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# NOISE EQUIPMENT INVENTORY FOR FF-1052 CLASS SHIPS

July 1978



Prepared for

PERA(CRUDES)
PHILADELPHIA NAVAL SHIPYARD
Philadelphia, Pennsylvania

Under Contract N00140-77-D-0417-0018 new



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Prepared by

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# NOISE EQUIPMENT INVENTORY FOR FF-1052 CLASS SHIPS

July 1978

PERA(CRUDES)
PHILADELPHIA NAVAL SHIPYARD
Philadelphia, Pennsylvania

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# NOISE EQUIPMENT INVENTORY FOR FF-1052 CLASS SHIPS

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# ABSTRACT

An inventory listing of resilient mounts and flexible hose connections on KNOX class frigates is presented. This information was developed to support the maintenance program for FF-1052 class ships.

# SUMMARY

KNOX class frigates have many resilient mounts and flexible hose connections in their design. This large population of highly critical sound-isolation equipment necessitates an effective maintenance program to assure optimum low-noise performance.

As a basic part of an effective maintenance inspection program, a complete inventory listing of resilient mounts and flexible hose connections is needed, and such a listing is provided by this report.

The maintenance program will comprise several elements. An initial inspection to determine correct installation is essential. Periodic inspections in accordance with MRC requirements, supplemented by Equipment Guide Lists developed from Tables 2-1, 2-2, and 2-3, will serve to detect failures or deterioration between overhauls. Pre-overhaul planning for resilient mount and flexible hose replacement on a blanket basis with a POT&I check for detailed conditions will ensure renewal of the components just prior to the expiration of their allowable lifetimes.

During the development of the inventory listing, it was noted that the resilient mount Maintenance Requirement Card is not complete. The information needed to complete that MRC is provided in this report.

# CONTENTS

# 1
# INTRODUCTION

One of the characteristics of USS KNOX (FF-1052) class frigates is their quiet acoustic signature. The reduction of structureborne noise was a fundamental design consideration for this class program. Quiet machinery with low vibration levels was selected. Resilient mounts were used in conjunction with the quiet machinery to help ensure a minimum noise level. To preclude other structureborne noise paths to the ship structure, flexible connections were used in each resiliently mounted machinery installation. Flexible hoses were used to make the connections from the cooling water, fuel, lube oil, compressed air, and other service systems to the machinery.

The above design features have resulted in the use of more than 300 resilient mounts and associated flexible hose connections in each ship of the FF-1052 class. This large population of highly critical sound-isolation equipment demands an effective maintenance system to preserve optimum performance. The foundation for an effective maintenance system must be a well defined program for inspection of noise attenuating components to detect signs of incipient failure in the resilient mounts or flexible piping connections.

As the basis for such a program, this report and inventory listing of resiliently mounted units, and the type and quantity of resilient mountings and associated flexible pipe connections, was prepared. The purpose of this effort is to identify the current typical installation for these ships with respect to equipments requiring resilient mounting to meet noise reduction requirements. Not included in this report are devices installed for improving resistance to shock, such as installed on electronic equipment cabinets; nor flexible connections for services not related to equipments resiliently mounted for noise reduction, e.g., flexible air and hydraulic hoses in the ASROC loader installation.

Section 2 of this report discusses general maintenance requirements for sound-isolation equipment and presents the data developed to support the maintenance program for the FF-1052 class. Section 3 provides recommendations for revising the resilient mount Maintenance Requirement Card (MRC).

# 2
# INSPECTION REQUIREMENTS

As stated earlier, the foundation for an effective maintenance system for sound-isolation equipment must be a well defined program for inspection of the noise attenuating components to detect signs of incipient failure in the resilient mounts and flexible piping connections. Elements of such a program are the initial, periodic, and pre-overhaul inspections, as discussed in Sections 2.1 through 2.3, respectively. The inspection support data for resilient mounts and flexible connections are described in Section 2.4.

## 2.1 INITIAL INSPECTION

A thorough initial inspection is necessary to ensure that the resiliently mounted machinery system is properly installed. The following key points should be checked:

a. *Correct mount type as required by the foundation drawing*
b. Correct mount orientation and direction of loading
c. Proper angular alignment and loading of the mount
d. Proper fasteners.

## 2.2 PERIODIC INSPECTION

Periodic inspection and replacement of resilient mounts and flexible connections is required to preserve effective performance. Two basic MRCs cover the quarterly and semiannual inspection of sound-isolation components:

a. MRC A-176 S-1 for resilient mounts
b. MRC A-709 Q-1 for flexible rubber and neoprene hose, and fittings and supports.

These cards are illustrated in Figures 2-1 and 2-2 respectively. Each contains detailed inspection procedures and component replacement criteria. Of the four ships visited during this study, three had the resilient mount MRC and three had the MRC for flexible hoses.

| SHIP SYSTEM | SUBSYSTEM | MRC CODE |
|---|---|---|
| | Equipment Mountings | A-176 S-1 |

| SYSTEM | EQUIPMENT | RATES | M/H |
|---|---|---|---|
| | None | MM/EN/EM2 | 0.2 |

MAINTENANCE REQUIREMENT DESCRIPTION

1. Inspect resilient mounts.

TOTAL M/H
0.2
ELAPSED TIME
0.2

SAFETY PRECAUTIONS

TOOLS, PARTS, MATERIALS, TEST EQUIPMENT

1. Rags
2. Flashlight
3. Inspection mirror
4. Soap and water solution
5. Silicone grease, FSN 9150-616-9212, or equivalent

PROCEDURE

1. Inspect Resilient Mounts.
   a. Inspect resilient mounts for:
      (1) Rubber to metal bond failure
      (2) Cuts cracks, and abrasions. If these conditions exist, accomplish the following interim actions:
         (a) Clean rubber element with soap and water solution.
         (b) Apply a thin coat of silicone grease.
      (3) Swelling or softening of rubber due to oil absorption.
      (4) Loose or missing nuts, bolts, and cotter pins
      (5) Large areas of dry paint on rubber element

NOTE: A mount with a large area of dry paint on the rubber elements should be replaced. Removal of paint by paint remover or abrasives will damage or deteriorate the rubber.

PAGE 1 OF 1

A2 1FQD N

| LOCATION | DATE |
|---|---|
| Equipment Guide List Recommended | October 1972 |

MAINTENANCE REQUIREMENT CARD (MRC)
11ND NAVSEACENPAC 4700/1 (9-75)

Figure 2-1. MRC Card for Resilient Mounts

| SHIP SYSTEM | SUBSYSTEM | MRC CODE |
|---|---|---|
| | Flexible Hose | A-709 Q-1 |
| **SYSTEM** | **EQUIPMENT** | **RATES** / **M/H** |
| | None | MM/EN/BTI 0.2 |

**MAINTENANCE REQUIREMENT DESCRIPTION**

1. Inspect flexible rubber/neoprene hose, fittings, and supports.

**TOTAL M/H** 0.2

**ELAPSED TIME** 0.2

**SAFETY PRECAUTIONS**

1. Comply with Navy Safety Precautions for Forces Afloat, OPNAVINST 5100 series.

**TOOLS, PARTS, MATERIALS, TEST EQUIPMENT**

1. Rags
2. Flashlight
3. Inspection mirror

**PROCEDURE**

1. Inspect Flexible Rubber/Neoprene Hose, Fittings, and Supports.

NOTE 1: Identification numbers are molded on hose covers. Refer to example for interpretation of identification numbers.

Example: Commercial 1509-16/2Q73
MIL-Spec MIL-H-24135CL1-16/2Q73

| Commercial | MIL-Spec | Interpretation |
|---|---|---|
| 1509 | MIL-H-24135CL1 | Hose type |
| -16 | -16 | ID in 16th of an inch |
| 2Q73 | 2Q73 | Quarter and year of manufacture |

NOTE 2: Installation date should be stamped on a metal tag and attached to hose. Do not install rubber hose that has been on shelf for more than four years, excluding quarter of manufacture.

