

## Therma Guard

### *Therma Guard*

**Therma Guard** was designed to control heat exchange between the inside and out side of a building. It acts as effectively as 6-8 inches of batt insulation at a fraction of the thickness. The Therma Guard barrier maintains heat on either surface side of the building and will not allow any penetration.

### *What is it?*

**Therma Guard** is a combination of high performance acrylic resins in water, which contain no co-solvents and will dry by evaporation.

**Therma Guard** is designed with three separate ceramics. Two are reflective, the other acts as a dead air space between the coating surface and the substrate. This allows Therma Guard to be an actual insulating coating not just a reflective coating. The urethane resin acts to bind all the other resins and ceramics together and provides a vapor barrier in the dry film similar to the paper backing on batt insulation.

**Therma Guard** cures out completely in one week to an extremely tough, durable, white, non-yellowing, water resistant coating that also provides flexibility and ultra-violet stability. It is in a latex base that cleans up with warm soap and water while in its wet state.

**Therma Guard** was designed to meet the requirements of industrial uses which require a tough surface not found in any flexible coating in the market today, and provide flexibility as required by the stresses of expansion and contraction.

### *How does it work?*

**Therma Guard** has two reflective ceramics to reflect sunlight and radiant heat while the third ceramic compound works to stop heat and/or cold conduction through the coating film. The combination of acrylics provide elasticity and toughness with the urethane providing the binding for the acrylics and compounds while also providing a moisture barrier.

### *Application*

**Therma Guard** is a latex based product that has both interior and exterior applications. Therma Guard is a paint like product that is thicker than average household paint. It can be applied to interior surfaces with either a brush, roller, or can be sprayed on. On exterior surfaces the same applies. The coverage for interior surfaces is approximately 125 sq. ft. and exterior surfaces is approximately 100 sq. ft. The surface preparation is like paint. A clean, dry, oil, dirt and dust free surface. As with paint, it should not be applied in freezing temperatures. Its life expectancy is 30+yrs. interior and 20+yrs. Exterior.

### *Product Information*

- VOC-compliant only 67 grams/litre. The limit is 420 grams.
- Water based
- USDA Approved for use in and around food preparation
- Mildew and mold resistant and can withstand moisture
- Cannot be applied for underwater use.
- Has been fire tested with a "0" flame and smoke result
- Built with a combination of two acrylics and one urethane which makes it flexible, yet tough
- It has 3 different types of ceramics built in to give it not only reflective abilities, but also non-conductive ability for heat and cold. Goes beyond known "R" factor ratings yielding in some cases a 100% savings of energy.
- Will dry to touch in 45 minutes to 1 hour. You can re-coat in 1 hour. Completely cured in 7-10 days.
- Apply only above 40 degrees F. and below 110.

# TECH INFORMATION

# ThermaGuard

## DESCRIPTION:

**ThermaGuard** is a unique combination of high-performance aliphatic urethanes, elastomeric acrylics, standard acrylics and resin additives in a water-borne formula. No co-solvents are present and will dry by evaporation. Due to the unique combination of acrylics and urethanes, **ThermaGuard** cures out completely in 14 days to an extremely tough, durable, non-yellowing, water-resistant coating that also provides flexibility, water-proofing and UV-stability. **ThermaGuard** was built to meet the requirements of industrial uses which required a tough surface, and provide flexibility against stresses of contraction and expansion. Also, unlike all other "reflective" coatings on the market which offer only a single reflective ceramic to provide heat reflection, **ThermaGuard** is designed with three separate ceramics--two are reflective, the other acts as a dead air space between the coating surface and the substrate. This allows **ThermaGuard** to be an actual "insulating" coating not just a reflective coating. The urethane resin acts to bind all the other resins and ceramics together and provides a vapor barrier in the dry film similar to the paper backing on batt insulation. **ThermaGuard**'s design is based on the latest ceramic technology known in the science field today with continuing research and testing to keep it the best insulating coating in the World Market.

