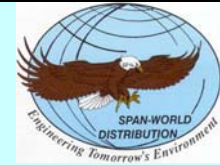


LATEX/CERAMIC INSULATION COATING



TEMP-COAT®

PRESENTATION

BY

U.S.NAVY

DEPARTMENT OF SAFETY AND SURVIVABILITY

May, 2001

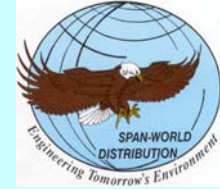
1

TEMP-COAT® LIQUID ACRYLIC LATEX INSULATION PROVIDES:



- **TEMP-COAT® , A MULTI-PURPOSE PRODUCT HAS PROVIDED SERVICES TO THE MARITIME INDUSTRY FOR OVER TEN YEARS.**
- **TEMP-COAT® IS APPROVED AND USED BY SUCH DISTINGUISHED CUSTOMERS AS THE U.S. COAST GUARD, CHEVRON, EXXON, SHELL OFF SHORE, PEMEX, DIXIE CARRIERS, Del MONTE, DOLE, CHIQUITA AND A HOST OF OTHER MARITIME AND OFF-SHORE INTERESTS WHO RECOGNIZED THE NEED FOR A MULTI-PURPOSE PRODUCT.**
- **TEMP-COAT® INSULATES, HELPS PREVENT CORROSION BECAUSE IT ADHERES TO THE SURFACE IT INSULATES, WEIGHS LESS THAN 5.9 LBS. PER GALLON AND CAN BE TINTED ANY LIGHT TO MEDIUM COLOR.**
- **TEMP-COAT® IS EXTREMELY EASY TO INSTALL, INEXPENSIVE AND IS SAILOR FRIENDLY. TEMP-COAT® CONTAINS NO VOC's, NO HEAVY METALS, NO MERCURY OR CHLORIDES AND WILL NOT ADD TO A FIRE IF ONE OCCURS. TEMP-COAT® SMOKE IS NON-TOXIC.**

TEMP-COAT® LIQUID ACRYLIC LATEX INSULATION PROVIDES:

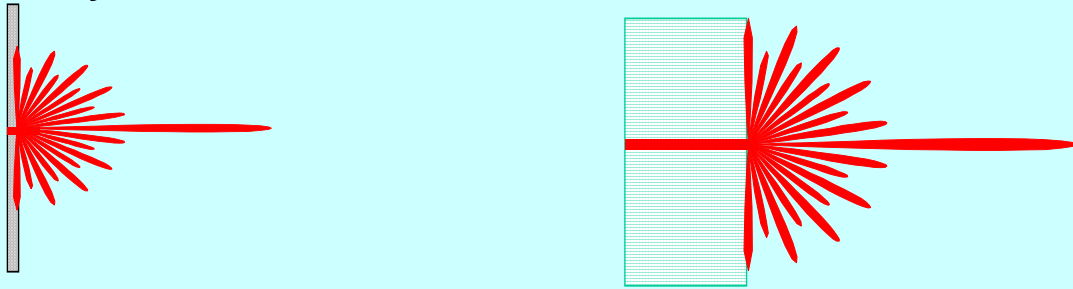


- **TEMP-COAT® IS USED IN THE PRIVATE SECTOR TO PREVENT CONDENSATION BEHIND LAGGING SUCH AS THAT WHICH IS USED IN NAVY VESSELS. TEMP-COAT® HAS REPLACED INSULATION IN MANY INSTANCES WHERE MOISTURE AND SALT AIR HAS CAUSED CORROSION DAMAGE.**
- **TEMP-COAT® IS USED TO INSULATE PIPES, BOILERS, CHILLED WATER LINES, CRYOGENICS AND A WIDE ARRAY OF OTHER IMPLEMENTS BECAUSE OF ITS SUPERIOR QUALITIES AND EASE OF APPLICATION.**
- **TEMP-COAT® HAS BEEN TESTED AND DEEMED TO BE AN EXCELLENT FORM OF INSULATION AND ANTI-CONDENSATION MATERIAL VIA ITS THERMAL CONDUCTIVE NATURE. TESTS AND PRACTICAL FIELD TRIALS HAVE BEEN CONDUCTED SUCCESSFULLY BY THERMAL PHYSICAL PROPERTY LABS, PURDUE UNIVERSITY, BATH IRON WORKS, NEWPORT NEWS SHIPYARDS, INGALLS SHIPBUILDERS, FLEET TECHNICAL SUPPORT CENTER PACIFIC, U.S. COAST GUARD, ATLANTIC ASSIGNED VESSELS AS THE INCHON & THE ANZIO AND THE BOARD OF INSPECTION & SURVEY ALL OF WHICH IS AVAILABLE FOR YOUR REVIEW.**

