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PROTECTION AGAINST HEAT
AND HUMIDITY



INTELLIGENT PROTECTION FOR MAN AND MATERIAL



ELEGANT AND MODERN, BUT NOT WITHOUT PROBLEMS – THE FLAT ROOF

In the construction of domestic houses, flat roofs are modern and elegant. In commercial and industrial construction, too, there is often no reasonable alternative (e. g. production or storage buildings). This type of roof, however, requires the consideration of various aspects such as drainage, the impermeability of the roof and thermal heating.

HOW DO WE DEFINE A FLAT ROOF?

The term flat roof is understood as a roof construction with a slant of less than 10 degrees. A flat roof consists of a floor slab with bitumen or synthetic sealing and is thus relatively cost-efficient as far as design and construction work are concerned.

Flat roofs are particularly suited to photovoltaic/solar modules, since the collectors can be mounted on racks at an ideal angle, thus significantly improving the efficiency.

THE PROBLEM WITH HEAT AND HUMIDITY

The danger of water penetrating is considerably higher with flat roofs, therefore they require significantly more maintenance. Uneven areas, as well as defects, lead to reduced drainage of rainwater, which means that humidity will enter as a long-term effect. If this absorbed moisture then freezes, blisters and large cracks will develop (see images on the right).





In addition, flat roofs are particularly exposed to environmental impact and are thus among the elements of a building that have to withstand the highest strain, i.e. through:

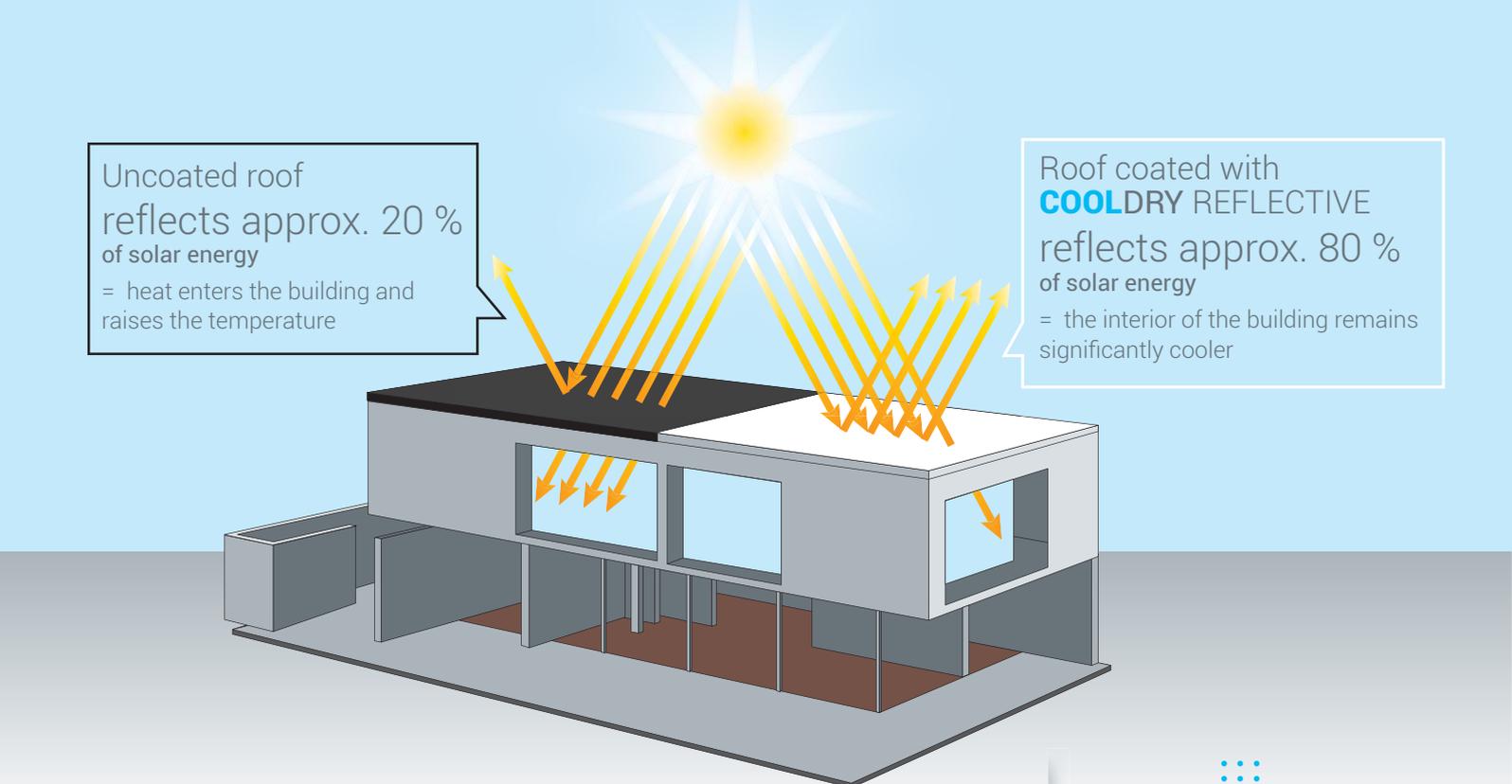
- external moisture – precipitation and standing water (puddles)
- extreme temperature changes from $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ and the resulting considerable material expansion often leading to expansion cracks (in particular at interfaces between dry and humid areas or sunny and shaded surfaces)
- extreme heat build-up, particularly on dark roofs such as those covered with bitumen (tar paper)
- UV radiation (and the resulting material fatigue)
- mechanical strain due to
 - building movements
 - strain due to pressure and thrust
 - bending of structural elements

