ThermaCote Case Studies

CONSTRUCTION, INDUSTRIAL AND SPECIALITY

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THERMACOTE CLIENTS

United States Army
Coca-Cola
BASF
ARAMCO
ABB
Samsung C&T
Exxon
Shell
NASA
Johnson Controls
United States Navy
Nestle
Northrop Grumman
Princess Cruise Lines
Dole, Chiquita
Budweiser Racing
Dubai Airports Company
SIKORSKY
State Farm Insurance
Thermo King
AMMROC
Emirates Airlines
Baker & Hughes
Hartsfield International Airport
UAE Air Force
GAC Logistics
Habitat for Humanity
United States Coast Guard
Kharafi National
Atlanta Gas Light Company
Helmerich & Payne
Kempinski Hotel
International Drilling Co
Ingalls Shipbuilding
University of Georgia
University of Mississippi
Margaritaville Beach Hotel
Moorehouse College
Alabama State Department of Education
HCA Midwest Medical Research Center
Walker Construction
XERVON
Bucharest International Airport
New York NYC CoolRoofs

RATINGS AND ACCREDITATIONS

Intertek ISO 9001:2008
UL® Classified
USGBC Member
Abu Dhabi Quality & Conformity Council
Better Business Bureau Member
CRRC Rated Product
MAS Certified Green
US Department of Commerce
Collaborative for High Performance Schools
ENERGY STAR Certified Roof Product
ECRC Rated Product
LNE
CRESTEB

Table of Contents :

1. INDUSTRIAL

1.1. HVAC Ductwork insulation, Heating, Ventilation and Air-Conditioning

Description / Initial Condition:

- Duct insulation was falling off as result of condensation moisture saturation
- Portions of the duct were rusting from the moisture saturation
- Several leaks were found in duct line
- AHU internally was in need of cleaning

Localization: Houston, Texas, United States **Date:** 2010

ThermaCote Solution:

HR duct and AHU corrective efforts and ThermaCote. Prior to ThermaCote application, duct insulation was falling off as result of condensation moisture saturation, portions of the duct were rusting from the moisture saturation, several leaks were found in duct line, and AHU internally was in need of cleaning. Once ThermaCote was applied, condensation and corrosion was eliminated, and there was a 57°F / 14°C difference in temperature measurement between the treated and untreated areas.

HR Duct and AHU Corrective Efforts
Performed September 2010

Conditions

- Duct insulation was falling off as result of condensation moisture saturation
- Portions of the duct were rusting from the moisture saturation
- Several leaks were found in duct line
- AHU internally was in need of cleaning

Duct prior to work

Bottom of duct has insulation that is bellied out with water

Moisture has broken through seal layer

Wet insulation at unit discharge

Uncovered bottom of duct

Heavy condensation droplets

Effects of condensation

Cleaning the surfaces

ThermaCote® Applied

Eliminates condensation and stops corrosion

Inside the unit

Before

After

Before

After

Finished ThermaCote® Application

Temperature difference

12" Apart
Coated vs.
Uncoated
Roof
Surface

57° Difference

1.2. Liquid oxygen Tank and Pipe Insulation

Description / Initial Condition:

Tanks housed liquid oxygen at around -325°F / -199°C and is a double walled tank with a space between which is filled with perlite insulation.

Localization: United States

Date:

ThermaCote Solution:

The application 'specs' are 2mm of ThermaCote® after prep. An alkyd enamel 'red metal' primer was used where blasting was required to remove corrosion.

1.3.Insulation of Steam Pipe for Coca-Cola Bottling Co

Client: Coca-Cola Bottling Co. **Localization:** Atlanta, United States **Date:** 1994

Description / Initial Condition:

Steam pipe at 200°F / 93°C, on washing machine for Coca-Cola Bottling Co in Atlanta

ThermaCote Solution:

Insulation for employee safety and energy conservation

"The thin layer of ceramic insulation you applied to 93C plus degrees steam pipe on our washing system is performing amazingly well. I couldn't believe that I could place my bare hand on it without injury." Mickey Fulcher, Maintenance Manager.

Coca-Cola USA
Division of
The Coca-Cola Company

November 8, 1994

Tommy Sharp, Jr.
Therma-Cote, Inc.
2652 North Peachtree Road
Chamblee, GA 30341

Dear Tommy,

The thin layer of ceramic insulation you applied to the 200 plus degrees steam pipe on our washing system is performing amazingly well. I couldn't believe that I could place my bare hand on it without injury.

I'm sure that we have many uses for your ceramic insulation for employee safety and energy conservation. I would like to schedule an appointment to discuss other insulation applications in our plant.

Sincerely,
Mickey Fulcher

Mickey Fulcher
Maintenance Supervisor
Production

3791 Browns Mill Road, S.W.
Atlanta, GA 30354
404 676-8500

1.4. Oil Tank and lines insulated and protected to Fino Oil & Chemical Company

Client: Fino Oil & Chemical Company **Localization:** United States **Date:** 2000

ThermaCote Solution:

Davis Brothers Contractors

"ThermaCote has been applied to Fino Oil & Chemical Company….purpose for applying to insulate and prevent hardening the oil, making it difficult to load. ThermaCote keeps the oil at a constant temperature until loading time…..also prevents rusting of tanks, lines and treaters."

1.5. Exxon applied ThermaCote to one oil well pipe line in Florida

Client: Exxon **Localization:** Florida, United States **Date:** 2000

ThermaCote Solution:

"Applied to one oil well pipe line in Florida with temperatures exceeding 265 degrees. With ThermaCote temperature was reduced by 100 degrees plus. Previously Exxon had problems keeping any type of paint coating on this well, because of extreme temperature."

1.6. Shell Western has also used ThermaCote to an oil well

Client: Shell **Localization**: United States **Date**:

ThermaCote Solution:

'Shell Western has also used ThermaCote to an oil well with highly concentrated heat with temperatures reduced by at least 100 degrees."

"We have applied ThermaCote on a metal office building for Shell Western E & P, Inc. Monitoring the building the temperature dropped 20 degrees. We also applied 19 mils of ThermaCote to the bottom of metal with eyewitnesses the temperature dropped 28 degrees within a hour.'

1.7. Atlanta Gas Light Company

Client: Atlanta Gas Light Company **Localization**: Georgia, United States **Date**:

Atlanta Gas Light operates and maintains natural gas pipes, reads meters and distributes natural gas

ThermaCote Solution:

"Since our work was done we have no further leaks and have reduced cooling costs considerably. It is really a fine product that performs as promised." Robert M. Herring, Atlanta Gas Light Company

1.8. ThermaCote on steam traps, valve bodies, pipe flanges or even boiler fire doors

Client: HCA Midwest Health healthcare in Kansas City

ThermaCote Solution:

"Note to express my amazed high level of satisfaction. I use the product for areas where standard insulation is difficult to near impossible-to-apply areas frequently access such as steam traps, valve bodies, pipe flanges or even boiler fire doors……. I am retaining enough heat in my equipment to lower the room temperature approximately 20 to 30 degrees." Aaron Robison, Property Manager, Health Midwest Office Facilities Corporation

1.9. Insulate the exhaust systems on our offshore equipment

Client: JO-DE Equipment Rental Company, Inc. (Serving the offshore, construction and petrochemical industries over 40 yers)

ThermaCote Solution:

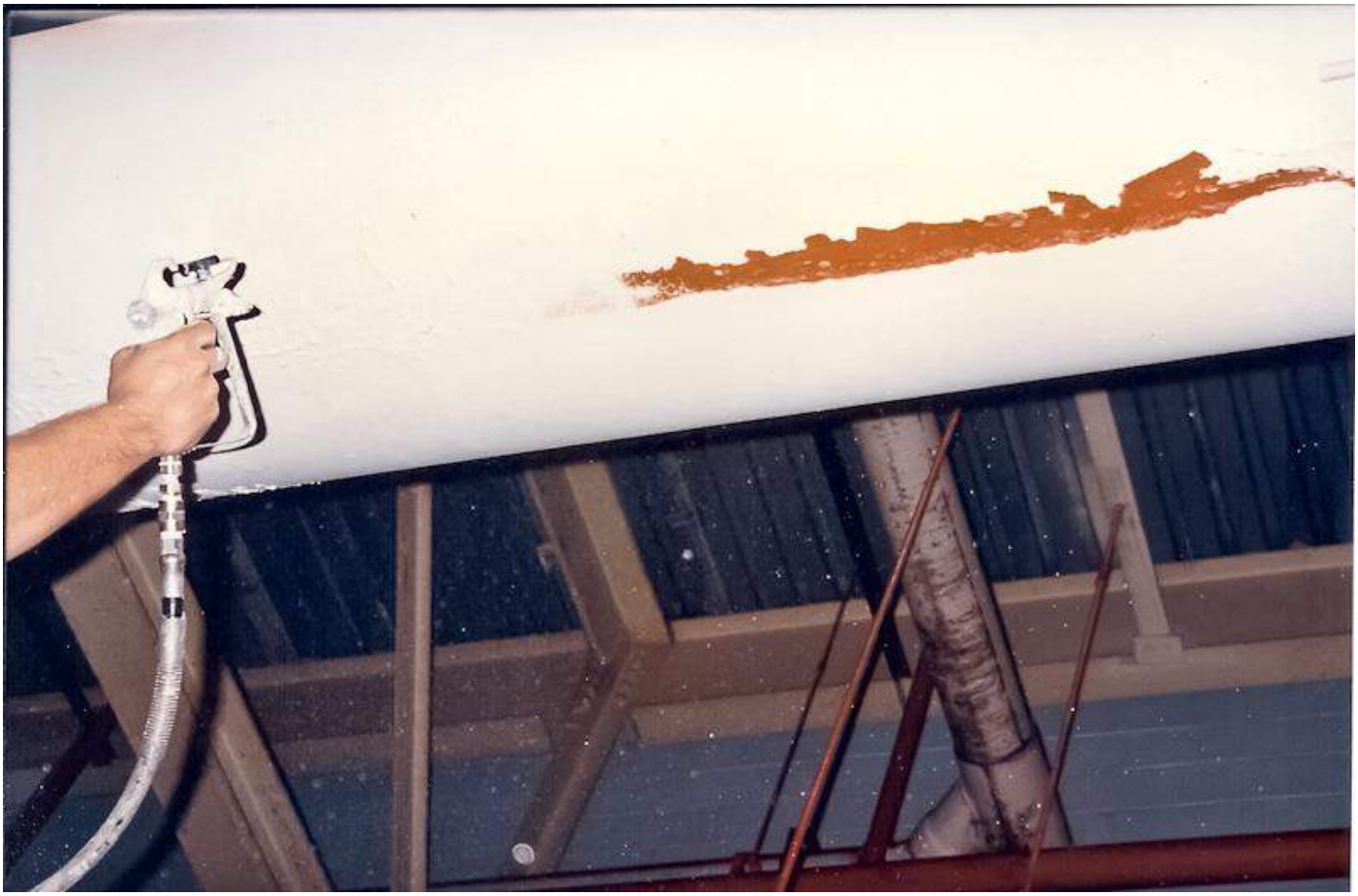
"We use this to insulate the exhaust systems on our offshore equipment. We have found three coats to reduce the exhaust temperature from 360 degrees to a temperature which may be touched without burning."

Jace J. Owens, Jo-De Equipment Rental Company, Inc.

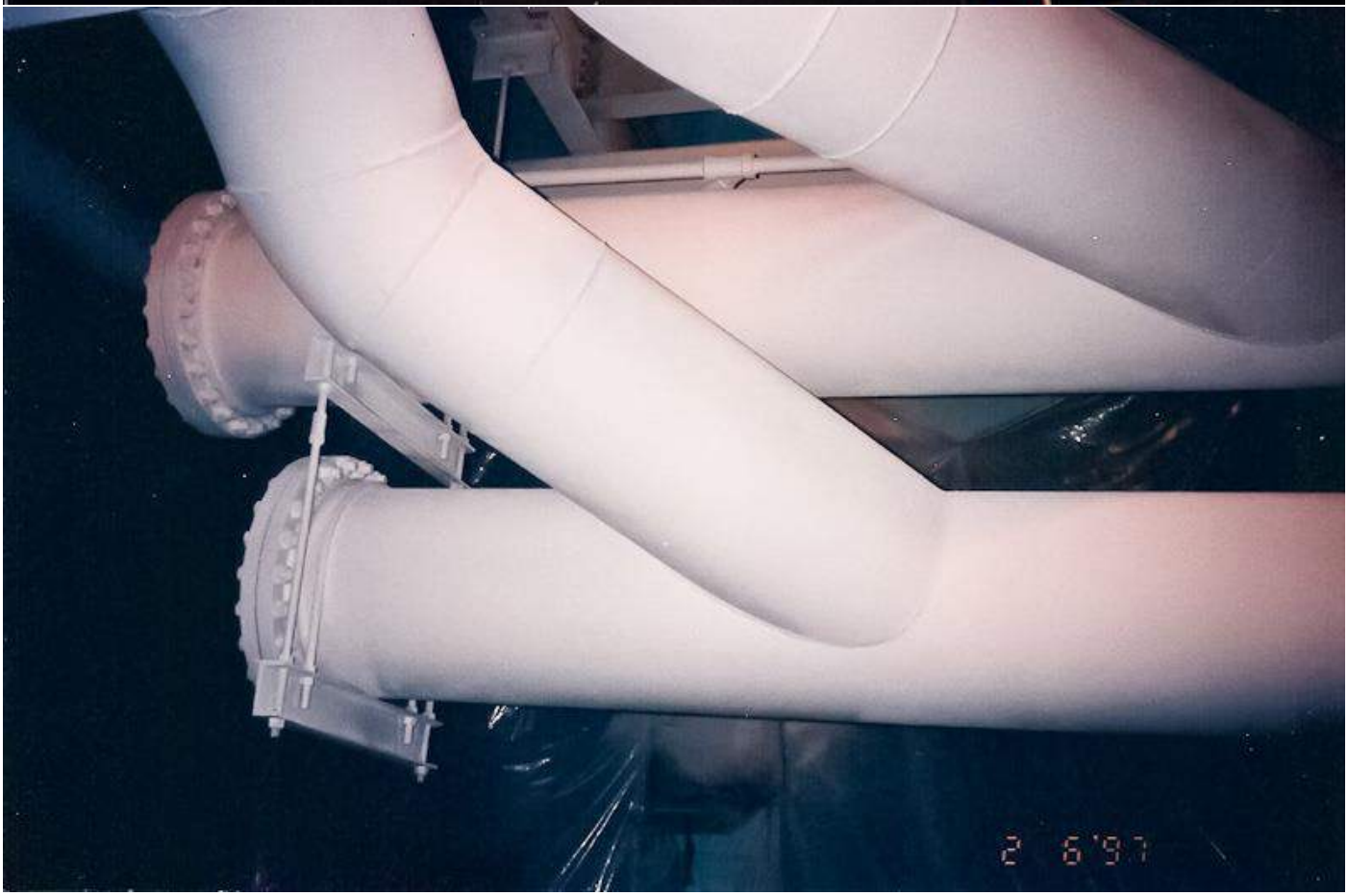
1.10. Pipe for General Motors automobile factory in Doraville

Client: General Motors Plant LLP **Localization:** Georgia, United States **Date:** 1997

ThermaCote Solution:



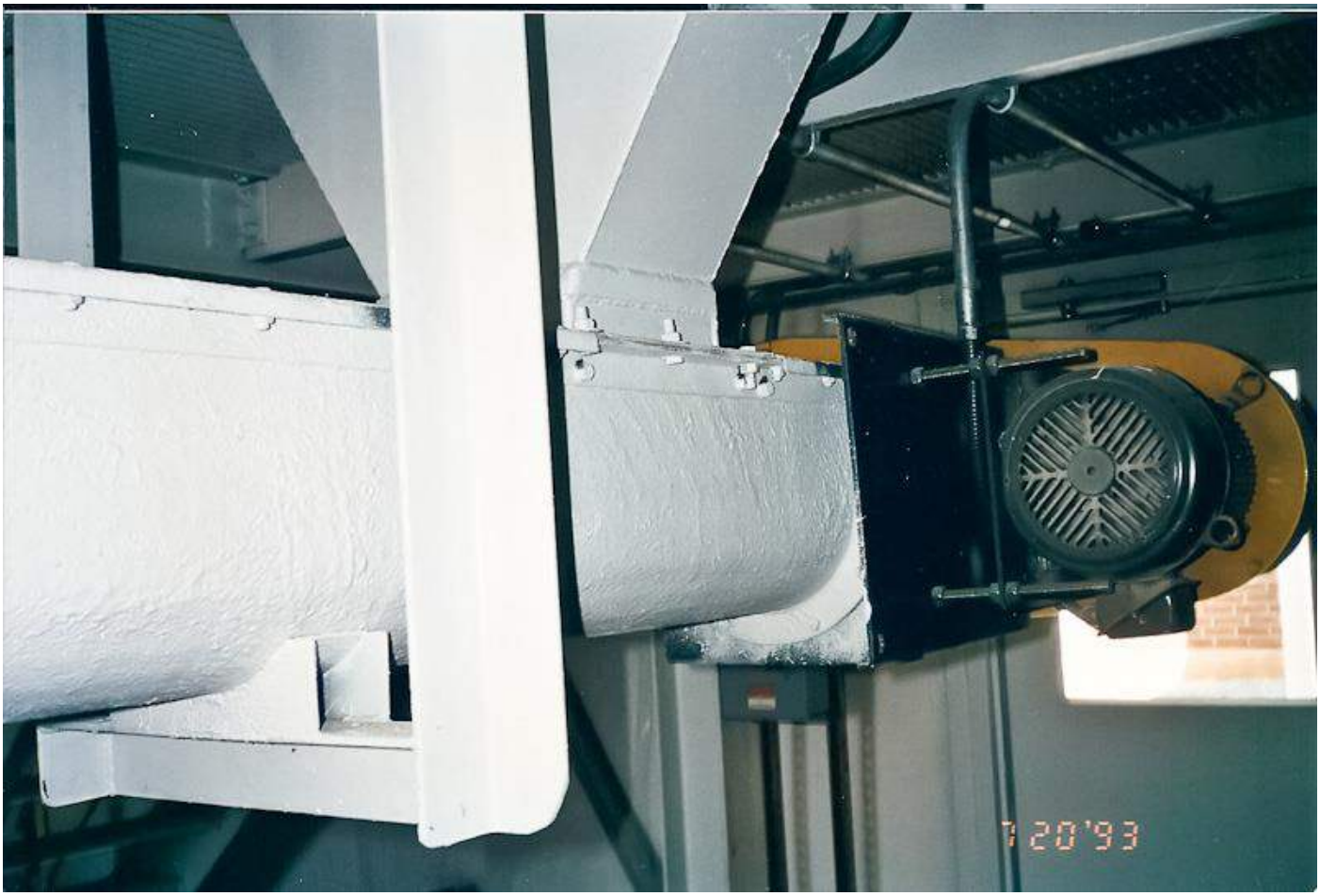

2 6'97


2 6'97

1.11. Thermal protection of a Conveyor with ThermaCote

Client: Schust Engineering **Localization:** United States **Date:** 1993

ThermaCote Solution:


7 20'93

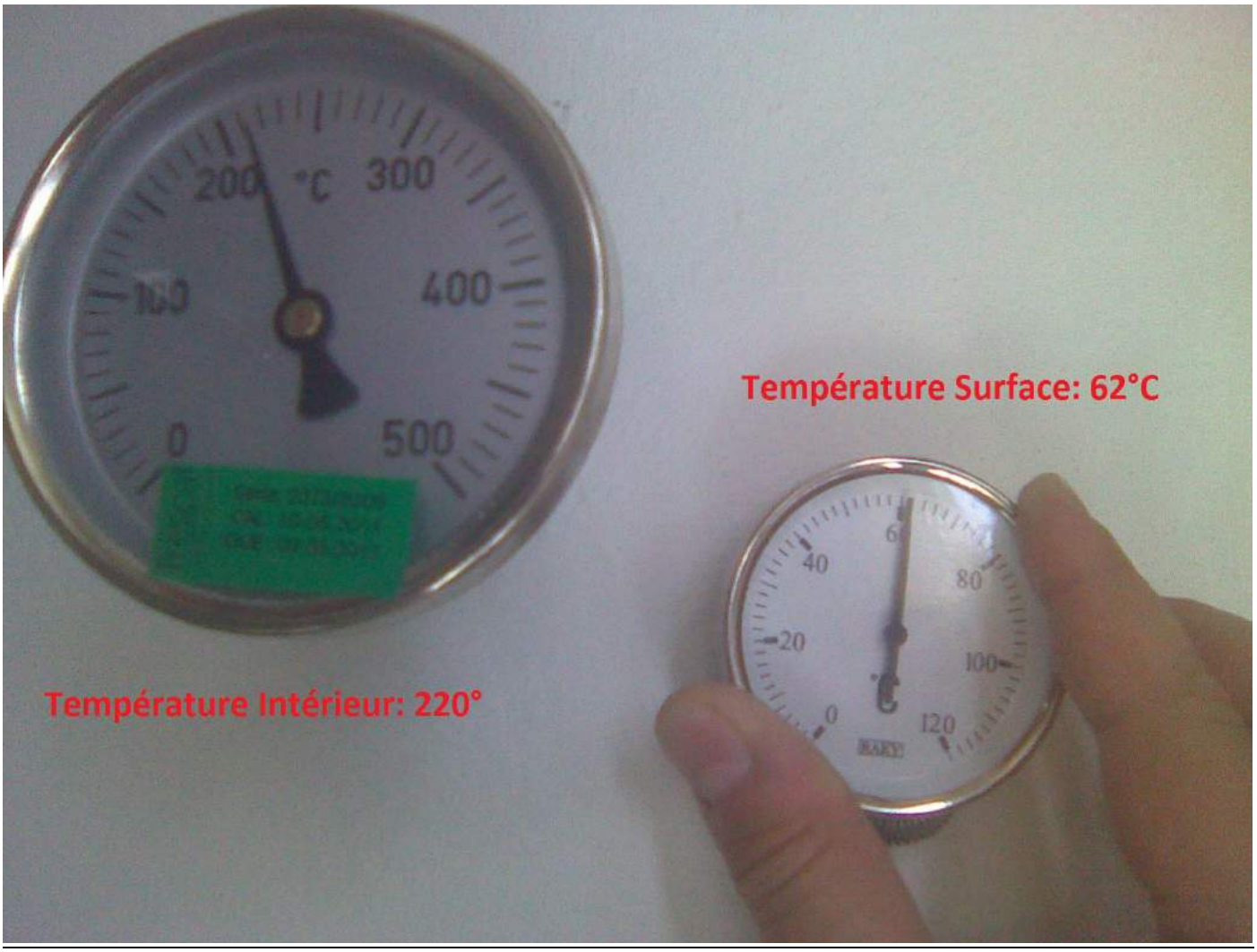
1.12. Boiler Tube and Pipe insulation to Bucharest Henri Coandă International Airport

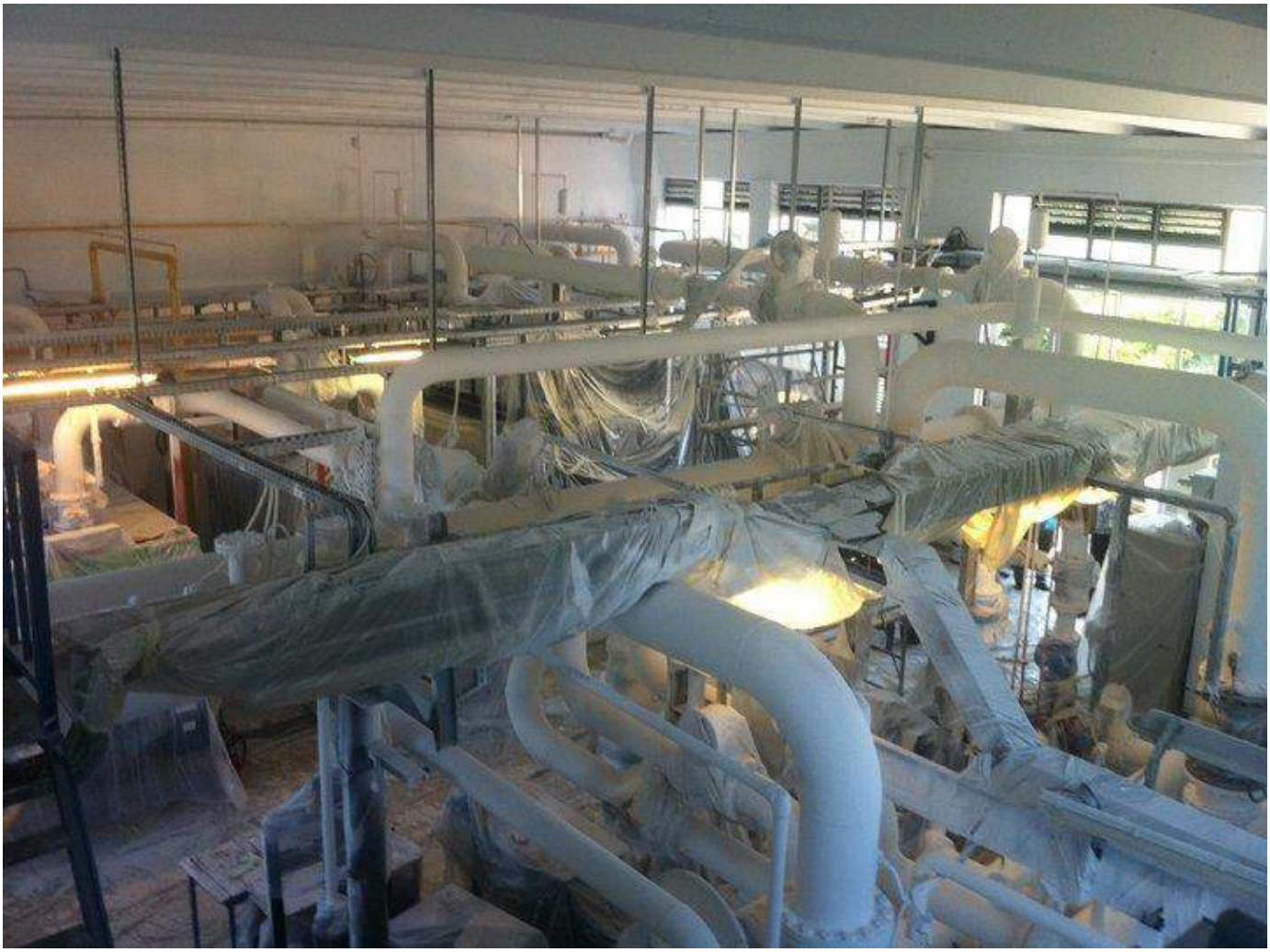
Client: Bucharest Henri Coandă International Airport **Localization:** Bucharest, Romania **Date:** 2012

Description / Initial Condition:

Boiler Tube and Pipe insulation

ThermaCote Solution:





1.13. Valve insulation and worker protection

Client: Austral Group S.A.A. / Austevoll Seafood Company **Localization:** Peru **Date:** 2013

Description / Initial Condition:

Standard insulation is difficult to near impossible-to-apply areas frequently access such as steam traps, valve bodies, pipe flanges…

ThermaCote Solution:

Initial surface temperature= 172°C

With ThermaCote surface temperature was reduced to 69°C

ThermaCote was applied in 5 layers, total thickness =2.5mm


69.8
MAX
88


CALDERO 2

1.14. Exhaust tube and pipe insulated with Thermacote On a high-efficiency generating sets

Client: Heaven Energy **Localization:** Lorient, France **Date:** 2013

Description / Initial Condition:

Exhaust tube and pipe insulated with Thermacote On a high-efficiency generating sets. Using a thermodynamic cycle using thermal loses engines, to reduce fuel consumption.

