

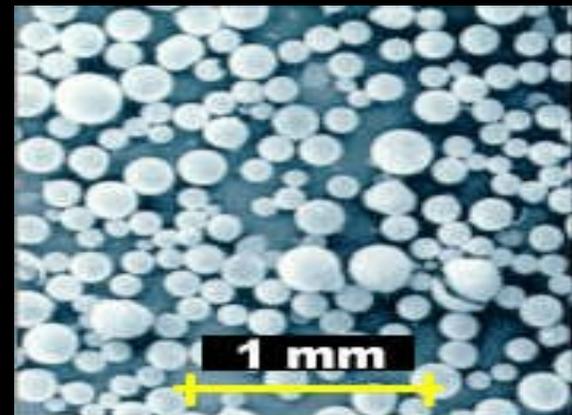
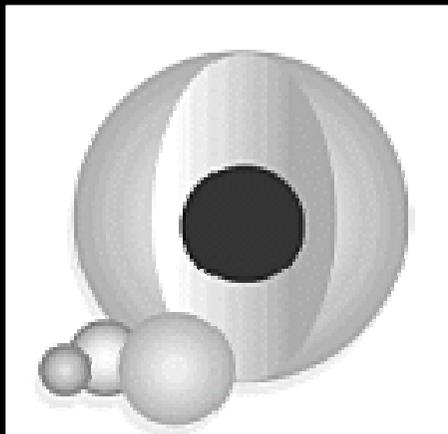
Ceramics are well known for their properties of not conducting heat as seen in this photo from a National Geographic Magazine article where this ceramic cube glows with an interior temperature of 2200 degrees, yet can be safely held by bare hand.

Space Shuttle technology combines hollow ceramic tiles with a vacuum center to protect the Space Shuttle against incredible heat at re-entry. Physics law states “nothing can move by conduction through a vacuum, since it represents an absence of matter.” So, it’s impossible for heat or sound to travel by conduction through a vacuum.





During the 1970's, General Industries Corporation, a specialty chemical development company in Colorado Springs, Colorado, Rohm and Haas, the world leading manufacturer of resins and polymers, and the 3M Company who designed the vacuum ceramic micro spheres, spent 7 years of trial and development to put this science into a system that would perform under the toughest conditions on the planet, and in the conditions that are the most important to you, your project.

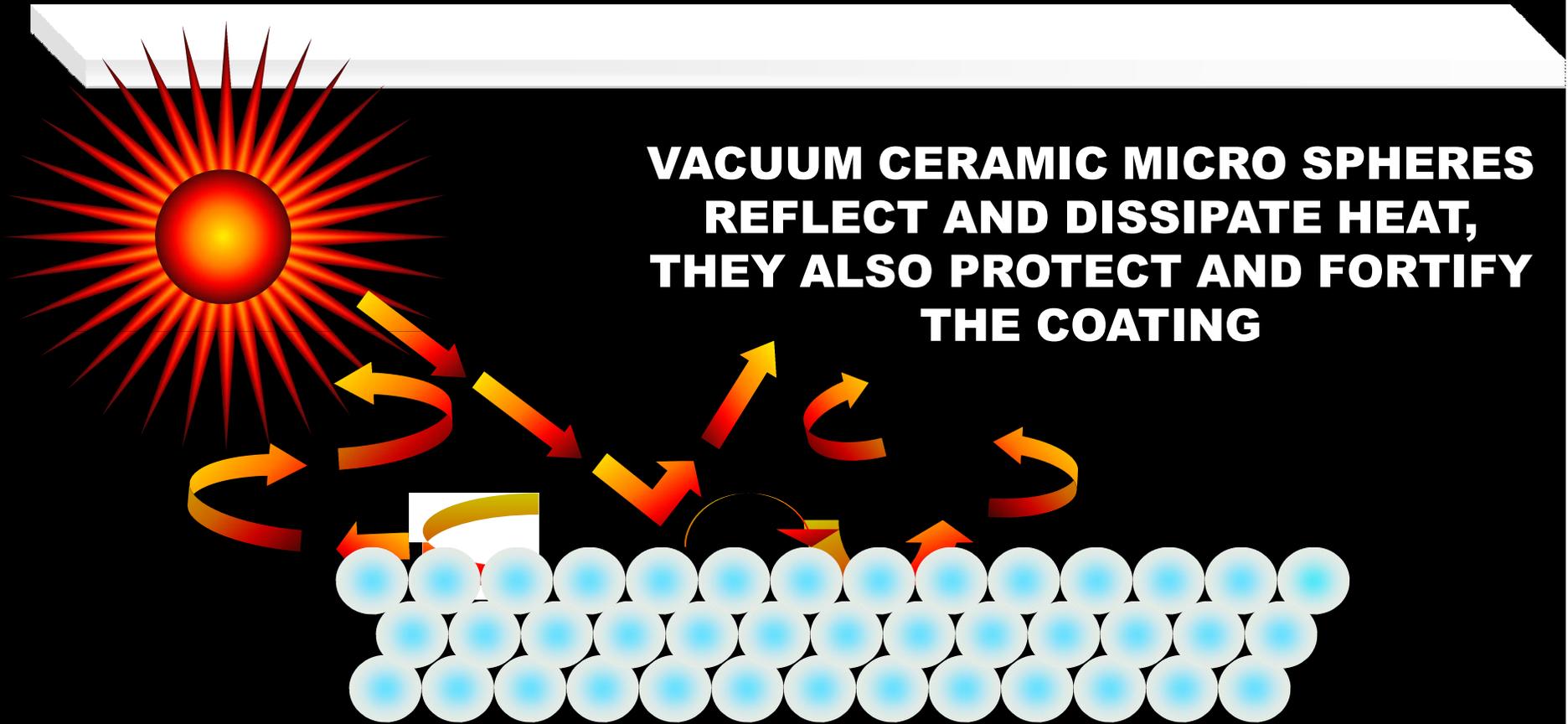


***Roof Exterior Interior Texture
Tank Wood and Deck***

THERMO-SHIELD FLUID APPLIED CERAMICS ARE THE RESULT. THEY PROTECT, RESTORE, BEAUTIFY, AND INSULATE ANY SURFACE THEY ARE APPLIED TO, AND **THERMO-SHIELD** HAS A SYSTEM TO GO ON ALMOST EVERYTHING. THE COATINGS ARE LOADED WITH CERAMIC MICRO SPHERES WITH A HOLLOW CENTER THAT CONTAINS A VACUUM. IT IS THIS VACUUM/CERAMIC THAT CREATES THE INCREDIBLE HEAT BLOCKING BARRIER !

