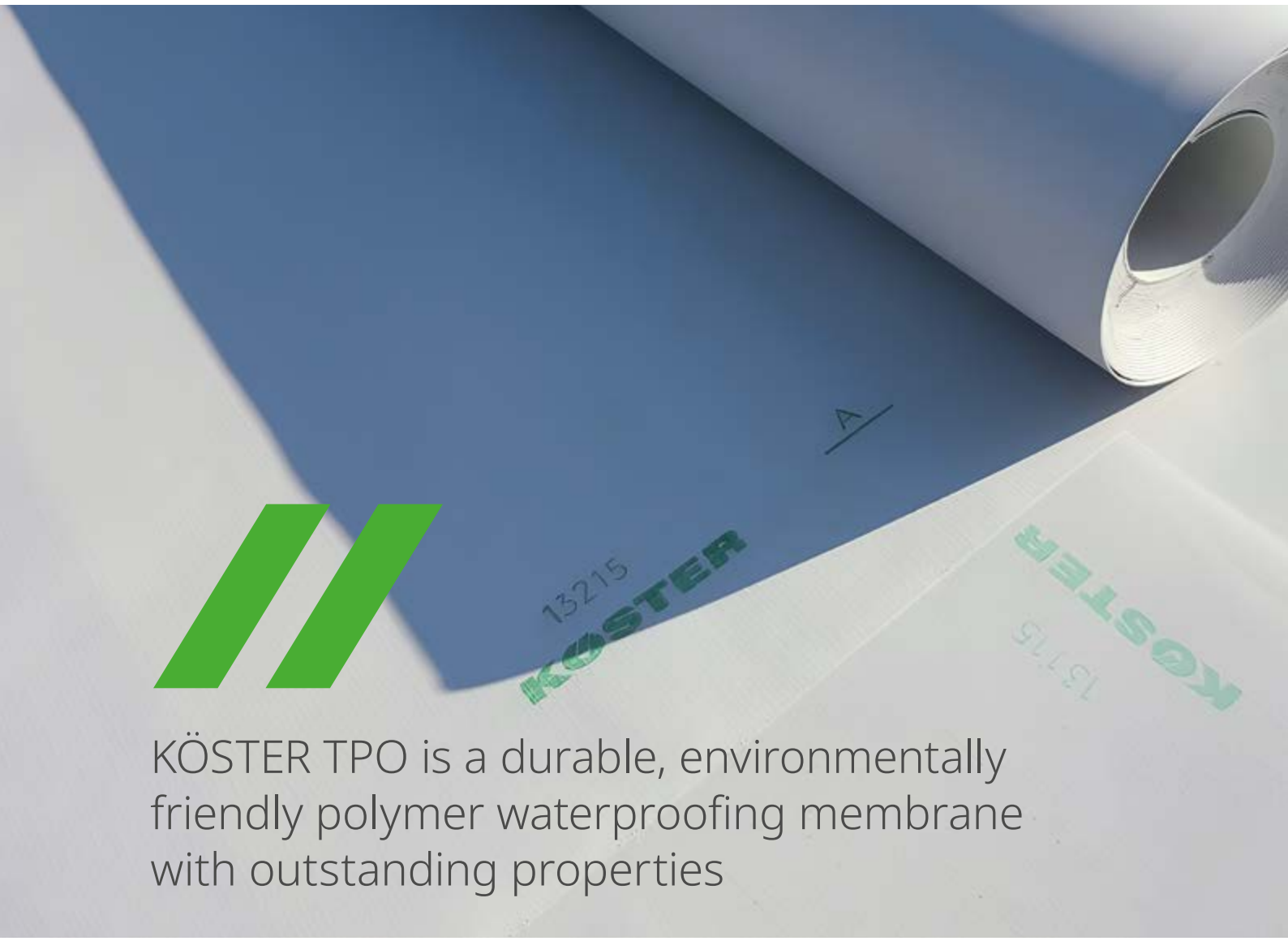
KÖSTER

Roofing Systems

High-performance single-ply TPO / FPO roofing membranes



KÖSTER TPO is a durable, environmentally friendly polymer waterproofing membrane with outstanding properties

KÖSTER TPO is

- **Durable:** more than 40 years of proven durability on roofs
- **Economical:** quick and easy to install with low maintenance
- **Sustainable:** long-lasting and recyclable with minimum environmental impact
- **Easy to weld:** top and bottom layers are made of the same material
- **Safe:** very wide welding temperature range from +400 °C to +620 °C
- **Reliable:** up to 25 years guarantee

... and offers even more advantages:
UV-resistant, root, and rhizome-resistant, acid and kerosene-resistant, high tensile strength and elongation values, resistance to microorganisms, and standing water.

Building and the Environment

The KÖSTER BAUCHEMIE AG is committed to protecting and preserving our environment. We combine the use of the most modern raw materials and production technologies in connection with constant research and development. This means that most materials are not only solvent-free, but are also designed for minimal environmental impact and maximum safety for the installers. The KÖSTER BAUCHEMIE AG is also a member of the Institute for Building and the Environment, whose members are committed to sustainable construction. The basis for this is the transparent disclosure of all relevant product information, including the life cycle assessment data.

