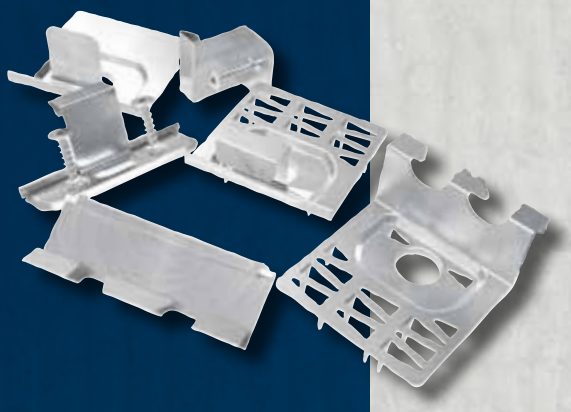

CLIPS USER MANUAL

01.05.2022

BJARNES SYSTEM

The use of sheet metal as a cladding material for roofs and walls has a long history both in Scandinavia and also globally. Most building types can be covered by flat sheet metal in different shapes and qualities. In order to ensure that everything works as it should, and to make sure that you get a satisfactory result, *the fastening system* is one of the most important details.

Structural Performance

Strengths given (see technical information) apply only to products from the Bjarnes System catalogue. Characteristic values are defined as the lower 5%fractile at a 75% confidence level. In order to maintain the design value, the characteristic value is reduced by partition co-efficients (safety factors). Partition co-efficients vary depending on the calculation method, material, fasteners and substrate.

The value of ingoing partition co-efficients is determined using current eurocodes.

Reservation

The information given in this manual is intended to be read as general advice, and is not necessarily obligatory. Additional information and advice regarding particular applications can be attained upon request. This requires a careful description of the desired application.

All information in this text relating to the installation of our products must be adapted to local conditions with regards paid to specific materials and effects. If performance specifications are missing, contact Bjarnes Systems's advice service.

We do not take responsibility for improper applications and reserve the right to make technical and product changes without notification. We are not responsible for any eventual typing or printing errors.

Production: Tydligen i Båstad AB & Unite Fasteners Technology AB

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Printed on 01-05-2022

INTRODUCTION

Terms and Conditions

Unless the parties agree otherwise in writing, the general delivery provision NL 09 will apply to all sales with the following alterations and additions:

1. Price
All prices given exclude VAT. For orders of less than 1000 SEK a delivery charge of 300 SEK will apply. The seller reserves the right to change the agreed price upon changes to the goods ordered.

2. Delivery Clause
Ex our warehouse (EXW) unless otherwise agreed. Confirmed delivery times are valid from the point at which the goods are available for delivery from the seller.

3. Payment Conditions
30 days from the invoice date or as agreed. Interest on late payments will be charged at 11.5% from the first day after the original due date. In addition, a fixed fee of 50 SEK will be applied to late payments.

4. Complaints
It is the responsibility of the customer to check the goods against the information given on the delivery slip and for any visible faults immediately upon delivery. Checks of unwrapped goods should then be undertaken with care within at least seven (7) days of delivery. Any faults should be reported to the seller in writing within seven (7) days of their discovery or by the time by which their discovery may reasonably have been expected. Any damages that have occurred during transportation or any deviations from the delivery slip should be noted on the delivery slip and sent to the shipping company. The customer does not have the right to invoke claims for any damages that have not been reported within the proper timeframe.

5. Liability for Defects
Upon the approval of a complaint, the seller commits to provide fault-free replacements within a period of six (6) months at the latest. The seller is not required to take any further measures or to respond to any additional requests, costs or damages of any kind relating to faulty goods.

6. Returns
Returns must always be approved by Bjarnes System. Reimbursement will be given minus a 30% return fee on the net price. Returns for orders of less than 1000 SEK or for products older than six (6) months will not be approved. Only standard products that are intact and within undamaged packaging can be approved. The return of custom orders that are not ordinarily stocked by Bjarnes System will not be approved.

7. Ordering of Non-Standard Products
Upon the order of special products, the buyer commits to accept between 15% too little and 15% too much of the ordered product and the price alteration that this implies.

Prices are to be found in separate pricelist.

PRODUCT OVERVIEW CLIPS

Installation to substrate

WOOD

25 mm seam

Fixed clips	Sliding clip	Magasinised clip
F01S	G01S	G01C
		
F02S	G021S	G021C
		
F022S	G02S	G02130C
		
F01425S	*page 27*	*page 28*
		
F0245S		
		
page 26		

25 mm seam + 7 structural mat

Fixed clips	Sliding clip
F0230S	G02130S
	
F02230S	G0230S
	
F02430S	*page 29*
	
page 29	

Welded seam

Fixed clips	Sliding clip
	G021VS
	
	G021WS
	
	G02VS
	
	G02WS
	
	page 30

= Galvanised clip

= Stainless clip

CONCRETE/LIGHT WEIGHT CONCRETE/SANDWICH/SHEET METAL

25 mm seam

Fixed clips	Sliding clip
F01	G01
	
FO2	G021
	
F0WW	G02
	
page 34	*page 35*

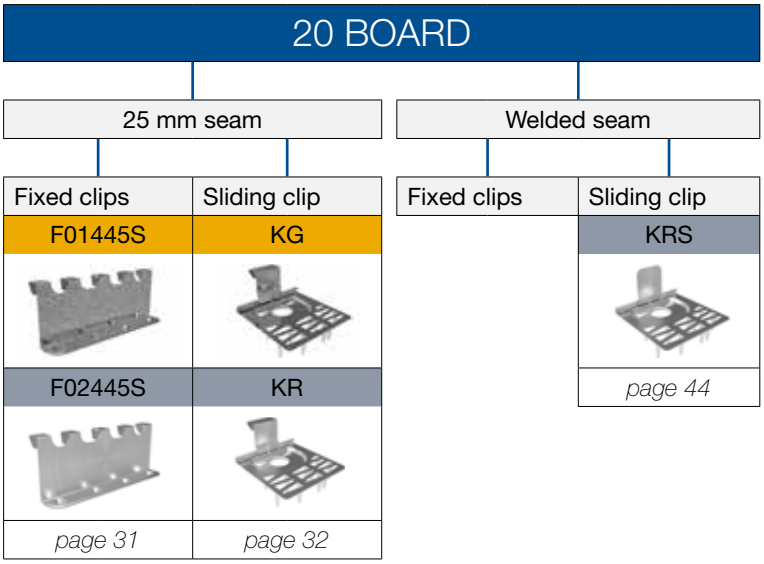
25 mm seam + 7 structural mat

Fixed clips	Sliding clip
F0230	G02130
	
F02230	G0230
	
page 36	*page 36*

Welded seam

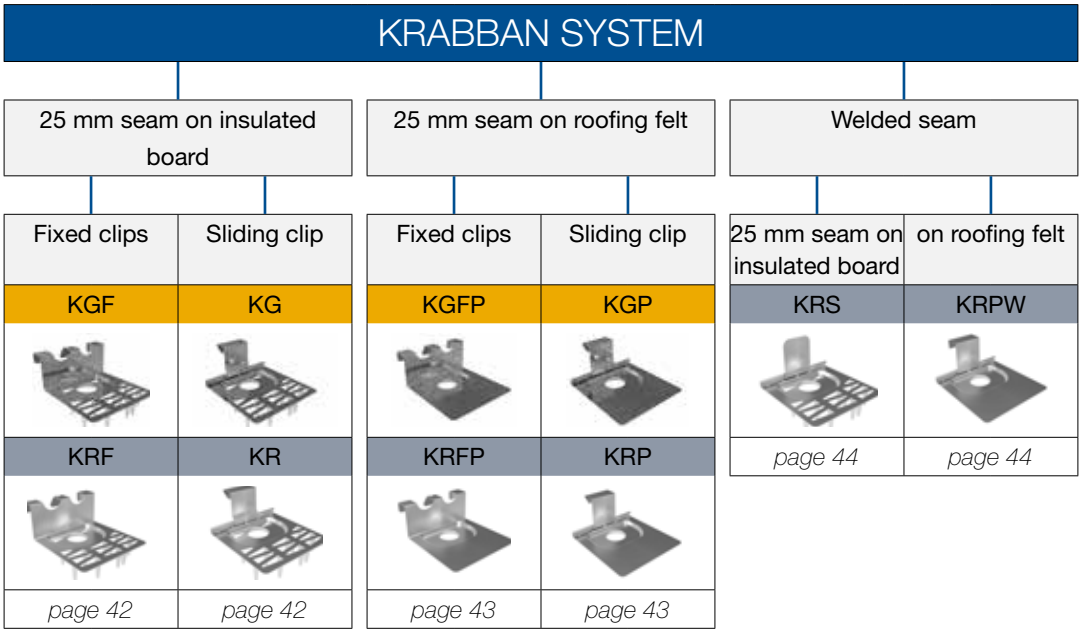
Fixed clips	Sliding clip
	G021V
	
	G02W
	
	G02V
	
	page 37

Installation to substrate



PRODUCT OVERVIEW CLIPS

Installation to insulated roofs



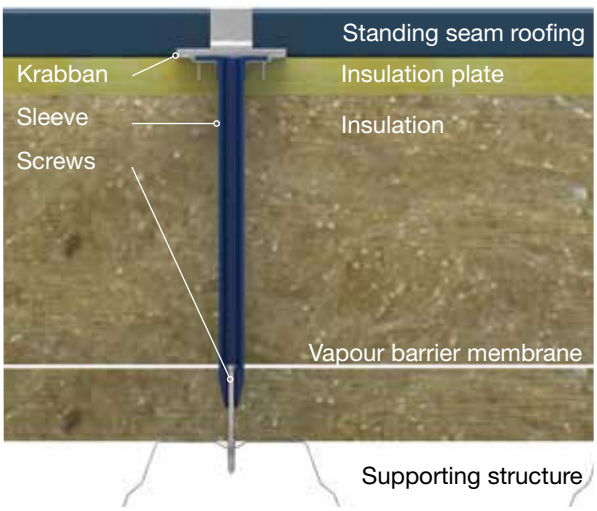
= Galvanised clip

= Stainless clip

Clip fastenings to isolated roofs - Krabban system

Snow and point loads can compromise isolation. In order to ensure that the fastener does not damage the sheet metal, the telescopic effect is used in the sleeves to adapt to any changes in shape. The telescopic effect should be at least 10% of the insulation thickness, but always at least 20 mm.

Plastic sleeves have a significantly lower conductivity than metal. The thermal bridge effect is thereby reduced considerably compared with traditional penetrating metal clips.



SIZING AND CALCULATIONS

Thermal movements

All sheet metal materials expand or shrink upon temperature changes. With standing seam roof systems it is therefore important to pay attention to any movements that occur during temperature changes. If there is no space for movement then damage may be caused to both the sheet metal and the substrate.

At temperatures of between -20 and 30 °C and between 70 and 80 °C, it is reasonable to expect that steel will move by 1mm/meter, while copper, aluminium and titanium zinc will move by 2mm/meter. It is assumed that the movement occurs from a fixed zone, the CENTRE OF MOVEMENT (CM). Fixed clips which do not allow for longitudinal movement are used within the centre of movement. Other fastenings use sliding clips which enable the sheet metal to move. Detailed solutions at the eaves, ridges and grommets must be executed in a way that enables the necessary degree of movement to occur.

Principles according to figure 1.