PAGE 1 OF 2

| LOCATION | DATE |
|---|---|
| Equipment Guide List Recommended | May 1975 |

MAINTENANCE REQUIREMENT CARD (MRC)
FIND NAVSEACENPAC 4100.2 (9-75)

Procedure (Cont'd)

a. Inspect hose for date of installation. Maximum service life is 5 years for wire reinforced hose and six years for polyester reinforced hose.

CAUTION: Hose and fittings shall not be painted, however, replacement is not necessary when only a few drops of paint fall on a hose. Do not attempt to remove paint from hose as solvents and abrasives will damage hose.

b. Inspect hose and fittings for leaks and large painted areas.
c. Inspect fittings for pitting, discoloration, cracks, and corrosion.
d. Inspect hose for cracking, abrasions, bulges, soft spots, twisting, and slippage from fittings.
e. Inspect segmented fittings for loose or shifted bands, retaining rings, loose nuts and bolts.
f. Inspect hose supports for broken welds, loose or damaged clamps, and deteriorated or missing rubber inserts.
g. Operate equipment; inspect hose for vibration damage caused by improper support at fixed ends and for high pulsations, fluid hammer and whipping caused by pressure surges.
h. Stop equipment if not needed for service.

PAGE 2 OF 2

MAINTENANCE REQUIREMENT CARD (MRC)
FIND NAVSEACENPAC 4100.2 (9-75)



Figure 2-2. MRC for Hose, Fittings, and Supports

In consideration of the large number of resilient mounts and flexible connections to be inspected and their diverse locations, both MRCs recommend the use of an Equipment Guide List (EGL) with the controlling MRC. Of the four ships inspected, only one had prepared such EGLs. The EGL is to be prepared by the individual ship, which is necessary since the work center breakdown varies among ships. In addition, maintenance actions listed on an individual EGL must be limited so that no more than a single day's work is specified.

## 2.3 PRE-OVERHAUL INSPECTION

The critical nature of sound-isolation components dictates that a detailed inspection be made as part of the Pre-Overhaul Test and Inspection (POT&I) process. The POT&I Plan for KNOX class frigates should include an item to inspect resilient mounts and flexible connections. The MRC inspection procedures are recommended as a source for development of POT&I sheets.

Current NAVSEA/NAVSEC requirements prescribe that if a resilient mount has not failed or deteriorated in service, it is to be replaced after being in service for 10 years or at the overhaul *closest to, but not exceeding, 10 years from the date of* installation.

The DDEOC overhaul cycle for the KNOX class calls for an overhaul at 54 ± 6 month intervals. Planning for each overhaul should include identifying replacement requirements of all resilient mounts that have not been renewed within the required time interval. Detailed requirements will be determined by the POT&I.

The maximum service life for flexible rubber/neoprene hose is 5 years for wire reinforced hose and 6 years for polyester reinforced hose. Therefore, planning for each overhaul should provide for widespread replacement of flexible connections. Similar blanket replacement should be anticipated at each subsequent overhaul. Specific replacement will be determined by the POT&I.

## 2.4 INSPECTION SUPPORT DATA

To provide the source data necessary for shipboard development of EGLs to accompany MRC A-176 S-1 for resilient mounts and MRC A-709 Q-1 for flexible connections, Tables 2-1 through 2-4 were developed using FF-1052 class drawings.

technical manuals, and Ship Information Books. The data were verified by conducting a sight inventory of each component aboard USS MOINSTER (FF-1097), USS RATHBURNE (FF-1057), USS WHIPPLE (FF-1062), and USS VREELAND (FF-1068). During the inventory, the following general observations were made:

- Many resilient mounts and the majority of flexible connections are not marked with an installation date.
- Flexible connection support resilient mounts are in many instances not being replaced when the equipment mounts are replaced.
- Many flexible connections are not marked with identifying data such as size, type, manufacturing date, etc.
- Many mounts, particularly those in bilge areas, have been painted.

The normal configuration for flexible hoses was as a 90-degree assembly consisting of two hose sections joined by a 90-degree elbow fitting. Most flexible piping is supported by an attachment system at the elbow that includes a resilient mount. The inventory data are presented in the tables as follows:

a. Table 2-1, "Summary of Resiliently Mounted Equipment", identifies machinery equipment items that are resiliently mounted and lists them in Ship Work Breakdown Structure (NAVSHIPS 0900-039-9010) order.

b. Table 2-2, "Resilient Mount Data", presents, in a format designed to facilitate development of Equipment Guide Lists, equipment name and number, SWBS number, equipment location, mount type, number of mounts, and minimum allowable mount height. For the four ships inventoried, the manufacture or cure date and/or installation date for each mount is also shown. Also included in this table are associated hanger assembly resilient mounts. Since the piping configurations vary somewhat, the piping supports are not uniform from ship to ship or equipment to equipment. Typically, however, the piping applications listed were found to contain resilient mount sound-isolation components which should be inspected when accomplishing the MRC for flexible hoses.

c. Table 2-3, "Flexible Connection Data", presents, in a format designed to facilitate development of Equipment Guide Lists for resiliently mounted

equipment, equipment name and number, SWBS number, equipment location, the flexible connection service, the hose type and size; and, for the four ships inventoried, the hose manufacture date and/or installation date. For Aeroquip hoses, the size is given in sixteenths of an inch by the last two digits of the nomenclature. For example, a type 2580-24 hose is a 1-1/2" hose. Hose manufacture and installation dates were recorded exactly as marked on the hose by the manufacturer or installer, e.g., "3/74" or "1Q74".

The following reference notes apply to Tables 2-2 and 2-3 as indicated by their letter designator in the data columns:

Reference Notes

A — Not accessible for recording data
B — Not labeled/marked
C — Markings not legible
D — Painted (some data may have been legible)
E — Covered with insulation/lagging/tape, etc.
F — Data taken from Reference Plan/Technical Manual
G — None installed
H — Not installed — removed for testing/replacement
J — Resilient mount installed but not connected
K — Installation not accessible for determination if a resilient mount was used
L — Data not recorded.

TABLE 2-1 SUMMARY OF RESILIENTLY MOUNTED EQUIPMENT

| SWBS | MACHINERY EQUIPMENT ITEM | |
|---|---|---|
| 2542 | SSTG Gland Leakoff Exhaust Fan | |
| 2543 | Auxiliary Gland Exhaust Fan | |
| 2553 | Main Feed Booster Pumps | |
| 2555 | Main Condensate Pumps | |
| 2556 | SSTG Auxiliary Condensate Pumps | |
| 2563 | SSTG Auxiliary Circulating Sea Water Pumps | |
| 2643 | Lube Oil Purifier | |
| 3142 | 400 Hz Motor Generators | |
| 3424 | SSDG Sea Water Circulating Pump | |
| 4631 | Sonar MG Cabinet | |
| 4631 | Lube Oil Filter Installation (LAPS) | |
| 5121 | Vent Fans | |
| 5141 | Chilled Water Circulating Pumps | |
| 5142 | Air Conditioning Compressor Units | |
| 5142 | Air Conditioning Sea Water Circulating Pump | |
| 5161 | Refrigeration Compressor Units | |
| 5212 | Fire Pumps | |
| 5311 | Distiller Sea Water Feed Pumps | |
| 5331 | Potable Water Pumps | |
| 5331 | Potable Water Prime Pump | |
| 5345 | Fresh Water Drain Tank Pumps | |
| 5515 | High Pressure Air Compressors | |
| 5515 | Low Pressure Air Compressors | |

