

**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 2: WEST SIDE NORTH END OF FACILITY. CLASSROOMS TESTED ARE TWO NEAREST IN PHOTO, 12 BEING THE NEAREST.



Figure 3: 2" R3 TECTUM ROOF WITH WHITE GRAVEL COVER





Figure 4: CLOSE-UP OF ROOF COVERING



Figure 5 COATED CLASSROOM CEILING



Figure 6: CONTROL CLASSROOM CEILING



Figure 7: COMMON HALL WALL BETWEEN CLASSROOMS 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

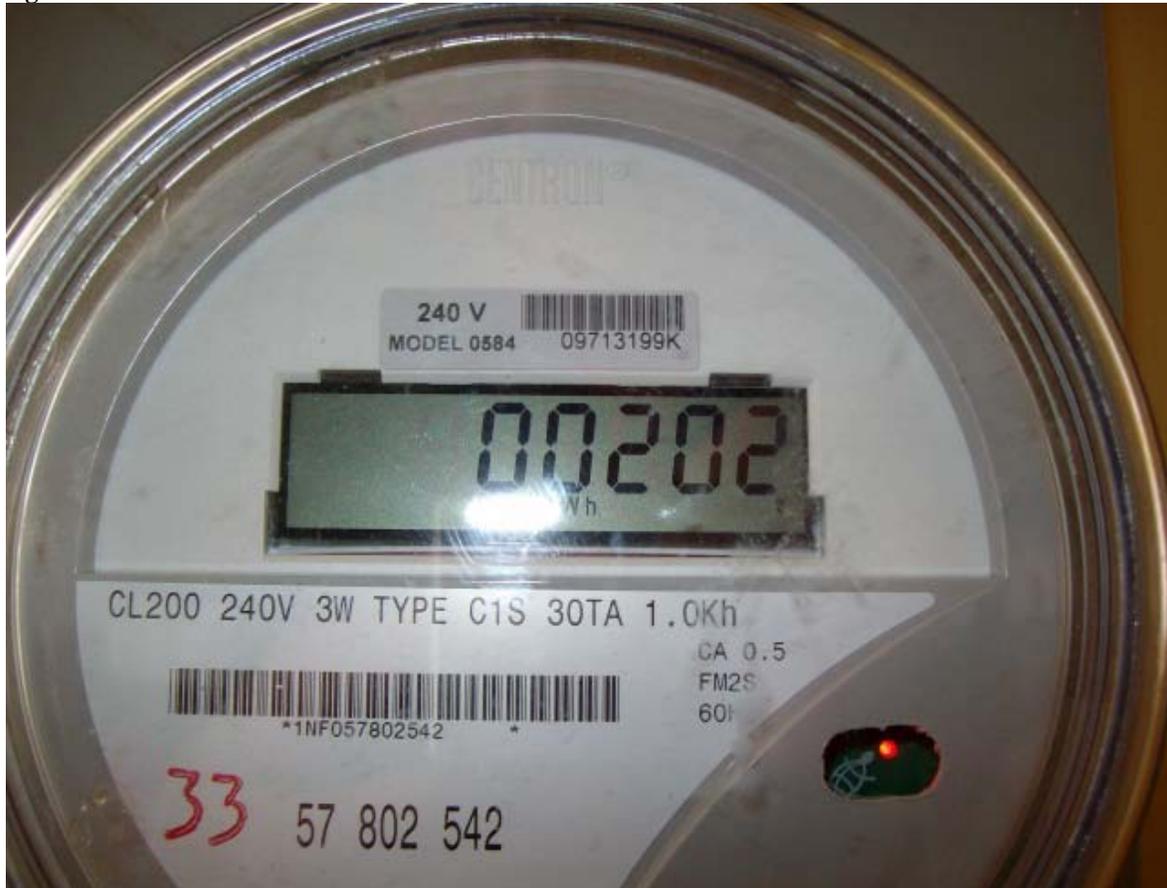


Figure 13 THIRD READING COATED ROOM 7/14/09 12:12 PM 129 KWH



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 |