



## SOLAR-LINE

Roofing accessories for solar systems

Providing expertise in the  
installation of photovoltaic  
and solar thermal systems

**KLÖBER**

## Expertise in solar energy systems

Klober's expertise can play an important role in your selection of matching accessories for photovoltaic and solar thermal systems. Roof-mounted systems require secure fixing methods that resist high wind loads and guarantee weatherproof connections of pipes and cables. These are needed to guarantee weathertight systems for the life of the roof.

We offer universal, reliable solutions for roof-mounted and roof-integrated solar systems.

The following pages will give you an overview of various Klober solutions for roof-mounted solar systems.

### Key:



Products suitable for:  
**Photovoltaics**



Products suitable for:  
**Solar thermal**

## MCS012 - Pitch Roof Installations

"The presence of the solar panel system must not decrease the weather performance of the roof covering or the roof structure" - reference MCS012 Clause 6.1 (General)

"Penetrations through the underlay can also pose a risk. Such penetrations must not jeopardise the role of the underlay, as specified in BS5534 (Section 4.10) and should therefore be sealed in an appropriate and durable manner, preferably with a purpose designed product." - reference MCS012 Clause 6.1. (iii In-roof systems)

"The sealing arrangement for the underlay penetrations shall be tested for weather-tightness. This shall be done with the underlay system fitted in place of the solar panel and tiles. The test shall follow the same test procedure as the Test D of Section 6.261.1 but should use a rainfall rate of 50mm/hr. instead of 225mm/hr. In addition there should be no direct rainfall, only run-off water applied at the top of the inclined roof rig, assuming a rafter length of 5m. The product shall be deemed to have passed the test if there is no water leakage through the joint with the underlay after 5 minutes." - reference MCS012, Clause 6.2.2 (The Performance of underlay penetrations)

"For solar panels, provided all unprotected gaps caused by the mounting and installation arrangement are no greater than those pre-existing in the roof covering before the installation of the solar panels then only Test D is mandatory; providing there is no reason to believe the gapping will increase due to wind. Tests A - C are then optional." - reference MCS012, Clause 6.2.1.1 (Test Procedure)

## Expertise in solar energy systems for roofs

### SOLAR-LINE

#### Company history

Since Klober was founded in 1960, we've become the leading supplier of roof accessories in Europe.

The intervening decades of experience, and a passion for understanding customer and market requirements, are incorporated into our products and system solutions.

Our passion for roofing product design has resulted in major innovations that have set industry standards, e.g. Roll-Fix® ridge and hip solutions, vapour-permeable membranes and high quality roof ventilation and outlet products.