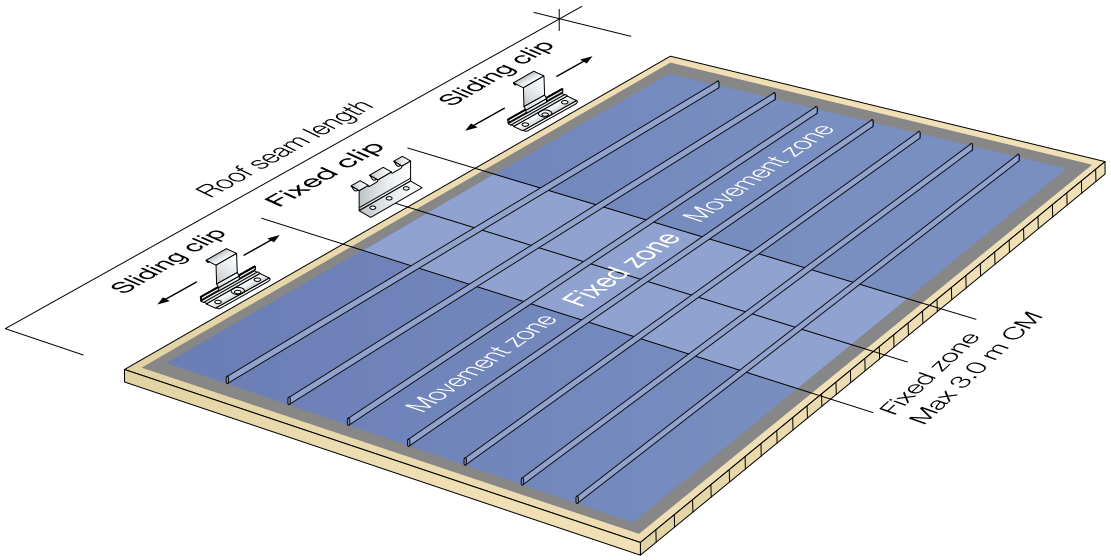


Figure 1. It is presumed that movement begins at a fixed zone, the so-called centre of movement (MC).

Thermal movements (contd.)

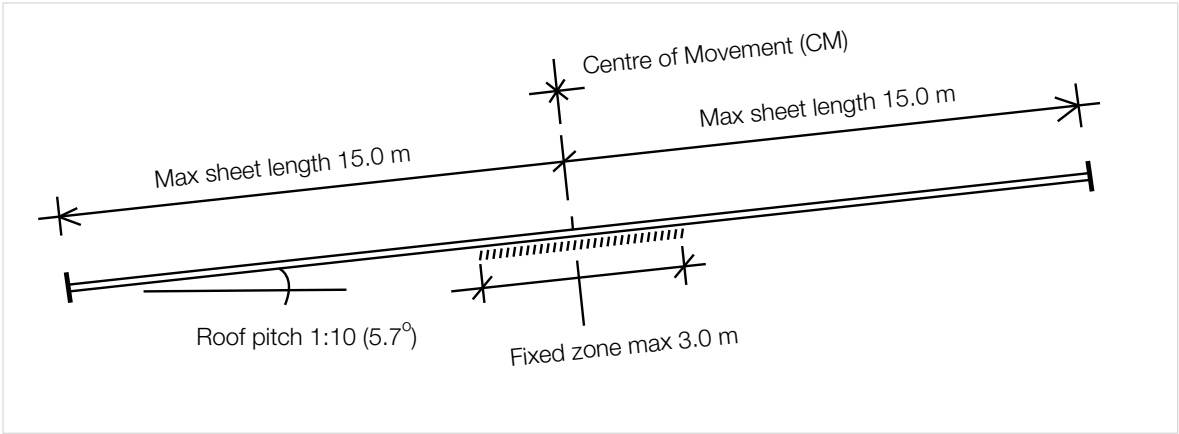
Material	Co-efficient of thermal expansion °C $^{-1}$ for different sheet metals
Steel sheet	$12 \bullet 10^{-6}$
Aluminium (Al)	$23 \bullet 10^{-6}$
Stainless (SS)	$17 \bullet 10^{-6}$
Copper (Cu)	$17 \bullet 10^{-6}$
Titanium Zinc (Zn)	$22 \bullet 10^{-6}$

Maximum movement in standing seam strips with a starting point at the centre of movement (CM). Assumed strip lengths are based on industry practice.

	Summer - Max temperature **+75°C**					**Winter -** Min temperature **-35°C**				
Installation temperature	**Steel** 15m	**Al** 10m	**SS** 10m	**Cu** 10m	**Zn** 8m	**Steel** 15m	**Al** 10m	**SS** 10m	**Cu** 10m	**Zn** 8m
-10°C	+15mm	+20mm	+15mm	+15mm	+15mm	-5mm	-6mm	-5mm	-5mm	-5mm
0°C	+14mm	+17mm	+13mm	+13mm	+13mm	-6mm	-8mm	-6mm	-6mm	-6mm
+10°C	+12mm	+15mm	+11mm	+11mm	+12mm	-8mm	-10mm	-8mm	-8mm	-8mm
+20°C	+10mm	+13mm	+9mm	+9mm	+10mm	-10mm	-13mm	-9mm	-9mm	-10mm
+30°C	+8mm	+10mm	+8mm	+8mm	+8mm	-12mm	-15mm	-11mm	-11mm	-12mm

Example 1

Standing seam roofing with aluminium sheet metal on a wooden substrate. Pitch 1:10 (5.7 degrees) Fixed zone in this case right in the middle of the roof. (see figure)

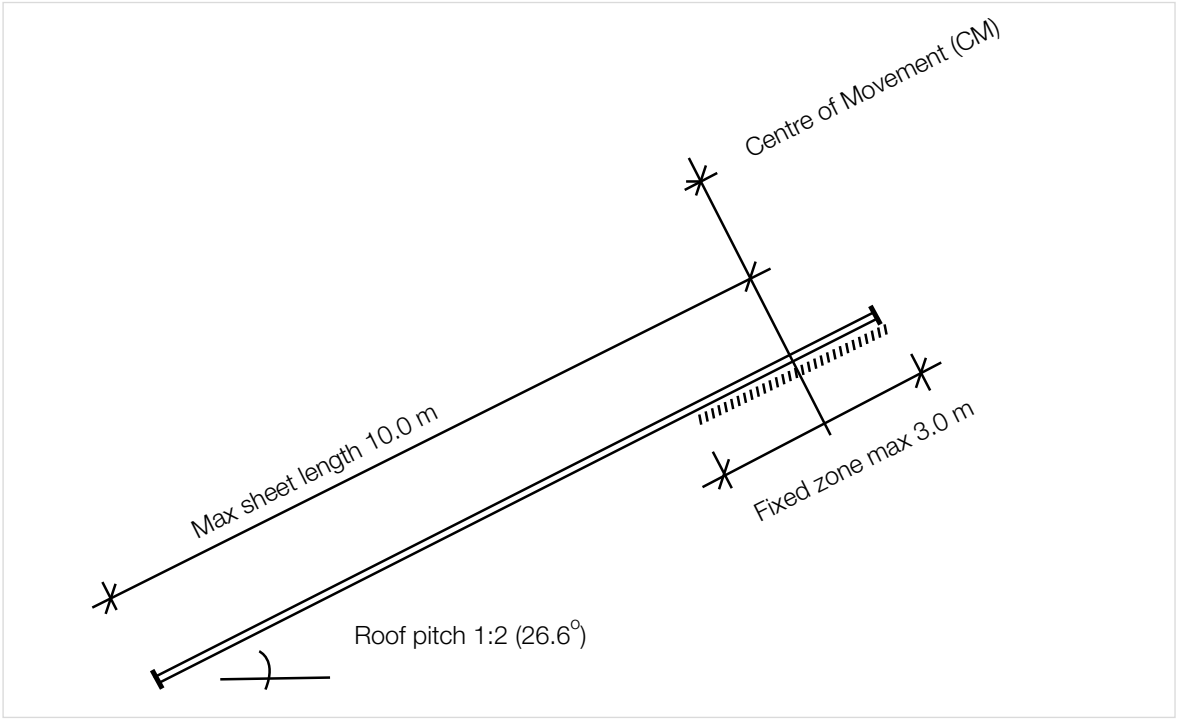


Maximum strip length with starting point at the centre of the fixed zone will be 15.0 metres. With an assumed installation temperature of +10 °C, the strip will be approximately 12mm longer during summer and will contract by around 8mm in winter in accordance with the conditions given above.

Thermal movements (contd.)

Example 2

Standing seam roofing with aluminium sheet metal on a wooden substrate. Pitch 1:2 (26 degrees) The fixed zone is located in this case at the ridge of the roof. (see figure)



Maximum strip length with starting point at the centre of the fixed zone will be 11.5 metres. With an assumed installation temperature of +30 °C, the strip will be approximately 10mm longer during summer and will contract by around 15mm in winter.

Fixed clips that do not allow movement along the seam can only be used in the fixed zone with a maximum length of 3.0 meters. The fixed zone can be placed anywhere on the roof. Suitable placement may be after any existing obstacles.

Sliding clips with a movement capacity that is adapted to sheet length changes should be used on other surfaces. Any detail solutions must be developed in a way that does not obstruct movements of the sheet.

The movement capacity of sliding clips is shown in the technical specifications.

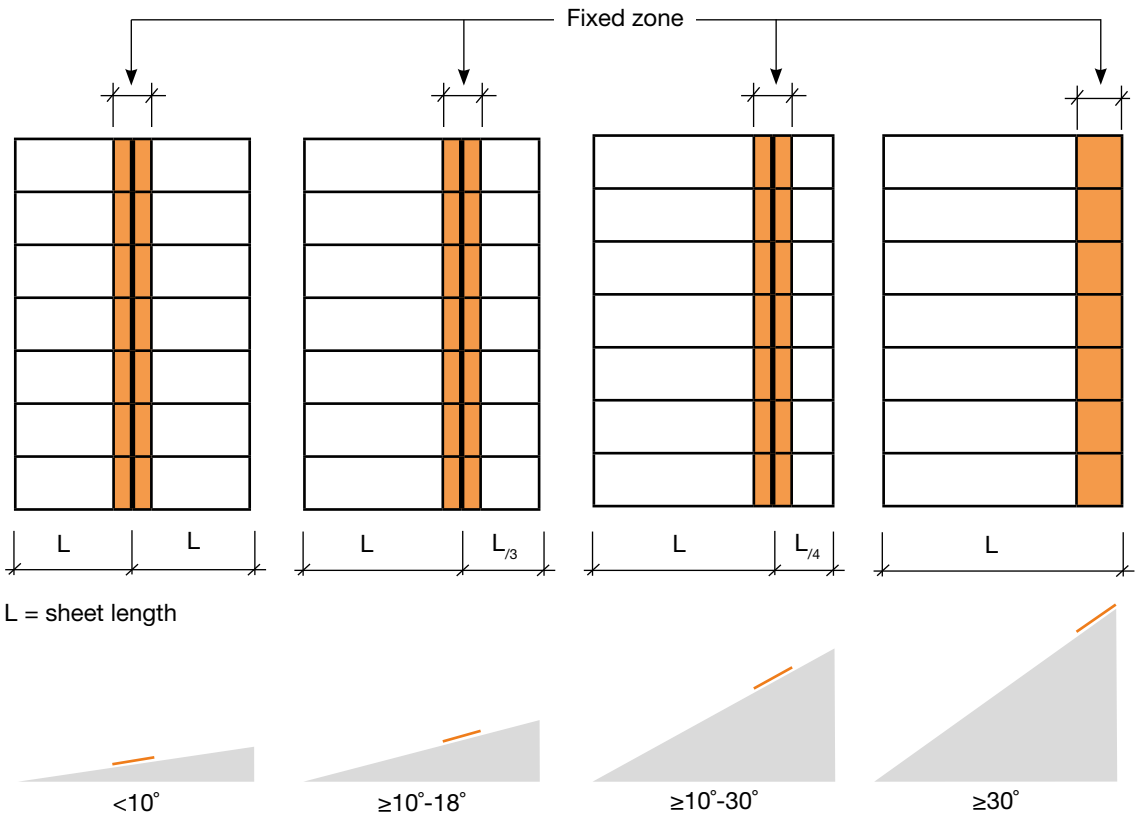
Fixed zone and moveable zone

In this regard, the term maximum sheet length is used to indicate the length of sheets that can be placed between expansion joints in the roof's direction of pitch. As the figure indicates, it is assumed that the sheet's movements begin at the centre of movement (MC) or the fixed zone. The centre of movement may be placed at the eave, in the middle of the roof, by the ridge or against a higher wall. As a general rule of thumb, on roofs with steep pitches the fixed zone should be placed at the ridge.