**ROCKET SCIENCE FOR HOMES, BUSINESS,
AGRICULTURE, AND INDUSTRY**

SPECIAL ELASTOMERIC RESINS FORM A SEAMLESS AND FLEXIBLE MEMBRANE AND PROVIDE REMARKABLE ADHEASION AND RESISTANCE TO NATURAL OR CHEMICAL BREAK-DOWN



VACUUM CERAMIC MICRO SPHERES REFLECT AND DISSIPATE HEAT, THEY ALSO PROTECT AND FORTIFY THE COATING

UNIQUE POLYMERS ADD WATERPROOFING, BREATHABILITY AND LONG LIFE.

Premium exterior paint from local building supply applied to epdm rubber.



Thermo-shield applied to other side of epdm , then cut into strips...



Give it a good stretch

White paint simply cracks



Thermo-shield can be stretched and stretched and it will not crack



Thermo-shield formula's are complex combinations of **Acrylics, Elastomerics, Mastics, Weather-Proofers, Dispensers, Reflectory Materials, Mildew Inhibitors, Fungicides, Bonding Resins, Anti-Shrink Materials, and other Materials heretofore unavailable.**

Thermo-shield products are unaffected by **Ultra Violet Rays or Atmospheric Pollution. They are Non Toxic, causing no know health or environmental impact. The coating has undergone rigorous testing to ensure its resistance to blistering, fungus, hail, even chemical corrosion.**



CALCOAST ANALYTICAL – ITL

Materials Chemistry and Lighting Science

TEST PERFORMED : ASTM D1308 Chemical Resistance of Cured Coating Film

Ref:Lab File #0530-3A/91 Sixteen Hour Spot Test for the following chemicals.

	ROOF	EXTERIOR	INTERIOR	Results Key:
Automobile Brake Fluid	N	N	O	N=No Effect
Animal Urine	N	N	O	
Battery Acid	N	N	B	S=Staining
Bleach	O	N	O	
Blood	N	N	S	O=Slight swell
Bunker Fuel #2	N	N	N	
Carbon Tetrachloride	N	N	O	B=Blistered
Chloroform	N	N	O	
De-icing Chemical	N	N	N	
Ethylene Glycol	N	N	N	
Gasoline	S	N	N	
Hydrochloric Acid 20%	O	B	B	
Hydrochloric Acid 35%	B	B	B	
Isopropyl Alcohol	N	N	N	
Lipstick	S	S	S	
Mineral Oil	N	N	N	
Menthylethyl Keytone	N	N	O	
Motor Oil	N	N	N	
Naptha	N	N	N	
Nitric Acid 10%	N	N	N	
Sodium Chloride 5%	N	N	N	
Sodium Chloride 40%	N	N	N	
Sulfuric Acid 25%	N	N	O	
Treated Sewage	N	N	N	
Xylene	O	N	O	
Skydrol , (fire retardant, aircraft hydraulic fluid)	S	S	S	

All the ingredients used in **Thermo-shield are synthetic**

Other paints and coatings use cheap fillers to keep the cost of their product down. Fillers like China Clay are common natural products that are readily broken down by nature. Thermal Shock, Extreme Heat or Cold, Wind, Rain, Snow, Hail, Ultra Violet Exposure, turn other products hard, they crack, blister, fade, peel, decay, turn chalky, or simply decompose.

The vacuum ceramic micro spheres are the “fillers” in **Thermo-shield Coatings. They are virtually indestructible in the conditions faced day in and day out in homes, business, agriculture, and industry.**

Torch is ignited, and a layer of vacuum ceramic micro spheres are poured onto hand



3,600 degree flame is applied to micro spheres.



THERMO-SHIELD IS A SUPERIOR WATERPROOFER



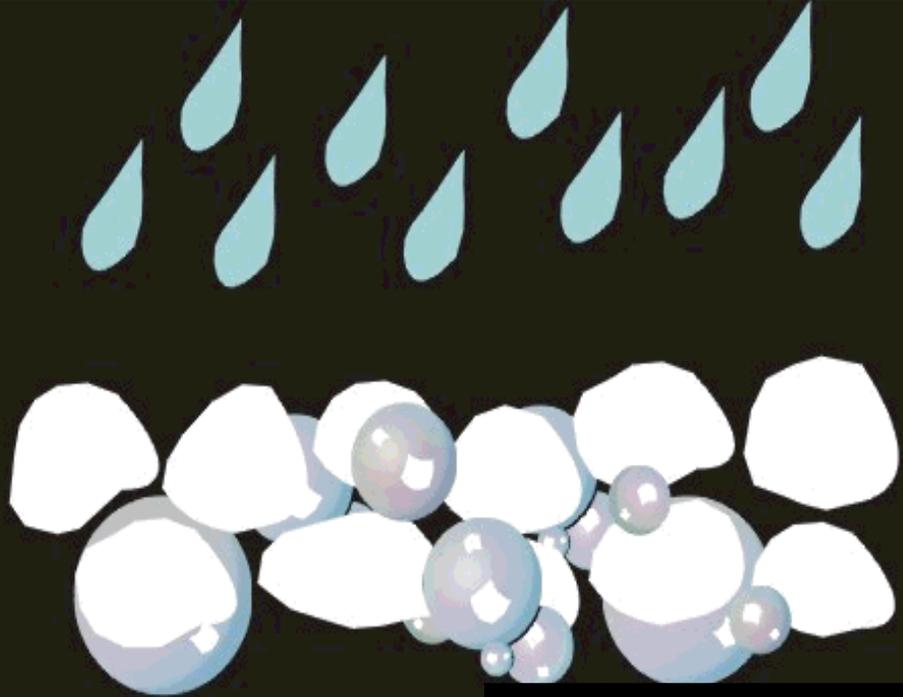
Just 3 brush coats of Exterior turn this cardboard box into rubber duck's leak free swimming pool ! (great for ponds and water features)