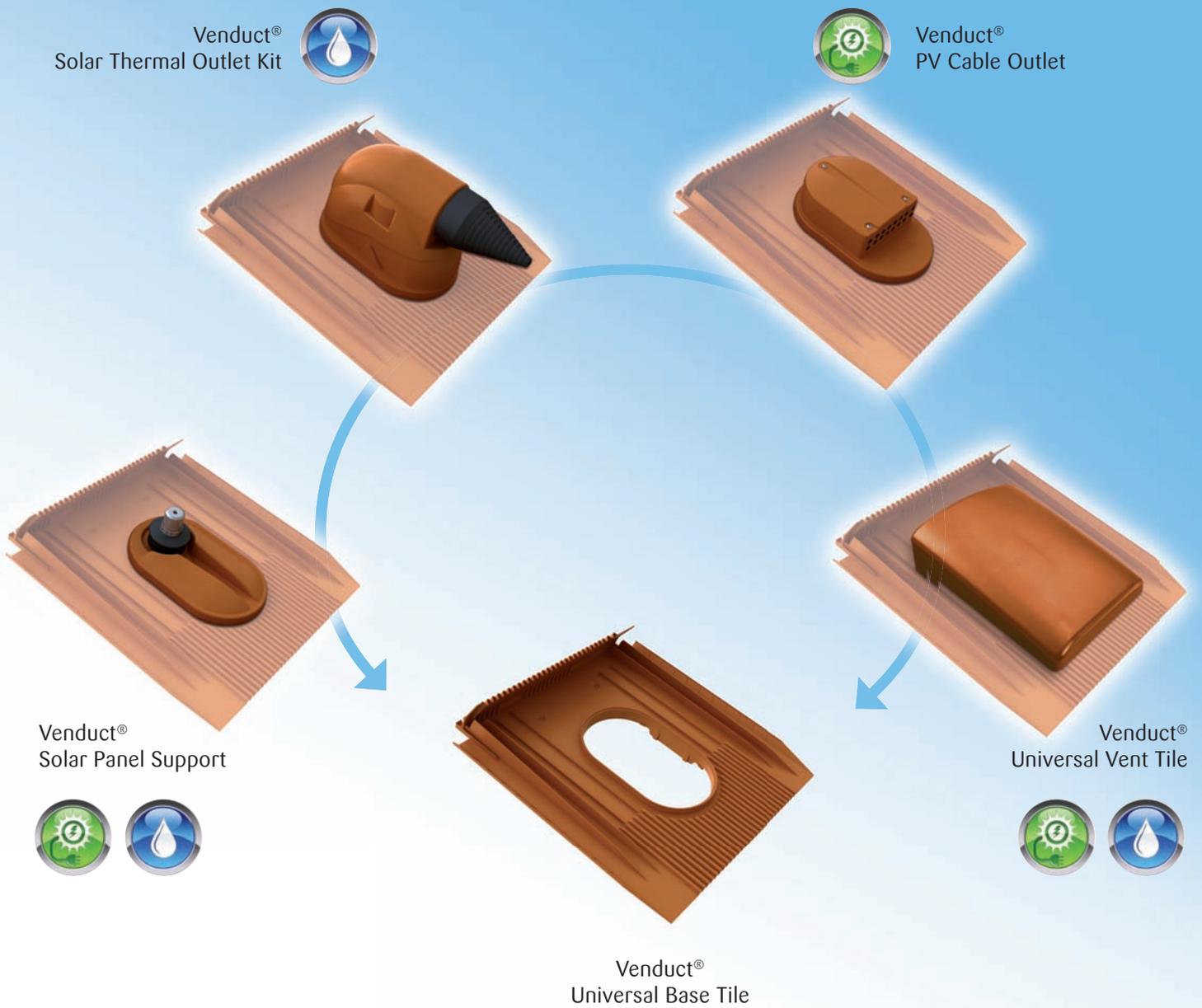
#### The basis of Klöber's success

Klober's Venduct® Universal Base Tile has proved itself in the formation of weatherproof outlet penetrations in roof structures. Easy to install, it matches almost all concrete and clay roof tiles. Wind tunnel tested, the Venduct® Universal Base Tile is suitable for roof pitches of at least 16° to 65°.

Building on this success, we're now expanding our range of products to include specific solar energy components that reflect our comprehensive expertise in the field of roof accessory products.

#### Perfection with a passion

Klober has over 50 years of experience and technical expertise in product development, manufacturing and service to our customers. Regular training for our customers helps to share our knowledge concerning standards, products and solutions.



## Roof penetrations

### Venduct® Universal Base Tile

Designed by roofers for roofers, with a proven, easy-to-use yet weatherproof click-on system, for a multitude of roofing product accessory applications.

With above-roof systems, attention should be given to ensuring that penetrations through the roof for the routing of power cables are weatherproof. This can best be provided using Klobber's purpose-made Venduct® Universal Base Tiles or flexible Easy-Form® Tape. Mastic or sealants alone should not be relied on to provide a weathertight seal.

Bolt-through fixings are not recommended because they can damage or weaken the roof tiles or slates, they can increase the loads on the roof covering, and they are difficult to seal. This is especially true for double lapped products such as slates

and plain tiles because the holes for the fixings must be drilled through two roofing elements, the lower of which cannot be seen or inspected for damage and cannot be easily sealed. In some cases, drilling holes in tiles or slates will invalidate the tile/slate manufacturer's warranty for that area of the roof.

(NHBC Guide to installation of renewable energy systems on roofs of residential building.)



## Stay safe and secure with Klober products

### SOLAR-LINE



Installations of solar systems often require modifications to the existing roof structure. These initially simple modifications can lead to serious consequences, such as a loss of weather proofing, resulting in property damage and a complete loss of warranty. The consequences of removing weather bars from roof tiles, for example, can lead to the penetration of water and the potential for mould growth.

## Klober's roofing products help to keep homeowners satisfied with properly installed solar systems

Good building practice, combined with adherence to the relevant regulations, ensure the weatherproof and longevity of roof structures and the solar systems that are installed upon them.

The Venduct® Solar Panel Support can withstand considerable forces (for example, caused by wind and snow loads) up to 2,500 N without any problem, and without any damaging stress to the roof tiles. In this way, the possible consequences of water damage can be prevented from the start.

Solar system fixings, as well as any roof penetrations such as cables and pipes, must be carefully installed. Cables and pipes may not be damaged by snow and wind loads, but failing to seal their penetrations may result in a serious risk of water damage to the whole roof structure.