## APPLICATION METHODS:

Surfaces must be clean and dry before application. Loose or flaking old paints or corrosion must be removed from surface before applying. High pressure water-blasting is as effective as light sandblasting in removing loose or flaking surfaces. As a rule, "a coating is only as good as the surface it covers." Grease, oil, waxy substances, dirt, etc. must be cleaned from surfaces. Old paints can remain if bonded solidly to surfaces. **ThermaGuard** can bond to metal, masonry, wood and other porous surface substrates, and can be applied best by airless or air pot spray, roller and by brush. If rolling, it may take two coats to apply required mils. Spraying requires a steel carbon tip of sizes .028-.032 tip (remove all filters from spray equipment before using). Roller is best applied by a 3/4 inch nap roller. Do not apply very thick on a single coat. If thickness is desired, apply in multiple coats. A thick coat will allow the top coating surface to dry before the bottom, creating cracks in the coating. If applied when humidity is high or it rains constantly for 3-4 days after **ThermaGuard** is applied (never apply if raining or chance of rain the day of application), you may notice some bubbling effects on the coating. DO NOT PUNCTURE these bubbles. This is normal as the formula is water-based and is absorbing the moisture and, therefore, forming bubbles. When the rain quits, the sun will dry out the coating and allow it to cure

down naturally. As the moisture is drawn out by the sun, the bubbles will settle down and allow the coating to adhere in its normal dry down without problem.

## FEATURES:

52% solid, 14 wet mil coat/7 dry mil coat  
 Dry time: 1 hour-touch, 2 hours-recoat, 14 days-full cure  
 Spread: 100 sq.ft./gallon = 7 dry mils  
 Flame Spread Test: ASTM E-84-89 UL 723 / Flame: 0 / Smoke: 0  
 Viscosity: 105-110 KU/R-19 rating  
 Fire Test: (Project #8940-89285) ASTM E119: Evaluation of thin coatings for thermal transfer properties at elevated temperatures--1,600F degrees; Findings: 30 minutes fire rating at 30 mils. **ThermaGuard** has the ability to stabilize thermal conductivity in various temperature levels.  
 Elongation: 125% / Hail-resistant to cracking  
 Flexibility: 180 bend test-ASTM D1737 1/8" mandrels  
 Salt Spray: 450 hours+ / Fungal/Mildew-resistance  
 Weathering: Ability to last a minimum of 10 years  
 Ability to withstand 500F degrees constant temperatures over a long period of time.  
 Noticeable sound-deadening qualities  
 U.S. Consumer Product Safety Commission-approved as not hazardous  
 U.S.D.A.-approved for use around foods  
 K Factor insulating rating (BTU transfer per hour/foot of heat through a substrate) K=0.019 W/mK  
 VOC (Volatile Organic Compounds) is 67 grams/liter California environmental maximum required upper limit 420 grams/liter  
**ThermaGuard** is extremely health- and environmentally-safe.  
 pH: 8.5-9.0 / Density: 12.02 lbs./gallon  
 Salt Spray Corrosion Test: ASTM B117 450 hrs evaluation  
 ASTM D1654 over black steel; Rating procedure B-9  
 (key to rating 0-10; 0=complete failure; 10-excellent)

## IMPORTANT:

Do not take internally. Avoid contact with eyes. If solution does come in contact with eyes, flush immediately with water and contact a physician for medical advice. Avoid prolonged contact with skin or breathing of spray mist. For quickest removal from skin, wash with water before drying. KEEP OUT OF REACH OF CHILDREN.

