KLÖBER
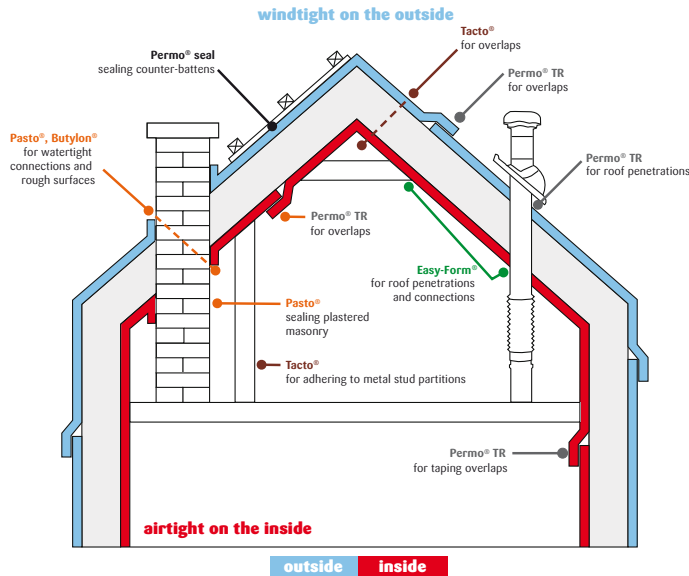
These fitting instructions relate to the following types of pitched roofs:

- Traditional ventilated cold roofs (with thermal insulation at ceiling level)
- Non-ventilated cold roofs (using vapour-permeable underlays)
- Warm roofs and Rooms-in-the-roof (with thermal insulation at rafter level)

The following booklet gives detailed instructions for fitting Klober's airtightness products. For airtightness techniques please refer to our 'Taking control of air leakage' pocket guide.

Using a combination of Klober's air barriers, tapes, sealants and sealing collars can achieve an 'airtight' roof system.

windtight on the outside

Permo® seal
sealing counter-battens

Tacto®
for overlaps

Permo® TR
for overlaps

Pasto®, Butylon®
for watertight connections and rough surfaces

Permo® TR
for roof penetrations

Permo® TR
for overlaps

Easy-Form®
for roof penetrations and connections

Pasto®
sealing plastered masonry

Tacto®
for adhering to metal stud partitions

Permo® TR
for taping overlaps

airtight on the inside

| outside | inside |

2

Meeting BS9250

Whether you are building new houses or renovating existing ones, you will need to comply with building regulations on energy efficiency (now commonly expressed in terms of carbon emissions) ie BS9250 (Code of Practice for design of the airtightness of ceilings in pitched roofs).

However, many public sector new build developments, such as for housing associations, now need to comply with more stringent requirements than the building regulation minimum, as set out in the Code for Sustainable Homes.

The interior surfaces of the building envelope must be permanently airtight.

Airtightness test (blower door)

Airtightness will be tested after the airtight system has been installed by carrying out a blower door test.

Whether you are on the construction yourself, or building to a specification, you need to be aware of the importance of airtightness in modern-day construction.

You also need to appreciate the importance of good workmanship and not deviating from the specification. You should check that work by your own staff, or by sub-contractors, is being carried out correctly, or that this responsibility has been properly delegated to somebody else.
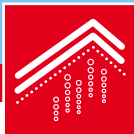
KLÖBER

1. Wallint® 50 or Wallint® solar
2. Permo® TR tape
3. Easy-Form® tape
4. Pasto® sealant
5. Pipe Sealing Collar
6. Solar Outlet Sealing Collar

- Prevents large volumes of water-vapour entering a construction from the interior, particularly during the drying out period
- Suitable for ceilings and walls of rooms-in-the-roof, and on the ceilings below non-habitable lofts
- When used in a well-sealed ceiling, helps prevent staining caused by mould and damp
- Provides support for insulation boards or quilts

Product codes: KU0065 (Wallint® 50), KU0063 (Wallint® solar)
Dimensions (length/width): 1.5m x 50m (75m²)

A. Wallint® 50

- Combined air barrier and vapour control layer
- Vapour resistance of 250 MN.s/g, meeting the requirements of BS9250