Broken tile caused by over-loading and faulty installation



Leaks and crushed cables as a result of sub-standard installation



Possible mould growth caused by blocked ventilation or cable damage



Water leakage and a loss of airtightness as a result of not sealing penetrations



#### Technical data

- Maximum pressure, vertically onto the roof: 2,500 N
- Maximum tension, vertically to the roof: -2,500 N
- Maximum tension, parallel to the side: 900 N
- Maximum shear, parallel to the roof: 1,200 N
- UV, weathering, aging and deformation resistant

## Venduct® – the strong and safe solar panel support system

Klober's high-quality Venduct® Solar Panel Support ensures that the fixing of solar energy systems comply with national roofing guidelines. Combined with Venduct® Universal Base Tiles, fixings can be used on most types of roof tiles with flat or high profiles.

The superimposed sealing collar, manufactured in highly UV-resistant EPDM, ensures a weathertight installation for the panel-mounting hook. In combination with the special solid Timber Support Base, along with the Reinforcement Bars, the Venduct® Solar Panel Support provides outstanding load-bearing properties for the whole system.

#### Suitable areas for application

- Suitable for roof pitches from 16° to 65°
- Matches most clay and concrete roof tiles
- Suitable for most rail system installations, including photo-voltaic with the PV Cable Outlet Adaptor

#### Product advantages

- No load on roof tiles – therefore protection against breakage and consequential leaks
- High load-bearing properties through transmission of forces directly into the roof structure
- No modification of roof tiles necessary
- Flexible fixing positioning, independent of rafters
- Optimum water-proofing through EPDM sealing collar and clip
- High-quality workmanship and materials
- Easy installation

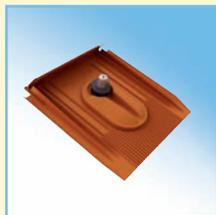
## Venduct® Solar Panel Support

The simple, solid and safe solution for fixing solar systems

#### Comparing design loads

- Maximum tension at 1,200 N in z-direction (corresponds to compression)
- Design load: 1,200 N in y-direction (corresponds to shear, parallel to the roof)

Conventional heavy-duty roof hooks in internal test simulation (linear structural analysis with Finite Element Programme)



#### Standard solar fixing

Plastic deformation of heavy-duty roof hook possible from circa 300 N/mm<sup>2</sup>.



#### Venduct® Solar Panel Support

No permanent plastic deformation of the system, even with heavy loads.

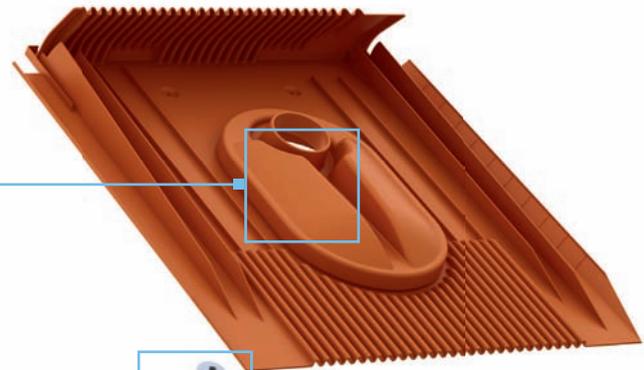
## Venduct® Solar Panel Support kit - assembly



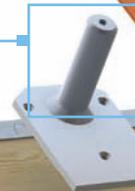
Stainless steel clip and  
EPDM collar



Venduct® Universal Base Tile  
with Special Insert



Aluminum Support solar fixing



Solid Timber Support Base  
with Reinforcement Bar



### Suitable for most profiles

including:

- clay roof tiles
- concrete roof tiles

Colours: anthracite, red, brown



## Venduct® Solar Panel Support - components

### Venduct® Solar Panel Support kit

The kit comes with two Venduct® solar fixings and Venduct® Universal Base Tiles with special inserts, Stainless Steel Clips, EPDM Collars and fixing screws.

### Solid Timber Support Base kit

The structural design of the fixing system complies to DIN standard 1052, 1055 and Eurocode 1.



#### Technical data

- Class B2 building materials
- Suitable for pipes and cables 4 - 8mm diameters
- UV, weathering, aging and deformation resistant

## Venduct® PV Cable Outlet

Klober's Venduct® PV Cable Outlet ensures a weatherproof installation for up to 16 through-the-roof cables. The Universal Base Tile fits perfectly underneath roof-mounted solar systems on a multitude of roof tile shapes and profiles.

