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Super Therm[®] Ceramic Coating for Military and U.S. Government Buildings

Alternative Energy Technology

15 April 2011

Major Andy Middione

309 AMARG

U.S. AIR FORCE

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Super Therm[®] Reflects Heat/Prevents Heat Loading



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How Super Therm[®] works:

High Reflectivity of Solar Radiation Heat Transfer resulting from three radiation waves. Super Therm[®] blocks 95% of the loading of heat onto the surface.

- **UV represents 3% of heat load** - Super Therm[®] blocks 99% of heat generated by UV.
- **Visual Light (short wave radiation) represents 40% of heat load** - Super Therm[®] blocks 92% of heat generated by Visual Light.
- **Infrared (long wave radiation) represents 57% of heat load** - Super Therm[®] blocks 99% of heat generated by Infrared.
- **High Thermal Emittance of .91** reflects heat, preventing the surface from heat loading.

By blending four shapes of ceramics, a plating effect is achieved with 95% heat reflection.

Certifications: Underwriter Labs, Energy Star, International Code Council Building Officials Code Administrators, Energy Star, State of California Cool Roof Program, USDA, ASTM, NASA Class A fire block, LEED Sustainable Site Credit 7.1 & 7.2 Heat Island, and Innovation & Design Process Credit 1.1

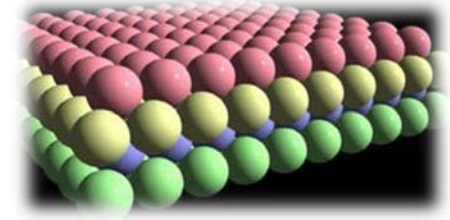


Super Therm[®] Blocks the Windows of Solar Radiational Heat

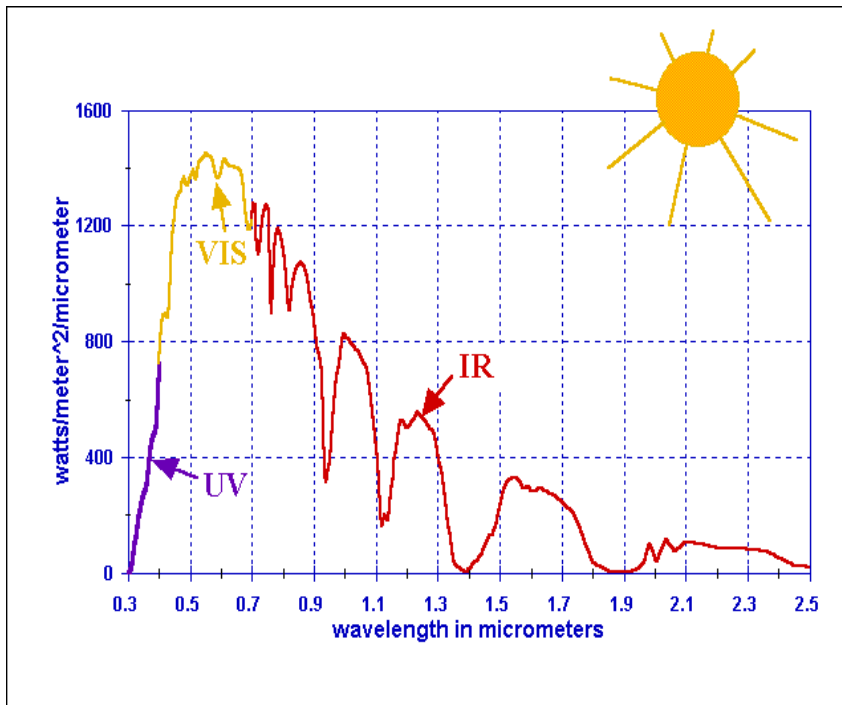


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The spherical shape permits the 4 types of ceramics to settle very tight together, not allowing air to interact between the ceramics; thus "plating". SUPER THERM[®] blocks 95% of the three sources of solar radiation heat.



Ceramics



- ◆ **Ultraviolet (UV)**
 - ◆ 3% of total energy
 - ◆ Responsible for sunburn
- ◆ **Visible (VIS)**
 - ◆ 40% of total energy
 - ◆ Visible light
- ◆ **Infrared (IR)**
 - ◆ 57% of total energy
 - ◆ Felt as heat