ThermaCote Solution:

With ThermaCote a thermal difference of 47°C

Without ThermaCote= 136°C

With ThermaCote= 89°C

HEAVEN ENERGY

mail: contact@heaven-energy.fr

Organic cycle rankine
Solutions for fuel economy for genset.
Using a thermodynamic cycle using thermal losses engines, to reduce fuel consumption .
This method allows reduction in CO2 emissions.

Nautical

Powerhouse

Mobile applications

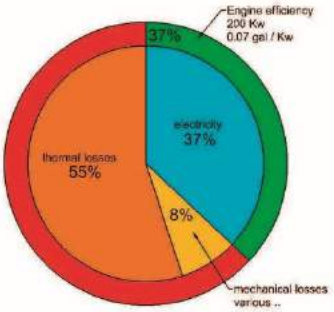
Data-center

Version for genset generator
100 to 600 Kw -750 KVA,
Available in skid or container.
Delivery time 3 months from the date of order.

Industry

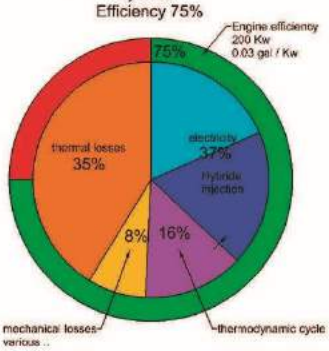
STANDARD

Diesel genset generators
Efficiency 37%



Heaven energy

Diesel genset generators
hybride
Efficiency 75%



Consumption comparison
genset 200 KW - 250 KVA

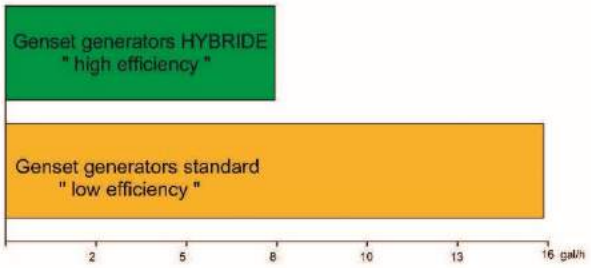
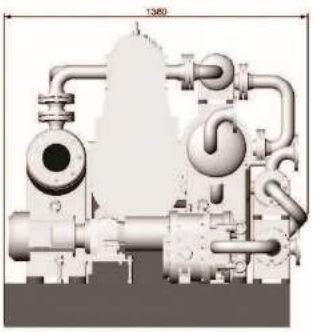


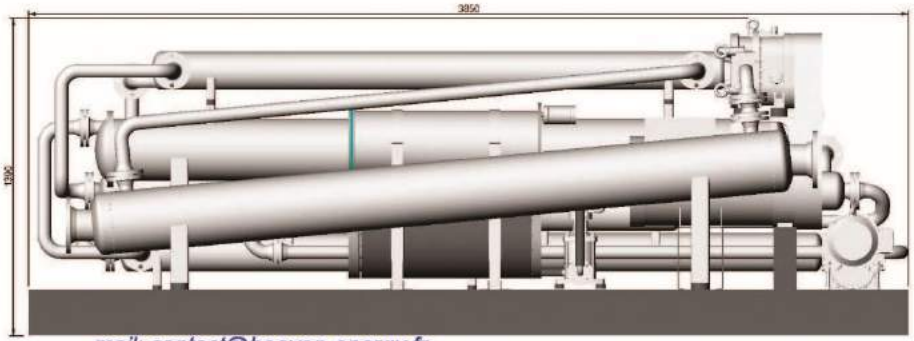
Table achievable economy compared with a standard set of 500 kW - 625 KVA.

	Consumption gal/h	Fuel price $	hours/year	Price/year k$	Gain 1 year k$
STANDARD	35,64	3,54	8000	1 009	....
HYNERGY	17,82	3,54	8000	505	504

** Simulation of fuel on a 3.54 $ per lgallon, for information.*

This system enables a rapid return on investment in less than one year.
In powerhouse version for energy production, provides a price as low as possible KW.
For mobile applications such as water, automobiles, aircraft, other, ...
the economy is 50% and a range doubled, reducing the cost of transporting .
"HYNERGY" is a technological breakthrough energy.





mail: contact@heaven-energy.fr

1.15. Pipe coated with Thermacote for insulation and Worker protection

Client: Pera **Localization:** France **Date:** 2014

1.16. ThermaCote Applied to Live Steam Pipes

ThermaCote as a Thermal Barrier for the steam pipes in the boiler room:

"I was amazed that I could actually touch the steam pipe after just two coats of ThermaCote were applied. The temperature on the steam pipe was 224 degrees Fahrenheit before the application; after just two brush applied coats, the measured temperature went down to 150 degrees Fahrenheit! I have to admit it was pretty impressive.

I like the idea of just "painting" with ThermaCote to enhance the insulative qualities of my buildings."

142 Caryl Realty LLC.
1141 Mile Square Road
Yonkers, N.Y. 10704
TEL: (914) 803-0433 FAX: (914) 803-0436

February 18, 2010

Mr. Paul Keramidas
President
CosmoGreen, L.L.C.
3812 32nd Street
Astoria, NY 11101

Mr. Keramidas,

Your suggestion to use ThermaCote as a Thermal Barrier for the steam pipes in the boiler room of the 14 unit apartment building my company owns in Yonkers, NY was great. Although I was skeptical, you were right..., I was amazed that I could actually touch the steam pipe after just two coats of ThermaCote were applied. The temperature on the steam pipe was 224 degrees Fahrenheit before the application; after just two brush applied coats, the measured temperature went down to 150 degrees Fahrenheit! I have to admit it was pretty impressive.

We expect that the use of ThermaCote will yield significant savings in fuel use as well. Even though the boiler is new, my experience makes me think that a significant amount of fuel savings will be achieved because the pipes should not experience any significant heat loss before entering the apartment units above.

Also, based on what you said ThermaCote should reduce or eliminate condensation that typically occurs on these types of pipes as well as minimize corrosion because of the rust-inhibitors built into the product. Based on the immediate performance of ThermaCote, I am now looking forward to using it on the roof of the building and for some other problematic areas where regular insulation isn't cost effective or requires ripping out walls to apply new insulation. I like the idea of just ***"painting"*** with ThermaCote to enhance the insulative qualities of my buildings.

Thanks again for your recommendation. I will keep you posted regarding any energy savings we experience.

Best Regards,

Teddy Mihalios

Managment

142 Caryl Realty LLC

2. CONSTRUCTION

2.1. Flat Roof insulation with ThermaCote for BASF Office

Client: BASF Kanoo. **Localization:** Dubai, United Arab Emirates **Date:** 2012

Description / Initial Condition:

"In December 2012 Emirates ThermaCote LLC applied their reflective coating to the roof of our office area, at our site, BASF Kanoo Dubai Industrial City"

ThermaCote Solution:

"We are pleased, and satisfied with the product, as we have seen a circa 10% reduction in our electricity consumption, a part of which is attributed to the coating."

"Overall, we are very satisfied with the project, given the results we have seen, we have an additional area which will be considered of the application in the future"

BASF
The Chemical Company

BASF Kanoo Polyurethanes LLC بي ايه اس اف كانو بوليوريثان ذ م م

Date 01/10/2013
Name Ray. Thompson
E-Mail ray.thompson@basf.com

To whom it may concern,

In December 2012, Emirates Thermacote LLC applied their reflective coating to the roof of our office area, at our site, BASF Kanoo Polyurethanes LLC, Dubai Industrial City.

We are pleased, and satisfied with the product, as we have seen a circa 10% reduction in our electricity consumption, a part of which is attributed to the coating.

We were pleased with the work of the application team. We supported with some suggestions to improve the application techniques, and safety of the team.

Overall, we are very satisfied with the project, given the results we have seen, we have an additional area which will be considered for the application in the future.

Ray Thompson

Site & Operation Manager

-04-
P.O. Box: 490001
DUBAI - U.A.E.
BASF KANOO POLYURETHANES (L.L.C)

2.2. Lyeffion Elementary School Energy Usage Test with ThermaCote ceramic coating

Client: Lyeffion Elementary School **Localization:** Evergreen, Alabama, United States **Date:** 2009

Description / Initial Condition:

Energy consumption compare between two rooms, Classroom #12 was chosen to be coated with the product with the adjacent classroom #11 assigned as the control comparison. The test rooms are of identical size with the exact same amount of exterior glass, all of which faces west. In addition these rooms are cooled by matched 2 ½ ton Bard wall mount air conditioners. These units are of the same model number and have nearly sequential serial numbers indicating that they were manufactured within days or hours of each other.

ThermaCote Solution:

Meter readings were recorded on three separate occasions in both classrooms. Power usage in the last period of approx. 22.5 hours revealed a 40% KWH usage reduction in the coated room. Latest readings show the ThermaCote classroom at 129 KWH, and the uncoated classroom at 202 KWH. This calculates into a 36.1% reduction in electricity usage for the air conditioner in the coated room as opposed to the usage in the control room. It bears noting that this facility already had a light colored roof coating. Application of this material to dark roofs or the underside of roof decking with dark shingles would produce even more dramatic results. In addition, ThermaCote has a .83 solar reflectivity as established by the Cool Roof Rating Counsel. This high radiant reflectance can result in reduction in the number of fluorescent tubes needed to deliver an appropriate amount of light to the desktops, which could conceivably increase savings on the lighting portion of the power bill.

THERMA-COTE BRAND CERAMIC INSULATIVE COATING
ENERGY USAGE TEST
FINAL REPORT

LYEFFION ELEMENTARY SCHOOL
Al. Hwy 83
Evergreen, Alabama 36401

SCHOOL AND UTILITY CONTACTS
Mr. Ronnie Brogden, Superintendent
Mr. David Cook BOE Chairman
Mr. Jeff Kirkland, Southern Pine Electric Cooperative

CONDUCTED BY:
Ira Cook, Evergreen Heating and Air

COATING FURNISHED AND APPLIED BY:
Therma-Cote Corporation, Lawrenceville, Georgia

METERS/TECHNICAL SUPPORT PROVIDED BY:
Southern Pine Electric Cooperative

ASSESSMENT DATE
JULY 5, 2009 – July 18, 2009

OVERVIEW

Several months ago I became aware of a product called ThermaCote® that claimed remarkable heating and cooling cost reductions. Company literature touted this ceramic coating as having reduced power bills as much as 45% in some applications. I was understandably skeptical and would have probably dismissed these claims out of hand if my current business partner had not told me he had witnessed the application and the subsequent energy savings. At about this same time I had been performing an energy audit and ACCA load calculation on Lyeffion School and it became apparent that this facility would be the ideal place to perform a controlled experiment to determine the effectiveness of this product. The test rooms are of identical size with the exact same amount of exterior glass, all of which faces west. In addition these rooms are cooled by matched 2 ½ ton Bard wall mount air conditioners. These units are of the same model number and have nearly sequential serial numbers indicating that they were manufactured within days or hours of each other. I approached Tom Sharp and Sam Rangel of ThermaCote, Inc. and asked them if they would be willing to apply their product for this experiment in exchange for us supplying them with the test results. They said they were on board with the project pending approval of the school system. I called Supt. Brogden asking permission to use the school for the test and he readily agreed. David Cook and Jeff Kirkland arranged for the loan of two watt-hour meters and bases through Southern Pine Electric Cooperative.

PROCEDURE

Classroom #12 was chosen to be coated with the product with the adjacent classroom #11 assigned as the control comparison. After room preparation, ceiling and upper 3 rows of frosted glass were coated with 20 gallons of product while the roof was coated with 15 gallons. Jalousie windows at top of common walls with hall were sealed off with sheet plastic to minimize infiltration from the hallway. Per manufacturer recommendations, material was allowed to cure for two weeks before monitoring began. In the interim, meter bases were installed and wired in between the service disconnects and the line voltage lugs on the air conditioners. On July 5, 2009, thermostats were set at 80 degrees, the meters were plugged in and the doors to the classrooms were pulled to and locked as were the entry doors to the building. Routine walkthroughs were performed to insure no tampering had taken place. Photos of the building exterior the interior of the rooms and the meter readings are attached.

RESULTS

Meter readings were recorded on three separate occasions during onsite inspections; these are documented in the attached photos and their captions. Additionally, these meters have an automated reporting feature which provides continuous feedback to Southern Pine. Jeff Kirkland has forwarded a spreadsheet detailing daily usage of each meter and temperature as provided to them by NWS. Reduction of usage was slightly higher during first period than in the second, but marginally so. This could have been due to changes in outside ambient temperature and humidity. Interestingly, the power usage

in the last period of approximately 22.5 hours revealed a 40% KWH usage reduction in the coated room. Manufacturing representatives have stated that the product will not attain its optimal performance until it has cured for several weeks. Latest reading shows the following:

COATED ROOM .....129 KWH
UNCOATED ROOM.....202 KWH

This calculates into a 36.1% reduction in electricity usage for the air conditioner in the coated room as opposed to the usage in the control room. It bears noting that this facility already had a light colored roof coating, (see fig. 3). Application of this material to dark roofs or the underside of roof decking with dark shingles may produce even more dramatic results. In addition, this product has a .83 solar reflectivity as established by the Cool Roof Rating Counsel. This high radiant reflectance may result in reduction in the number of fluorescent tubes needed to deliver an appropriate amount of light to the desktops. This could conceivably result in increased savings on the lighting portion of the bill.

