

WHITE REFLEX SV

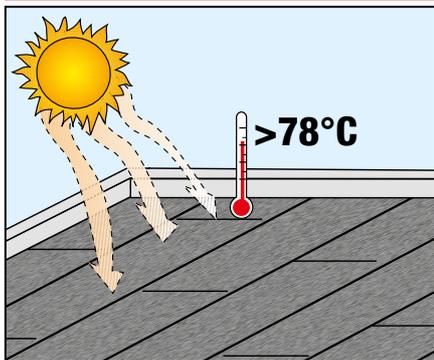
WHITE HIGH REFLECTANCE AND EMISSIVITY SOLVENT-BASED PAINT FOR USE ON BITUMINOUS WATERPROOFING, CONCRETE AND METAL SHEETS, CURVED AND OTHER ROOF TILES, TO IMPROVE THE THERMAL INSULATION OF BUILDINGS

GRANTS *LEED* CREDITS

| CHARACTERISTICS | | ENVIRONMENTAL | METHOD OF USE | | | | PRECAUTIONS |
|---------------------------|---------------------------|---------------|------------------|-------------------|----------------|-----------------|-------------|
| S SOLVENT BASED | A ONE-COMPONENT | | MIX MECHANICALLY | SPRAY APPLICATION | APPLY BY BRUSH | APPLY BY ROLLER | |

PROBLEM

PROTECTING BITUMINOUS COVERINGS FROM UV RAYS AND IMPROVING THE THERMAL INSULATION OF BUILDINGS



Over 90% of roofs are dark-coloured, and the surface of a roof exposed to solar radiation reaches temperatures of around 80°C, which also has negative effects on the useful life of waterproof coverings. The table below shows temperatures recorded in north Italy in July 2007 under bituminous surfaces with various degrees of protection:

| MAXIMUM TEMPERATURE | |
|---|-------------|
| Black bituminous membrane | 78°C |
| Grey slate-coated membrane | 74°C |
| White slate-coated membrane | 70°C |
| Painted aluminium membrane | 67°C |
| Self-protected membrane with copper foil | 60°C |
| Self-protected membrane with aluminium foil | 55°C |
| Bituminous membrane with WHITE REFLEX SV paint | 42°C |

| REFLECTANCE | |
|---|-----------------|
| Black bituminous membrane | <0.10 |
| Painted aluminium membrane | 0.40-0.45 |
| Bituminous membrane with WHITE REFLEX SV paint | >0.87 |
| EMISSIVITY | |
| Black bituminous membrane | >0.80 |
| Painted aluminium membrane | <0.60 |
| Bituminous membrane with WHITE REFLEX SV paint | >0.90 |

SOLUTION

WHITE REFLEX SV is a one-component white paint with polymer base in solvent based and special additives. Once dry, it forms a flexible film, resistant to atmospheric agents, with high reflectivity (0.81) and infrared emissivity (>0.90).



APPLICATION FIELDS

WHITE REFLEX SV is suitable for protecting waterproof coverings consisting of prefabricated polymer-bitumen membranes of the sand or slate-treated type or with texflamina finish and bituminous waterproofing applied cold, also in the presence of occasional stagnating water. Furthermore, when it is applied on slate-treated membranes, it protects and fixes the grit on their surfaces, preventing it from detaching, consequently increasing the membranes' service life. In addition to prolonging the life of film surfaces, the white finish and special additives reduce the temperature on the outer surface and inside the building. Furthermore, the solvent-based formulation accelerates the drying of the film and makes the product usable also at typical low winter temperatures. The high level of reflectance of **WHITE REFLEX SV** (0.87) does indeed considerably reduce the heat absorbed from the rays of the sun compared to a dark surface; this consequently leads to a considerable reduction in the temperature and to consistent savings in energy to condition the buildings. The high level of infrared emissivity (>0.90) also promotes the dissipation of heat accumulated overnight.