Thermo-shield Coatings have another very special property that makes them unique from ordinary paints and coatings

Thermo-shield Coatings have “Variable Permeability”

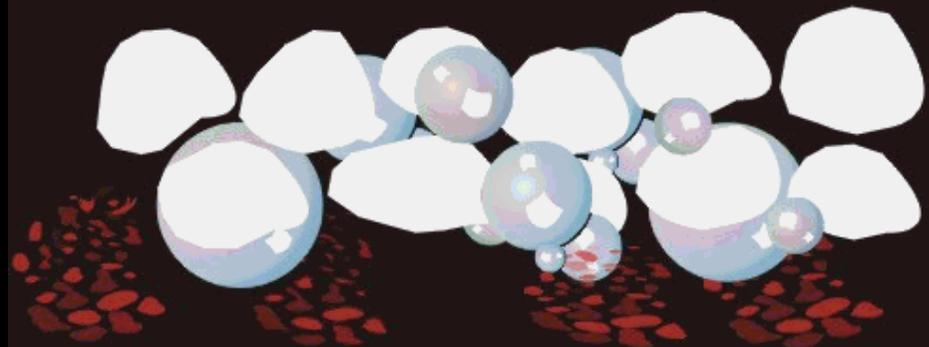
When conditions are wet, special polymers swell, making the coating completely watertight. When conditions are dry, these polymers shrink and moisture can breath out, never trapping mold, mildew, dry rot, or R value robbing moisture in walls and ceilings

**BECOMING WATERTIGHT
WHEN WET**



Variable Permeability

**BREATHING OUT MOISTURE
WHEN DRY**



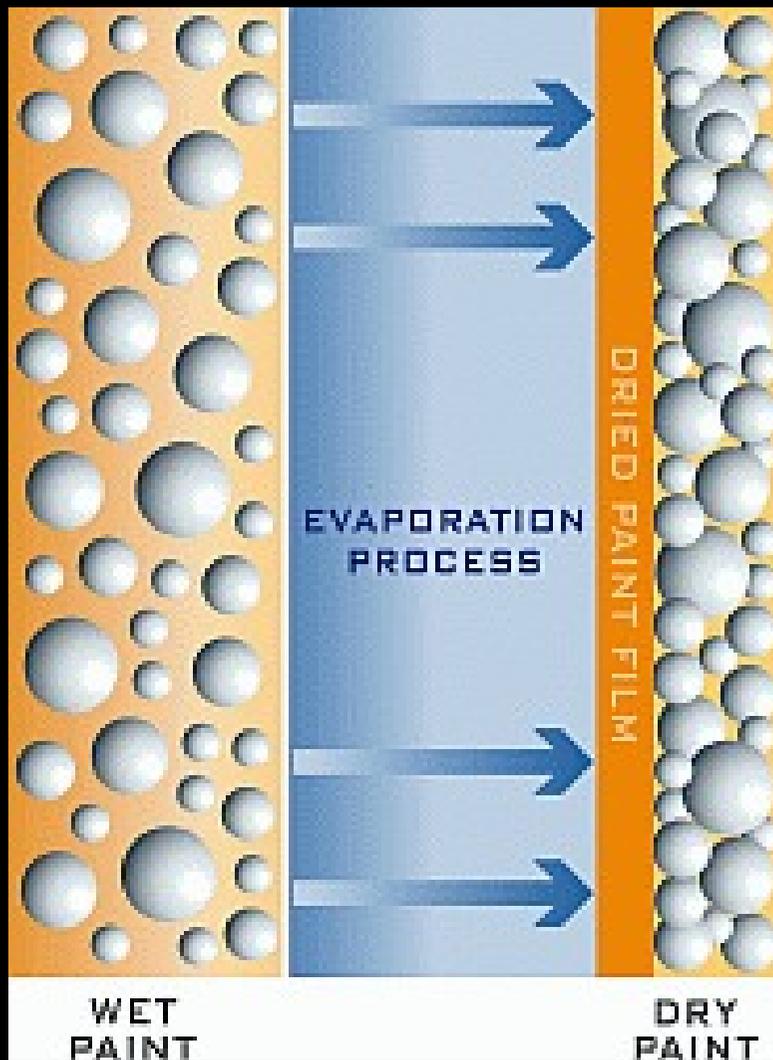


In an article at bobvilla.com entitled:

“Ceramic Coatings for Increased Insulation” , it says

“ Ceramic coatings and insulating paints bring huge energy savings as they prevent conditioned air loss from inside and block heat build up from outside. Ceramic coating has been around for 20 years and is highly effective in preventing unnecessary heat loss or gain in residential and commercial structures. Inspired in part by the ceramic tiles NASA uses on the space shuttle, a ceramic coating is a paint mixed with one or more ceramic compounds for application via spray or roller to exterior or interior surfaces.

Depending on the ceramic compound used (there are 100's of varieties), this insulating product has the ability to prevent heat transfer and heat loading onto a structure”.



Thermo-shields

unique chemistry allows the micro spheres to stay in fluid suspension until applied, where they form a seamless, flexible, heat blocking microstructure that fights heat gain or heat loss.

This was not an easy task as the spheres are light and will float to the top of ordinary paint or coatings.

This leads a lot of our competition to use solid spheres, or products that have been simply ground into dust



coating of superior adhesion, flexibility and abrasion/impact-resistance. It is resistant to chemical solvents and acid splash. Originally designed for metal surfaces, **RUST GRIP** demonstrates excellent adhesion to wood, concrete, fiberglass and many other substrates. **RUST GRIP** is designed for the encapsulation of and adherence to tightly-bonded surfaces of lead-based and other toxic paints as well as rusted surfaces.

