



SOLAR-LINE

Roof accessories for solar systems

Your expert for
photovoltaic and
solar thermal systems



KLOBER

Roof expertise for solar energy systems

Your expert for photovoltaic and solar thermal system accessories for the installation of solar collectors or photovoltaic modules not only the system itself but also the selection of the matching accessories play an important role. Roof-mounted systems in particular require secure fixing methods, which can also resist high wind loads and guarantee rain-proof connection of pipes and cables. These are needed to guarantee weathertightness for the life of the roof.

As expert for roof accessories, Klöber offers universal and reliable solutions for roof-mounted and roof-integrated solar systems.

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

The basis of Klöber's success

The Venduct® Universal Base Tile has proved itself for years in rainproof outlets through roof structures. Covering the roof without effort or complication and matching almost all concrete and clay roof tiles, the Venduct® Universal Base Tile was tested in a wind tunnel and is applicable for roof pitches of at least 16 to 65 degrees. Its universal applicability helps to reduce stock.

Building on this basis of success, Klöber is now expanding its range of products to include specific solar energy components, which reflect its comprehensive know-how in the field of roof accessories.

Legend:



Accessories suited for:
Photovoltaics



Accessories suited for:
Solar thermal

Roof expertise for solar energy systems

SOLAR-LINE

Company history

Klöber was founded in 1960 in Schwelm (Germany). It is the leading supplier of roof accessories in Europe.

Decades of experience and passion for understanding customer and market requirements are incorporated into our products and solutions.

Our passion and devotion to the roof has resulted in major innovations which have set industry standards, e.g. rollable ridge and hip solutions, vapour permeable membranes and industrial manufactured roof outlets.

Perfection with a passion

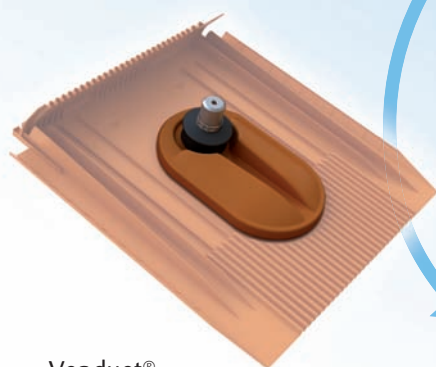
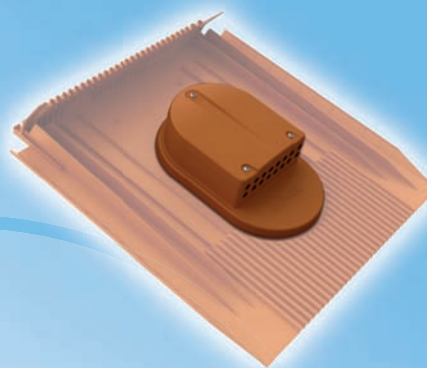
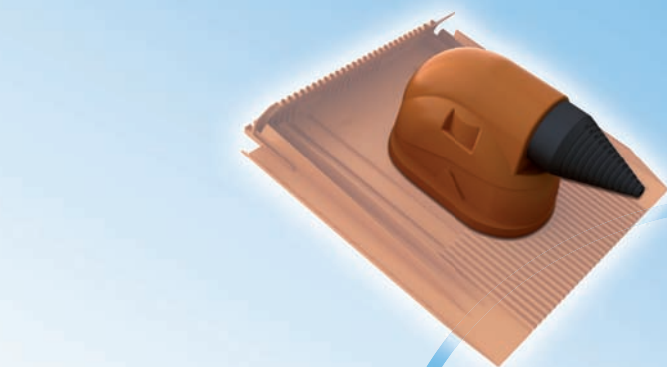
Klöber has over 50 years of **experience** and technical **expertise** in product development, manufacturing and service to the customer. Regular **trainings** for our customers help share our **knowledge** concerning standards, products and solutions.