B. Wallint® solar

- Reflective air barrier and vapour control layer
- Vapour resistance of >500 MN.s/g, far exceeding the requirements of BS9250

1. Before Wallint® is installed, check that the moisture content of the timbers is less than 20%.
2. Wallint® should be fixed on the warm side of the insulation and rafters, with the printed smoother surface (or reflective surface for Wallint solar) facing inwards.
3. Before the beginning and at the end, leave a 150mm overlap to allow Wallint® to be sealed to adjoining walls.
4. Roll-out Wallint® with a horizontal headlap of 150mm.
5. Fix to rafters/ceiling joists using non-corrosive fixings eg staples.
6. Ensure laps are sealed using a tape eg Permo® TR.
7. Ensure Wallint® is sealed at all abutments and junctions using either tape eg Permo® TR or sealant eg Pasto®. If parging, first turn Wallint® down the face of the wall, fix plaster stop bead on top of Wallint® and then parge on top. Any holes or tears in the air barrier/vapour control layer should be repaired with Permo® TR tape.
8. When pipes pass through the air barrier/vapour control layer use Klober's Pipe Sealing Collar and tape edges to Wallint® to achieve an airtight seal.
9. Wallint® should cover the entire internal timber frame area of the rooms in the roof and, where applicable, link with the vapour control layer in the wall below to form a continuous air barrier.
10. For refurbishment projects, Wallint® should be laid vertically either from ridge to eaves or vice versa. This is to allow small sections of the roof to be worked on. Joins should be taped using Permo® TR and sealed at the eaves using Pasto® or Permo® TR.
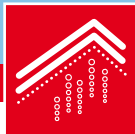
Use for:

- Installing the vapour barrier on the inside
- Sealing around nail holes when installing counter-battens for service voids
- 50mm and 20mm wide versions available

Wide range of applications – for airtight connections on the inside and watertight connections on the outside.

Product codes: KU 0103 (width 20mm), KU 0104 (width 50mm) (10 rolls per carton)
Dimensions (width/length): 20mm x 25m, 50mm x 25m

Installing the vapour barrier on the inside - Butylon®

A. On a timber frame eg rafters

1. Apply the Butylon® tape to the timber frame.
The air barrier can be fastened in place without stapling.

2. Fix the Wallint® air barrier in place with the writing/reflective surface facing the inside of the room and without any creases.
3. Remove the backing film of the Butylon® adhesive tape and press the Wallint® sheet in place by hand.
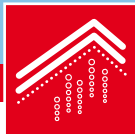
NB: overlap should be 100 mm. Additional fixings at regular intervals are required e.g. by counter-battens.

B. On a metal frame

Instructions are as above.
Additional fixing at regular intervals are required e.g. by plasterboard panels.
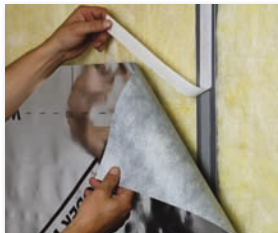
Double-sided, highly durable tape – suitable for:

- Sealing the laps between air barriers/vapour control layers
- Adhering air barriers and vapour control layers to most surfaces, both smooth and irregular eg plasterboard, roof lights & roof vents
- Timber frame: planed/finished or stained
- Absorbent materials: gypsum fibreboard
- Synthetic materials: paper, fleece or similar, PE, PP or hard PVC
- Other surfaces: metal, glass, PUR-foam/Styrofoam
- Use both internally & externally

Product code: KU 0111 (10 rolls per carton)
Dimensions (width/length): 20 mm x 50 m

Installing the vapour barrier on the inside - Tacto®

A. On a timber frame eg rafters

1. Apply the Tacto® tape to the timber frame.
The air barrier can be fastened in place without stapling.

2. Fix the Wallint® air barrier in place with the writing/reflective surface facing the inside of the room and without any creases.
3. Remove the backing film of the Tacto® adhesive tape and press the Wallint® sheet in place by hand.

NB: overlap should be 100 mm. Additional fixings at regular intervals are required e.g. by counter-battens.

B. On a metal frame

Instructions are as above.
Additional fixings at regular intervals are required e.g. by plasterboard panels.