SUPERTHERM



Is a **PAINT** with an **R19 INSULATION VALUE!** Built with a combination of two acrylics and one urethane, which makes it flexible, yet tough. It has four different types of ceramics built in to give not only reflective abilities but also non-conductive ability for heat and cold. Other elastomeric reflective coatings have only one acrylic and a single reflective ceramic. **SUPERTHERM** ceramics are not the rough multifaceted type as the one found in other coatings, **SUPERTHERM** ceramics are ground to form microscopic spheres. The spherical shape permits the 3 type of ceramics to settle very tight together and not allowing air to interact between the ceramics thus "plating" is therefore the reason why **SUPERTHERM** is a true insulating not just a reflective coat as are all the competing formulas in the market.

ceramics are ground to form microscopic spheres

ANTI- GRAFFITI

**TOUGH and CLEAR SUPER
COATING for ALL SURFACES**



providing resistance to water and humidity, stains, chemicals, and solvents, as well as tremendous scuff, mar, and impact resistance. Ideal for use on bridges applied over **RUST GRIP** or by itself for complete encapsulation of the metal, providing protection from rust and corrosion for a minimum of 20 years in normal circumstances. Resistant to hail damage and similar abuses that create opportunities for rust and corrosion. Completely UV- controlled and weather resistant. **ENAMO GRIP** can be used on flooring for a tough, long wearing surface. In summary, the overall toughness, durability, of **ENAMO GRIP** makes it the ideal choice for architectural maintenance situations that



COATINGS

Industrial



Marine



Sound Damping



Roof & Home



Automotive



INFORMATION

► Brochure

► Material Safety Data Sheet

► Technical Data

► Application Ins

► Success Storie

OTHER P

Application Equipment

WeatherBloc™

Weather bloc is a ceramic, insulating roof and exterior coating specifically designed for residential/commercial roofs and sidewall substrates.

This coating is comprised of the best in acrylic binders and ceramic/silica coating materials to provide unequalled resistance to adverse weather conditions while also providing thermal insulation properties.

Unlike conventional blanket systems, this coating attacks heat or cold penetration before it ever enters the substrate. This allows the coating to deal with the thermal transfer as a problem, not as a symptom after it has already made



Brief Tech Data

Container size:
5 gallon, (20 liters)

Components:
One part

Coat thickness: 0.020" (0.5

Ceramic and silica particles

sphere



Our unique composition of ceramic and silica particles structure encased in a very high grade latex emulsion allows for little transfer of radiative and conducted heat

This structure is very different than other reflective roof/sidewall coatings as it can be applied on top of or underneath roofs and still produce dramatic temperature

6.2 lbs/gal (0.73 kg/liter)

Volume solids: 75%

Color: Bright White

Sheen: Flat

Base: Acrylic

Elongation: 632%

Permeability:

Contact us today for more information!

Phone
(713) 465-0304

Toll Free
(800) 549-0043

Thermo-shield works
against all 3 forms of heat
transfer

Conduction

Convection

Radiation

CONDUCTION is direct heat flow through matter (molecular motion). It results from actual PHYSICAL CONTACT of one part of the same body with another part, or of one body with another. For instance, if one end of an iron rod is heated, the heat travels by conduction through the metal to the other end; it also travels to the surface and is conducted to the surrounding air, which is another, but less dense, body. An example of conduction through contact between two solids is a cooking pot on the solid surface of a hot stove. The greatest flow of heat possible between materials is where there is a direct conduction between solids. Heat is always conducted from warm to cold, never from cold to warm, and always moves via the shortest and easiest route.

Conduction: Direct heat flow thru matter resulting from physical contact

CONVECTION is the transport of heat within a gas or liquid, caused by the actual flow of the material itself (mass motion). In building spaces, natural convection heat flow is largely upward, somewhat sideways, not downward. This is called "free convection."

For instance, a warm stove, person, floor, wall, etc., loses heat by conduction to the colder air in contact with it. This added heat activates (warms) the molecules of the air which expand, becoming less dense, and rise. Cooler, heavier air rushes in from the side and below.

Convection: Transfer of heat within a gas or liquid

RADIATION is the transmission of electromagnetic rays through space. Radiation, like radio waves, is invisible. Infrared rays occur between light and radar waves (between the 3 -15 micron portion of the spectrum). Henceforth, when we speak of radiation, we refer only to infrared rays. Each material that has a temperature above absolute zero (-459-7 F.) emits infrared radiation, including the sun, icebergs, stoves or radiators, humans, animals, furniture, ceilings, walls, floors, etc.

All objects radiate infrared rays from their surfaces in all directions, in a straight line, until they are reflected or absorbed by another object. Traveling at the speed of light, these rays are invisible, and they have NO TEMPERATURE, only ENERGY. Heating an object excites the surface molecules, causing them to give off infrared radiation. When these infrared rays

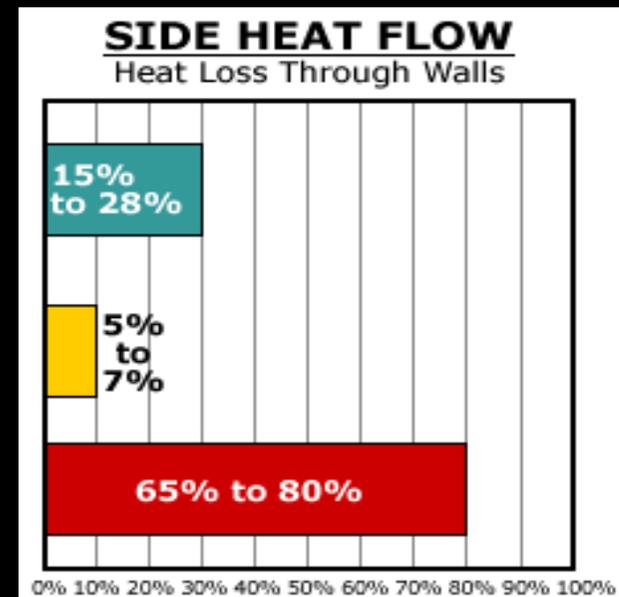
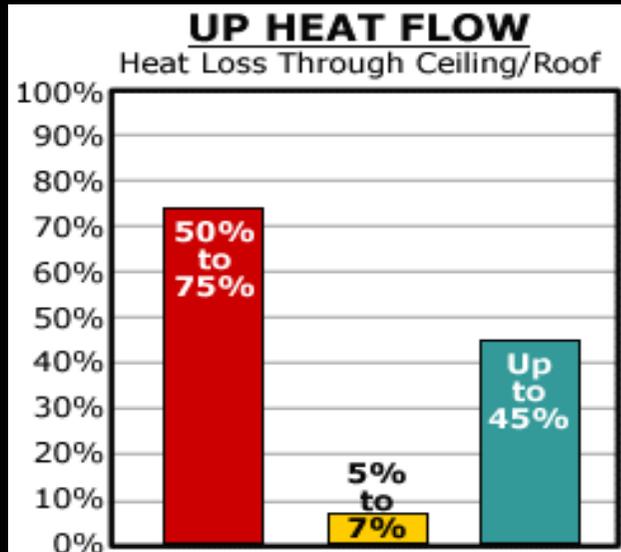
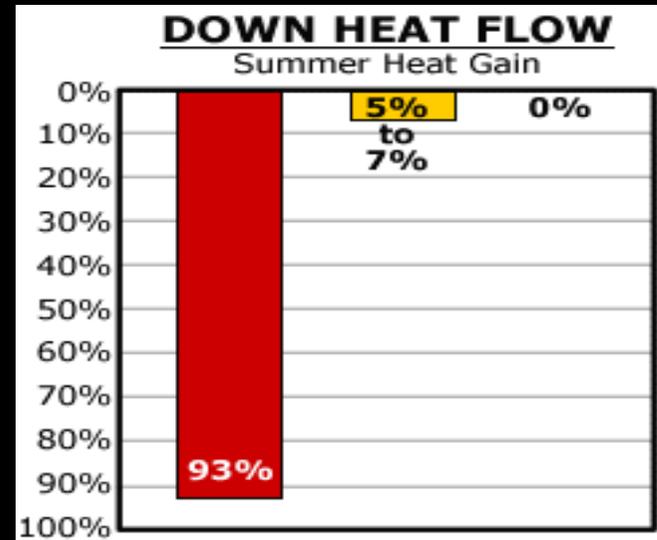
Radiation: Transmission of electromagnetic rays