PHOTOS

Figure 1: EAST SIDE OF FACILITY

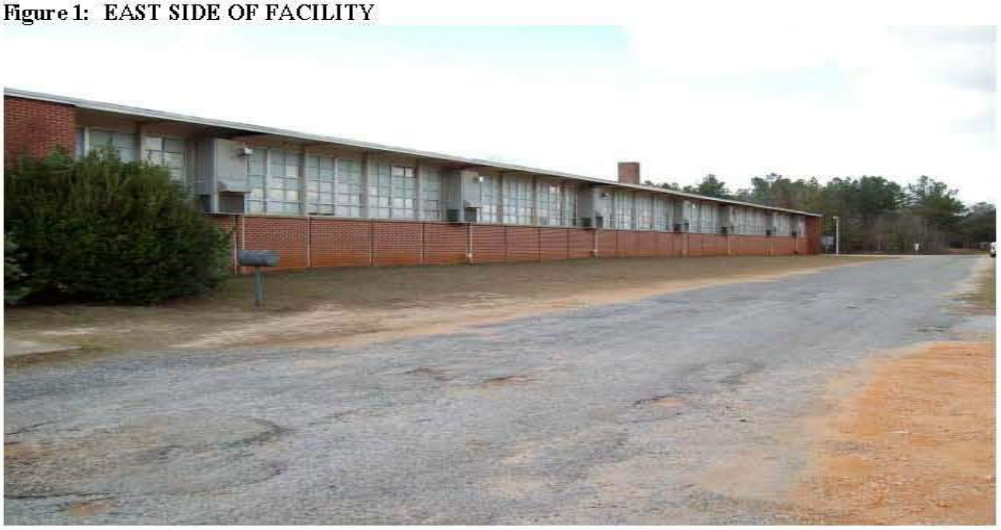


Figure 4: CLOSE-UP OF ROOF COVERING

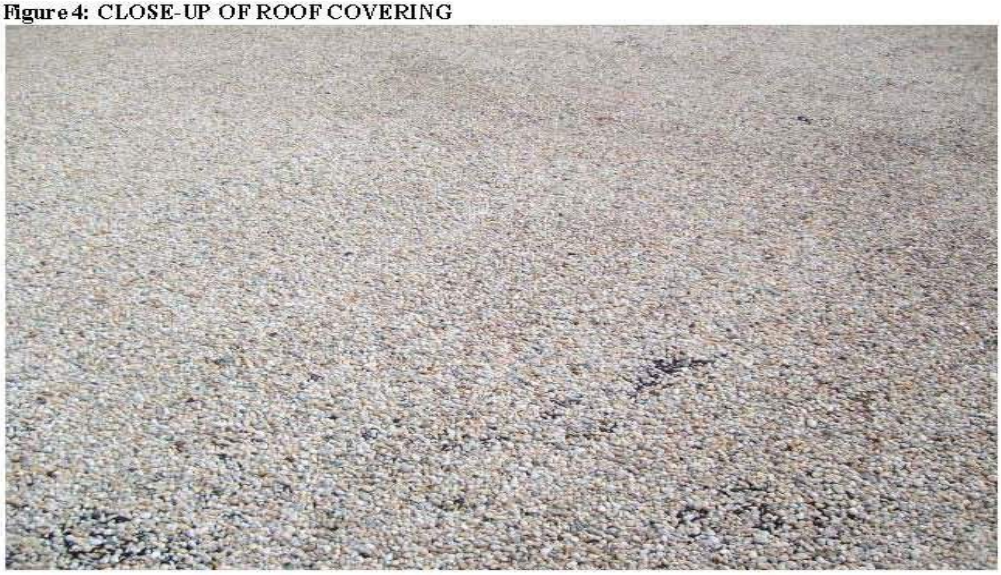


Figure 5 COATED CLASSROOM CEILING

Figure 6: CONTROL CLASSROOM CEILING

Figure 7: COMMON HALL WALL BETWEEN CLASROOMS 12, (NEAREST DOOR), AND 11

Figure 8: INITIAL READING UNCOATED ROOM 7/10/09 4:11 PM - 129 KWH

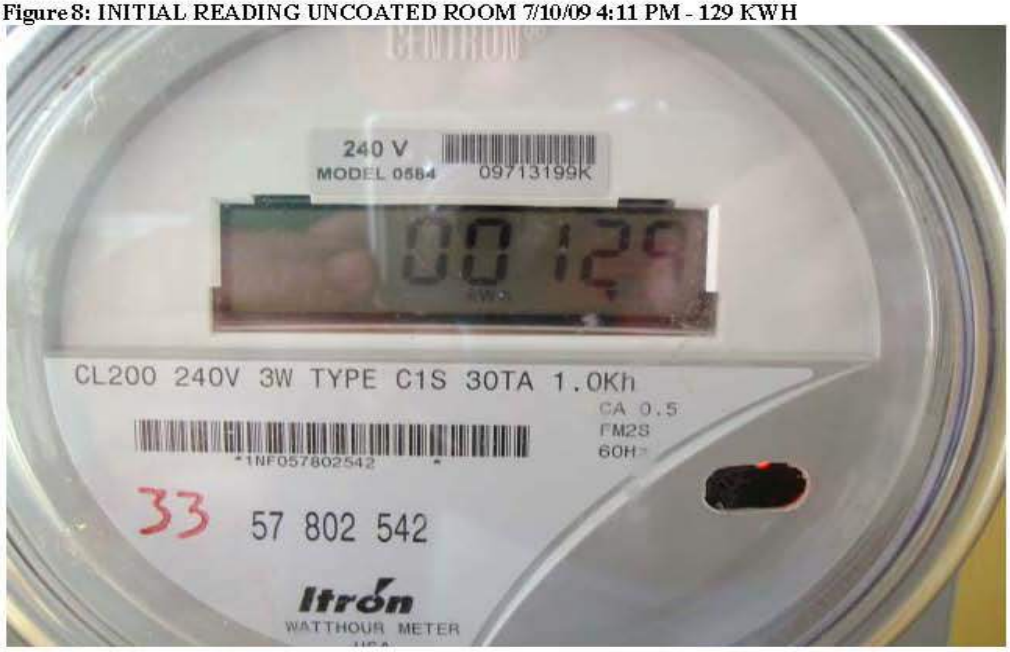


Figure 9: INITIAL READING COATED ROOM 7/10/09 4:13 PM – 80 KWH

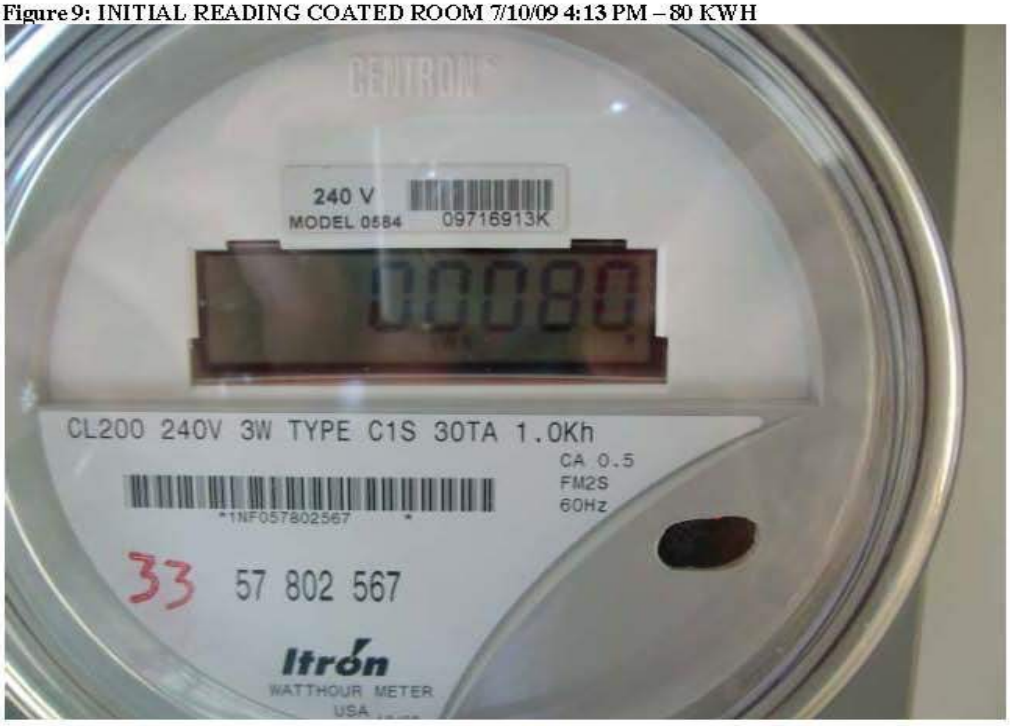


Figure 10: SECOND READING UNCOATED ROOM 7/13/09 2:58 PM – 192 KWH

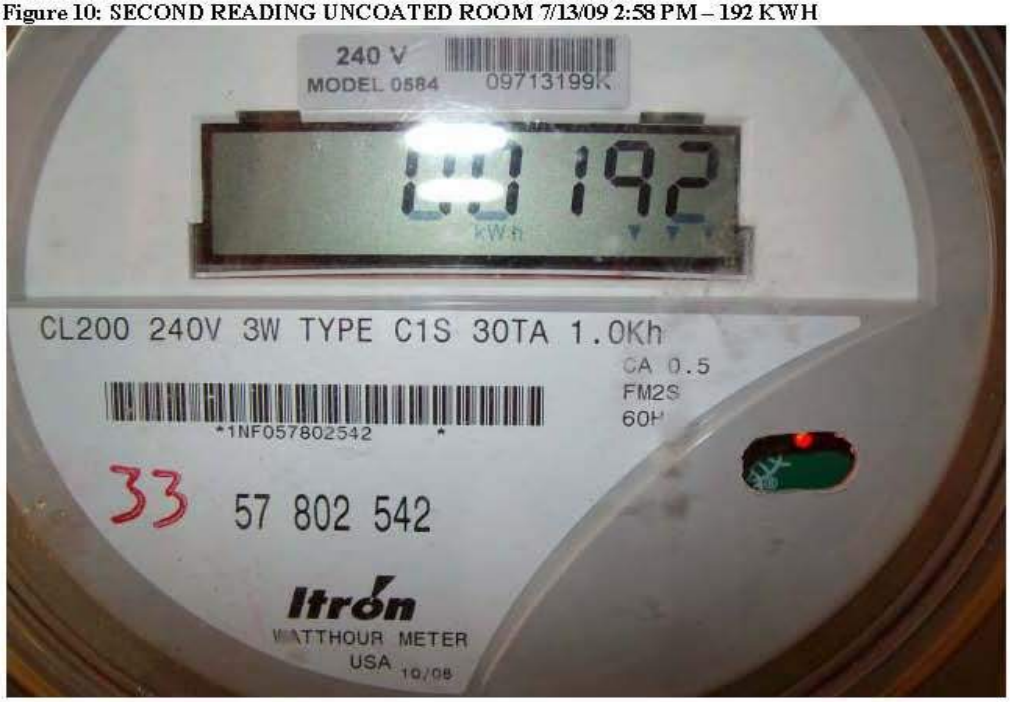


Figure 11: SECOND READING COATED ROOM 7/13/09 2:57 PM -123 KWHD

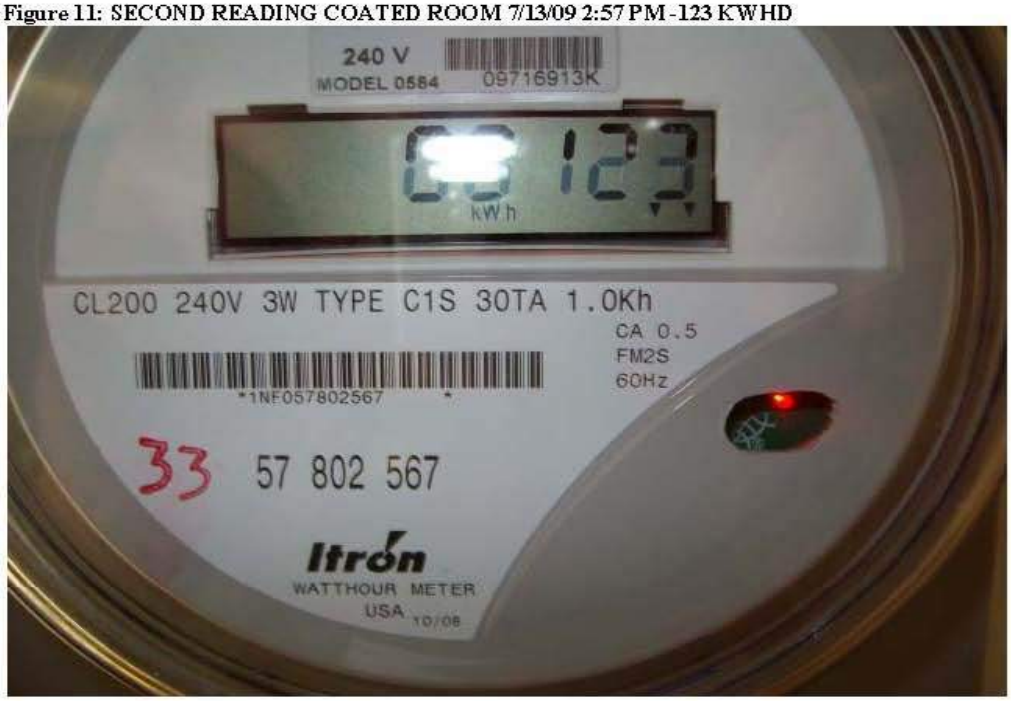


Figure 12: THIRD READING UNCOATED ROOM 7/14/09 12:13 PM 202 KWH

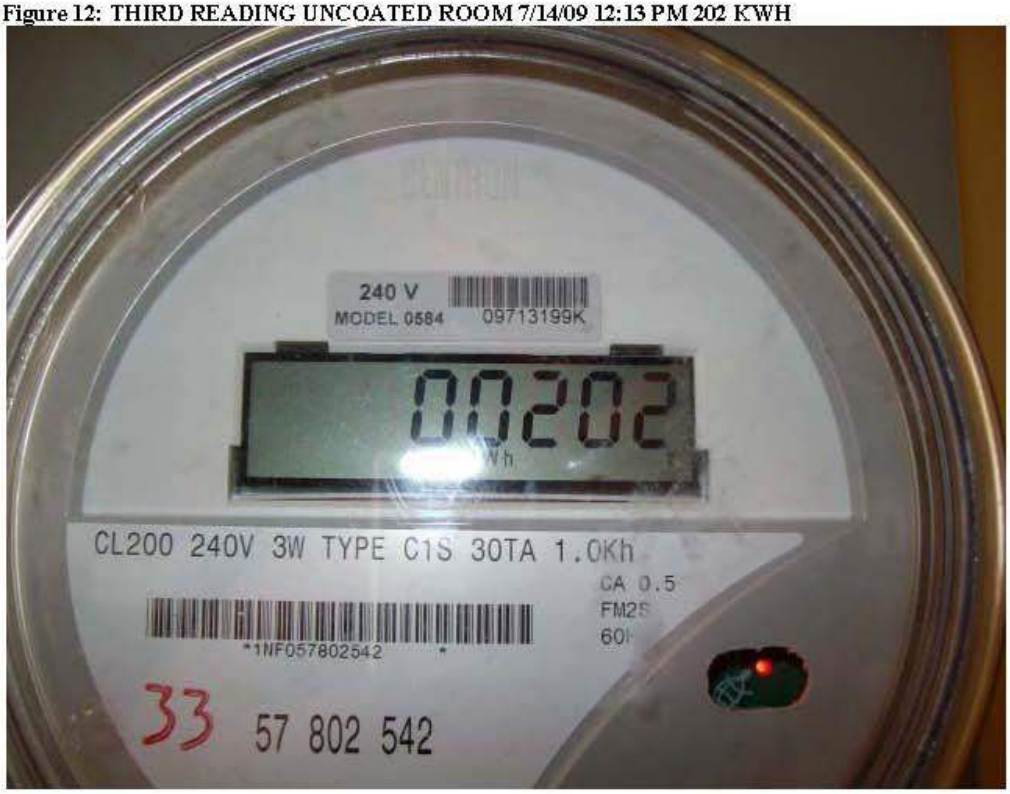
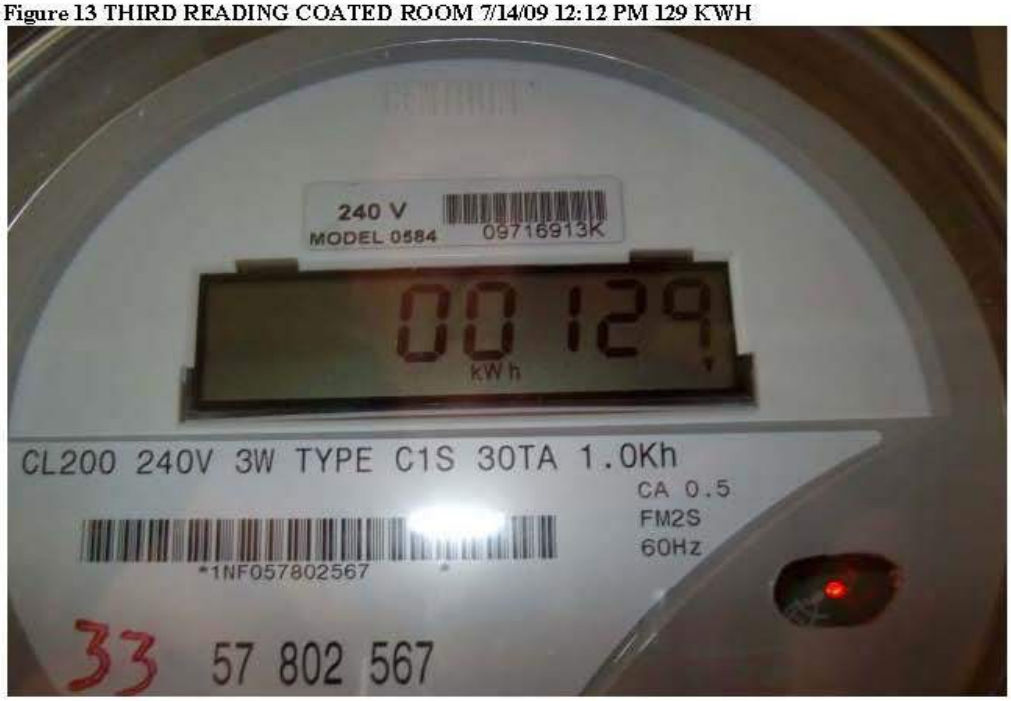


Figure 13 THIRD READING COATED ROOM 7/14/09 12:12 PM 129 KWH



Meter # 57802542

Meter Read Date	kWh Reading	Usage	Max Demand	Max Demand Date		Temp high	Temp low
7/18/2009 13:31	285	19	3.320313	7/17/2009 16:49		88	69
7/17/2009 10:25	266	16	3.4375	7/16/2009 15:43		91	73
7/16/2009 7:07	250	18	3.359375	7/15/2009 12:10		96	72
7/15/2009 3:52	232	32	3.476563	7/14/2009 17:25		96	72
7/14/2009 0:40	200	12	2.109375	7/13/2009 16:28		95	69
7/12/2009 21:25	188	46					
7/12/2009 6:20 AM						93	72
7/11/2009 3:05 AM	142	23	3.378906	7/10/2009 3:38 PM		91	68
7/9/2009 11:53 PM	119	18	3.222656	7/9/2009 6:56 PM		93	69
7/8/2009 8:38 PM	101	43	3.261719	7/8/2009 3:26 PM		91	71
7/7/2009 5:25 PM	58	15	3.261719	7/7/2009 4:43 PM		87	73
7/6/2009 2:13 PM	43	43	3.4375	7/5/2009 2:31 PM		84	73

meter #57802567

Meter Read Date	kWh Reading	Usage	Max Demand	Max Demand Date		Temp high	Temp low
7/18/2009 13:33	192	12	3.242188	7/17/2009 16:51		88	69
7/17/2009 10:20	180	12	3.320313	7/16/2009 15:38		91	73
7/16/2009 7:05	168	15	3.125	7/15/2009 17:53		96	72
7/15/2009 3:53	153	25	3.300781	7/14/2009 15:26		96	72
7/14/2009 0:40	128	6	1.640625	7/13/2009 18:58		95	69
7/12/2009 21:27	122	33					
7/12/2009 6:25 AM						93	72
7/11/2009 3:00 AM	89	16	3.222656	7/10/2009 6:03 PM		91	68
7/9/2009 11:46 PM	73	13	3.144531	7/9/2009 3:49 PM		93	69
7/8/2009 8:38 PM	60	11	1.914063	7/8/2009 4:11 PM		91	71
7/7/2009 5:20 PM	49	11	2.324219	7/7/2009 4:38 PM		87	73
7/6/2009 2:06 PM	38	38	3.339844	7/5/2009 4:54 PM		84	73

2.3. ThermaCote coated container versus Jotun painted

Client: Dubai Airports **Localization:** Dubai, United Arab Emirates **Date:** 2014

Description / Initial Condition:

Temperature readings at ThermaCote coated container versus Jotun painted identical container.

Test for application of ThermaCote reflective insulation was carried out on SCADA Container, on a non-air conditioned containers and glass area was covered.

ThermaCote Solution:

Side wall exposed to sun: Temperature readings on ThermaCote container is 105°F/40.56°C when Jotun container temperature reading is 115°F/46.11°C. So a difference in temperature= 25°F/ 5,55°C less on the ThermaCote container.

Top side exposed to sun: Temperature readings on ThermaCote container is 118°F/47.78°C when Jotun container temperature reading is 143°F/61.67°C. So a difference in temperature= 25°F/ 13,89°C less on the ThermaCote container.

Average Temperature inside: Temperature readings on ThermaCote container is 102°F/38.89 when Jotun container temperature reading is 109°F/42.78°C

Dubai Airports

Rashid Haque Iqbal
Emirates Thermacote LLC
Musaffah (M) 26
Abu Dhabi, UAE

November 30, 2014

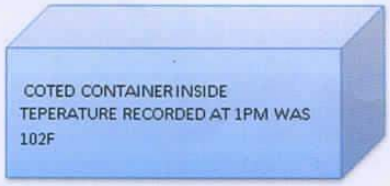
Re: Temperature readings at ThermaCote™ coated container versus a Jotun painted identical container

Test for application of ThermaCote reflective insulation was carried out on SCADA container, results are tabulated below.

Test was jointly witness by DAC engineers & Mr. Thomas Sharp President of ThermaCote who was visiting from USA.

	Temperature readings on coated container	Temperature readings on Jotun container	DIFFERENCE IN TEMPERATURE	AREA in ft2
TOP SIDE EXPOSED TO SUN	**118°F**	**143°F**	25F	320
SIDE WALL EXPOSED TO SUN	105F	115F	10F	768
AVERAGE TEMPERATURE IN SIDE	102F	109F	7F	

ROOF TOP TEMPERATURE RECORED WAS 118F



Test was carried out on a non-air conditioned containers & glass area was covered temporarily (with old newspapers), ambient temperature on the ground (bricks) **was 128F at 1P.M.**

Testing Instrument was a **Raytec** Laser gun thermometer made in USA.

Sincerely,

مطارات دبي
وحدة الخدمات الهندسية
Dubai Airports
ENGINEERING SERVICES UNIT
DUBAI AIRPORTS

Eng. Abdulrazaq Hassan
Manager
Chillers & Plants
Dubai Airports Company

2.4. Wall and Roof applied for Waterproofing and insulation at Al Dhafra Air Base

Client: United Arab Emirates Air Force **Localization:** Abu Dhabi, United Arab Emirates **Date:** 2014

Description / Initial Condition:

700 – 800 microns of ThermaCote waterproofing, insulation, reflective material applied to Hangar 27 at Al Dhafra Air Base, Abu Dhabi, United Arab Emirates

ThermaCote Solution:

“ThermaCote has passed all Water proofing tests”

“Roof Sheet Temperature outside with ThermaCote is at 44°C, when uncoated roof is at 65°C”, Temperature difference: 21°C

“Center of the room temperature with ThermaCote is at 27°C when uncoated room is at 46°C”, Temperature difference 19°C

“Wall temperature from inside with ThermaCote is at 34°C, when uncoated wall is at 41°C”, Temperature difference: 7°C

شركة الخرافي ناشيونال (ذ.م.م)
Kharafi National Co. (L.L.C)

KHARAFI NATIONAL

December 31, 2014

Rashid Haque Iqbal
Emirates ThermaCote LLC.
Musaffah (M) 26
Plant 10 Store 26
Abu Dhabi, UAE

Re: 700 – 800 microns of ThermaCote waterproofing, insulation, reflective material applied to Hangar 27 at Al Dhafra Air Base, Abu Dhabi.

ThermaCote has passed all Water proofing tests.

These are initial readings Kharafi National took in September 2014 and in December 2014.

September Reading - Time @930AM

	Uncoated	Coated
Ambient Temperature	26	26
Roof Sheet Temperature (ouside)	45	27
Roof Sheet Temperature (from Inside)	32	26
Wall Temperature (from Inside)	30	25
Room temperature (Center of the room)	26	24
Return Air Temperature	28	25
Supply (at Grill) Temperature	28	24.5

September Reading - Time @1430AM

	Uncoated	Coated
Ambient Temperature	42	42
Roof Sheet Temperature (ouside)	65	44
Roof Sheet Temperature (from Inside)	52	37.5
Wall Temperature (from Inside)	41	34
Room temperature (Center of the room)	46	27
Return Air Temperature	32	28
Supply (at Grill) Temperature	25	20

December Reading - Time @0930AM

	Uncoated	Coated
Ambient Temperature	22	22
Roof Sheet Temperature (ouside)	34	22
Roof Sheet Temperature (from Inside)	26	22
Wall Temperature (from Inside)	24	21
Room temperature (Center of the room)	26	20
Return Air Temperature	27	23
Supply (at Grill) Temperature	26	22

December Reading - Time @1430 PM

	Uncoated	Coated
Ambient Temperature	29	29
Roof Sheet Temperature (ouside)	49	30
Roof Sheet Temperature (from Inside)	40.5	28
Wall Temperature (from Inside)	25	22
Room temperature (Center of the room)	28	21
Return Air Temperature	27	24
Supply (at Grill) Temperature	22	18

We are pleased with the results and will continue monitoring your materials effectiveness.

Sincerely,

P. Prakash
Project Manager- AMMROC
FM Institutional and Commercial
Kharafi National - UAE
P.O. Box 26831 Abu Dhabi, U.A.E.

Email : prakash.dhas@kharafinational.com
Website: www.kharafinational.com

2.5.ThermaCote was used to stop heat transfer at Hotel Indigo – Margaritaville

Client: Hotel Indigo – Margaritaville **Localization:** Florida, United States **Date:** 2010

Description / Initial Condition:

Stop heat transfer underneath the parking structure from entering into the conditioned space above

ThermaCote Solution:

"I just want to take a moment to thank you guys for all your help in making our application on the new Margaritaville Hotel such a great experience. The cost savings over the product that was originally specified was huge. The application and tinting was also very easy to do. As you know, your product was used to stop heat transfer underneath the parking structure from entering into the conditioned space above.

ThermaCote has done its job and looks great too! It was used in under structure parking as well as some enclosed areas where the finished product was very visible, and it looks great. In the past some different types of blow on insulation would have been used which were unsightly. This is a much better alternative.

I will definitely be using your product again. Thanks again for all your personal attention and helping this project go so smoothly."

Hotel Indigo – Margaritaville

Sam & TJ,

I just want to take a moment to thank you guys for all your help in making our application on the new Margaritaville Hotel such a great experience. The cost savings over the product that was originally specified was huge. The application and tinting was also very easy to do. As you know, your product was used to stop heat transfer underneath the parking structure from entering into the conditioned space above. ThermaCote® has done its job and looks great too! It was used in under structure parking as well as some enclosed areas where the finished product was very visible, and it looks great. In the past some different types of blow on insulation would have been used which were unsightly. This is a much better alternative. I will definitely be using your product again. Thanks again for all your personal attention and helping this project go so smoothly. I have attached a few pictures for your files.

Thank you,
Darrell Walker

12402 Slide Road, Suite 103
Lubbock, TX 79424

Office 806.771.6888
Fax 806.771.0961
Cell 806.787.6432

Darrell Walker
dwalker@walkerincorporated.com
www.WalkerIncorporated.com

2.6.Thermal images and test before and with ThermaCote on social housing building

Client: social housing building **Localization:** Puteaux, Paris, France **Date:** 2016

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a social housing building, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure

The optimization of the thermal diffusivity of the brick walls is perceptible on all façades.

The renovation works took into consideration the optimization of the balcony joints, in order to perpetuate in time the work carried out (permeability to water).

The thermal bridges of the low / high floor and the walls are considerably improved

Average thermal diffusivity reduction (by Sampling):

- Ceiling lights: thermal reduction of 55%

- Reflow: 60% thermal reduction

This aspect is also identified in the concreted structures of balconies.

Download complete study on our web site: http://thermacote.eu/en/case-studies

CéVeS
CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection par thermographie infrarouge

Etablissement : Immeubles collectifs

Lieu : Rue Cartault – PUTEAUX (92)

Date d'intervention : 19/01/2015 – 28/07/2016

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

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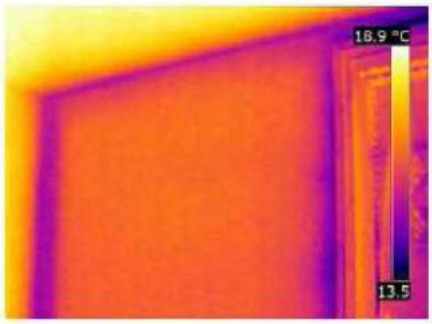
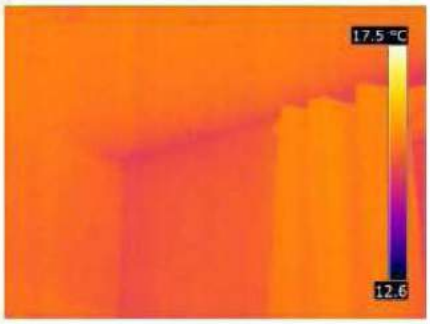
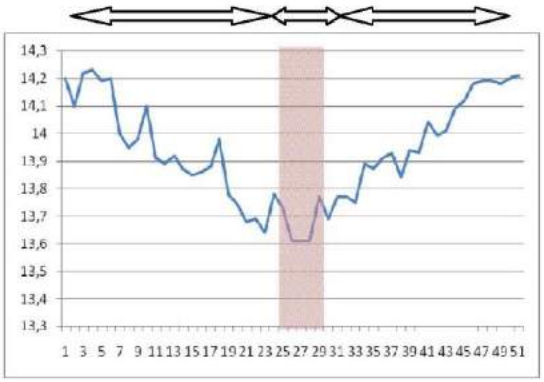
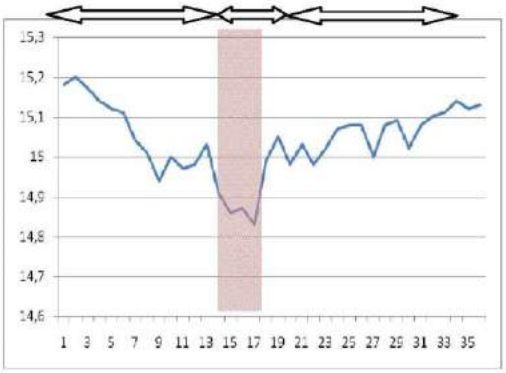
Exemples de clichés thermographiques

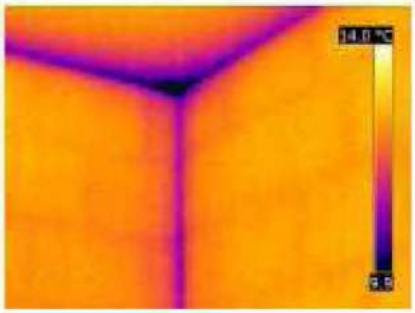
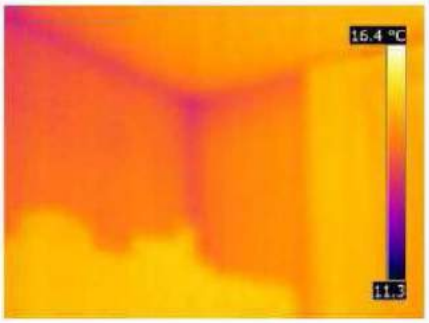
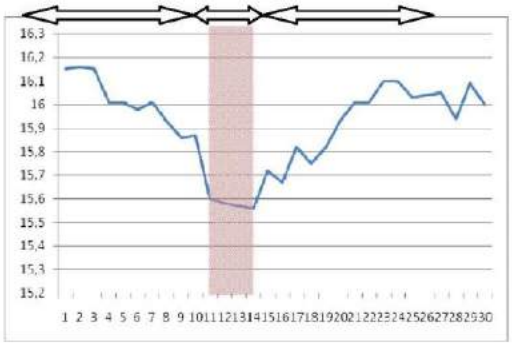
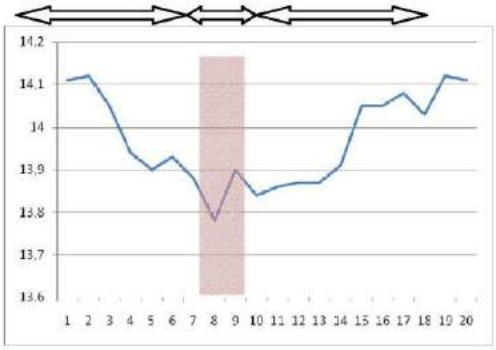
Pont thermique de refend et de plafonnier:

Etat originel: Les soubassements de fenêtres en structure béton, ainsi que les ponts thermiques de refends et de plafonnier étaient à l'origine aisément sont détectables du fiat de l'absence d'isolation au sein des murs.
Cette fragilité structurelle favorise en l'état l'apparition de points de rosées (condensation).

