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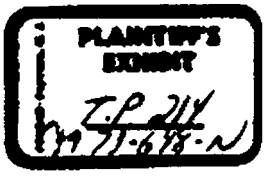
STUDY OF ASBESTOS ELIMINATION REPLACEMENT AND PERSONNEL PROTECTION

Prepared for

Naval Ship Engineering Center
Mr. A. Winer
Code 6101E

Under

NAVSEC Contract N00024-76-C-4451
Task 6101-30



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1.0 INTRODUCTION

1.1 Scope

This report has been prepared by Designers and Planners (D&P) Inc. in response to NAVSEC Task 6101-30 under contract N0-024-76-4451. The task concerns engineering studies of asbestos replacement and personnel protection in Naval shipboard applications.

Specifically, the following subtasks were identified as part of this task.

- o Consultation with the Navy Environmental Health Center with reference to equipment and protective clothing to be used during asbestos rip-out, selection of pass/fail criteria for operations on asbestos containing materials and examination of the usefulness of electron microscopy.
- o Preparation of Item Control Recommendations for entering new items into the Supply System.
- o Determination of substitutes for asbestos millboard.
- o Provision of liaison with NAVSECPHILADIV on tests of asbestos substitute materials.
- o Provision of support and liaison with NAVSECPHILADIV relative to substitutes for asbestos pipe hanger liners.

1.2 Approach

In order to accomplish the task, several actions were taken based largely upon the knowledge and contacts made during the preceding studies carried out under NAVSEC Task 6101-22. Those actions included:

- o Consultation with each of the Naval Shipyards on the status protective clothing, pipe hanger liners, and the use of asbestos millboard.
- o Consultation with NAVSECPHILADIV and NAVSHIPYDPHILA on the status of pipe hanger liner substitutes and test results and asbestos millboard substitutes.
- o Consultation with vendors of protective clothing, respirators and insulation.
- o Consultation with NAVENVIRHLTHCEN personnel on the asbestos pass/fail criteria, measurement program, and selection of materials.

Results of the study are discussed in Section 2 of this report which is organized as follows:

Protective clothing,

Respirators, Supplied-Air

Welders blankets

Millboard

Pipe hanger liners

Measurement Program

Miscellaneous Items

Recommendations are made in Section 3 of this report.

2.0 RESULTS

2.1 Background

The U.S Navy, in response to national safety and health requirements concerning asbestos, has instituted procedures designed to insure reduced personnel exposure to this hazard. These procedures include use of safety equipment, ventilation, and improved asbestos removal procedures. Concurrent efforts have been initiated to define suitable replacement materials for asbestos containing products.

OPNAVINST 6260.1 of 9 April 1974, specified limits of exposure of Naval personnel to asbestos. The Chief, Bureau of Medicine and Surgery, was assigned technical responsibility for evaluating asbestos exposures. The Chief of Naval Material was directed to provide technical assistance to define appropriate industrial hygiene controls and develop remedial projects.

NAVSEA Instruction 5100.2, 24 October 1975, established NAVSEA policy on the elimination of asbestos in ship construction and maintenance and directed actions to further reduce asbestos exposure. The following specific policy items were addressed:

a. Asbestos and materials containing asbestos shall not be used in the construction, overhaul, repair, and maintenance of naval vessels nor shall such materials be used in any facility or operational application where suitable alternate materials have been designated. However, in locations where asbestos materials are presently installed rip-out operations shall not be performed for the sole purpose of eliminating asbestos.

b. This instruction applies to all asbestos containing materials but the implementation details are currently available for thermal insulation only. As additional substitute materials are developed, appropriate specification and instruction revisions shall be made for implementation of this policy.

c. Personnel working with asbestos shall be provided with, and be required to use, protection and safeguards in accordance with OPNAVINST 6260.1.

Chapter 635 of the Naval Ships Technical Manual (NSTM) was revised, 15 April 1976, to eliminate asbestos containing insulation, bringing it into correspondence with MIL-STD-769 and related specifications for asbestos free insulation. Appendix A of Chapter 635 provides safety instructions for insulation workers.

Under the title of "Asbestos Replacement/Personnel Protection Program," tasks were assigned in support of OPNAVINST 6260.1 and NAVSEA INST 5100.2. Subtasks were assigned to NAVSECPHILADIV for tests of asbestos substitutes, to NAVENVIRHLTHCEN for measurements of asbestos contamination and program recommendations, and to D&P as described in Section 1.1.

2.2 Protective Clothing

Appendix A of Chapter 635 of the NSTM states (635-A.2.2)

> d. Asbestos and fibrous glass handlers disposable coveralls and clothing in accordance with MIL-C-29133 (Navy) providing whole body, head, hand, and foot coverings for use by personnel exposed to airborne concentrates of asbestos fibers shall be provided. Cloth hoods, such as painters hoods, shall be worn for head covering. Disposable plastic gloves

shall be worn to protect hands. Cloth gloves may be worn inside the plastic gloves for comfort, but shall not be used alone. Sleeves shall be made secure at the wrist by use of flaps provided or by use of masking tape. Stock numbers for coveralls by size are:

X-Small	NSN 8415-00-601-0792
Small	NSN 8415-00-601-0793
Medium	NSN 8415-00-601-0794
Large	NSN 8415-00-601-0797
X-Large	NSN 8415-00-601-0801
XX-Large	NSN 8415-00-601-0802

The Naval Shipyards were surveyed to find how acceptable were the coveralls listed above and to find out what shoe coverings and gloves were being used and their acceptability.

It was painfully clear that the instructions contained in the NSTM have not filtered down to the shop level as of 15 September 1976. At least four of the lagging shops in the eight yards had not seen the new Chapter 635 of the NSTM, and were not aware of the clothing requirements.

The Navy Clothing and Textile Research Unit, Natick, Massachusetts is the activity responsible for the development of clothing items and related specifications. The Clothing and Textile Unit, Defense Supply Agency, Philadelphia, Pennsylvania, is the control point.

The information contained in this protective clothing section of this report is current as of 15 September 1976.

Disposable protective clothing is widely available in plastic materials. Polyolefin (TYVEK is duPonts' trade name for spun bonded olefin), polyethylene, polyvinylchloride and rayon are a few of those materials. While flame resistance varies, all melt when exposed to flame and under some conditions may cause serious burns.