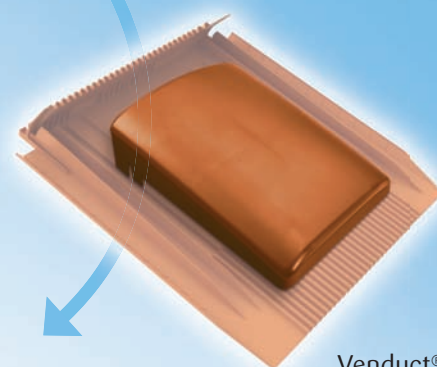
Venduct®
Solar Thermal Outlet Kit



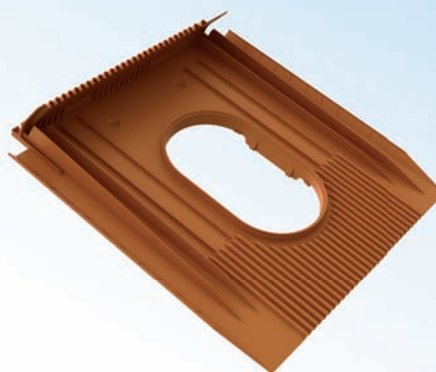
Venduct®
PV Cable Outlet



Venduct®
Solar Panel Support



Venduct®
Universal Tile Vent



Venduct®
Universal Base Tile

Venduct® Universal Base Tile

One perfect base designed from roofers for roofs.

With a proven, easy to use yet weathertight click-on system for a multitude of roof applications.



With Klöber products you are on the safe side

SOLAR-LINE



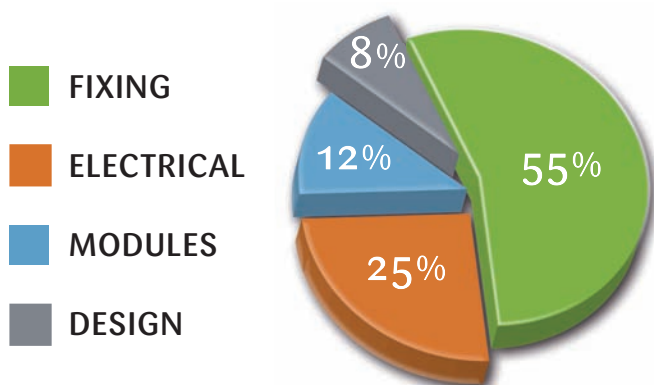
The installation of solar systems often requires a modification of the existing roof system. These simple modifications can lead to serious consequences such as loss of weathertightness with consequential damage and a complete loss of warranty. For example removing the weatherbar of the tile by grinding it off with a flexitool. Penetration of water and potential mould growth are often the consequences.



Many home owners are faced with the aftermath of improperly installed solar systems.

The current installation practices result in a growing number of complaints. For example, tiles can be damaged during substandard fixing and installation of solar systems, wind loads are not taken into account and holes through roofs are not sealed in a rain-proof manner or following roofing codes. These codes have been developed with the goal to ensure the weathertightness and longevity of roofs.

Installations that are not properly carried out, can cause serious financial risks if the projected gains (e.g. feed-in tariffs) have to be used for repeated services and repairs.



Source: www.solar-sachverständiger.de

No more complaints because of inadequate fixing!

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

Not only the fixing but also roof penetrations, e.g. for cables and pipes must be carefully executed. Cables and pipes may not be damaged by snow and wind loads but an improper sealing of the penetration bears serious risks of water damage to the whole roof structure.



Broken tile caused by overloading, faulty installation



Leaks and crushed cables through substandard installation



A danger of mould growth through blocked ventilation or damaged cables



Water and ventilation leak caused by inadequate installation



Venduct® Solar Panel Support System – Strong and Safe

The high-quality material of the Venduct® Solar Panel Support ensures that the fixing of the solar energy system complies with local roofing standards. Through combination with the Venduct® Universal Base Tile the fixing can be used with many types of roof tiles (e.g. with flat to high profiled roof tiles).

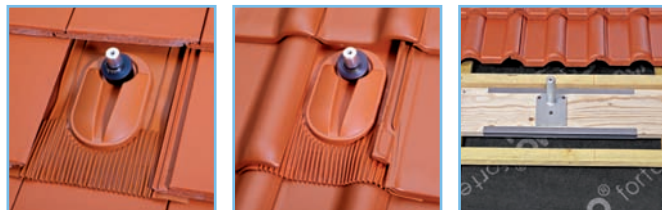
The superimposed sealing collar out of highly UV-resistant EPDM ensures a weathertight installation of the hook. In combination with the special solid Timber Support Base with reinforcement bars the Venduct® Solar Panel Support shows outstanding load-bearing properties of the whole system.