Immeuble G :

Avant travaux	Après travaux
	
Pont thermique de plafonnier	Pont thermique de plafonnier
	
Pont thermique : - 0.55°C (médian)	Pont thermique : - 0.3°C (médian)

Immeuble H :

Avant travaux	Après travaux
	
Pont thermique de refend	Pont thermique de refend
	
Pont thermique : - 0.5°C (médian)	Pont thermique : - 0.3°C (médian)

Rapport de contrôle par thermographie infrarouge

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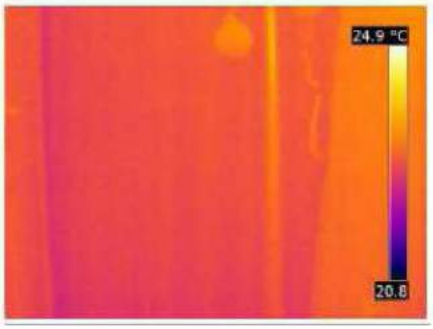
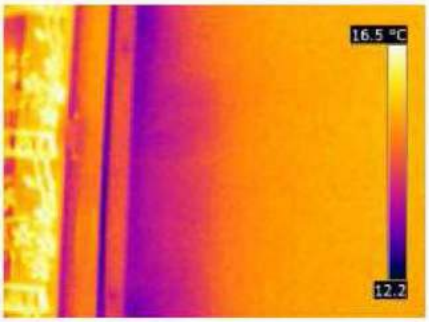
Diffusivité de mur :

Etat originel : Il n'apparait pas en l'état de résistance thermique des parois. A la lecture des clichés thermographiques, la structure des murs en brique est distinctement identifiable.
La brique est manifestement déminéralisée par l'effet du temps et du lessivage des eaux pluviales.

Immeuble G :

Avant travaux	Après travaux
	
	

Rapport de contrôle par thermographie infrarouge

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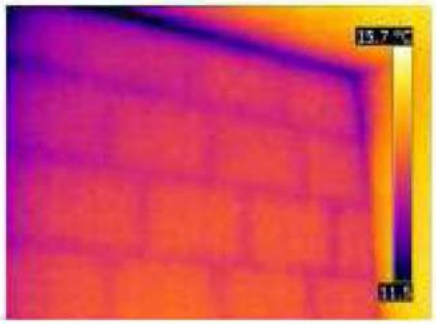
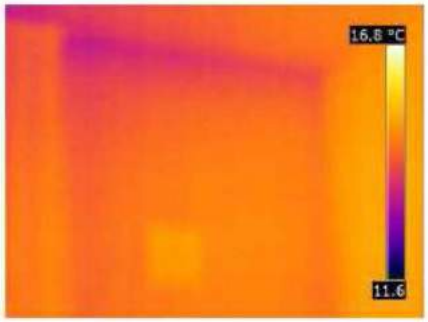
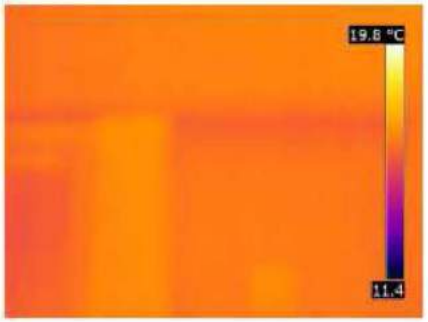
Immeuble H :

Avant travaux	Après travaux
	
	

Rapport de contrôle par thermographie infrarouge

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SYNTHESE : résultats thermiques des bâtiments inspectés

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

	Précision / Commentaire
Diffusivité (chaud/froid)	L'optimisation de la diffusivité thermique des parois en brique est perceptible sur l'ensemble des façades. Les travaux de rénovation ont pris en considération l'optimisation des joints de balcon, afin de pérenniser dans le temps les travaux réalisé (perméabilité à l'eau).
Pont thermique	Les ponts thermiques du plancher bas/haut, et du refend des murs sont nettement améliorés Réduction moyenne de diffusivité des ponts thermiques (par échantillonnage) : - Plafonniers : réduction thermique de 55 % - Refend : réduction thermique de 60% Cet aspect est également identifié au niveau des structures bétonnées des bacons et des balconnets.
Etanchéité	Non concerné.

2.7.Thermal test before and after ThermaCote coating on a residential house

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

Download complete study on our web site: http://thermacote.eu/en/case-studies/thermal-test-and-after-thermacote-coating-residential-house

CéVeS
CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Me CATREVAUX

Lieu : 13 Rue René Clair – 56890 Saint Avé

Nature : Habitation individuelle

Date d'intervention : 19/03/14 et 21/05/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

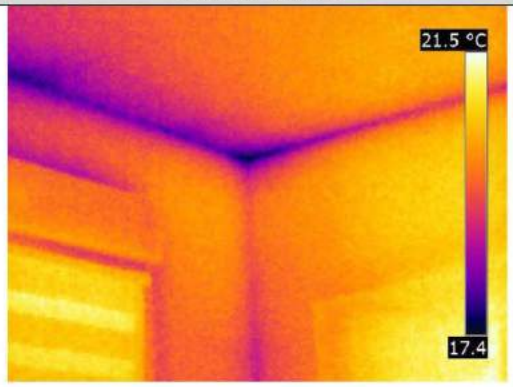
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

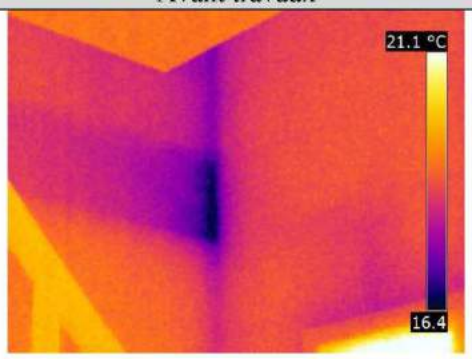
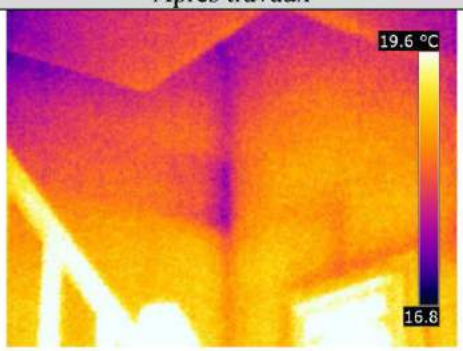
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

Pont thermique du plafonnier

Avant travaux	Après travaux
	

Pont thermique de dalle de plancher et résistance thermique du mur

Avant travaux	Après travaux
	

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Correction partielle	Correction globale	Précision / Commentaire
Diffusivité (chaud/froid)			X	Sans observations
Pont thermique		X		-La mitoyenneté du garage avec l'habitation ne profite pas à traiter correctement les ponts thermiques associés au mur de refend du garage (le produit n'ayant pas « englobé » le pont thermique) - La dalle du plafond du salon/cuisine profite pleinement de l'application du produit
Etanchéité	X			

Rapport de contrôle par thermographie infrarouge

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2.8.Thermal test before and after ThermaCote coating on a residential house

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

Download complete study on our web site: http://thermacote.eu/en/case-studies

CéVeS
CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Mr/Me Evanno

Lieu : 7 Rue du 65é régiment d'infanterie – 56000 Vannes

Nature : Habitation individuelle

Date d'intervention : 31/03/14 et 20/06/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

Rapport de contrôle par thermographie infrarouge

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CéVeS

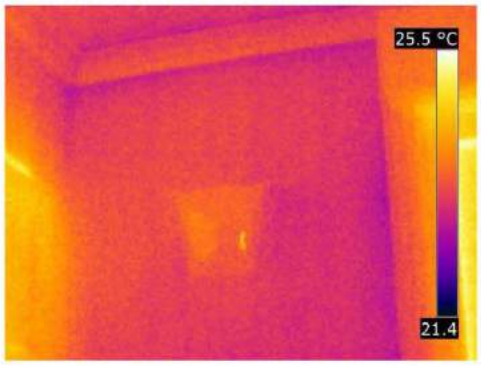
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

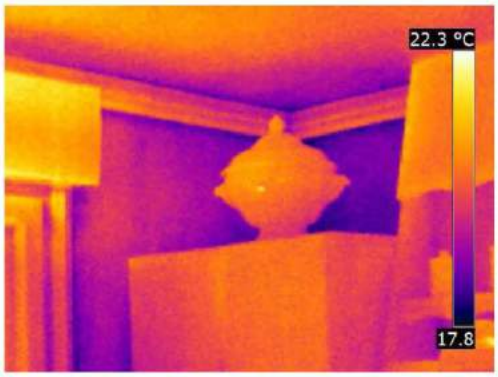
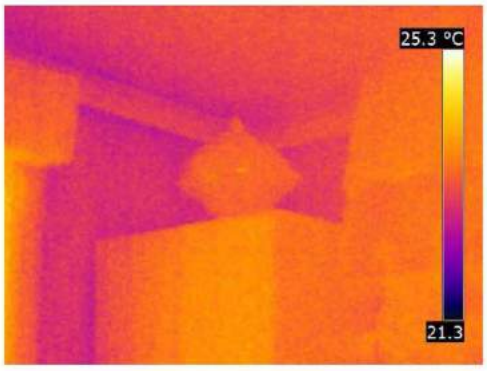
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

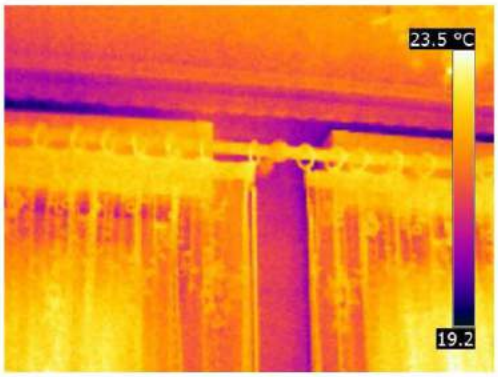
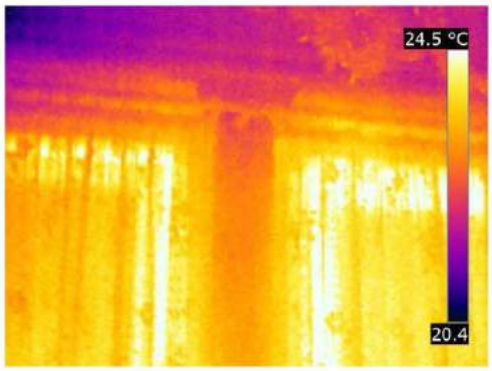
Isolation de mur

Avant travaux	Après travaux
	

Pont thermique

Avant travaux	Après travaux
	

Huisseries

Avant travaux	Après travaux
	

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Non corrigé	Corrigé	Précision / Commentaire
Diffusivité (chaud/froid)			X	La diffusivité de la paroi de façade avant et arrière sont nettement moins déperditives. Cet aspect est notamment observable au niveau des menuiseries.
Pont thermique			X	Les ponts thermiques de refends et du plafonnier sont atténués par l'application du produit.
Etanchéité	X			

2.9. Thermal image test before and after ThermaCote

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

Download complete study on our web site: http://thermacote.eu/en/case-studies

CéVeS
CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Me Le Doriol

Lieu : 8 Allée des Mimosas – 56860 SENE

Nature : Habitation individuelle

Date d'intervention : 31/03/14 et 20/06/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

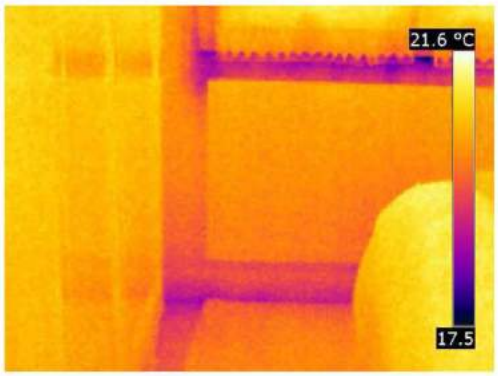
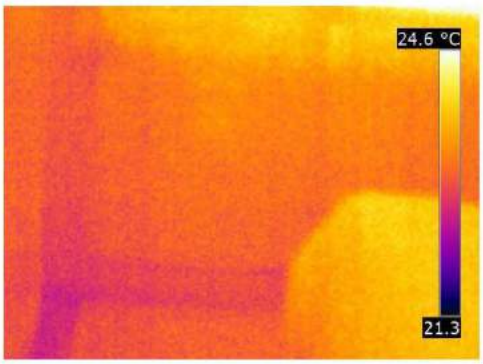
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

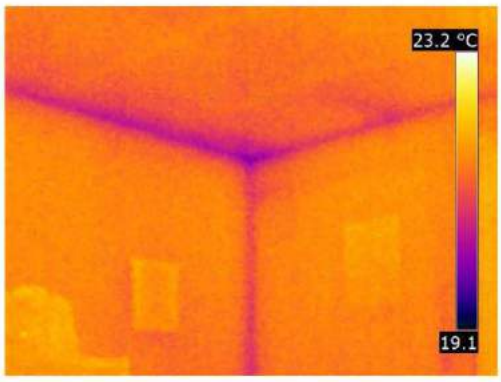
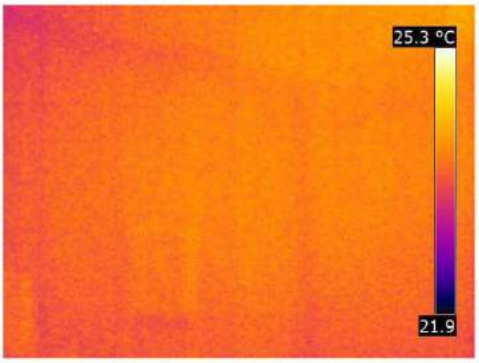
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

Appui de fenêtre

Avant travaux	Après travaux
	

Pont thermique

Avant travaux	Après travaux
	

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Non corrigé	Amélioré	Précision / Commentaire
Diffusivité (chaud/froid)			X	L'application du produit au niveau des ébrasements de fenêtres ainsi que des appuis à permis de réduire notablement les déperditions en ce point. Cet aspect est tout particulièrement identifiable au niveau de la chambre de Me Le Doriol.
Pont thermique			X	En ce qui concerne les murs, ceux-ci présentaient dès l'origine une bonne isolation des parois.
Etanchéité	X			

A noter : Le clichè thermographique comparatif de la salle de bains n'est pas représentatif du fait d'une chaleur excessive dans la pièce lors de la première visite de contrôle.

2.10. Thermal test before and after ThermaCote coating on a residential house (56400)

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

Download complete study on our web site: http://thermacote.eu/en/case-studies

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CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Mr/Me MOREL

Lieu : 3 Résidence des Korrigans – 56400 Sainte Anne d'Auray

Nature : Habitation individuelle

Date d'intervention : 19/03/14 et 20/06/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

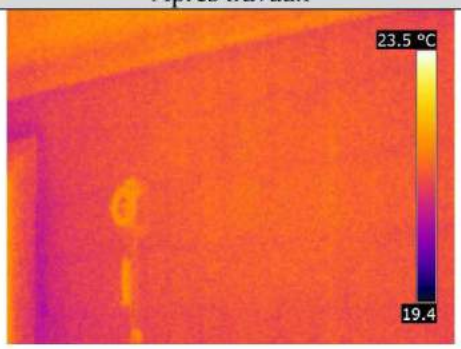
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

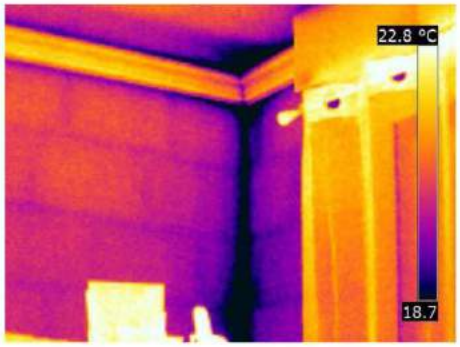
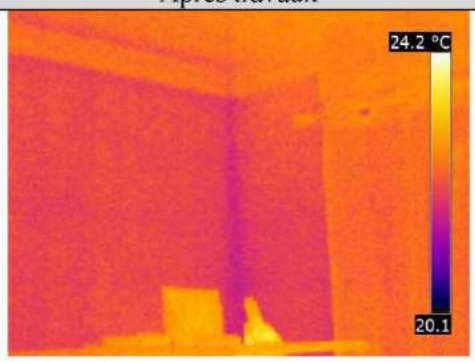
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

Isolation de mur

Avant travaux	Après travaux
	

Pont thermique

Avant travaux	Après travaux
	

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Non corrigé	Corrigé	Précision / Commentaire
Diffusivité (chaud/froid)			X	Le briquetage intérieur n'est plus perceptible en l'état des travaux que ce soit au niveau du rez de chaussée que de l'étage. Les murs présentent une diffusivité amélioré par rapport à l'intervention initiale
Pont thermique			X	Les ponts thermiques des murs de refends et du plancher intermédiaire se sont nettement résorbés
Etanchéité	X			

Rapport de contrôle par thermographie infrarouge

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2.11. Thermal image test with ThermaCote on residential House (56450)

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

- Diffusivity: The interior bricks of the house are no longer distinguishable at the end of the application of the product
- Thermal bridge: Reduction of heat losses from thermal bridge and ceiling.
  The thermal bridge of the floor is not treated as it is.
- Waterproofing: The loss of air and water identified during the initial intervention is no longer perceptible.
  There is no longer any loss of sealing in the kitchen as in the bathroom

- Diffusivité : Les briques intérieures de l'habitation ne sont plus distinguables au terme de l'application du produit
- Pont thermique : Diminution des déperditions calorifiques des ponts thermiques de refend et du plafonnier.
  Le pont thermique du plancher n'est pas traité en l'état.
- Etanchéité : La perte à l'air et à l'eau identifiée au cours de l'intervention initiale n'est plus perceptible.
  Il n'est plus détecté de perte d'étanchéité au niveau de la cuisine comme de la salle d'eau

Download complete study on our web site: http://thermacote.eu/en/case-studies

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CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Mr/Me PINOT

Lieu : 3 Rue des Sternes – 56450 THEIX

Nature : Habitation individuelle

Date d'intervention : 19/03/14 et 21/05/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

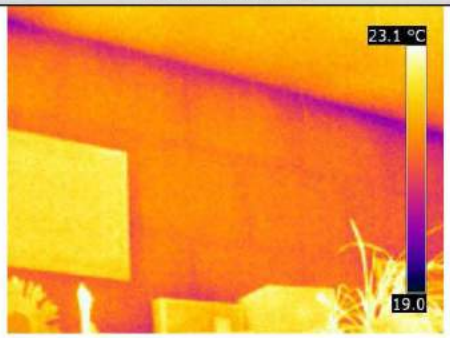
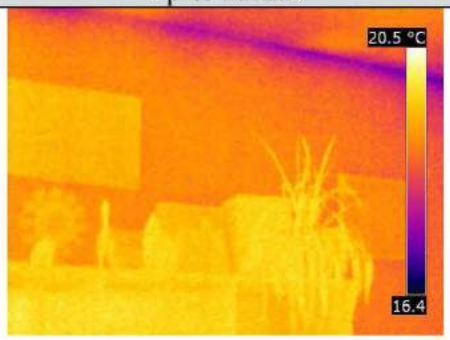
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

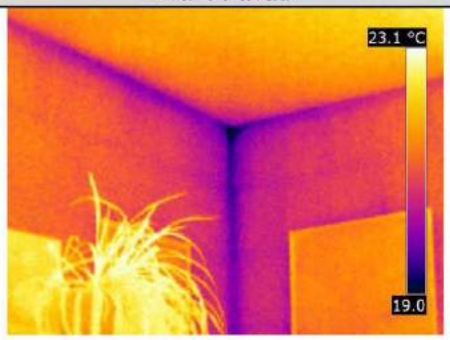
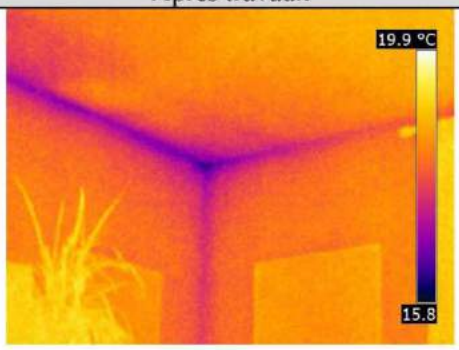
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

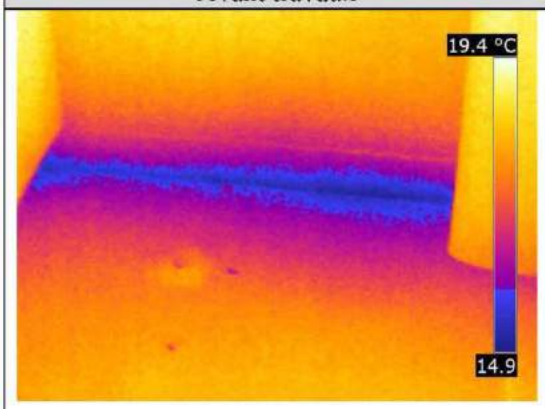
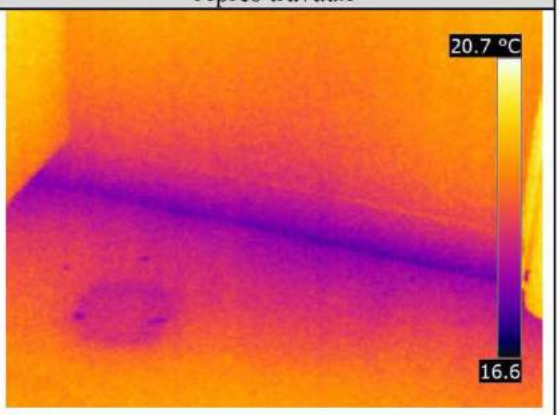
Isolation de mur

Avant travaux	Après travaux
	

Pont thermique

Avant travaux	Après travaux
	

Etanchéité

Avant travaux	Après travaux
	

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Non corrigé	Corrigé	Précision / Commentaire
Diffusivité (chaud/froid)			X	Les briques intérieures de l'habitation ne sont plus distinguables au terme de l'application du produit
Pont thermique			X	Diminution des déperditions calorifiques des ponts thermiques de refend et du plafonnier. Le pont thermique du plancher n'est pas traité en l'état.
Etanchéité			X	La perte à l'air et à l'eau identifiée au cours de l'intervention initiale n'est plus perceptible. Il n'est plus détecté de perte d'étanchéité au niveau de la cuisine comme de la salle d'eau

Rapport de contrôle par thermographie infrarouge

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2.12. Thermal image inspection on residential house (56300)

Client: Residential House **Localization:** Morbihan, France **Date:** 2014

Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

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Rapport d'inspection de travaux par thermographie infrarouge

Domicile : Mr/Me ROGER

Lieu : 21 Rue Eglantines – 56300 Pontivy

Nature : Habitation individuelle

Date d'intervention : 31/03/14 et 21/05/14

Pour le compte de : Sarl THERMACOTE France

CEVES
24 Rue Dévoline / 53210 Soulgé Sur Ouette : 02.43.66.15.31 – 06.07.12.79.94 / ✉ : jmasserot@ceves.fr
SIRET 532 089 240 00016 – www.ceves.fr

Rapport de contrôle par thermographie infrarouge

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CéVeS

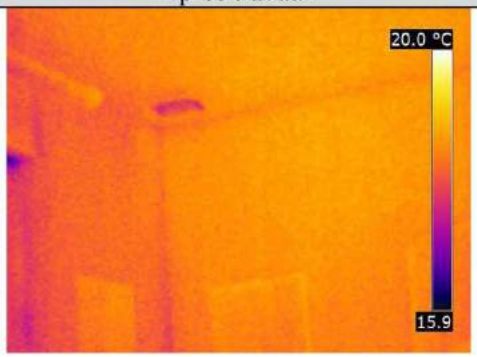
6/ Conclusion

La présente étude a décrit le bâtiment du point de vue de son enveloppe extérieure.