2.2.1 Coveralls

A laminated cellulosic material is called [illegible], from which the MIL-C-29133 coveralls are made. The specification requires that the material not melt or drip in the flame test. One trade name for the cellulosic material is KAYCEL.

Three users of the coveralls in the stock system (MIL-C-29133) report general satisfaction with the items. Every user reported that they tear easily when snagged on sharp objects. Two users reported that the XX-Large size is not large enough for some of their workers. One previous user reported that the stiching is inadequate and is now using double stitched KAYCEL coveralls obtained on local purchase.

One previous user found that the clothing did not breathe well enough and tended to creep and bind in the shoulder and crotch. As a result that yard is using a launderable 60/40 cotton dacron blend coverall. Several iterations of laundering procedure (done under contract) were required to get the residual asbestos fiber content down. The problem was primarily in pocket areas; pockets are being eliminated.

The remaining three yards are using local purchase disposable coveralls, made of TYVEK.

2.2.2 Shoe Coverings

Two yards are using the shoe covering (bootie), in insulation work, that has been put into the system for nuclear workers (NSN 8430-00-890-2079). These booties meet MIL-F-82240, and are

vinyl chloride film (Type I, class 2 of L-P-375). One of the two yards is ordering the bootie, to MIL-F-82240, except for white or green color (the stock numbered item is yellow). Two other yards are using plastic booties bought under local purchase. Four are not using any shoe covering or are taping plastic to coveralls.

2.2.3 Gloves

Three yards are using cotton gloves (NSN 8415-00-268-8330). One yard is using a leather drivers glove. One yard is using a vinyl coated cloth glove. Three yards are using disposable plastic gloves of differing types; two are using surgical gloves, one yard for all applications,.one yard only when handling cement (which irritates skin).

2.2.4 Hoods

Two yards are not using hoods. Two are fabricating hoods locally from cotton cloth. Two are using a disposable hood made of TYVEK. One is using a hood which is part of an approved air-fed respirator systems.

When air-fed respirators are used, NIOSH approval is for respirator systems, which include specific hoods. Substitution of elements of the respirator system, for example, using one hood in place of another, technically invalidates the approval. For additional information on respirator systems see Section 2.3.

2.3 Respirators

2.3.1 General

Basic standards are set by the Occupational Health and Safety & Health Administration (OSHA). The National Institute for Occupational Safety and Health (NIOSH) acts in an advisory capacity to OSHA and, among other duties, tests and certifies items of safety equipment for workers such as respirators. NIOSH prepares and publishes lists of certified products.

The Navy, by means of OPNAVINST 6206.1 and NAVSEAINST 5100.2, promulgated requirements for respiratory protection (and other protective devices) for workers engaged in asbestos work. In addition, the Naval Ship Technical Manual Chapter 635, Appendix A, deals with the required protective devices.

2.3.2 OSHA Requirements

These are found in CFR Title 29, Chapter XVII. Section 1910.93(d)(2)iii delineates three different classes of respirators depending on the expected concentration of airborne asbestos. The type of respirators required vs the limiting airborne asbestos concentrations are given below. Limit refers either to the ceiling or to the eight hour time weighted average.

TWA	Type respirator
Less than 10X limit	A
10 - 100X limit	B
over 100X limit	C

The current time weighted average limit (effective 1 July 1976) is 2 asbestos fibers per cubic centimeter of air, with a ceiling exposure limit of 10 fibers per cubic centimeters of air. Since the extent of exposure cannot be predicted well it must be assumed that a shipboard worker engaged in asbestos insulation removal would require a Type C respirator.

Type C respirators are defined as a supplied-air continuous flow or pressure demand respirator which consists of a source of respirable breathing air, a hose, a detachable coupling, a control valve, an orifice, a demand valve or pressure demand valve, an arrangement for attaching the hose to the wearer, and a facepiece, hood or helmet. Regulations for approval of respirators are defined in 30 CFR Part 11. Approvals under these regulations are issued jointly by the U.S. Department of the Interior, Mining Enforcement and Safety Administration (MESA) and NIOSH.

Additional requirements relating to the air supply are found in OSHA regulation 1910.134(d)2(ii) which requires temperature monitoring of the air.

The quality of air supply for human breathing is defined in the Compressed Gas Association Commodity Specification G-7.1-91966 (Class D).

2.3.3 NIOSH Requirements

NIOSH under authorization of the Coal Mine Health and Safety Act of 1969 and the Occupational Safety and Health Act of 1970, provides a testing, approval and certification program and develops performance regulations, tests and certifies

protective devices and verifies the quality of manufacture of these devices.

Supplied respirators which are certified by NIOSH are given by manufacturer and model number in Appendix C of the DAC report on Task 6101-22, dated 30 June 1976. It must be emphasized here that these certifications are for complete Type C supplied air respirator systems and any interchange of parts from different vendors would render the NIOSH certification invalid.

2.3.4 Navy Requirements

General

The requirements for respiratory protection for personnel engaged in asbestos work are given in OPNAVINST 6260.1 and NAVSEA INST 5100.2. In addition Appendix A to Naval Ships Technical Manual Chapter 635 (NAVSEA 901-LP-635-0000) calls out safety requirements for insulation workers. This chapter also references Chapter 9880, Section II, of NSTM (Damage Control: Practical Damage Control).

In general, these three documents follow the OSHA and NIOSH requirements but to be in strict accordance, Chapter 635 requires minor changes. These are given in Section III, Recommendations, of this report.

2.3.5 Activities Involved

Within the Department of Defense, the Defense Supply Agency unit at Richmond, Va. controls Defense General Supplies including FSC 4240, respirators. The Naval Construction Battalion, Port

Huenome, California, prepares specifications for respirators. Edgewood Arsenal, Maryland, tests respirators for the Military services.

GGG-M-125 is the general specification for respirators and respirator assemblies. Slash sheets specify individual types of respirators. Supplied air respirators are covered in the following shash sheets:

GGG-M-125/1	Respirator Assemblies: Air Line, with Facepiece (Supplied Air).
GGG-M-125/2	Respirator Assemblies: Air Line, Helmet, (Supplied Air).
GGG-M-125/3	Respirator Assemblies: Air Line, with Disposable Hood, (Supplied Air).

