



INDO-SWISS BUILDING ENERGY
EFFICIENCY PROJECT (BEEP)



asci
Leadership through Learning

A READY RECKONER FOR COOL ROOFS

*Reference Manual
for Cool Roof use*

WHAT IS A COOL ROOF?

A cool roof is a specially designed roofing system that reflects more of the sun's radiant energy back into space rather than transferring it as heat into a building. The roof is an important component of the building envelope, impacting energy needs and providing thermal comfort to occupants. To put it simply, cool roofs are essential to reflect sunlight and absorb less heat. Depending on the setting, cool roofs can help keep indoor temperatures lower by 3 to 5°C as compared to the regular roofs. In hot climates, cool roofs help to combat rising temperatures, ensuring a comfortable living environment.

HOW IS COOL ROOF DIFFERENT FROM CONVENTIONAL ROOF?

Two characteristics primarily differentiate a cool roof from a conventional roof - solar reflectance and thermal emittance. In simple words, standard roof reflects low, absorbs high and keeps the thermal comfort in less levels. On the other hand, cool roof reflects high, absorbs low and maintains high levels of thermal comfort.

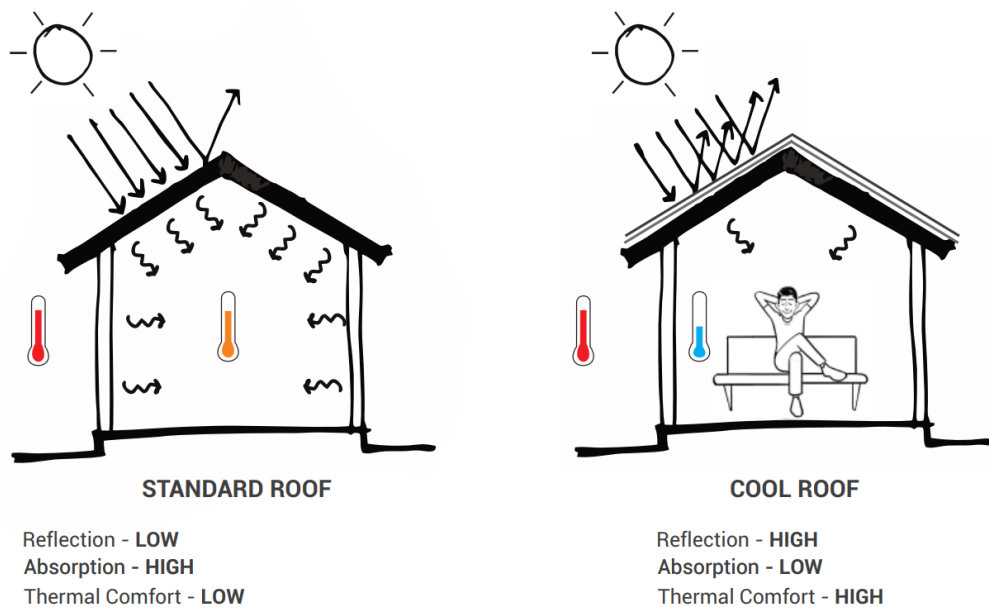


Image Source: House owners' guide alternate roof cooling solutions by National Disaster Management Authority (NDMA)

When drawn an analogy with human body, cool roofs are similar to wearing light coloured clothes on a sunny day. As light-coloured clothes on a sunny day absorbs less heat and keeps the body temperature cool, a cool roof too absorbs less radiation keeping a building cool. Generally, Conventional roofs can reach temperatures of 150°F or more on a sunny summer afternoon. Under the same conditions, it is proven that a reflective roof could keep the temperatures not more than 90°F (32 °C).

BENEFITS OF COOL ROOF

Besides lowering indoor temperatures and improving thermal comforts, cool roofs have many other benefits:

1. Lowering electricity Costs: Equipping a building with cool roofs reduces the demand for Air-conditioning thus reducing the additional bills that incur due to use of such equipment. Moreover, a cool roof can also help in increasing the longevity of the equipment.
2. Health benefits: Cool roofs are said to have an associated impact on reducing temperature related health effects as it helps in increasing the level of thermal comfort in a building. Since it lowers the ambient air temperatures, and improves air quality it is also said to reduce smog-related health issues including heat stroke and asthma.
3. Reduction of greenhouse gas emissions: Cool roof makes a building less dependent on air-conditioning and thus reduces the electricity consumed contributing to the lowered emissions of Co2 from power plants.
4. Cool roofs reduce peak electricity demand, which can help prevent power outages

COOL ROOF TYPES

There are many types of cool roof systems available in the market. However, the surface solar reflectance of the roofing product — the outermost layer of the roof exposed to the sun, also known as the roof covering—determines whether the roof is cool or not. There are cool roof options for nearly all types of roof coverings.