Purdue University Thermophysical Properties Research Lab

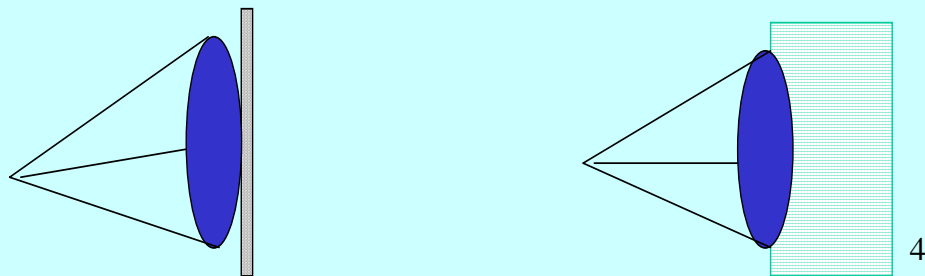


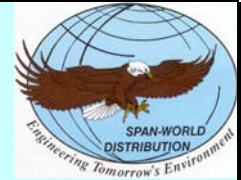
Thermal Diffusivity, per ASTM E-1461-92, is determined using the laser flash diffusivity method



Note; According to Dr. Taylor this test records Specific Heat & Thermal Diffusivity of a given point on the coupon provided. It does not take into consideration TEMP-COAT'S added benefits of Reflectivity, Diffusivity and Emmissivity of the total mass of the barrier.

Specific heat (c), per ASTM E-1269, was measured using a differential scanning calorimeter and Thermal Conductivity (λ) values were calculated as a product of ie: $\lambda = \rho C_p d$





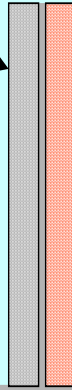
TEMP-COAT® Data

TEMP-COAT® is filled with Hollow Ceramic Micro-spheres

TEMP-COAT® "101" **DOES NOT ABSORB MOISTURE**

TEMP-COAT® "101" **INSULATES** via Thermal Conductivity, Diffusivity & Emmissivity

TEMP-COAT® "101" protects the coated surface from "CU" (corrosion under insulation)