If a flat roof sealing is not permanently resistant to such strain (or, in the case of very old roofs, the natural aging process has already advanced too far), damages to the roof shall eventually occur - the flat roof becomes permeable.

Often it is hardly possible to detect the initial stages of a damaged flat roof. However, the defect increases, in many cases with serious consequences and lasting damage to the structure of the building, the removal of which is extremely costly.

This is exactly where **CoolDry** – Reflective comes in. An excellent and cost-effective solution for the efficient coating of roofs, preventing excessive heating-up and providing a perfect sealing against penetrating water.





Uncoated roof
reflects approx. 20 %
of solar energy
= heat enters the building and
raises the temperature

Roof coated with
COOLDRY REFLECTIVE
reflects approx. 80 %
of solar energy
= the interior of the building remains
significantly cooler

COOLDRY – REFLECTIVE HOW IT WORKS



THE SOLAR-REFLECTIVE ROOF COATING

CoolDry is a simple and highly efficient way to protect the roof and to act against the increasing need for air conditioning.

COOLDRY – REFLECTIVE!

CoolDry is a high-quality and permanently flexible roof coating paint, which reflects approximately 80 % of the direct solar radiation, thus preventing the heating-up of buildings, vehicles and other objects effectively and in an energy-saving manner. Not only the light-coloured base of the material, but in particular the multitude of minute, coated, hollow high-tech glass reflection bodies reduce the roof temperature by up to 40 °C and thus produce considerably cooler indoor temperatures as well as significantly lower air conditioning costs.

A roof coated with **CoolDry** warms up to a maximum of 2 to 3 °C above the respective outside temperature.

Extensive tests carried out by DEKRA have clearly proven and confirmed the high efficiency of **CoolDry**. The DEKRA engineers recorded a reduction of heat transfer to the interior of the building of up to 77 %. (see page 5).

Another important aspect: photovoltaic/solar modules work less efficiently at very high temperatures, i.e. they produce less energy. Therefore **CoolDry** also improves the efficiency of solar collectors installed on roofs.

Particularly in times of increasing energy prices, rising temperatures and stronger environmental and climate awareness, **CoolDry** is thus an ideal solution for the coating of the most diverse surfaces that need to be protected from heating-up by sunlight – metals, tar paper, plastics, stone, tiles, concrete, even glass or textiles can easily be coated by roller, brush or airless spraying.

However, **CoolDry** not only keeps surfaces cool, but also dry. The highly elastic roof coating closes hairline cracks, protects against material fatigue caused by UV radiation (it goes without saying that **CoolDry** is UV-resistant) as well as against heat expansion and seals against rain water.

Plus: **CoolDry** is eco-friendly, since it is water-based, extremely durable and, in addition, can be disposed of without difficulty.