Flexible fitting strips at the sides allow the easy, weatherproof installation of the Universal Base Tile into the roof covering. An internal Foam Strip protects against rain penetration.

The Venduct® PV Cable Outlet can be extended for retrofitting by further 8 outlets with the aid of the kit's adaptor.

#### Area of application

- Applicable for pipe and cable diameters of 4 - 8mm
- Applicable for roof pitches from 16° to 65°  
Fitting most clay and concrete roof tiles

#### Product advantages

- Weatherproof penetration for up to 16 cables in pre-fabricated kit method
- Suitable for most common cable types such as e.g. PV, antenna or lamp cables
- Optimum sealing with an additional Foam Strip
- Constructed in a proven UV-resistant PVC
- Safe and easy to install
- Available in 3 colours



## Klober Sealing Collars

- For weatherproof and airtight connection of solar pipes to underlay membranes and vapour barriers
- Suitable for wide range of diameters:  
8-12mm, 15-22mm, 25-32mm, 42-55mm, 50-70mm
- UV, weathering, frost and aging-resistant
- Permanently flexible

## Venduct® PV Cable Outlet - assembly

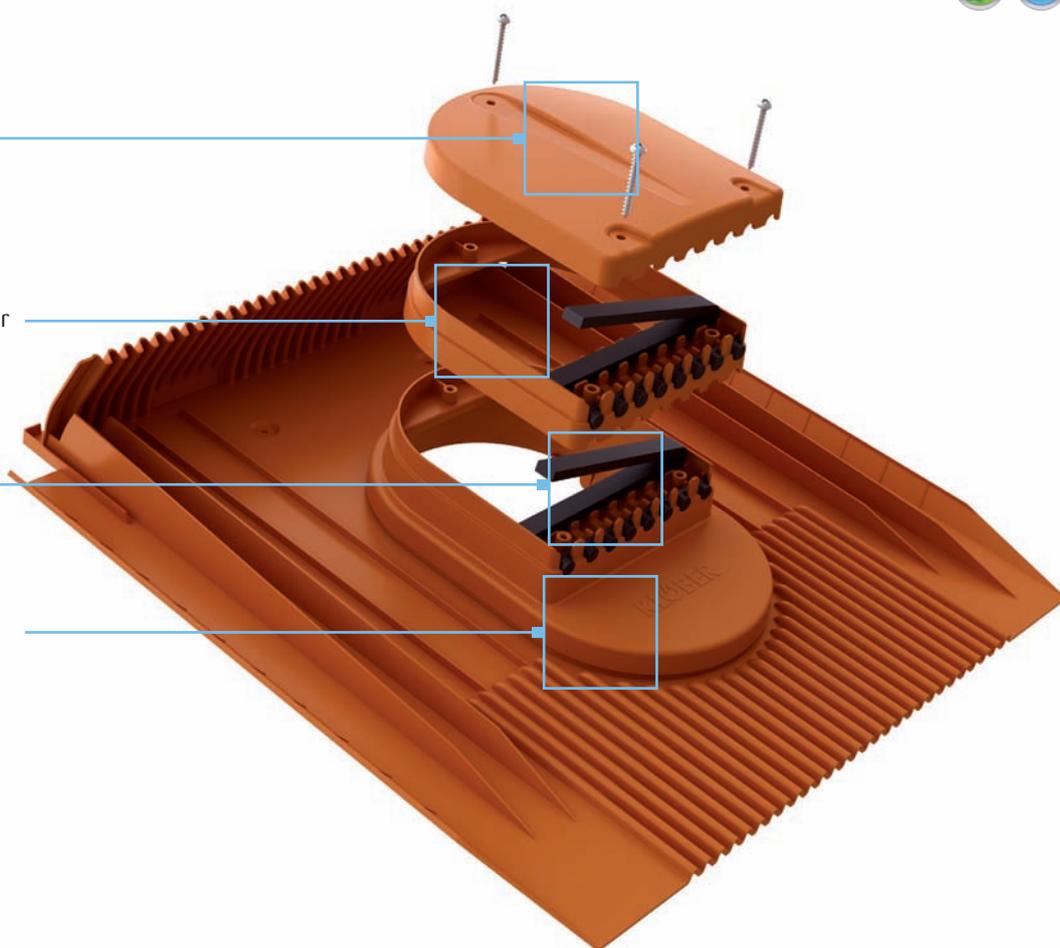


UV resistant PVC cover

Venduct® PV Cable Outlet  
Adaptor option adds a further  
8 outlets

Sealing strip and  
additional Foam Strip  
waterproofing

Venduct® Universal Base Tile  
with Special Insert



### Suitable for most profiles

including:

- clay roof tiles
- concrete roof tiles

Colours: anthracite, red, brown



## Venduct® Solar Thermal Outlet Kit

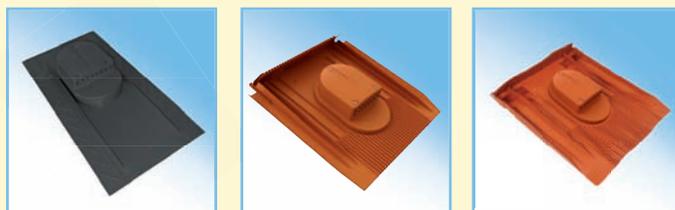
No more problems with through-the-roof cables

### Venduct® PV Cable Outlet (for up to 16 cables)

The Cable outlet is pre-assembled in two versions: for up to 8 cables and up to 16 cables with an Adaptor

### Venduct® Base Tiles with special insert

- Venduct® base tile for slate
- Venduct® Universal Base Tile
- Venduct® Universal Base Tile with long apron





## Venduct® Solar Thermal Outlet Kit

The Venduct® Solar Thermal Outlet is ideal for the installation of through-the-roof solar pipes and photovoltaic cables. Its unique nozzle design and flexible EPDM sealing collar provide penetrations with a secure weather-tight fit to protect the roof structure from damage.

Quick and easy installations of Venduct® Universal Base Tiles or Venduct® Slate Base Tiles are ensured through prefabrication. The universal design can be used with almost any roof tile.

In addition, the Venduct® Solar Outlet fits the 100mm Venduct® Base Tiles, and can be combined with a wide range of roof tiles, profiles and colours.

### Suitable areas for application

- Suitable for pipe diameters of 10mm – 70mm
- Suitable for roof pitches of 16° – 65°
- Fits most clay and concrete roof tiles
- Venduct® Solar Thermal Outlet Kit with long apron
  - suitable for high profiled clay and concrete roof tiles up to 60mm
  - suitable for roof pitches of 20° – 50°
- Venduct® Thermal Outlet Kit for slate
  - suitable for roof pitches of 22° – 60°



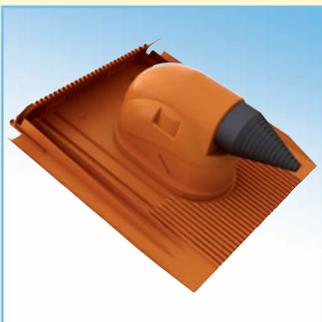
### Technical details

- Class B2 building materials
- Suitable for pipe diameters of 10mm-70mm
- UV, weathering, aging and deformation resistant

EPDM Sensor Cable Gromme for later installation (sealing enclosed)