TABLE 2-1 SUMMARY OF RESILIENTLY MOUNTED EQUIPMENT

| SWBS | MACHINERY EQUIPMENT ITEM | |
|---|---|---|
| 5611 | Steering Gear Units | |
| 5611 | Steering Gear Units Pumps | |
| 5651 | Fin Stabilizer Power Units | |
| 7211 | Motor Generators | |
| 7212 | ASROC Heating and Cooling Circulating Water Pumps | |
| 7212 | ISSM Coolant Pump | |
| 7222 | Hydraulic Power Unit | |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2542 | SSTG Gland Leakoff Exhaust Fan | AMR 1 | 4 | | | D | D | A | D |
| | Intake Hose Hanger | | 1 | 6E100 | 1.00 | 1/68* | A | G | G |
| | Exhaust Hose Hanger | | 1 | | | D | A | G | G |
| 2543 | Auxiliary Gland Exhaust Fan | Fireroom | 4 | 15P220A<br>6E150 | 1.16<br>1.00 | 1/78 | 1Q74* | 3Q75* | D |
| | Intake Hose Hanger | | 1 | 6E100 | 1.00 | B | ?/69 | G | G |
| 2553 | Main Feed Booster Pumps | | | | | | | | |
| | No. 1A | Fireroom | 4 | 6E900 | 1.34 | 11/77 | B | 5/76* | 11/68* |
| | Suction Hose Hanger | | 2 | | | A | A | G | G |
| | Disch Hose Hanger | | 1 | | | D | A | G | G |
| | No. 1B | Fireroom | 4 | 6E900 | 1.34 | 11/77 | B | 6/76* | D |
| | Suction Hose Hanger | | 2 | | | A | A | G | G |
| | Disch Hose Hanger | | 1 | | | D | 4/69 | G | G |
| | No. 1C | Fireroom | 4 | 6E900 | 1.34 | 11/77 | B | 6/76* | D |
| | Suction Hose Hanger | | 1 | | | A | | G | G |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2553 | Main Feed Booster Pumps (Continued) | | | | | | | | |
| | Suction Hose Hanger (Continued) | | 2 | | | | A | G | G |
| | Disch Hose Hanger | | 1 | | | D | A | G | G |
| 2555 | Main Condensate Pumps | | | | | | | | |
| | No. 1A | Engineroom | 4 | 6E900 | 1.34 | 1/78 | D | D | 11/87* |
| | Suction Hose Hanger | | 1 | 6E150 | 1.00 | A,D,J | A | D | D |
| | Disch Hose Hanger | | 1 | 6E100 | 1.00 | D | D | 1/76* | D |
| | Vent Hose Hanger | | 1 | 6E100 | 1.00 | 4/68* | D | G | G |
| | No. 1B | Engineroom | 4 | 6E900 | 1.34 | 1/78 | D | D | 11/87* |
| | Suction Hose Hanger | | 1 | 6E150 | 1.00 | A,D | D | D | D |
| | Disch Hose Hanger | | 1 | | | D | D | G | D |
| | Vent Hose Hanger | | 1 | 6E100 | 1.00 | 4/68* | D | G | G |
| 2556 | [illegible] Aux Cond Pumps | | | | | | | | |
| | No. 1A | AMR 1 | 4 | 7E450 | 0.90 | 11/77 | 2/79 | 2075* | D |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | 1/76* | D | G | G |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2556 | SSTG Aux Cond Pumps No. 1A (Continued) | | | | | | | | |
| | Disch Hose Hanger | | 1 | J-8579-1 | | B | | | |
| | | | 1 | | | | D | G | G |
| | No. 1B | AMR 1 | 4 | 7E450 | 0.90 | 11/77 | ?/70 | 2Q75* | D |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | D | D | G | G |
| | Disch Hose Hanger | | 1 | J-8579-1 | | B | | | |
| | | | 1 | | | | D | G | A |
| | No. 1C | AMR 1 | 4 | 7E450 | 0.90 | 11/77 | D | 2Q75* | D |
| | Suction Hose Hanger | | 1 | | | B | D | G | G |
| | Disch Hose Hanger | | 1 | | | D | D | G | G |
| 2563 | SSTG Aux Circ SW Pumps | | | | | | | | |
| | No. 1A | AMR 1 | 5 | 7E450 | 0.90 | 11/77 | D | 1Q75* | D |
| | Suction Hose Hanger | | 1 | | | D | A | D | D |
| | Disch Hose Hanger | | 1 | | | D | A | D | D |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2563 | SSTG Aux Circ SW Pumps (Continued) | | | | | | | | |
| | No. 1B | AMR 1 | 5 | 7E450 | 0.90 | 11/77 | D | 2Q75* | D |
| | Suction Hose Hanger | | 1 | | | A | A | D | D |
| | Disch Hose Hanger | | 1 | | | A,E | A | D | D |
| | No. 1C | AMR 1 | 5 | 7E450 | 0.90 | 11/77 | D | 2Q75* | D |
| | Suction Hose Hanger | | 1 | | | D | A | D | D |
| | Disch Hose Hanger | | 1 | | | D | A | D | D |
| 2643 | Lube Oil Purifier | Engineroom | 4 | 6E150<br>7E450 | 1.00<br>0.90 | 12/77 | D | ?/75* | 6/58*,<br>?/73 |
| | Support Brace | | 2 | | | - | L | D | D |
| | | | 2 | J-7580-2 | | D | - | - | - |
| | Suction Hose Hanger | | 1 | | | D | B | G | G |
| 3142 | 400 Hz Motor Generators | | | | | | | | |
| | No. 1 | AMR 1 | 4 | 6E2000 | 1.38 | 11/77 | 4/65* | 9/75* | ?/73 |
| | No. 2 | AMR 2 | 4 | 6E2000 | 1.38 | 11/77 | 11/64* | 9/75* | ?/73 |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 3424 | SSDG SW Circ Pump | AMR 2 | 4 | 7E450 | 0.90 | 9/76* | D | D | D |
| | Suction Hose Hanger | | 1 | | | - | A | G | G |
| | | | 1 | J-3879-1 | | D | | | |
| | Disch Hose Hanger | | 1 | | | D | D | G | G |
| 4631 | Sonar M.G. Cabinet | Sonar Eqpt Room 4-29-0-Q | 6 | 6E2000 | 1.38 | 11/77 | 11/75 | 2/69 | 3/73 |
| 4631 | Lube Oil Filter Unit | Sonar Eqpt Room 4-29-0-Q | 4 | 7E450 | 0.90 | D | 7/69 | C | 3/73 |
| | Filter Stand Brace | | 1 | | | D | B | L | L |
| 5121 | Ventilation Fans (Each has 1 or 2 Bellows Type Spools depending on installation) | | | | | | | | |
| | 2-21-1 | 2-16-0-Q | 4 | 10M50 | 0.50 | 4/67* | 10/67* | B | 11/68* |
| | 3-31-2 | 3-29-2-Q | 4 | 6E100 | 1.00 | D | 10/67* | 2/75* | 5/73 |
| | 3-40-1 | 3-37-1-Q | 4 | 6E150 | 1.00 | 2/68* | 2/70 | 3Q75* | 5/73 |
| | 2-42-2 | 2-41-2-Q | 4 | 6E100 | 1.00 | 10/67* | 10/67* | 2/75* | 5/73 |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5121 | Ventilation Fans (Continued) | | | | | | | | |
| | 2-51-1 | 2-50-1-A | 4 | 11M25 | 0.56 | - | 4/67* | 2/68* | D |
| | | | | 10M50 | 0.50 | 7/69* | | | |
| | 3-59-1 | 3-50-0-Q | 4 | 10M50 | 0.50 | 4/67* | 2/70 | 2Q75* | ?/73 |
| | 3-62-1 | 3-59-0-C | 4 | 6E100 | 1.00 | 4/68* | 10/67* | A | 11/73 |
| | 2-74-1 | 2-67-0-C | 4 | 11M25 | 0.56 | | 2/68* | 9/66* | Fan not installed |
| | | | 4 | 10M50 | 0.50 | 7/69* | | | |
| | 2-101-2 | Engineroom | 4 | 7E450 | 0.90 | D | B | ?/75* | ?/73 |
| | 2-103-1 | Engineroom | 4 | | | A | A | A | A |
| | 3-113-1 | 3-107-1-A | 4 | 10M50 | 0.50 | 10/67* | 4/67*, 10/67* | 10/67* | ?/73 |
| | 3-136-1 | 3-135-1-Q | 4 | 6E150 | 1.00 | | 10/74* | 3Q75* | Fan not installed |
| | | Laundry Str Room | 4 | 6E150 | 1.00 | 3Q75* | - | - | - |
| | 2-137-1 | 2-136-0-Q | 4 | 6E100 | 1.00 | 4/75* | 2Q74* | Fan not installed | Fan not installed |
| | 2-141-2 | 2-141-2-A | 4 | 11M25 | 0.56 | D | 2/70 | | 3/73 |
| | | | 4 | 10M50 | 0.50 | | | 4Q73* | |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5121 | Ventilation Fans (Continued) | | | | | | | | |
| | 2-159-2 | 2-147-0-1 | 4 | 10M50 | 0.50 | 2/68* | 2/68* | 2Q75* | 3/73 |
| | 3-165-1 | 3-155-0-E | 4 | 10M50 | 0.50 | 10/69 | 2/70 | 4Q75* | 3/73 |