- **Cool Roof Paints:** Cool roof coatings are special reflective pigments – usually white – that reflect light. Think of them as really thick paint that protects the roof surface from ultraviolet rays and chemical and water damage. In addition, cool roof coatings offer high thermal emittance and solar reflectance. The paint reflects about 60 – 90% of sunlight, keeping the house cooler than can a traditional roof, which absorbs the sunlight instead reflecting.



Advantages/Disadvantages:



- Less costly as compared to other cool roof options
- Coating is easily applicable
- Coating acts as waterproof membrane
- Not damaged by freezing temperatures
- Lasts from nearly 4-5 years

- Can be damaged through human movement & objects
- Water based coating cannot be applied in winter and rainy season

- **Cool Roof Tiles:** Cool roof tiles are made of naturally occurring white minerals with high solar reflectance materials to reflect sunlight that falls on the roof. In simple terms, the sunlight that hits the roof will be reflected back into the atmosphere. The heat received by the roof is minimised by reflecting the sunshine back and preventing it from entering the roof resulting in a lower interior temperature. This method of preventing the heat by sunlight which falls on the roof top by using the white roof tiles are commonly called as cool roof tiles.



Image Source: Johnson Endura

Advantages/Disadvantages:



- Recyclable
- Provide thermal insulation
- Low maintenance
- Highly durable to weather conditions
- Lasts for many years

- Heavy, hence structural evaluation is necessary
- Ceramic tiles are fragile

HOW TO APPLY - TECHNIQUES AND SPECIFICATIONS

COOL ROOF MATERIAL	SPECIFICATIONS & MEASURES
Cool Roof Paint	<ol style="list-style-type: none"> 1. Application Areas: All types of Roofs - Concrete, Metal, Asbestos, China Mosaic, Plaster 2. Application Modes: Brush/Roller/ Spray 3. Coverage: 120 Sq. ft./ Kg. / Coat for normal smooth surface 4. No. of coats recommended: 5 coats 5. Dry to touch: 30 min. 6. Recoating Period: Min 2 hours - [@ 28 - 30° C & 60 + 5% R.H.] 7. Full Cure Time: 9 to 12 hrs. [@ 28 - 30° C & 60 + 5% R.H.] 8. Solar Reflective Index (SRI): >102 9. Thickness of Coating Recommended: 300 to 400 microns (5 Coats) 10. Skid Resistance (Friction Coefficient): >0.4
Cool Roof Tiles	<ol style="list-style-type: none"> 1. The tiles shall be free of defects, deficiencies, or bloating that would interfere with the laying/placing of the tiles, the performance of the roof, or the requirements of this specification. 2. The exposed tile surface shall be free of chipping or other imperfections detracting from the appearance when viewed from a distance of 12 m under the illumination of not less than 50 FC (538 lm/m) by an observer with normal vision. 3. When exposed to 50 cycles of the freezing-and-thawing test, the tile must exhibit no breaking, no crack formation that exceeds the minimum dimension of the specimen, and no more than 0.5 percent loss in dry weight. 4. Highly fire-resistant property. 5. Solar direct reflectance is 0.70 6. The mosaic tiles wearing the face of tiles shall be free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles.