Area of application

- Applicable for roof pitches from 16° to 65°
- Matches most clay and concrete roof tiles
- Fitting many rail systems via adaptor (for photovoltaics)

Product advantages

- No load on roof tiles and therefore protection against breakage and consequential leaks
- High loadbearing 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 collar
- High-quality workmanship and materials: building authority approval (for wood & fixing material)
- Easy laying



Technical data

- | | |
|---|---------|
| ■ Maximum pressure, vertically onto the roof: | 2,500N |
| ■ Maximum tension, vertically to the roof: | -2,500N |
| ■ Maximum tension, parallel to the side: | 900N |
| ■ Maximum shear, parallel to the roof: | 1,200N |
| ■ Minimum rafter thickness: | ≥ 6cm |
| ■ Building materials class | B2 |
| ■ UV, weathering, aging and deformation-resistant | |

Venduct® Solar Panel Support

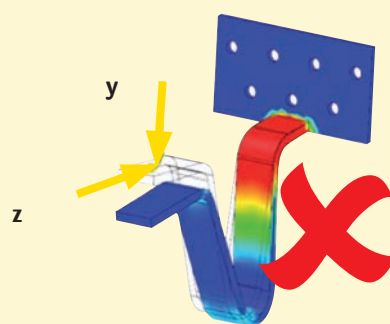
The simple and solid solution for fixing solar systems

Design loads in comparison

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

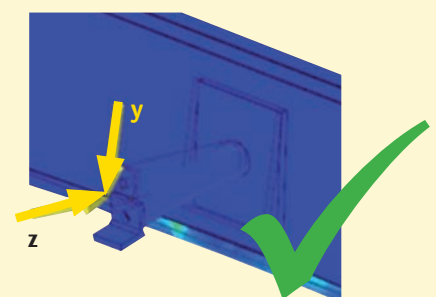
Conventional heavy-duty roof hooks in internal test simulation (linear structural analysis with Finite Element Programme)

Standard solar fixing



Plastic deformation of heavy-duty roof hook possible (from circa 300N/mm²).

Venduct® Solar Panel Support



Even with heavy loads no permanent plastic deformation of the system.



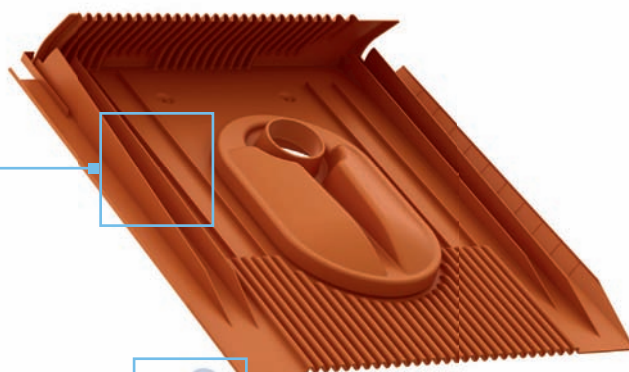
Venduct® Solar Panel Support kit - assembly



Stainless steel clip and
EPDM sealing collar



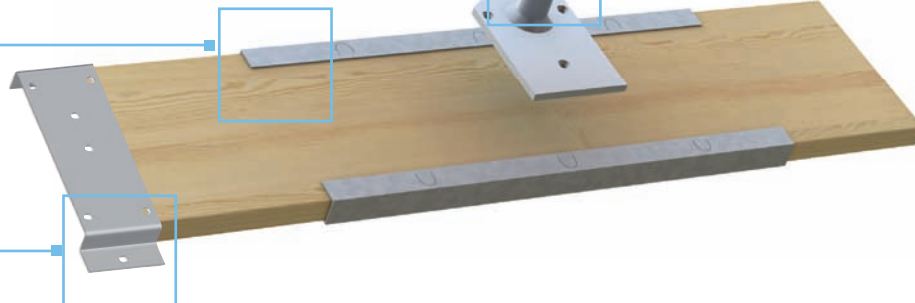
Venduct® Universal Base Tile
with special insert



Solar fixing in aluminium



Solid Timber Support Base
with reinforcement bar



Butt joint
connection of
galvanised sheet metal



For various profiles

fitting most:

- clay roof tiles
- concrete roof tiles



Colours: anthracite, red, brown



Venduct® Solar Panel Support - system components

Venduct® Solar Panel Support kit

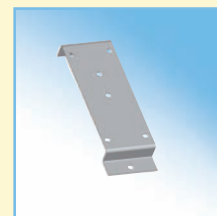
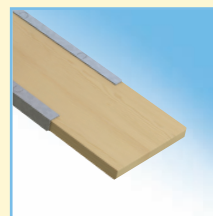
The kit comes with two Venduct® solar fixings and Venduct® Universal Base Tiles with special inserts, stainless steel clips, EPDM collars and fixing screws.