| 5141 | Chilled Water Circ Pmps | | | | | | | | |
| | No. 1 | Engineroom | 4 | 15P220A | 1.16 | 12/77 | D | A | D |
| | No. 2 | Engineroom | 4 | 15P220A | 1.16 | 12/77 | D | A | D |
| | Suction Hose Hanger | | 1 | | | A | A | G | G |
| | Disch Hose Hanger | | 1 | | | D | G | G | G |
| | No. 3 | A/C Machinery Room | 4 | 7E450 | 0.90 | 3/78 | | Pump not installed | Pump not installed |
| | | | | 15P220A | 1.16 | | 10/77 | | |
| 5142 | A/C Compressors | | | | | | | | |
| | No. 1 | Engineroom | 5 | 6E900 | 1.34 | B | D | 3Q75* | D |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | | 4/69 | G | A |
| | | | 1 | J-8579-1 | | D | | | |
| | Disch Hose Hanger | | 1 | 6E100 | 1.00 | | 4/69 | | |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5142 | A/C Compressors | | | | | | | | |
| | No. 1 | | | | | | | | |
| | Disch Hose Hanger (Continued) | | 1 | J-8579-1 | | D | | | |
| | No. 2 | Engineroom | 5 | 6E900 | 1.34 | B | B | 3Q75* | D |
| | Suction Hose Hanger | | 1 | | | A | A | G | A |
| | Disch Hose Hanger | | 1 | | | A | A | G | A |
| | No. 3 | A/C Machinery Room | 6 | 6E900 | 1.34 | 3/78 | | Eqpt not installed | Eqpt not installed |
| | | | 4 | 6E2000 | 1.38 | | B | | |
| | Suction Hose Hanger | | 3 | 15P50A | 0.78 Inverted Minimum | 2/76* | G | | |
| | Disch Hose Hanger | | 3 | 15P50A | 0.78 Inverted Minimum | 9/75* & 2/76* | | | |
| | | | 1 | Spool Type | | | B | | |
| 5142 | A/C S.W. Circ. Pump #3 | Engineroom | 4 | 15P220A | 1.16 | Not inst. | 10/75 | Not inst. | Not inst. |
| 5161 | Refrigeration Compressors No. 1 | Refrigeration Mach Room | 4 | 7E450 | 0.90 | 1Q75* | 9/75 | 2Q75* | D |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | B | | G | G |
| | Suction Hose Hanger | | 1 | Spool Type | | | B | | |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5161 | Refrigeration Compressors (Continued) No. 1 | Refrigeration Mach Room | | | | | | | |
| | Disch Hose Hanger | | 1 | 6E100 | 1.00 | 1/68* | | G | G |
| | Disch Hose Hanger | | 1 | Spool Type | | | B | | |
| | No. 2 | Refrigeration Mach Room | 4 | 7E450 | 0.90 | 9/76* | 2/70 | 2Q75* | D |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | 1/68* | | G | G |
| | Suction Hose Hanger | | 1 | Spool Type | | | B | | |
| | Disch Hose Hanger | | 1 | 6E100 | 1.00 | 1/68* | | | |
| | Disch Hose Hanger | | 1 | Spool Type | | | B | | |
| 5212 | Fire Pumps | | | | | | | | |
| | No. 1 | ARM 1 | 4 | 15P800A | 1.50 | 11/77 | 9/75 | A | D |
| | Suction Hose Hanger | | 1 | | | D | D | C | D |
| | Disch Hose Hanger | | 1 | | | D | D | C | D |
| | No. 2 | Fireroom | 4 | 15P800A | 1.50 | 11/77 | 9/75 | B | ?/73 |
| | Suction Hose Hanger | | 1 | 6E100 | 1.00 | B | D | Missing | L |
| | Disch Hose Hanger | | 1 | 6E100 | 1.00 | D | D | Missing | L |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5212 | Fire Pumps (Continued) | | | | | | | | |
| | No. 3 | Engineroom | 4 | 15P800A | 1.50 | 11/77 | D | A | D |
| | Suction Hose Hanger | | 1 | | | D | A | Missing | D |
| | Disch Hose Hanger | | 1 | 7E450 | 0.90 | D | A | Missing | D |
| | No. 4 | AMR 2 | 4 | 15P800A | 1.50 | 11/77 | D | B | D |
| | Suction Hose Hanger | | 1 | | | D | A | A | D |
| | Disch Hose Hanger | | 1 | | | D | A | A | D |
| 5311 | Distiller S.W. Feed Pumps No. 1 and 2 | Engineroom | 5 | 15P220A | 1.16 | 1/78 | | | |
| | (Common Bed Plate) | | 5 | 7E450 | | | 1Q74* | | |
| | Distiller S.W. Feed Pump No. 1 | | 4 | 6E150 | 1.00 | | | 4Q75* | D |
| | Distiller S.W. Feed Pump No. 2 | | 4 | 6E150 | 1.00 | | | 4Q75* | D |
| | Suction Hose Hangers (2) | | 1 ea | | | D | D | G | D |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5331 | Potable Water Pumps Nos 1 and 2 (Common Bed Plate) | Shaft Alley No. 1 | 4 | 6E150 | 1.00 | 1/78 | | | |
| | | | 4 | 7E450 | 0.90 | | B | | |
| | | | 4 | 6E100 | 1.00 | | | | D |
| | Potable Water Pump #1 | | 4 | 6E100 | 1.00 | | | 1Q75* | |
| | Potable Water Pump #2 | | 4 | 6E100 | 1.00 | | | 1Q75* | |
| 5331 | Potable Water Prime Pump | Shaft Alley No. 1 | 4 | 6E150 | 1.00 | 1/78 | | 2Q75* | D |
| | | | 4 | 7E450 | 0.90 | | 2/74* | | |
| 5345 | F.W. Drain Tank Pumps | | | | | | | | |
| | NO. 1A | Fireroom | 3 | 15P220A | 1.16 | D | B | D | D |
| | Suction Hose Hanger | | 1 | | | L | L | G | G |
| | Disch Hose Hanger | | 1 | | | D | D | G | G |
| | NO. 1B | Fireroom | 3 | 15P220A | 1.16 | A | A | D | D |
| | Suction Hose Hanger | | 1 | | | L | L | G | G |
| | Disch Hose Hanger | | 1 | | | D | A | G | G |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5515 | H.P. Air Compressors | | | | | | | | |
| | No. 1 | AMR 1 | 4 | 6E900 | 1.34 | B | B | 3Q75* | 3/73 |
| | Air Intake Hose Hanger | | 1 | | | B | 4/69 | G | G |
| | No. 2 | AMR 2 | 4 | 6E900 | 1.34 | 12/77 | D | B | ?/73 |
| | Air Intake Hose Hanger | | 1 | | | G | B | G | G |
| 5515 | L.P. Air Compressors | | | | | | | | |
| | No. 1 | AMR 1 | 9 | 7E450 | 0.90 | 12/77 | D | 7/69* | D |
| | Air Out Hose Hanger | | 1 | | | G | A | G | G |
| | Cooling Water In Hose Hanger | | 1 | | | G | B | G | G |
| | No. 2 | AMR 2 | 9 | 7E450 | 0.90 | B | 2/70 | 4/76* | ?/73 |
| | Cooling Water In Hose Hanger | | 1 | Spool Type | | G | B | G | G |
| | Cooling Water Out Hose Hanger | | 1 | Spool Type | | G | B | G | G |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5611 | Steering Gear Unit No.1 | Steering Gear Room | 4 | 6E900 | 1.34 | 10/77 | 2/70 | 3Q75* | 3/73 |
| | Pump No. 1 | | 4 | J-6210-1 | | B | B | L | L |
| | H.P. Flex Hose Hangers (2) | | 1 ea | 6E100 | 1.00 | 11/65* | 1/70 | G | L |
| | L.P. Flex Hose Hangers (2) | | 1 | 6E100 | 1.00 | G | B | G | L |
| | Steering Gear Unit No.2 | Steering Gear Room | 4 | 6E900 | 1.34 | 10/77 | 2/70 | 3Q75* | 3/73 |
| | Pump No. 2 | | 4 | J-6210-1 | | B | B | L | L |
| | H.P. Flex Hose Hangers (2) | | 1 ea | | | A | B | G | L |
| 5651 | Fin Stab. Power Unit No. 1 | AMR 1 | 4 | 6E900 | 1.34 | 10/72* | 9/75 | | |
| | | | 4 | 7E450 | | | | 2Q75* | D |
| | Fin Stab Power Unit No. 2 | AMR 1 | 4 | 6E900 | 1.34 | B | 9/75 | | |
| | | | 4 | 7E450 | | | | 2Q75* | D |
| 7211 | Motor Generator No. 1 | Launcher Control Power Room | 4 | A4200-T10 | | D | D | B | Eqpt not installed |
| | Motor Generator No. 2 | Launcher Control Power Room | 4 | A4200-T10 | | D | D | B | Eqpt not installed |