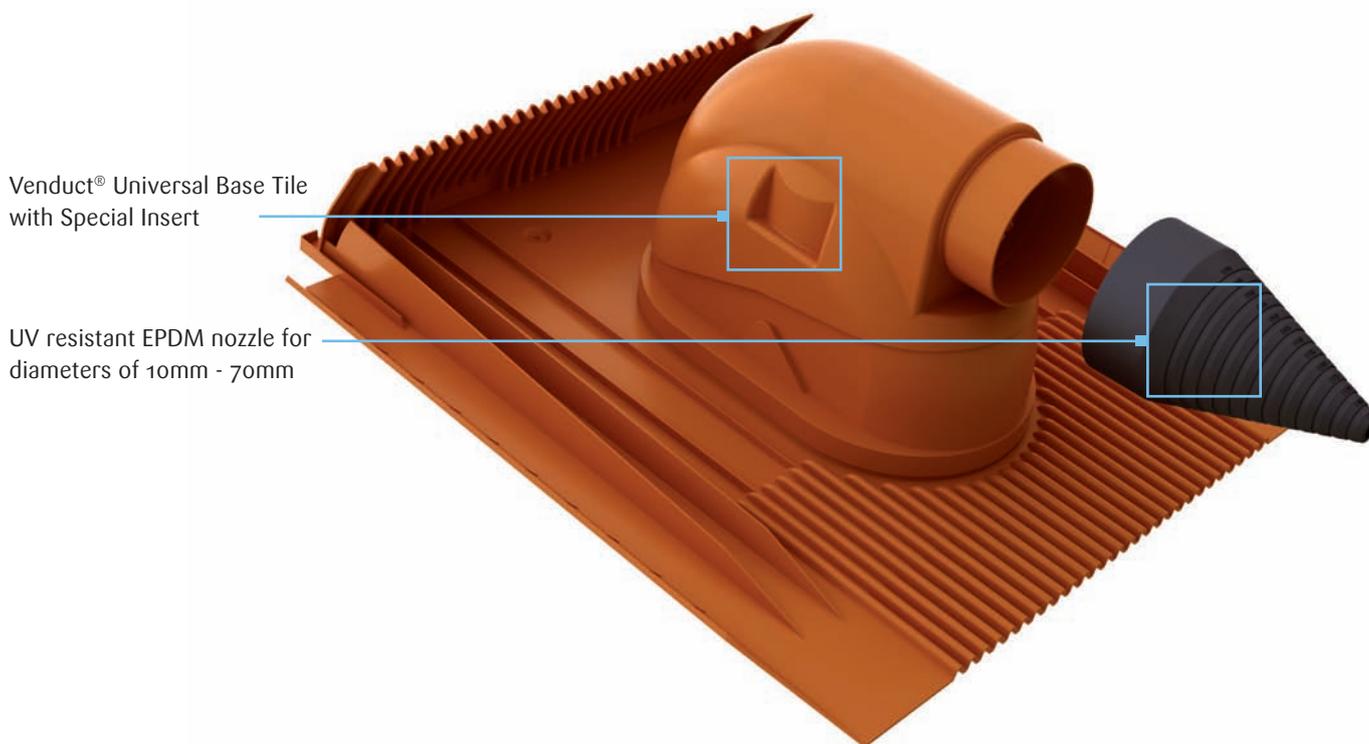
### Product advantages

- Weatherproof and airtight through-the-roof solar pipe and cable penetrations, combined with a flexible EPDM collar
- Constructed in a proven UV-resistant PVC
- EPDM collar heat-resistant up to 100° C
- Safe and easy to install
- Available in a choice of three colours



### Venduct® Solar Thermal Outlet DN 100

The ideal solution for through-the-roof cables and water pipes for solar panels. In combination with Klobert's flexible EPDM Collar, it creates a weatherproof and airtight seal.



Venduct® Universal Base Tile with Special Insert

UV resistant EPDM nozzle for diameters of 10mm - 70mm

**Suitable for most profiles**

including:

- clay roof tiles
- concrete roof tiles

**Colours:** slate grey and red



# Venduct® Solar Thermal Outlet Kit

The ideal universal connection solution for Solar Thermal Systems

**Venduct® Solar Thermal Outlet - options**

**Venduct® Solar Thermal Outlet Kit for slates**

Available in slate grey as a pre-fabricated kit combined with the Venduct Slate Base Tile.

**Universal Venduct® Solar Thermal Outlet Kit**

The universal option fits most roof coverings and is available in Slate Grey and Red.

**Venduct® Solar Thermal Outlet Kit with long apron**

The option with a long apron fits high profiled clay and concrete roof tiles up to 60mm. It is available in Slate Grey and Red.





## Venduct® Universal Vent Tile

Under solar energy or photovoltaic system panels, the Venduct® Universal Vent Tile fits the majority of roof tile profiles.

The flexibility of Venduct® Universal Base Tiles provides problem-free weatherproof installation to the roof covering.



### Technical data

- Class B2 building materials
- UV, weathering, aging and deformation resistant

### Area of application

- Fits most clay and concrete roof tiles
  - suitable for roof pitches from 16° to 65°
- Venduct® Universal Vent Tile with long apron:
  - fitting high profiled clay tiles and concrete roof tiles up to 60mm

### Product advantages

- Ideal for installation under roof-mounted solar systems
- Universally applicable
- Solar energy systems can be installed without gaps
- Constructed in a proven UV-resistant PVC
- Safe and easy to install
- Flexipipes with matching Adaptors available for 100mm and 125mm diameters