TEST REPORT

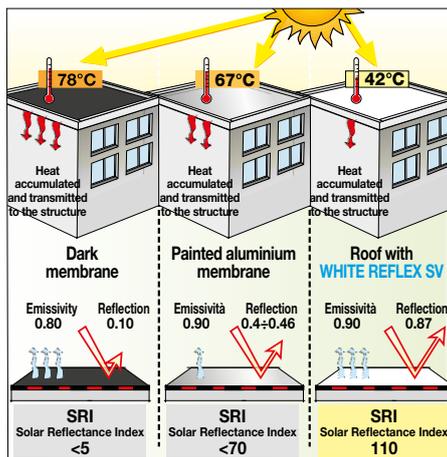


It can also be applied on metal, plaster and concrete surfaces and on sheet metal roofing and on curved and other roof tiles. The reduction in temperature and the diffused light also increase the efficiency of photovoltaic panels. The performance of the panels does indeed decrease by approximately 5% for every 0.5°C deviation from the temperature of 25°C (temperature at which best performance is obtained).

By painting roofs with **WHITE REFLEX SV** you will obtain an SRI (Solar Reflectance Index) value ≥ 110 , and therefore obtain *LEED* credits for the reduction in the Heat Island Effect.

ADVANTAGES

- Protection of polymer-bitumen membranes.
- Reduction in superficial temperature.
- Improved thermal insulation and consequent energy savings.
- Easy to apply.
- Allows *LEED* credits to be obtained for reducing heat islands.
- Increased efficiency of photovoltaic panels.



Solar reflectance index

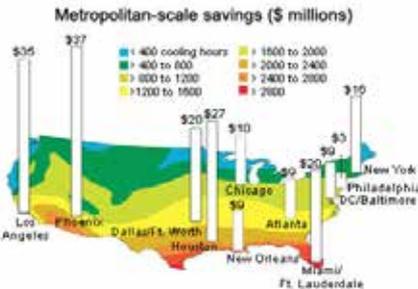
WHITE REFLEX SV
Solar Reflectance Index
SRI ≥ 110

MONITORING ON ENERGY SAVING CARRIED OUT IN THE USA

Monitoring carried out on 10 buildings in California and Florida has shown a reduction from 20% to 70% in the energy consumed due to air conditioning. The saving is most noticeable for roofs with little or no thermal insulation and in climatic zones characterized by hot and sunny summers.

Even though painting the roofs of non-air-conditioned buildings does not generate energy saving, it does increase the internal comfort in summer. Research has demonstrated that in the majority of climatic zones in the USA, the energy saving on summer air conditioning obtained by painting is significantly larger than the winter energy penalty due to the lower absorption of solar heat in the cold season.

The estimate of the cost of the energy which could potentially be saved by painting the roofs of residential and commercial buildings, calculated for 11 American cities representing various climates (Los Angeles, Phoenix, Dallas, Houston, Chicago, New Orleans, Atlanta, Miami, Baltimore, Philadelphia, New York), amounts to 195 million dollars per year.



The graph shows the potential urban energy saving in some large US cities if the roofs of the residential and commercial buildings were painted with paints such as WHITE REFLEX

DURATION OVER TIME

Solar reflectance tends to diminish over time due to the deposition of dust and dirt onto the white surface. Measurements taken at laboratories of research institutes indicate a fall in the solar reflectance of **WHITE REFLEX** and **WHITE REFLEX ULTRA** of about 10% after two years of exposure to the open air. These results are in line with studies conducted at authoritative research institutes:

- The Florida State Energy Center has estimated a maximum reduction of 11% after two years without any cleaning or maintenance.
- Studies conducted by LBNL (Lawrence Berkeley National Laboratory) indicate that there is a larger percentage reduction in the first year and it slows considerably in subsequent years.

We therefore recommend periodic cleaning of the roof to keep solar reflectance high. The studies mentioned above advise repainting roofs roughly every ten years.

METHOD OF USE

• PREPARING THE SUPPORT

Surfaces must be clean, dry and free from impurities or residues of old paint. They must also be washed with water to remove the reddish water-soluble powder and any residue of talc coating which is not adhering (1).

• APPLICATION

WHITE REFLEX SV is ready to use and must only be mixed carefully before application; it does not need to be diluted when applying with paintbrush or roller; if necessary or to clean tools, dilute with about 10% synthetic or nitro thinner.