TABLE 2-2 RESILIENT MOUNT DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | MTS PER UNIT | MOUNT TYPE | MINIMUM HEIGHT | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SURFPAC | | SURFLANT | |
| | | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 7212 | ASROC Heating & Cooling Circ Water Pumps No. 1 and 2 (Common Bedplate) | | 5 | 15P300A | 1.16 | D | A | | D |
| | Pump No. 1 | | 4 | 15P150A | 1.16 | | | B | |
| | Pump No. 2 | | 4 | 15P150A | 1.16 | | | B | |
| | Suction Hose Hangers (2) | | 1 ea | 6E100 | 1.00 | 1/68* | 10/67* | G | G |
| | Disch Hose Hangers (2) | | 1 ea | 6E100 | 1.00 | B | 10/67* | G | G |
| 7212 | ISSM Coolant Pump | | 4 | | | Equipment not installed | | D | Eqpt not installed |
| 7222 | Hydraulic Power Unit | | 4 | 7E450 | 0.90 | 9/68* | 10/69* | G | G |

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2542 | SSTG Gland Leakoff Exhaust Fan | AMR 1 | Suction | 4.00 | 11/75 | 4Q75 | L | L |
| | | | Exhaust | 4.00 | 11/75 | B | L | L |
| | | | Drain | 1.00 Single Hose | L | 3Q68* | | |
| | | | Drain | Aeroquip | | | | B |
| | | | Drain | Accordian Type Flex Rubber | | | B | |
| 2543 | Auxiliary Gland Exhaust Fan | Fireroom | Suction | 3.00 | B | B | L | L |
| | | | Exhaust | 3.00 | B | B | L | L |
| | | | Drain | 1.00 | A | B | | |
| | | | Drain | 1.00 Single Hose | | | B | |
| | | | Drain | Aeroquip | | | | B |
| 2553 | Main Feed Booster Pumps No. 1A, 1B, 1C | Fireroom | Suction | 8.00 | E | E | E | Garlock Connectors |
| | | | Discharge | 8.00 | E | E | E | S/A 136 Refers |
| | | | Vent | 2.00 Metal Braid Covrd | B | B | B | |
| | | | | 2.00 Metal Braid Covrd Sngl Hose | | | | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2555 | Main Condensate Pumps No. 1A | Engineroom | Suction | 6.00 | 4Q77 | A | D | B |
| | | | Discharge | 4.00 | 4Q77 | 4Q75 | B | B |
| | | | Vent | 2.00 | 4Q77 | 4Q75 | | |
| | | | Vent | Aeroquip Sngl Hose | | | | B |
| | | | Vent | Rigid Copper Tubing | | | B | |
| | | | Gland Seal | 0.50 Single Hose | 4Q77 | A | B | B |
| | No. 1B | Engineroom | Suction | 6.00 | 4Q77 | H | B | B |
| | | | Discharge | 4.00 | 4Q77 | H | B | B |
| | | | Vent | 2.00 | 4Q77 | H | | |
| | | | Vent | Aeroquip Sngl Hose | | | | B |
| | | | Vent | Rigid Copper Tubing | | | B | |
| 2556 | SSTG Aux Condensate Pumps Nos. 1A, 1B, and 1C | AMR 1 | Suction | 3.00 | 4Q77 | B | 8/76 | B |
| | | | Discharge | 1.50 | 4Q77 | B | B | |
| | | | Discharge | 1.50 Sngl Hose | | | | B |
| | | | Vent | 1.00 Sngl Hose | 4Q77 | B | B | B |
| | | | Gland Seal | 0.50 Sngl Hose | 4Q77 | B<br>No 1C-4Q75 | L | L |

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TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 2563 | SSTG Aux S.W. Circ Pumps | AMR 1 | | | | | | |
| | No. 1A | | Suction | | 4Q77 | 1Q75* | 8/76 | B |
| | | | Discharge | | 4Q77 | 4Q67* | 8/76 | B |
| | No. 1B | | Suction | | 4Q77 | B | 8/76 | B |
| | | | Discharge | | 4Q77 | B | 8/76 | B |
| | No. 1C | | Suction | | 4Q77 | B | 8/76 | B |
| | | | Discharge | | 4Q77 | 4Q67* | 8/76 | B |
| 2643 | Lube Oil Purifier | Engineroom | Suction | 1.25 | B | 4Q75 | B | B |
| | | | Discharge | 1.00 | B | 4Q75 | B | |
| | | | Discharge | Aeroquip Sngl Hose | | | | B |
| | | | Heater Suction | 1.25 | B | 4Q75 | B | |
| | | | Heater Suction | Aeroquip Sngl Hose | | | | B |
| | | | Heater Discharge | 1.25 | B | 4Q75 | B | |
| | | | Heater Discharge | Aeroquip Sngl Hose | | | | B |
| | | | Gauge | 0.50 Single Hose | L | 4Q75 | B | B |
| 3424 | SSDG S.W. Circ Pump | AMR 2 | Suction | Aeroquip 150901-64 | 4Q77 | B | | |