The fixed zone should be shown clearly in drawings and descriptions given that it is an important factor for the sizing and design of fastenings and for the determination of details. The sheet may be fixed in position by fixed clips, details, roof safety appliances with penetrating fastenings or similar. If the sheet is fixed at more than one point along the roof's length or if the recommended sheet length is exceeded, then an expansion joint must be placed between these points.

The recommended sheet lengths for each material in the table below are based upon the movement range of the sliding clip. Sliding clips with greater movement ranges could therefore enable larger sheet lengths. It should nonetheless be noted that large sheets are difficult to handle and that this alone limits sheet lengths.

Material	Recommended maximum sheet lengths from the centre of movement (CM).
Aluminium	10 m
Copper	10 m
Metallised steel sheets	15 m
Stainless steel	10 m
Titanium Zinc	In accordance with the manufacturer's guidelines



Placement of the fixed zone on different roof pitches. On steep roof pitches, the most appropriate position for the fixed zone is at the ridge. If the fixed zone is placed in the middle of the roof, then a sheet length can be taken upwards and another downwards from the fixed zone. Regarding steel sheets, a total unbroken sheet length of 30m applies. The fixed zone should have a length of 1/4 of the sheet length, but should never be greater than 3 m. Figure provided by AMA-Hus 14, JT- 1-4.

Wind load

The roof cladding and its fixing to the substrate is affected mostly by suction forces caused by the wind. The designed wind load is based on a number of different factors, such as:

- Geographical location
- Height, length and width of the building.
- Type of terrain
- Pitch of the roof

Wind suction can be considerably higher at the eaves, ridges and gables - the so-called roof perimeter zone - than at the inner areas.

Various standards indicate how wind load should be calculated.
In Sweden and in many other European countries, eurocdoe 1 is used. SS-EN 1991-1-4

An example of wind load distribution is given in figure 2.

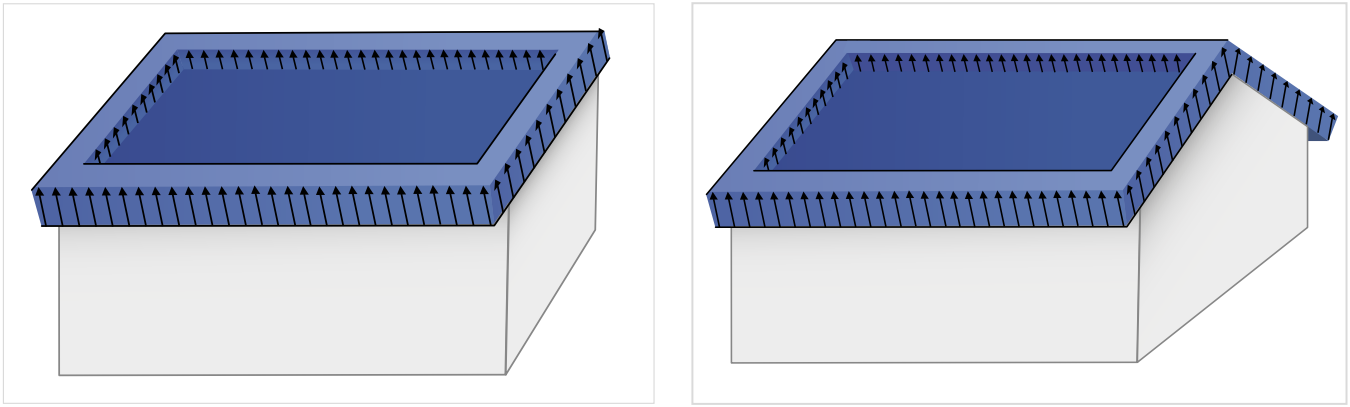
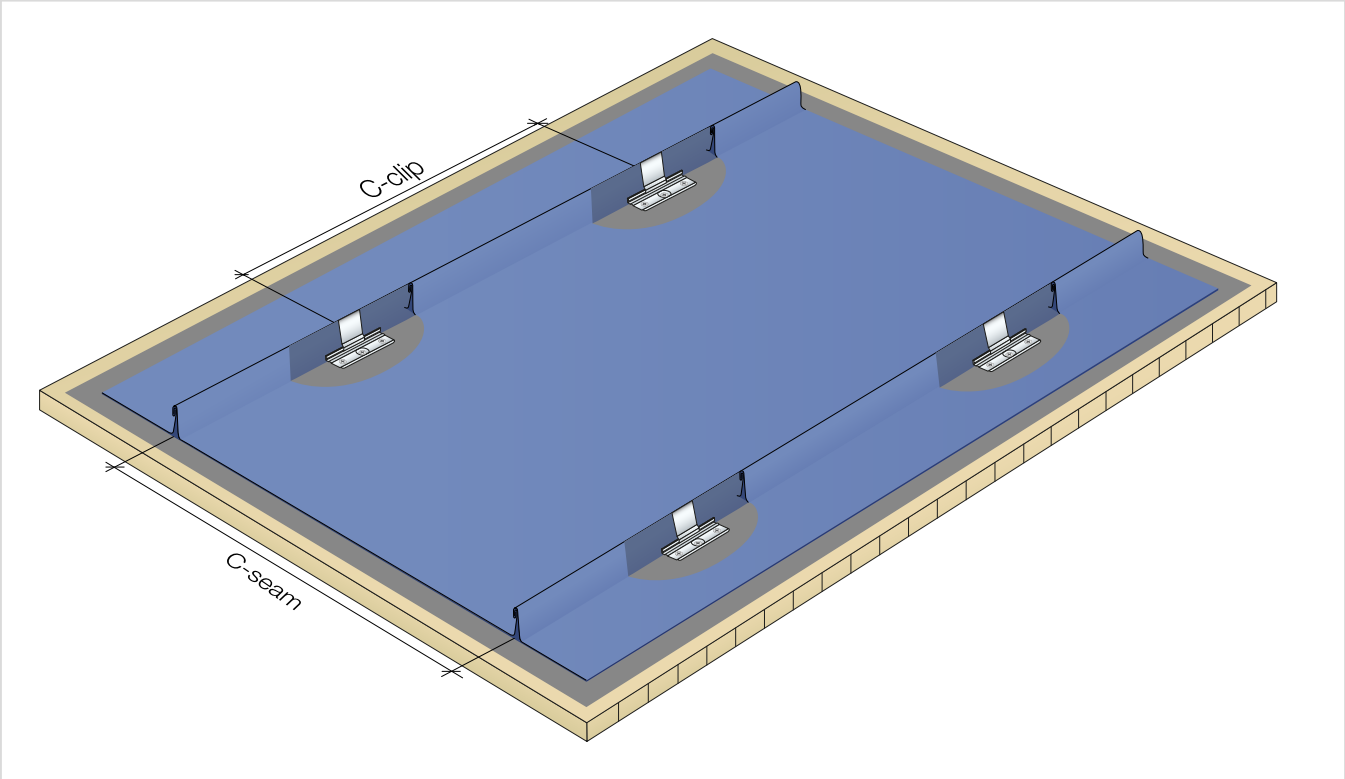


Figure 2. Schematic illustration of the wind load distribution on pitched and mono-pitched roofs. Considerably higher wind suction on the roof surfaces at the eaves, ridges and gables.

Wind load (contd.)



The withdrawal force is calculated based on the designed wind load in various zones (F_{kl}) on clip fastenings.

F_{kl}	$= q_d \bullet c_{kl} \bullet c_{seam}$
q_d	= wind load
c_{kl}	= distance between seams
c_{seam}	= distance between seams

Example:

F_{kl}	$= 1.5 \bullet 0.6 \bullet 0.45 = 0.40$ kN/clip
q_d	$= 1.5$ kN/m^2
c_{kl}	= 450 mm
c_{seam}	= 600 mm

Clip distance

Clips on fixed substrates are normally installed with a distance of 450-600m, and never greater than 600mm. Neither the fastening to the substrate nor the strength of the clip is crucial to the total strength of the sheet. In conditions exposed to winds, lower distances may be required. In order to obtain an optimal result, a fastening plan should always be drawn up for every individual project. The risk of fatigue in the sheet material can also lead to reduced strip widths, which again in turn influences the force placed on the clip fastening. The strip width should be calculated in accordance with the sheet manufacturer's guidelines.

The fixing of clips onto insulated roofs with profile sheet substrates normally takes place on the profile tops. This varies according to the sheet manufacturer. The distance used is normally around 200-300mm. In the event that the seam is parallel to the deck profiles, then fixing may occur at the bottom of the profile as well.

Strength of clips and fixings to the substrate according to technical information.

Loads in the roof pitch direction

Snow loads on a pitched roof together with the dead weight of the cladding and any roof safety equipment can lead to the exertion of force on the roof's pitch (Ph). In order to prevent the roof cladding from sliding, this force is absorbed by the clips. (NOTE! Fixed clips) Principles in accordance with figure 3.

Pitch α		cosαsinα
1:16	3.6°	0.0625
1:10	5.7°	0.0988
1:4	14°	0.2346
1:2	26°	0.3939
1:1	45°	0.4998

*Factor cos**α**sin**α**at different roof pitches.*

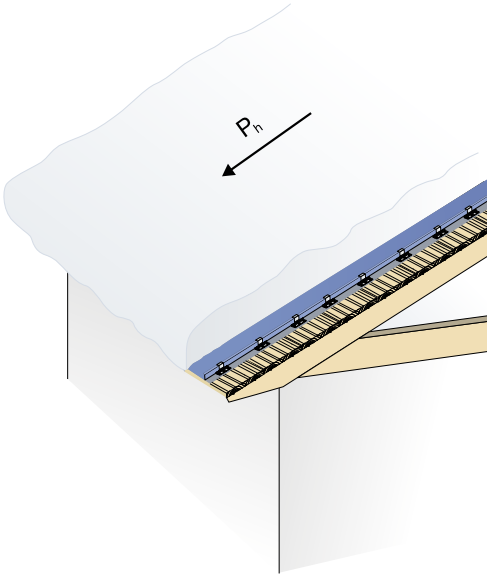


Figure 3. Schematic illustration of snow loads on a roof.

P_h	= parallel roof pitch loads $=C_{seam} \bullet L \bullet q_s \bullet \cos\alpha\sin\alpha$ (kN)
q_s	= snow load and roof dead weight
L	= pitch roof length
c_{seam}	= distance between seams

Example:

P_h	= 0.6•12.0•1.5•0.0988 = 1.06kN
q_s	= 1.5 kN/m²
L	=12.0 m
c_{seam}	= 600 mm (0.6 m)
α	= 1:10 (5.7°)

The resulting force is calculated for each seam and for the total length of the roof. This force is absorbed by fixed clips in the fixed zone and is transferred down to the substrate. Principles according to figure 4.

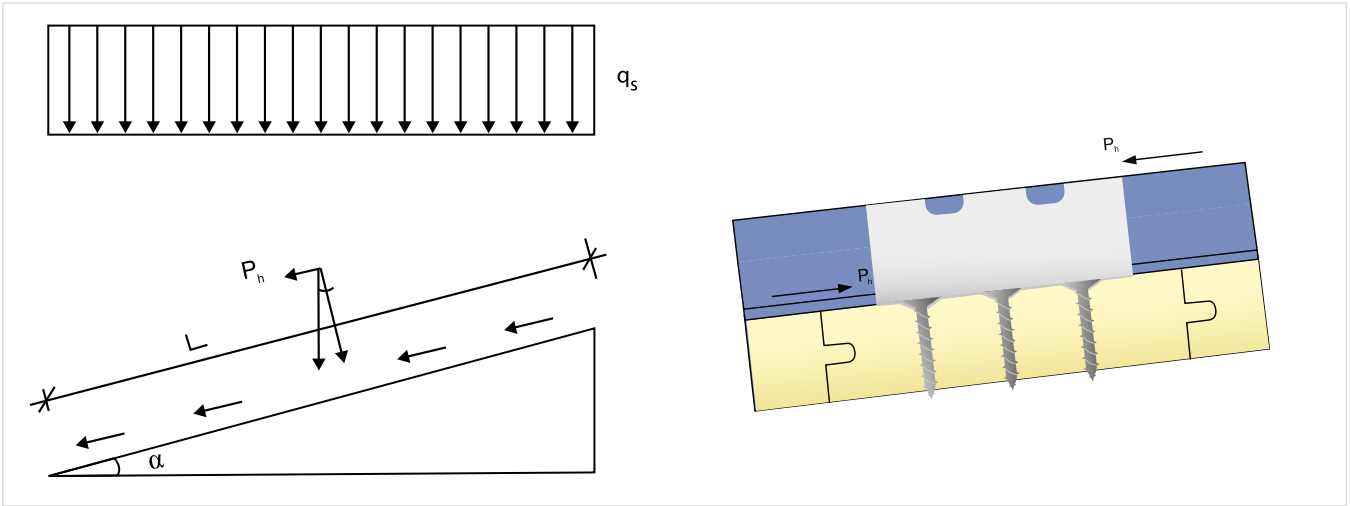


Figure 4. Force transfer via fixed clips to the fixed substrate. Strength values according to technical information.