KÖSTER TPO roofing membranes are at the same time ecologically and economically advantageous because of their durability over decades and because of the low maintenance intensity. They protect buildings from water ingress, which is the most common and costly cause of building damage. The real estate is preserved longer and important resources are saved. In contrast to other roofing membranes, KÖSTER TPO roofing membranes do not release any plasticizers into the environment and can be optimally recycled. They do not become brittle and are therefore more durable. KÖSTER TPO Roofing Membranes are an excellent base for green roofs.

Flat roofs

Cold, heat, rain, hail, snow, extreme wind, UV and infrared rays as well as many different types of chemicals impact a roof. Additionally, roofs are subject to movement and other mechanical stresses from the construction itself. As a result, roofs must be able to withstand a lot of stress. Permanently. At the same time, a wide variety of demands is placed on the roofs. They should be architecturally sophisticated, roof terraces should offer space to relax and unwind, and solar panels and solar modules should produce energy and be securely attached. There are also many other installations and superstructures on roofs such as ventilation shafts, transmission masts, or chimneys.

If the roof waterproofing is carefully planned and implemented, the building will be well protected for decades. A longer service life has a direct influence in reducing CO_2 emissions released into the atmosphere.

Concepts like Cool Roofs, Green Roofs, Blue Roofs, or Biosolar PV are generating significant interest from governments, planners, and owners who wish to play a role in the use of good practices to reduce the negative impact on the environment. The KÖSTER TPO roofing membranes are the natural choice for new roof concepts due to their extraordinary durability and uses in different types of installation.

KÖSTER TPO roofing membranes compatible with all roofing concepts

Cool Roofs

Roofs that use white or light-colored membranes that reflect a significant portion of the incident solar radiation into the atmosphere (reflectance) and also release some of the absorbed energy into the atmosphere (emittance). This lowers roof surface temperature when compared to black or dark-colored membranes and therefore has a direct impact on energy savings, reduction of carbon emissions, and greenhouse emissions at the same time that combats the Urban Heat Island Effect.

Green Roofs

Roofs that are completely or partially covered with vegetation planted on top of the waterproofing membrane. These roofs can be categorized as extensive, semi-intensive, and intensive. The difference is based on the type of vegetation used and the necessity for maintenance. Extensive Green Roofs require minimum maintenance and are designed to be self-sustaining with a thin layer of soil with grass or moss plantation, as the Intensive Green Roofs make use of thick soil layers with plantations anywhere from simple lawns to the growth of large plants and trees and it is labor intensive for frequent maintenance of the vegetation. The Semi-Intensive Green Roofs, include the two concepts mixed in different parts of the same roof.

Blue Roofs

Roofs that are designed to provide rainwater storage for gradual release, whether for reduction of flood risk due to lack of permeable surfaces in urban areas, for reuse as an irrigation source, or to mitigate runoff impacts for populations in drought regions. These roofs can be categorized as active or passive. Active Blue Roofs uses automated control systems for the discharge of the water drains in the roof, as the Passive Blue Roofs detain temporarily the water on the surface of the roof until a certain level is reached that overflows the detention structure.

Solar PV

Roofs that have mounted photovoltaic units for the use of the roof area for the production of carbon-free electricity. The PV panel units can be mounted and fixed to the structure after the installation of the roofing membranes in all types of buildings such as industrial, commercial or residential.

BioSolar PV

Roofs that have a combination of photovoltaic panels and green roofs increase the amount of solar energy gained on a green roof compared to a non-green roof. This has to do with the fact that a solar panel is most efficient when the ambient temperature is around 25°C and the greenery helps to regulate the temperature in the roof which increases the panel efficiency.

KÖSTER TPO membranes: The optimal solution for renovation or new build projects

Selecting the right membrane for a flat roof is an important task. The best solution should offer versatility, durability, and simple installation. The KÖSTER TPO membranes fulfill all these requisites and many more, by providing the simplest and fastest system for a secure and long-lasting solution for flat roofs.

Overall, KÖSTER TPO products are the ideal choice for all types of new build projects and also renovation projects that require a reliable, durable and easy-to-install roofing system. With its versatility, durability and environmental friendliness, it sets a high standard in the construction industry and offers long-term value retention for any structure.