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TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 3424 | SSDG S.W. Circ Pump (Continued) | AMR 2 | Discharge | Garlock | | | B | B |
| | | | | Aeroquip 150901-48 | 4Q77 | B | B | |
| | | | | Garlock | | | B | B |
| 4631 | Sonar M.G. Cabinet (LAPS) | Sonar Equipment Rm 4-29-0-Q | S.W. Inlet | Aeroquip 2651-32/ Sngl Hose | 4Q77 | 4Q75 | 4/74 | B |
| | | | S.W. Outlet | Aeroquip 2651-32/ Sngl Hose | 4Q77 | 4Q75 | 4/74 | B |
| | | | L.O. Inlet/ Outlet | Stratoflex 212-12/ Sngl Hose from L.O. Filter Assy | 4Q77 | | | |
| | | | L.O. Inlet/ Outlet | Aeroquip FC 163/1509/ 24135/1/-12/ 50556/Single Hose from L.O. Filter Assembly | | 4Q75 | B | B |
| | Lube Oil Filter Unit | Sonar Equipment Rm 4-29-0-Q | S.W. Inlet | Aeroquip 2651-32/ Single Hose | 4Q77 | B | 4/74 | B |

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TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE ** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5141 | Chilled Water Circulating Pumps Nos. 1 and 2 | Engineroom | Suction | 3.50 | 4Q77 | D | | |
| | | | Suction | Garlock | | | B | B |
| | | | Discharge | 3.50 | 4Q77 | E | | |
| | | | Discharge | Garlock | | | B | B |
| | | | Gland Drain | Aeroquip | G | G | B | B |
| | No. 3 | A/C Machinery Room | Suction | Aeroquip 150901-64 | 4Q77 | B | Pump not installed | |
| | | | Discharge | Aeroquip 150901-48 | 4Q77 | B | Pump not installed | |
| 5142 | Air Conditioning Compr No. 1 | Engineroom | Suction | Metal Braid Covered Anaconda AW-72 | B, E | E | B/76 | B |
| | | | Discharge | Metal Braid Covered Anaconda AW-72 | B, E | B | B/76 | B |
| | | | Gauge | Flex Tubing | L | B | L | L |
| | No. 2 | Engineroom | Suction | Metal Braid Covered Anaconda AW-72 | B, E | E | B/76 | B |