THIS IS HOW THE DEKRA ENGINEERS TESTED **COOLDRY**:



In order to obtain independent proof of how our **CoolDry** reflective coating works, and in addition to our own extensive test series, we asked the company DEKRA Industrial GmbH to conduct a study on the functional principle of **CoolDry**.

The study was carried out in the summer of 2010 in cooperation with the Bavarian Centre for Applied Energy Research (University of Würzburg) and came to the conclusion that the transfer of heat into the interior of buildings is "significantly" reduced by **CoolDry** (reduction by 68-77 %, depending on material, type of roof, wind speed, etc.).



The indicator SRI (Solar Reflectance Indicator), which is internationally applied in this context, was measured at 99-98-102 (concrete, bitumen, metal), extremely high values – in the USA tax relief has already been granted for systems with an SRI above 50.

SOLAR REFLECTANCE INDICATOR

In addition to the measured pure reflection of the sunlight, the SRI also indicates the ability of a material to release heat into the environment. This is crucial for the enabling of the building to dispose of the stored heat during the night – the heat is not "locked in" as is the case when insulation only is used.



DEKRA's energy experts come to the conclusion, that in particular the combined use of insulation and **CoolDry** reflective coating leads to the best results. However, even the most cost-effective option, i.e. only coating the roof with **CoolDry**, already protects the building very efficiently from heat transfer to the interior. This way substantial reductions of power consumption for air conditioning (up to 50 % depending on location and type of the building), a significant improvement of comfort in the building and a considerably prolonged lifespan of flat roofs are achieved.

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COOLDRY AS A MATERIAL FOR ASBESTOS ABATEMENT



CoolDry has been approved for the use in asbestos abatement in Italy by the state-recognized and internationally authorized Istituto Giordano in Milan and it is suitable for the encapsulation of asbestos fibre boards.

In Germany **CoolDry** may already be used to repair coated/painted asbestos boards (abatement or refurbishment in accordance with TRGS 519 – German technical rules for hazardous substances).



ISTITUTO GIORDANO
Qualità al Plurale.



GLOBAL WARMING – URBAN HEAT ISLANDS (UHI)

About half the global population lives in urban areas. This figure is expected to rise in the near future, reaching approximately 70 % by the year 2030.

Among other things this will lead to a dramatic increase of built-up areas in towns and cities and the respective decrease of natural areas.

It is these natural areas and the vegetation that collect solar radiation (photosynthesis) and produce shade, which contributes to the reduction of heat release in cities. The decrease of large green areas also reduces atmospheric cooling. Built-up areas on the other hand mainly consist of non-reflecting and water-resistant materials which release a significant portion of the sunlight as heat, thus creating the so-called: „Urban Heat Islands“.

URBAN HEAT ISLANDS

Cities are heat islands: at present the average annual temperature in cities is already between one and three degrees Celsius higher than in the surrounding areas. This so-called „urban heat effect“ is caused by the sun, which particularly heats up dark buildings and streets during the day. In the night this heat is only slowly released again, so that around the clock it is significantly warmer within the city than outside of urban areas.

GREENING OR REFLECTING

As early as October 2008, the American Environmental Protection Agency (EPA) issued a compendium of short-, medium- and long-term options to counteract further global warming titled „Reducing Urban Heat Islands“. Among other things, various possibilities of cooling the roofs of buildings are described and a general distinction is made between „Cool (reflecting) Roofs“ and „Green Roofs“. Cool Roofs are characterized by good reflective properties and low heat storage.

COOL ROOFS

Calculations by the American Department of Energy showed that large quantities of energy could be saved, if all roofs all over the world were painted white. Whereas dark roofs only reflect 20 % of the sunlight, white roofs reflect significantly more radiation back into space: buildings would require less air conditioning and vast quantities of carbon dioxide could be saved – an amount equal to the emissions by all the cars in the world in eleven years.

WHITE ROOFS REDUCE THE HEAT OF THE CITY

Meanwhile a team of scientists around Keith Oleson of the National Center for Atmospheric Research (NCAR) has established the effect of light-coloured paint on the climate. Alongside studying the effects on world climate, particular focus was also put on the climate of cities. "Our research demonstrates that white roofs, at least in theory, can be an effective method for reducing urban heat," writes Oleson. "It remains to be seen if it is actually feasible for cities to paint their roofs white, but the idea certainly warrants further investigation."