GGG-M-125/9 is a supplied air respirator for abrasive blasting operations and /10 and /11 have powered-air-purifying units. The other respirators protect against gases and dusts. In addition to the MESA/NIOSH approval requirement under 30 CFR, Part 11, the specifications contain requirements for such aspects as lens quality, marking, etc.

GGG-M-130 is a specification for disposable filter masks.

2.3.6 Identification of Approved Respirators

An attempt was made to correlate the OSHA, NIOSH, and Navy requirements for respirators with the applicable federal specifications and standards and to determine which approved supplied-air respirators had National Stock Numbers (NSN) and could be assumed to be in the federal supply system.

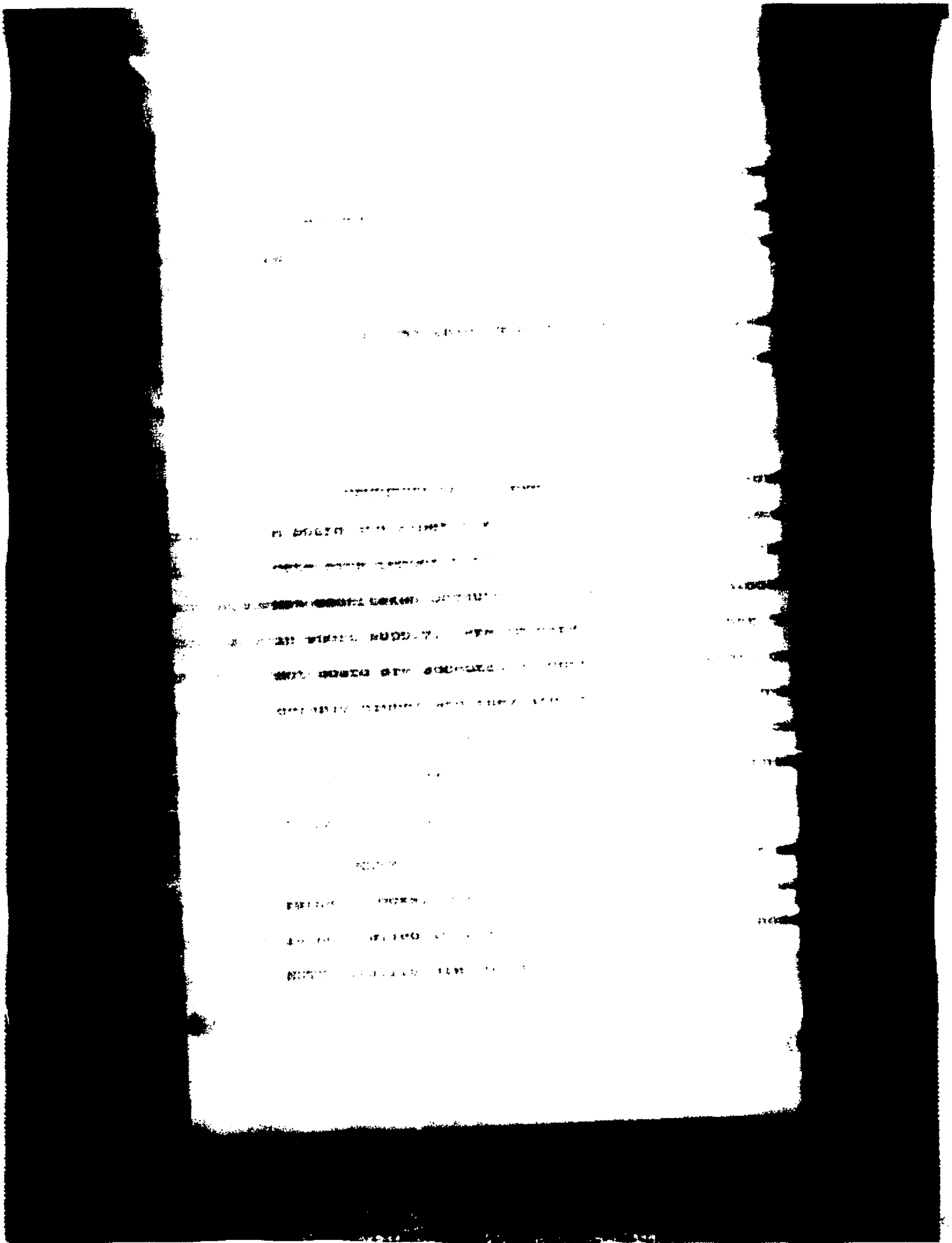
To this end, various codes in NAVSEC and NAVSEA were queried

as well as the Defense Supply Agency (DSA) Item Identification Group in Richmond, Va. No correlation could be established. Therefore, two [illegible] manufacturers of this equipment were consulted and no correlation could be established. It does not appear that air supplied respirators of an approved type are in the federal stock system.

2.4 Welders Blanket

While no completely satisfactory substitute for asbestos blankets and cloths has been found, a number of materials are available for use. To introduce these materials into the stock system as interim materials, Item Control Recommendations, NAVSUP Form 87, were prepared for the following items, see Appendix B:

1. An 18 ounce amorphous silica fabric (REFRASIL - UC 100-48)
2. A 34 ounce amorphous silica fabric (REFRASIL - UC 100-06)
3. An amorphous silica fabric, coated with silicone rubber (to 22 ounces) (REFRASIL C 100-48(Red))
4. A fibrous glass fabric coated with silicone rubber (to 32 ounces) (FABRICOTE 1584)