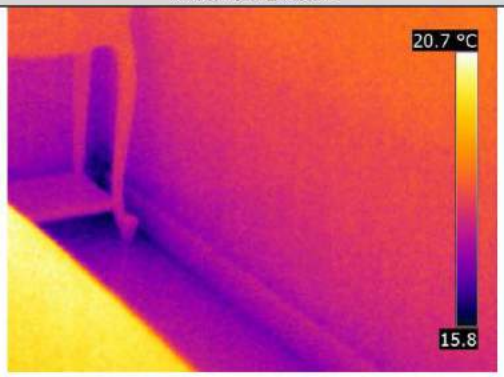
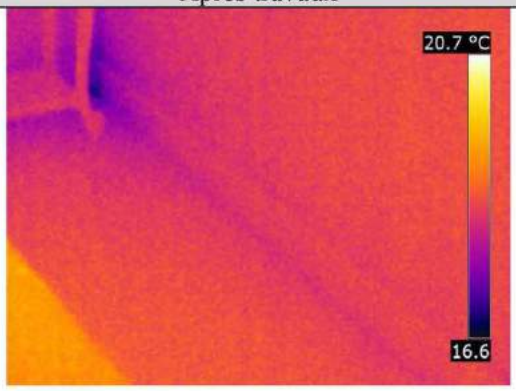
Une photo en situation réelle et le thermographe correspondant permettent de repérer les lieux, de faciliter la comparaison, et d'identifier de manière aisée les incohérences thermiques.

Clichés thermographiques exemplaires :

Pont thermique de refend et du plafonnier

Avant travaux	Après travaux
	

Pont thermique du plancher bas et réflexion thermique du mur

Avant travaux	Après travaux
	

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CONSEILS ET ETUDES POUR LA VALORISATION DE L'ENVIRONNEMENT ET DE LA SECURITE

Ci-joint les résultats obtenus après l'opération de rénovation :

Défauts	Non concerné	Non corrigé	Corrigé	Précision / Commentaire
Diffusivité (chaud/froid)			X	L'optimisation de la diffusivité thermique est perceptible en façade d'entrée du bâtiment
Pont thermique			X	Amélioration notables des ponts thermiques de refends et du plafonnier
Etanchéité	X			

Rapport de contrôle par thermographie infrarouge

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2.13. Thermal test before and after ThermaCote coating on a residential house (Laval)

Client: Residential House **Localization:** LAVAL, France **Date:** 2014

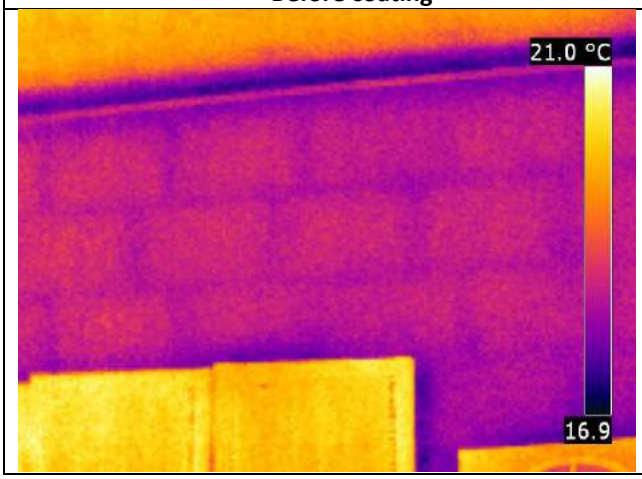
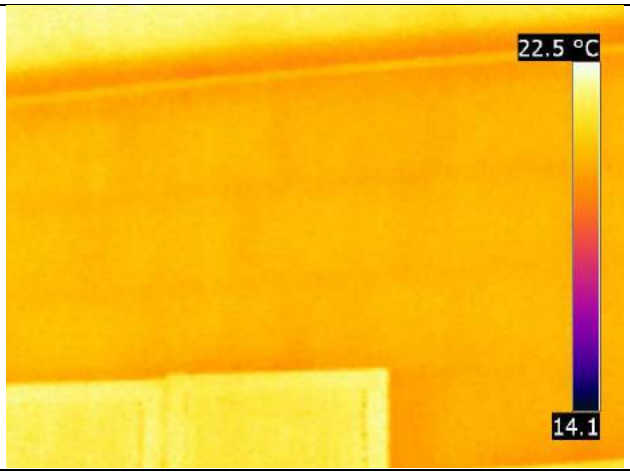
Description / Initial Condition:

Thermal test before and after ThermaCote coating on a residential house, realize by CEVES (is an independent and autonomous consulting firm: construction and thermal control)

ThermaCote Solution:

ThermaCote was applied on wall structure: increase thermal performance of the wall and stop thermal bridge

Download complete study on our web site: http://thermacote.eu/en/case-studies

Before coating	With ThermaCote
	

2.14. Thermal test before and after ThermaCote coating on a residential house (north)

Client: Residential House **Localization:** Nort of France **Date:** 2014

Description / Initial Condition:

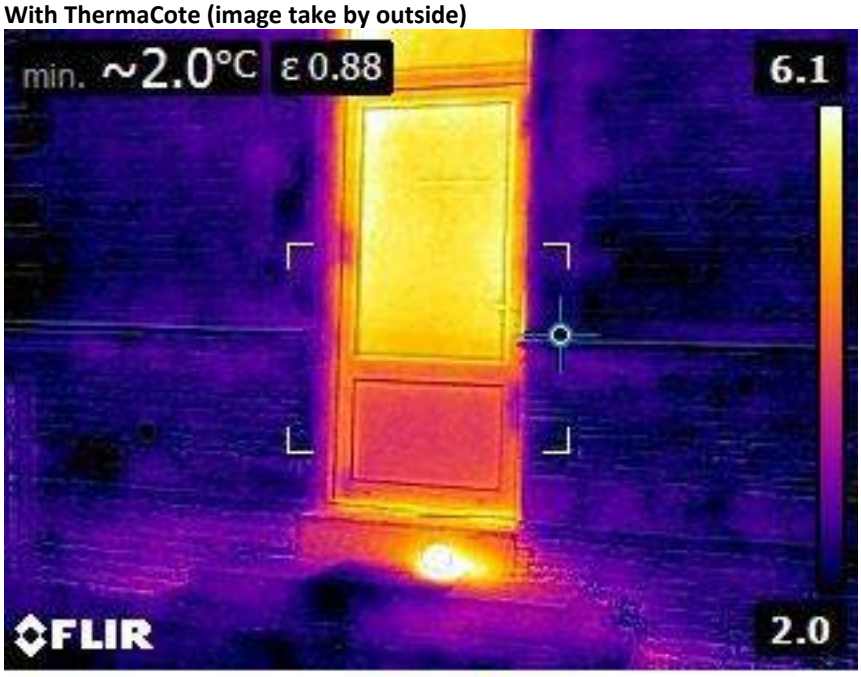
Thermal test before and after ThermaCote coating on a residential house

ThermaCote Solution:

Before coating (image take by outside)

Mur extérieur avant application

With ThermaCote (image take by outside)



Mur extérieur avec ThermaCote

2.15. Thermal test on metallic roof structure:

Application of a Thermacote coating layer on a 3mm sheet exposed to an infrared heating source

Type de mesure et expérimentation: application d'une couche de ThermaCote d'une épaisseur de 5/10èmes de mm sur une plaque de tôle de 3mm.

Source de chauffage: rampe infrarouge, Mesure du transfert thermique directe, précision /tolérance: 1/10ème de degré.

Test et Mesure réalisé par: CRESTEB http://www.aerebat.fr/

CRESTEB
Centre de recherches et d'études scientifiques sur la thermique de l'enveloppe du bâtiment

AEREBAT
Architectes & Experts en Rénovation Energétique du Bâtiment
Bâtiments Passifs-Positifs -Innovation

Measurements of direct heat transfer:

Measurements of direct heat transfer:				
Exposure Temperature: Infrared Source (outside face)	60,18 °C	70,14 °C	80,01 °C	90,04 °C
Temperature of the rear face (face not exposed)	37,41 °C	43,29 °C	50,38 °C	56,41 °C
DELTA T / Gain / thermal attenuation	***22,77 °C***	***26,85 °C***	***29,63 °C***	***33,63 °C***
Gain or thermal attenuation as a percentage	***37,84%***	***38,28%***	***37,03%***	***37,35%***

On walls exposed to infrared rays, surface temperatures can reach extreme levels as indicated above.

This experiment demonstrates the reduction of solar thermal transfer in the walls.

In conclusion: Thermacote considerably improves the thermal capacities of structure.

On the other hand, it is possible to formally demonstrate the incontestable capacity of this coating to sanitize the support by the suppression of the moisture, which gives the old properties back to the original properties, plus a coefficient of thermal resistance of 0.50R about

In Mediterranean climates, it is an indisputable asset to the reduction of energy consumption of refreshment.

2.16. Increase thermal resistance in situ measurement:

ThermaCote ® améliore la résistance thermique d'un mur, mesures in situ réalisé par: CRESTEB / AEREBAT

- Lieu : région d'Alençon - Année de construction : 1980 (34 ans)

Composition du mur : enduit ciment 15 mm, parpaing creux de 200 mm, laine de verre 100 mm Lambda 0.046 (valeur à neuf), brique platière enduite de plâtre 50 mm.

- *Constatation: Forte hygrométrie dans le mur, froid ressenti.*
- Valeur calculée à neuf : R = 2.527.

➢ Valeur mesurée avant travaux : **R = 1.59** (liée à la vétusté et à la forte hygrométrie).

➢ **Valeur mesurée après travaux (12 mois après application ThermaCote) R = 3.08**

➢ **Hygrométrie constatée normale.**

Constat de CRETEB : « on peut formellement mettre en évidence la capacité incontestable de ce revêtement à assainir le support par la suppression de l'humidité ce qui redonne à des murs vétustes ces propriétés d'origine majorées d'un coefficient de résistance thermique de 0.50 R environ. »

Explications : ThermaCote a supprimé la majeure partie de l'hygrométrie résiduelle du mur, sachant que l'humidité est un facteur aggravant du transfert thermique. La perméance à la vapeur d'eau de ThermaCote est de **6.779** Perms dans le sens intérieur vers extérieur alors qu'elle n'est que de **3,618** Perms dans le sens extérieur vers l'intérieur. Il est donc normal que l'hygrométrie résiduelle d'un mur migre vers l'extérieur d'où un assainissement constaté entre 3 et 6 mois après l'application.

CRESTEB

Centre de recherches et d'études scientifiques sur la thermique de l'enveloppe du bâtiment

RAPPORT D'ANALYSES, MESURES & CONSTATS

N° 2014- 11281

Produit :

Peinture à base de paillettes de céramique marque ThermaCote

Etude et constats réalisés pour le compte de la Sté THERMACOTE FRANCE

1) en laboratoire : détermination de la résistance thermique du produit :

Epreuve 5/10èmes de mm de peinture Thermacote appliquée sur une feuille d'acier doux de 3mm d'un Lambda de 46 soit une résistance thermique du support de R 0.0006521

Ce qui démontre un transfert thermique proche de 100%.

Mesure après une heure de transfert:

Température extérieure -12.42°

Température de surface intérieure +13.24

Température intérieure +22.59°

Coefficient U Global 2.14

Coefficient R Global 0.47

On peut aussi en définir un lambda 0.0005/ (0.47-0.000652) = 0.00124

Lambda =0.00124

Point de rosée (condensation de surface) néant.

Si le coefficient R utilisé pour mesurer les isolants épais ici n'est pas significatif, en revanche il convient de constater le delta entre la température extérieure et la température de surface intérieure : soit un gain de **25.66°** sur une épaisseur de 5/10èmes de mm

Ce qui pourrait être considéré comme une amélioration de la température extérieure de + de 25°

2) In situ : Amélioration de la résistance thermique d'un mur (mesures in situ)

Lieu ; région d'Alençon

Année de construction : 1980 (34 ans)

Composition du mur : Enduit ciment 15mm, parpaing creux de 200mm, laine de verre 100mm Lambda 0.046 (valeur a neuf) Brique platière enduite de plâtre 50mm

Forte hygrométrie dans le mur froid ressenti.

Valeur calculée a neuf : R=2.527

Valeur mesurée avant travaux : R=1.59 (lié a la vétusté et la forte hygrométrie)

Valeur mesurée après travaux (12 mois après application) R=3.08

Hygrométrie constatée normale

Explications ; on a constaté dans le test Numéro 1 que le ThermaCote améliorait de façon considérable la température extérieure de plus ou mois 25° cela en fonction du coefficient d'émitance de 96 (Mesure aux USA)

D'autre part le thermacote a supprimé la majeure partie de l'hygrométrie résiduelle du mur, sachant que l'humidité est un facteur aggravant du transfert thermique et que la perméance a la vapeur d'eau est de 6.779 Perms dans le sens intérieur vers extérieur alors qu'elle n'est que de 3,618 Perms dans le sens extérieur vers l'intérieur il est normal que l'hygrométrie résiduelle d'un mur migre vers l'extérieur d'où un assainissement constaté ente 3 et 6 mois après l'application. Ce qui ramène le coefficient R du mur proche de ses valeurs a neuf.

3/ Tests en chaleur extrême.

Type de mesure et d'expérimentation : Application d'une couche de revêtement Thermacote sur une tôle de 3mm exposée a une souche de chauffage infrarouge.

Mesures du transfert thermique direct ci-dessous :

Température d'exposition : source rayons infrarouges	**60.18°**	**70.14°**	**80.01°**	**90.04°**
Température de la face arrière (face non exposée)	**37.41°**	**43.29°**	**50.38°**	**56.41°**
DELTA T / Gain / affaiblissement thermique	**22.77°**	**26.85°**	**29.63°**	**33.63°**
Gain ou affaiblissement thermique exprimé en pourcentage	**37.84%**	**38.28%**	**37.03%**	**37.35%**

Sur des parois exposées aux rayons solaires infrarouge, les températures de surface peuvent atteindre des niveaux extrêmes comme indiqués ci-dessus.

Cette expérimentation démontre la réduction du transfert thermique solaire dans les parois.

En conclusion : si Thermacote seul ne peut être considéré comme un isolant de type traditionnel (isolants de masse), utilisé conjointement avec un isolant dit « épais » il améliore considérablement les capacités thermiques de celui-ci.

D'autre part on peut formellement mettre en évidence la capacité incontestable de ce revêtement à assainir le support par la suppression de l'humidité ce qui redonne à des murs vétustes ces propriétés d'origine majorées d'un coefficient de résistance thermique de 0.50R environ

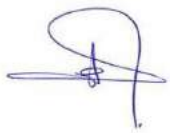
Dans les climats méditerranéens, il est un atout incontestable à la réduction des consommations d'énergie de rafraichissement.

Rapport fait le 28 Novembre 2014 mis à jour Mars 2016

Certifié sincère et véritable

Le responsable de laboratoire

Patrick DENIEUL

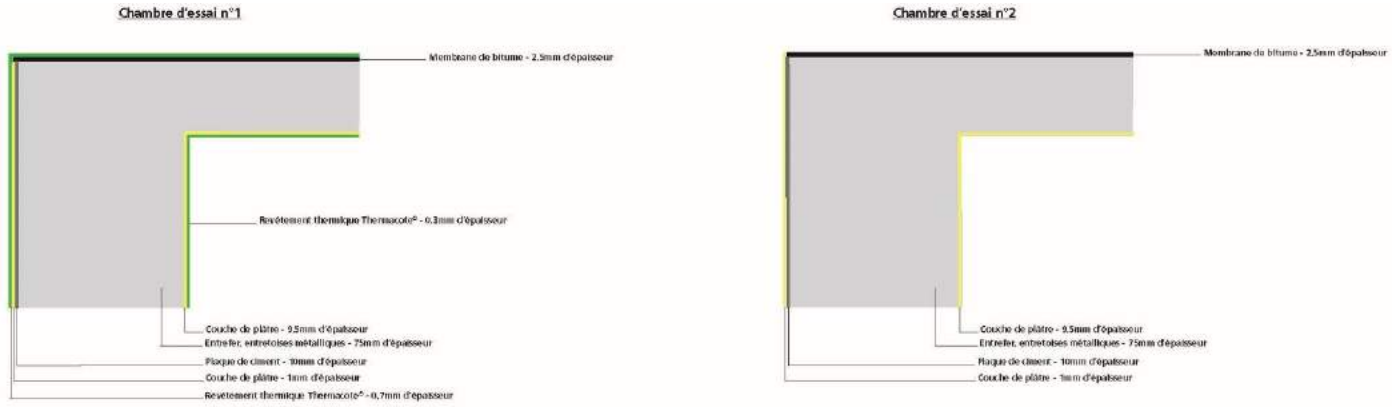


2.17. ISO 9869: Thermal insulation -- Building elements -- In-situ measurement of thermal resistance and thermal transmittance

Norme ISO 9869 : Isolation thermique -- Éléments de construction -- Mesurage in situ de la résistance thermique et du coefficient de transmission thermique

La méthode consiste à isoler de manière différente des bâtiments identiques, calibrés et à mesurer, puis comparer les consommations d'énergie nécessaires pour maintenir ces bâtiments à une température intérieure identique et constante, quelles que soient les conditions climatiques extérieures. Ce protocole de mesure, étude et test a été réalisé en Europe par le **CRES**, équivalent Grecque de **l'ADEME** en France, durant l'été 2015 dans un climat méditerranéen.

Méthode de test :



Avec ThermaCote	Sans revêtement
Climatisation= 35,9 kWh	Climatisation= 57,8 kWh
Economie de 38 %	

Mesures réalisés:

	NORME	RESULTATS
Mesurage in situ de la consommation d'énergie	EU ISO 9869	Consommation d'énergie **réduite de 38%**
Mesurage in situ de la résistance thermique : R	EU ISO 9869	**R** Valeur jusqu'à **1,87m²K/W**
Mesurage in situ du coefficient de transmission thermique : U	EU ISO 9869	**U** Valeur jusqu'à **0,53W/m²K**

CRES - Centre pour les énergies renouvelables et les économies d'énergie - Grèce

Le Centre pour les énergies renouvelables et économie d'énergie (**CRES**) est un organisme public supervisé par le ministère de l'environnement, de l'énergie et les changements climatiques. Il a une indépendance financière et administrative.

CRES est actif dans les domaines de **sources d'énergie renouvelables** (SER), **l'utilisation rationnelle de l'énergie** (URE) et des **économies d'énergie** (ES). Son objectif principal est de promouvoir les applications technologiques dans les domaines mentionnés ci-dessus à la fois **au niveau national et international**.

MEDENER est l'association méditerranéenne des agences nationales de maîtrise de l'énergie. Elle fédère les agences du pourtour méditerranéen chargées de l'efficacité énergétique et de la promotion des énergies renouvelables, deux conditions clés pour la réussite de la transition énergétique.

Convaincus de la nécessité d'une coopération renforcée pour la promotion de l'efficacité énergétique et des énergies renouvelables en région Méditerranée, **MEDENER** a été créé en 1997 à Tunis, sous la forme d'une association internationale à but non lucratif. Elle réunit aujourd'hui 12 organisations nationales des deux rives Nord et Sud de la Méditerranée.

The Centre for Renewable Energy Sources and Saving (CRES) is a government agency supervised by the Ministry of the Environment, Energy and Climate Change. It is financially and administratively independent.

CRES is active in the areas of **sources of renewable energy** (SRE), **rational use of energy** (RUE) and **energy savings** (ES). Its main goal is to promote technological applications in the areas mentioned above both at **national and international level**.

MEDENER is the Mediterranean Association of the National Agencies for Energy Conservation It brings together agencies in the Mediterranean region in charge of energy efficiency and the promotion of renewable energy sources, two key conditions for the success of the energy transition.

In 1997, due to the need for stronger cooperation for the promotion of energy efficiency and renewable energy in the Mediterranean region, **MEDENER** was created in Tunis in the form of an international non-profit organization. Today, it brings together 12 national agencies from the northern and southern banks of the Mediterranean.

ADEME-France
ADENE-Portugal
IDAE-Espagne
CRES-Grèce
ENEA-Italie
ADEREE-Maroc
ANME-Tunisie
APRUE-Algérie
ALMEE-Liban
NERC-Syrie
NERC-Jordanie
PEC-Autorité Palestinienne

2.18. Comparative analysis of surface temperature

Materials exposed in full sun in Carcassonne France February 5 at 14:30

Exposure time 1 hour – Ambient air temperature= 19.2°C

- Plastique Noir / Black plastic= 39.9°C
- Plaque de platre / Plasterboard= 31.6°C
- Panneaux de revetement de façade en résine / Plastic panels for facade =29.4°C
- Acier de 2.5mm revêtu de ThermaCote (0.5mm) / Metal sheet 2.5mm coated with ThermaCote= 24.7°C
- Isolant mince de 8mm / Thin insulation 8mm = 22.2°C

2.19. Morehouse College Roof: insulate, waterproofing and corrosion protection

Client: Morehouse College **Localization:** Atlanta, United States **Date:** 1993

Description / Initial Condition:

"It was severely corroded which resulted in water leaking, definitely jeopardizing the integrity of the interior renovation. Furthermore, we were faced with the dilemma of how to insulate said roof to eliminate the thermal heat buildup since its interior dome ceiling was friable and virtually non-accessible."

ThermaCote Solution:

"All conventional methods and techniques for correcting this problem were going to be very costly and not in the budget. We never envisioned that one simple system could solve both of these critical problems. "

Roberto A. Beauchamp, Architect, President, R.A. Beauchamp + Associates.

2.20. Workshop roof coated with ThermaCote

Description:

To helps reduce loss of energy induces by the badly isolated roof.

Solution:

Surface temperature with ThermaCote decrease to 86°F/30°C instead of 130°F/54.44°C on normal parts.

ThermaCote brought a significant decrease in energy consumption.

2.21. Shop roof coated with ThermaCote

ThermaCote®
Energy Saving/Corrosion Protection

DESIGN SOLUTION

SAFTEY SERVICE/BARBER SHOP

PROJECT

BONNER SAFETY/SPORTSCENTER
SARALAND, AL

PRODUCT

THERMACOTE-CERAMIC ROOF COATING

INSTALLER

ENERGY CONTROL INSULATION, INC.
MOBILE, AL (251)-443-8003

Energy Control Insulation used Thermacote on the roof of this structure to seal its "Envelope" thereby reducing to a minimum the loss of energy through the structure. This coating is a high performance thermal barrier, which incorporates ceramic technology to prevent the transfer of heat and cold. Thermacote repels the radiant energy of the sun and dramatically lowers the roof and attic temperatures.

In order to improve your building "sealant" quotient, reduce or eliminate thermal bridging/condensation and enhance the effectiveness of base load insulation, Contact Energy Control Insulation, Inc. today at (251) 443-8003 for complete details on how we can improve your building projects. Thermacote is the solution anywhere hot or cold presents a problem to be solved.

2.22. Roof coated with ThermaCote Kilowatt saving

(404) 923-5400

754 Beaver Ruin Road
Lilburn, Georgia 30247

May 20, 1993

Hulan Hall & Associates
3652 North Peachtree Road
Atlanta, Ga. 30341

Dear Hulan,

I thought you would be interested in some results we have calculated since having our roof coated with "Ceramic-Cover" in June of 1991.

