

Roof Asset Management Program “Cool Roofs”

**Robert Schmidt, Kansas City Site Office
Federal Program Manager**

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White Roof Definition

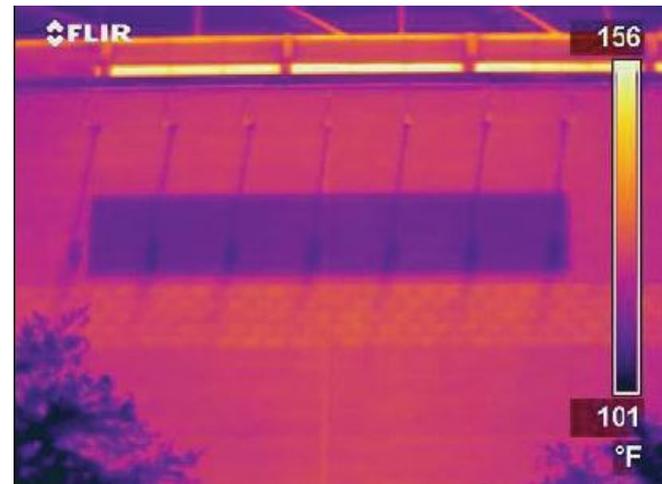
RAMP has incorporated white granular roofs since the beginning of the program due to their reflective qualities as well as slip resistance. The terms “white roof” and “cool roof” are many times mistakenly used interchangeably. A white roof is not necessarily a cool roof and a cool roof is not necessarily white.

RAMP has been evolving towards “Cool Roofs” as defined by industry standards (metal roofs, single ply's, modified bitumen, and acrylic coatings).

Effect of Solar Reflectance on Surface Temperature



Solar reflectance alone can significantly influence surface temperature, with the white stripe on the brick wall about 5 to 10°F (3-5°C) cooler than the surrounding, darker areas.



Cool Roof Definition

A “Cool Roof” is defined as a roof covering which efficiently reflects the sun’s heat and emits absorbed solar radiation back into the atmosphere. By doing so, the roof covering remains relatively cooler and less likely to transfer heat down through the other components of the roof system and then into the building, thereby reducing the cooling load upon the facility HVAC system.

Cool Roof Impact



Roof before treatment, thermometer reads 178-degree Fahrenheit at the roof surface on a hot summer afternoon.

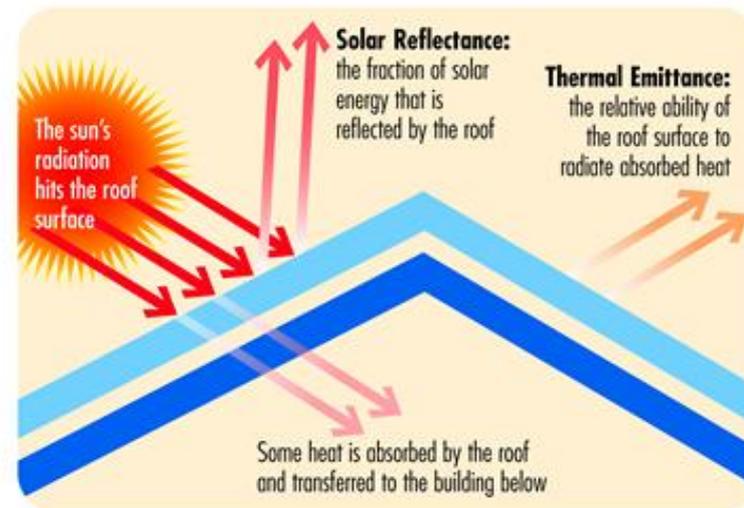
These pictures, courtesy of Hydro-stop, Inc. show hand-held temperature readings from before and after a cool roof treatment.



After a cool roof was installed, there was a dramatic decrease in roof air temperature. Pictures courtesy Hydro-Stop, Inc.

Cool Roof Components

The two factors which determine the degree of efficiency of a “Cool Roof” are the solar reflectance (SR) and thermal emittance (TE), both measured on a scale of zero (0) to one (1), with the least efficient essentially functioning as a “black box” which absorbs all the heat and radiation while the most efficient reflects all heat and radiation; the greater the decimal number of SR and TE, the better the efficiency.



