SDGE San Diego Gas & Electric
PO. BOX 1831 • SAN DIEGO, CA 92112 • 619/696-2000

Ed Jones

14 August, 1989

FILE NO.

Dear Ed:

Here are the results of the calculations I discussed with you on the phone comparing Cerama-Tech and conventional capsheet. The data you provided shows Cerama-Tech reducing heat transmission into the cooler by about 39%. I have extrapolated that data to predict reductions for interior temperatures of 50F, 60F, and 70F.

At an outside temperature of 104F, the following occurs:

Room Temp	Capsheet Temp	Cerama-Tech Temp	Heat Transfer Reduction (%)
40F	150F	107F	39.1 (measured)
50F	150F	107F	43.0 (estimated)
60F	150F	107F	47.8 "
70F	150F	107F	53.8 "

The applicable equation is the Conductive Heat Transfer Equation,

$$Q = UA\Delta T, \quad \text{where}$$

- Q is heat conducted through the wall, Btus/hr,
- U is heat transmission coefficient, Btus/hr*sqft*F,
- A is wall area, sqft,
- ΔT is the temperature difference between the outside surface and the interior surface.

Assuming UA is held constant for all four conditions considered, the ΔT becomes the only variable, with Q being directly proportional to ΔT. (It is also assumed that the exterior surface temperature would remain the same in each case, 150F for the capsheet and 107F for the Cerama-Tech.)

Room Temp	Capsheet Q	Cerama-Tech Q	Cerama-Tech Savings vs Cap (%)
40F	(150-40)UA	(107-40)UA	(110-67)/110*100 = 39.1%
50F	(150-50)UA	(107-50)UA	(100-57)/100*100 = 43.0
60F	(150-60)UA	(107-60)UA	(90-47)/90*100 = 47.8
70F	(150-70)UA	(107-70)UA	(80-37)/80*100 = 53.8

I hope this is helpful to you. Please let me know if I can help in any other way.

Sincerely,

Skip

Don "Skip" Fralick
Engineer
Tech Support
699-5101

Foster Farms Dairy

1707 McHENRY AVENUE
MODESTO, CALIFORNIA 95350

November 16, 1988

To whom it may concern:

Ralph Harrilson of Custom Portable Sandblasting applied Ceramitec to the roof of Foster Farms Daries Ice Cream plant.

The results were very good. The temperature reading of the roof surface on a 103 degree day was approximately 40 degrees.

The exact energy savings at this time is not known but it is expected to significant.

Sincerely

Bob Sprouse
Chief Engineer
Foster Farms Dairy

ALLIED REFRIGERATION & ENGINEERING
2231 A FORTUNE DRIVE • SAN JOSE, CALIFORNIA 95131
CONT. LIC. NO. 250554

December 3, 1988

Dave Pewitt
1565 Bulldog Ln., Apt. #102
Fresno, Ca 93710

SUBJECT: Ceramatek

Dear Dave:

Confirming our recent conversations enclosed are copies of my calculation sheets for heat loss through the panel building at Foster Farms Dairy in Fresno. The panels are composed of 5" thick urethane insulation.

As you can see from the attached calculations in most cases Ceramatek cut the heat transmission loss by about 50%.

Dave, we trust this satisfies your immediate needs.

Very truly yours,

ALLIED REFRIGERATION AND ENGINEERING

R.B. Morris, Jr.

RBM/jjg

ASSUMING 5" URETHANE INSULATION

$K = 0.16 \frac{BTU}{HR \cdot ft^2 \cdot °F \text{ T.D.}}$

HEAT TRANSFER FORMULA:

$Q = UA\Delta T$ WHERE $U = \frac{1}{R}$

$R = \frac{X}{K} = \frac{5"}{.16} = 31.25$

$U = \frac{1}{31.25} = .032$

A = 1 SQ. FT. SURFACE

ΔT = TEMP. DIFF. BETWEEN OUTDOOR SKIN TEMP & INSIDE SKIN TEMP.