We are averaging a 30,000 kilowatt savings annually which equates to a savings of $4113.00.

I think it is a great product for conserving energy and dollars.

Sincerely,

Robert B. Huston

2.23. Coating of the 3800 building roof with ThermaCote ceramic coating

Client: Crescent Real Estate Services, Greenway Plaza Campus **Localization:** Houston, United States **Date:** 2010

ThermaCote Solution:

Subject: Report of performance of the 3800 building roof coating

As you are familiar we completed the coating of the 3800 building roof with ThermaCote® ceramic coating. The application is 30 mils to the roof surface and the curb radius' along with the penthouse roof. After the coating a safety line was painted to mark the danger area of the perimeter.

The roof surface continues to be no more than the ambient temperature when we have measured the performance. At one point the surface temperature of a portion that was not coated reached 150˚ F while just a few feet away the surface where coated was 98˚ F.

Saturday the 21st we measured, with thermal imaging, several roofs within the campus. Comparisons are very impressive and a power point attachment will show those images. ThermaCote® shows a performance difference on the same day of 20 degrees better than any of the other surfaces. Including the "cool roof" technology applied to Building 8 where the coated portion reached 126˚ F and the walk pads not coated were over 140˚.

Thank you for the opportunity to serve and provide the performance benefits of ThermaCote® ceramic coating for Greenway Plaza.

Sincerely,

Phil Maybee

FUSION FOR GREEN

USGBC * LEED * IAQA * NAFA * EPA * ASHRAE *

A Division of The Filter Man®, LTD.

August 25, 2010

Crescent Real Estate Services
Greenway Plaza Campus
Houston, Texas

Attn: Kevin Saul
Subject: Report of performance of the 3800 building roof coating

As you are familiar we completed the coating of the 3800 building roof with ThermaCote® ceramic coating. The application is 30 mils to the roof surface and the curb radius' along with the penthouse roof. After the coating a safety line was painted to mark the danger area of the perimeter.

The roof surface continues to be no more than the ambient temperature when we have measured the performance. At one point the surface temperature of a portion that was not coated reached 150° F while just a few feet away the surface where coated was 98° F.

Saturday the 21st we measured, with thermal imaging, several roofs within the campus. Comparisons are very impressive and a power point attachment will show those images. ThermaCote® shows a performance difference on the same day of 20 degrees better than any of the other surfaces. Including the "cool roof" technology applied to Building 8 where the coated portion reached 126° F and the walk pads not coated were over 140°.

Thank you for the opportunity to serve and provide the performance benefits of ThermaCote® ceramic coating for Greenway Plaza.

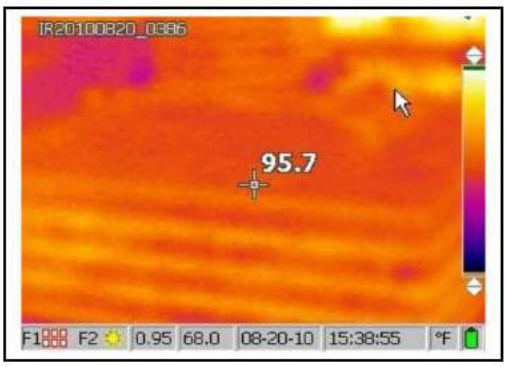
Sincerely,

Phil Maybee

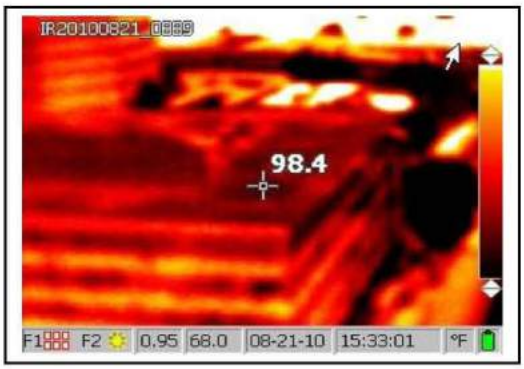
"Where Skills and Earth Friendly Products Fuse Together"
18924 East Industrial Parkway • New Caney, TX 77357
Phone: 281-429-3664 Toll Free: 800-224-7445 Fax: 281-429-9457 Toll Free Fax: 877-689-2412
WWW.FUSIONFORGREEN.COM

Saturday August 21, 2010
Ambient O/A temp 95˚ F

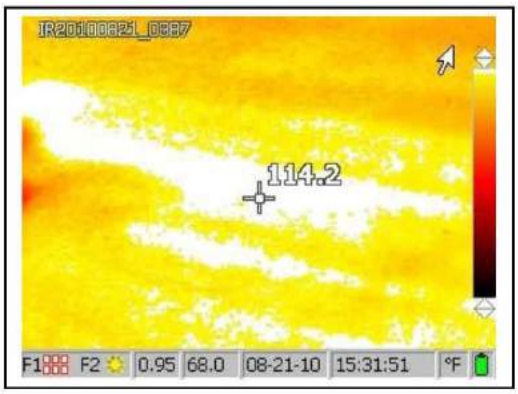
Roof surface



Metal drain cover

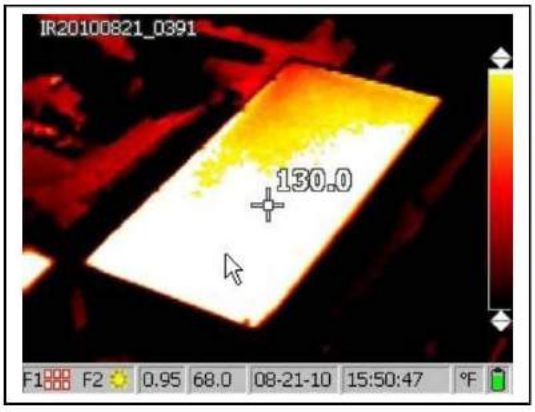


Building 4



Bldg 4 roofing has a material that is designed to be a cool roof material

Houston Club



The Houston Club has a White Roof, but shows a surface Temperature of 130^0 F

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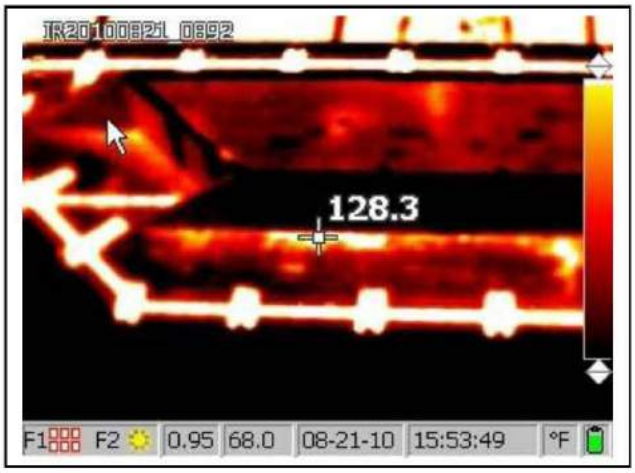
Phone: 281-429-3664 Toll Free: 800-224-7445 Fax: 281-429-9457 Toll Free Fax: 877-689-2412
WWW.FUSIONFORGREEN.COM

Bldg 8 – has cool roof material applied – the white areas in this picture are the brown sections of walk ways that are not coated with the cool roof material – they were 146^0 F plus

This shows that the material applied reflects some energy but in itself heats up - where ThermaCote® does not elevate above ambient temperature



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WWW.FUSIONFORGREEN.COM

2.24. Test report on Metallic roof with ThermaCote

Client: Mitchell Container Service Inc **Localization:** Saraland, United States **Date:** 2010

Description:

To helps reduce loss of energy induces by the badly isolated roof.

ThermaCote Solution:

Uncoated roof= 141°F/60.55°C Coaed with ThermaCote= 87°F/30.55°C

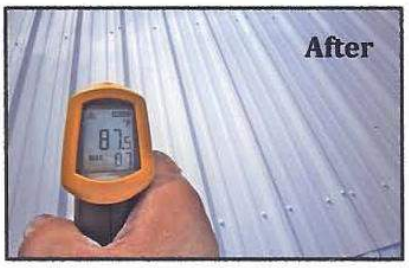
ThermaCote®
Energy Saving/Corrosion Protection

DESIGN SOLUTION
CONTAINER SERVICE

PROJECT
MITCHELL CONTAINER SERVICES, INC.
SARALAND, AL

PRODUCT
THERMACOTE

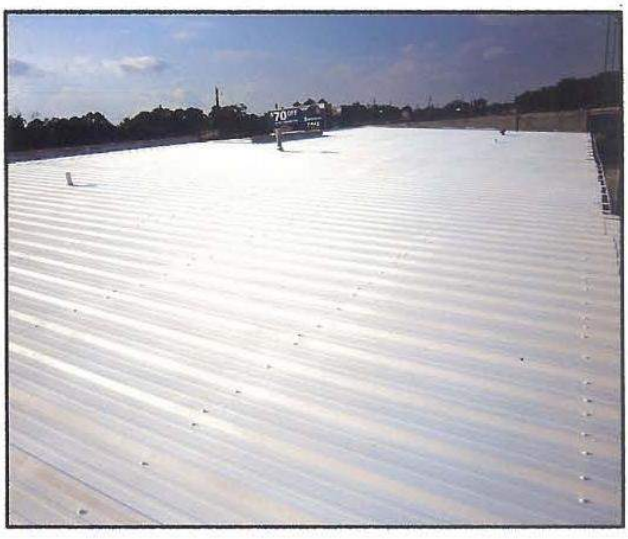
INSTALLER
ENERGY CONTROL, INC.
MOBILE, AL



Mitchell Container Services, Inc. is a company that makes available products and services, which provide containers of demonstrated integrity and quality, meeting all government regulations covering the shipment of hazardous materials, and to offer Responsible Container Management Services to surrounding areas.

Energy Control Insulation used Thermacote on the roof of this structure to seal its "Envelope" thereby reducing to a minimum the loss of energy through the structure. This coating is a high performance thermal barrier, which incorporates ceramic technology to prevent the transfer of heat and cold. Thermacote repels the radiant energy of the sun and dramatically lowers the roof and attic temperatures.

In order to improve your building "sealant" quotient, reduce or eliminate thermal bridging/condensation and enhance the effectiveness of base load insulation, **Contact Energy Control Insulation, Inc. today at (251) 443-8003 for complete details on how we can improve your building projects.** Thermacote is the solution anywhere hot or cold presents a problem to be solved.



2.25. Report of Architect ARCHEE Paris

Jérôme BOY Architecte ENSAIS
ARCHEE - 3 Sente de l'aigle 93260 Les lilas
Phone : 01 48 38 10 31
Fax : 01 48 38 06 02
Mail : agence@archee.org

Nous avons fait mettre en œuvre le produit Thermacote, selon votre prescription, sur les opérations suivantes :
1-Ravalement et parois intérieures agence d'architectes Archée aux Lilas - 2014
2-Ravalement, dans le cadre de l'extension d'une maison individuelle aux Lilas (partie neuve et partie ancienne)- 2014
3-Ravalement du bâtiment B de la résidence étudiante les Lauréades à paris XV-2015
4-Ravalement d'un Hôtel particulier en site protégé à Paris XVIII-2016

Ce produit nous a donné pleine satisfaction dans chacune de ces opérations, tant sur le plan esthétique qualité de couleur, velouté et grain de finition) que sur le plan des performances thermiques attendues. Les opérations 2 et 3 ont fait l'objet d'un diagnostic thermique par un bureau d'études thermique, qui ont permis de constater l'amélioration des performances thermiques du bâtiment, notamment par la suppression des ponts thermiques.

We have implemented the Thermacote product, according to your prescription, on the following operations:
1-Renovation and interior walls architects agency Archée aux Lilas - 2014
2-Ravalement, in the framework of the extension of a detached house in Les Lilas (new and old part) - 2014
3-Repair of building B of the student residence Les Lauréades in Paris XV-2015
4-Restoration of a private mansion in a protected site in Paris XVIII-2016

This product gave us full satisfaction in each of these operations, both in terms of aesthetic quality of color, velvety and finishing grain) and in terms of expected thermal performance. Operations 2 and 3 were subjected to a thermal diagnosis by a thermal engineering firm, which made it possible to observe the improvement in the thermal performance of the building, in particular by eliminating thermal bridges.

M. Jean Grillot
Agent Thermacote

Objet : application Thermacote

Monsieur,

Nous avons fait mettre en œuvre le produit Thermacote, selon votre prescription, sur les opérations suivantes :

1-Ravalement et parois intérieures agence d'architectes Archée aux Lilas - 2014
2-Ravalement, dans le cadre de l'extension d'une maison individuelle aux Lilas (partie neuve et partie ancienne)- 2014
3-Ravalement du bâtiment B de la résidence étudiante les Lauréades à paris XV-2015
4-Ravalement d'un Hôtel particulier en site protégé à Paris XVIII-2016

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Veuillez agréer, Monsieur, l'expression de nos salutations les plus distinguées.

Les Lilas, le 28 septembre 2016

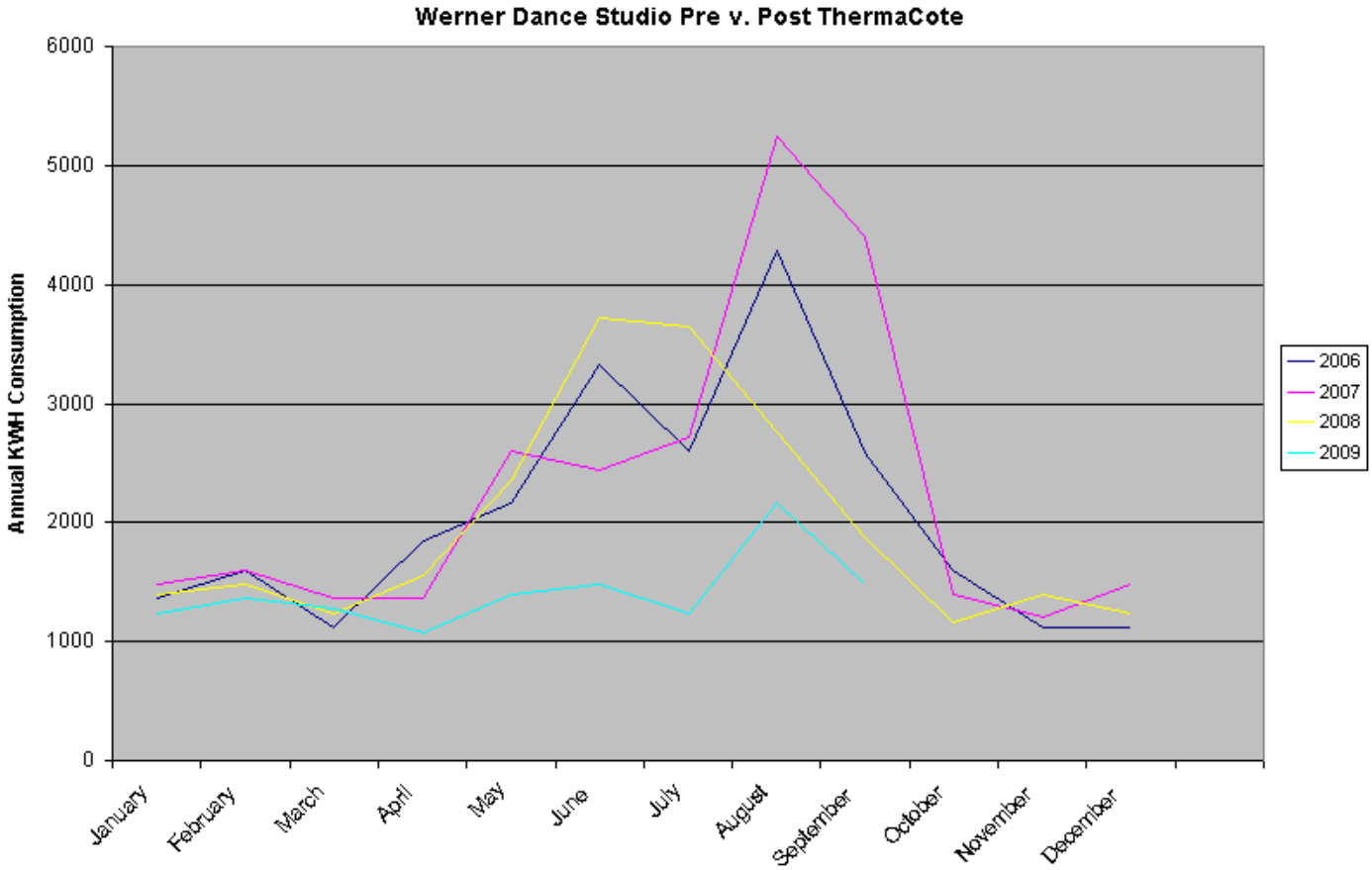
Jérôme BOY
Architecte ENSAIS

3 Sente de l'Aigle
93260 Les Lilas
Tél : 01 48 38 10 31
Fax : 01 48 38 06 02
agence@archee.org

2.26. Report of Energy consumption saving with ThermaCote

The complete building structure was coated with ThermaCote: wall and roof

The energy consumption of the building decreased around 40% for the year 2009, see details:



2.27. ThermaCote versus Dow Chemicals' R-20 Styrofoam

Made by Applied Technical Services | ATS http://www.atslab.com/

Applied Techical Services stands as one of North America's leading engineering firms with extensive testing and inspection capabilities.

"Temperatures in the house coated with 'ThermaCote' were on average 7.8 degrees cooler than the temperatures in the house filled with the 'Dow Chemicals' R-20 Styrofoam ." Applied Technical Services, Incorporated. Testing results: Maximum Air Temperature Achieved Adjunct to a House 170 F degrees."

3. SPECIALITY

3.1. ThermaCote on Passenger Boarding at Hartsfield-Jackson International Airport

Client: Hartsfield-Jackson Atlanta Airport **Localization:** Atlanta, United States **Date:** 2012/2013

Description / Initial Condition:

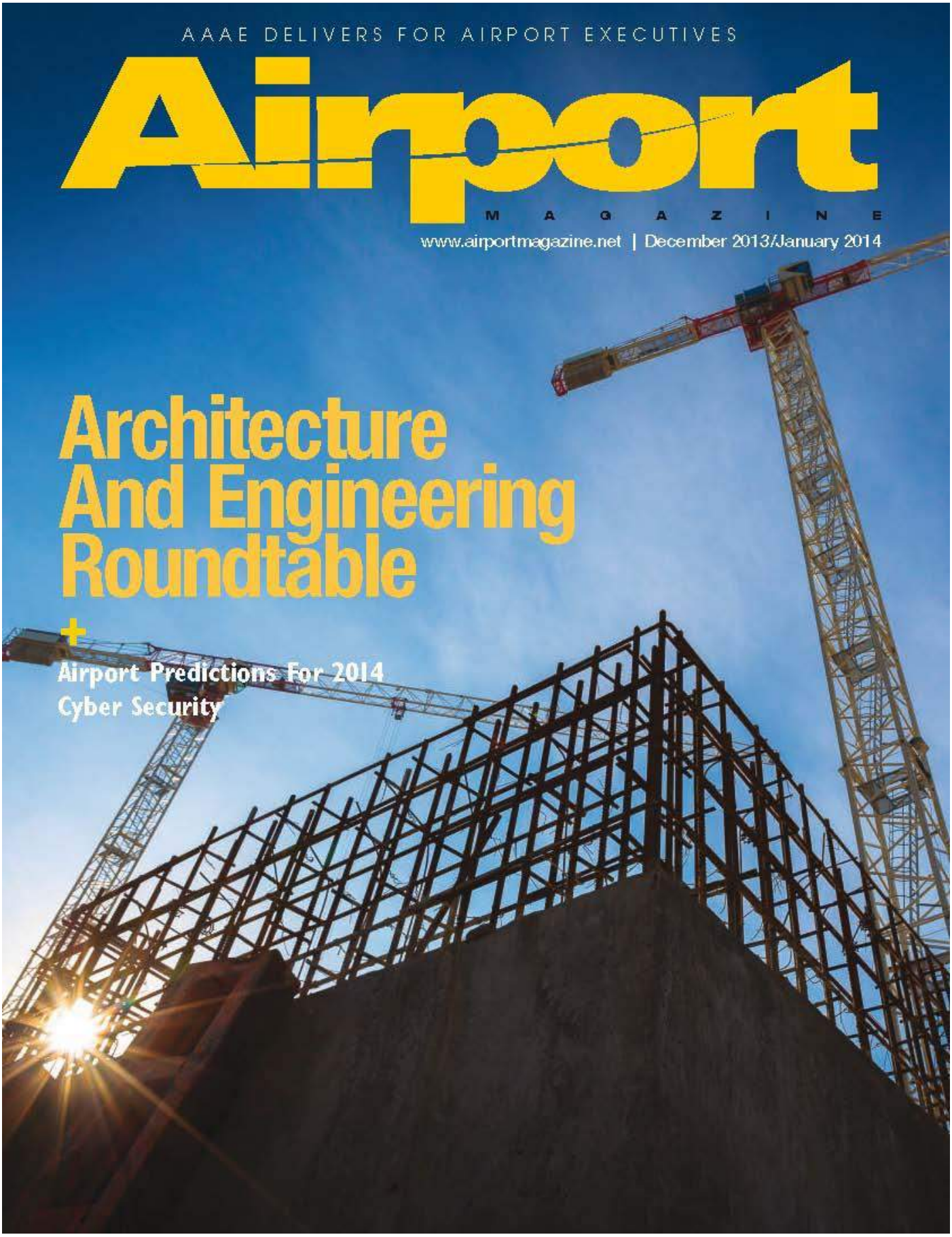
Passenger boarding bridges, air bridges, skyways and jet ways refer to the enclosed, adjustable bridges that provide direct passenger access between the terminal and aircraft. The bridge is mechanically driven, and able to pivot, telescope, raise and lower in order to accommodate a range of aircraft.

The boarding bridges are not directly air conditioned. Mounted under the bridge is an air handling unit, which provides pre-conditioned air to the aircraft while it is parked at the gate. During boarding and disembarking, air is exchanged between both the aircraft and the bridge, and the concourse and the bridge. As a result, conditioning the air in the bridges is inefficient and uncomfortable.

ThermaCote Solution:

ThermaCote in reducing the heat load on passengers boarding bridges which was conducted at Hartsfield-Jackson Atlanta Airport from July 12 to August 15 2013. Passenger boarding bridges, air bridges, skyways and jet ways are not directly air conditioned. During boarding and disembarking, air is exchanged between both the aircraft and the bridge, and conditioning the air in the bridges is inefficient and uncomfortable. ThermaCote was applied to the boarding bridge, reducing heat gain, lowering interior temperature, and providing energy savings.

- Temperatures in the bridge coated with ThermaCote was consistently at least 2-3°F (~1.5°C) lower than in the uncoated bridge. The temperature difference appears around 10am and lasts through the night.
- The coated bridge was cooler at arrival, and continued to get cooler until departure. The coated bridge was consistently closer to human comfort levels.
- The coating appeared to reduced heat gain by an average of 69.5 btu/h (0.02 kW).
- The energy savings from the coated bridge were ~450 BTUs (.13kWh) a day. Those savings are split between the concourse and the preconditioned air handlers attached to the bridge.
- Since the product works in part by reflecting solar radiation, the savings do not necessarily apply to cold weather.



ASSETMANAGEMENT

supplemental cooling unit (such as a rooftop cooling unit), which is used exclusively for lowering the passenger boarding bridge temperature.

However, 96 percent of passenger boarding bridges at Hartsfield-Jackson International, including the bridges evaluated in this study, are not configured with such bridge-dedicated cooling systems.

When the doors to the airplane and terminal are open as passengers board and disembark, pre-conditioned air from the plane and air from the terminal circulates within the bridge but does not cool the structure to the extent that is possible in the terminal itself or in the aircraft. In addition, energy use increases when hot air escapes into the terminal.

Heat Reduction Coating

In 2013, ThermaCote Inc. of Lawrenceville, Ga., which manufactures an environmentally friendly, water-based, spray-applied thermal barrier ceramic coating, offered the airport a chance to test its thermal barrier product, ThermaCote®. ATL's Asset Management and Sustainability Department agreed to use this opportunity to study the effectiveness of this product in reducing solar heat gain in the summer. Materials and labor costs for the test project were $9,990.