TEMP-COAT® is filled with Hollow Ceramic Micro-spheres

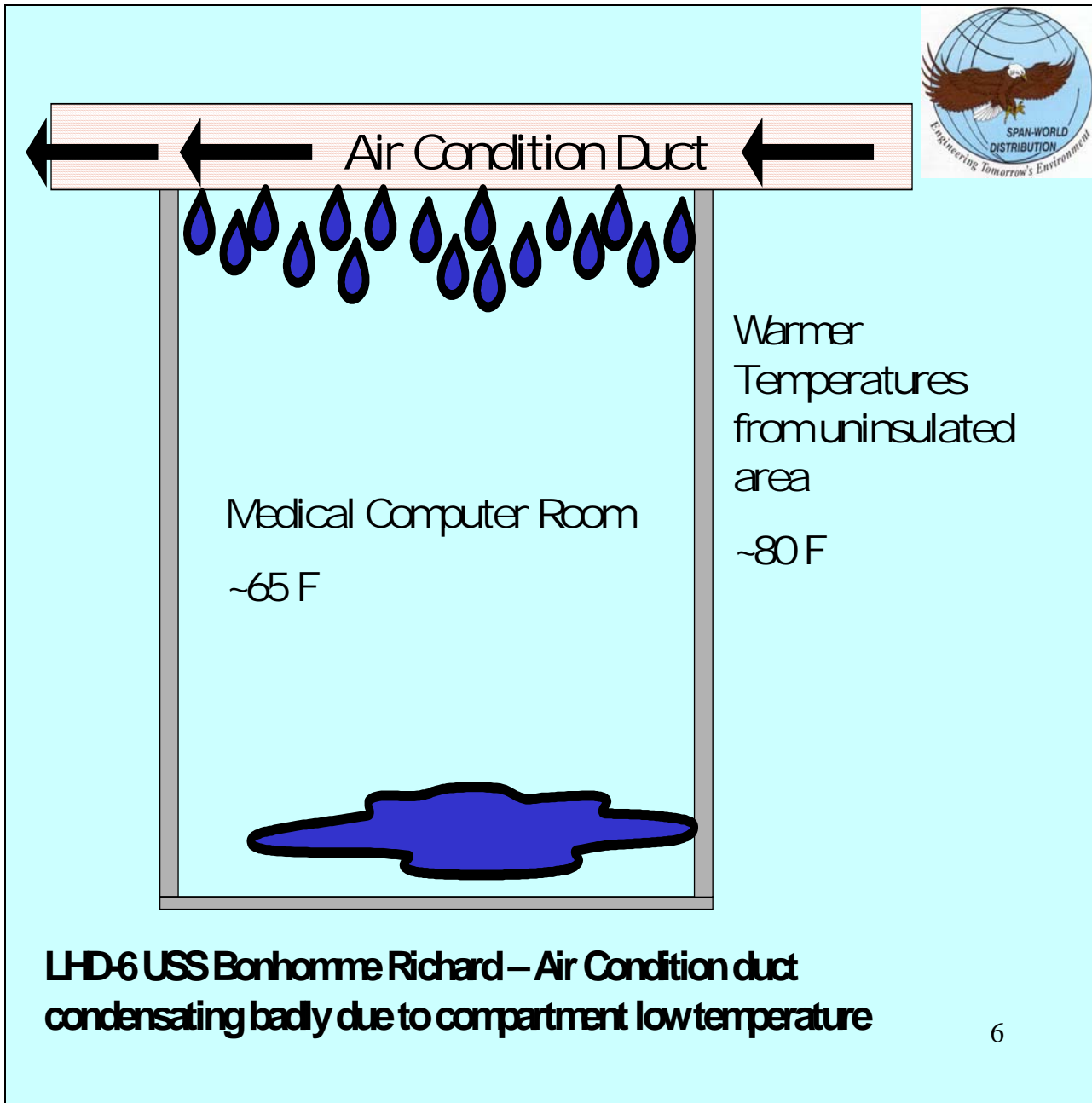
TEMP-COAT® is **NON-COMBUSTIBLE**

TEMP-COAT® **WILL NOT FUEL A FIRE**

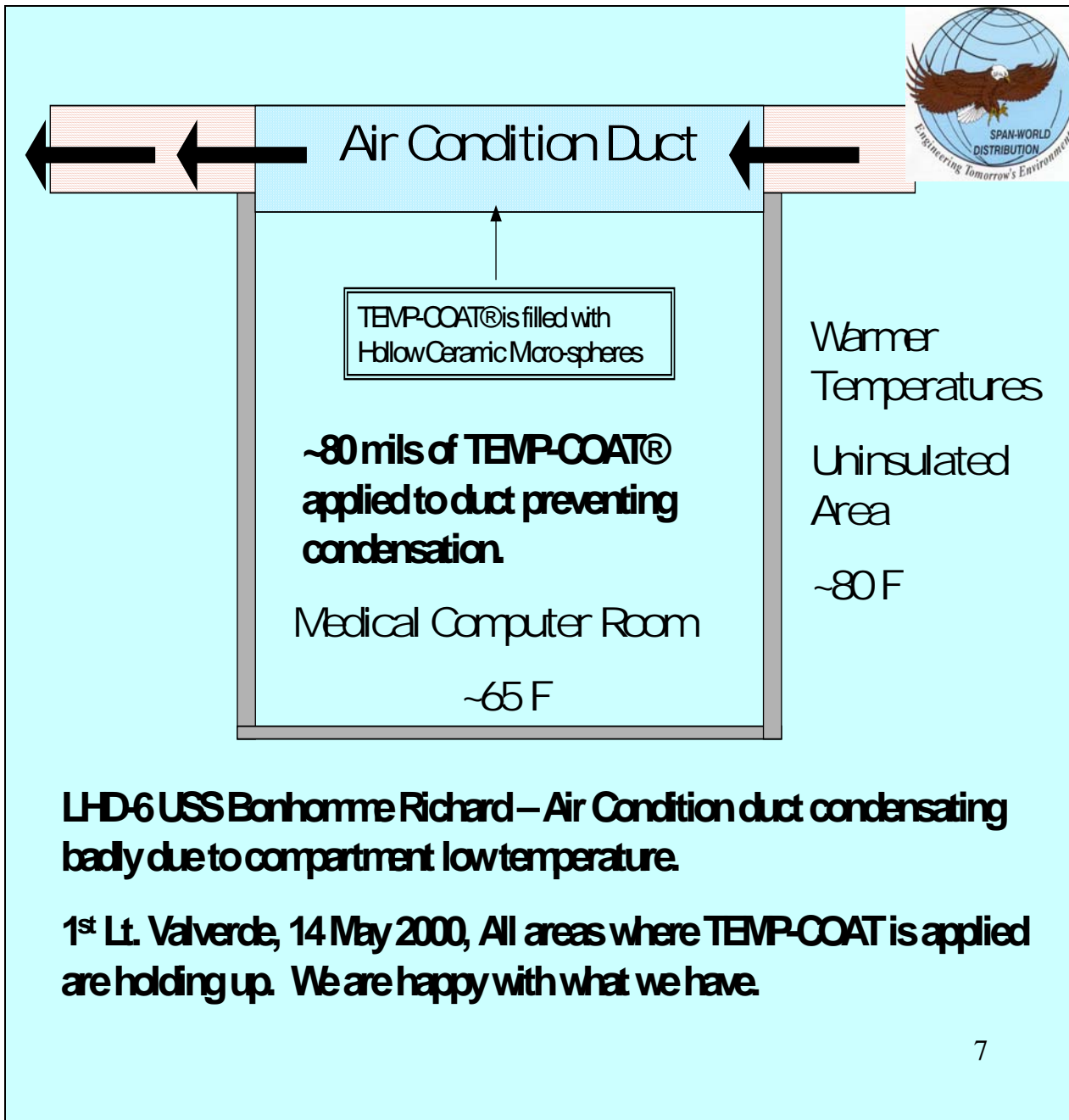
TEMP-COAT® has a **LOW FLAME SPREAD** of 5 (ASTM E-84) (0 is concrete and 99 is red oak flooring)



Some Insulations will burn when dry.



**LHD-6 USS Bonhomme Richard – Air Condition duct
condensating badly due to compartment low temperature**



LHD-6 USS Bonhomme Richard – Air Condition duct condensating badly due to compartment low temperature.

1st Lt. Valverde, 14 May 2000, All areas where TEMP-COAT is applied are holding up. We are happy with what we have.