As reported by the Cool Roof Rating Council

Cool Roof Standards

Currently Two Recognized Standards:

The Environmental Protection Agency's Energy Star Roof Product Program

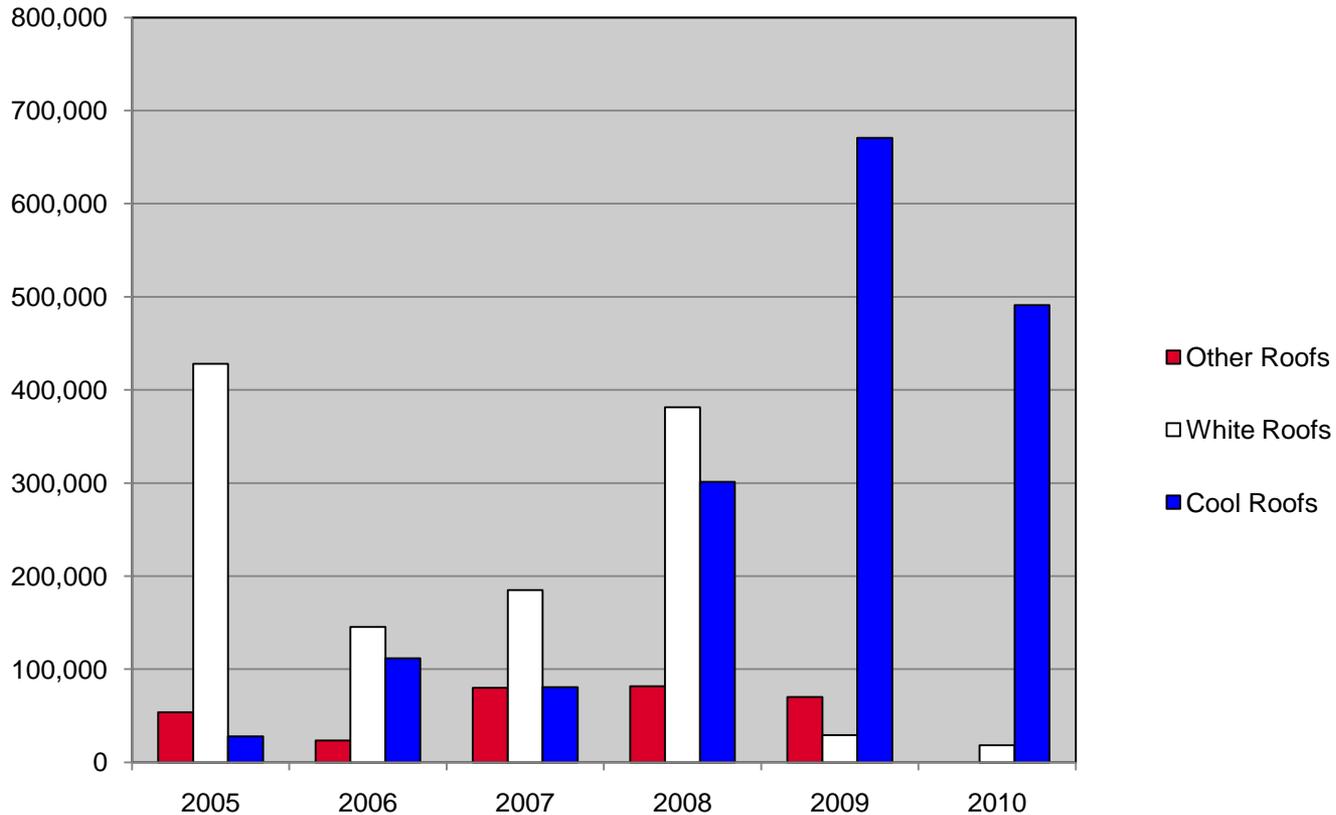
- Low-sloped roofs (less than 2:12) / Flat roofs must have an average initial reflectivity of at least 0.65,
- Steep sloped roofs must have an average initial reflectivity of 0.25 or more.