Loads in the roof pitch direction (contd.)

Force transfer through fixed clips for insulated roof structures. Krabban™ System with telescope (see figure 5).

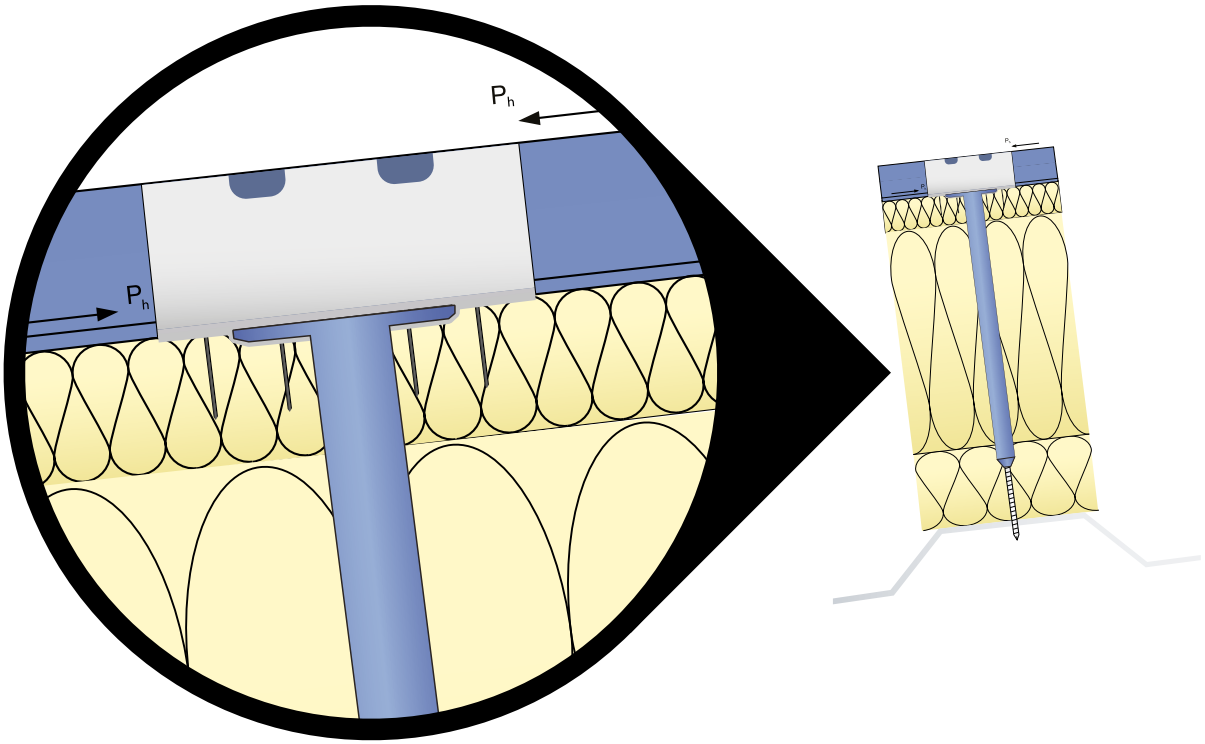


Figure 5. Krabban System with telescopic sleeves. Force transfer through fixed clips for insulated roof structures. Force is transferred through the spikes in the Krabban clip to the mineral wool board or the alternative cellular plastic insulation. The insulation must be stabilised in order to avoid sliding in the roof pitch. Strength values according to technical information.

Durability

Throughout their lifetimes, roofs are subjected to a number of different atmospheric conditions. In addition to wind, snow and thermal movements, corrosion resistence is also necessary.

Even in environments with only moderately aggressive environmental impacts, the fasteners of various constructions can be affected by moisture from within in the form of condensation and leakages. Internal air pressure in combination with high air humidity can also cause damages that are hard to detect.

Clips and their fasteners to various substrates should be selected in accordance with the corrosion classes given in the table.

Corrosion Class	Corrosion in Environment	Examples of typical environments	
		Outside	Inside
C1	Very little	-	Heated spaces with dry air and a negligible amount of impurities, e.g. offices, shops, schools, hotels.
C2	Little	Atmospheres with low levels of pollution. Mostly rural areas.	Non-heated spaces with varying temperatures and moisture levels. Low degree of condensation and small amount of air impurities, e.g. sports halls, depots, etc.
C3	Moderate	Atmospheres with a certain level of sulfur dioxide or moderate amounts of air impurities. Towns and lightly industrialised areas. Coastal areas with low salinity.	Spaces with moderate moisture levels and air impurities resulting from production processes, e.g. food-processing plants, breweries, laundries, etc.
C4	High	Atmospheres with high salinity or palpable amounts of air impurities. Industrial and coastal areas with high salinity.	Spaces with high moisture levels and high levels of air impurities resulting from production processes, e.g. chemical industries, swimming pools, coastal ships and boatyards.
C5	Very high (industrial)	Industrial areas with high moisture levels and aggressive atmospheric conditions.	Spaces where condensation is almost permanently present and with high levels of air impurities.
C5-M	Very high (marine)	Coast and off-shore areas with very high levels of salinity.	Spaces where condensation is almost permanently present and with high levels of air impurities.

Sheet metal in contact with other metals

Metal-metal	Stainless steel	Copper	Lead	Aluminium	Aluminium zinc	Galvanised steel	Zinc
Stainless steel		+	-	+[1)]	-	-	-
Copper	+		+	-	-	-	-
Lead	+	+		+	-	+	+
Aluminium	+[1)]	-	-		+	+	+
Aluminium zinc	-	-	-	+		+	+
Galvanised steel	-	-	-	+	+		+
Zinc	-	-	-	+	+	+	

Metal - other materials	Stainless steel	Copper	Lead	Aluminium	Aluminium zinc	Galvanised steel	Zinc
Bitumen	+	-	+	-	-	-	-
Iron Sulfate	-	-	+	-	-	-	-
Lime	+	+	+	-	-	+	+
Copper Vitriol	+	+	+	-	-	-	-
Pressure Treated (Tanalised) Wood	+	+	+	-	-	-	-

+ Indicates that no negative effects are known
- Indicates that the combination might be unsuitable in certain constructions and environments.
1 Stainless clips can be used unproblematically in roof and wall claddings with aluminium sheets so long as condensation is prevented. This is because ion migration hardly occurs in dry environments even if the materials are in direct contact with each other.

The table above concerns metals without protective paint layers. Aluminium sheets, aluminium zinc and galvanised sheets can be factory coated. This naturally protects the underlying metal so long as the coating is intact. Remember that scratches to the paint can leave the metal exposed.


BJARNES

Calculation examples

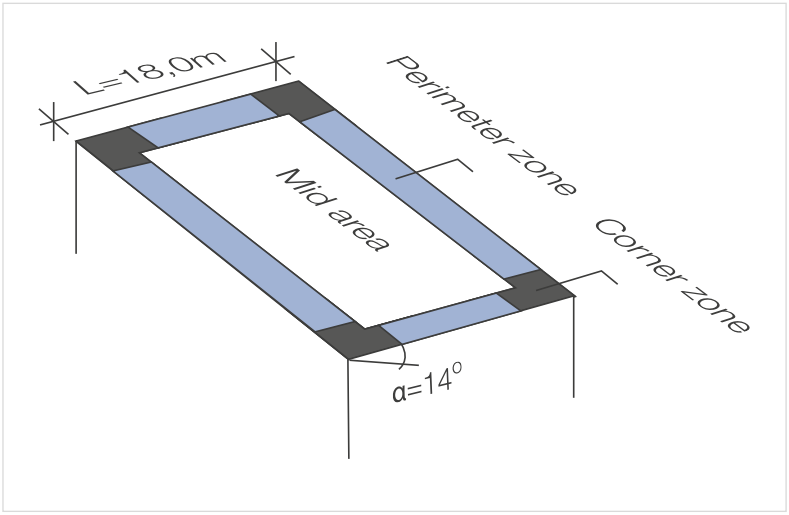
A. Roof type
Mono-pitched roof
Roof seam length = 18.0m
Roof pitch = 14° (1:4)

B. Wind load SS-EN 1991-1-4
Designed wind loads
Corner zone: 4.92 kN/m²
Perimeter zone: 4.23 kN/m²
Mid area: 2.03 kN/m²

C. Snow load SS-EN 1991-1-3
Designed snow load
1.2 kN/m2

D. Roof construction
Standing seam steel sheet C_{seam} = 600mm
Substrate 22mm soft wood.

E. Fastener



ROOF

Area:	Malmö
Terrain type:	1
Height:	12.0m

Clip type	Fastener	Area
Fixed clips F01S	Screw 4.5x26 KLRT	Fixed zone - centre of the pitch roof
Sliding clip G01S	Screw 4.5x26 KLRT	Movement zones

The design value of clips and screws

F01S	Fd=620N	γ_m=1.25 (SS-EN 1993-1-3)
G01S	Fd=1080N	γ_m=1.25 (SS-EN 1993-1-3)
KLRT	Fd=1050N	k_{mod} 1.10 γ_m=1.3 (SS-EN 1995-1-1)

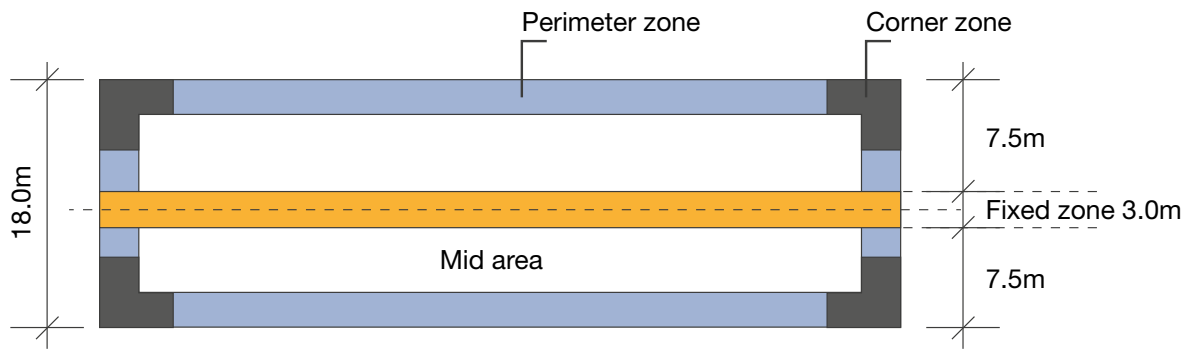
Design value fasteners - optimal c-measures

Roof zones

Clips	Corner zone:	Perimeter zone:	Mid area:
F01S	–	C240	C300
G01S	C350	C410	C600*

**Maximum distance between clips.*

Calculation examples



Zone type	Area	Clip type C-measurement
Fixed zone	Roof centre mid area	F01S C=300mm
Fixed zone	Roof centre perimeter zone	F01S C=240mm
Moveable zone	Corner zone:	G01S C=350mm
Moveable zone	Perimeter zone:	G01S C=410mm
Moveable zone	Mid area:	G01S C=600mm