## Venduct® Universal Tile Vent

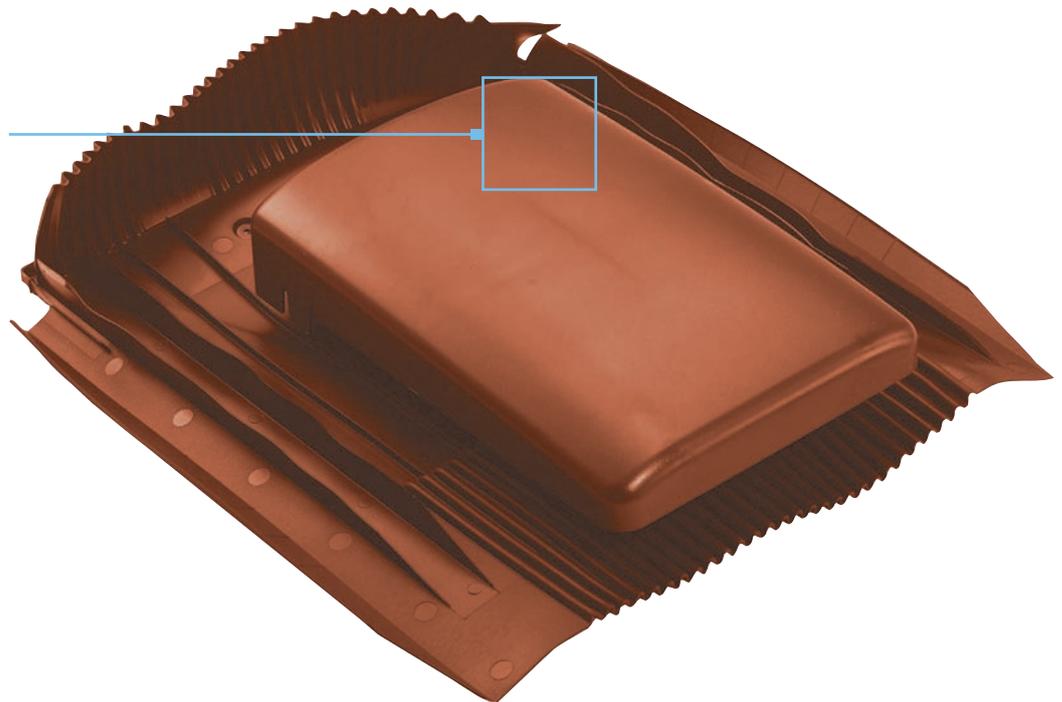
The ideal ventilation solution under a roof-mounted solar system



No cutting-off or relocation of old soil and vent pipes. Instead, the existing outlet can be replaced by Klobner's Venduct® Universal Vent Tile.



Flat ventilation cap fits under roof-mounted solar systems



### Suitable for most profiles

including:

- clay roof tiles
- concrete roof tiles

Colours: anthracite, red, brown and antique red



### Venduct® Universal Vent Tile - accessories

#### Adaptors for 100mm and 125mm pipe connections

Klober's Adaptor is required for problem-free connection to hoses or high temperature pipes.

#### Klober Sealing Collar

The flexible 'bellows' style construction is suitable for almost every roof pitch and fits pipes with diameters of 100mm and 125mm. Klober's Sealing Collars are UV, aging and temperature resistant.

#### Venduct® Flexipipes

Venduct® Flexipipes are high flexible, robust and can be connected to a range of popular pipe outlet diameters.





### Trapac® Safety Hooks

- Personal safety harness restraint and anchorage points



### Trapac® Walkway Kit

- For solid and secure roof access
- Coordinated system for clay tiles and concrete roof tiles
- Suitable for roof pitches of 20° – 56° (including 3° deviation from the horizontal)



### Trapac® Single Step

- Anti-slip
- Self-tightening nut fixing
- Suitable for roof pitches of 14° – 56° (including 3° deviation from the horizontal)



### Snow and Tile Guard

- Quick and easy to install
- Suitable for new build and refurbishment projects
- Lightweight and easy to fit without need for additional support batten
- Galvanised and powder coated
- Prevents slipping tiles from falling



## Roof accessories for solar systems

### A comprehensive range

#### Trapac® roof safety systems

Once solar thermal or photovoltaic systems are installed, regular maintenance can minimise the risk of system failure. Klobber's Trapac® roof safety systems provide safe and secure access upon the roof.