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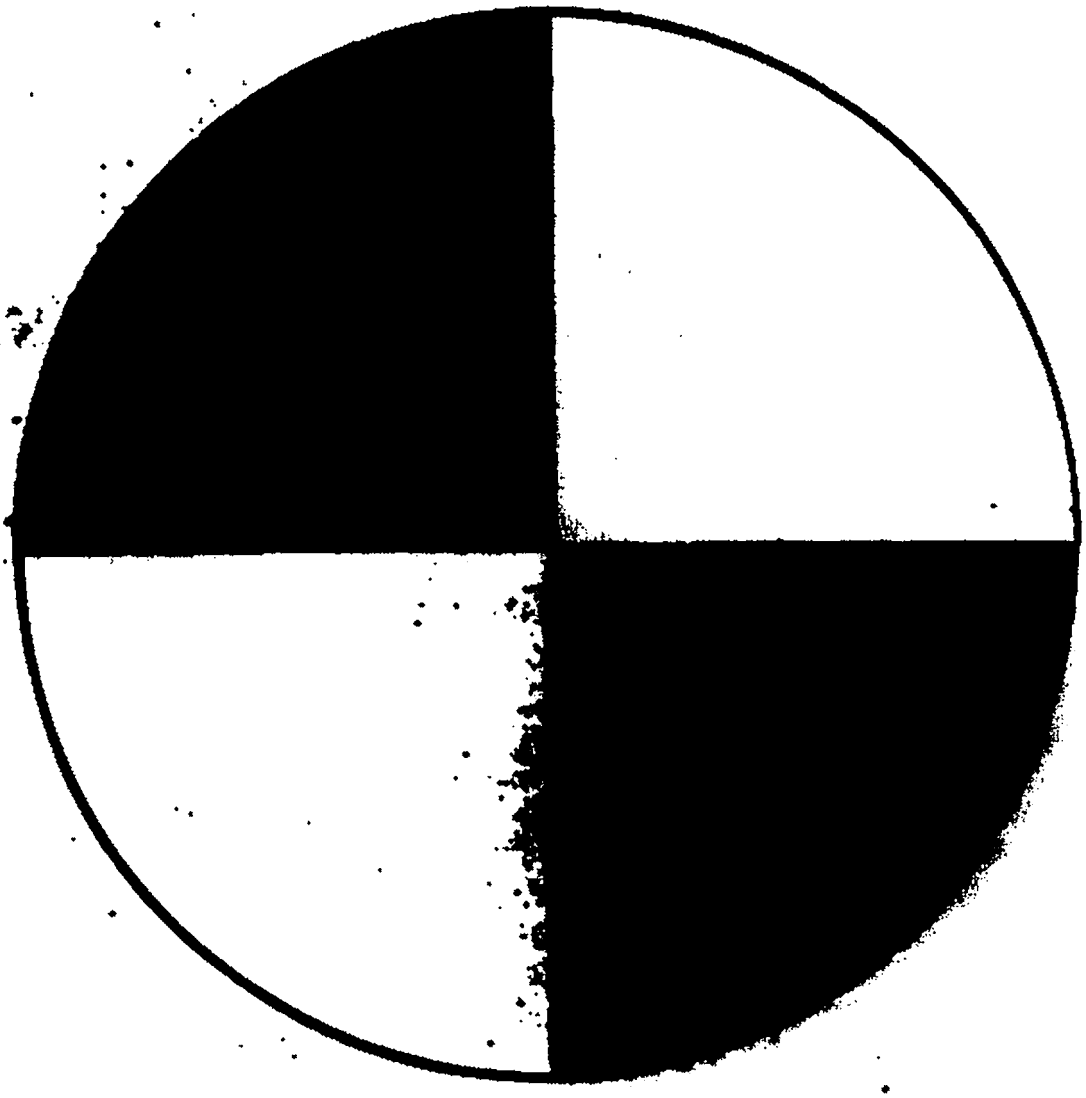

2.5 Asbestos Millboard

Asbestos millboard is intended for interior use to serve as temporary protection against fire (surface flame spread), heated gas, liquid or solid objects and against acids and corrosive liquids.

It is available in sheet form with thicknesses of 1/6, 1/8, 3/16, 1/4, 3/8, and 1/2 inch, and widths of 42 inches and lengths of 48 or 96 inches (HH-M-351E).

2.5.1 Kaowool "M" Board and Fiberfrax Hot Board

NAVSECPHILADIV investigated the acceptability of Kaowool M board and Fiberfrax Hot Board as a substitute for calcium silicate high temperature insulation block (MIL-I-2819F). This check was undertaken because 1" thick insulation block was sometimes in short supply. Preliminary reports are that "M" board and Hot Board are acceptable substitutes, however, costs are considerably higher and they are not manufactured in thicknesses less than 1/2 inch. Indications are that the 1" calcium silicate is no longer in short supply and substitution should not be necessary.

2.5.2 Millboard Used in Boilers

NSTM 9510, Boilers, defines methods for constructing boiler furnace docks, rear and sidewall linings. The use of millboard is not called for, and materials other than those listed under NSTM 9510.116 are to be used only in an emergency.

NSTM 9510 calls for a one inch thickness of insulating block next to the steel casings. It has been reported that some boiler furnace plans call for 1-1/8 or 1-1/4 inch of insulating block next to the boiler casing. Insulating block under MIL-I-2819F is supplied in thickness of 1, 1-1/2, 2, 2-1/2, 3, 3-1/2, or 4 inches. Therefore, asbestos millboard is sometimes used to make up the required thickness of insulating block next to the boiler casing. As an alternative to asbestos millboard it was reported that a layer of mineral wool has sometimes been used.

An example of the variance in the Naval shipyard use of asbestos millboard can be drawn between Philadelphia and Norfolk Naval Shipyards. Philadelphia Naval Shipyard, Shop 41 (Boiler) stated they did not use asbestos millboard and had no need for a substitute; at Norfolk Naval Shipyard, Shop 41 reported that they occasionally used asbestos millboard in 1/8 or 1/4 inch thicknesses to build up the required thickness of insulation next to the boiler casings. An example given was the recent use of asbestos millboard in the boilers on the USS America (CV66).

2.5.3 Joiner Bulkheads (PHM-1)

An asbestos containing material was used as a bulkhead liner in the engine compartment and as some joiner bulkheads on the PHM-1. It was not identified as asbestos millboard but as as asbestos containing material.

The specifications for the follow on PHM-3 class vessels state that asbestos free material shall be used in its construction.

No retrofit is presently scheduled to remove the asbestos containing material. However, when an ROH is scheduled, replacement will be considered.

2.5.4 Welders Booths

No instances were found where asbestos millboard was being used as dividers for welders booths. These booths are normally partitioned using REFRASIL or one of the many other fibrous glass cloths available.

2.6 Pipe Hanger Liners

In some applications, asbestos tape or cloth has been used to line hangers which support piping runs aboard ... The liner reduces heat transmission. Some Naval shipyards have been substituting fibrous glass tape in those applications. D&P was requested to review the acceptability of the substitution.