For spray applications dilution is recommended for both coats; use a synthetic or nitro thinner in a percentage between 10% and 20%. The second coat must be applied at least 3 hours later, and anyway when the surface is completely dry. **We always recommend applying two coats, preferably criss-crossing them in the amounts indicated below.** The product can be applied with a brush, roller or spray gun (2). **WHITE REFLEX SV** is more resistant to stagnant water than common paints in aqueous emulsion. In any case the surfaces must be pitched sufficiently to drain rainwater. Over time, as well as reducing the adhesion of the paint, stagnant water leads to the accumulation of dirt and hence a reduction in the reflectance and performance of the photovoltaic panels. To keep reflectance and therefore efficiency high, we recommend periodic maintenance of the surfaces, with a visual inspection



and removal of the dirt by washing with a water jet cleaner. For application on sheet metal roofs, apply in advance a gripping base coat of **JOINT DECK**, following the procedure indicated in the relevant technical sheet. When applying on concrete, any holes, cracks or cavities should be filled with **RESISTO UNIFIX** mortar. Spread a first coat as an insulating fixative, diluting the product with 30% water. If the surfaces appear to be particularly porous and chalking, apply the acrylic primer **PRIMER FIX** or **BETON PRIMER S**, following the procedure indicated in the relevant technical sheet. Application to plain or half-round tiles should follow the same procedure as for concrete, but in this case the product should be applied by spraying. (2).

• COVERAGE

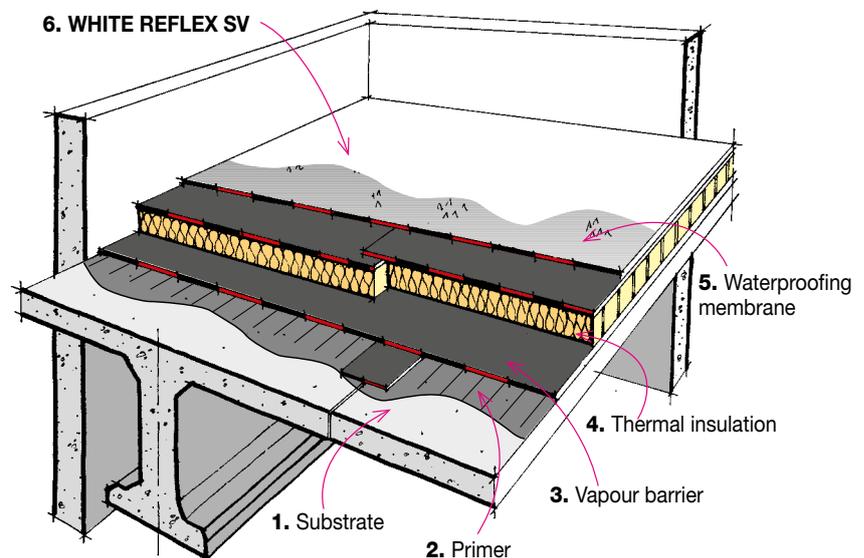
Coverage depends on the nature and porosity of the substrate.

The consumption per coat, on aged smooth membranes is about 200÷300 g/m², whereas on slated membranes, it is about 350÷450 g/m².

• PRECAUTIONS

- It can be applied on surfaces subject to the occasional presence of stagnating water. The waterproofing must however be arranged appropriately to drain rainwater efficiently.
- Do not apply on wet or damp surfaces.
- Do not use for tanks, cellars, drains or channels subject to strong water backflow or pressurised water.
- Do not on surfaces or containers where edible liquids and drinking water are kept or that may come into contact with solvents or mineral oils.
- Mix the product well before applying.
- Do not mix with water.
- Keep the containers sealed before use.
- Apply at temperatures between +5°C and +35°C. Extreme conditions of heat and cold must be avoided during application. Do not apply if the temperature is likely to drop below +5°C while the paint film is drying. Do not apply on very hot substrates because the paint filming process would be unduly accelerated with negative consequences on the cohesion and adhesion of the product to the substrate.
- Although they are solvent-based products, do not apply them when there is a risk of rain

(See following)



(See previous)

while the film is still drying.