Interior Heat Flows

Radiation

Convection

Conduction



Measured k-value (conductivity) of common building materials, taken from the 2005 ASHRAE HANDBOOK

conduction

Hardwood, oak	1.25
Softwood , cedar	0.68-0.90
Plywood, douglas fir	0.80
Particle board	0.94
Wafer board	0.63
Fiberboard acoustical tile	0.42
Loose fill cellulose	0.27
Cement plaster, sand aggregate	5.00
Brick, fired clay	2.50-10.20
Cement/lime, mortar, stucco	9.70

SUPER THERM

SUPER THERM PASSED

Spec sheet from competitor **"Super Therm"**
(this is the product featured in the bobvilla.com article)
shows a **K-value of 0.101**
pretty good compared to the common building materials shown
however....

Application Temperatures	Not over 194F / 90C degrees
Application Required	10 mils, two coats if the surface is to be overcoated with another dark coating
Dry Times	1 hr to touch @ 22C. deg. 4 hrs to recoat
Curing Times	14-21 days
Remarks	More dry time required if in very damp climate. Be sure to remove all filters from spray equipment to prevent sifting of ceramic particles. Apply with side-to-side, up-and-down strokes for even coverage.

SUPER THERM K value (0.101) expressed in Lambda.

THERMO-SHIELD
HAS A K-VALUE OF
0.054

K value of 0.10 results from ASTM 1269 / 1461-92

At 20 mils Outperforms 10 inches of fiberglass insulation

SUPER THERM has 92% Sunshine Reflective Ratio.

SUPER THERM can reduce sound by 68%.

NASA "Class A" fire "0" smoke and flame spread.

Passed 2000 hour salt spray.

Do the math. Its easy to see, Thermo-shield works better !

(the article also says **Super Therm** retails at **\$100.00 per gallon**)
wow do the math again, **Thermo-shield** is half that !

Energy Star rated SUPER THERM one of the best overall.
SUPER THERM saves Sony Corporation 80% of energy

SP 20011	Three hours FIRE PROOFING
HOT PIPE	Extreme Heat Insulation
SUPERTHERM	R19 Insulation

Thermo-shield's low conductivity in real world applications :

From United Mattress: Manufacturing Facility, Colorado Springs, CO.

Thermo-shield was applied to **INSIDE** walls of Mattress Sterilization Unit. Unit runs at 220 degrees and has substantial energy costs to operate.

“After monitoring electrical consumption for 6 months, we can verify a 25 % savings in our energy costs. We also noticed the thermostat began cycling OFF. In the past it had always stayed ON until we turned the Unit off.”

From Hyssna International: Gulf Cement Factory, Ras Al Khaima, UAE

Thermo-shield was applied to the **OUTSIDE** of 2 steel access doors on a large manufacturing kiln.

Door # 1	surface temp before coating	435 degrees f.	- 99 degrees
	surface temp after coating	336 degrees f.	
Door # 2	surface temp before coating	360 degrees f.	- 64 degrees
	surface temp after coating	296 degrees f.	

Convection

Physics tells us that moist air always moves to dry air and heat always moves to cold, this can lead to moisture levels building up in walls and attics and in their insulation. A small 1 ½ % moisture level in a wall will reduce R-level of fiberglass insulation by 36 %.

“It’s hard to stay warm in a wet coat, and the same thing is true for walls and ceilings.”

Testing in Germany showed that **Thermo-shield coatings will remove and regulate moisture levels in a wall during the first season of use. Their study showed that reducing the moisture (**convection level**) in a wall makes that wall work the way it was designed to and just having that dry wall can improve performance of that wall an average of 15%**

Eliminates Condensation on Walls

Thermo-shield Coatings will dramatically reduce hot - cold / cold - hot surface temperature fluctuations. The special formula reacts to ever changing humidity in the air or increasing moisture levels in a wall, absorbing excess moisture into the coating to be released back into the room as humidity levels fall. Peak performance from dry walls in the winter and built in cooling during the hot summer months

Promotes Healthy Air and Environment

The **Thermo-shield** formula is designed to control the total humidity level of a room. It is set to maintain humidity levels at an optimum 55%. This makes breathing easier. **Thermo-shield** does not release any allergens into the air. Also the coating is free from any emissions, having no detrimental impact on health or environment. Even heat reflection and distribution ensures less air circulation and that means less dust. The ceramics on the coating surface prevent electrostatic charges and the chemical bonding with dust particles that can occur with common paint.