2.6.1 Present Requirements

General Specifications for Ships, Section 505

> For services below 200 degrees F, pipe hangers shall be lined with a liner material to prevent metal to metal contact between the pipe clamp and pipe when the pipe clamp and pipe are of dissimilar materials.
>
> For services from 200 degrees F up to 650 degrees F, pipe hangers shall be lined with a liner material to prevent metal-to-metal contact between the pipe clamp and the pipe. For services above 650 degrees F., minimum contact hangers shall be used.
>
> For all hot services, the hanger rod between the pipe clamp and resilient mount shall be of sufficient length to preclude mounts from being subjected to temperatures in excess of 140 degrees F.
>
> Applicable liner materials shall be in accordance with Table 6. Asbestos liner materials shall not contain any metallic particles or reinforcing wires.

TABLE 6. PIPE HANGER LINER MATERIAL

Temp., degrees F	Liner material & Form	Applicable specification
Up to 180	Synthetic rubber channel, block type or sheet rubber cemented to hanger clamp	MIL-B-6855, class II, 60 durometer
Over 180 to 450	Silicone rubber	ZZ-R-765, class II, 60 durometer
Over 450 to 650	Asbestos: Felt, Tape,	HH-P-1784 SS-C-466, form IV, or HH-T-1782 class I, grade AA or AAA

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TABLE 6. (CONTINUED)

Cloth	SS-C-466, Form 1, Grade AA or [illegible] Reinforced); or SS-C-1783, Class 1, grade AA or AAA;
Sheet	MH-P-46

Standard Drawings

Hangers, pipe for surface ships Dwg # 810-1385781
For sound and vibration reduction, the pipe clamp shall be lined with 1/4 in. thick rubber. Liner to be in accordance with MIL-R-6855, class 2, 60 durometer for fluid temperatures up to 125°F.

For piping with fluid temperatures above 125°F a liner of 1/8 in. asbestos in accordance with SS-C-466, type IV shall be provided between the pipe and clamp.

Hangers, pipe for submarines Dwg. # 5000-S4823-1385782
where piping temperature exceeds 180°F the following materials shall be used in lieu of rubber, MIL-S-6855 specified in the list of materials:

(A) Silicon rubber, ZZ-R-765 Class II grade 60 Max 550°F), or
(B) Asbestos felt, MIL-F-20077, or
(C) Asbestos tape MIL-C-4117, Cl 1 (non-metallic) Type XX or XXI Grade AA, AAA or AAAA
(D) Non-wire reinforcing cloth, SS-C-466 (Navy-ships), of a style containing not less than 90 percent asbestos.

2.6.2 Status of Liner Program

NAVSEC, Philadelphia had previously been assigned a task to determine through shop (laboratory) test, the acceptability of fibrous glass pipe hanger liners. This is an ongoing task which has not been completed as of the date of this report.

In conjunction with this an attempt was made (by both NAVSECPHILADIV and D&P) to determine if the Naval Shipyards had used fibrous glass pipe hanger liners aboard ship in the past and if so, had the application/results been satisfactory.

Personnel in the Design and Production Departments of the Naval Shipyards were asked to identify ships in which fibrous glass liners had been installed. The following ships were tentatively identified as having had fibrous glass pipe hanger liners installed:

SSN 596	Mare Island
SSN 618	Mare Island
SSN 620	Portsmouth
SSN 635	Portsmouth
SSN 646	Portsmouth
SSN 664	Portsmouth
SSN 673	Portsmouth
SSN 674	Portsmouth
SSN 676	Portsmouth
FF 1072	Charleston
FF 1078	Charleston

Three fibrous glass products have been identified as being used by the shipyards as pipe hanger liner material.

[illegible]	ALPHA [illegible]
Portsmouth	Claremont #1[illegible]
Charleston	NSN 8315-00-267-1634
	NSN 8315-00-267-1635

It was the intent of this task to identify and visit several ships which had had fibrous glass pipe hanger liners installed, and the liners would then be examined to see how well they had withstood pounding, vibration, wetness, etc.

2.6.3 Results

Since shipyard personnel could not positively identify on which piping system or in which compartments the liners had been installed, no ship visits were made.

Without positive location of fibrous glass liners, it would be costly and difficult to examine their performance because in general the hangers and liners are enclosed by the insulation covering the pipes. To inspect the liner the insulation must be removed, and subsequently it must be replaced.

If inspection of liners in service revealed no damage, it would not guarantee that fibrous glass would be an acceptable substitute in all applications for long term use because the conditions of use would not be known. On the other hand, if inspection revealed damaged liners, it could lead to a general prohibition of use.

Three fibrous glass products have been identified as being used by the shipyards as pipe hanger liner material.

Mare Island	ALPHA Catalog #320[illegible]
Portsmouth	Claremont #19T25
Charleston	NSN 8315-00-267-1632
	NSN 8315-00-267-1633

It was the intent of this task to identify and visit several ships which had had fibrous glass pipe hanger liners installed, and the liners would then be examined to see how well they had withstood pounding, vibration, wetness, etc.

2.6.3 Results

Since shipyard personnel could not positively identify on which piping system or in which compartments the liners had been installed, no ship visits were made.

Without positive location of fibrous glass liners, it would be costly and difficult to examine their performance because in general the hangers and liners are enclosed by the insulation covering the pipes. To inspect the liner the insulation must be removed, and subsequently it must be replaced.

If inspection of liners in service revealed no damage, it would not guarantee that fibrous glass would be an acceptable substitute in all applications for long term use because the conditions of use would not be known. On the other hand, if inspection revealed damaged liners, it could lead to a general prohibition of use.

Therefore, it is believed that inspection of existing fibrous glass liners would have limited value. If the two pipe hanger liner drawings and the NSTM requirements are taken together, fibrous glass liners are required only in the range 550°F to 650°F. One option is to extend the use of limited contact liners downward to include the range 550°F to 650°F to eliminate the use of asbestos and the need for another substitute.

2.7 Measurement Program

The Navy Environmental Health Center has been funded to conduct an asbestos measurement program and to make recommendations for changes to asbestos handling procedures and equipment. Discussions were held with the Center to transmit, in advance of this report, our findings and what information we had gained since the report on Task 6101-22.

2.8 Miscellaneous Items

In the course of the study a number of applications of asbestos were uncovered or revi[illegible] discussion of each of these items follows.

2.8.1 Fireman's Clothing

D&P was asked to review the status of fireman's clothing.