Solid Timber Support Base kit

Available official building approval for the water proof multiplex board and fixing accessories. The structural system design of the fixing system is according to DIN standard 1052 and 1055 and Eurocode1.

Butt joint connector kit

The butt joint connector in galvanised sheet metal is used for additional reinforcement with two solid Timber Support Bases connected on one rafter.





Technical data

- Building materials class B2
- Applicable for pipes and cables 4 - 8mm in diameter
- UV, weathering, aging and deformation-resistant

Venduct® PV-Kabeldurchgang

The Klöber Venduct® PV Cable Outlet ensures a rain-proof installation of up to 16 cables through the roof. The Universal Base Tile also fits perfectly underneath roof-mounted solar systems in a multitude of roof tiles, shapes and profiles.

Flexible fitting strips at the sides allow the easy, rain-proof installation of the Universal Base Tile into the roof covering. An internal foam strip protects against rain penetration.

For retrofitting the Venduct® PV Cable Outlet can be extended by further 8 outlets with the aid of the 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
- Venduct® PV-cable outlet with long apron
 - Fitting profiled clay and concrete roof tiles up to 60 mm
 - Suitable for roof pitches between 20° and 50°
- Venduct® PV-Cable Outlet for slate roof tiles
 - Usable for roof pitches between 22° and 60°

Product advantages

- Rain-proof penetration of up to 16 cables in pre-fabricated kit method
- Usable for most common cable types (e.g. pv, antenna or lamp cables)
- Optimum sealing through additional foam strip
- Made of proven UV-resistant special PVC
- Easy laying



Venduct® PV Cable Outlet - accessories Klöber sealing collars

- For air and windtight connection of solar pipes to underlay membrane and vapour barrier
- Obtainable for wide range of diameters (8-12 / 15-22 / 25-32 / 42-55 / 50-70mm)
- UV, weathering, frost, aging-resistant and permanently elastic



