

9221
053C/Ser 3134
X7740

9 MAR 1989

MEMORANDUM

From: 053C (G. Arazy)
To: 022B

Subj: INSTALLED ASBESTOS MILLBOARD ENCAPSULATION

Ref: (a) Service request from 022B (R. Gardiner) of 27 Oct 88.
(b) NAVSSES memo 9221, 053C/Ser 0937, X7740 of 19 Dec 88.

Encl: (1) Thermogravimetric Analysis (TGA) profile of Polarroof Firegard

1. The Navy currently utilizes asbestos millboard material on the inside of the outer casings on FF-1052 class Combustion Engineering (CE) boilers. NAVSSES has previously received reports from some ships where this material has deteriorated and, as a result, spread hazardous asbestos particles into the air. In an attempt to control or alleviate this problem, NAVSSES has considered the possibility of encapsulating the asbestos millboard with a non-hazardous, fireproof coating compound.

2. By reference (a), SSES 022B forwarded information concerning an encapsulation material, POLAROOFF FIREGARD, to SSES 053C. They requested that we study this product literature and advise them if the material would be suitable for shipboard use as an encapsulant over the asbestos millboard discussed above.

3. SSES 053C reviewed the literature and discussed the feasibility of using this product with cognizant personnel in NAVSEA codes 05M3 and 07AE. As a result of these discussions, it was recommended that SSES 053C conduct in-house laboratory testing of this encapsulant material prior to commencing any shipboard tests. This information was communicated to SSES 022B by reference (b), along with a copy of the Material Safety Data Sheet (MSDS) for the POLAROOFF FIREGARD material.

022B/4/4/9
R. Gardiner
(215) 887-7177

MILESTONES

TITLE: Asbestos Millboard Encapsulation (B-6580)

OBJECTIVE: To eliminate the need to remove asbestos millboard from boiler casings by encapsulating the installed millboard with an approved coating.

MILESTONE	PLANNED DATE	REVISED DATE	ACTUAL DATE
Obtain material	1/9		1/9
Start in house test	2/9		2/9
Contact TYCOM to identify candidate ship	4/9		2/9
Complete in house test	4/9		2/9
Shipboard installation	6/9	5/3/89	5/3/89
Shipboard Test/Evaluation	7/9	5/29/89	
Inspect installation after first at sea period	8/9	5/21/89	
Inspect installation at SAI	12/9	7/31/89	
Evaluate Shipboard test results	12/9	9/8/89	
Prepare final report/advisory	12/9		
Complete project/Issue advisory	12/9		

Subj: INSTALLED ASBESTOS MILLBOARD ENCAPSULATION

4. Funding for this test program was received by SSES 053C, sample encapsulant material was received from the manufacturer, and in-house tests were initiated to determine the suitability of the POLAROOFF FIREGARD for shipboard use. The results of these tests are as follows:

a. Flame resistance

To ensure that the encapsulant material was non-flammable, four flame resistance test specimens were prepared and then tested in accordance with the requirements of ASTM D 635. This test involves holding one end of the six-inch long specimen over a flame for 30 seconds, removing the flame source, and measuring how long the sample continues to burn without the flame source present. In each of the four tests, the sample was observed to self-extinguish in less than one second. By the criteria specified in ASTM D 635, the POLAROOFF FIREGARD material could be rated as both "non-flammable" and "self-extinguishing".

b. Thermogravimetric Analysis (TGA)

To determine the thermal stability of the cured encapsulant material as a function of temperature, samples were submitted for TGA testing. The result of this testing is shown in the graph of enclosure (1). Two factors can be observed from examination of this graph. At a temperature of approximately 100°C, the encapsulant material loses weight due to the evaporation of the ammoniated water, which is one of its ingredients. In addition, the sample was still basically intact after exposure to a temperature as high as 248°C (480°F). SSES 022B has indicated that this temperature is considerably higher than what the encapsulant material would be exposed to in service.

c. Viscosity

The viscosity of the encapsulant was determined by using a Krebs-Stormer viscometer at 200 rpm in accordance with ASTM D 562. The measured viscosity of 108 Krebs units is higher than that of most paints. This material would be relatively easy to apply by brush, but may be difficult to spray onto the desired surface.

d. Density

The density of the encapsulant was determined to be 11.6 lbs/gal. Since the manufacturer supplies this product in five gallon pails, it should be noted that a full pail may be somewhat difficult to lift and transport during a shipboard application. Since the material is a one part system, separating the five gallons into smaller cans prior to use is recommended.

Subj: INSTALLED ASBESTOS MILLBOARD ENCAPSULATION

e. Sag

A Leneta sag test was conducted on the encapsulant to determine if the material had any tendency to run when applied on a flat plate in a vertical position. These tests indicated that coating thicknesses up to 16 mils showed no tendency to sag or run. This is a desired characteristic, considering the orientation of the boiler casing this material would be covering in a shipboard application.

f. Condition in Container

The condition of the encapsulant in its container was considered very good in that no settling was apparent and no skin had formed on the surface. The material appeared homogeneous even before stirring, and was relatively easy to stir. The manufacturer, however, cautioned against exposure of the material to sub-freezing temperatures, which could cause coagulation.

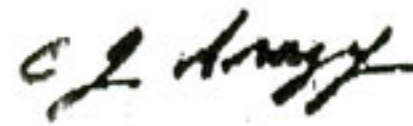
g. Percent Volatiles by Weight

Testing of five samples indicated that an average of 33.1 weight percent of the encapsulant is volatile. This is consistent with the manufacturer's claim that 32 percent of the material is ammoniated water.

h. Adhesion on Thermal Insulation

Although the material would be used aboard ship on asbestos millboard, safety considerations dictated that our in-house tests be conducted on a similar but non-hazardous substrate (calcium silicate board). Tests were conducted using an elcometer adhesion tester and small metallic pins. The results of these tests indicated that the encapsulant's internal strength and adhesion were greater than the insulation itself, and that the coating forms a rubbery layer over the insulation which is difficult to cut or rip apart. Tests were performed both with and without a surface primer (POLAPRIME), with no difference noted by use of the primer.

5. In summary, as a result of these in-house tests, SSES 053C believes that the POLAROOFF FIREGARD encapsulant material could be used successfully, without a primer, over asbestos millboard on FF-1052 class ships. The material is non-flammable, thermally stable, and possesses good viscosity, sag, and adhesion characteristics. SSES 053C can support 022B with any future shipboard evaluations of this product, including initial applications and follow-up inspections. If requested, evaluations of other encapsulant products by different manufacturers can also be performed by SSES 053C.



C. J. Arazy

Copy to:
053, 053C(2)



Sample: FIRECARD ISO 1000 #3
Size: 25.85 mg
Rate: 100/MIN 100ML/MIN A
Program: TGA Analysis V2.0

TGA

Date: 21-Feb-89 Time: 14:05:12
File: 053C.15 TGA.DG
Operator: SL9
Plotted: 21-Feb-89 15:15:28