## COVERAGE RECOMMENDATIONS:

URETHANE ROOFING/METAL ROOFING .....	100 sq.ft./gallon
MEMBRANE ROOFING .....	100 sq.ft./gallon
CONCRETE (prime w/INNER SEAL @ 150sq.ft./gal/3 coats or SUPER BASE @ 100sq.ft./gal)	100 sq.ft./gallon



## **ThermaGuard**

### **IN THE TRUCKING INDUSTRY**

**Reduces Temperatures by up to 30 degrees.**

**Benefit: Reduction in heat damaged goods claims.**

**Additional Benefit: Increased worker productivity and reduction of heat stress related Workman Comp Claims.**

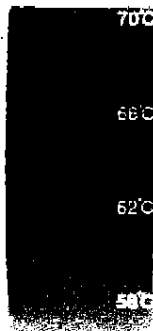
**In the trucking/package delivery industry heat related claims are a major cost due to damaged goods and heat stress related employee claims. Worker productivity is reduced due to discomfort both for the drivers and the employees that load and unload the trailers.**

**ThermaGuard is an industrial coating that insulates the trailers and delivery vans. It is both a reflector of radiant heat and a non-conductor providing an R-19 insulation rating (Equivalent to 6 to 8 inches of fiber glass insulation) with just a 7 mil coating that can be brushed, rolled or sprayed on. The reflectivity does not rely on the coating being clean, as is the case with other reflective coatings. Because it is a non-conductor of heat, it works effectively when applied to the inside walls, as well as, the exterior roofs of the trailers.**

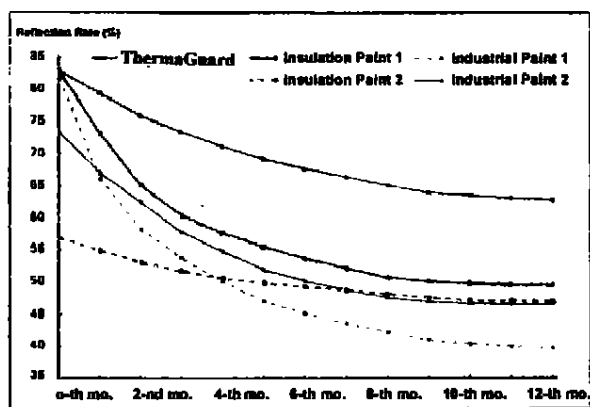
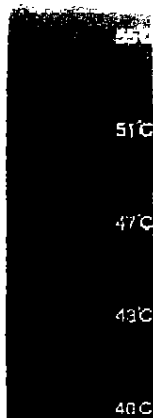
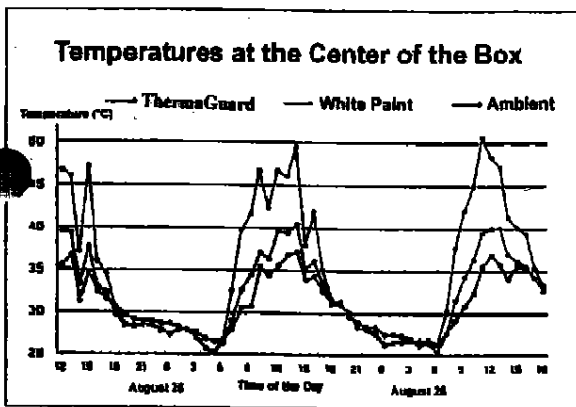
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# Heat Insulation Tests for ThermaGuard