Venduct® PV Cable Outlet - assembly

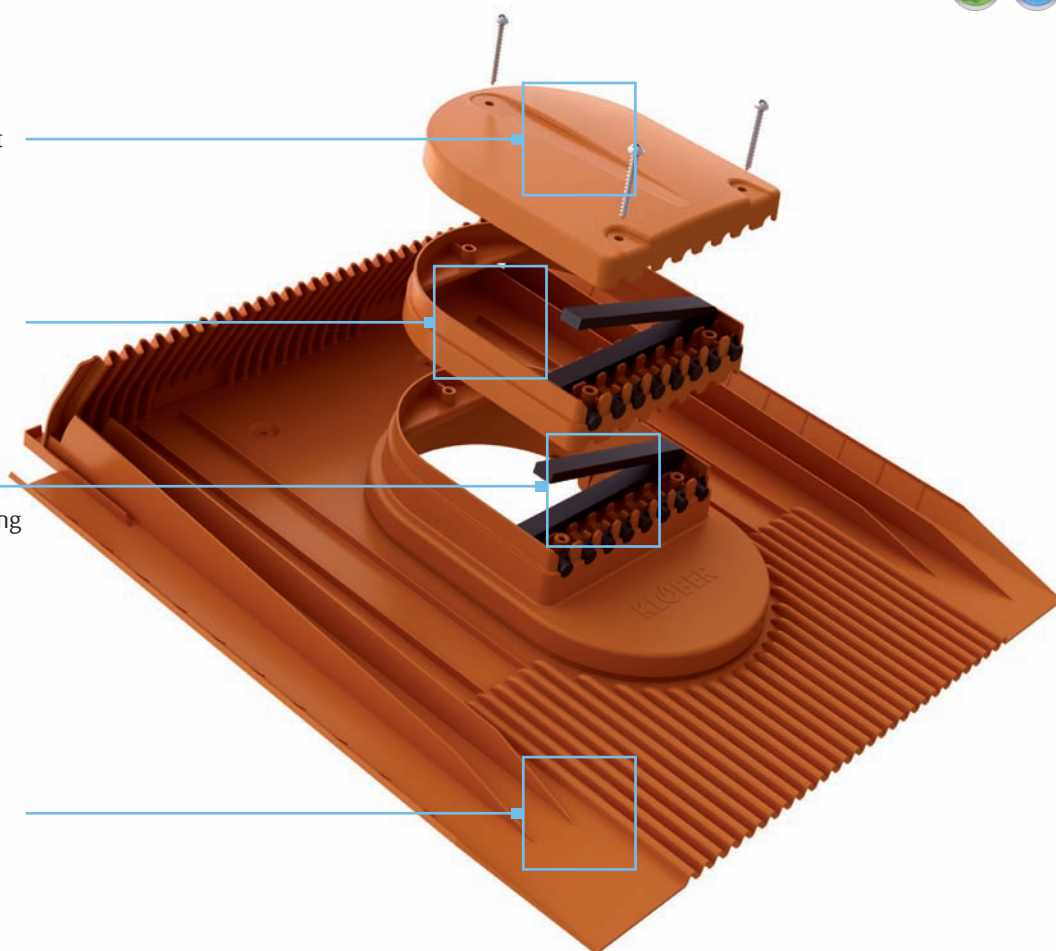


Cover of proven UV-resistant special PVC

Venduct® PV Cable Outlet Adaptor extends by a further 8 outlets

Sealing strip and additional foam water-proofing

Venduct® Universal Base Tile with special insert



For various profiles

fitting most:

- clay roof tiles
- concrete roof tiles



Colours: anthracite, red, brown



Venduct® Solar Thermal Outlet Kit

No more problems with the cable through the roof

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

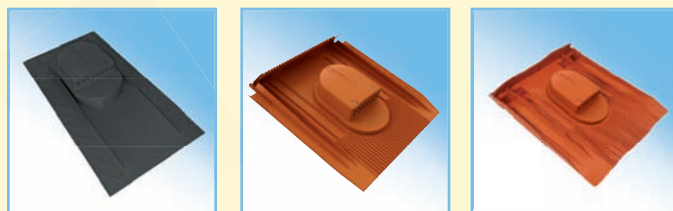
The pre-assembled product is offered in two versions. For outlets up to 16 cables...

Venduct® PV Cable Outlet (for up to 8 cables)

... and for the rain-proof installation of up to 8 cables through the roof.

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 the optimal solution for the installation of solar pipes and photovoltaic cables through the roof. Due to its unique shape in combination with an elastic EPDM sealing collar the penetration has a water-tight fit and thus protects the roof structure from water damage.

In a kit with the Venduct® Universal Base Tile or the Venduct® Slate Base Tile quick installation on site is ensured through pre-fabrication. The universal design also simplifies storage, since it can be combined with almost any roof tile.

In addition the Venduct® solar outlet fits the Venduct® 100 mm base tiles and can be combined with a broad portfolio of roof tiles, profiles and colours.

Area of application

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

Product advantages

- Rain-proof penetration of solar pipes and cables through combination with an elastic EPDM collar
- Of proven UV-resistant special PVC
- EPDM collar heat-resistant up to 100° C
- Allows an air and windtight connection in combination with the Klöber Sealing Collar for solar pipes
- Easy laying



Technical details

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

EPDM sensor cable outlet for later installation (sealing enclosed)



Venduct® Solar Thermal Outlet DN 100*

Solution for cables and water pipes for solar thermal and photovoltaic panels passing through the roof. In combination with an elastic EPDM collar it creates an airtight and rainproof seal e.g. against driving rain.

