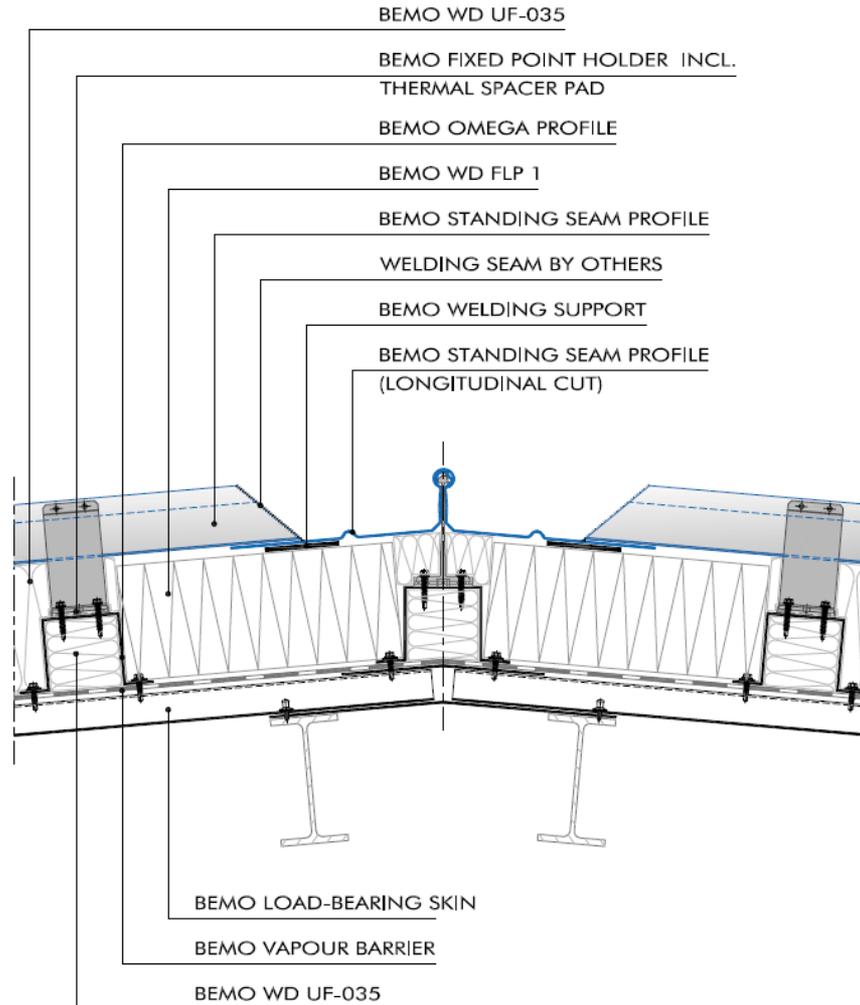
14.0 Items that penetrate the roof

14.2 Roof Penetration



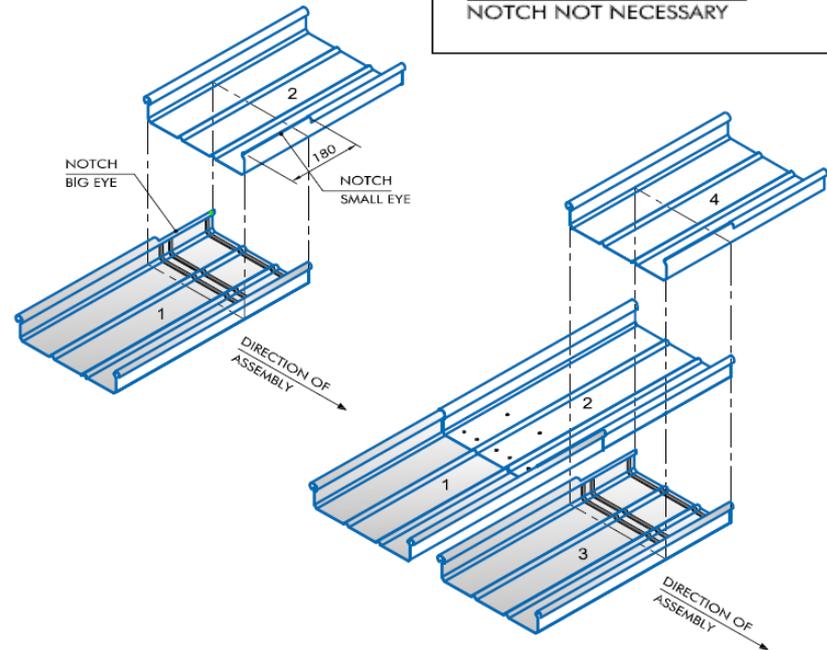
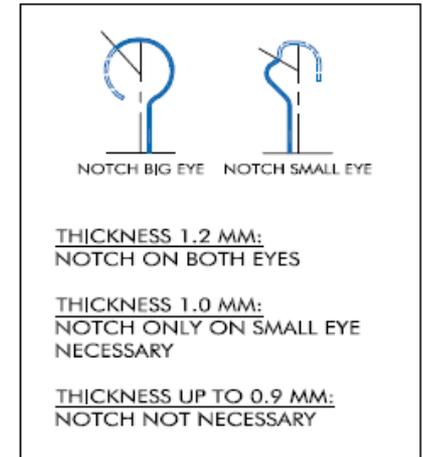
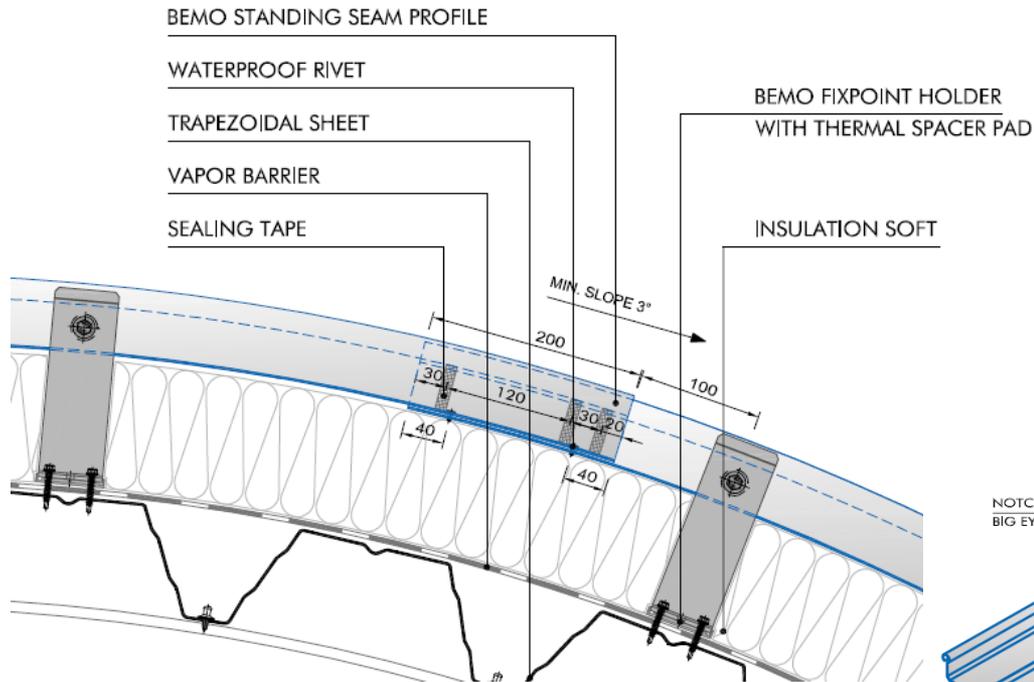
14.0 Items that penetrate the roof