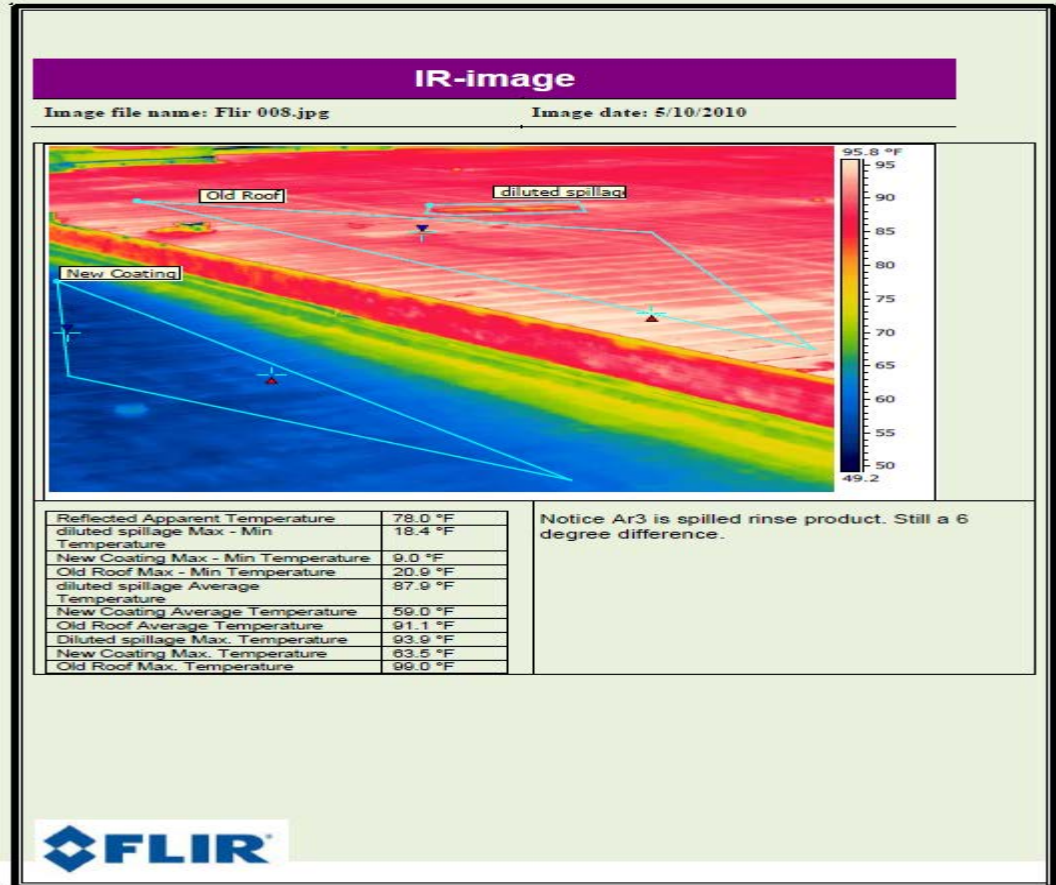


FLIR Photographic Evaluation

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This Forward Looking Infrared Radar picture shows a roof where Super Therm® has been applied to half of the structure.

- Red areas are uncoated and show absorption of heat on the roof.
- Blue areas are coated with Super Therm® and show reflection of heat and cooler surface temperatures resulting in reduced heat transfer to the interior of the building.





Tucson International Airport

374,803 Sq. Feet



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- After SUPER THERM® was applied = **22% reduction** in total energy usage (lighting, elevators, food facilities, etc) in August, 2009.
- After SUPER THERM® was applied = **40% reduction** in air conditioning costs.

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Vodafone Mobile Telephone Containers Turkey



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Energy Saving Benefits of White Paint are Overrated



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- **White paint only reflects two windows of heat (UV and Visual Light) – 43% of solar radiational heat.**
- **White paint only reflects while it is clean, white, and shiny.**
- **Anyone who has owned a white car knows that white paint is not effective in reflecting or blocking solar radiational heat.**
- **In Arizona (or any other state) in the middle of the day with the sun shining brightly, a white car roof will be too hot to touch. Therefore, it is absorbing (not reflecting) heat, and the absorbed heat will transfer to the interior of the car.**
- **The same car roof painted with Super Therm[®] will be cool to the touch and no hotter than the ambient air temperature.**
- **When the exterior of a building or vehicle is coated with Super Therm[®], the result is similar to permanently placing the building or vehicle under a dense shade tree – the heat on the building or vehicle is substantially reduced.**



Super Therm[®] Field Test Results Denver, Colorado (July 2004)



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THE THERMAL ENERGY NECESSARY TO HEAT OR COOL THE BUILDING COATED WITH THE *SUPER THERM* PRODUCT REQUIRED **26% LESS ENERGY.**



- Container coated with **SUPER THERM[®]** required **26% Less Energy** to heat or cool.
- Container coated with **White Paint** = **235 BTU/hr/ft² °F.**
- Container coated with **SUPER THERM[®]** = **80 BTU/hr/ft² °F.**

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Passenger Bus Roof City of Hermosillo, Sonora, Mexico



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Super Therm® Saves Fuel for Food-Hauling Fleet

Heavy Duty Trucking Magazine

April 2010



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- Pacific Shipping & Trucking of Denver, which has a two-way food products haul with temperature extremes that were difficult to deal with.
- Then came Super Therm®, a special roof coating, that proved to be an impressive solution.
- After coating roofs with Super Therm®, the cool-down time in Phoenix was cut by 1.75 hours or 44 percent. The study showed a reefer unit also used less fuel while under way: 20 percent less fuel on the outbound “hot” haul and 29 percent less on the return “cold” leg.
- A reefer burned thus 5.75 fewer gallons per day and saved about \$13.50 with non-road fuel at \$2.35 per gallon.
- Super Therm® costs \$900 to \$1,000 to apply, but saves enough fuel to pay for itself in 10 to 11 months.