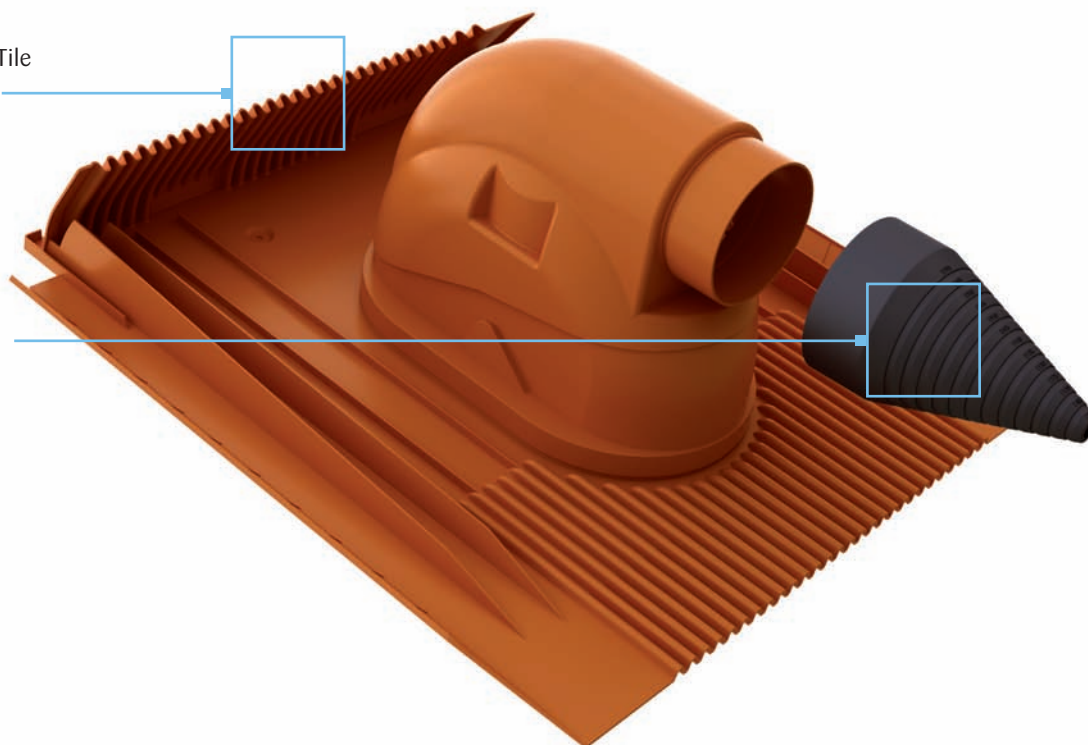
The Venduct® Solar Thermal Outlet can be combined* with a large number of Klöber precision-fit base tiles for most top selling tiles as well as Venduct® Universal Base Tile with long apron and is available in a large variety of colours.

* please note enclosed installation instruction



Venduct® Universal Base Tile
with special insert

UV-resistant EPDM nozzle
for 10 mm to 70 mm
in diameter



For various profiles

fitting most:

- clay roof tiles
- concrete roof tiles



Colours: anthracite, red, brown



Venduct® Solar Thermal Outlet Kit

The universal solution for the connection of solar thermal and photovoltaic systems

Venduct® Solar Thermal Outlet - Product options

Venduct® Solar Thermal Outlet Kit - Slate

Also available in combination with the slate base tile as a pre-fabricated kit in black.

Venduct® Solar Thermal Outlet Kit - Universal

The universal Venduct® Solar Thermal Outlet Kit fits most roof coverings and is available in red, brown and anthracite.

Venduct® Solar Thermal Outlet Kit with long apron

The universal Solar Thermal Outlet Kit fits high profiled clay and concrete roof tiles up to 60mm. It is available in red, brown and anthracite.





Venduct® Universal Tile Vent

Underneath solar energy or photovoltaic systems the Venduct® Universal Tile Vent fits each roof tile shape perfectly.

Because of the laterally flexible fitting strips the Venduct® Universal Base Tile allows problem-free rain-proof installation in the roof covering. Through its universal application, storage can be simplified.

Please look for resistance to ammonia and hazardous materials in the product information of the solar energy or photovoltaic system manufacturers.



Technical data

- Building materials class B2
- UV, weathering, aging and deformation-resistant

Area of application

- Fits most clay and concrete roof tiles
 - applicable for roof pitches from 16° to 65°
- Venduct® Universal Tile Vent with long apron:
 - fitting high profiled clay tiles and concrete roof tiles up to 60mm
- Applicable for roof pitches between 20° and 50°

Product advantages

- Ideal for installation under roof-mounted solar systems
- Universally applicable
- No sawing-off of ventilation pipes necessary
- Solar energy systems can be laid without gaps
- Made of proven UV-resistant special PVC
- Quick installation
- Matching flexpipes with diameters 100mm and 125mm with adaptor