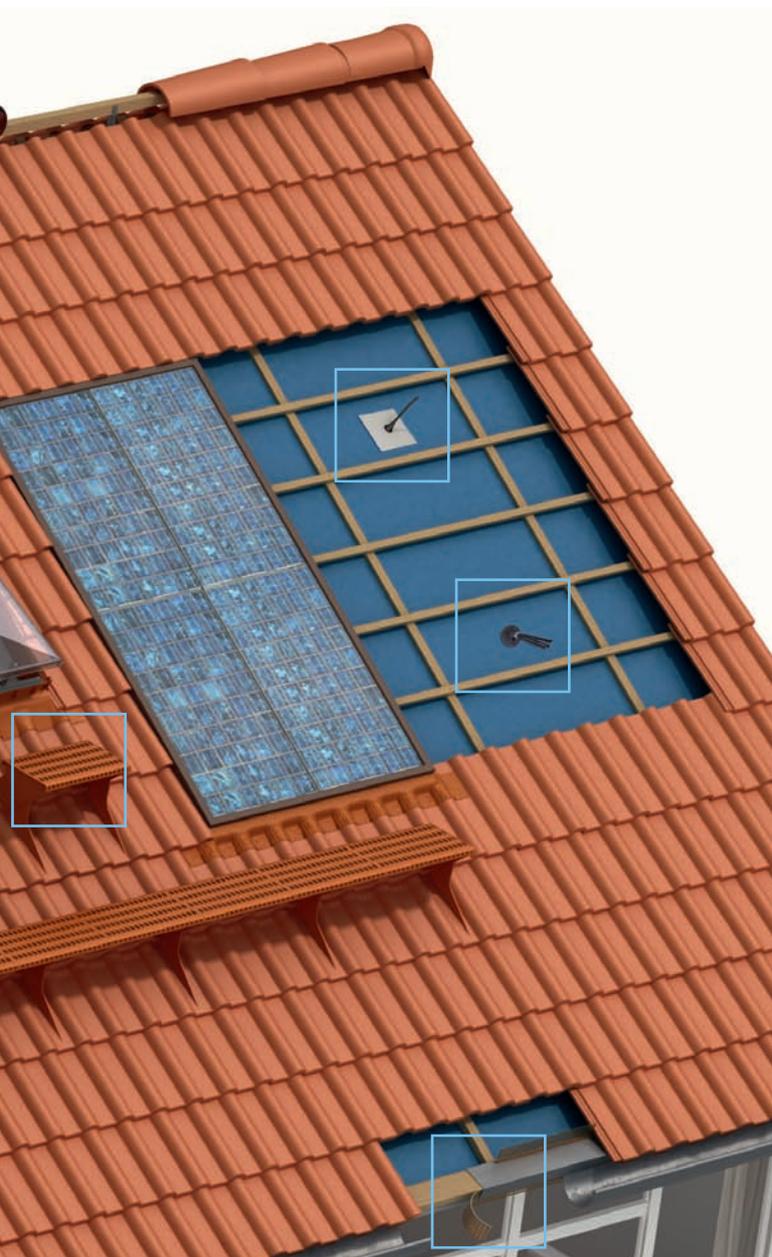
The Trapac® Single Steps and Walkway Kits allow maintenance personnel secure access to the solar systems. Trapac® Safety Hooks are used as an anchor for safety harnesses.

Klobber's Trapac® products are resistant to weathering, frost and aging. They are CE-certified.

#### Certified safety

The Trapac® products listed comply with:  
DIN EN 516  
DIN 18160 T5  
CE-certified





### Roll-Fix® Kit for ridge and hip

- High-level ventilation
- Adheres securely to the roof covering
- Bonded and sewn seams for reinforced tear-resistance
- Available in four colours



### Klover Sealing Collars

- Provide weathertight and airtight sealing of solar pipe and cable penetrations through membrane layers
- Available for various diameters of 8-12mm, 15-22mm, 25-32mm, 42-55mm and 50-70mm
- UV, weathering, frost, aging resistant and permanently flexible



### Easy-Form® Tape

- Providing weatherproof and airtight seals for through-the-roof cables
- Patented aluminium and butyl adhesive installation tape
- Stretchable up to 70%
- Available in 60mm and 90mm widths



### Eaves ventilation and protection

- Maintains low level air movement in the batten cavity
- Allows moisture run-off below the roof finish
- Prevents entry of birds and large insects
- Quick and easy to install

### Weathertight and airtight seals

Klover produces a range of quick and simple-to-install self-adhesive sealing collars. They provide weathertight and airtight connections of solar pipes and cables to Permo® underlays and Wallint® vapour barriers.

Klover's flexible Easy-Form® Tape is recommended to produce weatherproof and airtight installation of through-the-roof cables.

### Ridge, hip and eaves ventilation

Ventilation between the protective membrane and the solar system/roof-covering tiles is highly recommended in order to keep photovoltaic integrated systems efficient.

Fitting Klover's ventilation strips, or eave combs, will ensure airflow from eave to ridge under the solar system, keeping it cooler and more efficient.

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

For further information please visit our website [www.klober.co.uk](http://www.klober.co.uk) or contact our SOLAR-LINE sales representatives.

## SOLAR-LINE

Roofing accessories for solar systems

SL#01-UK-0312

**KLOBER**