Loads in the roof pitch

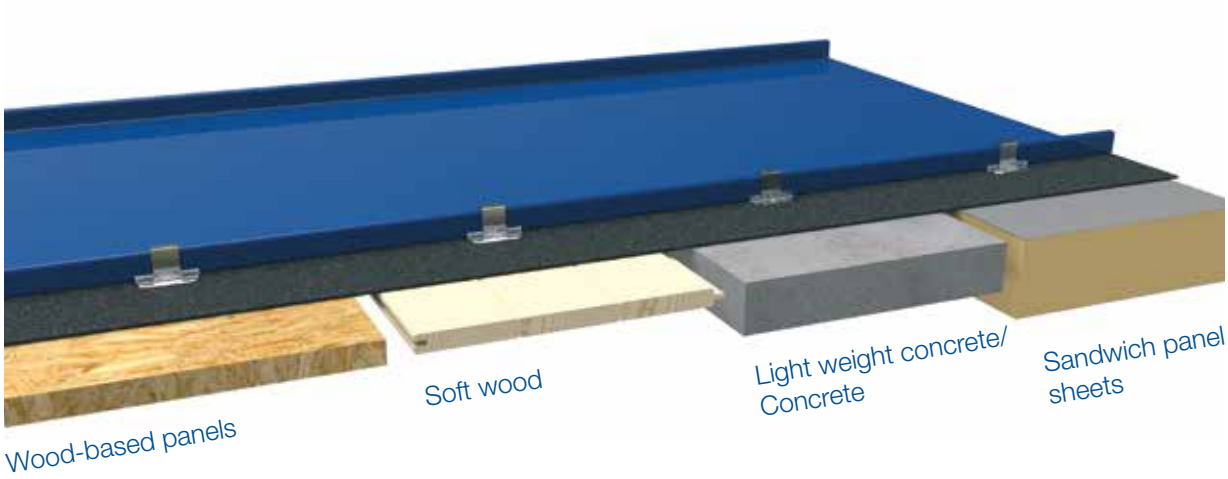
Snow loads can cause a force of 3 kN for each seam and the total length of the roof. Fixed clips should be mounted at a c-measure of 300mm in the fixed zone.
This means that there should be 11 fixed clips in the fixed zone. Each clip can take up to 0.27 kN which is transferred to the substrate.

Thermal movements.

An installation temperature of +10°C gives an average length change of about +7mm.
in the summer and -5mm in the winter. G01S takes movement of up to ± 10mm

NOTE! Calculation only considers clip fasteners.
Estimations of strip width should be carried out in accordance with the sheet manufacturer's guidelines.
If the strip width shrinks, the fastener should be adapted to the new width.

INSTALLATION TO SUBSTRATE



Each time you go to attach a clip, there is a series of questions that first need to be answered. What kind of substrate will the clip be attached to? in what environment is the building, geographical location and terrain type? And so on.

For roofing contractors, it is of the highest importance that the material supplier's recommendations and the AMA Hus 14 standard are followed. In addition, in the case of a mechanical fastening of waterproofing layers (e.g. clips, standing seams, substrates), the contractor must ensure that wind load calculations are made and that the fastening plan is developed in accordance with eurocode SS-EN 1991-1-4.

This is something that we at Bjarnes System will gladly help with, so that you as our customer can feel confident about your chosen solution, and so that you only need one single contact for all of your clip requirements.
Last but not least, the questions you ask should seek to ensure that the roof will be a safe place both now and also for a long time into the future, for you and for subsequent users. All design values in the Bjarnes System manual are unique and adapted to the specific Bjarnes Systems products. They cannot be re-applied to similar products manufactured by another brand.

Fastening to substrate

Fastening to wood - 25 mm seam	Technical info.					Item no.	Length (mm)	No./ bucket
	**Clip screw KLRT**							
	Dimension:	4.5 x L	Drive:		Torx	KLRT	26	1000
	Material:	Stainless steel	Quality:		1.4301	KLRT 35	35	1000
	Point:	Penetrating				KLRT 50	50	500
	Minimum anchoring depth:				25 mm			
	Characteristic tension force value soft wood (Lowest quality G4-2 or G2-2 SS-EN 16999-1)			17 mm:	865N	KLRT 70	70	500
				22 mm:	1240N	KLRT 90	90	500
	Characteristic tension force value plywood (Lowest quality construction plywood P30)			18 mm:	930N			
				21 mm:	1320N			
	**Clip screw KLRP25**							
	Dimension:	4.5 x 25	Drive:		PH2	KLRP25	25.	1000
	Material:	Stainless steel	Quality:		1.4301			
	Point:	Penetrating						
	Minimum anchoring depth:				25 mm			
	Characteristic tension force value soft wood (Lowest quality G4-2 or G2-2 SS-EN 16999-1)			17 mm:	1000N			
				22 mm:	1077N			

Screw for fastening to sheet metal	Technical info.				Item no.	Length (mm)	No./ bucket
	**Clip screw KLRTS**						
	Dimension:	4.5 x 22	Drive:	Torx	KLRTS	22	1000
	Material:	Stainless steel	Quality:	1.4301			
	Point:	Penetrating					
	Minimum anchoring depth:			20 mm			
	Characteristic tension force value						

Rivet for fastening to sheet metal	Technical info.				Item no.	Length (mm)	No./ bucket
	**Multigrip**						
	Dimension:	3.2 x 12	Grip area:	2.0-8.0 mm	BS11	12.	1000
	Material:	Stainless steel	Quality:	1.4301			
	Predrilled.:	3.3 mm					
	Characteristic tension force value steel sheet metal (Lowest quality/yield strength 350 MPa)		0.6 mm	390N			
			0.7 mm	600N			

Fastening to substrate

Screw for fastening to light-weight concrete	Technical info.				Item no.	Length (mm)	No./ bucket
	**Lightweight concrete screw LBS**						
	Dimension:	8.0 x L	Drive:	Torx	LBS85	85	500
	Material:	Surface treated carbon steel	Quality:	SS1370	LBS105	105	250
	Point:	Penetrating			LBS125	125	250
	Minimum anchoring depth:			75 mm:			
	Characteristic tension force value light weight concrete (Lowest quality/density 500 kg/m3)			1650N			
	**Light weight concrete screw LBSR**						
	Dimension:	8.0 x 80	Drive:	Torx	LBSR	80	250
	Material:	Stainless steel	Quality:	1.4301			
	Point:	Penetrating					
	Minimum anchoring depth:			75 mm:			
	Characteristic tension force value light weight concrete (Lowest quality/density 500 kg/m^3)			1650N			

Screw for fastening to concrete	Technical info.				Item no.	Length (mm)	No./ bucket
	**Concrete screw BSC**						
	Dimension:	6.1 x 28	Drive:	Torx	BSC28	28	1000
	Material:	Surface treated carbon steel	Quality:	SS1370			
	Predrilled concrete						
	Minimum anchoring depth:			20 mm			
	Characteristic tension force value concrete (Lowest quality C25/30)			1440N			

Fastening to wood

We recommend fixed shear clips for all applications. This product is incredibly strong compared with regular fixed clips and it works particularly well with point loads and snow loads. When used together in an installation with Clipdriver, shear clips in the fixed zone provide the most economic, ergonomic and time efficient result.

Fixed clips for 25 mm seams

Fixed clips	Technical info.		Item no.	No./bucket
	**Fixed clip with screw F01S**			
	Hot dip galvanised	275 g/m²	F01S	500
	Thickness 0.4mm	Quality EN 10142		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	912N		
	Characteristic value (centric load)	780N		
	**Fixed clip with screw F02S**			
	Stainless		F02S	500
	Thickness 0.4mm	Quality EN 1.4301		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	1470N		
	Characteristic value (centric load)	785N		
	**Fixed clip with two screws F022S**			
	Stainless		F022S	500
	Thickness 0.4mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	2260N		
	Characteristic value (centric load)	1700N		
	**Fixed shear clip F01425S (delivered with unassembled screw)**			
	Hot dip galvanised	275 g/m²	F01425S	100
	Thickness 0.6 mm	Quality EN 10142		
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		
	**Fixed shear clip F02425S (delivered with unassembled screw)**			
	Stainless			
	Thickness 0.6 mm	Quality EN 1.4301	F0245S	100
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		

Fastening to wood

Sliding clips for 25 mm seams

Sliding clips	Technical info.		Item no.	No./bucket
	**Sliding clip with screw G01S**			
	Hot dip galvanised	275 g/m²	G01S	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	1230N		
	Characteristic value (centric load)	1160N		
	**Sliding clip with screw G021S**			
	Stainless		G021S	500
	Thickness Over 0.4mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		
	**Sliding clip with two screws G02S**			
	Stainless		G02S	400
	Thickness Over 0.4 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	1060N		
	Characteristic value (centric load)	974N		

Fastening to wood

Banded sliding clips for 25 mm seams

Banded Sliding clips	Technical info.		Item no.	No./box
	**Banded sliding clips with screw G01C**			
	Hot dip galvanised	275 g/m^2	G01C	1050
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Includes screw:	KLRP25		
	Breaking load (centric load)	1230N		
	Characteristic value (centric load)	1160N		
	**Banded sliding clips with screw G021C**			
	Stainless		G021C	1050
	Thickness Over 0.4 mm	Quality EN 1.4310		
	Thickness Under 0.4 mm	Quality EN 1.4301		
	Includes screw:	KLRP25		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		

Clipdriver	Technical info.	Item no.	
	**Clipdriver CDDF**		
	Automatic tool for clip fastening of sheet steel roofing. High and even quality with identical clip installation every time. Automatic measuring system for clips and fasteners. 15 clips in each strip. The Clipdriver's height can be adjusted in order to make things easier on your back.	CDDF	1

Screwdriver	Technical info.	Item no.	
	**Cordless screwdriver ASCS 6.3**		
	Powerful lightweight magazine screwdriver with the perfect weight distribution for working without getting tired. Maintenance free, brushless EC motor with a very high efficiency rate. One of the lightest screwdrivers of its kind. Works together with Clipdriver CDDF. Without battery.	ASCSUB	1
	Battery kit, 2 pce batteries + charger.	ASCSBS	1

Fastening to wood

Fixed clips for 25 mm seams + 7 mm structural mat

Fixed clips	Technical info.		Item no.	No./bucket
	**Fixed clip with screw F0230S**			
	Stainless		F0230S	500
	Thickness 0.4mm	Quality EN 1.4301		
	Includes screw:	KLRT		
	Breaking load (centric load)	1470N		
	Characteristic value (centric load)	785N		
	**Fixed clip with two screws F02230S**			
	Stainless		F02230S	400
	Thickness 0.4mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	2260N		
	Characteristic value (centric load)	1700N		
	**Fixed clip F02430S (delivered with unassembled screws)**			
	Stainless		F02430S	
	Thickness 0,6 mm	Quality EN 1.4301		
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		

Sliding clips for 25 mm seams + 7 mm structural mat

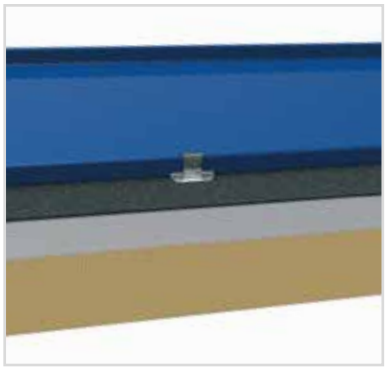
Sliding clips	Technical info.		Item no.	No./bucket
	**Sliding clip with screw G02130S**			
	Stainless		G02130S	500
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes screw:	KLRT		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		
	**Sliding clip with two screws G0230S**			
	Stainless		G0230S	400
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	1060N		
	Characteristic value (centric load)	974N		
	**Banded sliding clip with screw G02130C**			
	Stainless		G02130C	900
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes screw:	KLRT		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		

Fastening to wood

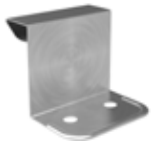
Sliding clips for welded seams

Sliding clips	Technical info.		Item no.	No./bucket
	**Sliding clip with screw G021VS**			
	Stainless		G021VS	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		
	**Sliding clip with screw G021WS**			
	Stainless		G021WS	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 1 screw:	KLRT		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	960N		
	**Sliding clip with two screws G02VS**			
	Stainless		G02VS	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	903N		
	Characteristic value (centric load)	765N		
	**Sliding clip with two screws G02WS**			
	Stainless		G02WS	400
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Includes 2 screws:	KLRT		
	Breaking load (centric load)	1060N		
	Characteristic value (centric load)	974N		