LEED Version 2.2 (approved Oct. 31, 2005)

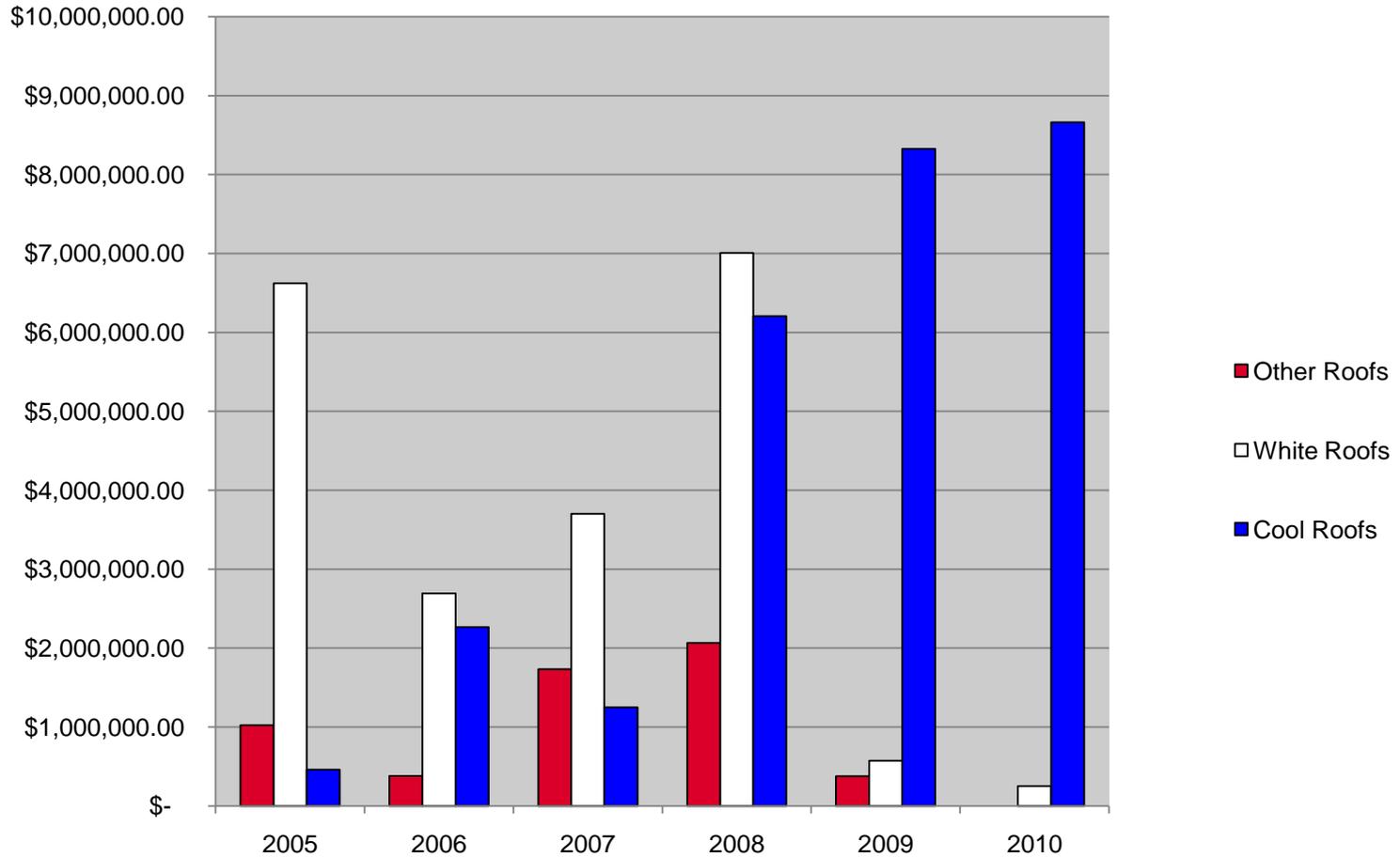
- Solar Reflectance Index (SRI) combines Solar Reflectance (SR) and Thermal Emissivity (TE) as a measure of materials overall ability to reject solar heat.
- Low slope roofs (less than 2:12) a SRI of 78
- Steep-sloped roofs (greater than 2:12) must have an SRI of 29.

The RAMP Team has adopted the LEED Standard which combines Solar Reflectance and Thermal Emissivity calculations into a Solar Reflectance Index (SRI) rating.

Roof Asset Management Program Square Feet Installed by Roof Type



Roof Asset Management Program Total Costs by Roof Type



“Cost of Roofing” Factors

- 1. Type of “Cool” roof systems**
 - **Low cost: coatings, overlays and single ply (PVC, TPO)**
 - **Medium cost: built-up systems (APP)**
 - **High cost: metal roofs**
- 2. Location of building: secure area vs. less secure area**
- 3. Degree of difficulty in removing existing roof - 40% of roofing cost**
- 4. Degree of difficulty in installing new roof. Quantity and complexity of rooftop equipment.**
- 5. Size of re-roof area: economies of scale**