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TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5142 | Air Conditioning Compr No. 2 (Continued) | Engineroom | Discharge | Metal Braid Covered | B, E | 2/70 | 8/76 | |
| | | | | Anaconda AW-72 | | | | B |
| | | | Gauge | Flex Tubing | L | B | L | L |
| | No. 3 | A/C Machinery Room | Suction | Anaconda | B | | Equipment not installed | |
| | | | | Anaconda W-40 | | B | | |
| | | | Discharge | | B | | | |
| | | | | Anaconda | | B | | |
| | | | Gauge | Metal Braid (4) | B | | | |
| | | | | Flex Tubing (2) | | B | | |
| 5142 | A/C S.W. Circulating Pump No. 3 | Engineroom | Suction | | Eqpt not installed | 4Q75 | Equipment not installed | |
| | | | Discharge | | | 4Q75 | | |
| 5161 | Refrigeration Compressors Nos. 1 and 2 | Reefer Machinery Rm | Suction | Metal Braid Covered | B | E | 8/76 | B |
| | | | Discharge | Metal Braid Covered | B | B | 8/76 | B |
| | | | Gauge | Metal Braid Covered (3) | B | L | | |
| | | | | Cloth Covered-Single Hose | | | B | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE ** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5212 | Fire Pumps | | | | | | | |
| | No. 1 | AMR 1 | Suction | 6.00 | 4Q77 | B | | |
| | | | | Garlock | | | 8/76 | B |
| | | | Discharge | 5.00 | 4Q77 | B | | |
| | | | | Garlock | | | 8/76 | B |
| | No. 2 | Fireroom | Suction | 6.00 | 4Q77 | B | | |
| | | | | Garlock | | | B | B |
| | | | Discharge | 5.00 | B | B | | |
| | | | | Garlock | | | B | B |
| | No. 3 | Engineroom | Suction | 6.00 | B | 4Q75 | | |
| | | | | Garlock | | | 5/76 | B |
| | | | Discharge | 5.00 | 4Q77 | 4Q75 | | |
| | | | | Garlock | | | 5/76 | B |
| | No. 4 | AMR 2 | Suction | 6.00 | A | B | | |
| | | | Garlock | | | | B | B |
| | | | Discharge | 5.00 | A | | | |
| | | | Aeroquip 2758-80 | | | 2Q76* | | |
| | | | Garlock | | | | 5/78 | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5311 | Distiller S.W. Feed Pumps | | | | | | | |
| | No. 1 | Engineroom | Suction | 4.00 | B | 4Q75 | | |
| | | | | Garlock | | | B | 2/71* |
| | | | Discharge | | 4Q77 | H | | |
| | | | | Garlock | | | B | 2/71* |
| | No. 2 | Engineroom | Suction | 4.00 | B | H | | |
| | | | | Garlock | | | B | 2/71* |
| | | | Discharge | | 4Q77 | 4Q75 | | |
| | | | | Garlock | | | B | 2/71* |
| 5331 | Potable Water Pumps | | | | | | | |
| | No. 1 | Shaft Alley No. 1 | Suction | Aeroquip 2652-48 | 1Q67* | | | |
| | | | | Aeroquip | | 2/70 | B | B |
| | | | Discharge | Aeroquip 2651-32 | 1Q70 | | B | |
| | | | | Aeroquip | | 2Q67* | | B |
| | | | Prime | Aeroquip 2651-32 | 1Q70 | | | |
| | | | | Aeroquip | | 2Q67* | B | B |
| | | | Vent | Aeroquip 2651-8MP | 2Q72* | | | |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5331 | Potable Water Pumps No. 1 (Continued) | Shaft Alley No. 1 | Vent (Continued) | Aeroquip Garlock | | B | B | B |
| | | | Gauge | Aeroquip Single Hose | L | L | B | B |
| | No. 2 | Shaft Alley No. 1 | Suction | Aeroquip 2652-48 | 4Q67* | | | |
| | | | | Aeroquip | | 2/70 | B | B |
| | | | Discharge | Aeroquip 2651-32 | 1Q70 | | B | |
| | | | | Aeroquip | | 2Q67* | | B |
| | | | Prime | Aeroquip 2651-32 | 1Q70 | | | |
| | | | | Aeroquip | | 2Q67* | B | B |
| | | | Vent | | B | B | B | B |
| | | | Gauge | Aeroquip Single Hose | L | L | B | B |
| 5331 | Potable Water Prime Pump | Shaft Alley No. 1 | Suction | Aeroquip 2651-24 | 3Q67* | | | |
| | | | | Aeroquip | | B | B | B |
| | | | Seal Tank Vent | Aeroquip 2651-24 | 3Q67* | | | |
| | | | | Aeroquip | | 2/70 | | |
| | | | | Aeroquip Single Hose | | | B | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5345 | F.W. Drain Tank Pumps No. 1 | Fireroom | Suction | | A | A | | |
| | | | | Garlock | | | B | B |
| | | | Discharge | Metal Braid Covered | B | B | | |
| | | | | Aeroquip Single Hose | | | B | |
| | | | | Garlock | | | | B |
| | | | Vent | Single Hose | A | A | A | B |
| | No. 1B | Aireroom | Suction | | A | A | | |
| | | | | Garlock | | | B | B |
| | | | Discharge | Metal Braid Covered | B | | | |
| | | | | | | A | | |
| | | | | Aeroquip Single Hose | | | B | |
| | | | | Garlock | | | | B |
| | | | Vent | Single Hose | A | A | A | B |
| 5515 | H.P. Air Compressors No. 1 | AMR 1 | Air Inlet | | B | B | | |
| | | | | Rubber Accordian Flex Hse | | | B | B |
| | | | H.P. Outlet | Single Hose | 1Q78 | 3Q73* | | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5515 | H.P. Air Compressors No. 1 (Continued) | AMP 1 | H.P. Outlet | Aeroquip 1508-8 Single Hose | | | 2Q74* | |
| | | | S.W. Inlet | | 4Q77 | 1Q75* | | |
| | | | | Ronco - Single Hose | | | 8/76 | |
| | | | | Aeroquip - Single Hose | | | | B |
| | | | S.W. Outlet | | 4Q77 | 2Q67* | | |
| | | | | Ronco - Single Hose | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |
| | | | Unload Vlv Drain | Single Hose | B | B | G | G |
| | | | S.W. Drain | Single Hose | B | B | G | G |
| | No. 2 | AMP 2 | Air Inlet | | B | 2/70 | B | B |
| | | | H.P. Outlet | Aeroquip 1529-8 Single Hose | 1Q78 | | | |
| | | | | Single Hose | | 1/78 | 4Q74* | B |
| | | | S.W. Inlet/ Outlet | Aeroquip 2651-24MP | 4Q77 | 1/78 | | |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5515 | H.P. Air Compressors No. 2 (Continued) | AMR 2 | S.W. Inlet (Continued) | Single Hose | | 1/78 | | |
| | | | | RONCO - Single Hose 265103-24V - 32 in | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |
| | | | Unload Vlv Drain | Single Hose | G | B | G | G |
| | | | S.W. Drain | Single Hose | G | B | G | G |
| 5515 | L.P. Air Compressors No. 1 | AMR 1 | L.P. Outlet | | 4Q77 | 3Q69* | | |
| | | | | Aeroquip 2651-32MP | | | 1Q75* | |
| | | | | Garlock | | | | B |
| | | | S.W. Inlet | | 1Q78 | 1Q67* | | |
| | | | | RONCO Single Hose | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |
| | | | S.W. Outlet | | 1Q78 | 1Q67* | | |
| | | | | RONCO Single Hose | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURPPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5515 | L.P. Air Compressors No. 1 (Continued) | AMR 1 | Unload Valve Drain | Single Hose | 4Q77 | 2Q68* | G | G |
| | | | Gauge | Aeroquip Single Hose | G | G | B | G |
| | L.P. Air Compressors No. 2 | AMR 2 | L.P. Outlet | | 4Q77 | 1/78 | | |
| | | | | Aeroquip | | | B | B |
| | | | S.W. Inlet | | B | 1/78 | | |
| | | | | RONCO Single Hose | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |
| | | | S.W. Outlet | | B | 1/78 | | |
| | | | | RONCO Single Hose | | | 8/76 | |
| | | | | Aeroquip Single Hose | | | | B |
| | | | Unload Valve Drain | Single Hose | L | B | G | G |
| | | | Gauge | Aeroquip | G | G | B | B |
| 5611 | Steering Unit No. 1 | Steering Gear Room | H.P. (2) | Aeroquip 2786-20 | 4Q74* | | | |
| | | | | | | 1/78 | 7/76 | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE ** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5611 | Steering Unit No. 1 (Continued) | Steering Gear Room | H.P. Gauge | Aeroquip 1509-8 Single Hose | 3Q75* | | | |
| | | | | | | 9Q77 | B | B |
| | | | L.P. Gauge | Weatherhead 1/2-H-104-SAE Single Hose | B | | | |
| | | | | Single Hose | | 9Q77 | B | B |
| | | | L.P. Filter to Press Switch | Single Hose | B | B | 7/76 | B |
| | | | L.P. to Solenoid Vlv | Single Hose | B | B | 7/76 | B |
| | Steering Unit No. 2 | Steering Gear Room | H.P. (2) | Aeroquip 2786-20 | 4Q74* | | | |
| | | | | | | B | 7/76 | B |
| | | | H.P. Gauge | Aeroquip 1509-8 Single Hose | 3Q75* | | | |
| | | | | Single Hose | | B | B | B |
| | | | L.P. Gauge | Weatherhead 1/2-H-104-SAE Single Hose | B | | | |
| | | | | Single Hose | | B | B | B |
| | | | L.P. Filter to Press Switch | Single Hose | B | B | 7/76 | B |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 5611 | Steering Unit No. 2 (Continued) | Steering Gear Room | L.P. to Solenoid Vlv | Single Hose | B | B | 7/76 | B |
| 5651 | Fin Stabilizers Units No. 1 | AMR 1 | Discharge (2) | Single Hose | 11/75 | 4Q67* | ?/76 | B |
| | | | Suction | Single Hose | B | B | ?/76 | B |
| | | | Gauge (2) | Single Hose | 3/78 | 3Q74* | ?/76 | B |
| | No. 2 | AMR 1 | Discharge (2) | Single Hose | 11/75 | 3Q74* | ?/76 | B |
| | | | Suction | Single Hose | 11/75 | B | ?/76 | B |
| | | | Gauge (2) | Single Hose | 3/78 | 4Q67* | ?/76 | B |
| 7212 | ASROC Heating & Cooling Water Circulating Pumps Nos. 1 and 2 | AMR 1 | Suction | | B | 1Q67* | 8/76 | B |
| | | | Discharge | | B | 4Q66* | 8/76 | B |
| 7212 | ISSM Coolant Pump | AMR 1 | Suction | Metal Braid Covered Single Hose | G | G | B | G |
| | | | Discharge | Metal Braid Covered Single Hose | G | G | B | G |
| 7222 | Hydraulic Power Unit | Electronics Cooling Equipment Room | Suction | Aeroquip 2661-16 Single Hose | 1Q77* | | | |
| | | | | Single Hose | | B | G | G |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

TABLE 2-3 FLEXIBLE CONNECTION DATA

| SWBS | EQUIPMENT NAME AND NUMBER | EQUIPMENT LOCATION | HOSE SERVICE | HOSE IDENT AND SIZE** (INCHES ID) | MANUFACTURE* OR INSTALLATION DATE | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | SURFPAC | | SURFLANT | |
| | | | | | FF-1057 | FF-1062 | FF-1068 | FF-1097 |
| 7222 | Hydraulic Power Unit (Continued) | Electronics Cooling Equipment Room | Discharge | Single Hose | B | B | G | G |
| | | | Press Filter Outlet | Single Hose | B | B | G | G |
| | | | Oil Return Lines (2) | Weatherhead 1/2-H-25-SA | B | B | G | G |
| | | | Cooling Line | Single Hose | B | B | G | G |

**All hose assemblies are 90° "L" configurations unless otherwise marked.

# 3
# CHANGES TO RESILIENT MOUNT MRC

During development of the inventory listing of resilient mounts installed in KNOX class ships, it was noted that the mount inspection MRC is not complete. This section provides recommended changes to that MRC.

## 3.1 TECHNICAL CONSIDERATIONS

The Navy Resilient Mount Handbook, NAVSEA 0900-LP-089-501D of August 1977, enumerates inspection and replacement criteria that are more extensive than those listed in MRC A-176 S-1 for the inspection of resilient mounts. The current MRC (Figure 2-1) does not cover the following critical areas.

a. Drift. Resilient mounts should be inspected and replaced if the mount has drifted beyond the specified minimum mount height established for each type of resilient mount. This condition occurs as a result of creep or relaxation of the rubber element that carries the mount loading. The minimum height specification can also be violated by misalignment at installation or by overloading.

b. Age. In addition to the many other factors that dictate mount replacement, such as excessive swelling, deterioration of the rubber elements due to oil absorption, prominent breaks in the rubber elements, heavy painting, and failure of the rubber-to-metal bonds, there is an overriding age criterion. Mounts should be replaced when they have been in service for 10 years or at the overhaul nearest to, but not exceeding, 10 years from date of installation. The date a mount is installed is to be stamped on metal parts of the mount. Where the mount is inaccessible for inspection, a metal tag incorporating the required data should be attached to the equipment foundation or subbase adjacent to the applicable mount. A mount that has exceeded its maximum shelf life of 7 years should not be installed.