14.3 Groin Detail



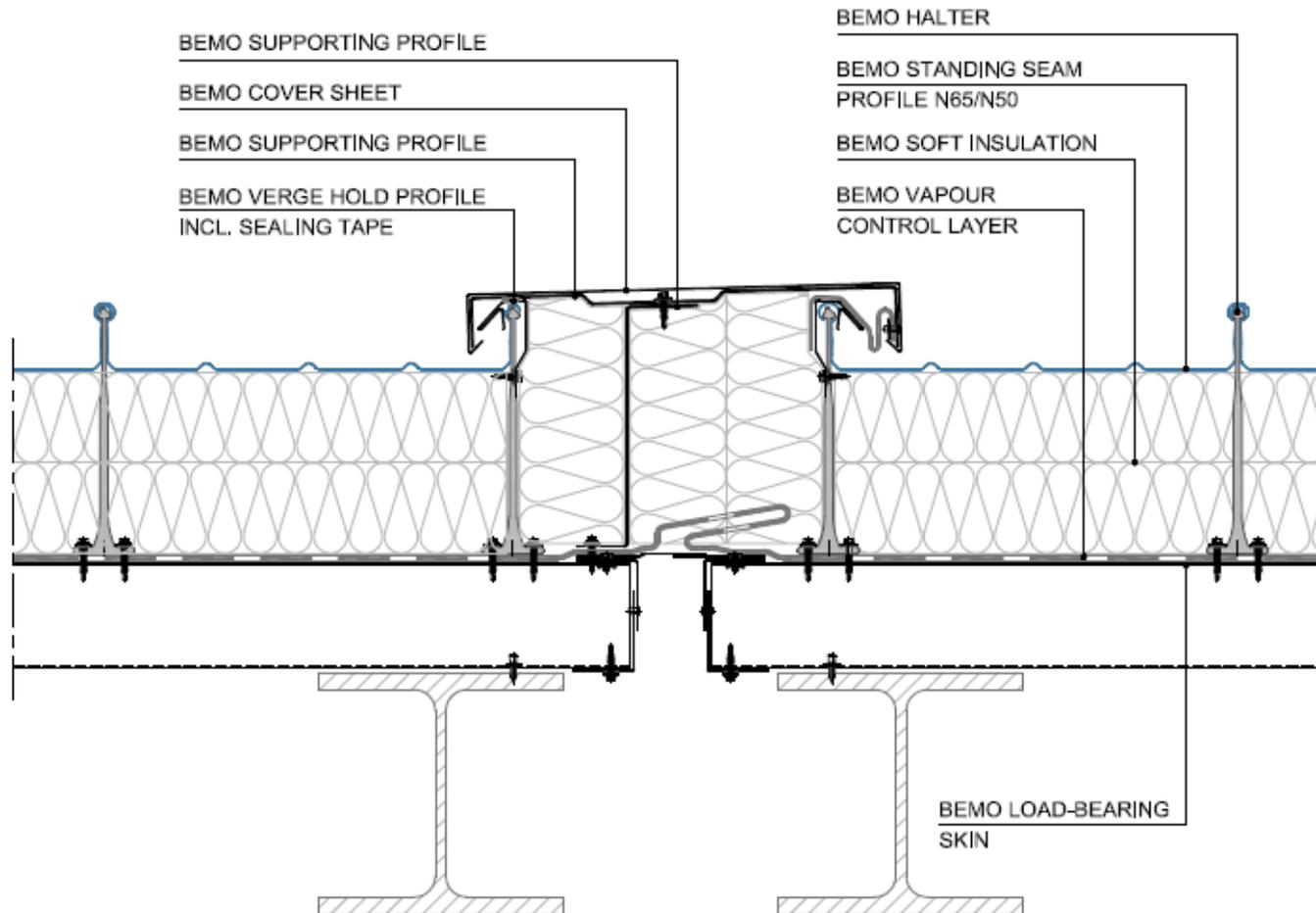
14.0 Items that penetrate the roof

14.4 Lap Joint



14.0 Items that penetrate the roof

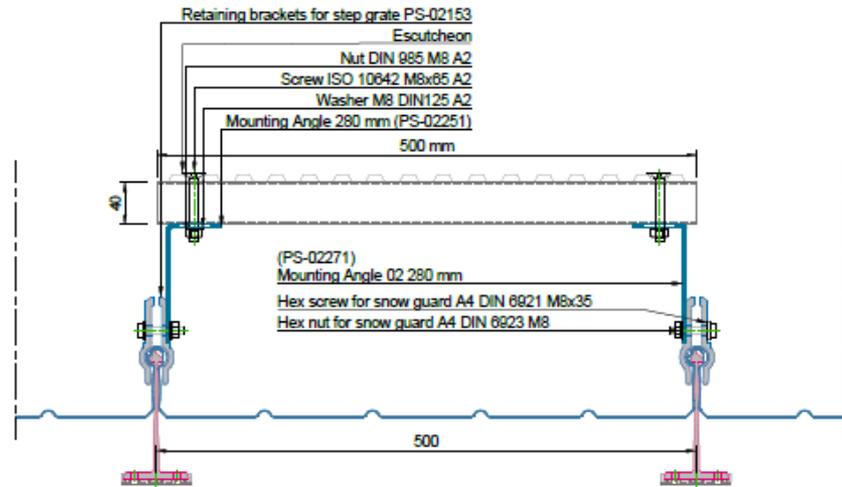
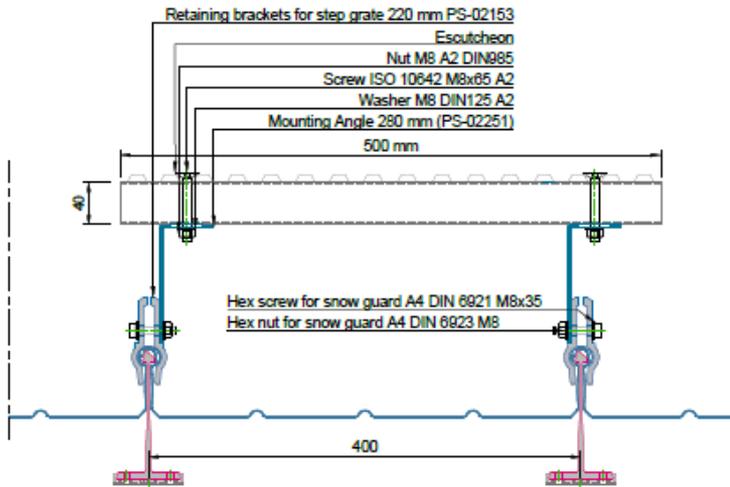
14.5 Movement Joint



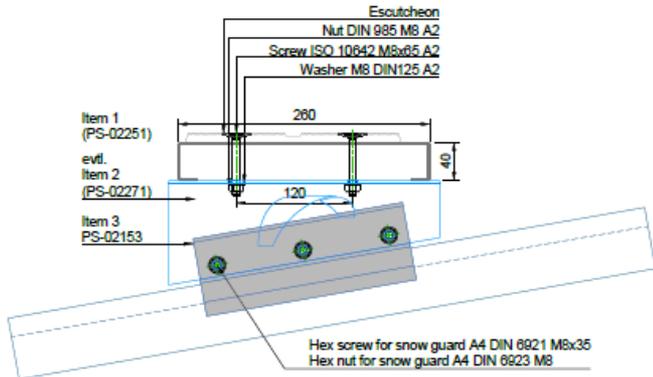
15.0 On-Roof Applications

15.1 Catwalk

Longitudinal section:



Cross section:



Note: For the Catwalk / BEMO-STEP installation a separate Installation Manual is available – please ask the BEMO Team to handover at request.