Santorini: The houses in South European countries are traditionally plastered with white chalk. This reflects sun radiation and reduces heating-up. With CoolDry this effect can be increased to 80 %.

RISING AIR CONDITIONING COSTS

Due to the increasing warming, particularly in cities, the share of air conditioning and the cooling of buildings in the total electrical energy consumed also rises.

In Germany refrigeration and cooling accounts for a total of 14 % of the demand for electrical energy and it generates approximately 5 % of greenhouse gas emissions. In view of the national climate control goals these figures clearly illustrate that action is required to improve the climate friendliness of air conditioning and refrigeration technology.

Principally, the following rule applies: the lower the initial temperature before cooling, the lower the energy demand or the smaller the dimension of the air conditioning system. There are simple and efficient options to avoid the heating-up of buildings, such as the reflective coating of roofs.

illustration 1: useful and final energy demand for cooling and refrigeration for the applications researched

Source: Sustainable cooling supply in Germany by the examples air conditioning in buildings and industry, by the "Bundesumweltamt" (German Federal Environmental Agency) 25/2014



COOLDRY – REFLECTIVE REFERENCES FROM ACROSS EUROPE

CoolDry – Reflective has been successfully put to use all over Europe and in the Middle East for many years. Numerous references prove outstanding reflective properties in the most varied regions and on extremely diverse types of buildings. This is just a short selection.

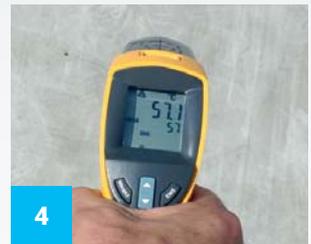
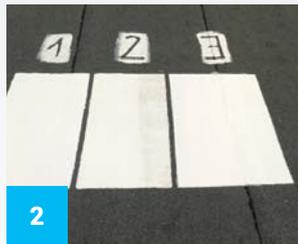
- 1 Metal factory in Malta
- 2 Commercial building north of Berlin
- 3 Container in Spain (comparison of inside temperatures)
- 4 Storage building in Italy
- 5 Commercial building in South Germany
- 6 Private villa in Greece
- 7 Summer house in the Netherlands



COOLDRY CAN BE APPLIED VERY EASILY AND AT LOW COST

CoolDry can be applied on a multitude of surfaces such as concrete, stone, tiles, bitumen (tar paper), wood, cement, plastics and metals pretreated with an anti-corrosive. The application is carried out without dilution by roller, brush or airless spraying (up to 5 % dilution with water possible), in two layers with an intermediate drying period

of 16 hours. The best reflection results are obtained with 2 coats of 200 µm each. Applied in this way, one litre of **CoolDry** roof coating paint is sufficient for approximately 1.5 m². Throughout Germany there is a network of authorized coaters which apply **CoolDry** professionally, particularly in the commercial sector.



Object: Commercial building north of Berlin, temperatures measured in the late morning, work carried out in August/September 2014

- 1 First of all, the roof to be coated is thoroughly inspected, the work to be done is documented and the actual temperatures prior to coating are recorded.
- 2 Particularly in the case of bitumen (tar paper) it is recommendable first to coat test areas with and without a primer in order to find out if the tar paper bleeds through the paint, as well as to measure the differences in temperature.
- 3 At 11 o'clock in the morning the roof temperature of the tar paper already shows more than 55 °C.
- 4 The adjoining plastic roof coating reaches even more than 57 °C.
- 5 Compared to this, the temperature of the test area coated with **CoolDry** only shows approx. 30 °C.
- 6 Before the roof can be coated, a thorough removal of loose particles must be carried out. The surface can be swept ...
- 7 ... or vacuumed.
- 8 In the case of tar paper a prime coating with the **CoolDry – TarStopper** is now recommendable in order to efficiently prevent bleeding through. Furthermore, the TarStopper provides an additional sealing of the roof against penetrating water.
- 9 Next the edges, borders and interfaces are prepainted.
- 10 Then 2 coatings with **CoolDry** follow, which are either applied with the roller ...
- 11 ... or by airless spraying.
- 12 The professionally coated roof now is and, above all, remains: cool & dry! The roof temperature now only reads 28.6 °C. In addition, the roof is now sealed against water thanks to the highly flexible **CoolDry**. Expansion of and expansion cracks in the tar paper are effectively and lastingly prevented.