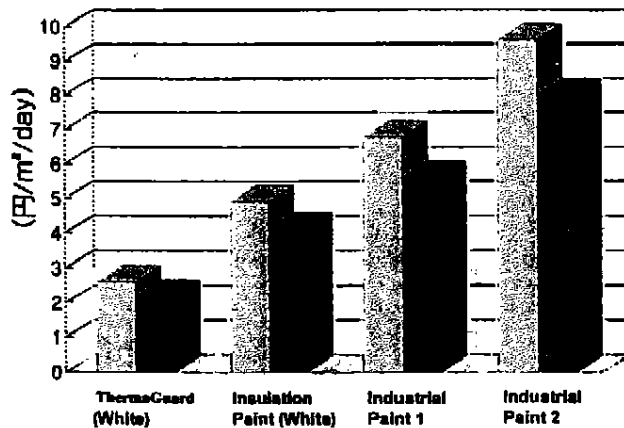
## BOX TEST



## Comparison of Heat Insulation of SuperTherm for Several Different Coatings on Metal Roofs



## Cost Comparison for Air-Conditioning



**Test Conditions**  
 The test was conducted in Tokyo, Japan in August 15, 1999. The weather was clear. The indoor temperature was at 25 °C. The air-condition cost comparison was made for Yen per square meter per day.  
 ~ Air Cooling (Yen/m<sup>2</sup>/day)  
 ■ Water Cooling (Yen/m<sup>2</sup>/day)  
 \*Elec. Cost= 13 Yen/kW



**Once the heat is allowed to penetrate into the trailer or van, the packages absorb the heat and it is impossible to reduce heat with ventilation. The key is to stop the heat from being absorbed by the packages by reducing the transmission of heat in the beginning.**

### **ACTUAL TEMPERATURE TEST RESULTS**

- **Infrared temperature testing of the inside roof temperatures dropped from 129 degrees to 89 degrees on uncoated versus coated roofs. Ambient temperature was 75 degrees with hazy sunshine. ThermaGuard was applied to the exterior of the roof.**
  - **Interior wall temperatures dropped from 133 degrees to 105 degrees on uncoated versus coated walls. Ambient temperature was 75 degrees with hazy sunshine. ThermaGuard was applied to the interior of the walls.**
-

# ThermaGuard COMPOSITE OF INSULATION STATUS

1. SUMMARY OF JAPANESE COMPANIES TESTING GIVEN TO SPI.
2. BTU ENERGY REPORT USING OMEGA GUN ON TWO IDENTICAL FACILITIES.
3. BTU ENERGY REPORT USING OMEGA GUN ON INTERIOR CONCRETE WALLS SHOWING INSULATION WITHOUT THE AID OF REFLECTION.
4. PURDUE UNIVERSITY TESTING FOR STOPPAGE OF HEAT CONDUCTION ON METAL AND CONCRETE.
5. NASA TESTING PERFORMED ON ThermaGuard TO PROVE "0" FLAME IN FIRE TEST TO GIVE A "CLASS A" FIRE RATING. NONE OF THE "REFLECTIVE" COATINGS CAN PASS A FIRE TEST AT 7 MILS AND NONE HAVE EVER BEEN TESTED BY ACTUAL NASA TESTING.
6. ON REFLECTIVITY – THIS COATING IS A NON-CONDUCTOR OF HEAT AND IS THE BEST KNOWN REFLECTIVE PRODUCT ON THE MARKET AT 99.5% REFLECTIVITY.
7. **SOUND INSULATION** Testing and Results - 50% sound reduction

THESE POINTS ARE WHAT MAKES **ThermaGuard** A TRUE INSULATOR AND, THUS FAR, SUPERIOR TO THE "REFLECTIVE" COATINGS ON THE MARKET.

PROVEN INSULATION--99% (NON-CONDUCTIVE)  
99.5% REFLECTIVITY  
IN EITHER SITUATION, WE ARE THE BEST IN THE MARKET

# ThermaGuard

## \*\*TEST LISTINGS\*\*

### 1. ASTM Testing:

G 53 exposure to UV, elevated temperature and humidity	Passed
E 96 water vapor transmission	Passed - less than .01
D522 resistance to cracking on metal or rubber type materials	Passed - 1" (25mm) bend 1/4" (6mm) bend
D412 Tensile strength	Passed .041 thickness = 13,248psi
D1653 Vapor rate of passage	Passed
BOCA ( <u>B</u> uilding <u>O</u> fficials <u>C</u> ode <u>A</u> dministration) USA	Passed - ID # 21-25
Section 723.2 Exposed installations, Thermal insulation	
Section 723.3 Concealed installations, Thermal insulation	
Section 803.2 Classification, Interior finish	
1998 International Mechanical Code	
Section 604.3 Coverings and Linings, Insulation	
E 84-89 Flame spread and Smoke generation	Passed - "0" development
E 119 Structural Steel Fire curve	Passed - 25minutes
C 177 thermal conductivity testing	Passed
C 411 thermal resistance and conductivity	Passed
Thermal penetration through a substrate by-	
E1269 differential scanning calorimeter	
E1461-92 laser flash technique conductivity/diffusivity	Passed - blocking 99% of heat BTU conduction
D1654 Salt spray (fog/weathering)	Passed - 2000 hours
D3274 rating degree of fungal growth or soil and dirt accumulation on paint film	Passed - excellent (8 out of 9)

