

NOTES



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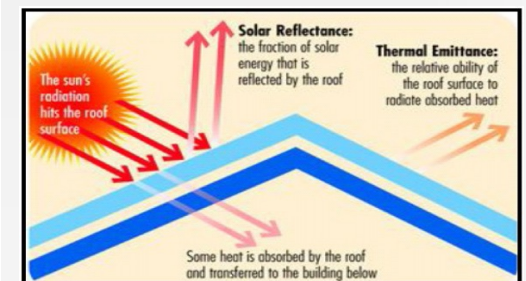
Ceramic Cool Roofs

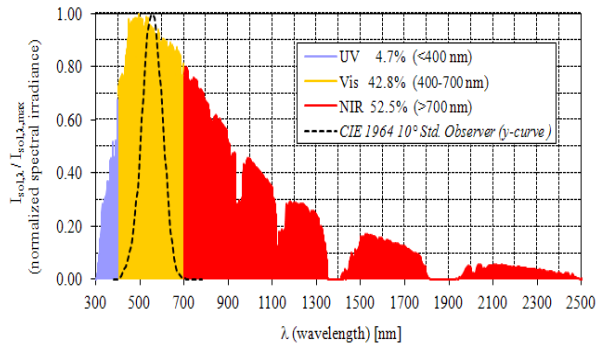
*Cool Engobes & Glazes for your
Roof Tiles*

What is a cool roof?

A roofing system able to reject solar heat and keep roof surfaces cooler under the sun.

It reflects the solar radiation during the day (solar reflectance) and releases the absorbed heat during the night (infrared emittance).





- About 60% of solar radiation is not visible, but it is still able to heat the building, if not reflected
- An homogeneous temperature, without hot spots or fresh airstream from conditioning systems, is healthier and more comfortable for people. On bigger scale a cool roof city or suburb mitigate the problem of heat islands, which results in part from the combined heat of numerous individual hot roofs.

Why should it be reflected?

- **To improve indoor thermal comfort**
- **To reduce the energy required for interior cooling: the annual neat energy saving is estimated about 30%**
- **To reduce smog and release of pollutants**
- **To reduce thermal stresses on the roof potentially improving system life times**

Photovoltaic solar cell performance decreases with increasing temperature. For a typical silicon-based photovoltaic system the efficiency loss is about -0,45% per °C (over 25°C). A dark roof surface can easily reach 70°C during summer: in these conditions the panel has an efficiency loss of 20%. A fresh roof can help to reduce the panel temperature.

- **To reduce running and maintenance costs of your roof (reduced daily fluctuations)**
- **To increase the building performance evaluation (and its economical value)**

An average fluctuation of about 20°C has been tested on traditional roofs; for a cool roof the average fluctuation can be about 10°C. Continuous and repeated cycles of expansion/contraction cause great stress to the materials, and early ageing effect. This proves one more benefit of cool roofs: longer life time of the material because thermal fatigue is more important for greater temperature swings.

Within 2020 Europe requires elevated energetic efficiency and environmental qualification for new buildings:

Directive 2010/31/EU, Art.9:

1.Member States shall ensure that: a) by 31 December 2020 all new buildings are a nearly zero-energy buildings; and b) after 31 December 2018 new buildings occupied and owned by public authorities are nearly zero-energy buildings.

Many fiscal and financial vantages are also included for energy efficiency improvement projects in existing buildings.

Pros and Cons of 'cool' materials

Direct benefits (for the user):

- Lower energy need for cooling and, consequently. Lower cost of air conditioning
- Increased comfort in the building (lower perceived temperature, no hothead effect)
- Minor structural stress and fatigue of the roof
- Lower chemical and physical degradation of materials (coatings, waterproofing membranes, insulation, etc.)

Indirect benefits (for the community):

- Minor release of pollutants due to chemical and physical degradation
- Lower overheating of the urban areas (urban heat island)
- Reduction of photo-chemical smog
- Reduction of electricity peak demand, consumption, and related release of CO₂.

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Why should you choose a ceramic cool roof?

Because an organic product loses its properties (about 20% of solar reflection is lost after 3 years); it needs at least one annual cleaning and a re-coating every 3-5 years (depending on product life expectancy and site conditions).

A ceramic cool roof coating on a traditional roof is very durable and has no re-coating or maintenance costs.

Moreover the installation cost of a ceramic cool roof is included in the roof standard installation during construction and after that it won't be repeated during all the life of roof.

For any further information please feel free to contact our Customer Service Department.

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