COOLDRY IN THE VEHICLE SECTOR

Aside from buildings, camper vans and refrigerated vehicles (e.g. for food transportation) constitute an ideal field for the use of **CoolDry**. Particularly when standing in sunny regions during the holidays, camper vans tend to heat up in an intolerable manner and require energy-intensive air conditioning. Here **CoolDry** offers great advantages:

A major part of the impinging solar energy causing the warming is reflected, so that the surface heats up to a maximum of 2-3 °C above the ambient temperature.

Praxis
Klimaschutz Nr. 10/11

Die Farbe macht den Unterschied

Kühler wohnen trotz Sommerhitze – ein völlig neuartiger Farbenstrich mit Glaskugelfüllmaterial soll dies möglich machen. Auch bei Caravans und wärmegedienten gar ohne Klimaanlage.

Weniger als 1000, bei langer Haltbarkeit, sind sie in hellen Farben. Lange haben sie keine sommerliche Leichtigkeit, sondern sind in weiß gelblichen Tönen, die sich in weiß gelblichen Tönen und Blaustrichen auch bei großer Sonneneinstrahlung zeigen. Das ist die Farbe der CoolDry-Farbe, die sich in einem speziellen, innovativen Material, dem Glaskugelfüllmaterial, unterscheidet. Dieses Material besteht aus winzigen Glaskugeln, die sich in einem speziellen, innovativen Material, dem Glaskugelfüllmaterial, unterscheiden. Dieses Material besteht aus winzigen Glaskugeln, die sich in einem speziellen, innovativen Material, dem Glaskugelfüllmaterial, unterscheiden.

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Aufhellung Caravans

Die Temperaturerhöhung der Caravans...

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Refrigerated transports in Saudi Arabia in a vehicle coated with **CoolDry** (image on the right) consumed 19 % less fuel for the cooling unit than the same vehicle type without coating (image on the left).



A private expedition vehicle coated with **CoolDry**, before and after the coating.

COOLDRY ON A CAMPER VAN

With **CoolDry** the inside temperature of this camper van could be reduced from 44 °C (10th July 2010, noon) to 31 °C (11th July 2010, noon). Now the summer may arrive!



1



2



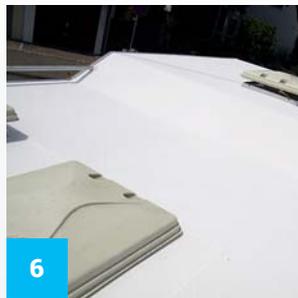
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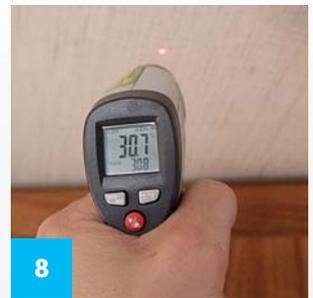
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6



7



8

- 1 The untreated white roof shows a temperature of 43.9 °C and the steps on the top as much as almost 55 °C.
- 2 The ceiling inside measures at just over 44 °C.
- 3 The old coat is coarsely sanded. The sanding dust is wiped off dry.
- 4 Stir the paint well – and you can start working immediately. Corners and angles are pre-painted with a brush.
- 5 The first coat is applied in the evening light, since the roof must not be too hot.

- 6 The second coating is carried out the following morning (after a minimum drying time of 12 hours), the finished roof is as white as snow and, above all, cool.
- 7 The roof coated with **CoolDry**, now at 31.4 °C, is about 13 degrees cooler than before.
- 8 Inside, the ceiling now measures at about 30 °C – comfortable as compared to the previous 44 °C.

For this camper van, approximately 6 litres of **CoolDry** were used.



DIE **COOLDRY** PRODUCT FAMILY

CoolDry – Reflective is available in three colours:

- white
- beige (sandstone)
- light grey

each in the three sizes 10 ltr, 5 ltr and 2.5 ltr.