As with the disposable clothing, the Navy Clothing and Textile Research Unit is responsible for fireman's clothing. At present fireman's clothing is made from an aluminized asbestos/aramid (nylon) fabric (MIL-C-29143) backed up with a quilted lining. While the Clothing and Textile Research Unit is aware of the asbestos problem they are not funded in FY 1977 to develop a replacement for the asbestos/aramid cloth.

2.8.2 Asbestos Pump Vanes

The Auxiliary Equipment Branch (NAVSEC 6153D) has approved the substitution of Ryton (Polyphelene Sulfide plus glass and Teflon filler) for the previously used Melamine Asbestos in vane pumps supplied to the Navy by Blackmer Pump Division of the Dover Corporation.

2.8.3 Machinery Space Escape Trunks

To minimize heat transfer to ladders in machinery space escape trunks, the present design uses asbestos insulating pads between the ladder and the bulkhead. In proposing redesigns which meet the intent of the General Specifications for Ships, one of the criteria being assumed by D&P is the use of non asbestos insulation in the application.

2.8.4 Anti Sweat Paints

D&P was asked to investigate anti-sweat paints of two types.

1. Coating Compound, Paint Antisweat, TT-C-492C.
2. Paint, Fire-Retardant, MIL-P-15144, plus Vermiculite, MIL-V-15196.

The coating compound, FSC 8010, is controlled by the Federal Supply Service. TT-C-492C specifies the components of the paint except for an extender which is nominally 90% by weight of the pigment (27% of the product weight). There are two approved suppliers. One supplier states that the extender is entirely antimony oxide. The other supplier states the extender is 20% diatomaceous silica and 7% asbestos by weight of solids.

The fire retardant paint contains no asbestos. The specification for vermiculite, MIL-V-15196 has been superseded by HH-I-585, Insulation, Thermal, Vermiculite, which calls out ASTM Standard C516 for Vermiculite. No mention is made of asbestos.

3.0 RECOMMENDATIONS

3.1 General

In the course of this study a number of [illegible] Discussion of those recommendations is presented below.

3.2 Insulation Color Coding

The bulk of the insulation in Navy ships is block or preformed insulation. Use of such insulation containing asbestos is presently prohibited, but it is difficult to distinguish between asbestos-containing and asbestos-free forms of block and preformed insulation during rip-out. (It is relatively much easier to distinguish between asbestos cloth and fibrous glass cloth and between other forms of asbestos containing insulation and the substitutes.) It is suggested that insulation manufacturers be requested to color code the insulation for all users. (Manufacturers have objected to the problems involved in setting up a separate line for Navy products). In that way, if in future rip-out non-color-coded insulation were encountered, personnel would at least be alerted to the danger. Non-color-coded asbestos-free insulation installed up to the change over point would continue to be treated as though it were asbestos-containing. At present there is no way of knowing which material is being torn-out, and there appears to be no assurance that the situation will be resolved at any point in the future.

3.3 Technical Manual Revision

It is apparent that the promulgation of safety requirements through Chapter 635 of the Naval Ships Technical Manual is not

rapid enough to insure compliance in a timely manner. Also, in view of the unsettled status of protective clothing and respirators in terms of what is both safe and acceptable and in terms of clear identification, it is recommended that the Technical Manual be revised to contain only policy statements and that the implementation of those policy statements through recommendations for use of specific items of equipment or clothing be made directly to the expected users. For example:

1. Change Appendix A to NSTM Chapter 635 relating to respiratory protection as follows:

   (a) Paragraph 2.b.1 change "type A, class II" to read "NIOSH Certified Type C supplied air respirators."

   (b) Delete paragraphs 2.b.(2) & 2.b.(3) for two reasons: one, the specified breathing apparatus is not NIOSH certified for this application and also these respirators are emergency equipment stowed in the damage control locker and should be so reserved.

2. Do not assign NSN's to air-supplied respirators. Approved respirators are available from industry in a timely fashion via purchase under "Authorized Federal Supply Schedule Catalogs" by manufacturers' item numbers. The respirators are under FSC Group 4240. Example: Item NIS-2390, New Item Introductory Schedule, Contract Number GS-00S-31030, Minnesota Mining & Manufacturing Co., St. Paul, Minn., 55101 Dept. 220-7W.

However, one problem is that fleet activities do not normally have access to such documents. For those activities data must be provided so that they can order suitable protective equipment. The NSTM should not be relied upon to provide timely dissemination.

This recommendation is made in light of the large number of repair and replacement parts required for each model respirator and the fact that mixing of various items of vendors equipment is not only difficult but would invalidate the NIOSH Certification.

3.4 Respirator Air Supplies

Investigate the compatibility of existing air supplies for these respirators with the applicable OSHA and NIOSH requirements. Of particular interest are the safety and standby devices per OSHA regulation 1910.134(d)2(ii).

3.5 Disposable Clothing

As discussed above, in spite of the instructions contained in Chapter 635 of the NSTM, lagging shops in the shipyards are using a wide variety of clothing items, including in some cases no protection. It is also clear that there is some dissatisfaction with the disposable coveralls now in the stock system. The following are recommended.

1. Request the Navy Clothing and Textile Research Unit to revise the existing specifications for disposable coveralls (MIL-C-29132 for the material and MIL-C-29133 for the coverall) to increase tear resistance, revise the stitching, add additional sizes, and add requirements to minimize creep and bunching.

2. Since Recommendation 1 is expected to require a year to two years to accomplish, as an interim solution permit the yards to use local purchase of coveralls.

3. Review the fire safety requirements of the coveralls, and if found to be a hazard, prohibit the use of plastic disposable clothing (such as TYVEK and vinyl).

4. Request the Navy Environmental Health Center to determine whether KAYCEL clothing is adequate to protect against asbestos dust.

5. Direct the Naval Shipyards to use full protective clothing and supplied air respirators, as described in Appendix A of NSTM Chapter 635, by more rapid and direct means than the NSTM.

6. Revise Chapter 635 of the NSTM to include the rationale for use of Class C (supplied-air) respirators, i.e., that 100 X the 8 hour time weighted average limit or ceiling limit is expected to be exceeded during any asbestos rip-out.

3.6 Pipe Hanger Liners

1. Continue the effort to identify locations on the ships listed where fibrous glass pipe hanger liners were installed. If such locations can be identified visit those ships to determine acceptability.