### 2. NASA (National Aeronautics and Space Administration)

NHB 8060.1B/C Test 1 Flammability testing	Passed - "0" Burn, Class "A" rating
NHB 8060.1C, Test 7 Toxic Offgassing	Passed - "K" no offgassing
Tests performed at Marshall Space Flight Center	

### 3. Japanese Institute of Standards

JIS A 5759 Reflectivity of sunlight on window or coating film	Passed - Reflective ratio 92.2 Long Wave Radiation ratio 99.5 (Infrared)
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### 4. USDA test for suitability to be applied around foods

Environmentally safe and safe for use around animals	Passed - letter from USDA on file.
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**5. China Center for Technical Testing of Non-Metallic  
Materials for Ship-Building, China Ship-Building  
Corporation.**

National Bureau for the Inspection of Technologies  
(97) Measurement Approval (National) No. (M0729)

Passed - 2000 hours Salt,UV,  
Weathering.

**6. ENERGY STAR Program**

Approved and accepted as an energy star partner for  
saving energy.

Approved partner

# COMPARISON

## ThermaGuard

1. Four resin blend for strength
2. Four ceramic compounds
  - Two reflective compounds
  - One non-conductor compound
  - One compound to block Infrared
3. NASA tested and approved
4. NASA association member of Technology 2000
4. Proven reduction of KW usage on a building coated with SUPER THERM showing a 75% drop in utility usage
5. Proven ASTM (American Standards for Testing and Materials) for insulation
6. Proven insulation field studies on insulation to the interior of buildings
7. ASTM test proving stoppage of 99% of heat conduction
8. Two US certified laboratories with written certification of insulation equal to 150 mm of fiberglass and rockwool.
9. USDA tested and approved to be used in and around foods. Non-toxic.
10. Class A fire rated coating. "0" Flame and "0" smoke in flame spread
11. Long Wave heat Radiation Ratio is 99.5
12. Sunshine Reflective Ratio 92.2
13. Dry Film Thickness as tested for effectiveness is 200 microns

## "Reflective Coatings"

- One resin of elastomeric Acrylic, not long lasting  
 One "reflective" compound for surface sunlight bounce  
 - Ceramic Balloon is boro silicate which is glass and does not work well. Glass can become hot
- No NASA testing and no approval  
 No association with NASA
- No proof of usage dropping KW usage on buildings coated with this product
- No ASTM testing proof for insulation effectiveness
- No proven field studies for insulation effectiveness on interior
- No testing to prove stoppage of heat conduction
- No testing from certified laboratories to prove insulation effectiveness. No written certification.
- No USDA testing for approval of non-toxic around foods and animal environments.
- No "0" flame rating. Coating will burn.
- No Long Wave Radiation testing.  
 Reflective ratio is reported to be 99.6%  
 Dry Film Thickness must be 500 micron which is 250% thicker than SUPER THERM. This means that this requires 250% more CC-100 coating to do the same job.

The reflective coating companies talk about NASA meaning that they know how to spell it, BUT they have never been there. We have worked with NASA, been invited to speak at their trade shows about SUPER THERM, and NASA has tested SUPER THERM for their own use.