Single-sided, multi-functional tape for joining, repairing and creating airtight seals. Includes a reinforcement mesh for strength. Suitable for:

- Repairing holes/tears in vapour control layers/air barriers
- Sealing laps between vapour control layers/air barriers
- Creating a seal around sealing collars
- Use around roof penetrations
- Butt joints
- Timber frame: planed/finished or stained
- Synthetic materials: paper, fleece or similar, PE, PP or hard PVC
- Other surfaces: metal, glass, PUR-foam/styrofoam
- Use both internally & externally

Product code: KU 0121 (10 rolls per carton)
Dimensions (width/length): 60 mm x 25 m

Sealing overlaps - Permo® TR

1. Peel back a small section of the release paper and, ensuring the overlap is in the middle of the tape, press down to ensure good adhesion.
Note: Only peel off small sections of the release paper at a time. This will prevent creases from forming. Do not overstretch the tape, to avoid the material springing back. It is recommended that the adhesive tape is smoothed with a plastic scraper.
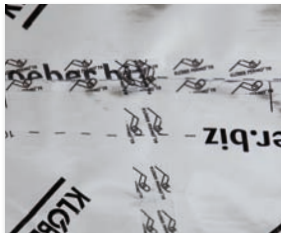

2. . When a vertical joint occurs in the Wallint® it must run on the substructure. It is then possible to form a T-butt joint.

If creases form, smooth out from the other side of the Wallint® membrane.

Ensure the crease is sealed airtight by taping across the crease as shown.
When Wallint® is used in conjunction with a tape it should not support the insulation. This is because pressure will be put on the tape which could reduce its effectiveness.
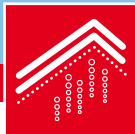
Klober's Easy-Form® tape is a multi-functional, highly flexible tape.
Suitable for:

- Creating air and watertight seals around penetrations, corners of roof windows, etc. due to its 70% stretchability
- Butylon® gives excellent adhesion
- Using on components which experience movement, such as gutters or transition points
- Both inside and outside

Product code: KW 0060, KW 0090 (8 rolls / 6 rolls per carton)
Dimensions (width/length): 60 /90 mm x 10 m

A. Sealing around joists

1. Line up, cut and fix Wallint® vcl.
2. Measure area to be stuck down and cut Easy-Form® to length.
3. Fold Easy-Form® tape lengthways along the centre. Peel off one side of the release paper in small sections. Stick down and rub the side around the joist.

4. Peel off the remaining release paper in small sections and rub to gain maximum adhesion.
5. Stretch or press together the Easy-Form® tape in the corners.

B. Sealing around pipes/cables

Instructions are as above with the exception of Step 5.

Pasto®

Pasto® is an easy-to-apply sealant, particularly suitable for creating air- and windtight seals between vapour control layers/air barriers and rough surfaces. Suitable for:

- Sealing holes in plasterboard ceilings where services pass through vapour control layers/air barriers
- Sealing vapour control layers/air barriers to rough surfaces eg masonry, abutments and chimneys
- Sealing around nails
- Timber frame: rough sawn, planed/finished or stained
- Absorbent materials: brick*, sandstone*, concrete* or gypsum fibreboard
- Synthetic materials: paper, fleece or similar, PE*, PP* or hard PVC*
- Other surfaces: metal, glass, PUR foam
- Humidity of 15° or more

* When using on these rough or uneven surfaces it is recommended that a batten is fixed at the abutment.

Product code: KU 0128 (12 pcs per carton)
Coverage: 310 ml tube will cover up to 10 m

# Wall connection - Pasto®

A. Wall connection at the side

1. With party walls between buildings such as plastered or fully-jointed masonry blockwork the Wallint® is laid with an overlap down the wall of 75 mm.
2. Apply Pasto® to the masonry blockwork.
3. Press the Wallint® onto the Pasto®.

Note: Since building structures move it is important that no pressure is applied to the connection. A batten should not be fixed tight against the wall.