Renovation projects

General reasons for flat roof renovations include

- Leaks and problems with the existing roof
- Storm damage
- Age of the roof
- Improvement of energy efficiency
- Planned installation of solar systems
- Conversion of the building function
- Aesthetic reasons

Before

After

Different material options for different needs

KÖSTER TPO

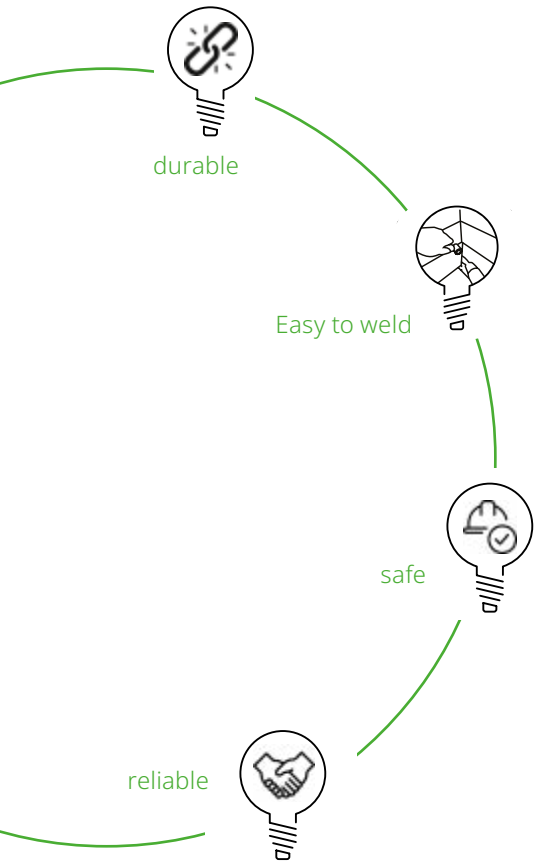
The reliable solution produced with 100% virgin polymers of the highest quality with proven track record of more than 35 years and installed in roofs across all continents.

KÖSTER TPO Pro

The responsible solution for roofs and for the environment. Made with > 50% of near-to-prime recycled polymers and a high SRI (> 94), we have brought a new leader into the market. The leader of innovation and pioneer in sustainability.

KÖSTER TPO FR

The version with a superior fire resistance. The building regulations governing fire safety are designed to preserve life. KÖSTER TPO FR membranes are specially designed to meet the toughest standards in fire protection today for roofing membranes.



KÖSTER TPO Roofing Membranes

KÖSTER TPO Roofing Membranes are particularly characterized by their excellent workability, flexibility, and weldability. The unique polyethylene (PE) based composition guarantees a simple, uncomplicated, safe, and permanent weld.

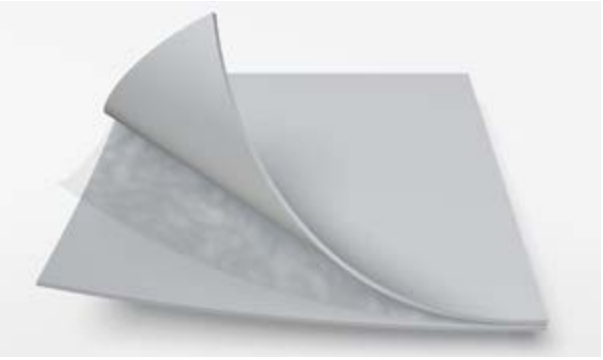
We offer a wide variety of options that meet all the requirements for all types of projects. With the KÖSTER TPO roofing membranes no project is compromised.

Product name	Thickness in mm	Color	SRI
KÖSTER TPO	1.2/1.5/1.8/2.0	Light Grey	> 58
KÖSTER TPO PRO	1.2/1.5/1.8	White	> 94
KÖSTER TPO FR	1.5/1.8/2.0	White	> 85
KÖSTER TPO F	1.5/2.0	Light Grey	> 58
KÖSTER TPO SK	1.5/2.0	Light Grey	> 58

Why Polyethylene (PE) base FPO/TPO?

Polyethylene (PE) is a thermoplastic polymer that belongs to the polyolefin family. It can be made from a variety of different monomers, the most common of which is ethylene. There are several advantages of the PE-base membrane, such as

- PE is more resistant to UV radiation
- PE is more resistant to low temperatures
- PE is more flexible and combines a very high tensile strength and abrasion resistance
- PE is more resistant to many polar solvents, such as acids, alkalis, alcohols, and oil
- PE is tougher and has a higher density making it more durable and tear-resistant



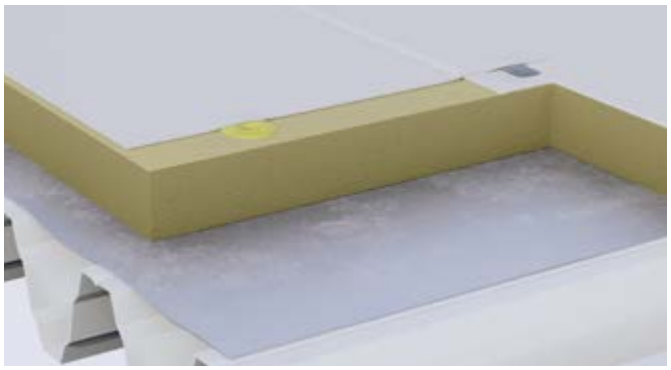
One-of-a-kind feature

Same quality in the top and the bottom layers

Why?