Local contractors applied ThermaCote® to all the surfaces outside of Gate E34. Nearby Gate, E36, was left untreated as a control unit. Both of these bridges receive direct sunlight all day.

Dry bulb thermometers at three points inside each bridge and one on the rooftop recorded temperature readings at five-minute intervals for 35 days from July 12 to Aug. 15, 2013. (See figure 1) A study team from the International Knowledge and Research Center for Green Building at

ASSETMANAGEMENT

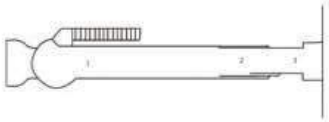


Figure 1

Southern Polytechnic State University in Marietta, Ga., analyzed the data to determine if the applied thermal barrier reduced temperatures within the coated bridge compared to the uncoated bridge.

During the sample period, gates E34 and E36 experienced nearly identical numbers of arrivals and departures and serviced relatively the same number of aircraft. Flights typically took place from 7 a.m. to

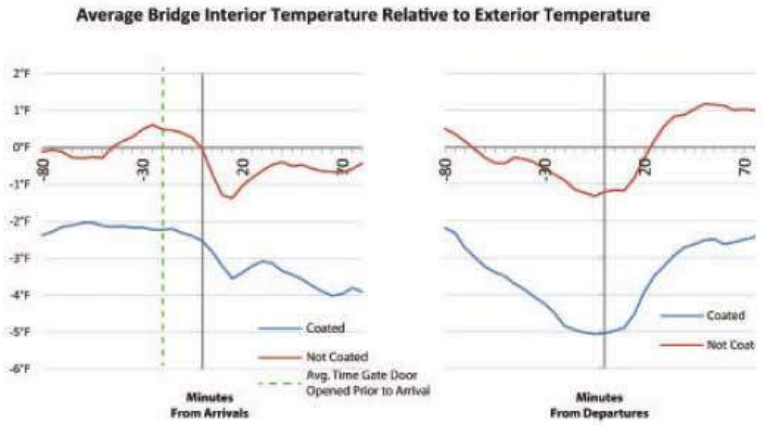


Figure 2

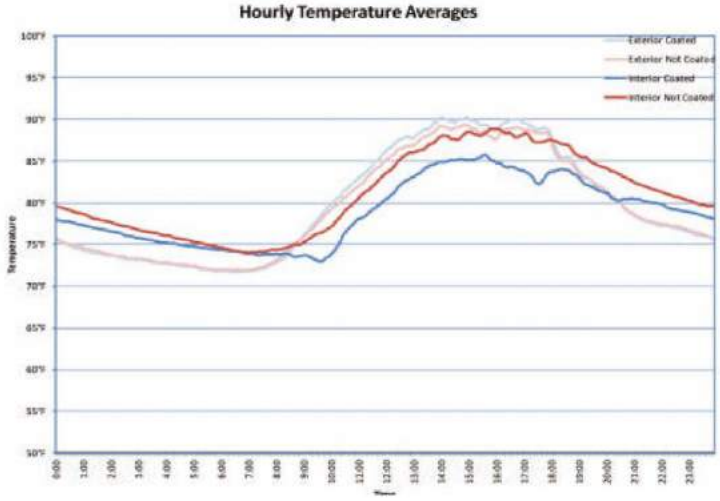


Figure 3

1 a.m., and the average gate time per flight was 110 minutes. Because the length between arrivals and departures varies, the study looked at temperatures before, during, and after each arrival and departure (see Figure 2).

As the graphs show, temperatures in both bridges dropped quickly in the 10 minutes after arrival, while passengers were disembarking and doors to the concourse were open. However, when the doors were closed, temperatures in the non-coated bridge rose back to previous levels, while in the bridge coated with ThermaCote®, temperatures continued to decline until boarding — 20 to 30 minutes before departure.

Dry bulb thermometer inside the bridge

Energy Savings

Temperatures in the bridge coated with ThermaCote® were consistently at least 2° to 3° (1.3°C) lower than in the uncoated bridge, beginning around 10 a.m. and continuing through the night The average temperature inside the uncoated bridge was 1.4° (0.8°C) higher than the outside temperature. The average temperature inside the coated bridge was 0.9° (0.5°C) lower than the outside temperature (see Figure 3).

Since the rate of air conditioning at the gates was unknown, the study calculated the heat load reduction from the difference in temperature change under equal AC power. Calculations revealed a heat load reduction of 69.5 BTU/h (0.02 kWh).

Considering the number of flights each day and the average turnaround time, the total energy savings for Gate E34 would be about 450 BTUs (0.13 kWh) per day, split between the concourse and the pre-conditioned air unit. Although not all bridges receive the same amount of direct sunlight, the thermal barrier could help lower interior temperatures and provide energy savings.

Potential Next Steps

This study was limited in its scope and time span. The airport needs to investigate further the effectiveness of a thermal barrier in reducing temperatures in the passenger bridges. Before broader implementation, the coating would have to be tested at more gates, in different locations, and over a longer period of time. While further testing is essential, the results of this limited preliminary experiment are intriguing. The airport is open to new ways to save energy and reduce costs. With further testing and optimization, a process like this one could provide one more way to help us reach our sustainability goals by 2020. The potential benefits go beyond energy savings. Charles Marshall, utilities manager-asset management and sustainability at Hartsfield-Jackson, stated, "This thermal coating technology appears to provide consistent lowering of heat gain within the passenger boarding bridges, which adds two benefits: customer comfort while using the passenger boarding bridges, and a decrease in cooling load as gate doors are opened for passenger bridge use." All of this translates into savings, considering that more than 200 boarding bridges are used each day during peak cooling periods.

Several factors should be considered in any further testing or application of the coating. Thermal ceramic coating is an effective and environmentally friendly way to reduce solar heat gain. However, the application process should not occur when humidity levels are higher than 70 percent, as this drastically increases drying and curing time, as well as dry fall. In addition, leaving the bottom of the bridges uncoated should not have a significant impact on the cooling load due to the shade and height off the ground.

Of course, safety considerations are paramount when considering any change to airport equipment or facilities. Pilots were interviewed to determine whether the coated bridge presented any potential challenges to the cockpit. According to Delta pilot Sandy Brown, "There were no issues with glare at passenger boarding bridge Gate E34. It's only slightly brighter in color than the rest of them. There's no problem for us as pilots dealing with it."

Michael Cheyne, A.A.E., is director of asset management and sustainability at Hartsfield-Jackson Atlanta International. He may be reached at michael.cheyne@atlanta-airport.com. Tanita Toatong is the airport's facility manager and LEED green associate. She may be reached at tanita.toatong@atlanta-airport.com.

October 2013

Hartsfield-Jackson International Airport

ThermaCote Paint Study

INTERNATIONAL KNOWLEDGE AND RESEARCH CENTER FOR GREEN BUILDING

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Hartsfield-Jackson Internation Airport: Thermacote Paint Study

International Knowledge and Research Center for Green Building

By: Ian Elmore

Introduction:

This report concerns an experiment on the effectiveness of ThermaCote in reducing the heat load on passengers boarding bridges which was conducted at Hartsfield-Jackson Atlanta Airport from July 12 to August 15 2013.

Existing Conditions

Passenger boarding bridges, air bridges, skyways and jet ways refer to the enclosed, adjustable bridges that provide direct passenger access between the terminal and aircraft. The bridge is mechanically driven, and able to pivot, telescope, raise and lower in order to accommodate a range of aircraft.

The boarding bridges are not directly air conditioned. Mounted under the bridge is an air handling unit, which provides pre-conditioned air to the aircraft while it is parked at the gate. During boarding and disembarking, air is exchanged between both the aircraft and the bridge, and the concourse and the bridge. As a result, conditioning the air in the bridges is inefficient and uncomfortable.

ThermaCote

ThermaCote is described by its manufacturer as "a single component spray applied thermal barrier coating encompassed of ceramics and acrylics (water based)." It claims to increase the R value of assemblies by reducing thermal bridging, as well as reducing solar and radiant heat gain. Applied to the boarding bridge, it should reduce heat gain, lower interior temperature, and provide energy savings.

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Procedure:

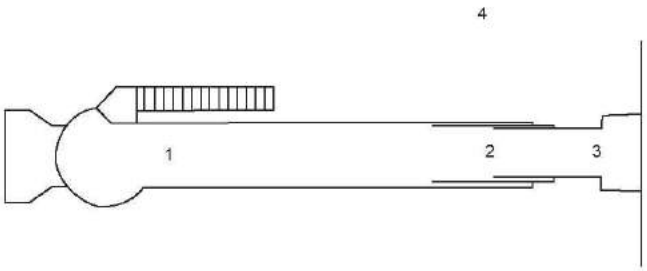

Figure 1

Two passenger boarding bridges were tested for a period of five weeks (July 12 to August 15). The bridge at gate E34 was treated with a 20 Mil (.5 mm) coat of ceramic thermal barrier (see Appendix A). The bridge at gate E36 was left untreated. Dry bulb temperature readings were taken at five minute increments at three points inside of each bridge, as well at outside of each bridge (see Figure 1, Appendix B).

Results

Flights

During the sample period, the treated bridge experienced 125 arrivals and 114 departures, with a total of 130 unique flights and 103 flights with both arrival and departure times given. The uncoated bridge experienced 121 arrivals and 108 departures, with a total of 124 unique flights and 102 flights with both arrival and departure times given. There was an average of 3.7 and 3.5 aircraft in each gate respectively. Flights ranged from 7 am to 1 am. For aircraft with both arrival and departure times given, the average time in gate was 110 minutes, while the median was 79 minutes.

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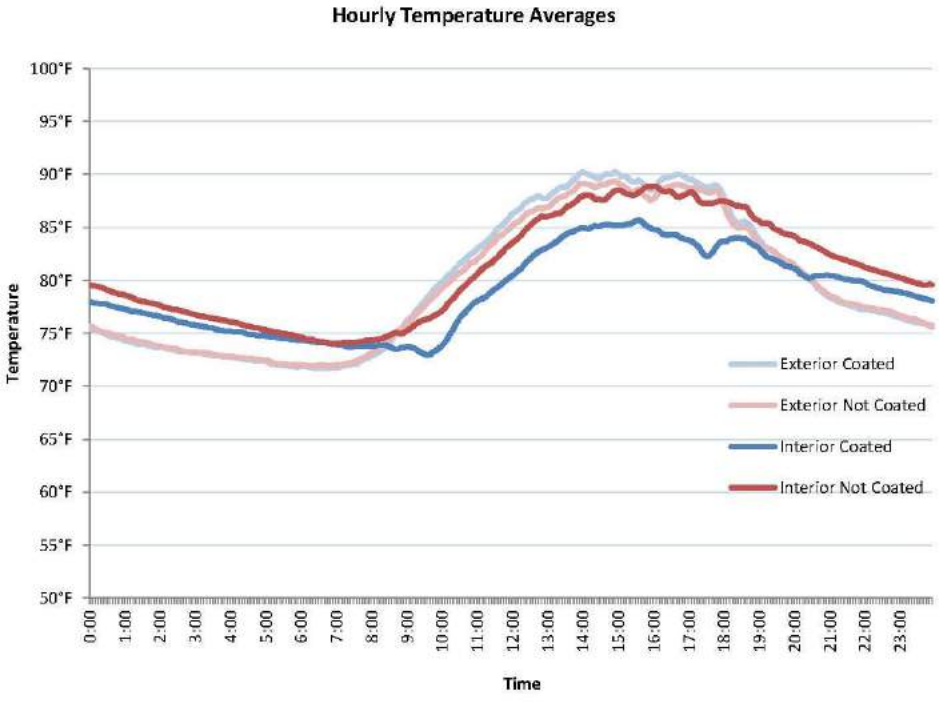
Temperature

During the sample period, outside temperatures ranged from 65°F (18.5° C) to 105° F (40.5° C). Outside temperatures at the treatment terminal were on average 0.23° F (.13° C) higher than at the control terminal. The average daily high was 95° F (35° C) while the average low was 71°F (21.5° C).



(Figure 2)

On average for the entire testing period, the interior temperature of the coated bridge was 2.3° F (1.3° C) lower than the uncoated bridge. While the average temperature inside of the uncoated bridge was 1.4° F (0.8° C) higher than the outside temperature, the temperature inside of the coated bridge was 0.9°F (0.5°C) lower than the outside temperature (see Figure 2)

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Average Bridge Interior Temperature Relative to Exterior Temperature

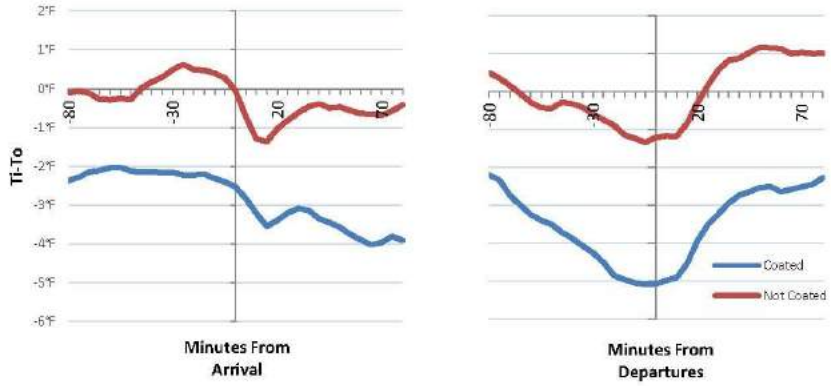

Figure 3

Since the length between arrivals and departures vary, looking at the temperatures before, during, and after each arrival and departure (figure 3) reveals the trends during these times (these charts are presented with greater detail in Appendix C).

As the graphs show, temperatures drop quickly in the 10 minutes after arrival, while passengers are disembarking the aircraft and the doors to the concourse are opened. While the non-coated bridge sees temperatures rise back to previous levels, the bridge coated with ThermaCote continues to decline in temperature until boarding (20-30 minutes before departure), when both temperatures drop again.

Heat Gain/Energy Savings

Without knowing the rate of air conditioning at either gate, we can calculate the heat load reduction from the difference in temperature change under equal AC power. For each flight with both arrival and departure time given, we can use the equation:

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$$\frac{Temp_D - Temp_A}{Time_D - Time_A} \times M_{air} \times C_{air} = \frac{\Delta Energy}{\Delta Time}$$

Where

$Temp_d$ = Average interior temperature at departure

$Temp_a$ = Average interior temperature at arrival

$Time_d$ = Time of departure

$Time_a$ = Time of departure

M_{air} = The estimated mass of air in the bridge. As the bridge can vary in length from approximately 50 to 100 ft. in length (17.5-33.5 m), the volume of air at any given time must be estimated. For the purpose of calculation, the interior air volume will be assumed to average 5040 ft^3 (142.7 m^3), and the density of air will be averaged at 0.07 lb/ft^3 (1.15 kg/m^3).

C_{air} = The specific heat of air is 1.006 kJ/kg

This gives an average net heat gain of -142.7btu/h (-0.04kW) for the treated terminal, and -73.2 btu/h (-0.02kW) at the uncoated terminal. Thus, the coated bridge experienced a heat load reduction of 69.5 btu/h (0.02 kW).

Given the number of flights a day and the average turnaround time, the total energy savings would be around 450 BTUs (.13 kWh) per day. This average includes flights from 7AM to 1AM and represents the average energy savings throughout the day. These savings would be split between the concourse and the preconditioned air coming from the plane.

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Conclusions

- Temperatures in the bridge coated with TermaCote was consistently at least 2-3°F (~1.5°C) lower than in the uncoated bridge. The temperature difference appears around 10am and lasts through the night.
- The coated bridge was cooler at arrival, and continued to get cooler until departure. The coated bridge was consistently closer to human comfort levels.
- The coating appeared to reduced heat gain by an average of 69.5 btu/h (0.02 kW).
- The energy savings from the coated bridge were ~450 BTUs (.13kWh) a day. Those savings are split between the concourse and the preconditioned air handlers attached to the bridge.
- Since the product works in part by reflecting solar radiation, the savings do not necessarily apply to cold weather.

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APPENDIX A:

ESTES SERVICES
3091 Irodesport Blvd
Atlanta, GA 30354
404-361-6560
www.estes.com

Lessons Learned during the application of ThermaCote on Hartsfield-Jackson Bridge E-34:

Background: Estes Services was contracted (PO 51305833) to coat a bridge of choice with 20 mils of a ceramic thermal barrier product ThermaCote. The subject of the study is to determine the effectiveness of the product in lowering the heat/cooling load on a bridge effectively lowering the required energy to heat/cool the bridge.

Summary:

1) Access badge process is cumbersome and time consuming. But once completed it works well.
2) There are many stakeholders in regards to scheduling
3) Work time schedules are open to change, due to air line delays
4) Characteristics of the product noticed while working on this project:
    a. Dry drop length increased
    b. Total dry time increased

    We feel these increases are due to the high humidity during the schedule.
5) The normal terminal lighting is insufficient on some areas of the bridge
6) The coating should stop at the rubber boot from the bridge to the terminal
7) All wiring should be lowered on the bottom side to ensure an even coating
8) The round about on either end should be allowed to dry completely before moving, requiring two shifts to cover
9) All auxiliary attachments will have to be covered before coating, handrail, bag slide, ect.
10) The extending sections clearance seal rub marks seem to be more visible on the coating than the previous painted surface

If a project to coat other bridges were to move forward none of the above mentioned would be a show stopper for the contractor coating the bridge. More time would have to be allotted per bridge than normal for drying, but if schedules worked out it should not delay the project significantly. It has also been discussed not to coat the under side of the bridge, this is an option and in our opinion would not have significant effect on the heat/cooling load due to the shade and height off the ground.

Materials used:

Primer	Kilz White Primer exterior oil based
ThermaCote	TCote original
Beige	SW7512
White	Behr Ultra Pure White 4850

Thank you for the opportunity to be a part of this study.

Dan Bramblett
Estes Services
678-300-3623

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APPENDIX B: Photos of Installation

Left Outer Side Entrance

Left Outer Side

Inside View From Entrance

Bridge Data Logger

Typical Data Logger installation

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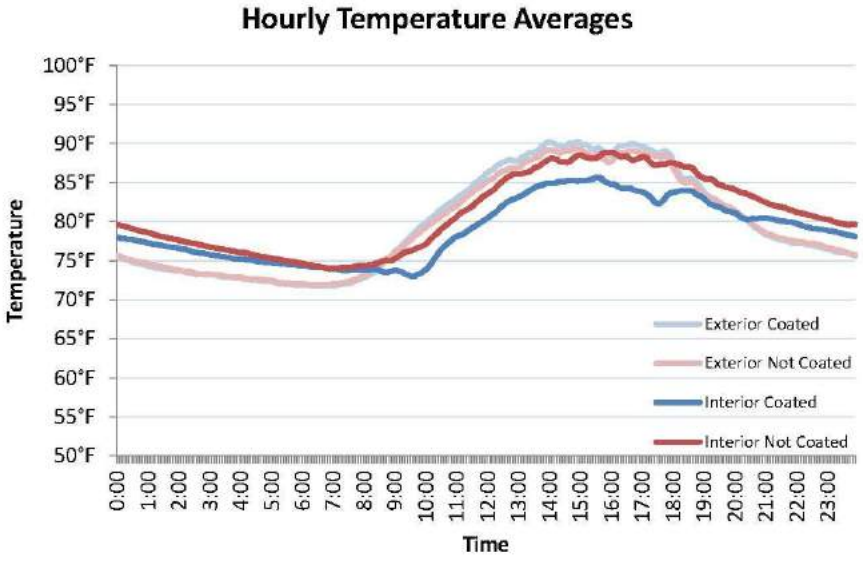
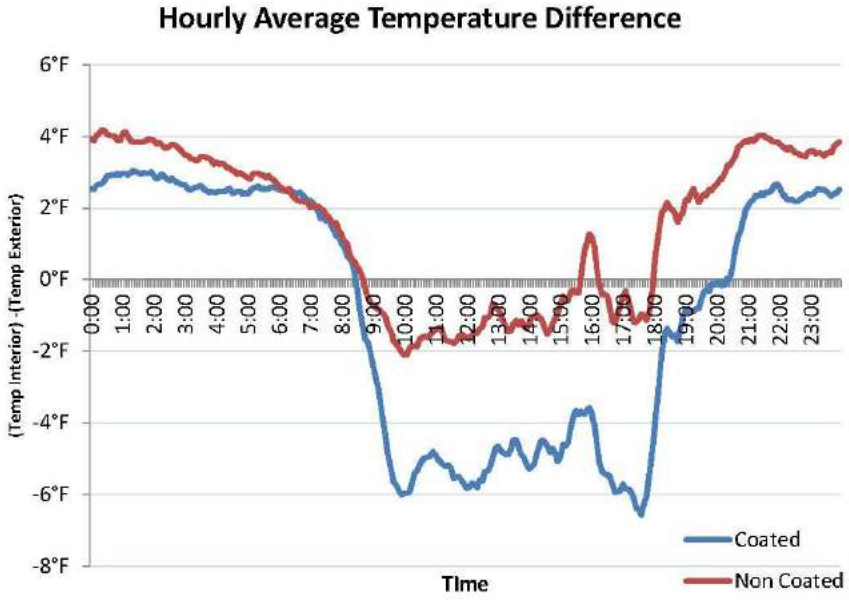
APPENDIX C: Graphs





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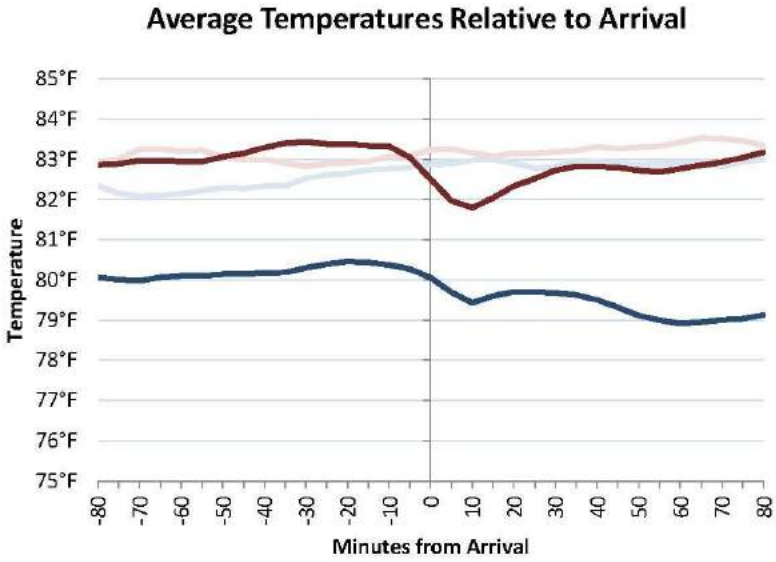
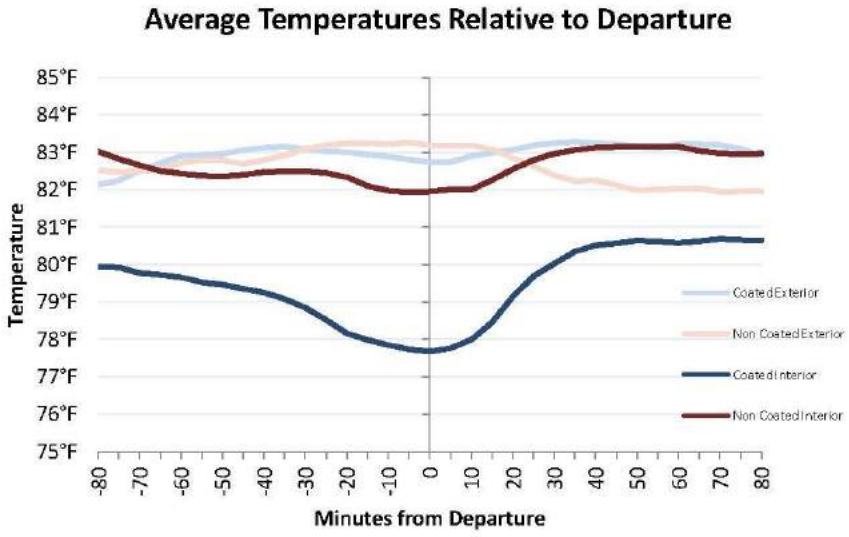
APPENDIX C: Graphs





3.2. Motor Home roof insulated with ThermaCote

Client: Crown RV Center **Localization:** Conyers, Georgia, United States **Date:** 2010

Description / Initial Condition:

Crown RV is a family owned and operated dealership with over forty years of experience serving the Recreational Vehicle public throughout the South East.