Detail
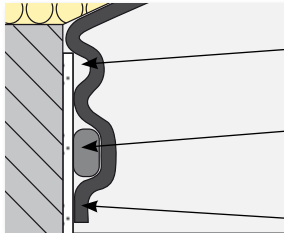
Load relief batten

Pasto®

Wallint®

Klober's Pipe Sealing Collar is the ideal solution for creating air- and wind-tight seals around pipes which pass through the roof. Use with a Klober sealing tape to create fully wind- and airtight seals between the underlay/vcl and pipes which penetrate the roof. Suitable for:

- Suitable for both rigid & flexi-pipes
- Inside & outside
- Roof pitches between 10 - 70°
- Pipes with a diameter from 100 mm
- Sealing to any vapour control layer/air barrier

Product code: KU 8001 (20 pcs per carton)
Diameter: for pipes from 100mm + diameter

Sealing around pipes

1. Pass the pipe through the insulation. Insulate cavities in order to avoid thermal bridging.
Make the opening in the Wallint® just large enough for the collar to cover the opening.

2. Pull the Pipe Sealing Collar over the pipe.
Advantage: The material is very flexible and suitable for 100 to 125 mm pipes. The collar creates an air-tight seal around the pipe.

3. When the collar has been positioned onto the Wallint, begin taping from the bottom to the top of the collar using Permo® TR.

4. Press down firmly on the Permo® TR. It is recommended to rub on the adhesive tape with a plastic scraper.

KLÖBER

The self-adhesive underside allows the Sealing Collar for solar pipes and cables to be glued quickly and safely to the air barrier.

- For interior and exterior use
- For universal use
- Easy to install
- Highly flexible

Product codes & diameters: KE 8090 (42-55mm), KE 8091 (50-70mm)

Sealing around solar pipes - Solar Outlet Sealing Collar

1. Pass the solar pipe through the insulation. Insulate the cavities in order to avoid thermal bridging. Make the opening in the Wallint® just large enough for the collar to cover the opening.

2. Pull the Sealing Collar over the solar pipe.

Advantage: the material is very flexible and suitable for diameters between 42-55 mm and 50-70 mm. The collar creates an airtight seal around the pipe.

3. When the collar has been positioned on top of the Wallint®, peel off the two-part protective film and stick it onto the Wallint®.
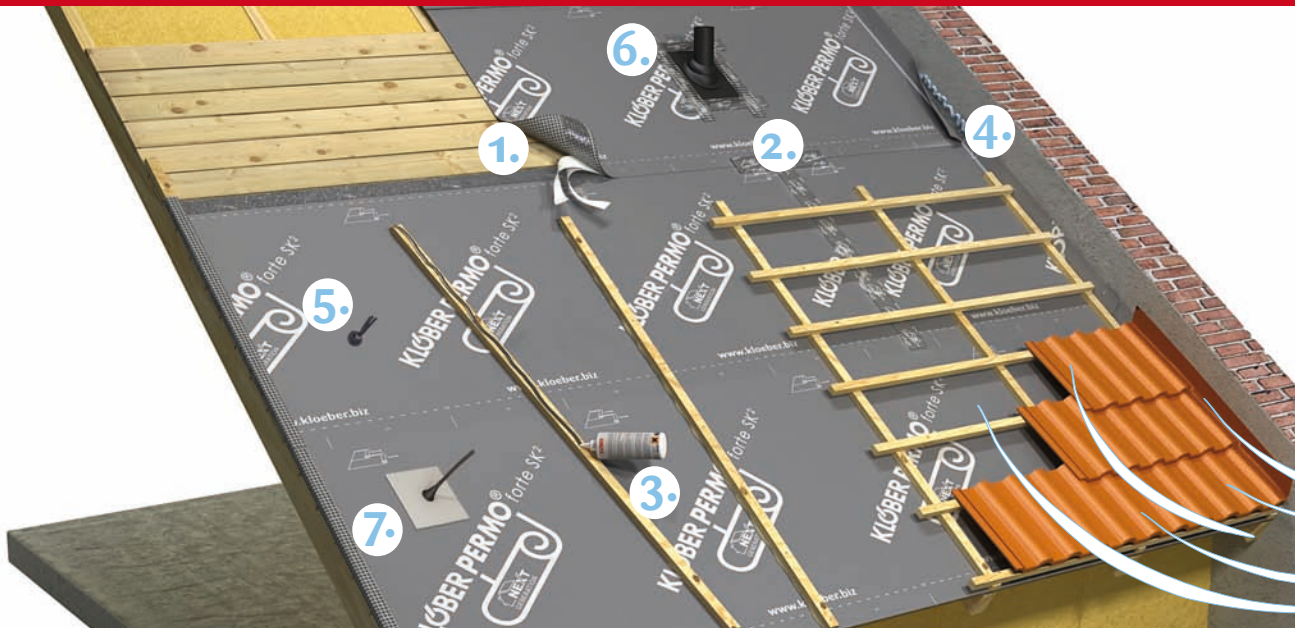
4. Press down firmly and rub onto the Wallint®.