TEST #1: (A) 114°F = OUTSIDE SKIN OF GALVANIZED FINISH
(B) 75°F = OUTSIDE SKIN OF GALV. PAINTED W/ CERAMATEK.
40°F = ROOM TEMP. = INSIDE SKIN TEMP.

(A) $Q = UA\Delta T$
$= .032 \times 1 \times (114 - 40) = 2.368 \frac{BTUH}{ft^2}$

(B) $Q = .032 \times 1 \times (75 - 40) = 1.12 \frac{BTUH}{ft^2}$

$2.368 \div 1.12 = 2.11 \times 100 = 211\%$

∴ GALVANIZED FINISH HAS 211% HIGHER HEAT LOSS THAN CERAMATEK FINISH.

OR, EXPRESSED IN ANOTHER WAY

$\frac{1.12}{2.368} = .473 \times 100 = 47.3\%$

∴ CERAMATEK ONLY HAS 47.3% OF THE HEAT LOSS AS DOES GALVANIZED FINISH. OR, HEAT LOSS LESS THAN HALF.

TEST #2: (A) = 121°F $Q = .032 \times 1 \times (121-40) = 2.592$ BTU/H/ft

(B) = 79°F $Q = .032 \times 1 \times (79-40) = 1.248$ BTU/H/ft

$\therefore \frac{2.592}{1.248} \times 100 =$ 207.7% HIGHER LOSS WITH GALVANIZED FINISH.

TEST #3: (A) = 143°F $Q = .032 \times 1 \times (143-40) = 3.296$ BTU/H/ft

(B) = 94°F $Q = .032 \times 1 \times (94-40) = 1.728$ "

$\therefore \frac{3.296}{1.728} \times 100 =$ 190.7% HIGHER LOSS WITH GALVANIZED FINISH.

TEST #1: (A) = 146°F $Q = .032 \times 1 \times (146-40) = 3.392$ BTU/H/ft

(B) = 99°F $Q = .032 \times 1 \times (99-40) = 1.888$ "

$\therefore \frac{3.392}{1.888} \times 100 =$ 179.7% HIGHER LOSS WITH GALVANIZED FINISH.

12-2-83

(2)

EXECUTIVE ABSTRACT

The University of Nevada, Las Vegas under the direction of the Mechanical Engineering Department has developed the Arid Regions Environmental Laboratory (AREL) to test new technologies that help in saving on energy demand. The test facility is located at the Thomas Beam Engineering Complex, on campus and is composed of chambers equipped with a computer based data acquisition system to record different variables that help in assessing the performance of each of these technologies.

The first technology that was tested was a ceramic base paint, distributed by the CERAMA-TECH COMPANY. The testing period was between the months of June - September 1994. The results showed the chamber that was painted with the regular outdoor paint showed a 52.20 % increase in energy usage compared to the chamber painted with the ceramic paint.

Work will be continuing in the summer of 1995 to study the performance of attic radiant barrier system (ARBS) and will be reported in the final report on this project.

ARID REGIONS BUILDING LABORATORY

BY

ARNEL V. RUFFY

DEPARTMENT OF MECHANICAL ENGINEERING
UNIVERSITY OF NEVADA, LAS VEGAS
DECEMBER 1994

INTRODUCTION:

Due to the explosive growth that the Southwest is currently witnessing and knowing that our resources in this area are limited, several new technologies have sprouted as a result of the need for efficient energy use. The performance of all these technologies and products need to be verified for use in our area.

In response to this need the University of Nevada at Las Vegas established the Arid Regions Environmental Laboratory (AREL) on campus and under the direction of the Mechanical Engineering Department. The facility consists of two identical constructed rooms, which are identically oriented with respect to the sun. The facility is equipped with a heating and cooling system, digital readout watt meters, several sensors for measuring indoor surface temperatures and instantaneous heat flows, local wind speed and directions as well as the total intensity of sunlight received on horizontal surface. All these data are collected at regular time intervals using a computer-data-acquisition system. These data are stored in the system for long term data analysis of trends as well as for comparative purposes between it and computer model simulations.