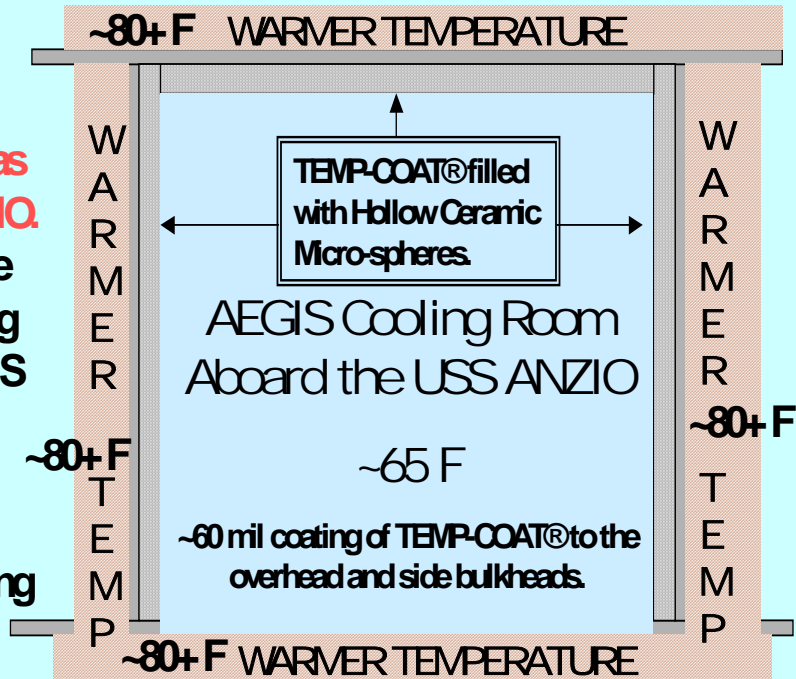


Comments of WEPS (Lt. Biggers) USS ANZIO, 3 October 2000

1. "Since applying Temp-Coat in February 2000 to AEGIS Cooling Room One, ANZIO has noticed the near complete elimination of condensate".

2. "The Cooling Rooms bulkheads and overhead stayed dry throughout ANZIO'S recent Mediterranean/Adriatic deployment, which included Winter, Spring and Summer conditions. Past condensate build up required a devotion of man-hours to keep Cooling Room bulkheads, overhead, deck, and equipment dry. With Temp-Coat ANZIO dedicated ZERO man-hours to cleaning up condensate".

3. "Summary: Temp-Coat has been very beneficial to ANZIO. It has improved crew morale and quality of life by keeping ANZIO's highly skilled AEGIS technicians working and growing professionally in the area of AEGIS rather than spending hours cleaning up condensate".



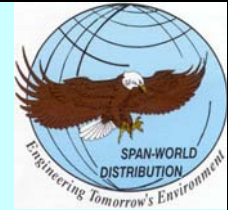
ADMINISTRATIVE MESSAGE

ROUTINE

131200Z APR 01 ZYB PSN 795796L43

FM INSURVLANT NORFOLK VA//00//

SUBJ/QUICKLOOK REPORT FOR USS ANZIO (CG 68) MATERIAL INSPECTION



C. "USS ANZIO IS THE TEST PLATFORM FOR A NEW TECHNOLOGY RADIANT BARRIER COATING (DFS CG68-01-00) MARKETED UNDER THE TRADE NAME "TEMP-COAT." THIS CERAMIC COATING IS DESIGNED TO REDUCE HEAT TRANSFER AND ELIMINATE CONDENSATE BUILD-UP ON SURFACES BETWEEN SPACES OF SIGNIFICANTLY DIFFERENT AMBIENT TEMPERATURE. USS ANZIO INSTALLED THIS PRODUCT ON THE BULKHEADS OF THE AEGIS COOLING ROOM (2-236-0-Q), A SPACE NOTORIOUS FOR EXCESSIVE CONDENSATION. AT A REPORTED COST OF ONLY 12 DOLLARS PER GALLON, THE EFFECTIVENESS OF THIS LOW TOXICITY PRODUCT IS IMPRESSIVE. I STRONGLY RECOMMEND THAT EVALUATION OF THIS PRODUCT BE ACCELERATED AND IT BE APPROVED FOR FLEETWIDE USE AT THE EARLIEST POSSIBLE OPPORTUNITY - THE POTENTIAL MANPOWER SAVINGS AND COSMETIC IMPROVEMENTS PROVIDED ARE DRAMATIC".