Venduct® Universal Tile Vent

The optimum solution under roof-mounted solar systems



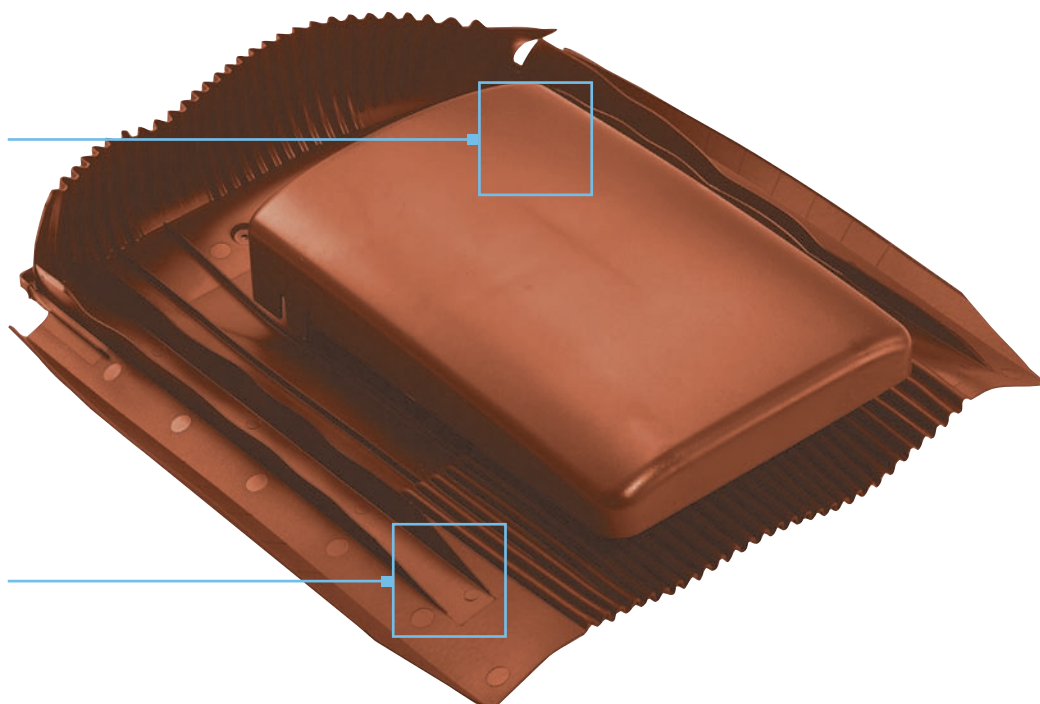
No cutting-off or relocation of old, already existing roof ventilators necessary. Instead of this the existing outlet can be replaced by the Venduct® Universal Tile Vent.





Flat ventilation cap fits under roof-mounted solar systems

Venduct® Universal Base Tile with special insert



For various profiles

fitting most:

- clay roof tiles
- concrete roof tiles



Colours: anthracite, red, brown



Venduct® Universal Tile Vent - accessories

Adaptor in 100 mm or 125 mm

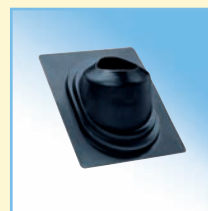
For problem-free connection of hoses or HT (heating / high temperature) pipes the Klöber adaptor is required by standard.

Klöber Sealing Collar

Fits pipes with diameters of 100 mm to 125 mm and, as a result of the elastic bellows construction, usable for almost every roof pitch, age-, UV- and temperature-resistant for years.

Venduct® flexpipe

Venduct® flexpipes are distinguished by high flexibility and robustness and can be used for different connection diameters.





Trapac® Safety Hooks

- To secure persons or as an anchorage for loads
- Tested by BIA
- Applicable for roof pitches between 20° and 75°



Trapac® Walkway Kit

- For solid and secure roof access
- Coordinated system for clay tiles and concrete roof tiles
- Tested by BIA
- Applicable from 20° to 56° (including 3° deviation from the horizontal)



Trapac® Single Step

- Anti-slip
- Self-tightening nut
- M8 on the whole system
- Tested by BIA
- Applicable from 14° to 56° (including 3° deviation from the horizontal)



Roof accessories for solar systems

The powerful range – to the last detail

Trapac® roof safety systems

After solar hot water and photovoltaic systems are taken into use, regular maintenance can minimise the risk of system failure. Secure method for access allowing craftsmen a secure access to the roof.

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

These high-value Trapac® products are resistant to rot, weathering, frost and aging and are CE-certified.