- In foggy or very humid environments the formation of the film and hence the drying of the material takes longer. High thicknesses and dilutions can also increase drying time.
- Apply the second coat only when the first coat is perfectly dry.
- It is not a product that can be walked on except for occasional maintenance.
- It is suitable for painting bituminous surfaces with a slated, sanded and textile (Texflamina type) finish. If the surface is dirty, clean by brushing and washing with water.
- New, just applied bitumen surfaces usually have surface 'outcrops' of hydrocarbons, which make perfect adhesion of the paint film a problem. We recommend painting the coatings only 6 months after laying - this period is usually sufficient to eliminate dirt. However,

just waiting is not always enough. Therefore, we recommend making an estimate, by empirical tests with adhesive tape, in order to evaluate the quantity of dirt and, if necessary, the adhesion of the paints (the tests are described in the booklet entitled "The waterproofing guide"). If the surface is dirty, clean by brushing and washing with water. If applying to a new covering, the surface of the last layer must be slated.

- The product applied onto polymer-bitumen membranes placed on insulation packs, may over time form surface micro-cracking. This, however, will not affect the waterproofing in any way.
- After use, clean tools with white spirit or common thinners.
- Store in original packaging, away from heat sources and naked flame, as it is a flammable product.

FLAT ROOFS AND RENEWABLE ENERGY

The trend of architecture for sustainable building is not limited to the design of a "conservative" envelope from an energy point of view: current design research seeks to make the building envelope perform an "active" energy role. Flat roofs allow substantial freedom in the orientation of installations for capturing solar energy both for solar heating and for photovoltaic solar power.

WHITE REFLEX SV paint, with a double effect, also provide a significant increase in the energy output of any photovoltaic solar panels installed on the flat roof, both because they reduce the temperature of the covering and consequently increase the output of the panels which are more efficient if they are working in a lower heat environment, and because they increase the diffused and reflected light which is added to the light collected by direct radiation. This second effect is more marked in systems that use latest generation panels with cylindrical tubes with a CIGS (copper, indium, gallium, (di)selenide) film, which do not

require fixing elements which pass through the roof covering or heavy ballasts, and which are sensitive to the light diffused and reflected by the waterproof covering including onto the lower face.

DESIGN CERTIFICATION

In Italy the legislation in force for the certification of the environmental quality of a building is fragmentary and mainly refers to energy consumption, hence there is a lack of tools for a holistic evaluation of the building's environmental impact. For some time LEED certification, which originated in the United States, has now become widespread all over the world. It is promoted in Italy by the GBC (Green Building Council), whose main aim is to encourage sustainable building on the Italian market through the LEED system, developed over more than 10 years' experience by USGBC. In this sense GBC Italia is aiming to make use of the result of the work carried out by USGBC in the USA, and to adapt the various aspects tackled by it to the Italian situation.



GBC ITALIA (Green Building Council) AND LEED CERTIFICATION



index
"GBC Italia" Associated

Index is affiliated to GBC Italia, which is responsible for using the guidelines shared by all members of the **LEED** international community to develop the characteristics of the **LEED Italia** Italia system,

which must take into consideration the specific climate, building and regulatory situation in Italy.

LEED opts for a view of sustainability that makes the most of all possible ways of reducing the various kinds of environmental impacts and harmful emissions of new builds.

The **LEED** (Leadership in Energy and Environmental Design) standards are parameters for *sustainable building* developed in the USA and applied in 40 countries throughout the world. They indicate the requirements for eco-compatible buildings, able to "work" sustainably and self-sufficiently in terms of energy. It is essentially a rating system for the development of "green" buildings.

LEED is a certification, on a voluntary basis, where the actual designer is responsible for collecting the data for the assessment. The system is based on the award of credits for each of the requirements that characterize the sustainability of the building.

The certification level obtained comes from the sum of the credits.