TEMP-COAT® Ceramic Insulation Coating Installation to *ALLEVIATE CONDENSATION* onboard the USS INCHON & USS WASP



USS INCHON

- Radio Transmitter Room NR 1 & 2
- One XMITTER Room Vent Duct & Cableway Enclosure

Response from EMO INCHON, 21, May 1999 - *“That stuff worked wonders. The Radioromen put it up, so it’s sailor proof and we haven’t had any problems with condensation.” “I’d love to put it up in all my electronic spaces, but especially Radar 2.”*

USS WASP

- Bulkhead(s) in the Main Engineering Space

Test and Evaluation of Ceramic Insulation Coating SSS 68-082 by Bath Iron Works funded via N00024-92-G-2805 for FMS-400D August 31, 1999



Excerpts from Engineering Report.

As per Mr. Greg Buczkowski and Mr. Gary West: **“Testing results generally supported manufacturer’s claim regarding thermal conductivity, and fared acceptably with regard to adhesion and chemical compatibility”**. Signature Page

“The performance as anti-condensation coating on USS INCHON (LPH/MCS-12) has proven to be very successful. However, it appears that when used in appropriate situations, and when properly applied, have proven to be effective both as insulators and as anti-condensation measures”. Page 1 paragraph 3

“The thermal conductivity values determined by Sparrell Engineering Research Corporation for the ceramic insulation coating tested in this SSS were approximately twice the values claimed by the manufacturer. However, they were within an order of magnitude as those claimed, and the coating could be expected to present good insulation properties even at the values obtained. As a point of reference, The empirical values for thermal conductivity of the ceramic insulation coating obtained in this study correspond nearly identically to those of asbestos: an excellent, if not somewhat undesirable insulator”. Page 6 Paragraph 1

**BWDetermined
Thermal Conductivity
(BTUin/hr-ft²-°F) & (W/mK)**

TEMP-COAT 101™	1.14/0.164
Asbestos	1.11/0.158

Bath Iron Works (CONTINUED)



‘That the technical data provided by the manufacturer of TEMP-COAT™, via Purdue University TPRL, are corroborated by third party test data must be given reasonable weight. Also, considering the possible errors introduced by the less than optimum 'field' conditions associated with the application of the coatings to the test panels in this SSS (as compared to a test samples prepared by the manufacturer under tight, controlled conditions), the differences in thermal conductivity obtained are explainable’. Page 6 Paragraph 2

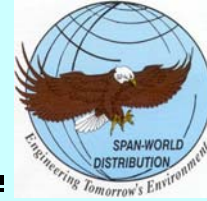
Recommendation:

‘further consideration should be given to other shipboard applications of this coating. Potential application would include use in areas with high radiant heat loads and temperature gradient or potentially as an anti- condensation coating in bilge areas’. Page 7 Paragraph 10

Report by: Mr. Greg Buczkowski

Approved by Mr. Gary West

TEMP-COAT® ECONOMICS



TEMP-COAT® IS A VERY ECONOMICAL PRODUCT TO USE

The PRODUCT IS APPROXIMATELY 83% SOLID BY VOLUME THEREFORE DRYING TIME IS EXTREMELY RAPID. SINCE TEMP-COAT® IS LIGHT WEIGHT AND VISCOUS IT CAN BE APPLIED IN FAIRLY THICK COATS ON DRY SURFACES TO SPEED UP THE APPLICATION PROCESS.

TEMP-COAT® PROVIDES MANY SERVICES AND ADVANTAGES WITH JUST ONE APPLICATION COST.

TEMP-COAT® INSULATION, PRODUCT COST	\$42.00 per US Gal
TEMP-COAT® COVERAGE RATE	60 sqft per US Gal
APPLICATION RATE IN THICKNESS* PER COAT, IN MILS (1/1000)	20
RECOMMENDED THICKNESS FOR GENERAL SHIPBOARD USE IN MILS (1/1000)	60
COATS TO OBTAIN 60 MIL THICKNESS	3
COST OF PRODUCT PER SQ. FT. AT 60 MILS	\$ 2.80
COST FOR LABOR VIA OUTSIDE CONTRACTOR ** FOR 3 COATS AND 60 MILS PER SQ. FT.	\$ 7.20

TEMP-COAT® Economics

(Continued)



ALL END COST FOR AN ACTUAL INSTALLATION ON A NAVY VESSEL BY INDEPENDENT CONTR.	\$10.00 (60 ML SF)
COST PER 10 SQ. FT. @60 MLS	\$100.00
COST PER 10 SQ. FT. @240 MLS	\$400.00

• APPLICATION RATES CAN VARY DEPENDING UPON WEATHER CONDITIONS, BAROMETRIC PRESSURE, DEWPOINT, TEMPERATURE AND WORKING CONDITIONS.