2. Continue laboratory tests being conducted by NAVSEC-PHILADIV.

3. Inform all Naval Shipyards that fibrous glass has not been approved as an acceptable material for pipe hanger liners, and to use General Specifications for Ships and Naval Standard Drawings as reference for approved materials.

4. Select a ship now in overhaul and install alternative liner materials in identified locations with the intent of examining the liners after, say, a years' operating service.

5. Alternatively, revise the General Specification and pipe hanger drawings to delete reference to asbestos materials and to require the use of silicone rubber (ZZ-R-765) up to temperatures of 550°F and minimum contact pipe hangers above that temperature. (There are differences in application temperatures in the drawings and the specifications, see 2.6.1.)

3.7 Millboard

Since no application can be found for millboard (for which it is required), it is recommended that its use be prohibited.

APPENDIX A

FACILITIES AND AGENCIES CONSULTED

Federal Supply Service

Paints	Mr. Baldeman	(212) 557-6357 *

Defense Supply Agency, Richmond, Va.

Item Identification	Mr. Oakley	695-4410
Engineering	Mr. Woods	695-3664

U.S. Navy

Portsmouth Naval Shipyard

Shop 56 Superintendent	Mr. Parent	684-2364
Shop 56 Planner	Mr. Patch	684-2350
Code 260.12	Mr. Legere	684-2293

Philadelphia Naval Shipyard

Shop 56 Asst. Supt.	Mr. Sweeney	443-3320
Code 262	Mr. Wolfe	433-3387
Shop 41	Mr. Hilton	433-2260

Norfolk Naval Shipyard

Industrial Hygienist	Mr. Marr	961-4319
Shop 56	Mr. Callis	961-5330
Shop 41	Mr. Scott	961-5743

Charleston Naval Shipyard

Shop 56 Materials	Mr. Schwertsberger	794-5501
Shop 56	Mr. McBride	794-5488
Shop Stores	Ms. Lindsey	794-2713

Long Beach Naval Shipyard

Shop 26 General Foreman	Mr. Vollrath	360-7797

* Commercial number if area code is given, otherwise AUTOVON.

Shop 56 General Foreman	Mr. Webi	360-6406
Code 906 Safety Issue	Mr. Cauley	360-6836
Pipe Shop	Mr. Davis	360-6449
Shop Stores Supervisor	Ms. Sharlean	360-6896

Mare Island Naval Shipyard

Shop 64 General Foreman	Mr. McFadden	253-2373
Technical Supply	Mr. Pollard	253-4402
Code 260	Mr. Schmutz	253-2277

Puget Sound Naval Shipyard

Pipe Shop	Mr. Nelson	439-7849
Shop 56 General Foreman	Mr. Rogers	439-7444
Shop 56 General Foreman	Mr. Brown	439-3221

Pearl Harbor Naval Shipyard

Safety Office	Mr. Roberts	(808) 471-3471

Naval Ship Engineering Center, Philadelphia

	Mr. Rogus	433-3587
	Mr. Vapniarek	433-3587
	Mr. Burt	433-3914

Naval Ship Engineering Center, Hyattsville

PHM Project Office	Mr. Bebar	(301) 436-1720

Navy Clothing and Textile Research Unit

R&D (Fireman's Clothing)	Mr. Andruk	955-2173
(Disposable Clothing)	Mr. Seigfried	955-2785

Specifications (Disposable Clothing)	Mr. Loparto	955-2789
Planning	Mr. Bailey	955-2785
Navy Environmental Health Center	Mr. Crawl	989-3863

Contractors

Disposable Clothing		
Mars Manufacturing Co.	Mr. Fisk	(704) 254-0741
Ness Disposables	Mr. Abell	(704) 274-2100
Unitrex Products	Mr. Beyer	(215) 365-7400
Edmont-Wilson	Mr. Welsh	(614) 622-4311
Durafab	Ms. McCoy	(817) 645-8851
Respirators		
3M	Mr. Savin	(609) 667-1361
Mine Safety Appliances	Mr. Leary	(202) 785-2565
Anti-Sweat Paint		
Steven Industries	Mr. Steven	(201) 437-6501
Farwest Paint Mfg. Co.	Mr. Sheehan	(206) 762-1344
Insulation		
Clairemont	Mr. Roy	(203) 238-2334

APPENDIX B

ITEM CONTROL RECOMMENDATIONS

ITEM CONTROL RECOMMENDATION

NAVSUP FORM 87 (10-51)

NOTE: For use in recommending (1) deletion of requirement of items, (2) discontinuance of stocking of items, (3) assignment of new items, (4) supersedure of existing items, (5) combination of [illegible]

FROM (Activity) NAVSEC (Code 6101) Mr. A. Winer	RECOMMENDATION NO.	DATE
TO: SECTION (Code 5641) Mr. J. Wisherd	LOCAL ITEM OR STOCK NO.	
TO: DD FORM 146 ATTACHED ☐	FEDERAL DESCRIPTION PATTERN NO.	FEDERAL STOCK NO.
RECOMMENDATION FOR ☐ TRANSFER ☐ DISCONTINUANCE ☐ NEW ITEM ☐ SUPERSEDURE	RECOMMENDED INVENTORY MANAGER (DASD, etc.)	STANDARD NAVY STOCK NO. (If any)

NAME OF ITEM — Protective Blanket, High Temperature, Silicone Rubber Coated Lightweight (Asbestos Free)
(Insert, in capital letters)

DESCRIPTION: For new items describe in detail on DD FORM 146, using Federal Description Pattern, if published. Indicate Military, Federal, or Manufacturer's specification drawing or procurement reference number and indicate known sources of supply.

Continuous filament, amorphous silica fabric, 0.024 inch nominal thickness, 18 ounces per square yard, coated both sides with silicone rubber compound (Dow Corning Silastic S2351) to a nominal thickness of 0.026 inch and a nominal weight of 22 ounces per square yard. The material shall comply with MIL-STD-767 and MIL-I-24244, 33 inches wide nominal, in 50 yard rolls. Red in color

Manufacturer's Trade name: REFRASIL Item Code: C-100-48 (Red)

Manufacturer: Fabricote Division of R&S Glass Fabrics Co., Inc., 724 E. 60th Street, Los Angeles, CA., 90001

(If more space is needed, use plain sheets, numbering them "Page 1 of ..." etc., and showing on each the name and recommendation number of initiating activity)

REASON FOR RECOMMENDATION: Urgent requirement to eliminate asbestos containing materials Breathing asbestos fibers is a serious health hazard.