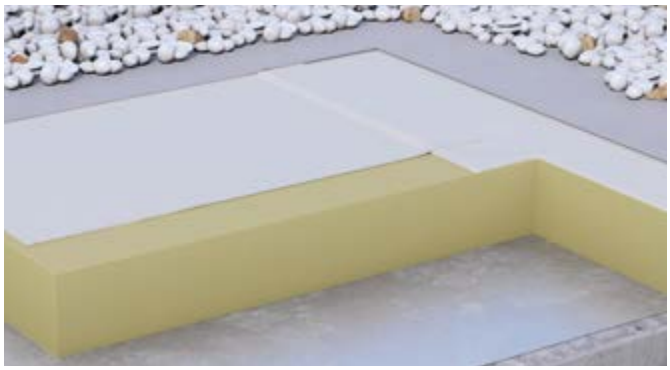
+ Same UV stability and fire resistance on the total thickness of the membrane
+ Superior welding performance by welding the same quality material

Different installation methods for different needs



Mechanically fastened using KÖSTER TPO

The KÖSTER TPO membranes can be installed with the mechanical fastening systems. This type of installation is considered the most reliable and secure method for the application of single-ply roofing membranes. Due to the speed and simplicity of the installation, low labor and material costs as well as superior durability, this method is the most commonly used on flat and sloped roofs worldwide. The membranes are fastened to the roof structure, using special fasteners and plates. The induction fasteners KÖSTER TPO membranes are also compatible with mechanical induction systems.

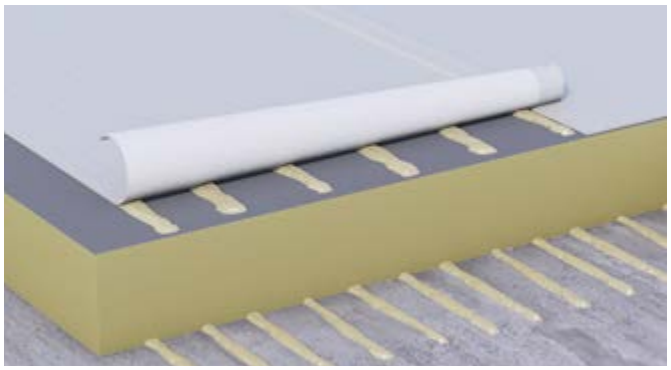


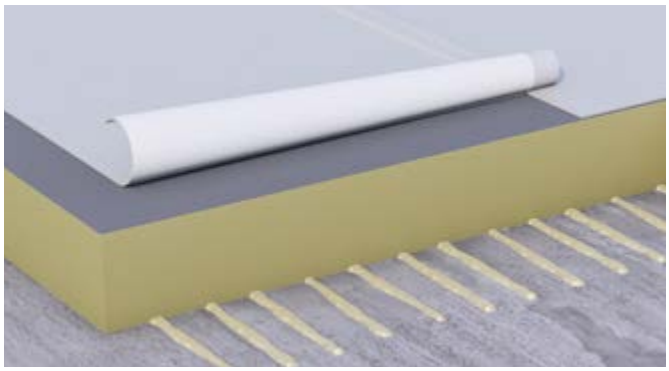
Loose-laid installation with KÖSTER TPO

A quick and secure way to install KÖSTER TPO roofing membranes is through loose laying with ballast over the membrane. Ballast can consist of either gravel, paving slabs, or even green roofs. Ballast helps protect the roofing membrane against wind loads and can accommodate a wide range of architectural styles. The main advantage of this installation method is that the roofing membrane does not need to be mechanically fastened to the substrate. Due to the weight of the ballast, higher loads must be taken into consideration in the roof load calculation. KÖSTER TPO roofing membranes are compatible with all types of loose-laid installation options.

// All KÖSTER TPO variations have improved flame-resistant properties and fulfil requirements of „hard roofs“ an minimum Broof (t1). A direct application on EPS insulation is authorized.

Roof membranes must be secured against the effects of wind suction forces. The application method of KÖSTER roofing and waterproofing membranes depends on the field of application and the type of installation.





When drilling is not an option: KÖSTER TPO F

KÖSTER TPO F (fleece-back) membranes are the all-rounder among the KÖSTER TPO roofing membranes. They can be used in any roof structure. They are mainly installed with KÖSTER PUR Membrane Adhesive. The membrane is bonded permanently to almost any surface via the firmly laminated polyester fleece on one side of the membrane.