Fastening to concrete/light weight concrete/sandwich/sheet metal



Fixed clips for 25 mm seams

Fixed clips	Technical info.		Item no.	No./ bucket
	**Fixed clip F01**			
	Hot dip galvanised	275 g/m²	F01	1000
	Thickness 0.4mm	Quality EN 10142		
	Breaking load (centric load)	912N		
	Characteristic value (centric load)	780N		
	**Fixed clip F01F (with countersunk hole)**			
	Hot dip galvanised	275 g/m²	F01F	1000
	Thickness 0.4mm	Quality EN 10142		
	Breaking load (centric load)	1280N		
	Characteristic value (centric load)	1030N		
	**Fixed clip F02**			
	Stainless		FO2	500
	Thickness 0.4mm	Quality EN 1.4301		
	Breaking load (centric load)	1470N		
	Characteristic value (centric load)	785N		
	**Fixed clip F02**			
	Stainless		F0WW	500
	Thickness 0.4mm	Quality EN 1.4301		
	Breaking load (centric load)	2260N		
	Characteristic value (centric load)	1700N		

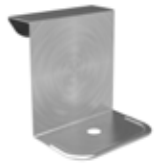
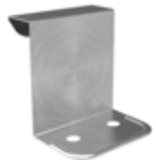
Fastening to concrete/light weight concrete/sandwich/sheet metal

Sliding clips for 25 mm seams

Sliding clips	Technical info.		Item no.	No./ bucket
	**Sliding clip G01**			
	Hot dip galvanised	275 g/m²	G01	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1230N		
	Characteristic value (centric load)	1160N		
	**Sliding clip G01F (with one counter sunk hole)**			
	Hot dip galvanised	275 g/m²	G01F	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1230N		
	Characteristic value (centric load)	1160N		
	**Sliding clip G021**			
	Stainless		G021	500
	Thickness Over 0.4 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		
	**Sliding clip G02**			
	Stainless		G02	500
	Thickness Over 0.4 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	916N		

Fastening to concrete/light weight concrete/sandwich/ sheet metal

Fixed clips for 25 mm seams + 7 mm structural mat

Fixed clips	Technical info.		Item no.	No./bucket
	**Fixed clip F0230**			
	Stainless		F0230	500
	Thickness 0.4mm	Quality EN 1.4301		
	Breaking load (centric load)	1470N		
	Characteristic value (centric load)	785N		
	**Fixed clip F02230**			
	Stainless		F02230	500
	Thickness 0.4mm	Quality EN 1.4301		
	Breaking load (centric load)	2260N		
	Characteristic value (centric load)	1700N		
	**Fixed clip F02430S (delivered with unassembled screws)**			
	Stainless		F02430S	
	Thickness 0,6 mm	Quality EN 1.4301		
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		

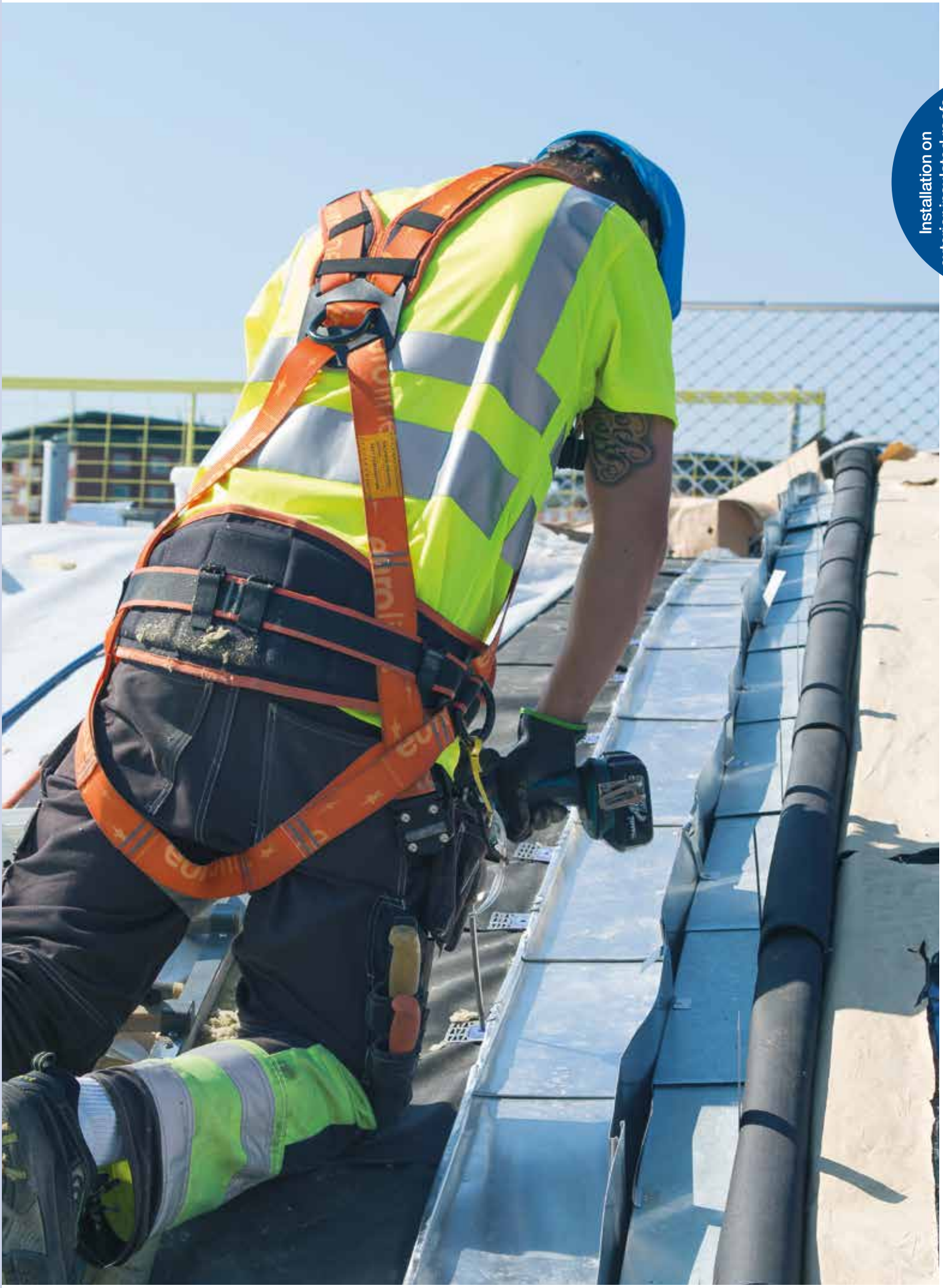
Sliding clips for 25 mm seams + 7 mm structural mat

Sliding clips	Technical info.		Item no.	No./bucket
	**Sliding clip G02130**			
	Stainless		G02130	500
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	937N		
	Characteristic value (centric load)	740N		

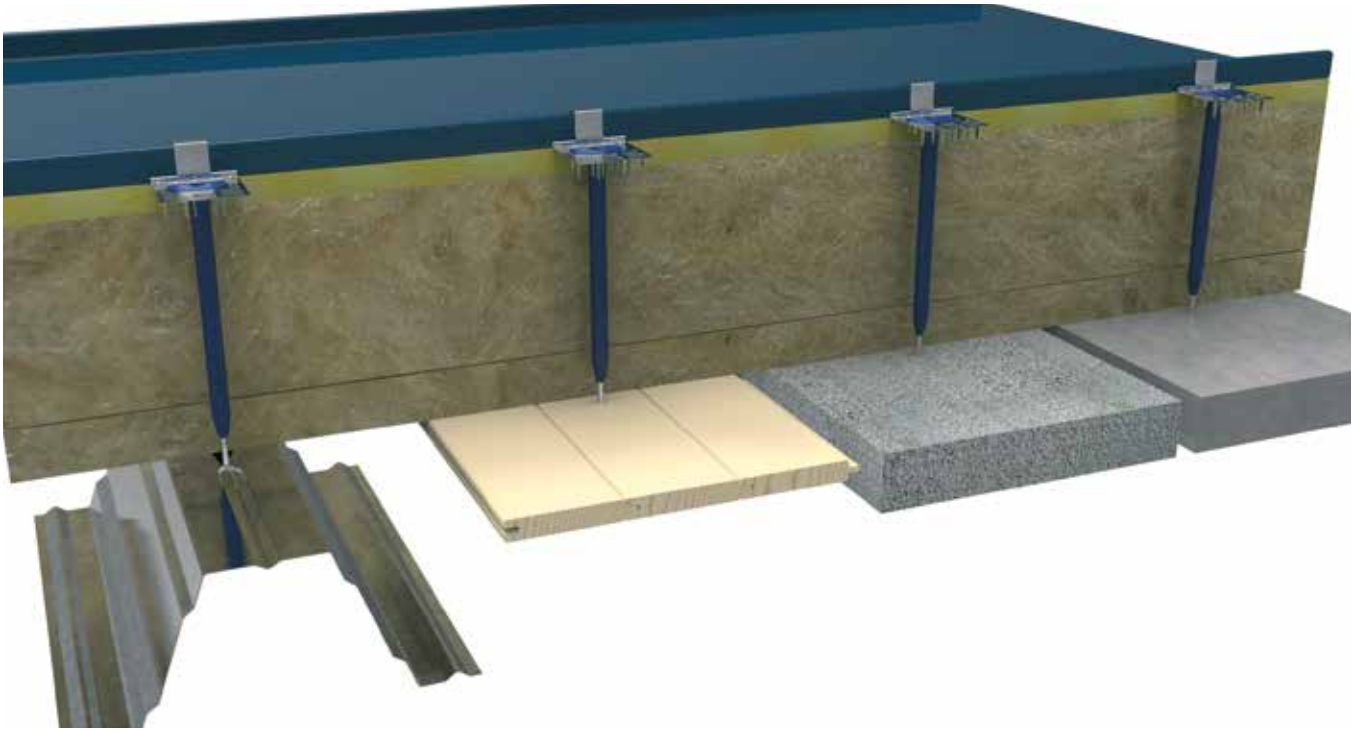
Fastening to concrete/light weight concrete/sandwich/ sheet metal

Sliding clips for welded seams

Sliding clips	Technical info.		Item no.	No./bucket
	**Sliding clip G021V**			
	Stainless		G021V	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	942N		
	Characteristic value (centric load)	880N		
	**Sliding clip G02W**			
	Stainless		G02W	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	960N		
	**Sliding clip G02V**			
	Stainless		G02V	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	942N		
	Characteristic value (centric load)	880N		



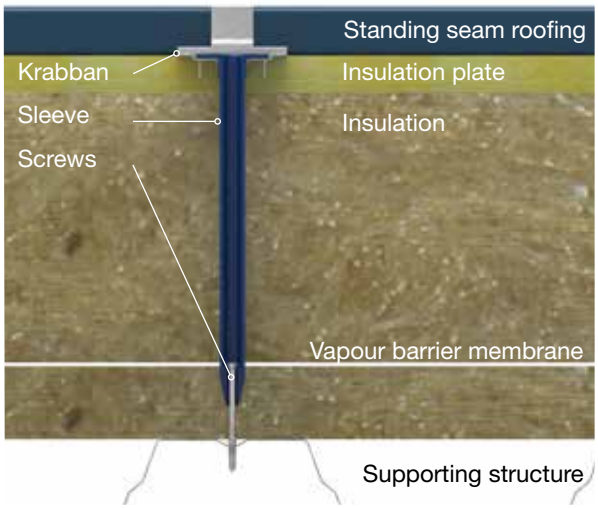
INSTALLATION ON INSULATED ROOFS



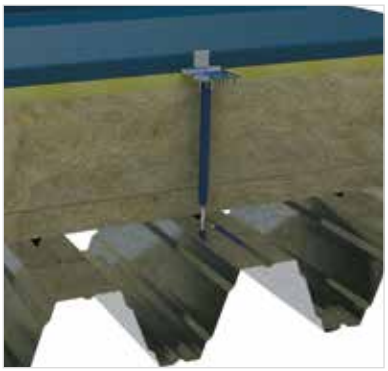
Krabban with telescopic sleeves is an appropriate fastening for:

- standing seam roofing systems made of aluminium, copper, steel sheet metal and zinc
- stainless seamed or welded

The shape of the telescopic sleeve provides the required compression of the insulation without risk of damage to the sheet metal. The telescopic effect should be at least 10% of the insulation thickness, but always at least 20 mm. The Krabban system is installed independently of the positioning of the insulation joints in relation to the seam, which eliminates the risk of gaps in the insulation.