The assessment criteria used by **LEED** (2009 version) are grouped into six categories (plus one valid only in the USA), which envisage one or more compulsory prerequisites and a number of environmental performances that determine the building's final score:

The following point in the **LEED** regulations includes the solar reflectance index:

- **SS Credit 7.2: Heat Island Effect: Roofs Opzione 1 - Use roofing materials with a Solar Reflectance Index (SRI) equal to or greater than the values indicated in the table below for a minimum of 75% of the roof surface.**

| Roof type | Pitch | SRI |
|--------------------|-------------------|-----|
| Low pitched roof | ≤2:12(9,5°-16,7%) | 78 |
| Steep pitched roof | ≤2:12(9,5°-16,7%) | 29 |

Opzione 3 - Install high albedo and green roof surfaces that, in combination, meet the following criteria: (Roof area meeting minimum SRI / 0.75) + (Area of green roof / 0.5) ≥ Total roof area

Membranes painted with **WHITE REFLEX** or with **WHITE REFLEX ULTRA** have a Solar Index Reflectance SRI ≥ 78

- **EA Credit 2: On-site Renewable Energy**
Increase in the efficiency of photovoltaic solar panels installed on the roof.

TECHNICAL CHARACTERISTICS

| | Standard | WHITE REFLEX SV |
|---|------------------------|---|
| Appearance | | Pasty liquid |
| Colour | | White |
| Density | EN 2811-1 | 1.30 ± 0.10 kg/L |
| Dry residue - at 130°C | UNI EN ISO 3251 | 68 ± 3% |
| DIN 4 cup viscosity | Met. Interior | 80 ÷ 100 seconds |
| Flammability point - closed container | ASTM D 3828-87 | > +23°C |
| Storage in original packaging in a dry place | | 12 months |
| Workability characteristics | | |
| Application thickness | | 0.2 ÷ 0.4 mm (two coats) |
| Waiting time - for dust-free drying (*) | | 30 ÷ 60 minutes |
| Waiting time - till tack-free drying (*) | | approx 1 ÷ 2 hours |
| Waiting time - for applying each coat over the previous one (*) | | minimum 3 hours |
| Waiting time - for total dry (*) | | approx 12 ÷ 24 hours |
| Application temperature | | +5°C to +35°C |
| Application | | manural or spray |
| Performance characteristics | | |
| | Standard | Product performance |
| Class and type | EN 1504-2 | C PI-MC-IR |
| Permeability to water vapour | EN 7783 | Sd <5 m - class I |
| Adhesion test | EN 1542 | ≥1.0 MPa |
| Water absorption through capillarity | EN 1062-3 | w < 0.1 kg/m ² ·h ^{0.5} |
| Permeability to CO₂ | EN 1062-6 | Sd >50 m |
| Solar reflectance | ASTM E-903-12 | 0.87 (**) |
| Emissivity in the infrared | ASTM C-1371-15 | 0.90 (**) |
| SRI (Solar Reflectance Index) | ASTM E-1980-11 | 110 (**) |
| Reduction in temperature - over black membrane (75° to 80°C) | Internal method | 40 ÷ 45°C |
| Exposure to artificial weathering - QUV Test | EOTA TR 010 | No change evident |
| Thermal resistance - Working temperature | | -30°C to +90°C |
| Hazardous substances | EN 1504-2 | According note in ZA.1 |

Test conditions: temperature 23±2°C, 50±5% R.H. and air velocity in test area <0.2 m/s. **These parameters may vary based on the specific conditions of the worksite: temperature, humidity, ventilation, porosity of the substrate.**

(*) The stated times may be longer or shorter as the temperature decreases or increases.

(**) Test report Department of Mechanical and Civil Engineering - University of Modena and Reggio Emilia

Compliant with the general principles defined in **EN 1504-2** - Principles for evaluation of the use of products and systems.

REFERENCES



PACKAGING

20-kg-Pail

• FOR ANY FURTHER INFORMATION OR ADVICE ON PARTICULAR APPLICATIONS, CONTACT OUR TECHNICAL OFFICE • IN ORDER TO CORRECTLY USE OUR PRODUCTS, REFER TO INDEX TECHNICAL SPECIFICATIONS •

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