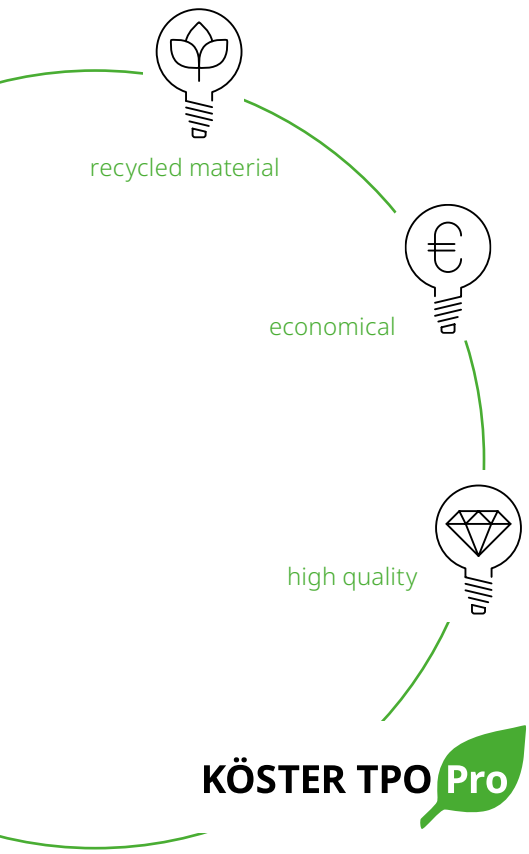
KÖSTER TPO F Membranes can be fully or strip adhered with KÖSTER Membrane Adhesive or fully adhered with hot bitumen. The membranes can also be loose laid (under ballast) or mechanically fastened.

When it has to be quick: KÖSTER TPO SK

KÖSTER TPO SK self-adhered TPO membranes provide a quick and fast installation when time is a key factor. These special membranes include a special self-adhering fleece laminated underside, and improved flame-resistant properties (FR) that it can be adhered directly to the prepared substrate. KÖSTER SK membranes are deliberately available in the easy-to-use membrane width of 1.05 m, in the two nominal layer thicknesses of 1.5 and 2.0 mm in light grey.

Pioneer in sustainability: KÖSTER TPO Pro

This is what sustainability looks like: KÖSTER TPO Pro has the same quality requirements as all KÖSTER TPO Membranes and uses near-to-prime industrial recycled raw materials. These are polymers that were used directly in production or for one-time use in the commercial sector (e.g. wrapping films). This means that the KÖSTER TPO Pro membrane protects the environment with every square meter installed.



Extremely resource-saving

With KÖSTER TPO Pro, we have developed the first roofing membrane based on recycled material. The use of recycled raw materials has a direct impact on the reduction of several kgs of CO_2 emissions per m^2 released into the atmosphere. The reduction of CO_2e is calculated by direct and indirect greenhouse gas emissions from the production of the product (recycling of waste), the substitution of new material, and the avoidance of the incineration of waste. After decades, at the end of their life cycle, KÖSTER TPO Pro roofing membranes can be completely recycled.

Particularly economical

The long lifespan of more than 30 years, the use of recycled material and cost-effective production make KÖSTER TPO Pro a particularly economical roof waterproofing Membrane. Compared to PVC waterproofing membranes, cost advantages can be achieved over the entire service life.