Motor Home roof insulated with ThermaCote

ThermaCote Solution:

"I've been monitoring the temperatures inside on my motor home for the last several days. The result have been more than exceptional.

I have no doubt that ThermaCote is keeping the heat off the roof, ThermaCote applications will provide my customers a more comfortable Recreational Vehicle and save them money."

Temperature reading with the motor home and all vents completely closed up and **no AC Running**.

	15/07/2010		16/07/2010		17/07/2010		18/07/2010	
Degrees	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius
Outside	103	39,44	99	37,22	102	38,89	95	35
inside	89	31,67	86	30	92	33,33	88	31,11
Temperature difference	14	7,77	13	7,22	10	5,56	7	3,89

2102 Iris Drive SW
Conyers, Georgia 30094 770-483-5057 Fax 770-483-1836 www.crownrv.com

Sam, August 4, 2010

I've been monitoring the temperatures inside on my motor home for the last several days. The results have been more than exceptional. With the ambient temperatures being as high as they've been these past few days, I have no doubt that ThermaCote® applications will provide my customers a more comfortable RV and save them money. Since ThermaCote® was applied on my Motor Home in March, I have periodically inspected the application itself and am happy to report the ThermaCote® is holding tough with absolutely no issues.

NOTE: The Following Temperature Readings were taken on 4 consecutive days using the Motor Home's Digital Thermometer which measures both ambient and interior temperatures. These readings were taken with the motor home and all vents completely closed up and no AC running.

07-15-10
7:16 PM
Outside Temperature: 103 degrees
Inside Temperature: 89 degrees

07-16-10
9:30 AM
Outside Temperature: 92 degrees
Inside Temperature: 88 degrees

6:30 PM
Outside Temperature: 99 degrees
Inside Temperature: 86 degrees

07-17-10
5:30 PM
Outside Temperature: 102 degrees
Inside Temperature: 92 degrees

07-18-10
1:00 PM
Outside Temperature: 95 degrees
Inside Temperature: 88 degrees

I have no doubt that ThermaCote® is keeping the heat off the roof and making my Motor Home much more comfortable. When I'm running my AC it seems not to be working as hard and even cycling. I am always careful when offering aftermarket products to my customers, but I am so impressed with the results I am personally getting that my intentions are to offer ThermaCote® to all my service customers whether they're out to repair or replace their RVs top or even just as a comfort option.

We are taking two of the grandkids to Dollywood and I will keep logging temperature readings. You have a good time in Puerto Rico and keep spreading the word about ThermaCote®.

See you soon,
Earl King, President
Crown RV
Conyers, GA

3.3. El Toro-Clute Unit condenser coil and cabinet El Toro Restaurant

Client: El–Toro Mexican Restaurant **Localization:** Texas, United States **Date:** 2013

Description / Initial Condition:

A KWH data logger was placed on the unit 2 weeks prior to starting the project. At the 2 week point, the unit condenser coil and cabinet on the until were first cleaned. The condenser coil was coated with MicroGuard AD 35 siloxane coating to prevent corrosion and enhance energy efficiency. The exterior cabinet was coated with ThermaCote ceramic coating to protect against corrosion and to provide a radiant barrier against solar heat gain, which reduces load and energy consumption.

ThermaCote Solution:

Exterior cabinet temperature was reduced from 135°F/57.22°C to 92°F/33.33°C. KWH data logger continued to collect data for 2 weeks after. Implementation of the coating project on all of the units on the roof had a substantial positive impact on operating costs and the overall bottom line. Savings were achieved through energy consumption KWH, peak demand KW, reduced maintenance cost, reduced mean time to failure, and reduced capital cost replacement budget.

Life cycle extension 25 to 50%

Reduced maintenance cost, time, mean time to failure

Energy Consumption reduced by 24%

EPS Energy Performance Solutions

EL TORO Restaurant - Clute, TX.

Energy Efficiency Case Study Summary

EPS (Energy Performance Solutions) based in Houston, TX, approached the management team of El Toro to discuss an innovative new approach combining best results of two products, MicroGuard and ThermaCote, into a complete efficiency and protection package. This approach would allow El Toro to achieve efficiency and sustainability in a one-time solution that requires no additional maintenance.

Equipment Selected for Data Trial - 15 ton High Efficiency American Standard rooftop package - 3 months old

Data Trial Parameters:

- Placed KWH data loggers and recorded KWH consumption for two weeks
- Cleaned and coated condenser coils with MicroGuard AD 35, coated cabinet with ThermaCote energy star ceramic coating
- Continued to record KWH consumption for an additional two weeks
- Collected data at the 4 week mark and compared like degree days

Results

- KWH energy consumption was reduced 24%

Total project results

- Customer immediately issued PO to have all 7 units coated
- 45 days after project completion, customer received their power bill and compared June of 2012 against June of 2013.
  - June 2012 power cost $8,700.00
  - June 2013 power cost $6,900.00
  - Total power bill reduction of 20%
  - HVAC power reduction 40%, HVAC accounts for 50% of total power bill

Customer has issued PO for the next building and plans to systematically address all of their sites.

Russell McNeice
russell@energyps.com
off. 713-931-2735 cell. 910-508-7277
fax. 888-315-5116

www.energyps.com

El Toro – Clute
Energy Efficiency Trial

Before

After

Project Implementation

- A KWH data logger was placed on the unit 2 weeks prior to starting the project.
- At the 2 week point, the unit condenser coil and cabinet were cleaned.
- The condenser coil was coated with MicroGuard AD 35 siloxane coating to prevent corrosion and enhance energy efficiency.
- The exterior cabinet was coated with an Energy Star Ceramic coating to protect against corrosion and to provide a radiant barrier against solar heat gain, which reduces load and energy consumption . Exterior cabinet temperature was reduced from 135*F to 92*F.
- KWH data logger continued to collect data for 2 weeks after.

Data Logging Equipment

(Records KWH energy usage)

El Toro Data Logger Sheet

Date	Max T	Mean T	Min T	Weather	KWH	comparable days		% reduction
4/29/2013	79	71.7	64.4	prt cloudy	229	5/1/2013	242	24%
4/30/2013	79	71.5	64	prt cloudy	233	5/28/2013	184	
5/1/2013	81	72.5	64	sunny	242			
5/2/2013	79	65	51.1	cloudy	210	5/9/2013	247	26%
5/3/2013	68	56	44.1	rain	198	5/27/2013	182	
5/4/2013	78.1	59	39.9	rain	178			
5/5/2013	73.9	61.4	48.9	cloudy	181	5/11/2013	239	24%
5/6/2013	79	61.5	44.1	am fog	179	5/15/2013	183	
5/7/2013	82	67	52	sunny	190			
5/8/2013	81	69	57	sunny	211	Total average		24%
5/9/2013	80.1	75.6	71.1	sunny	247			
5/10/2013	80.1	72.2	64.4	sunny	235			
5/11/2013	84	73.5	63	am fog	239			
5/12/2013	81	71	61	am fog	234			
5/13/2013	79	70.5	61	sunny	244			
5/14/2013	80.6	66.8	53.1	am fog	189			
5/15/2013	80.6	73.3	66	sunny	186			
5/16/2013	82	76	70	sunny	229			
5/17/2013	84	78.5	73	sunny	237			
5/18/2013	88	81.5	75	am fog	241			
5/19/2013	86	80	73.9	am fog	239			
5/20/2013	84.9	80.4	75.9	sunny	246			
5/21/2013	86	81	75.9	sunny	249			
5/22/2013	89.1	82	75	cloudy	238			
5/23/2013	87.1	79.1	71.1	sunny	248			
5/24/2013	88	81	73.9	am fog	237			
5/25/2013	86	79.5	73	sunny	241			
5/26/2013	88	78	73	prt cloudy	229			
5/27/2013	83	75	71	sunny	182			
5/28/2013	84	73	69	sunny	184			

Summary of Project Results

- Corrosion protection for coil and exterior cabinet, extends life of unit and avoids capital cost replacement. Life cycle extension 25 to 50%
- Reduced coil fouling and reduced maintenance time for cleaning coil.
- Reduced peak demand
- Energy consumption (KWH) reduced on a 3 month old unit by 24%
- Simple ROI for a single unit 17 months. Simple ROI for a complete roof top 13 months (20% discount applied).
- IRR – 91.46% or 91.46% interest earned on the investment
- NPV – Net Present value of project $32,277

Project Potential

Implementation of the coating project on all of the units on this roof and the other facilities within the customer's portfolio, will have a substantial positive impact on their operating cost and overall bottom line.

Savings will be achieved in:

- Energy consumption KWH
- Peak demand KW
- Reduced maintenance cost
- Reduced mean time to failure
- Reduced capital cost replacement budget

3.4. Motor sports insulation and protection to protect driver and increase performance

Client: Junior Johnson, Budweiser Racing Team **Localization:** NASCAR, United States

Description / Initial Condition:

Protect Driver and increase performance

ThermaCote Solution:

“If it performs in the grueling NASCAR Winston Cup Circuit, we feel it should perform even better under normal conditions.” Junior Johnson, Budweiser Racing Team

“Talked to PeterBuilt yesterday and they are thrilled with the results. The driver commented that his ice cooler used to be melted by noon, now he still has ice when he finishes the day.”

David F. Scroggin, MotorSports Marketing Corporation


Bud
KING OF BEERS
AMOCO


KING OF BEERS
AMOCO

3.5.Insulation of a pilothouse for Master Tyler Trawler

Client: Rod Regus Ship Build **Localization:** Bayou La Batre, Alabama, United States

Description / Initial Condition:

Eliminate thermal bridging/condensation, enhancing the effectiveness of the base load insulation and reducing to a minimum the loss of energy through the structure, without space reducing.

ThermaCote Solution:

Energy Control Insulation used ThermaCote on the pilothouse of Rod Regus Ship Build's trawler ship “Master Tyler” to eliminate thermal bridging/condensation, enhancing the effectiveness of the base load insulation and reducing to a minimum the loss of energy through the structure. This coating is a high performance thermal barrier, which incorporates ceramic technology to prevent the transfer of heat and cold. ThermaCote repels the radiant energy of the sun and dramatically lowers temperatures.




3.6. Roofs of trailers to enhance cooling, saving product and reducing fuel consumption

Client: Performance Food Group **Localization:** Tennessee, United States

Description / Initial Condition:

Temperature tests were performed on trailer 573 prior to, and after applying 40 mils of ThermaCote to the roof of the trailer. The test was conducted to determine the benefit of coating the roofs of trailers to enhance cooling, therefore saving product and reducing fuel consumption.

ThermaCote Solution:

The uncoated roof top reached a temperature of 170°F/76.66°C. The coated roof top reached a temperature of 84°F/28.89°C

The coated trailer reached zero degrees 26% faster than the uncoated trailer.

The coated trailer used 41% less fuel for the entire test.

Test results of trailers from zero degrees for three cycles

Time	Refrigeration Unit Status before coating	Trailer Sensor Temp (F)
5:33	Off	0.0
5:40	On	11.0
6:32	Off	0.0
6:39	On	11.0
6:53	Off *	0.0
7:02	On *	11.0
	* Outside temperature 80 degrees	
5:53	Into Defrost	
6:03	Out of Defrost	20.0

Total time to zero plus three cycles - 5 hr 32 min.

Time	Refrigeration Unit Status after coating	Trailer Sensor Temp (F)
2:49	Off	0.0
2:57	On	11.0
3:19	Off	0.0
3:27	On	11.0
3:45	Off	0.0
3:54	On	11.0
	Outside temperature 90 degrees	

Total time to zero plus three cycles - 4 hr 9min.

Test results prior to and after coating

Ambient temperature to zero degrees

Time	Trailer 573 Uncoated Inside Trailer Temp (F)	Temp. Drop
1:25	79.0	
1:40	62.0	17.0
1:55	53.0	9.0
2:10	43.0	10.0
2:25	37.0	6.0
2:40	32.0	5.0
2:55	28.5	3.5
3:10	25.0	3.5
3:25	20.0	5.0
3:40	15.5	4.5
3:55	12.0	3.5
4:10	9.5	2.5
4:25	7.5	2.0
4:40	5.5	2.0
4:55	4.0	1.5
5:10	2.5	1.5
5:25	1.0	1.5
5:33	0.0	1.0
	Total time to zero degrees - 4hr. 8 min.	

Time	Trailer 573 Coated Inside Trailer Temp (F)	Temp. Drop
11:45	70.5	
12:00	47.5	23.0
12:15	38.0	9.5
12:30	32.0	6.0
12:45	27.0	5.0
1:00	19.0	8.0
1:15	14.5	4.5
1:30	11.0	3.5
1:45	8.0	3.0
2:00	6.0	2.0
2:15	4.0	2.0
2:30	2.5	1.5
2:45	1.0	1.5
2:49	0.0	1.0
	Total time to zero degrees - 3 hr. 4 min.	

3.7. Tractor Trailer roof insulated with ThermaCote

With ThermaCote the trailer roof temperature decrease to 87°F/30.56°C instead of 135°F/57.22°C on standard trailer.

ThermaCote®
Energy Saving/Corrosion Protection

DESIGN SOLUTION
53' TRACTOR TRAILERS

PROJECT
MITCHELL CONTAINER SERVICES, INC.
(53' TRACTOR TRAILERS) SARALAND, AL

PRODUCT
THERMACOTE-CERAMIC ROOF COATING

INSTALLER
ENERGY CONTROL INSULATION, INC.
MOBILE, AL (251)-443-8003

Mitchell Container Services, Inc. is a company that makes available products and services, which provide containers of demonstrated integrity and quality, meeting all government regulations covering the shipment of hazardous materials, and to offer Responsible Container Management Services to surrounding areas.

Energy Control Insulation used Thermacote on the roof of these tractor trailers to seal their "Envelope" This coating is a high performance thermal barrier, which incorporates ceramic technology to prevent the transfer of heat and cold. Thermacote repels the radiant energy of the sun and dramatically lowers the roof temperatures.

In order to improve your building "sealant" quotient, reduce or eliminate thermal bridging/condensation and enhance the effectiveness of base load insulation, **Contact Energy Control Insulation, Inc. today at (251) 443-8003 for complete details on how we can improve your building projects.** Thermacote is the solution anywhere hot or cold presents a problem to be solved.

3.8. Refrigerated truck fuel report:

Client: Quik Trip Distribution **Localization:** Pendergrass, United States **Date:** 2010/2011

Description / Initial Condition:

ThermaCote Solution:

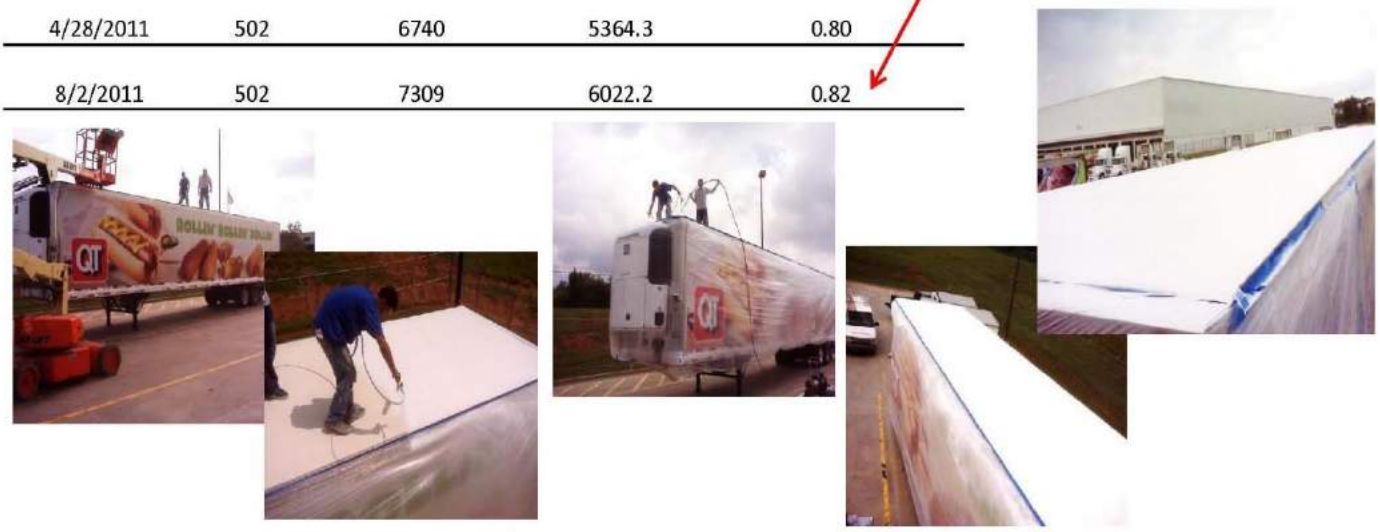
With ThermaCote on the roof of the refrigerated trailer, THE AMOUNT OF GALLONS USED PER HOUR REDUCED BY **32.77%**

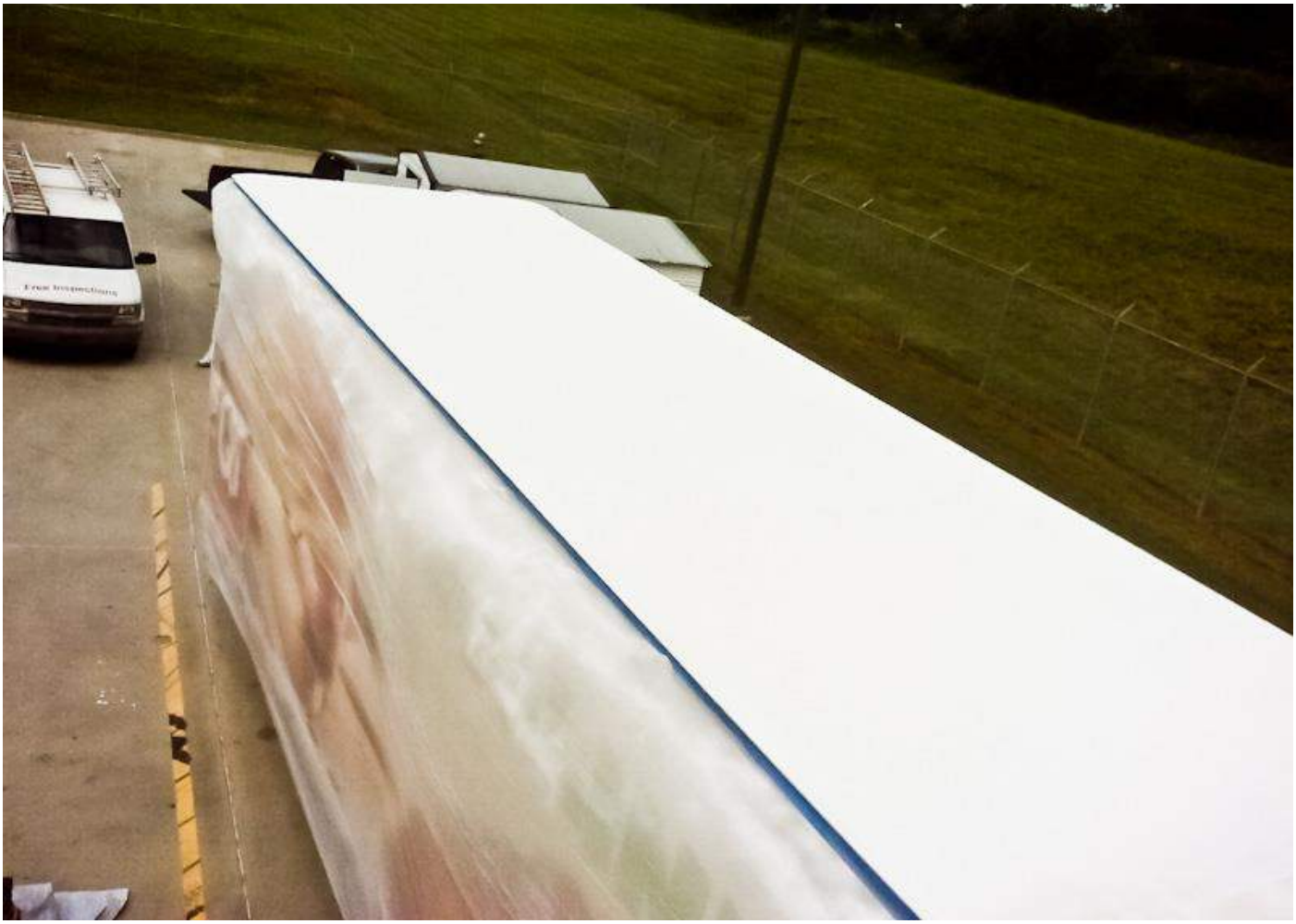
QuikTrip Distribution Center - Pendergrass, GA
REFRIGERATED TRUCK FUEL REPORT

DATE RECORDED	TRUCK #	UNIT RUN / HOUR	FUEL - GALLON	GALLONS / HOUR
9/13/2010	502	5441	4571.9	1.19
9/29/2010	502	5664	4732.3	1.20
10/14/2010	502	5675	4740.3	0.84
11/8/2010	502	5908	4887.9	0.83
3/7/2011	502	6534	5212.6	0.80
4/6/2011	502	6646	5304.7	0.80
4/28/2011	502	6740	5364.3	0.80
8/2/2011	502	7309	6022.2	0.82

ALMOST A YEAR AFTER....

THE AMOUNT OF GALLONS USED PER HOUR REDUCED BY **32.77%**





3.9. University of Mississippi:

"ThermaCote was burned for approximately 4 minutes at a temperature of 540 C degrees . All exposed animals (mice) survived without signs of sickness or irritation other than the usual irritation from smoke inhalation."

Arthur S. Hume, PhD. University of Mississippi, Medical Center

4. Some other Testimonials:

> "When he first applied 'ThemaCote' to the top of his trailer in November of last year it dropped his utility bills almost 50%."

Bobby J Chandler, President, Chandler's Distributors, Inc.

> "There seems little doubt that the coating reduces overall temperature inside the feed bin."

Michael P. Lacy, the University of Georgia, the US Department of Agriculture and Counties of the Cooperating.

THE UNIVERSITY OF GEORGIA
COOPERATIVE EXTENSION
College of Agricultural and Environmental Sciences
College of Family and Consumer Sciences

> "It really works! We have enjoyed the benefits of our decision to have the roof coated, inasmuch as it has created a better environment and saved money by conserving energy."

President Carlos A. Diago, Aluminum Classics Inc

> "After the application of ThermaCote insulation you could keep your hands on the same lines for any length of time with absolutely no heat being detected to the touch! We are extremely pleased with the way your product has maintained its integrity and insulation quality."

Daniel A. Ross, Service Manager, Atlanta Energy Specialist

> "After exploring several methods of additional insulation against the heat, we decided to have the building roof and rear exterior walls coated with ThermaCote. We immediately noticed a significant reduction in heat and more efficient cooling of the entire facility by our air conditioning units."

R. Ellison Ricks, President, Computer Town.

> "Material heated at 300 degrees and one could only place a hand within 18" of the area. After applying ThermaCote one can easily place a hand directly on the area."

John T. McCaskill, Vice President, Gulf Coast Sulphur Corporation

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> "Two large windows on the west wall of the home. One frame was coated with 'ThermaCote' and the other was left uncoated. The monitoring results of the interior window temperature with sir conditioning running, using a programmable temperature probe, indicating high and lows during a 24 hour period are as follows: Coated frame interior high reading at the glass was a maximum 84.7 degrees and the uncoated frame registered a maximum 112.6 degrees during the use of air conditioning within the home. A reduction of 27.9 degrees of heat transfer through the windows was recorded and documented. Evening and early morning window interior temperatures registered at glass are as follows: Coated 69.9 degrees and uncoated 47.8 degrees, indicating the high insulating properties of 'ThermaCote' containing interior warmth." U.S. Thermal R-20 Test Results on mobile home located in Bullhead City, Arizona.

> “Frankly, when I read the literature on the product, I found it extremely difficult to believe that a product could perform as represented. Having no apparent alternatives, I elected to go ahead and purchase some and try it on the duct work.
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> The day the duct work was actually coated was a 95 degrees day. After the last coat of material was applied and dried, I started the air conditioner and went inside to check the air temperature coming out of the inside ducts. To my absolute surprise, when I measured the temperature of the air being released into the room, I found it 22 degrees change between interior and exterior air temperature. In effect, with a very thin coating of the product, I achieved a practical solution to a problem that no conventional insulation could solve.”

Howard F. Delaney, Star Plumbing & Heating