Especially for the professional coating of bitumen roofs we offer the „TarStopper“ as an insulation primer, which in addition creates a further protective sealing coat for your roof. Bitumen roofs may bleed through, i.e. due to the oil content of the tar paper dark stains may occur on the surface coated with **CoolDry**, which may also impair the functionality of **CoolDry**. We thus absolutely recommend to coat bitumen with a layer of our Tar-Stopper as an insulation primer.

The innovative **CoolDry** coating is just as well suited to metal roofs (e.g. all kinds of corrugated or profiled sheet metal), whether galvanized or powder-coated. For this application our product range includes a „Metal Primer“. This top-quality primer, especially designed for all metal surfaces such as aluminium, galvanized steel, etc., provides excellent protection from corrosion and serves as a perfect base for **CoolDry**.

In addition, for concrete roofs we offer our special „Concrete-Primer“, which seals the partly porous and absorptive surface and binds loose particles. Thus you have a comprehensive system for all materials at your disposition.



FlexDry can even be used on old and weathered roofs. Apart from light grey, FlexDry is also available in white, brick-red, green and magnolia.



THE WATER-REPELLENT ROOF COATING

FlexDry was developed after many years of international research activities, partly carried out in German laboratories, and in varied test series, also in tropical climate zones. The result is a roof coating with exceptional elasticity and water resistance.

FlexDry has proved itself as one of the coating products with the most effective sealing properties on the market. It distinguishes itself by its excellent surface adhesion and an extremely high adaptability and flexibility. Thus no water can penetrate under the coating.

FlexDry forms a waterproof, flexible and durable coating, ideal for flat or pitched roofs and suitable for concrete, bitumen (tar paper) as well as for galvanized steel or aluminium. The advantage: even in hot weather **FlexDry** does not soften and is easy to clean. And, of course: **FlexDry** is UV-resistant.

FlexDry is ready to use and does not need to be diluted. The application is easy and can be carried out by brush or with a large roller. For optimum results two

coats should be applied (with a drying time of approximately 24 hours before the second coating). The quantity required is about ½ litre per square meter per layer. It can be painted onto other insulating and sealing materials already in place and perfectly closes minor cracks and porous patches.

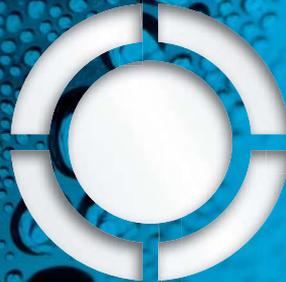
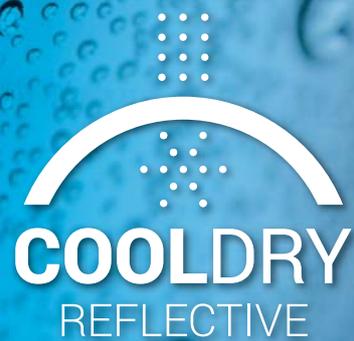
Furthermore, **FlexDry** should be applied to the side walls at least 20 cm high. This stops rainwater from entering into the wall and prevents damages to the front of the building.

FlexDry can also be used to fill cracks. For this purpose it is mixed with sand and pressed into the cracks, then painted over.

FlexDry possesses exceptional elastic properties. It expands up to twice its normal length, even under constant climatic impact. This makes it ideal for flat roofs which are exposed to extreme weather and temperature changes.

FlexDry has already been variously used in many cases and with great success on private houses, industrial buildings, factories, old buildings, etc.

COOLDRY ADVANTAGES AT A GLANCE



- Reflects up to 80 % of solar energy (heat, light, UV radiation)
- Reduces the temperature of the roof (by up to 40 °C)
- The interior remains significantly cooler
- Cost savings for air conditioning of up to 50 %
- More comfortable room temperature = better job performance and improved occupational safety
- Reduced utilization of the air conditioning system = longer lifespan and lower maintenance costs
- Permanent protection of the roof from: expansion cracks (bitumen sheets), weathering due to UV radiation, rainwater
- Higher utility of the property and conservation of its value
- Easy and very cost-efficient application

WHAT WE OFFER YOU



We shall be pleased to develop an individual solution for your project together with you. Contact us personally or visit us on our website: www.sistec-coatings.de/en/products/cooldry-en



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