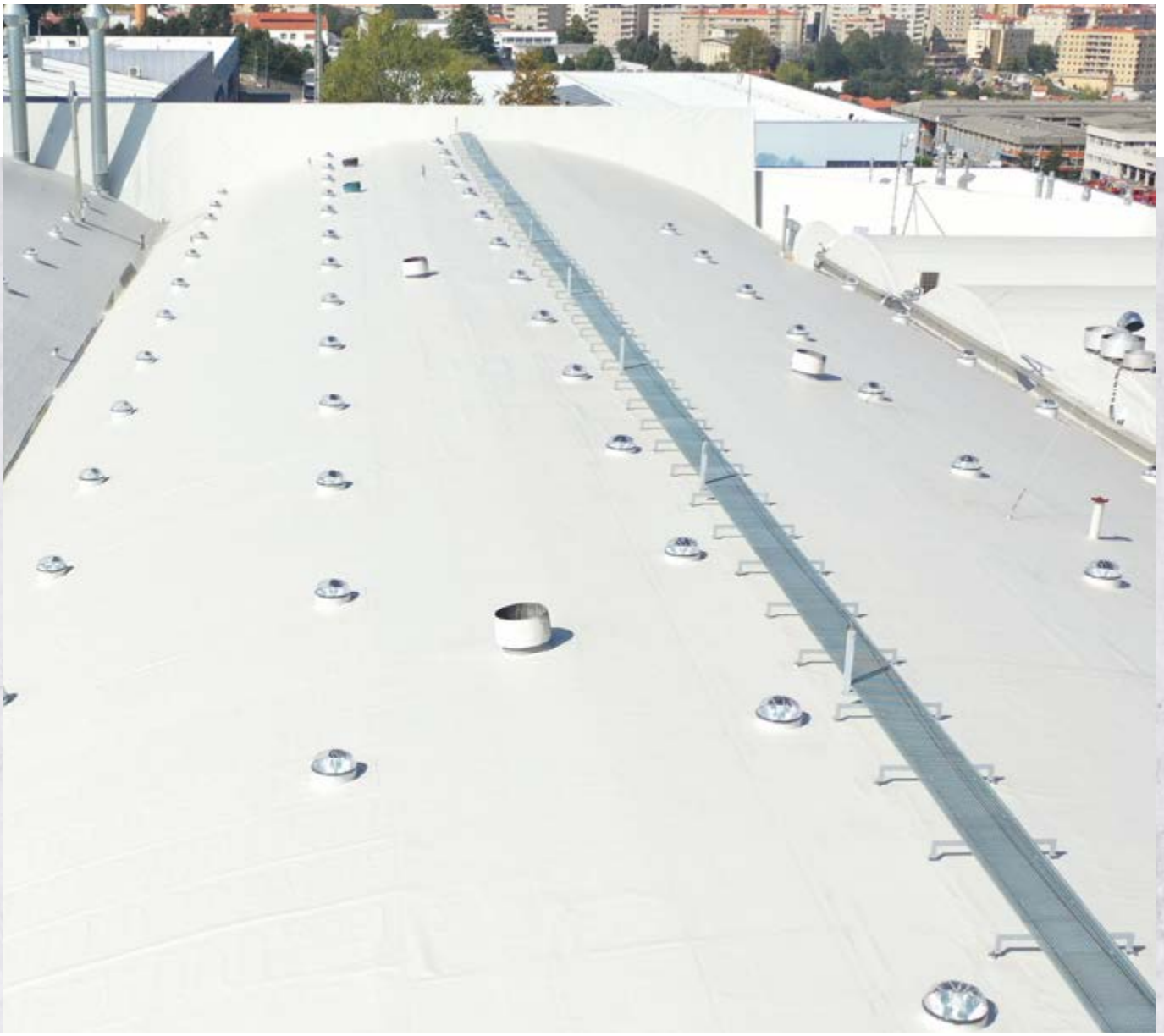
Sustainable

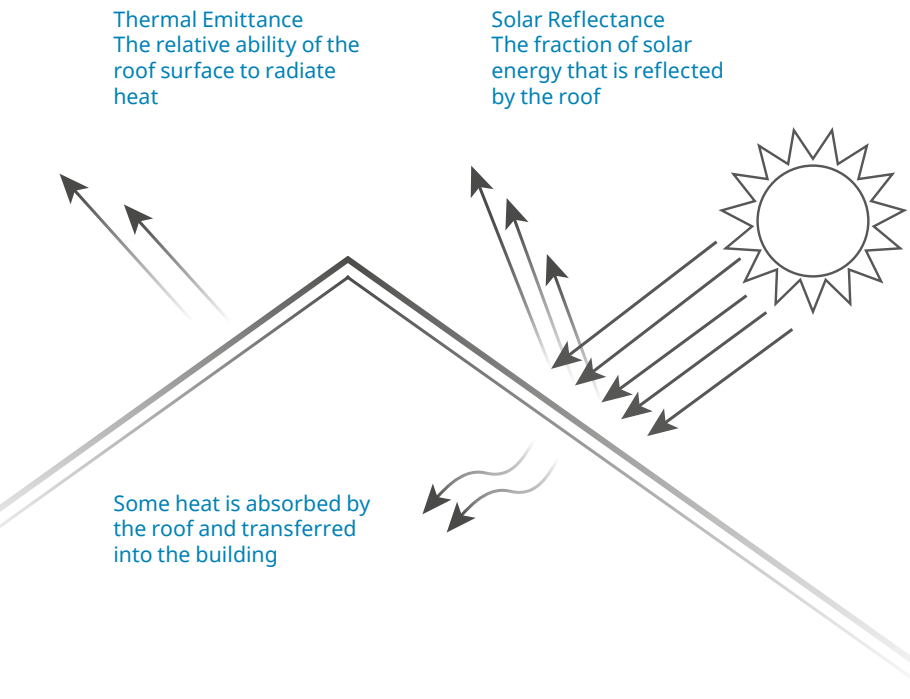
By using recycled polymers, KÖSTER TPO Pro contributes to a sustainable building culture and therefore also to the criteria for a DGNB certificate. The basis and evidence for the ecological assessment is the environmental product declaration (EPD) of the Institute Building and Environment (IBU).

Climate protection active: KÖSTER TPO in white

The KÖSTER TPO membranes offer highly reflective properties. It reflects most of the sunlight directly back and therefore hardly heats up. The roof remains pleasantly cool and air conditioning costs are reduced. That saves energy. Even further: reflected solar energy reduces global warming.

White KÖSTER TPO roofing membrane reflects the sunlight. As a result, the temperature on the roof drops. In addition to the generally lower cooling requirement for the entire building, a lower temperature on the roof surface significantly increases the efficiency of photovoltaic systems. If a building ventilation system is installed on the roof, this effect also transports much cooler air into the building. This is positive for the energy balance and therefore for the environment. KÖSTER TPO white membranes possess excellent SRI values from > 85 up to 106, depending on the type of membrane.





Reflectance and Emittance. What's the difference?