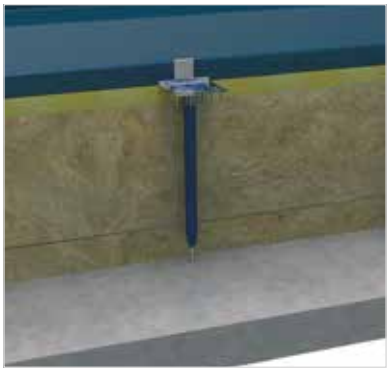


Fastening on insulated roofs



Screw for fastening to sheet metal and wood	Technical info.				Item no.	Length (mm)	No./ bucket
	**Roof screw LS**						
	Dimension:	4.8 x L	Drive:	Torx	LS50	50	500
	Material:	Surface treated carbon steel	Quality:	SS 1370	LS60	60	500
	Point:	Drill point	Drill capacity:	2 x 1.25 mm	LS70	70	500
	Minimum anchoring depth:			20 mm	LS80	80	500
	Characteristic tension force value steel sheet metal. (Lowest quality/yield strength 350 MPa)		0.7 mm	1050N	LS90	90	500
			0.8 mm	1220N	LS100	100	500
					LS110	110	500
					LS120	120	500
					LS130	130	500
					LS140	140	500
					LS150	150	500
					LS170	170	500
					LS190	190	500
	**Roof screw RS**						
	Dimension:	4.8 x L	Drive:	Torx	RS50	50	500
	Material:	Stainless steel	Quality:	1.4301	RS60	60	500
	Point:	Drill point	Drill capacity:	2 x 1.25 mm	RS80	80	500
	Minimum anchoring depth:			20 mm	RS100	100	500
	Characteristic tension force value steel sheet metal. (Lowest quality/yield strength 350 MPa)		0.7 mm	1050N			
			0.8 mm	1220N			

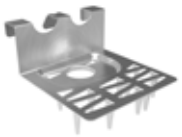
Fastening on insulated roofs



Screw for fastening to concrete	Technical info.				Item no.	Length (mm)	No./ bucket
	**Concrete screw BSC**						
	Dimension:	6.1 x 28	Drive:	Torx	BSC28	28	1000
	Material:	Surface treated carbon steel	Quality:	SS1370	BSC40	40	500
	Predrilled concrete				BSC50	50	500
	Minimum anchoring depth:			20 mm	BSC60	60	1000
	Characteristic tension force value concrete (Lowest quality C25/30)			1440N	BSC70	70	500
					BSC80	80	500
					BSC90	90	500
					BSC100	100	500
					BSC120	120	500
					BSC140	140	500
					BSC160	160	500
					BSC180	180	500
					BSC200	200	500
					BSC220	220	500

Screw for fastening to lightweight concrete	Technical info.				Item no.	Length (mm)	No./ bucket
	**Lightweight concrete screw LBS**						
	Dimension:	8.0 x L	Drive:	Torx	LBS85	85	500
	Material:	Surface treated carbon steel	Quality:	SS1370	LBS105	105	250
	Point:	Penetrating			LBS125	125	250
	Minimum anchoring depth:			60 mm:			
	Characteristic tension force value lightweight concrete (Lowest quality/density 500 kg/m3)			1650N			

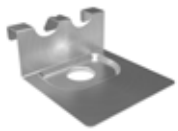
Krabban fixed clips for 25 mm seam on insulation board

Fixed clips	Technical info.		Item no.	No./box
	**Krabban fixed clip KGF**			
	Hot dip galvanised	275 g/m²	KGF	250
	Thickness 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	1030N		
	Characteristic value(shear load - roof pitch)	Cellular plastic: 200N		
	Characteristic value(shear load - roof pitch)	Mineral wool: 400N		
	**Krabban fixed clip KRF**			
	Stainless		KRF	250
	Thickness 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		
	Characteristic value(shear load - roof pitch)	Cellular plastic: 200N		
	Characteristic value(shear load - roof pitch)	Mineral wool: 400N		

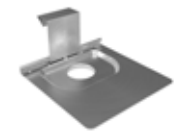
Krabban sliding clips for 25 mm seam on insulation board

Sliding clips	Technical info.		Item no.	No./box
	**Krabban sliding clip KG**			
	Hot dip galvanised	275 g/m²	KG	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	1030N		
	**Krabban sliding clip KR**			
	Stainless		KR	500
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

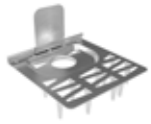
Krabban fixed clips for 25 mm seam on roofing felt

Fixed clips	Technical info.		Item no.	No./box
	**Krabban fixed clip KGFP**			
	Hot dip galvanised	275 g/m^2	KGFP	500
	Thickness 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	1030N		
	**Krabban fixed clip KRFP**			
	Stainless		KRFP	500
	Thickness 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Krabban sliding clips for 25 mm seam on roofing felt

Sliding clips	Technical info.		Item no.	No./box
	**Krabban sliding clip KGP**			
	Hot dip galvanised	275 g/m^2	KGP	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	1030N		
	**Krabban sliding clip KRP**			
	Stainless		KRP	500
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Krabban for welded seam on 20/30 mm board

Sliding clip	Technical info.		Item no.	No./box
	**Krabban sliding clip KRS**			
	Stainless		KRS	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Krabban for welded seams on roofing felt

Sliding clip	Technical info.		Item no.	No./box
	**Krabban sliding clip KRPW**			
	Stainless		KRPW	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Fastening to wood

Fixed clips for 25 mm seams + 20 mm board

Fixed clips	Technical info.		Item no.	No./box
	**Fixed shear clip F01445S (delivered with unassembled screws)**			
	Hot dip galvanised	275g/m ^{2}	F01445S	100
	Thickness 0.6 mm	Quality EN 10142	**Use for board 20 mm**	
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		
	**Fixed shear clip F02445S (delivered with unassembled screws)**			
	Stainless		F02445S	100
	Thickness 0.6 mm	Quality EN 1.4301	**Use for board 20 mm**	
	Includes 4 screws:	KLRP25		
	Breaking load (centric load)	5045N		
	Characteristic value (centric load)	4860N		

Fastening to wood

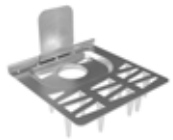
Krabban for 25 mm seams + 20/30 mm board

Sliding clips	Technical info.		Item no.	No./box
	**Krabban sliding clip KG**			
	Hot dip galvanised	275 g/m^2	KG	500
	Thickness Over 0.4 mm	Quality EN 10142		
	Thickness Under 0.6 mm	Quality EN 10142		
	Breaking load (centric load)	1080N		
	Characteristic value (centric load)	1030N		
	**Krabban sliding clip KR**			
	Stainless		KR	500
	Thickness Over 0.4 mm	Quality EN 1.4301		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Washer for Krabban	Technical info.		Item no.	No./ bucket
	**Washer H06**			
	Stainless		H06	500
	Thickness 0.6 mm	Quality EN 1.4301		
	**Washer H09**			
	Stainless		H09	500
	Thickness 0.6 mm	Quality EN 1.4301		

Fastening to wood

Krabban for welded seam on 20/30 mm board

Sliding clip	Technical info.		Item no.	No./box
	**Krabban sliding clip KRS**			
	Stainless		KRS	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Krabban for welded seams on 20/30 mm board

Sliding clip	Technical info.		Item no.	No./box
	**Krabban sliding clip KRPW**			
	Stainless		KRPW	500
	Thickness Over 0.15 mm	Quality EN 1.4310		
	Thickness Under 0.6 mm	Quality EN 1.4301		
	Breaking load (centric load)	1273N		
	Characteristic value (centric load)	1260N		

Washer for Krabban	Technical info.		Item no.	No./ bucket
	**Washer H06**			
	Stainless		H06	500
	Thickness 0.6 mm	Quality EN 1.4301		
	**Washer H09**			
	Stainless		H09	500
	Thickness 0.6 mm	Quality EN 1.4301		

Accessories

Sleeves and washers for Krabban

Washer for Krabban	Technical info.		Item no.	No./bucket
	**Washer H06**			
	Stainless		H06	500
	Thickness 0.6 mm	Quality EN 1.4301		
	**Washer H09**			
	Stainless		H09	500
	Thickness 0.6 mm	Quality EN 1.4301		

Sleeve for Krabban	Technical info.		Item no.	No./box
	**Sleeve H30-H565**			
	Polypropylene	30 mm	H30	500
		50 mm	H50	500
		70 mm	H70	500
		90 mm	H90	500
		110 mm	H110	500
		130 mm	H130	500
		160 mm	H160	500
		190 mm	H190	500
		220 mm	H220	500
		250 mm	H250	250
		280 mm	H280	250
		310 mm	H310	250
		485 mm	H485	100
		565 mm	H565	100

Accessories

Bits

Torx Bits	Technical info.	Item no.		No./package
Torx Bits 20W	70 mm			
		BIT20W		1
Torx Bits 20 double	200 mm			
		BIT20D		1
Torx Bits 25 for extender	fits BFL750			
		BT25		5
Bits extender for BT25	750 mm			
		BFL750		1
Telescopic bits Torx 25				
				
	150 mm	TEBT1		1
	400 mm	TEBT4		1
Torx Bits 30	70 mm			
		BT30		1

Bits Philips	Technical info.		Item no.	Adapts to machine	No./frp
Bits PH2 double	200 mm				
			BPH2D		1
Bits PH2 for CDDF		**Description**			
					
	Total length = 208 mm		BDFK25	Festool	1
	Total length = 225 mm	Green	BDFK	Fein	1
	Total length = 443 mm		BDFL25	Festool	1
	Total length = 460 mm	Green	BDFL	Fein	1

Accessories

Other

Extender	Technical info.		Item no.		No./package
Bits extender BFL	700 mm				
			BFL750		1
Drive extender BF					
					
	SDS bracket and cone	500 mm	BF500		1
		750 mm	BF750		1

Drive	Technical info.	Item no.		No./package
Hammer drill bit	5 x 32 mm, (around 100 holes)			
		HB5K		1
Hammer drill	5 x 100, (around 100 holes)			
		HB5100		1
Hammer drill	5 x 160, (around 100 holes)			
		HB5160		1
Drill for sheet metal thicker than 2.5 mm	400 mm x 4,5 mm steel drill			
		BFS		1

GUTTER BRACKETS

Reinforced support hooks with pre-assembled screws and EPDM

	Colour	Length	Item no.	Name	No./box
	Black RAL 9011	100	F100S	Forged support hook	60
		125	F125S	Forged support hook	60
		150	F150S	Forged support hook	60
	Dark grey RAL 7011	100	F100MG	Forged support hook	60
		125	F125MG	Forged support hook	60
		150	F150MG	Forged support hook	60
	Brown RAL 8017	100	F100B	Forged support hook	60
		125	F125B	Forged support hook	60
		150	F150B	Forged support hook	60
	Tile red RAL 8004	100	F100TR	Forged support hook	60
		125	F125TR	Forged support hook	60
		150	F150TR	Forged support hook	60
	Dark red RAL 3009	100	F100MR	Forged support hook	60
		125	F125MR	Forged support hook	60
		150	F150MR	Forged support hook	60
	Silver metallic RAL 9006	100	F100SM	Forged support hook	60
		125	F125SM	Forged support hook	60
		150	F150SM	Forged support hook	60
	Stainless	100	F100R	Forged support hook	60
		125	F125R	Forged support hook	60
		150	F150R	Forged support hook	60

Forged support hook

	Colour	Length	Item no.	Name	No./box
	VFZ	Forged support hook with pre-assembled EPDM. Delivered with screws and bits.			
		131	FRK5	Forged support hook	50
		156	FRK6	Forged support hook	50
		181	FRK7	Forged support hook	50