15.0 On-Roof Applications

15.2 Snow guard system

Required tools

- Wrench 13 mm
- Cordless screwdriver
- Screw insert Torx T25

The BEMO snow guard system prevents snow and ice masses from sliding off over large areas. These are mainly installed over traffic areas and paths to prevent damage to property and personal injury.

The snow guard pipes are laid out and installed on the roof with a spacing of approx. 10 mm or more in order to be able to absorb temperature-related linear expansion. The exact distance depends on the length of the snow guard pipe (standard 6000 mm or in individual cases 3000 mm).

The snow stoppers are installed pointing towards the ridge so that the shear load of the snow hits there. In principle, the number of stoppers varies depending on the width of the sheet. As a guide for the 65-400 profile, 2 stoppers per profile are recommended and thus 5 pcs of snow guards per running metre. An increase in the number is permissible. We ask you to contact us in case of any lower numbers.

When using an extension element, these must be mounted with retaining straps. The 2nd row does not require additional snow guards.

The system was developed and designed exclusively for the BEMO standing seam roof. Changes to the system or during installation can lead to impaired functioning. Calculations and designs as well as the consideration of the relevant standards must be checked in advance and, if necessary, coordinated with BEMO.

Use of the snow guard as a fall protection is not permitted.

15.0 On-Roof Applications

15.2 Snow guard system

Step 1: The square pipe is positioned at the place where the snow guard is to be placed later.



Step 2: The fixing clamps are screwed on and slipped over the square pipe at each seam.



Step 3: Tighten the screws of the clamps with 35 Nm.



Step 4: The snow stoppers are inserted over the square tube at each bead of the BEMO standing seam sheets, aligned on the ridge side.

Ridge side



Eave side

Step 5: The snow stoppers are inserted over the square tube at each bead of the BEMO standing seam sheets, aligned on the ridge side.



Note: For the BEMO Snow guard system installation a separate Installation Manual is available – please ask the BEMO Team to handover at request.

15.0 On-Roof Applications

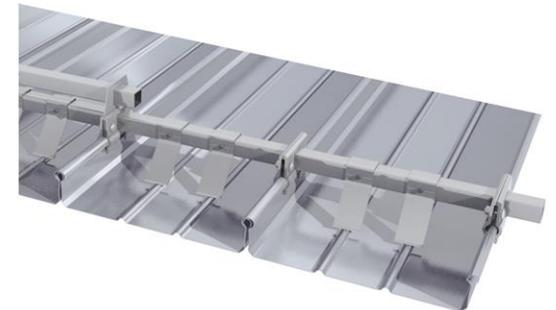
15.2.1 Snow guard system – Recommended Quantities

Normal case:

BEMO Profile	Clamp pcs./lm	Stoppers pcs./lm	Tube lm/lm
N 50/333	1,5	3,0	1,0
N 65/250	2,0	4,0	1,0
N/VF 65/305	1,7	3,3	1,0
N/VF 65/333	1,5	3,0	1,0
N 50/400 / N/VF 65/400	2,5	5,0	1,0
N 50/429 / N/VF 65/434	2,3	4,6	1,0
N 50/500 / N/VF 65/500	2,0	4,0	1,0
N 50/529	1,9	3,8	1,0
N/VF 65/600	1,7	3,4	1,0

We want to point out, that the a. m. quantities of clamps and stopper are based on our experiences and not on a static calculation for your project.

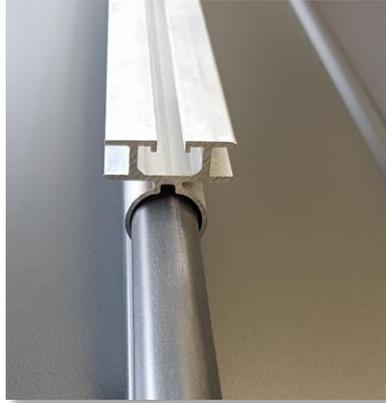
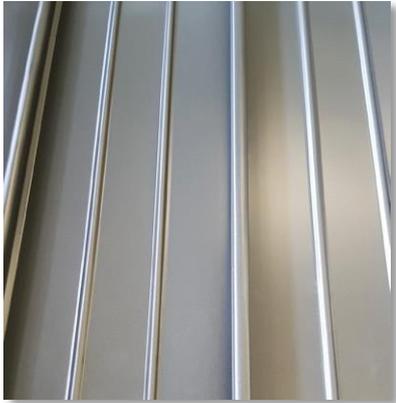
A liability for damages or accidents must be crowd out.



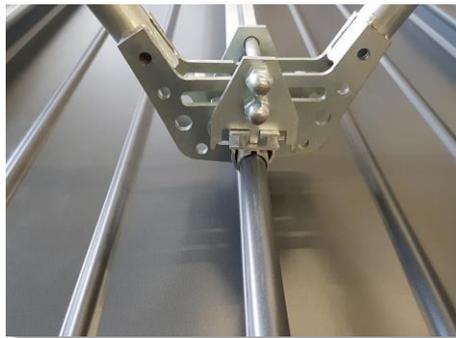
15.0 On-Roof Applications

15.3 TOP & AKKORD Rails for PV or Rainscreen application

Step 1: Attach the Top- or Akkord rail to the ready-seamed BEMO-Standing seam.



Step 2: The hand seaming tool is placed on the profile and seamed with the BEMO standing seam profile by pressing the grip pieces apart. This process is done over approximately the first 30 cm of the rails.



1. Setting up the hand folding tool

2. Seaming (pressing) the profiles

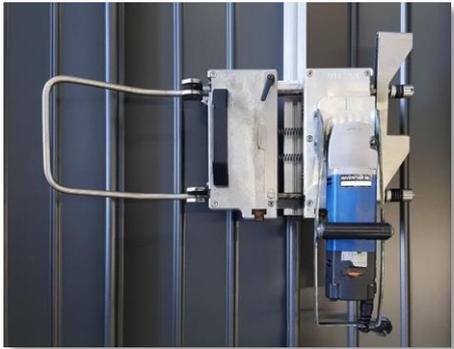
3. Seamed profile

15.0 On-Roof Applications

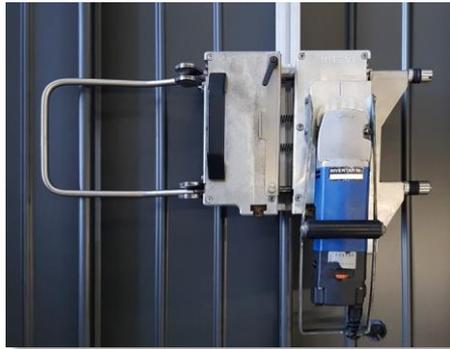
15.3 TOP & AKKORD Rails for PV or Rainscreen application

Step 3

- The special AKKORD or TOP-seaming machine is placed on the bar profile with the lever open.
- Close the lever by pushing it back to the machine.
- The closing of the lever can be simplified by tapping the on switch.
- Check that the press rollers are properly positioned on the profile.
- Switching on the machine starts the folding process.
- As a rule, the speed should be selected between level 3 and 4 and care should be taken to ensure that the cable feed is unobstructed.
- While the machine is running independently, the operator should walk alongside the machine.
- Should the machine reach the end of the bar profile, it should be switched off and removed from the bar profile after opening the lever.