Results shows excellent reflectivity in the spectrums that account for heat transfer by Radiation

Visible Light 88 %

Near Infra-Red 84 %

Ultra-Violet 15.6 %

**How a surface reflects these spectrums give an Overall Solar Reflectance percentage
Thermo-shield performs at 82.3 %**

Solar Reflectance of Common Roof Surfaces

Dark Pea Gravel	0.12
Typical Tar and Gravel	0.34
Black Roof	0.05
Dark Gray Roof	0.15
White Roof	0.55
Aluminum Shingle	0.40
Epdm Rubber Roofing 60 mil.	0.10
Aluminum Fiber Silver Coat	0.36
Thermo-shield, white	0.82



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THERMO-SHIELD
Roof and Wall Coatings

DSET Report No.: 89r1219-01
DSET No.: 36558
Date: December 19, 1989

HEMISPHERICAL SPECTRAL REFLECTANCE TEST REPORT

1.0 INTRODUCTION

This report presents results of spectral reflectance measurements on the following specimens: Thermo-Shield Roof Coating applied to Polyester Cloth:
#1, #2, and #3

**This test measures reflectance in
all spectrums responsible for
heat by **Radiation:**
Visible, Near Infra-Red, and Ultra-
Violet**

and automatic filter change in the Beckman 5240 Spectrophotometer. This disparity generally occurs only in regions of rapid change in percent reflectance.

4.0 RESULTS

Specimen Code	Solar (p)	% Reflectance		
		UV	VIS	NIR
1	80.8	15.5	86.2	82.8
2	83.2	15.7	89.2	84.7
3	82.9	15.7	88.6	84.7

UV spectrum only accounts for about 5% of heat

OAK RIDGE NATIONAL LABORATORY

Managed by UT Battelle for the Department of Energy

● research ●

For the past ten years, research has been focused on applying white radiation control coatings to existing low-slope roofs with non-reflecting membranes. The project has evolved into a three-year study of 24 different white and aluminum coatings. This research, begun in the summer of 1997, is conducted in partnership with the Roof Coating Manufacturers Association and several coating manufacturers.



Preparing the base uncoated roof test section



Laying out the test areas for different coatings



Applying individual coatings by roller or brush



A completed test section with five coated areas and one uncoated area

In 1997 a 3 year study with 24 white and aluminum coating systems was begun. This project measured initial reflectivity and infrared emittance. And compared this to measurements taken from samples that had weathered for 3 years.



Measuring the solar reflectance after coatings have weathered



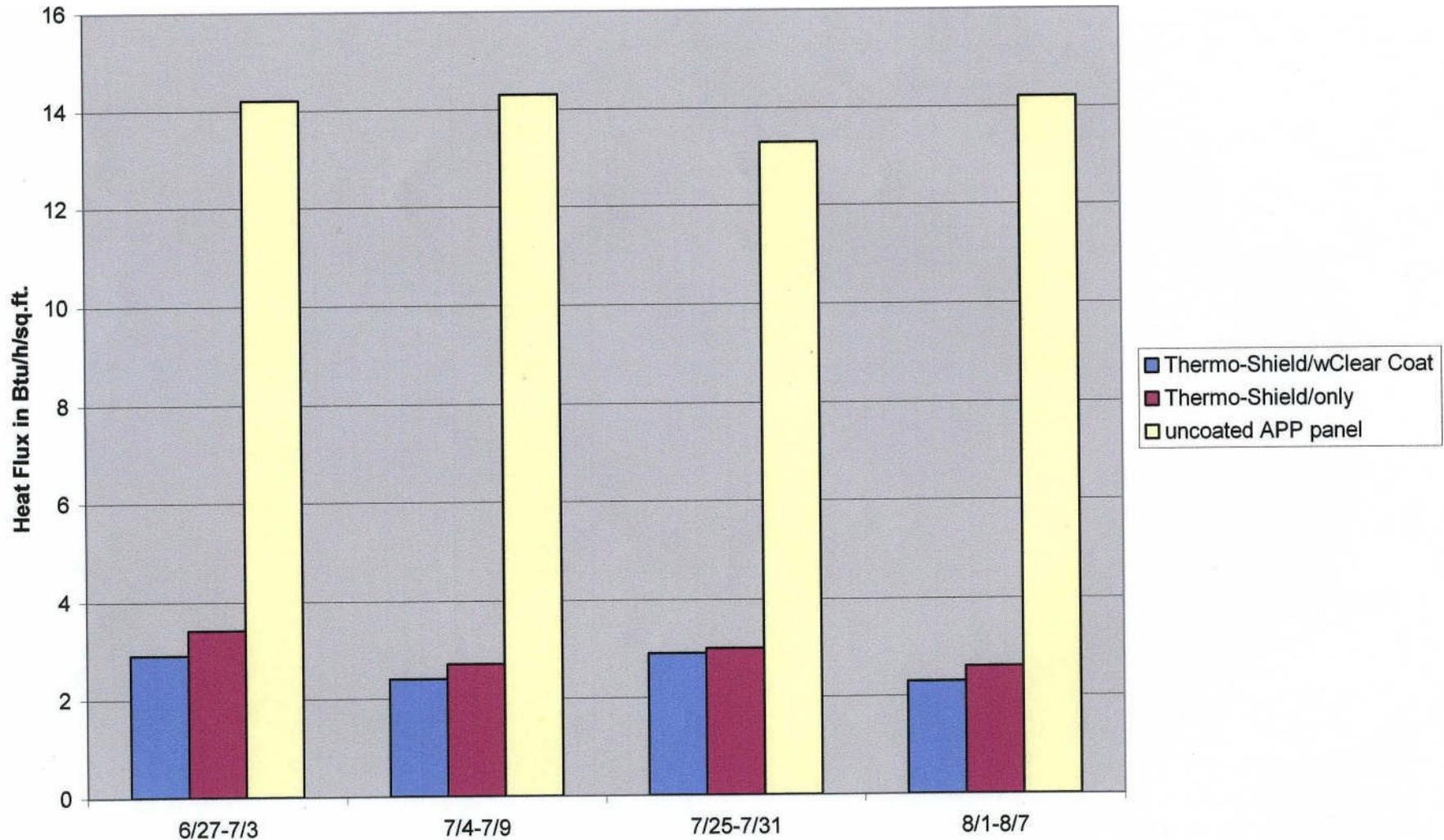
Layout of low-slope roofing systems on half of test building for SPRI project; metal roof project will take place on other half of roof