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## ThermaGuard

**What is it?** ThermaGuard is a liquid substrate with a combination of high performance acrylic resins in water, which contain no co-solvents and will dry by evaporation. It is applied just like paint. ThermaGuard cures out completely in one week to an extremely tough, durable, non-yellowing, water-resistant coating that also provides flexibility and ultra-violet stability.

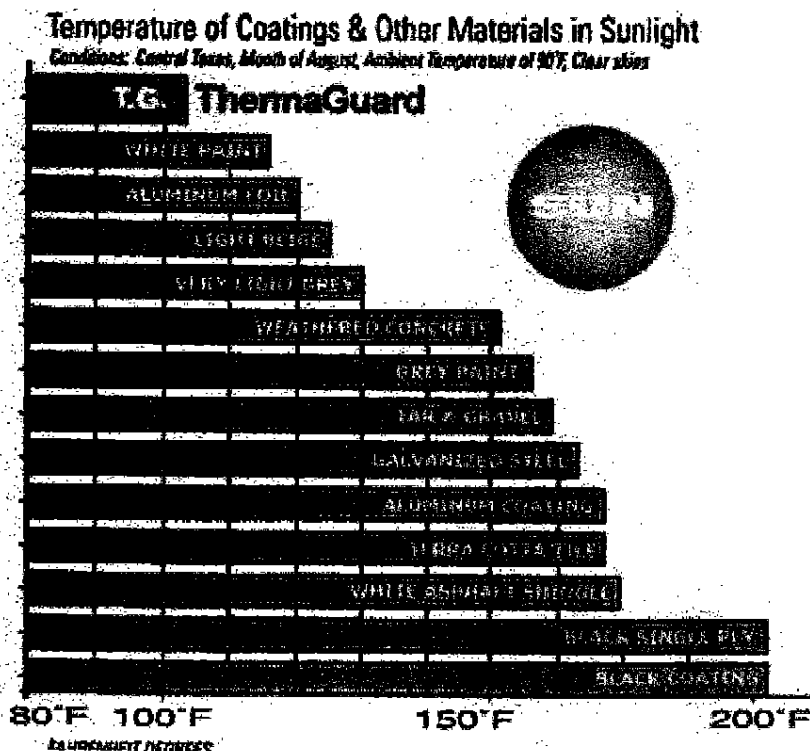
**ThermaGuard goes beyond known "R" factor ratings yielding in some cases a 100% savings of energy (acting as an extraordinary insulator) and has been fire tested with a "0" flame and smoke result--which means it is nearly impossible to burn.**

**ThermaGuard** was designed to control heat exchange between the inside and outside of a building. It acts as effectively as 6-8 inches of batt insulation at a tiny fraction of the thickness. The ThermaGuard barrier maintains heat on either surface side of the building and will not allow any penetration.

**ThermaGuard** was built to meet the needs of industrial users which required a tough surface not found in any flexible coating in the market today, and provide flexibility for the stresses of contraction and expansion.

**ThermaGuard** is designed with three separate ceramics. Two are reflective; the other acts as a dead air space between the coating surface and the substrate. This allows ThermaGuard to be an actual insulating coating, not just a reflective coating. The urethane resin acts to bind all the other resins and ceramics together and provides a vapor barrier in the dry film similar to the paper backing on batt insulation.

### HOW DOES IT WORK?



APRIL 2002 NEWS  
 A-E INTERNATIONAL ENERGY REPORT • FRIDAY, APRIL 30, 1999

**ThermaGuard** has two reflective ceramics to reflect sunlight and radiant heat while the third compound works to stop heat and/or cold conduction through the coating film. The combination of acrylics provide elasticity and toughness with the urethane providing the binding for the acrylics and compounds while also providing a moisture barrier.