1. Attaching of the AKKORD-seaming machine



2. Opening of the lever



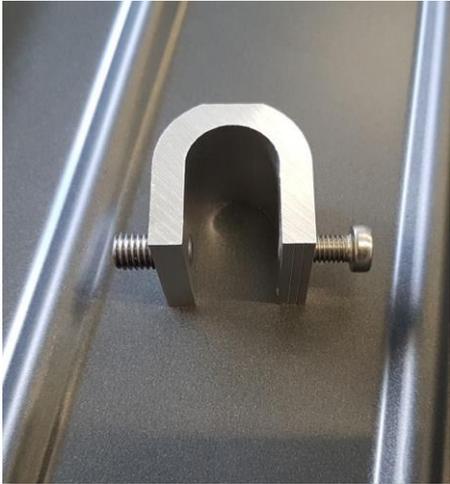
3. Closing of the lever

15.0 On-Roof Applications

15.3 TOP & AKKORD Rails for PV or Rainscreen application

Step 4

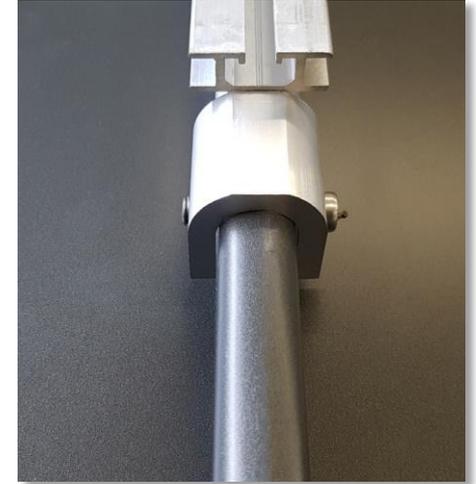
- To avoid the sliding down of the rails, a surge locking device U-Clamp has to be installed at the lower part of the rail.
- The surge locking device is not allowed to be installed at the position of a sliding halter in order to allow for thermal movement of the standing seam profile.



1. Surge locking device (U-Clamp)



2. U-Clamp is placed on top of the seam and in front of the bar profile



3. Screws of the U-Clamp are tightend

Note: For the BEMO TOP & AKKORD rail installation a separate Installation Manual is available – please ask the BEMO Team to handover at request.

16.0 Surfaces



Stucco



Brushed



BEMO-FLON



Aluzinc



Eloxal



BEMO-Eco-Clean™

- Copper natural, oxide or pre-patina (pre-weathered)
- Zinc natural, pre-weathered, Pigmento or Anthra
- Steel galvanized color-coated or galvalume
- Stainless steel in numerous surfaces
- Aluminum mill-finish, stucco-textured, pre-patina
- Coating systems: Polyester, HDPE, PVDF lacquers, BEMO-FLON

16.0 Surfaces

- BEMO panels that are supplied ready-coated (painted, or with anti-condensation/soundproofing treatment on the under-side) should be handled with extra care.
- The manufacturer cannot accept liability for scratches or similar damage caused, for example, by inadequate storage conditions, careless handling or the use of panel runs as walkways during installation work.
- Note that production conditions may cause the colour tone of both bare and painted surfaces to vary slightly from batch to batch. For this reason, you are recommended - especially when large projects are involved - to obtain all material from the same batch when ordering.
- Take into account the variations permitted by ECCA and/or RAL Standards.
- Remove any protective plastic foil from the BEMO panels within 8 to 10 days of delivery.
- UV rays cause a reaction in the chemical composition of the adhesive, which can then make the plastic film very difficult to peel off.
- This also applies to edge sections.

17.0 BEMO tools



Seaming machine



Hand seaming tool



Metal rollers for
seaming machine



Upstanding tool
at ridge



Plastic rollers for
seaming machine

For the use at painted
BEMO profiles without
protection foil



Downstanding tool
at gutter

18.0 General precautions

- As mentioned, BEMO panels can be made of a variety of different materials.
- This requires the use of different types of tools and equipment for welding, soldering and bending.
- All specialist installation firms should ensure that they are adequately equipped to carry out the required fitting operations.
- We shall be happy to recommend the corresponding specialists if you do not have the facilities for welding aluminium, for example.
- This installation manual cancel and replace all previous versions.
- All rights reserved.
- No copying, in whole or in part or by any means, without the express written permission of the BEMO Group.

19.0 Connected



19.0 Connected

19.1 Certifications

German Certification

DIBt - Allgemeine Bauaufsichtliche Zulassung Z-14.1-182 - BEMO Stehfalzprofile Aluminium

DIBt - Allgemeine Bauaufsichtliche Zulassung Z-14.1-640 - BEMO Stehfalzprofile Steel

European Certification

ETA - European Technical Approval no. 15-0351 – BEMO Standing Seam Profiles

British Certification

BBA Certificate no. 13/5036 – BEMO secret fix roof system

French Certification

DTA no. 5.1/22-2589_V1 – BEMO Curved panels

DTA no. 5.1/22-2590_V1 – BEMO Straight panels

US Certification

ASTM1592 – Structural performance of BEMO metal roof with aluminum halter

ASTM1592 – Structural performance of BEMO metal roof with hook clip

ASTM1680 – Water penetration test

ASTM1646 – Air infiltration

100 000 Cycle clip/halter test

General Certification

FM-Approval of BEMO 305 and BEMO 400

FM 1-90, FM 1-105, FM 1-120, FM 1-180

LEED Certification

3rd Party Wind & Water tests

Various Acoustic tests

19.0 Connected / Accessories

19.2 Standing Seam Halter Systems



BEMO Standard
Aluminium halter



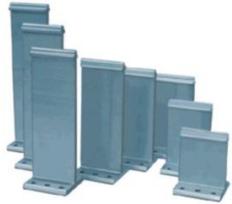
BEMO Thermal halter
eliminates thermal bridges



BEMO HOOK-halter
for deployment in
extreme wind zones

19.0 Connected / Accessories

19.3 The system includes a number of accessories



Alu-halter-clips



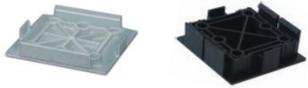
GFK-thermal halter-clips



Flashings



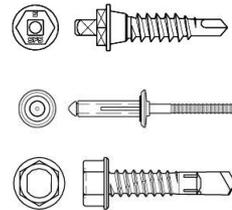
Fall arrest system



Thermal spacers



Ridge filler plates



Fasteners



Catwalks



Verge profiles



Fillers for ridge and eave



Seam clamps



Support systems

19.0 Connected / Accessories

19.4 BEMO-SAP – Fall arrest system



End- and intermediate anchor point



Single- and intermediate anchor point



Intermediate anchor point



Corner anchor point



End padlock with fall / shock absorber



Movement device on cable



Stainless steel cable



Personal safety equipment

Note: For the BEMO SAP Fall arrest system installation a separate Installation Manual is available – please ask the BEMO Team to handover at request.