CHANER

	Colour	Item no.	Name	No./box
	VFZ	**Chaner, mounted in pairs, 4 units per hatch.**		
		Chan	Chaner	100

Combination table telescope steel and wood

Min 20 mm telescope effect 20 mm fixing depth

Insulation thickness mm	Bits	Extender	Drill Bits*	Sleeve	Screw	Total length (mm)
20	TEBT4		BFS + 4,5 mm steel drill	H06	LS50	50
30	TEBT4		BFS + 4,5 mm steel drill	H06	LS50	50
40	TEBT4		BFS + 4,5 mm steel drill	H06	LS60	60
50	TEBT4		BFS + 4,5 mm steel drill	H30	LS60	70
60	TEBT4		BFS + 4,5 mm steel drill	H30	LS70	80
70	TEBT4		BFS + 4,5 mm steel drill	H50	LS60	90
80	TEBT4		BFS + 4,5 mm steel drill	H50	LS70	100
90	TEBT4		BFS + 4,5 mm steel drill	H70	LS60	110
100	TEBT4		BFS + 4,5 mm steel drill	H70	LS70	120
110	TEBT4		BFS + 4,5 mm steel drill	H90	LS60	130
120	TEBT4		BFS + 4,5 mm steel drill	H90	LS70	140
130	TEBT4		BFS + 4,5 mm steel drill	H110	LS60	150
140	TEBT4		BFS + 4,5 mm steel drill	H110	LS70	160
150	TEBT4		BFS + 4,5 mm steel drill	H130	LS60	170
160	TEBT4		BFS + 4,5 mm steel drill	H130	LS70	180
170	TEBT4		BFS + 4,5 mm steel drill	H130	LS80	190
180	TEBT4		BFS + 4,5 mm steel drill	H160	LS60	200
190	TEBT4		BFS + 4,5 mm steel drill	H160	LS70	210
200	TEBT4		BFS + 4,5 mm steel drill	H160	LS80	220
210	TEBT4		BFS + 4,5 mm steel drill	H190	LS60	230
220	TEBT4		BFS + 4,5 mm steel drill	H190	LS70	240
230	TEBT4		BFS + 4,5 mm steel drill	H190	LS80	250
240	TEBT4		BFS + 4,5 mm steel drill	H220	LS60	260
250	TEBT4		BFS + 4,5 mm steel drill	H220	LS70	270
260	TEBT4		BFS + 4,5 mm steel drill	H220	LS80	280
270	TEBT4		BFS + 4,5 mm steel drill	H250	LS60	290
280	TEBT4		BFS + 4,5 mm steel drill	H250	LS70	300
290	TEBT4		BFS + 4,5 mm steel drill	H250	LS80	310
300	TEBT4		BFS + 4,5 mm steel drill	H280	LS60	320
310	TEBT4		BFS + 4,5 mm steel drill	H280	LS70	330
320	TEBT4		BFS + 4,5 mm steel drill	H280	LS80	340
330	TEBT4		BFS + 4,5 mm steel drill	H280	LS90	350
340	TEBT4		BFS + 4,5 mm steel drill	H310	LS70	360
350	TEBT4		BFS + 4,5 mm steel drill	H310	LS80	370
360	TEBT4		BFS + 4,5 mm steel drill	H310	LS90	380
370	TEBT4		BFS + 4,5 mm steel drill	H310	LS100	390
380	TEBT4		BFS + 4,5 mm steel drill	H310	LS110	400
390	TEBT4		BFS + 4,5 mm steel drill	H310	LS120	410
400	TEBT4		BFS + 4,5 mm steel drill	H310	LS130	420
410	BT25	BFL750		H310	LS140	430
420	BT25	BFL750		H310	LS150	440
430	BT25	BFL750		H310	LS170	460
440	BT25	BFL750		H310	LS170	460
450	BT25	BFL750		H310	LS190	480
460	BT25	BFL750		H310	LS190	485
470	BT25	BFL750		H310	LS190	485

** To be used when the decking profile is thicker than 2,5mm*

Combination table telescope steel and wood

Min 20 mm telescope effect 20 mm fixing depth

Insulation thickness mm	Bits	Extender	Drill Bits*	Sleeve	Screw	Total length (mm)
480	BT25	BFL750		H310	LS220	515
490	BT25	BFL750		H310	LS220	515
500	BT25	BFL750		H485	LS50	520
510	BT25	BFL750		H485	LS60	530
520	BT25	BFL750		H485	LS70	540
530	BT25	BFL750		H485	LS90	560
540	BT25	BFL750		H485	LS90	560
550	BT25	BFL750		H485	LS100	580
560	BT25	BFL750		H485	LS110	580
570	BT25	BFL750		H485	LS120	590
580	BT25	BFL750		H485	LS130	610
590	BT25	BFL750		H485	LS140	610
600	BT25	BFL750		H485	LS150	620
610	BT25	BFL750		H485	LS170	640
620	BT25	BFL750		H565	LS90	640
630	BT25	BFL750		H565	LS100	650
640	BT25	BFL750		H565	LS110	660
650	BT25	BFL750		H565	LS120	670
660	BT25	BFL750		H565	LS130	680
670	BT25	BFL750		H565	LS140	690
680	BT25	BFL750		H565	LS150	700
690	BT25	BFL750		H565	LS170	720

** To be used when the decking profile is thicker than 2,5mm*

Combination table telescope concrete

Min 20 mm telescope effect 20 mm fixing depth

Insulation thickness mm	Bits	Extender	Drill Bits	Drill extender	Sleeve	Screw	Total length (mm)
20	TEBT4		HB5100		H06	BSC40	40
30	TEBT4		HB5100		H06	BSC60	60
40	TEBT4		HB5100		H06	BSC60	60
50	TEBT4		HB5100		H30	BSC60	70
60	TEBT4		HB5100		H30	BSC70	80
70	TEBT4		HB5100		H50	BSC60	90
80	TEBT4		HB5160		H50	BSC70	100
90	TEBT4		HB5160		H70	BSC60	110
100	TEBT4		HB5K	BF500	H70	BSC70	120
110	TEBT4		HB5K	BF500	H90	BSC60	130
120	TEBT4		HB5K	BF500	H90	BSC70	140
130	TEBT4		HB5K	BF500	H110	BSC60	150
140	TEBT4		HB5K	BF500	H110	BSC70	160
150	TEBT4		HB5K	BF500	H130	BSC60	170
160	TEBT4		HB5K	BF500	H130	BSC70	180
170	TEBT4		HB5K	BF500	H130	BSC80	190
180	TEBT4		HB5K	BF500	H160	BSC60	200
190	TEBT4		HB5K	BF500	H160	BSC70	210
200	TEBT4		HB5K	BF500	H160	BSC80	220
210	TEBT4		HB5K	BF500	H190	BSC60	230
220	TEBT4		HB5K	BF500	H190	BSC70	240
230	TEBT4		HB5K	BF500	H190	BSC80	250
240	TEBT4		HB5K	BF500	H220	BSC60	260
250	TEBT4		HB5K	BF500	H220	BSC70	270
260	TEBT4		HB5K	BF500	H220	BSC80	280
270	TEBT4		HB5K	BF500	H250	BSC60	290
280	TEBT4		HB5K	BF500	H250	BSC70	300
290	TEBT4		HB5K	BF500	H250	BSC80	310
300	TEBT4		HB5K	BF500	H280	BSC60	320
310	TEBT4		HB5K	BF500	H280	BSC70	330
320	TEBT4		HB5K	BF500	H280	BSC80	340
330	TEBT4		HB5K	BF500	H280	BSC90	350
340	TEBT4		HB5K	BF500	H310	BSC70	360
350	TEBT4		HB5K	BF500	H310	BSC80	380
360	TEBT4		HB5K	BF500	H310	BSC90	380
370	TEBT4		HB5K	BF500	H310	BSC100	400
380	TEBT4		HB5K	BF500	H310	BSC120	400
390	TEBT4		HB5K	BF500	H310	BSC120	410
400	TEBT4		HB5K	BF500	H310	BSC140	430
410	BT25	BFL750	HB5K	BF500	H310	BSC140	430
420	BT25	BFL750	HB5K	BF500	H310	BSC160	450
430	BT25	BFL750	HB5K	BF500	H310	BSC160	450
440	BT25	BFL750	HB5K	BF500	H310	BSC180	470
450	BT25	BFL750	HB5K	BF500	H310	BSC180	470
460	BT25	BFL750	HB5K	BF500	H310	BSC200	495
470	BT25	BFL750	HB5K	BF500	H310	BSC200	495

Combination table telescope concrete

Min 20 mm telescope effect 20 mm fixing depth

Insulation thickness mm	Bits	Extender	Drill Bits	Drill extender	Sleeve	Screw	Total length (mm)
480	BT25	BFL750	HB5K	BF750	H310	BSC220	510
490	BT25	BFL750	HB5K	BF750	H310	BSC220	510
500	BT25	BFL750	HB5K	BF750	H485	BSC60	530
510	BT25	BFL750	HB5K	BF750	H485	BSC60	530
520	BT25	BFL750	HB5K	BF750	H485	BSC80	550
530	BT25	BFL750	HB5K	BF750	H485	BSC80	550
540	BT25	BFL750	HB5K	BF750	H485	BSC90	570
550	BT25	BFL750	HB5K	BF750	H485	BSC100	570
560	BT25	BFL750	HB5K	BF750	H485	BSC120	590
570	BT25	BFL750	HB5K	BF750	H485	BSC120	590
580	BT25	BFL750	HB5K	BF750	H485	BSC140	610
590	BT25	BFL750	HB5K	BF750	H485	BSC140	610
600	BT25	BFL750	HB5K	BF750	H485	BSC160	630
610	BT25	BFL750	HB5K	BF750	H485	BSC160	630
620	BT25	BFL750	HB5K	BF750	H565	BSC90	640
630	BT25	BFL750	HB5K	BF750	H565	BSC100	650
640	BT25	BFL750	HB5K	BF750	H565	BSC120	670
650	BT25	BFL750	HB5K	BF750	H565	BSC120	670
660	BT25	BFL750	HB5K	BF750	H565	BSC140	690
670	BT25	BFL750	HB5K	BF750	H565	BSC140	690
680	BT25	BFL750	HB5K	BF750	H565	BSC160	710
690	BT25	BFL750	HB5K	BF750	H565	BSC160	710

Combination table telescope light weight concrete

Min 20 mm telescope effect 60 mm fixing depth

Insulation thickness mm	Bits	Extender	Sleeve	Screw	Total length (mm)
30	TEBT4		H09	LBS105	105
40	TEBT4		H09	LBS105	105
50	TEBT4		H09	LBS125	125
60	TEBT4		H30	LBS105	115
70	TEBT4		H50	LBS105	135
80	TEBT4		H50	LBS125	155
90	TEBT4		H70	LBS105	155
100	TEBT4		H70	LBS125	175
110	TEBT4		H90	LBS105	175
120	TEBT4		H90	LBS125	195
130	TEBT4		H110	LBS105	195
140	TEBT4		H110	LBS125	215
150	TEBT4		H130	LBS105	215
160	TEBT4		H130	LBS125	235
170	TEBT4		H130	LBS125	225
180	TEBT4		H160	LBS125	265
190	TEBT4		H160	LBS125	255
200	TEBT4		H160	LBS125	265
210	TEBT4		H190	LBS105	285
220	TEBT4		H190	LBS125	285
230	TEBT4		H190	LBS125	295
240	TEBT4		H220	LBS125	325
250	TEBT4		H220	LBS125	325
260	TEBT4		H220	LBS125	325
270	TEBT4		H220	LBS125	325
280	TEBT4		H250	LBS125	345
290	TEBT4		H250	LBS125	355
300	TEBT4		H250	LBS125	355
310	TEBT4		H280	LBS105	365
320	TEBT4		H280	LBS125	385
330	TEBT4		H280	LBS125	385
340	TEBT4		H310	LBS125	415
350	TEBT4		H310	LBS125	415

Lightweight concrete screw is mounted without pre-drilling.
Testing the tension force value for each object is recommended.

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