LIST OF COOL ROOF VENDORS/DEALERS IN AND AROUND ANDHRA PRADESH

S. NO	COMPANY NAME	ADDRESS & CONTACT DETAILS	LOCATION
1	Panache Green Tech Solutions Pvt. Ltd <i>(Manufacturer)</i>	Address: 13, Satyanarayan Industrial Estate Behind Watertank, Gorwa, Vadodara – 390016, Gujarat Contact: (+91) 992-518-8046; (+91) 909-992-1544 Email: info@panachegreen.com panache@panachegreen.com	Across India
2	Sai Cool Solution <i>(Manufacturer)</i>	Head Office: #142/3, 9th Karunanidhi Street, G.K.M. Colony, Peravallur, Chennai - 600 082 Contact: 90032 65750; 73054 06499 Email: orange1866@gmail.com; scsroofcoolcoat@gmail.com	Across India
3	Kartikeya Enterprises <i>(Dealer)</i>	Address: 7-22/1, Police Station Road, Madhurawada, Visakhapatnam-530048, Andhra Pradesh, India Contact: 7942544405	Andhra Pradesh
4	Sree Bhalaji Industries Private Limited <i>(Manufacturer)</i>	Address: 7-86, T.N.R Colony, Isukanuthipalle, Basinikonda Post, Chittoor, Madanapalle-517325, Andhra Pradesh, India Contact: 80482 74683	Across India
5	New Tech Painters <i>(Dealer)</i>	Address: 30/10/48, V.T College Road, Innespeta, Rajahmundry, Andhra Pradesh – 533101	Andhra Pradesh
6	Leader Paints Marketing <i>(Distributor)</i>	Address: Sr. No. 491, Office No. 404, Fourth Floor, Centre Point, Parvati, Pune - 411009, Maharashtra, India Contact: 8046070832	Across India
7	Perex Engineering Private Limited <i>(Distributor)</i>	Address: PSR Prime Towers Gachibowli, Next to DLF Cyber Towers, Nallagandla, Hyderabad-500032, Telangana, India Contact: 8048965225	Across India
8	Stallion Paints <i>(Manufacturer)</i>	Address: Plot No. 619, Subash Nagar, IDA Jeedimetla, Ranga Reddy, Hyderabad-500055, Telangana, India Contact: 8047631103	Across India
9	Roofplus Cool Proof Tiles <i>(Manufacturer)</i>	Address: Mohnith Ceramic, 6A, Goods Shed Road, Mudhaliyar Chatram, Trichy - 620 001, Tamilnadu, India. Contact: 98945 88883 Email: info@roofplus.in	Across India
10	Surfa Coats India Private Limited <i>(Manufacturer)</i>	Address: No. 639, Surfa Sadana, 46th A Cross, 3rd Block, Rajajinagar, Bengaluru - 560010, Karnataka, India Contact: 8046049455	Across India
11	Sri Balaji Enterprises <i>(Dealer)</i>	Address: Pillar No 83, 1st floor, Satyanaryana Nagar Colony, Attapur, Hyderabad-26, Contact: 9652305285	Andhra Pradesh
12	Bulwark Cool Coats and Chemicals Private Limited <i>(Manufacturer)</i>	Address: 494/3 Plot 15, Srinivasa Pillai Nagar Ayanambakkam, Chennai - 600095, Tamil Nadu, India Contact: 7942541774	Across India

13	Adhere Bonds Coats Private Limited (Manufacturer)	Address: No. 101, W- Block, 2nd Avenue, Anna Nagar West, Chennai - 600040, Tamil Nadu, India Contact: 8046041511	Across India
14	Sree Maruti Chemicals & Interior Products (Dealer)	Address: No. 29, Nazeem Towers, Mallikai Avenues Nagar, 200 Feet Road, Retteri Flyover Near, Thiruvalluvar Nagar, Chennai - 600099, Tamil Nadu, India Contact: 8048972168	Andhra Pradesh
15	Excel Coatings (Manufacturer)	37-93/33, Store 2, Road No: 4, Madhura Nagar, Nerdmet x Roads, Hyderabad, Telangana 500056	Andhra Pradesh
16	Thermoshield India Pvt Ltd (Dealer)	Address: #173, Anupam 7th Cross 5th C Main, RPC Layout, Bengaluru-560040, Karnataka, India Contact: +91-80-23207957 Email: sales@thermoshieldindia.com	Across India
17	Unnathi Group (Manufacturer)	Address: 3, 1st Cross, Netaji Circle, Mathikere Ext., Bangalore, Karnataka - 560054 Contact: +91 9986004163, 91 9845554959 Email: unnathigroups@gmail.com, info@unnathi.com, unnathicare@gmail.com	Across India
18	Thermatek Heat Resistant Terrace Tiles (Manufacturer)	Address: Ishaan Industries, Gandevi Road, Bilimora, Dist. Navsari, Gujara - 396 380. Contact: 02634 284416, Mobile: 9426117277 Email: admin@thermatek.co.in	Across India