A roof gets to 144 degrees in Denver in the sun. Elsewhere it'll get to 200 degrees. By putting Super Therm® on, the product doesn't allow the roof to heat up. It'll only be 2 or 3 degrees above ambient. It amounts to putting a tent over the trailer.

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Super Therm® Solar Reflectance Test After 17 Years



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- **User**

Mr. Roger Kuntz, President of K-Teck, Grainfield, Kansas 67737

- **Test Piece**

The test piece was taken in January, 2006, from a 17-year old roof where Super Therm® had been originally applied in 1989.

- **Climate Condition**

K-Teck is a manufacturing facility located in Grainfield, Western Kansas. This area's climate is very severe: with -5° F (-21°C) in the winter with snow and ice and with 100° F (38°C) in the summer with sand storms and very strong solar radiation.

- **Solar Reflectance Test**

Test Center: Japanese Institute of Standards, Building Material
Test Center Test Method: Solar Reflectance Test JIS R 3106
(Reflectance Test on Plate Glass)

- **Evaluation**

This is an exceptional result for the roof of a factory in extremely severe weather conditions to remain at 84.1% of visible light reflectance and 73% of total solar reflectance after 17 years.





Super Therm® Still Maintains the Same Insulation Benefit As The Day of Application



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**KOKUYO CO., LTD. (Nagoya Distribution Center) SUPER THERM® applied to Batten Seam Roofing
Application Year: 1994 Application Area: 6,000sq.m**

When SUPER THERM® (Cool Therm in Japan) was applied in 1994, the room temperature had decreased by 5 to 7 degrees C, and it was maintained below the outside temperature.

In 2004, ten (10) years after it was applied, SUPER THERM® was still providing the same insulation benefit.

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Super Therm[®] Return on Investment (ROI)



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- Super Therm[®] ROI will vary depending upon a number of factors.
- In the case of Sony Corporation in Japan, the payback time for a roof coated with Super Therm[®] was approximately thirteen (13) months.
- In the case of a roof coated with Super Therm[®] in Florida, the Florida Department of Energy concluded that the Super Therm[®] Roof Coating System proved to be an effective Energy Conservation Measure (ECM) that produced a reasonable simple pay back of approximately 2.2 years on this particular project.
- However, the brighter the sun and the hotter the temperature on the roof, the more effective Super Therm[®] will be and the shorter the payback period.
- For example, if an uncoated roof in Canada is 135 degrees F and a Super Therm[®] coated roof is 90 degrees F, the reduction of heat into the building is 45 degrees F. If an uncoated roof in Arizona is 180 degrees F and a Super Therm[®] coated roof is 95 degrees F, the reduction of heat into the building is 85 degrees F.
- If all other energy usage factors are the same, the payback period in Arizona will obviously be shorter. But even in Canada, Super Therm[®] will reduce energy usage and pay for itself over a reasonable time period.

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Super Therm[®] Performance



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Recommend that you insert description and pictures of trailer coated by Jim Williams at the AMARG Energy Symposium as a dramatic, direct, and personal reference of the performance of Super Therm[®].



SSPC Structure Awards Honor Projects

Hoover Dam Bypass – Superior Products International II, Inc.



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E. Crone Knoy Award

for a single, recent, outstanding achievement in industrial or commercial coatings work that demonstrates innovation

Hoover Dam Bypass Bridge - Colorado River Bridge

Spans between Nevada and Arizona

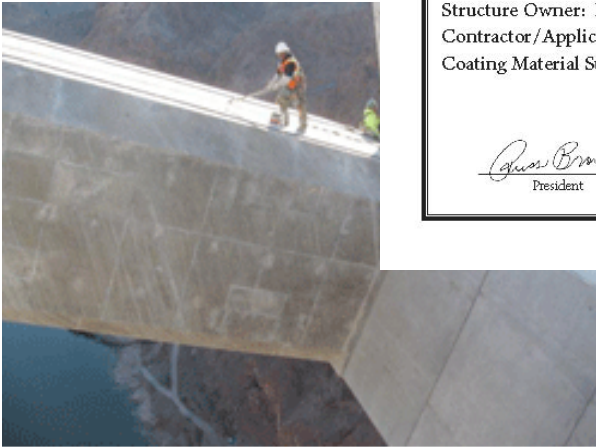


Structure Owner: Federal Highway Administration
 Contractor/Applicator: United/Anco Services - A Member of The Brock Group
 Coating Material Suppliers: PPG Marine and Protective Coatings, and Superior Products International (SPI)

Quinn Brown
President

January 31, 2011
Las Vegas, NV

Will Ashby
Executive Director



The work was conducted 900 feet above the Colorado River in desert temperatures.



The project was completed on time and under budget, with no recordable OSHA incidents.

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