* SECOND COAT CAN BE APPLIED IMMEDIATELY UPON FIRST COAT FLASHING (TEMP-COAT® IS MICRO POROUS).

** INDEPENDENT CONTRACTOR INFORMATION BASED ON ONE ACTUAL APPLICATION ABOARD THE ANZIO. THIS JOB WAS 750 SF AND THE COST INCLUDED TIME FOR ENTRY, SET-UP, MASKING, CLEANING AND PREP, APPLICATION, TAKEDOWN PLUS ALL RELATED TURNKEY JOB COSTS. PRODUCT WAS PURCHASED SEPARATELY BY THE ANZIO.

SHIP'S JOB INVOICES ARE AVAILABLE FOR REVIEW

CONCLUSION



. TEMP-COAT® IS A THERMAL BARRIER FORM OF INSULATION WHICH PERFORMS WELL AS A CONDUCTIVE AND RADIANT MATERIAL. **A PROVEN BY-PRODUCT OF THE INSULATION IS ITS EXCELLENT PERFORMANCE AS A CONDENSATION BARRIER.**

. TEMP-COAT® IS A FOURTEEN YEAR OLD PRODUCT WHICH IS ACCEPTED BY INDUSTRY AND COMMERCIAL USERS WORLD-WIDE. TEMP-COAT® IS NOTED FOR ITS ABILITY TO INSULATE WHILE PREVENTING CORROSION UNDER INSULATION (CUI). BECAUSE IT ADHERES TO THE SURFACE IT INSULATES AND DOES NOT REQUIRE JACKETING, PROBLEM SOLVING AND INSPECTION IS SIMPLE THOROUGH. TEMP-COAT® OFFERS A PERMANENT SOLUTION.

. TEMP-COAT® CAN SAVE THE NAVY MONEY WHILE IT PROTECTS ITS EQUIPMENT AND CREATES A BETTER, SAFER ENVIRONMENT FOR THE SHIPS INHABITANTS.

. TEMP-COAT® HAS BEEN TESTED USING EXACTING ASTM PROCEDURES PERFORMED BY A LEADING CERTIFIED THERMOPHYSICAL LAB. TEMP-COAT® HAS BEEN APPLIED TO NUMEROUS NAVY AND COAST GUARD VESSELS AS AN INSULATION AND AN ANTI-SWEAT COATING OVER A FIVE YEAR PERIOD WITHOUT A PRODUCT FAILURE. TEMP-COAT® IS APPROVED AS AN INSULATION AND AN ANTI-SWEAT PRODUCT BY THE U S COAST GUARD. SEVENTEEN TESTS WERE PERFORMED TO PROVE THE PRODUCTS OVERALL WORTHINESS.

. TEMP-COAT® IS EASY TO APPLY, VERY LIGHT WEIGHT AT LESS THAN 5.9 LB. PER GALLON, DOES NOT ABSORB SALT AIR OR MOISTURE AND IS EXTREMELY COST EFFECTIVE. TEMP-COAT® CAN BE TINTED TO ANY LIGHT TO MEDIUM COLOR TO COMPLY WITH THE NEEDS OF THE NAVY.

. TEMP-COAT® HAS BEEN APPLIED AND TESTED AT BATH IRON WORKS, NEWPORT NEWS SHIPYARD, INGALLS SHIPBUILDING, SAN DIAGO, BOLLINGER SHIPYARD (USCG) WITH COMPLETE SATISFACTION AS AN INTERIOR AND EXTERIOR INSULATION COATING.

. **TEMP-COAT® IS PROVEN TO BE A BENEFICIAL PRODUCT FOR THE NAVY.**