KLÖBER

1. Permo® SK²
2. Permo® TR
3. Permo® seal
4. Pasto®
5. Easy-Form® tape
6. Pipe Sealing Collar
7. Solar Outlet Sealing Collar

Installation details	Klober product	Page number
1. Sealing the roof membrane	» **Permo® SK²**	24-25
	» **Permo® forte/light & Permo® TR tape**	26-27
	» **Permo® TR tape**	28-29
2. Counter-batten sealing	» **Permo® seal**	30-31
3. Sealing to masonry blockwork	» **Pasto®**	32-33
4. Sealing around pipes & cables	» **Easy-Form® tape**	34-35
	» **Sealing collars**	36-39

A. On supported roofs
B. On open rafters

Using vapour-permeable underlays can help reduce energy loss through the roof. Create an windtight roof by using either:

- Permo® forte SK² has a double integral tape at the laps (for warm roofs)
- Permo® underlays using a separate Permo® TR tape (for cold and warm roofs)

Product code Permo® forte SK²: KU0044-11
Dimensions (length/width): 50m x 1.5m (75m²)

Product code Permo® TR tape: KU 0121 (10 rolls per carton)
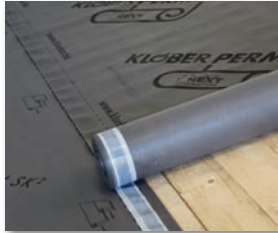Dimensions (width/length): 60mm x 25m

Sealing the roof membrane - Permo® SK²

1. Roll out the roof underlay and fix it in the upper overlapping area.

2. Overlap the roof underlay in such a way that the adhesion areas lie on top of each other.

3. Loosen the release paper at the same time from both adhesive strips and pull away uniformly.

4. The double adhesive strips immediately adhere, even with slight pressure.

KLÖBER

Permo® SK² and Permo® forte/light must be installed in accordance with their BBA certificates.
Permo® forte/light are suitable for all roof constructions - cold and warm.
Permo® SK² should only be used on supported roofs ie rigid insulation and timber sarking.
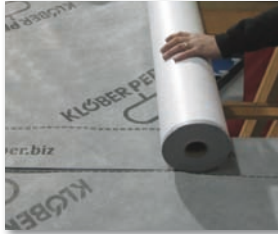

Certificate no. 993622

Certificate no. 00/3749

Certificate no. 03/0190

Sealing the roof membrane - Permo® & Permo® TR tape
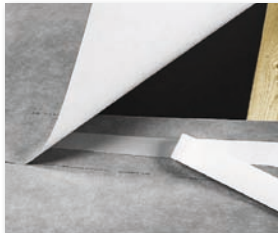
B. On open rafters

1. Roll out the underlay allowing for drape between the rafters and staple onto the rafters.

2. Roll out the second layer of underlay, allowing for minimum headlap according to the pitch of the roof and BBA certification.

3. Use Permo® TR tape to seal overlaps of underlays.

4. Alternatively, use Tacto® double-sided tape to seal overlaps of underlays.

Single-sided, multi-functional tape for joining, repairing and creating airtight seals. Includes a reinforcement mesh for strength. Suitable for:

- Repairing holes/tears in vapour control layers/air barriers
- Sealing laps between vapour control layers/air barriers
- Creating a seal around sealing collars
- Use around roof penetrations
- Butt joints
- Timber frame: planed/finished or stained
- Synthetic materials: paper, fleece or similar, PE, PP or hard PVC
- Other surfaces: metal, glass, PUR-foam/styrofoam
- Use both internally & externally

Product code: KU 0121 (10 rolls per carton)
Dimensions (width/length): 60 mm x 25 m

Sealing the roof membrane - Permo® TR tape

A. Sealing overlaps and butt joints

**1.** Tape vertical laps before installing each new layer of Permo.

2. To seal the butt joint peel off a small amount of release paper from the Permo® TR adhesive tape, line it up in the centre on the butt joint and press down.