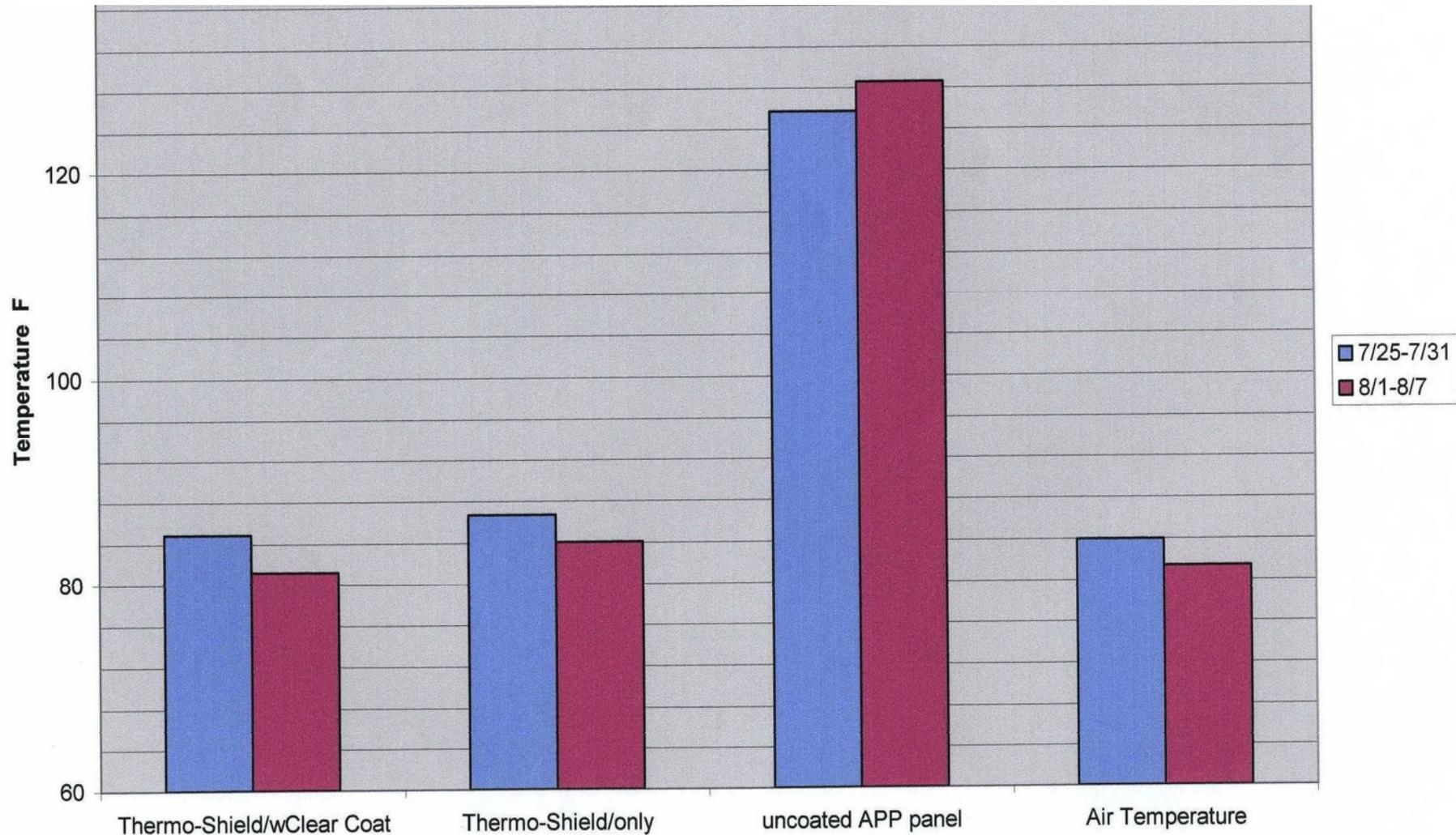
A typical metal roof; metal roof project will test over ten different configurations

A similar test procedure is being followed in a 3-year study of 18 different low-slope roofing systems. This project began in the summer of 1998 and cooperates with several members of SPRI (sheet membrane and component suppliers to the commercial roofing industry) to study the energy efficiency and service life of single-ply low-slope roofing systems. A third project, started in the summer of 1999, involves five U.S. steel roof manufacturers who are keenly interested in documenting whether both high- and low-slope bare and painted metal roofs can reduce building heating / cooling loads.

Initial 1997 measurements from these Government sponsored tests show Thermo-shield dramatically blocking heat gain