STOCK DATA OF INITIATING ACTIVITY FOR NEW ITEMS AND TRANSFERS OR SYSTEM STOCKS FOR SUPERSEDED AND DISCONTINUED ITEMS
(Figures based on unit of issue)

ITEM OR STOCK NO.	ESTIMATED YEARLY REQUIREMENTS (New items only)	PAST 6 MONTHS ISSUES	ON HAND	ON ORDER	ACCOUNT	UNIT PRICE	UNIT OF ISSUE
REFRASIL C-100-48(Red)	15,000 yds.					$8.50 yd.	

EXECUTING OFFICIAL (Name, title, and code) (Signature) DATE

ACTION BY DUSANDA

EXECUTING OFFICIAL (Name and title) (Signature) DATE 5026.0

ITEM CONTROL RECOMMENDATION

NAVSUP FORM [illegible]

NOTE: [illegible]

FROM: (Activity) NAVSEC (Code 6101) Mr. A. [illegible]

TO: [illegible] (Code [illegible]) Mr. [illegible]

DD FORM 146 ATTACHED ☐

FEDERAL DESCRIPTION PATTERN NO.

RECOMMENDATION FOR ☐ TRANSFER ☐ DISCONTINUANCE ☒ NEW ITEM ☐ SUPERSEDURE

RECOMMENDED INVENTORY MANAGER

NAME OF ITEM: Protective Blanket High Temperature Silicone Rubber [illegible]

DESCRIPTION: For new items describe in detail on DD FORM 146, using Federal Description Pattern [illegible] manufacturer's specification drawing or procurement reference number and indicate known sources of supply.

Continuous filament, fibrous glass fabric, 0.026 inch nominal [illegible] square yard, coated both sides with silicone rubber compound [illegible] S2351) to a nominal thickness of 0.039 inch, and nominal [illegible] yard. The material shall comply with MIL-STD-767 and MIL [illegible] nominal width, in 50 yard rolls. White in color.

Manufacturers Trade Name: FABRICOTE Item Code: 1584 (white)

Manufacturer: Fabricote Division of A&S Glass Fabrics Co, Inc., [illegible] Street, Los Angeles, CA. 90001.

(If more space is needed, use plain sheets, numbering them "Page 1 of ..." and showing on each the name and recommendation number of initiating [illegible])

REASON FOR RECOMMENDATION

Urgent requirement to eliminate asbestos containing materials. [illegible] asbestos fibers is a serious health hazard.

STOCK DATA OF INITIATING ACTIVITY FOR NEW ITEMS AND TRANSFERS OR SYSTEM STOCKS FOR SUPERSEDED AND DISCONTINUED ITEMS

(Figures based on unit of issue)

ITEM OR STOCK NO.	ESTIMATED YEARLY REQUIREMENTS (New items only)	PAST 6 MONTHS ISSUES	ON HAND	ON ORDER	[illegible]	UNIT PRICE	[illegible]
FABRICOTE 1584 (WHITE)	80,000 yds					$6.25 yd.	

EXECUTING OFFICIAL (Name, title, and code) (Signature) DATE

ACTION BY [illegible]

EXECUTING OFFICIAL (Name and title) (Signature) DATE

502671

ITEM CONTROL RECOMMENDATION

NAVSUP FORM 4110.5(1)

NOTE: For use in recommending (1) deletion of equipment and items, (2) discontinuance of stocking of items, (3) establishment of new items, (4) retention of obsolete items (5) combination of the above.

FROM: (Activity) NAVSEC (Code 6101) Mr. A. Winer (Code) | RECOMMENDED ITEM NO. | DATE

VIA: (Activity (Use abbreviation where possible)) SPCC (Code 5641) Mr J. Wisherd | LOCAL ITEM OR STOCK NO

TO: | FEDERAL DESCRIPTION PATTERN NO | FEDERAL STOCK NO

DD FORM 1B ATTACHED ☐ | RECOMMENDED INVENTORY MANAGER (USSO, etc.) | STANDARD NAVY STOCK NO (If any)

RECOMMENDATION FOR ☐ TRANSFER ☐ DISCONTINUANCE ☒ NEW ITEM ☐ SUPERSEDURE

NAME OF ITEM Protective Blanket, High Temperature, Lightweight (Asbestos Free)
(Insert, in capital letters)

DESCRIPTION: For new items describe in detail on DD FORM 1B using Federal Description Pattern, if published, indicate Military, Federal or Manufacturer's specification drawing or procurement reference number and indicate known sources of supply

Continuous filament, amorphous silica fabric, uncoated, 0.026 inch nominal thickness, 18 ounces per square yard. Shall maintain flexibility up to 1000 degrees Centigrade. Chloride content shall comply with MIL-I-24244. To be 36 inches nominal width in 50 to 55 yard rolls. Natural color.

Manufacturers Trade Name: REFRASIL- Item Code: UC-100-48

Manufacturer: Materials Division of HITCO, Armco Steel Corporation, 1600 West 135th Street, Gardena, CA., 90249

(If more space is needed, use plain sheets, numbering them "Page 1 of ," etc., and showing on each the name and recommendation number of initiating activity)

REASON FOR RECOMMENDATION: Urgent requirement to eliminate asbestos containing materials. Breathing asbestos fibers is a serious health hazard.

STOCK DATA OF INITIATING ACTIVITY FOR NEW ITEMS AND TRANSFERS ON SYSTEM STOCKS FOR SUPERSEDED AND DISCONTINUED ITEMS
(Figures based on end of month)

ITEM OR STOCK NO.	ESTIMATED YEARLY REQUIREMENTS (New items only)	PAST 9 MONTHS ISSUES	ON HAND	ON ORDER	ACCOUNT	UNIT PRICE	UNIT OF ISSUE
REFRASIL UC-100-48	30,000 yds.					$6.58 yd.	

CERTIFYING OFFICIAL (Name, title, and code) (Signature) DATE

ACTION BY DUSANDA

CERTIFYING OFFICIAL (Name and title) (Signature) DATE 5/26/72