### QUICK FACTS

- VOC (Volatile Organic Compounds) compliant. Only 67 grams/liter. The limit is 420 grams/liter. Extremely health and environmentally safe.
- Water based. USDA approved for use in and around food preparation.
- Mildew and mold resistant. Can withstand moisture.
- **Has been fire tested with a "0" flame and smoke result.**
- It has 3 different types of ceramics built in to give it not only reflective abilities, but also non-conductive ability for heat and cold.
- **Goes beyond known "R" factor ratings yielding in some cases a 100% savings of energy.**
- Will dry to the touch in 45 minutes to 1 hour. You can re-coat in 1 hour. Completely cured in 7-10 days.
- Apply only above 40 degrees F and below 110.

### ThermaGuard Passes Thermal Conductivity Test With Flying Colors

Using the latest technology in thermal testing equipment, Purdue University Research Park tested ThermaGuard to determine thermal conductivity (the main point of insulation) from heat source exposure of 212° F. Its findings showed that heat transfer was substantially reduced in the testing situation from 367.20 BTUs measured on bare metal to 3.99 BTUs on the metal surface coated with **ThermaGuard**.

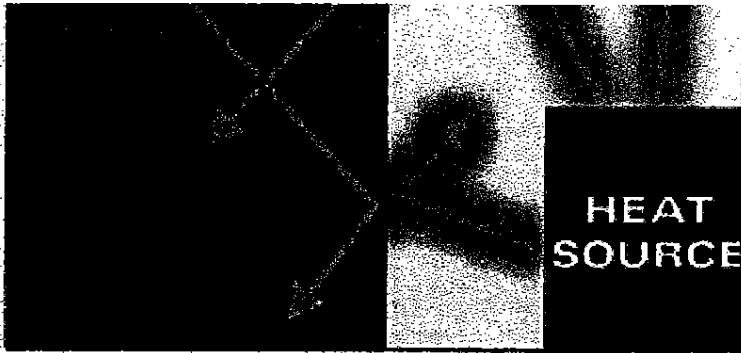
The significance of this study not only proves that **ThermaGuard** does, in fact, act as an insulator, but that it does so with measurable results by appreciably reducing heat conduction.

In the course of the study, it was also determined that a single coat of ThermaGuard was able to outperform 2-3 coats, provided there was a minimum of 7 dry mils or 200 microns thickness in that single coat. Although measurement of this was attempted with the radiation test, it was found to be impossible as the presence of ceramics either from coating both sides or through multiple applications distorted the radiated beams. surface improves



the effectiveness of the insulation effort and that multiple coats are required when top-coating ThermaGuard with a darker-colored paint.

*(NOTE: Conductivity of the paint is independent of the surface to which it is applied; that is,*



conductivity is the same on a metal or a concrete surface.)

**A Top of the Line Specialty Coating with Solutions in Mind**

Progress in any industry is a way of life that requires participants to stay abreast of the best,

"Inside or out, heat is reflected back to its source."

the newest and the most innovative ideas in order to remain competitive. But doing things "the old way" isn't always good enough.

**STATEMENT FOR FINISHED PRODUCT**

- **ThermaGuard** is suitable for the intended purpose and will not result in adulteration of food products if used and applied as intended or indicated on the label directions.
- **ThermaGuard** will perform, after curing completely, well under a daily regiment of cleaning, cyclical temperature change, and wet conditions.
- **ThermaGuard** is moisture resistant.
- **ThermaGuard** is a light solid color (excluding flooring materials) that will not obscure detection of debris or unsanitary conditions.
- **ThermaGuard** contains no known categories of carcinogens, mutagens and teratogens classified as hazardous substances, heavy metals or other toxic substances.

**COVERAGE:**

Urethane roofing/metal roofing: 100 sq. ft./gallon  
Membrane roofing: 100 sq. ft./gallon  
Concrete: 100 sq. ft./gallon  
Interior/exterior vertical walls: 100 sq. ft./gallon

**FEATURES:**

52% solid, 14 wet mil coat/7 dry mil coat

Dry time: 1 hour - touch;  
2 hours - recoat;  
14 days - full cure

Spread: 100 sq. ft./ gallon = 7 dry mils

Flame Spread Test: ASTM E-84-89 UL 723

Flame: 0  
Smoke: 0

Viscosity: 105-110 KU  
R-19 rating

Fire Test: (Project #8940-89285) ASTM E 119: Evaluation of thin coatings for thermal transfer properties at elevated temperatures -- 1,600° F.; Findings: 30 minutes fire rating at 30 mils, SUPER THERM has the ability to stabilize thermal conductivity in various temperature levels.