3. Press firmly down on the adhesive tape and rub to ensure good adhesion.
Note: To prevent creases forming only peel off small sections at a time. Do not over-stretch the tape to avoid the material springing back. It is recommended that the adhesive tape is smoothed with a plastic scraper.
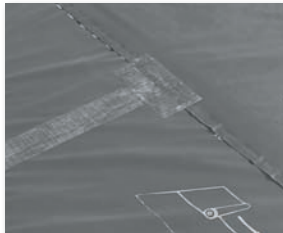
4. Overlap the roof underlay by at least 100 – 150 mm where the high points are covered over. Peel the release paper off the underlay adhesive strip, press down and rub. As shown, tape the top of the butt joint with a strip of Permo® TR in order to avoid the penetration of moisture.

Permo® seal is a durable and easy-to-apply sealant, ideal for sealing around nail penetrations and staples on counter-battens.

- Can be used on damp and dusty surfaces or battens as well as in cold weather
- Convenient bottle, covering approx. 50m of counter-battens
- Quick to apply

Product code: KU 0129-01 (10 pcs per carton)
Consommation : approx. 50 m (1000 ml bottle)

Counter-batten sealing - Permo® seal

1. Apply Permo® seal counter-batten filler along the centre of the counter-batten.

2. Turn over the counter-batten.

3. Fix the counter-batten using nails. The independently foaming sealing filler material, Permo® seal, penetrates into the nail holes.

4. Permo® seal performs, even with moisture and dust.

Pasto®

Pasto® is an easy-to-apply sealant, particularly suitable for creating air- and windtight seals between vapour control layers/air barriers and rough surfaces. Suitable for:

- Sealing holes in plasterboard ceilings where services pass through vapour control layers/air barriers
- Sealing vapour control layers/air barriers to rough surfaces eg masonry, abutments and chimneys
- Sealing around nails
- Timber frame: rough sawn, planed/finished or stained
- Absorbent materials: brick*, sandstone*, concrete* or gypsum fibreboard
- Synthetic materials: paper, fleece or similar, PE*, PP* or hard PVC*
- Other surfaces: metal, glass, PUR foam
- Humidity of 15° or more

* When using on these rough or uneven surfaces it is recommended that a batten is fixed at the abutment.

Product code: KU 0128 (12 pcs per carton)
Coverage: 310 ml tube will cover up to 10 m

Sealing to masonry blockwork - Pasto®

1. Overlap the underlay up the wall/chimney by 100 mm. Fold back the underlay.

2. Apply Pasto® adhesive to the masonry block work.

3. Press the underlay onto Pasto® to create an airtight seal.

Klober's Easy-Form® tape is a multi-functional, highly flexible tape. Suitable for use:

- Both inside and outside
- Around roof penetrations eg TV antennae, cables, pipes due to its 70% stretchability
- Repairing roofing underlays
- Around corners of skylights
- On components which experience movement, such as gutters or transition points

Product code: KW 0060, KW 0090 (8 rolls / 6 rolls per carton)
Dimensions (width/length): 60 /90 mm x 10 m

# Sealing around pipes & cables - Easy-Form® tape

A. Sealing around cables

1. Line up, cut and fix Permo® membrane.
2. Measure area to be stuck down and cut Easy-Form® to length.

3. Fold Easy-Form® tape lengthways along the centre. Peel off one side of the release paper in small sections. Stick down and rub the side around the cable.
4. Peel off the remaining release paper in small sections and rub to gain maximum adhesion.