- Cool Roofs reflect a significant portion of the incident solar radiation into the atmosphere **(reflectance)** and at the same time release less absorbed energy into the atmosphere **(emittance)**.
- Cool Roofs have white surfaces that result in a lower roof surface temperature when compared to black or dark-colored roofs.
- This leads to a higher **Reflectance,** with direct benefits in energy savings, and a lower thermal **Emittance** with direct benefits in the city's higher temperature.

Why use white reflective membranes?

Saves Money: Cool roofs can reduce air conditioning costs by 10% to 30% on hot summer days when air conditioning accounts for up to 40% of daily electricity use.

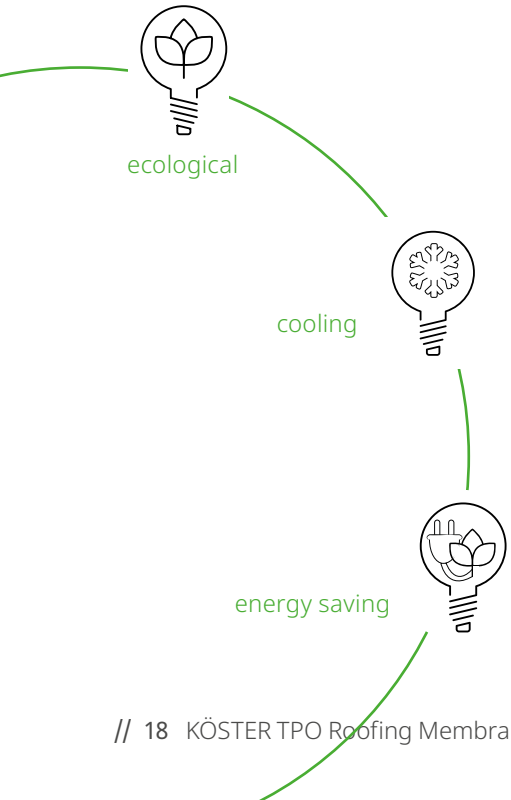
Reduce Energy Use: Cool roofs can reduce internal building temperatures by up to 30% in the summertime and in hot climate countries all year long, therefore reducing the necessary energy consumption to cool down the temperature.

Reduce Carbon Emissions: Cool roofs are estimated to reduce carbon emissions at a rate of 2,3 kg per 1 m^2 of roof. For example, by installing 200 000 m^2 of white roof area instead of black or dark colored, about 460 metric tons of carbon emissions can be reduced.

Reduce the Greenhouse Gas Emissions: Electric power generates the 2nd largest share (25%) of greenhouse gas emissions and includes emissions from electricity production used by other end-use sectors (e.g., industry). In 2022, 60% of the world's electricity still came from burning fossil fuels, mostly coal and natural gas.

Combat the Urban Heat Island Effect: All big cities, such as Tokyo or New York, have greater amounts of dark surfaces. The city temperatures are about 5°C to 7°C degrees warmer than surrounding rural areas on an average summer day. Only coating all eligible dark rooftops in these cities, would result in up to a 1°C reduction of ambient air temperature in the cities.

Preserve Structures: Cool roofs preserve the roof structures, materials, and installed equipment, simply because these structures don't reach such high temperatures as black/ dark roofs. This reduces the thermal shock stress associated with large temperature fluctuations, that promote constant expansion and contraction of the materials. As a positive consequence, the life cycle of the materials is significantly extended.



Green roofs with root-resistant KÖSTER TPO

A green roof can improve the humidity, radiation, and air temperature in its immediate vicinity. Plants absorb and reflect a large part of the short-wave rays that occur in the summer months. Another positive effect is caused by the evaporation of water on the leaf surface and the cooling associated with evaporation. Various measurements have shown a temperature gradient of up to +10 °C between green and non-green roof areas during the midday hours. Another argument is that it relieves the burden on sewers by not discharging rainwater at all or with a time delay. First, the green roof is saturated and only excess water flows away.

Green roofs, as a form of greenery for buildings, are part of ecological building and provide a habitat for insects. The common construction methods of green roofs is independent of the type of planting. In any case relevant green roofing guidelines must be observed.

Standard layer structure of green roofs:

- Vegetation layer
- Growth medium
- Filter membrane
- Drainage layer
- Protective layer
- KÖSTER TPO membrane
- Insulation
- Roof construction

KÖSTER TPO roofing membranes can be laid loosely under green areas if the further green roof system serves as ballast and protects against wind uplift. A positive characteristic of TPO roofing membranes is that they are root resistant and root-proof so that vegetation can be planted directly over the roofing membrane.

Solar Roofs with KÖSTER TPO

Roofs are all yearlong exposed to the sun. This infinite source of light and heat is the most important form of energy for life on Earth. The sun provides enough energy to meet the world's energy needs, and unlike fossil fuels, it is unlimited and clean.

Therefore, as a source of clean and renewable energy, the roofs and flat roofs are the optimal locations for the installation of hardware to harvest and store the energy from the sun. When the sun shines onto a solar panel, the energy from the sunlight is absorbed by the PV cells and this energy creates electrical charges.