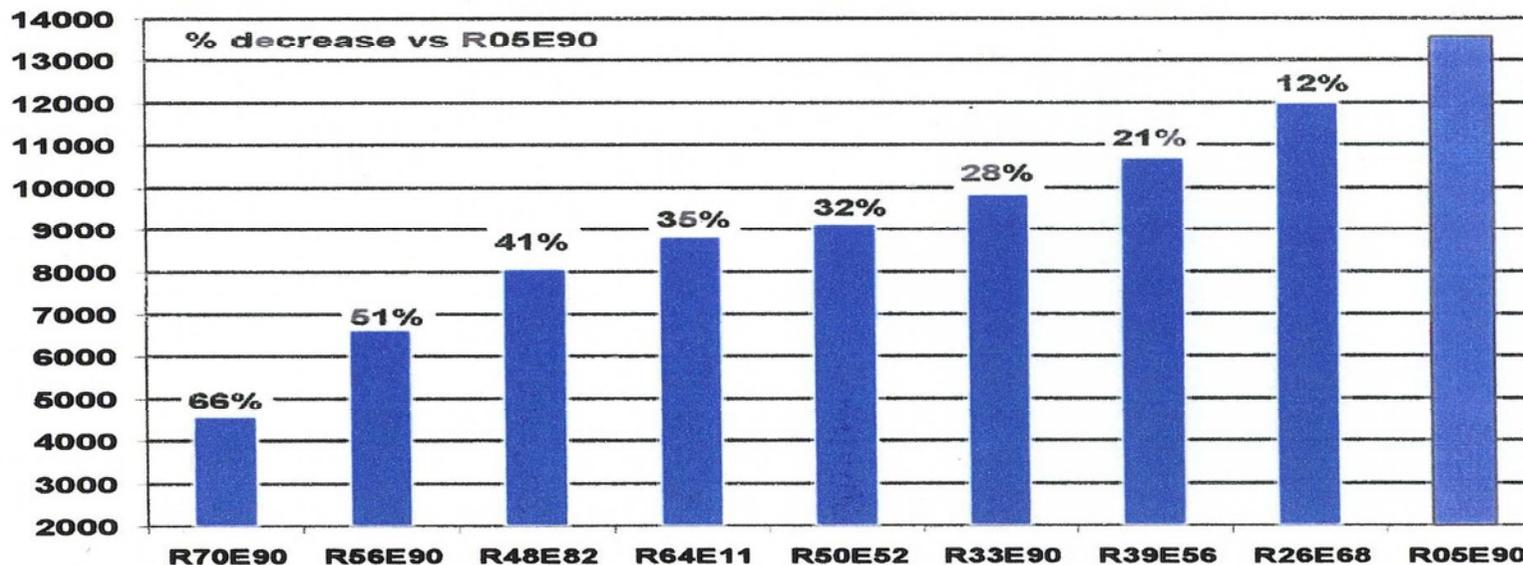


Notice that the **Thermo-shield** and the air temperature are within a few degrees.



In 2000, after 3 years of real world weathering conditions, **Thermo-shield (R70E90)** out performs all others in the testing with 70% reflectivity and 90% Infrared Emittance measurements

Knoxville Annual Roof Cooling Load (Btu/ft²-yr)



White will stay cooler than black, as white reflects the energy and black absorbs it, but even black **Thermo-shield will stay 25 % cooler than the black Epdm !**





**Temperature sensors are placed under samples and allowed to warm with the morning sun on two consecutive mornings. Temperature's were recorded when separate thermometer achieved air temperature of only 80 degrees .
(reached by 10:00 am)**

**Black
Thermo-shield**

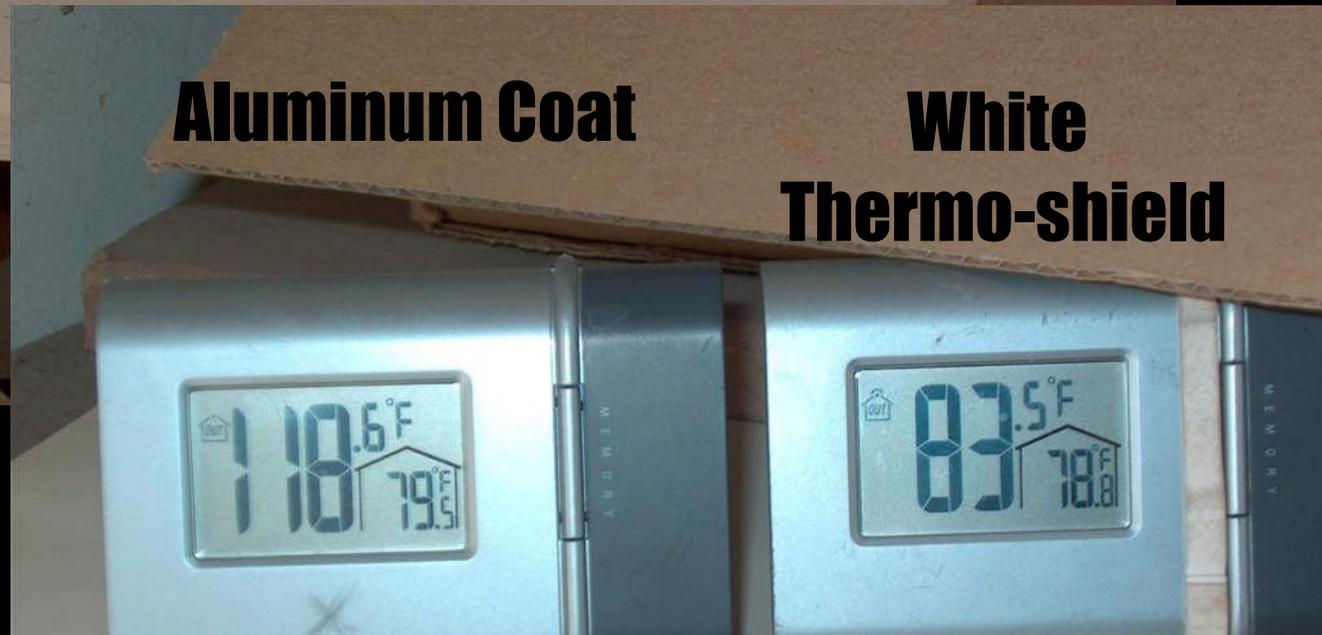


Black EPDM

Aluminum Coat

White

Thermo-shield



Black **Thermo-shield is 13 degrees cooler than Black EPDM, but notice that Aluminum Coat is only 3 degrees cooler than Black **Thermo-shield**, and White **Thermo-shield** is within a few degrees of air temperature!**

interiors

High reflectivity of the Near Infra-Red spectrum and low heat conductivity make **Thermo-shield** perfect for interiors. Heat waves bounce around a room instead of radiating into your walls and ceilings, losing their value. Temperature fluctuations between ceilings and floors can be greatly reduced, enhancing comfort levels and an over all feeling of well being.

Heat from hand
will radiate back
into room with
Thermo-shield



Using Infra-Red
imaging you can see
that heat from hand
simply disappears
into wall with
common interior
paint.

Beautiful Finish
Blocks Heat Gain OR Loss
Waterproofing
Variable Permeability
Humidity Control
Noise Absorption
Non Toxic in Liquid or Cured Form
Low VOC / No Harmful Emissions
Eliminate Condensation
Easy to Insulate Existing Buildings
Washable, Scrubable.
Foot Traffic Resistant
No Joints or Seams
Remains Flexible
Environmentally Friendly

Stain Resistant
Mold, Mildew, Fungus Resistance
Energy Savings/Quick ROI
High Fade Resistance
Long Life Performance
Chemical Resistant
Crack Bridging
Improves Air Quality
Long Factory Warranty
Un-Effectuated by UV exposure
Fire Resistance
Blocks Sound Transmission
Easy to Apply
Competitive Price
Over 25 Years Testing+History

Just some of the benefits available in every gallon of
Thermo-shield Fluid Applied Ceramic Systems