Certified safety

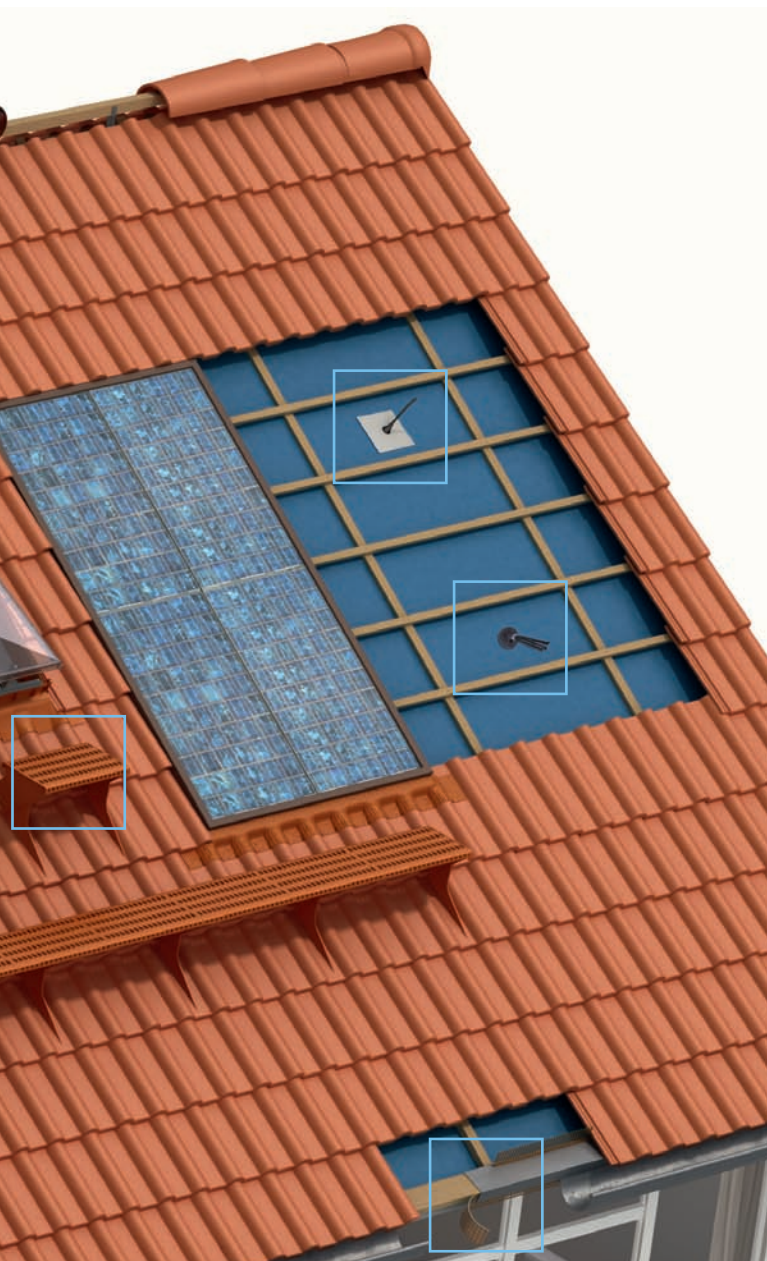
The Trapac® products listed comply with:
DIN EN 516
DIN 18160 T5
CE-certified



BIA

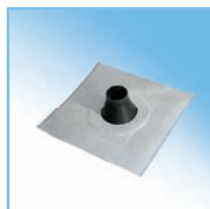
Berufsgenossenschaftliches
Institut für
Arbeitsschutz





TOP-ROLL® ridge and hip roll

- For back-ventilation of the roof covering
- Good ventilation properties
- Perfect fitting through heavily pleated metallic side strips
- Glued and sewn seam for reinforced tear-resistance



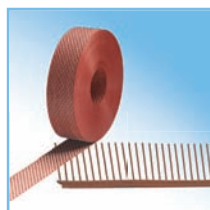
Klöber Sealing Collars

- For the air and windtight sealing of solar pipe and cable penetrations through membrane layers
- Available for various diameters (8-12 / 15-22 / 25-32 / 42-55 / 50-70mm)
- UV, weathering, frost, aging-resistant and permanently elastic



Easy-Form® Tape

- For the rain-proof and airtight passing of cables through the roof
- Patented aluminium butyl adhesive and installation tape
- Up to 70% stretchable
- In widths 60 & 90mm



Eaves ventilation elements

- For all back-ventilated facades and roofs
- Protection against insects, birds
- Fast and easy laying and minimal waste

Wind- and airtight sealing

For the wind- and airtight connection of solar pipes and cables to Permo® underlays and Wallint® vapour barriers, Klöber offers a range of sealing collars. Its self-adhesive underside provides a simple and quick connection method.

For the rain-proof and airtight installation of cables through the roof, we recommend the flexible Easy-Form® adhesive tape.

Ridge and eave ventilation

In order to keep or increase the efficiency of photovoltaic roof-integrated systems, a back ventilation between the protective membrane and solar system / tiles is highly recommended.

Fitting ventilation strips or eave combs assure airflow from eave to ridge behind the solar system, keeping it cooler and more efficient.

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SOLAR-LINE

Roof accessories for solar systems

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