19.0 Connected / Accessories

19.5 Vapour control layers

Selfadhesive membrane Aluminium reinforced

Thickness: 0.20 – 1.20 mm
Sd-value: > 1 500 m



Aluminium reinforced membrane

Thickness: 140 μ
Sd-value: ~ 7 600 m



PE-membrane

Thickness: 200 μ or 400 μ
Sd-value: ~ 241 m



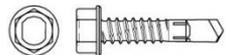
19.0 Connected / Accessories

19.6 Fasteners for BEMO halters

Trapezoidal sheets



SDK2-S-377
6.0 x 35 or 45 mm

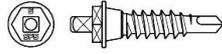


JT 3-X-2
6.0 x 36 or 46 mm

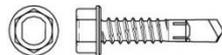


Bulb -Tite rivet
RV 6604-12W

Wood substructure



SDK2-S-377
6.0 x 35 or 45 mm



JT 3-X-2
6.0 x 36 or 46 mm



Self drilling screw
6.5 x 54 mm



Hexagonal screw
6.5 x 51 mm

Steel substructure



SDK3-S-377
6.0 x 35 or 45 mm



JT 3-X-2
6.0 x 36 or 46 mm



Hexagonal screw
with predrilling

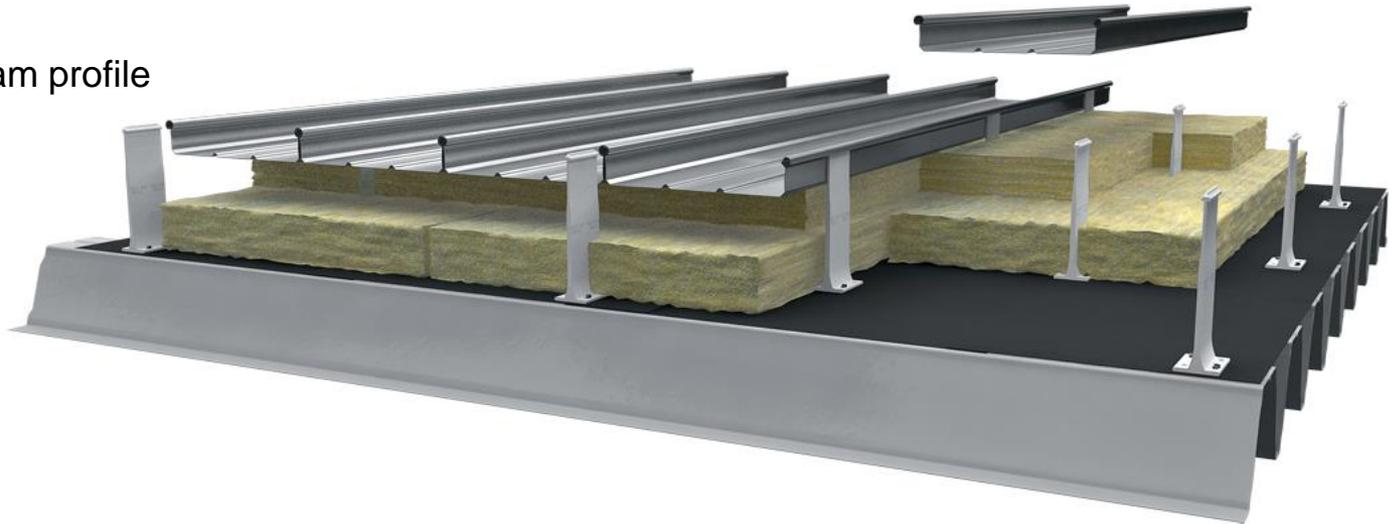
20.0 Complete / Constructions



20.0 Complete / Constructions

20.1 BEMO SOFT (FOR BINDER ROOFS)

- Trapezoidal sheet steel
- Vapour barrier
- BEMO halter-clips
- Thermal insulation
- BEMO standing seam profile



Sound reduction index - calculated value $R'_{w,R}$ [dB] ≈ 35

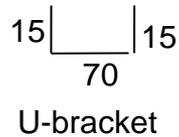
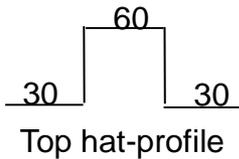
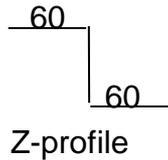
20.0 Complete / Constructions

20.2 BEMO SOFT PLUS (FOR PURLIN ROOFS)

- Trapezoidal sheet steel
- Vapour barrier
- Sub construction
- BEMO halter-clips
- Thermal insulation
- BEMO standing seam profile



Different types of sub construction parts:

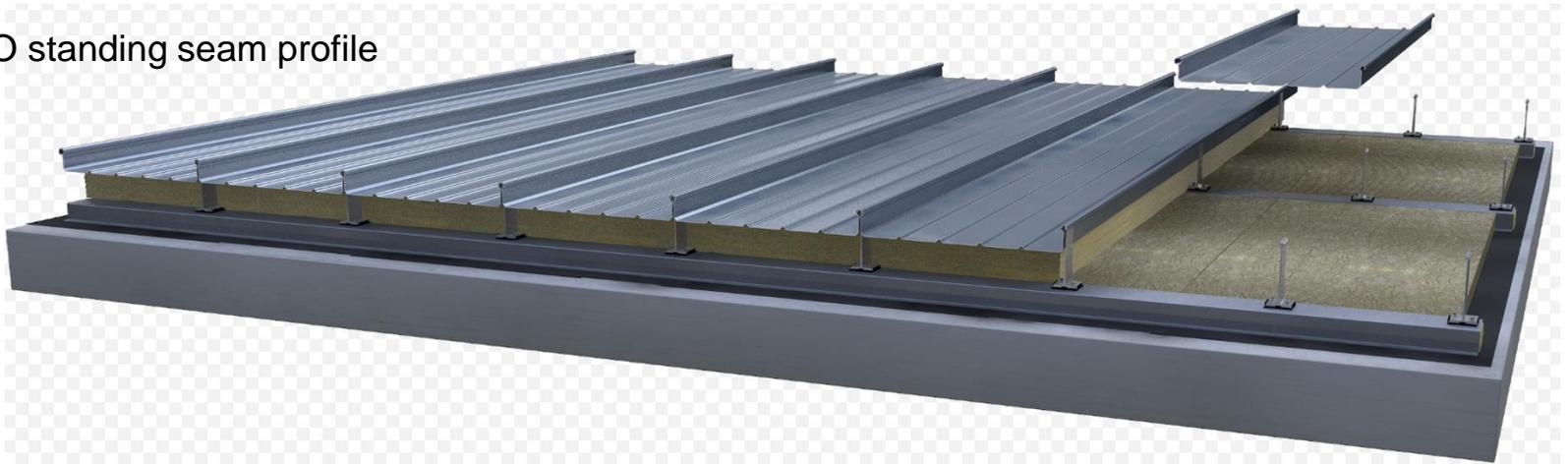


Sound reduction index - calculated value $R'_{w,R}$ [dB] \approx 35

20.0 Complete / Constructions

20.3 BEMO SOFT PLUS (ON CONCRETE SLABS)

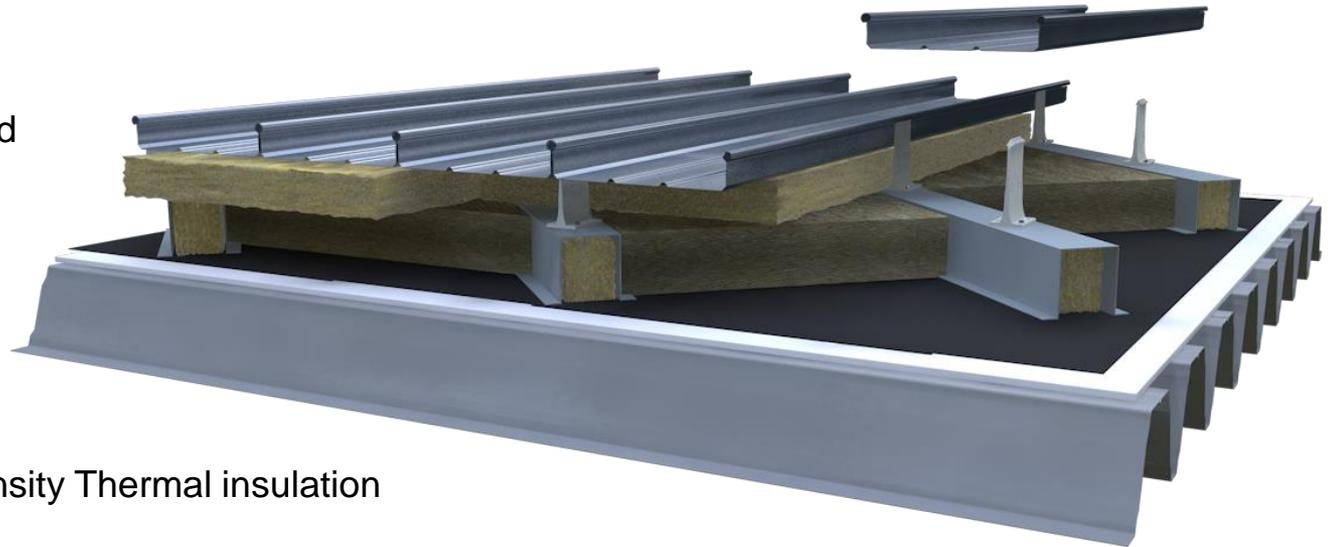
- Concrete slab
- Vapour barrier
- Sub construction
- BEMO halter-clips
- Thermal insulation
- BEMO standing seam profile



20.0 Complete / Constructions

20.4 BEMO ACOUSTIC

- Trapezoidal sheet steel
- Cement / Gypsum board
- Vapour barrier
- Sub construction
- BEMO halter-clips
- 1st layer soft or high density Thermal insulation
- 2nd layer soft or high density Thermal insulation
- BEMO standing seam profile



Sound reduction index - calculated value $R'_{w,R}$ [dB] > 50 possible

20.0 Complete / Constructions

20.5 BEMO-COMBI

- Trapezoidal sheet steel
- Vapour barrier
- Rigid insulation
- BEMO Combi rail
- BEMO halter-clips
- Soft insulation
- BEMO standing seam profile

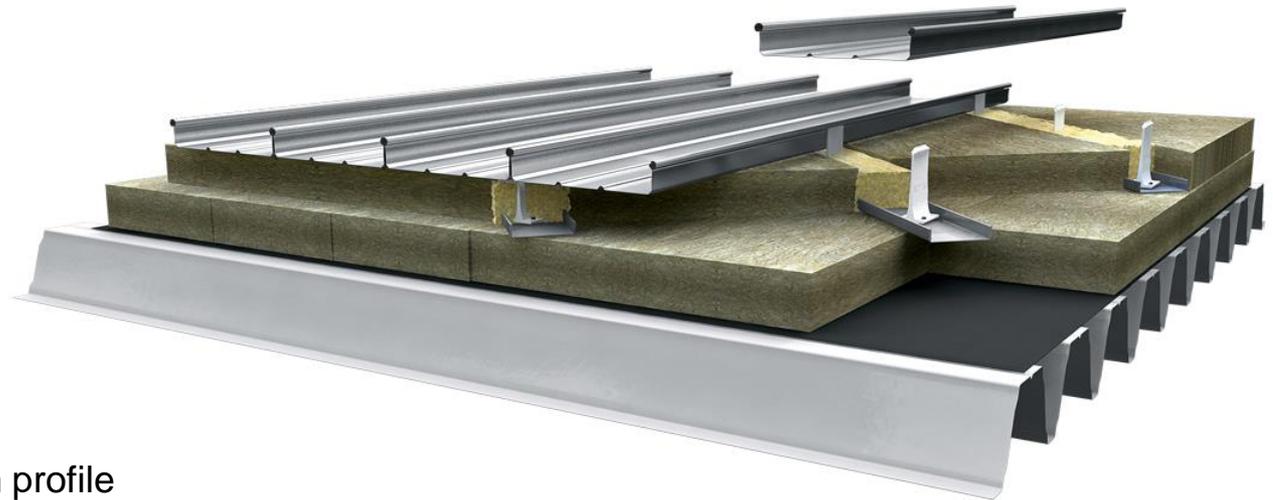


Sound reduction index - calculated value $R'_{w,R}$ [dB] ≈ 42

20.0 Complete / Constructions

20.6 BEMO-COMPACT

- Trapezoidal sheet steel
- Vapour barrier
- Rigid insulation
- BEMO Combi rail
- BEMO halter-clips
- Rigid insulation
- BEMO standing seam profile