B. Sealing around pipes & cables
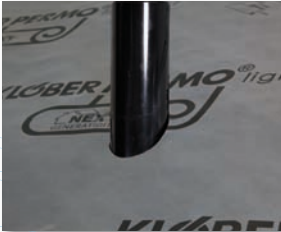
Instructions are as above.

Klober's Pipe Sealing Collar is the ideal solution for creating air- and wind-tight seals around pipes which pass through the roof. Use with Klober's sealing tape to create fully wind and airtight seals between the underlay/vcl and pipes which penetrate the roof. Suitable for:

- Both rigid & flexi-pipes
- Inside & outside
- Roof pitches between 10 - 70°
- Pipes with a diameter from 100 mm
- Sealing to any underlay

Product code: KU 8001 (20 pcs per carton)
Diameter: for pipes from 100mm + diameter

Sealing around a roof penetration

1. Cut a hole in the underlay/vcl according to the diameter of the pipe.

2. Place the Sealing Collar in position.

3. Tape the bottom edge of the flange to the underlay/vcl using a Klober sealing tape.
4. Tape the both sides of the flange, overlapping them with tape along the bottom edge.
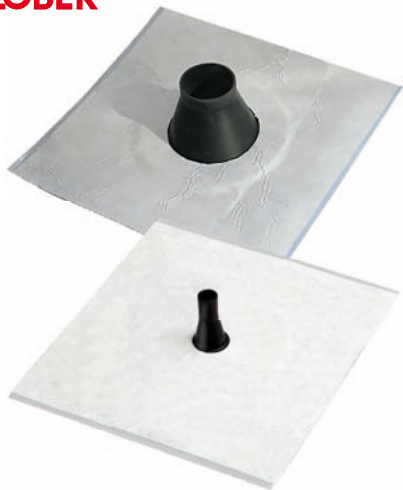**5.** Tape the top edge so that it overlaps both side tapes.

6. Push the pipe through the collar into its final position.

KLÖBER

The self-adhesive underside allows the sealing collar for solar pipes and cables to be glued quickly and safely to the underlay.

- For interior and exterior use
- For universal use
- Easy to install
- High flexibility

Product codes & diameters: KE 8090 (42-55mm), KE 8091 (50-70mm)

1. Pass the solar pipe through the insulation. Insulate cavities in order to avoid thermal bridging. Make the opening in the Permo® just large enough for the collar to cover the opening.

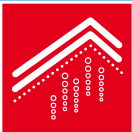**2.** Pull the connecting collar over the solar pipe.
Advantage: the material is very flexible and suitable for diameters between 42-55 mm and 50-70 mm. The collar creates an airtight seal around the pipe.

3. When the collar has been positioned on top of the Permo® peel off the two-part protective film and stick it onto the Permo®.

4. Press down firmly and rub onto the Permo®.

Klober Ltd.
Unit 6F
East Midlands Distribution Centre
Short Lane
Castle Donington
Derbyshire, DE74 2HA/UK
Tel. +44 (0)1332 813 050
Fax. +44 (0)1332 814 033
www.klober.co.uk
info@klober.co.uk

Klöber GmbH
Scharpenberger Str. 72-90
58256 Ennepetal/Germany
Tel. +49 (0)23 33/98 77-0
Fax +49 (0)23 33/98 77-199
Tech. Hotline +49 (0)23 33/98 77-164
www.kloeber.de
info@kloeber.de

Klöber - HPi France Sàrl
6, rue de l'Energie
67720 Hoerdt/France
Tel.: +33 (0)3 88 68 20 60
Fax: +33 (0)3 88 68 18 10
www.kloeber-hpi.fr
info@kloeber-hpi.fr

Klöber Benelux PGmbH
Herbesthaler Str. 36
4700 Eupen/Benelux
Tel. +32 (0)87/56 10 56
Fax +32 (0)87/56 12 56
www.kloeber.be
info@kloeber.be

HPI - CZ spol. s r.o.,
Kotrčova 306
503 01 Hradec Králové/Czech Republic
Tel. +420 (0)495 800 912
Fax +420 (0)495 217 290
www.hpi-cz.cz
info@hpi-cz.cz

Klöber Italia S.r.l.
Via Miles 9/10
20040 Cavenago di Brianza (MI)/Italy
Tel. +39 (0)2 95 33 53 01
Fax +39 (0)2 95 33 53 00
www.kloeber.it
info@kloeber.it

Klöber - HPi Polska Sp. z.o.o.
ul. 17 Stycznia 45b
02-146 Warszawa/Poland
Tel. +48 (0)22 35 12 900
Fax: +48 (0)22 35 12 901
www.kloeber-hpi.pl
info@kloeber-hpi.pl

KLÖBER