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Weathering: Ability to last a minimum of 10 years  
Ability to withstand 500°F. degrees constant temperature over a long period of time  
Noticeable sound-deadening qualities  
U.S. Consumer Product Safety Commission - approved as not hazardous  
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K Factor Insulating rating (BTU transfer per hour/foot of heat through a substrate)  $K=0.019 \text{ W/mK}$   
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### COVERAGE RECOMMENDATIONS (MUST BE APPLIED BY A CERTIFIED APPLICATOR):

URETHANE FOAM ROOFING /METAL	
ROOFING.....	90sq. ft./gallon
MEMBRANE	
ROOFING.....	100sq. ft./gallon
CONCRETE (prime w/INNER SEAL @ 150sq. ft./gal/3	

When the rain quits, the sun will dry out the coating and allow it to cure down naturally. As the moisture is drawn out by the sun, the bubbles will settle down and allow the coating to adhere in its normal dry down without problem.

### FEATURES:

52% solid, 14-16 wet mil coat/7-8 mil dry coat  
 Dry time: 1 hour-touch, 2 hours-recoat, 14-21 days-full cure  
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 Viscosity: 105-110 KU  
 Fire Test: (Project #8940-89285) ASTM E 119: 30 minutes  
 Elongation: 125% / Hail-resistant to cracking  
 Flexibility: 180 bend test-ASTM D1737 1/8" mandrels  
 Salt Spray: 2,000 hours+ /Fungal/Mildew-resistance  
 Weathering: 10 years/UV/weathering-2000 hours  
 US Consumer Product Safety Commission-approved  
 U.S.D.A.-approved for use around foods  
 VOC (Volatile Organic Compounds) is 67 grams/liter.  
 pH: 8.5-9.0/Density: 12.02 lbs./gallon  
 Salt Spray Corrosion Test: ASTM B117 450 hrs evaluation  
 ASTM D 1654 over black steel; Rating procedure B:9

Sound deadening is the function of blocking sound waves which is identical to blocking heat waves. Separate testing was performed in association with UNC & Stoughton Trailer; both registered 68% sound reduction. The type of ceramic blend and density of the formula is the reason for the blockage.

R-value established from Thermophysical Properties Research Lab. Report TPRL 1780 (tables #4&5). BTU heat flow of cold steel metal is 367.20 through the metal. BTU of one thin layer of THERMA-GUARD at .007 thickness is 3.99 BTU through the coating. This is the coating film alone. The same BTU reduction would be for all substrates to which the coating film is applied. R-19 equivalent is calculated using the Omega OS-652 Energy Meter.

### IMPORTANT:

Do not take internally. Avoid contact with eyes. If solution does come in contact with eyes, flush immediately with water and contact a physician for medical advice. Avoid prolonged contact with skin or breathing of spray mist. For quickest removal from skin, wash with water before drying. KEEP OUT OF REACH OF CHILDREN

### LIMITED WARRANTY:

*Unless UCSA provides a written warranty of fitness for a particular use, UCSA's sole warranty is that the product, as supplied, will meet then current sales specifications and is specific only to return of product found to be defective upon opening of container within one year. Customer's exclusive remedy and Superior's sole liability for breach of warranty is limited to refund of the purchase price or replacement of any products shown to be otherthan as warranted and UCSA expressly disclaims any liability for incidental or consequential damages*

coats or SUPER BASE/HS	
@ 100sq. ft./gal.).....	100sq. ft./gallon
INTERIOR /EXTERIOR VERTICAL	
WALLS.....	10
0sq. ft./gallon	