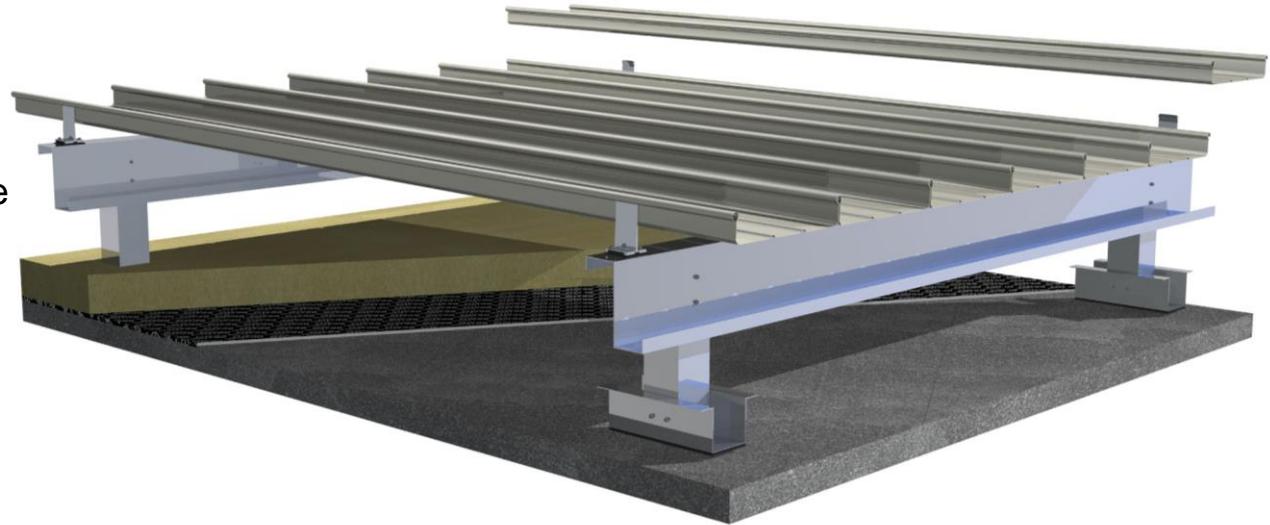


Sound reduction index - calculated value $R'_{w,R}$ [dB] ≈ 47

20.0 Complete / Constructions

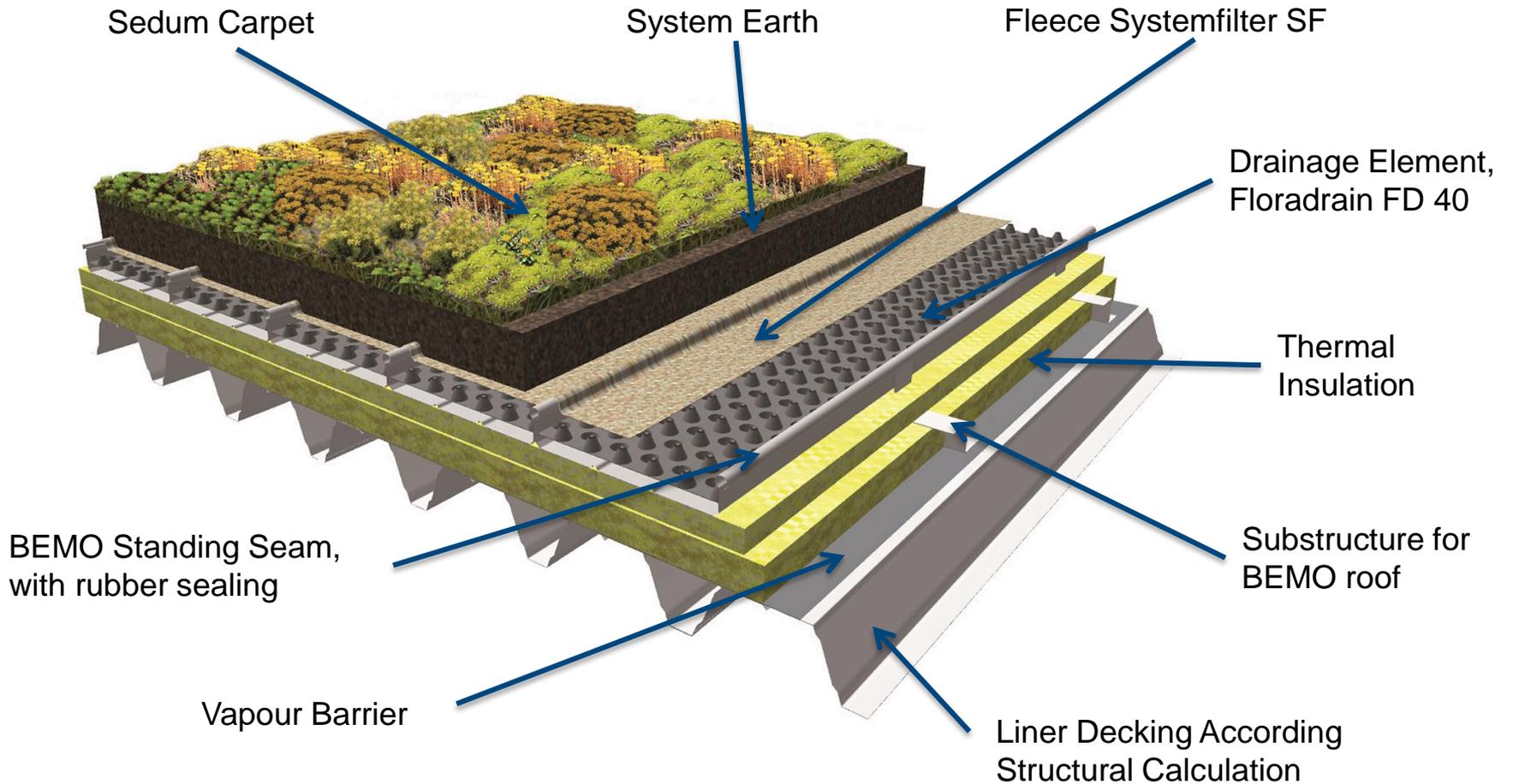
20.7 BEMO-ELEVATE

- “Old roof surface”
- Vapour barrier
- Thermal insulation
- BEMO Elevate
- BEMO halter-clips
- BEMO standing seam profile



20.0 Complete / Constructions

20.8 BEMO-VERT



21.0 Cleaning and Maintenance

21.1 General

General

During installation and after, for general maintenance and inspection purposes, it is possible to walk on BEMO panels that have been partially seamed or fully seamed together to the parameters shown in the ***Walkability Tables (General Certificates)***.

Maintenance and cleaning personnel must use walkways, scaffold boards and in any case fall arrest systems on all roofs with BEMO panels, to ensure their safety and so as not to damage the BEMO panels.

The sheets are capable of withstanding impacts resulting from handling, installation and normal service.

The ridge and eaves are common "walkways" on roofs. It is therefore important to advise workmen of the dangers involved.

The last sheet at the edge, e. g. gable/verge end, as well as plastic translucent sheets cannot be walked on.

Recommendation:

Always provide load-spreading measures (catwalks, rigid insulation) at the ridge and at the eaves in order to avoid local deformations as a result of excessive foot traffic in the base of the BEMO panels especially at the point of entry/access to the roof.

The sheets may occasionally be damaged in use by foot traffic, falling objects, severe weather etc. Such sheets can be repaired and any defective or missing halters replaced. However, if panels are damaged before erection, they **must not** be used.

Experienced and trained personnel **must** undertake any BEMO sheet removal.

21.0 Cleaning and Maintenance

21.2 Cleaning

Cleaning

Cleaning is vital in areas where industrial deposits have dulled the surface, where materials from construction processes have soiled the surface or where cleaner run-down from other surfaces should be removed.

Cleaning is specifically required in:

- Areas of low rainfall or in industrialized areas.
- Foggy coastal regions with cycles of condensation and drying may tend to cause a build-up of atmospheric salts and dirt.
- In any climate, sheltered areas, such as overhangs, may become soiled due to insufficient rainwater rinsing.
- Thorough rinsing is especially important after cleaning of these sheltered areas.

Local conditions as well as building location within a geographical area quite naturally have an effect on cleanliness.

Construction soils, including concrete or mortar, etc. should be removed as soon as possible. The exact procedure for cleaning will vary depending on the nature and degree of soil.

Try to restrict cleaning to mild weather. Cleaning should be done on the shaded side of the building or ideally on a mild, cloudy day.

Method of cleaning, type of cleaner, etc. of one component of the building must be used with consideration for other components such as glass, sealant, painted surfaces, etc.

21.0 Cleaning and Maintenance

21.2 Cleaning

Removal of light surface soil

Removal of light surface soil may be accomplished in several ways. Some testing is recommended to determine the degree of cleaning actually necessary to accomplish the task. Ideally, an initial step of forceful water rinse from the top down is recommended prior to any cleaner application. Significant benefit is gained with some type of surface agitation. Low water volume with moderate pressure is much better than considerable volume with little pressure. Physical rubbing of the surface with soft, wet brushes, sponges or cloth is also helpful.

The simplest procedure would be to apply the water rinse with moderate pressure to dislodge the soil. If this does not remove the soil, then a concurrent water spray with brushing or sponging should be tested. If soil is still adhering after drying, then a mild detergent will be necessary.

When a mild detergent (Ph7) or mild soap is necessary for removal of soil, it should be used with brushing or sponging. The washing should be done with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion.

Apply cleaners only to an area that can be conveniently cleaned without changing position. The surface must be thoroughly rinsed with clean water. It may be necessary to sponge the surface while rinsing, particularly if cleaner is permitted to dry on the surface. The rinsed surface can be air dried or wiped dry with a chamois, squeegee or lint free cloth.

Run down of cleaner (from any operation) to the lower portions of the building should be minimized and these areas should be rinsed as soon as and as long as necessary to reduce streaking etc. from unavoidable run down. Do not allow cleaning chemicals to collect on surfaces or to "puddle" on horizontal surfaces, crevices, etc. These areas should be flushed with water and dried via air or wiped dry with a chamois, squeegee or lint free cloth. Always clean coated surfaces down from top to bottom and follow with a thorough rinsing with clean water. (With one storey or low elevation buildings, it is recommended to clean from bottom up and rinse from top down). To avoid water stain, the surface should be wiped.