Today there are many different solar systems available for flat or sloped roofs. Different systems offer unique characteristics, enhanced performances, and different installation methods, but all fulfill the same purpose which is to use the roof as a clean energy production field that benefits the environment and the future of our planet.

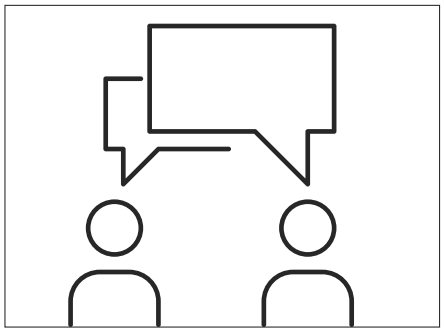
KÖSTER TPO membranes are fully adapted to all different systems and application methods available in the market and are the right choice as a complementary waterproofing system for the roof as an energy production field. The white color of our membranes and the high SRI, promote and increase the light index improving the energy harvested by the solar PV cells and helping to generate more clean energy. In addition, the low fire load of the KÖSTER TPO membranes e.g. compared to bitumen waterproofing, building insurers have no objections.

Standard layer structure of BioSolar PV roofs

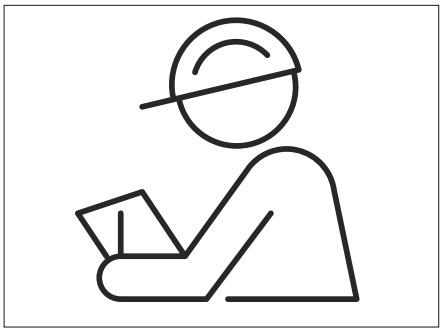
- Vegetation layer
- Growth medium
- Filter membrane
- Drainage layer
- Protective layer
- KÖSTER TPO membrane
- Insulation
- Roof construction

Our service

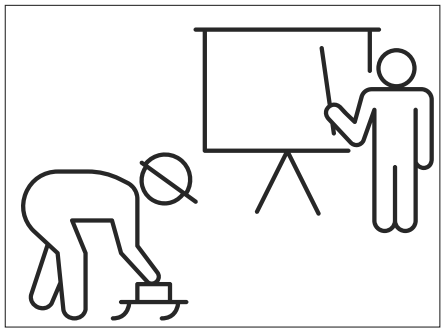
We want our expertise and experience to benefit all KÖSTER partners. Distributing our products through technical consultants ensures that our customers receive the technical support they need. In this way, safe and economical solutions are developed and implemented. This long-term consideration for the interest of our customers is very important to us, which is why technical support is a natural part of our service.



Personal consultation



Site instructions



Practical and theoretical trainings

Comprehensive range of accessories

In addition to our KÖSTER TPO roofing membranes, we provide a wide range of system accessories. This includes among others molded parts for corners and penetrations, connection sleeves, composite sheets and maintenance mats as well as accessories for drainage and ventilation.

We produce high-quality building materials according to German standards and are regularly monitored by external testing institutes

Certificates/Memberships

- Certificate of conformity of the factory production control 0761-CPR-0422; MPA Braunschweig
- Certificate of conformity of the factory production control 0761-CPR-0423; MPA Braunschweig
- Official Test Report according to 1200/057/15 DIN EN 13956; MPA Braunschweig
- Official Test Report according to 5278/015/14 DIN EN 13967; MPA Braunschweig
- Management System Zertifikat according to ISO 9001:2015; DNV – Business Assurance
- EPD-KBC-20210162-IBC1-DE Environmental Product Declaration according to the ISO 14025 and EN 15804; Institut Bauen und Umwelt e.V.
- Product Declaration – LEED; greenbuildingproducts.eu
- Official Test Report according to FLL 19/16; Hochschule Weihenstephan
- Test reports for determining the Solar Reflectance Index; Frauenhofer-Institute
- Test report Resistance to hail 114837/15; SKZ Würzburg
- Official Test Report according to ETAG 006 4/2015; I.F.I. Aachen
- Fish test A14-02548 BMG Zürich
- Classification reports according Broof(t4); Tests Institute: Warrington fire
- Classification reports according Broof(t3); Test Institute: PAVUS
- Classification reports according Broof(t2); Test Institute: Hoch
- Classification reports according Broof(t1); Test Institute: MPA Braunschweig/ MFPA Leipzig
- Classification reports according to reaction to fire class E; Test Institute: MPA Braunschweig/Hoch
- Supporting member of the Interest Group Quality Management for Roofs and Flat Roof Waterproofing – IQDF
- Member of the „RAL Quality Mark for Flat Roof Systems & Services“ – The premium standard for the manufacture and maintenance of quality flat roofs with quality-assured products and services
- Material guarantee deposit with the „Zentralverband des Deutschen Dachdeckerhandwerk e.V.“ (ZVDH)

Tested quality.


















References
















We are there for you – worldwide.

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Waterproofing Systems

Always adhere to the specifications in the respective Technical Data Sheets.