21.0 Cleaning and Maintenance

21.2 Cleaning

Mild detergents

Mild soaps or detergents ruled safe for bare hands should be safe for coated aluminium. Stronger detergents such as some dishwasher detergents should be carefully spot tested. Some of the latter may require rubber gloves, long handled brushes, etc. With any of these, the finish should be thoroughly rinsed with clean water and dried via air or wiped dry with a chamois, squeegee or lint free cloth. Some mild cleaning solutions, which consist of selected wetting agents in water solution, are available for automatic building washing machines. These machines would have built in brush agitation, squeegee, filtrations and recirculation; in some, a fresh water connection may be provided.

Cleaning of medium to heavy soil

Some type of mild solvent such as mineral spirits may be used to remove grease, sealant or caulking compounds. Stronger solvent or solvent containing cleaners may have a deleterious or softening effect on coatings; accordingly, great care should be taken. To prevent harm to the finish, these types of solvent or emulsion cleaners should be soap tested and preferably the coating manufacturer should be consulted. Care should be taken to assure that no marring of the surface is taking place in this manner since this could cause an undesirable appearance at certain viewing angles. Cleaners of this type are usually applied with a clean cloth and removed with a cloth. Remaining residue should be washed with mild soap and rinsed with water. Use solvent cleaners sparingly.

It may be possible for solvents to extract materials from sealants which could stain the painted surface or could prove harmful to sealants; therefore, possible adverse effects must be considered. Test clean a small area first.

If cleaning of a heavy surface soil has been postponed or in cases of tenacious soil, stubborn stains, etc., then a more aggressive cleaner and technique may be required. Cleaner and technique should be matched to the soil and the painted finish. Some local manual cleaning may be needed at this point. Always follow the recommendations of the cleaner manufacturer as to proper cleaner and concentration. Test clean a small area first. Cleansers should not be used indiscriminately. Do not use excessive, abrasive rubbings as such may alter surface texture or may impart a "shine" to the surface.

Concrete spillage that has dried on the coated surface may become quite difficult to remove. Special cleaners and/or vigorous rubbing with non-abrasive brushes or plastic scrapers may be necessary. Diluted solutions of Muriatic Acid (under 10%) may be effective in removing dried concrete stains; however, a small test clean area should be tried first, and proper handling precautions must be exercised for safety reasons.

21.0 Cleaning and Maintenance

21.2 Cleaning

Never mix cleaners

Never mix cleaners!

Doing so may be ineffective, and worse, very dangerous. For example, mixing chlorine containing materials, such as bleaches, with other cleaning compounds containing ammonia can cause poisonous gas emissions.

Always rinse the coated material after removal of heavy surface soil.

Summary of general cleaning tips

- Over-cleaning or excessive rubbing can do more harm than good.
- Strong solvents or strong cleaner concentrations can cause damage to painted surfaces.
- Avoid abrasive cleaners. Do not use household cleaners that contain abrasives on painted surfaces.
- Abrasive materials such as steel wool, abrasive brushes, etc. can wear and harm finishes.
- Avoid drips and splashes. Remove run downs as quickly as possible.
- Cleaning should be done in shade at moderate temperatures. Avoid temperature extremes. Heat accelerates chemical reactions and may evaporate water from solution. Extremely low temperature may give poor cleaning effects. Cleaning under adverse conditions may result in streaking or staining.
- Do not substitute a heavy duty cleaner for a frequently used mild cleaner.
- Do not scour coated surfaces.
- Never use paint removers, aggressive alkaline, acid or abrasive cleaners, phosphate or highly alkaline or highly acid cleaners.
- Follow manufacturers recommendations for mixing and diluting cleaners.
- Never mix cleaners.
- To prevent marring, make sure cleaning sponges, cloth etc. are grit free.
- Always test clean small surface.
- "An ounce of prevention is worth a pound of cure".

21.0 Cleaning and Maintenance

21.2 Cleaning

Cleaning of natural finishes

Natural finish surfaces like stucco embossed & mill finish.

Use an abrasive agent with a **ph value of between 5 - 8** and a soft non-woven fabric cleaning cloth.

When using special cleaning agents, make sure that they are ecologically compatible.

Always rinse off with water.

A specialized company must perform steam-jet cleaning.

Cleaning of coil coated finishes

When a mild detergent (ph value 7) or mild soap is necessary for removal of soil, it should be used with brushing or sponging.

The washing should be done with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion.

Apply cleaners only to an area that can be conveniently cleaned without changing position.

The surface must be thoroughly rinsed with clean water.

It may be necessary to sponge the surface while rinsing, particularly if cleaner is permitted to dry on the surface.

The rinsed surface can be air dried or wiped dry with a chamois, squeegee or lint free cloth.

21.0 Cleaning and Maintenance

21.2 Cleaning

Cleaning down before project handover to the client

- The roofing contractor is to thoroughly clean down all sheet areas.
- Any swarf, rivets, screws and debris must be removed from the roof area. All gutters are to be checked and cleaned.
- For colour coated material, the roofing contractor is to be remove with care all protective polyethylene film.

21.0 Cleaning and Maintenance

21.3 Repair of coated surfaces

Repair

Damage may be found on the surface of the coating when cleaning or otherwise maintaining the coated roof covering or wall cladding. Paint repair should be restricted to small areas (max. 5.0 m²). Any significant repair work should be discussed with your supplier to retain warranty benefits!

Execution when no corrosion is found:

- The damaged surface should be washed and dried as described above.
- A recommended touch-up paint should be applied for protective and aesthetic reasons.

Execution with small corrosion defects:

- Remove the dust by abrading, scraping, and sand blasting to the bare material.
- Degrease the complete surface.
- Clean and dry the surface (as described above) before applying a repair paint system (primer and top coat) recommended by the material supplier.

Overpainting / recladding

If it is deemed necessary to re-paint or reclad large surfaces, contact BEMO before execution to keep any right of warranty claim.

Investigating the economic feasibility of over-painting the existing structure or replacing the coated sheets is recommended.

In case of any questions about overpainting please contact us. Using non-compatible systems of repair paints and original coated surfaces might cause undesired effects.

21.0 Cleaning and Maintenance

21.4 Intervals & Maintenance guideline

Intervals

Two inspections per year and associated cleaning of all areas are recommended, at least one documented inspection is required for Limited Warranty coverage.

Regular inspection and maintenance should consist of:

- Checking the condition of the sealants, fasteners and flashings to ensure water tightness
- Examining local defects (e.g. scratches) that may cause early deterioration of the coating or corrosion of the substrate
- Removing any blockage in gutters to avoid overflow or buildup
- Removal of leaves, grass, mould and other objects and debris
- Removal of dirt in areas of cladding not rinsed naturally by rainwater
- Removal of graffiti or other marks
- *Fasteners* – all fasteners are to be checked for tightness and weather seal. Fasteners that are found to be loose or corroded **MUST BE REPLACED**.
- *Welds* – all welds shall be inspected for cracks that may occur during thermal expansion and contraction of the system or foot traffic.
- *Sealants* – all exposed or concealed sealant will be checked for early signs of degradation from thermal or UV exposure. If sealant is found not to be performing, the damaged sealant must be replaced.
- *Corrosion* – any area that is exhibiting corrosion **MUST** be addressed **IMMEDIATELY** and appropriate action taken to stop additional damage.

For warranties the related Terms & Conditions of BEMO and Partners / Suppliers need to be considered!

21.0 Cleaning and Maintenance

21.4 Intervals & Maintenance guideline

Additional recommendations

An individual inspection / maintenance is highly recommended after:

- Heavy rain
- Storm with high wind forces
- Hail and thunderstorms – especially after an thunder impact to the roof!
- Prolonged snow-loads above the project related calculated loads



Thanks for kind attention