## 3.2 RECOMMENDED CHANGES TO MRC

The following changes to the resilient mount MRC A-176 S-1 are recommended:

a. Revise the basic existing MRC in the manner shown in Figure 3-1, which incorporates the added inspection requirements for mount age and drift.

b. Add information similar to that shown in Figure 3-2 and Table 3-1 to the MRC. Figure 3-2 is a set of drawings for representative types of resilient mounts used in the KNOX class. For each mount type, the points of measurement for determination of mount height, "H", are indicated. In Table 3-1, representative minimum values of H that govern mount replacement are given for each mount type of Figure 3-2.

Use of the revised MRC, in conjunction with the specific minimum height data in Table 3-1, will ensure that all aspects essential to effective maintenance of resilient mounts are considered during the required semiannual inspection.

TABLE 3-1. RESILIENT MOUNT HEIGHT REPLACEMENT CRITERIA

| Resilient Mount Designation | Replacement Criterion — Minimum Allowable Mount Height (inches) |
|---|---|
| 6E 100* | 1.00 |
| 6E 150* | 1.00 |
| 6E 900 | 1.34 |
| 6E 2000 | 1.38 |
| *Natural rubber with protective coating. | |

| SHIP SYSTEM | SUBSYSTEM | MRC CODE |
|---|---|---|
| | Equipment Mountings | A-176 S-1 |

| SYSTEM | EQUIPMENT | RATES | M/H |
|---|---|---|---|
| | None | MM/EN/RM2 | 0.2 |

TOTAL M/H 0.2

ELAPSED TIME 0.2

MAINTENANCE REQUIREMENT DESCRIPTION

1. Inspect resilient mounts.

SAFETY PRECAUTIONS

TOOLS, PARTS, MATERIALS, TEST EQUIPMENT

1. Rags
2. Flashlight
3. Inspection mirror
4. Soap and water solution
5. Silicone grease, FSN 9150-616-9212, or equivalent

PROCEDURE

1. Inspect Resilient Mounts

   a. Inspect resilient mounts for:

      (1) Drift beyond minimum mount height (see mount drawing and Table I for location and minimum allowable height, "H").

      (2) Age of mount. Replace mounts after 10 years of service or at the overhaul closest to, but not exceeding, 10 years from date of installation. Installation date should be stamped on metal parts of the mount. Do not install a mount which has exceeded its maximum shelf life of 7 years.

PAGE 1 OF 2 | A2 | 1FQD | N

| LOCATION | DATE |
|---|---|
| Equipment Guide List Recommended | October 1977 |

MAINTENANCE REQUIREMENT CARD (MRC)
11ND NAVSEACENPAC 4700/1 (9-75)

      (3) Large cuts, cracks, or abrasions. If these conditions exist, accomplishing the following interim actions:

         (a) Clean rubber element with soap and water solution.

         (b) Apply a thin coat of silicone grease.

      (4) Excessive swelling or softening of the rubber elements (usually due to soaking in oil).

      (5) Failed rubber to metal bonds.

      (6) Heavily painted rubber elements. Inadvertent or random brush strokes, spray or spatter are not cause for mount replacement. Removal of paint with paint remover or abrasives will degrade the rubber.

PAGE 2 OF 2 | A2 | 1FQD | N

MAINTENANCE REQUIREMENT CARD (MRC)
11ND NAVSEACENPAC 4700/2 (9-75)



Figure 3-1. Proposed MRC for Resilient Mounts

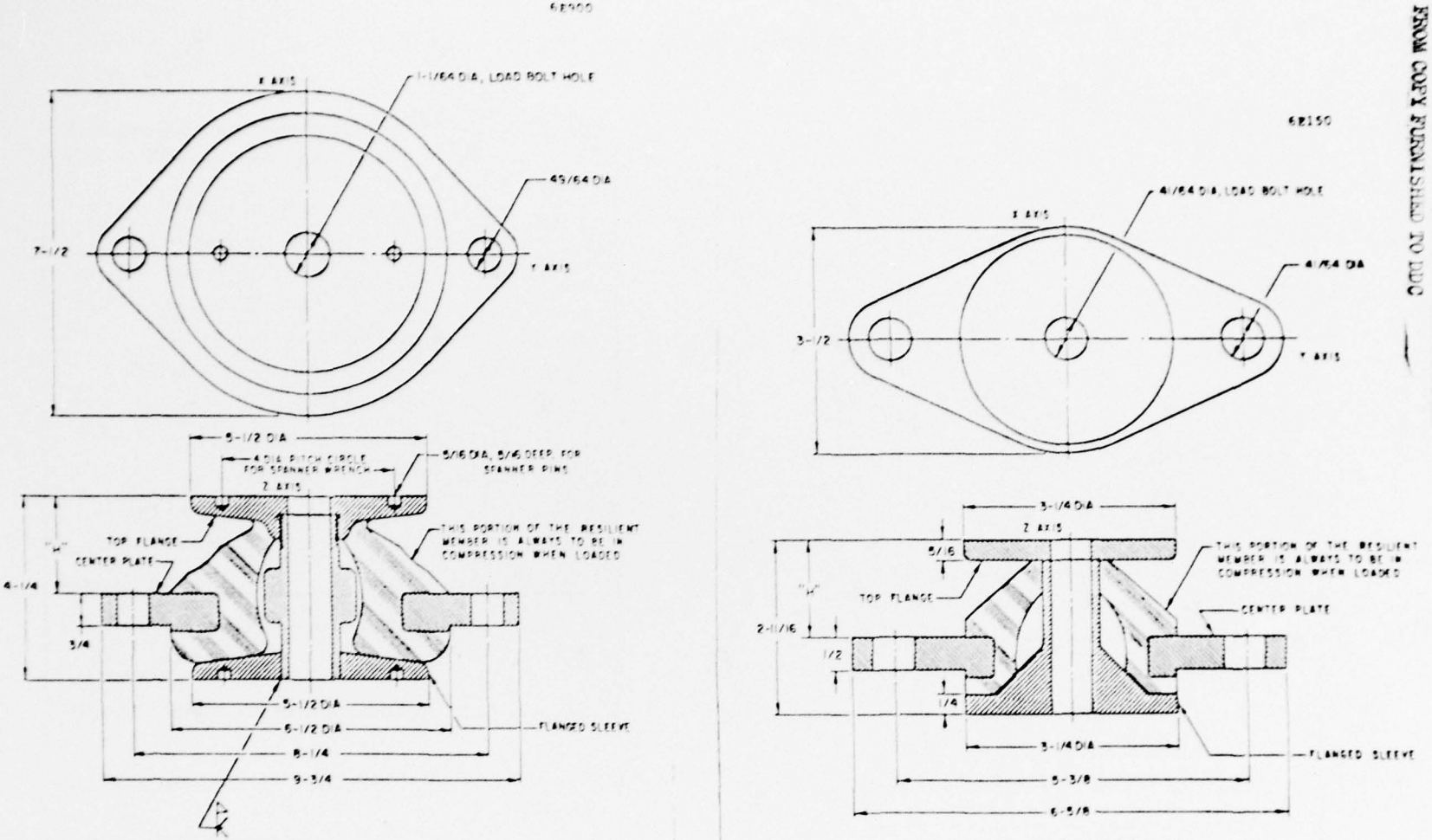
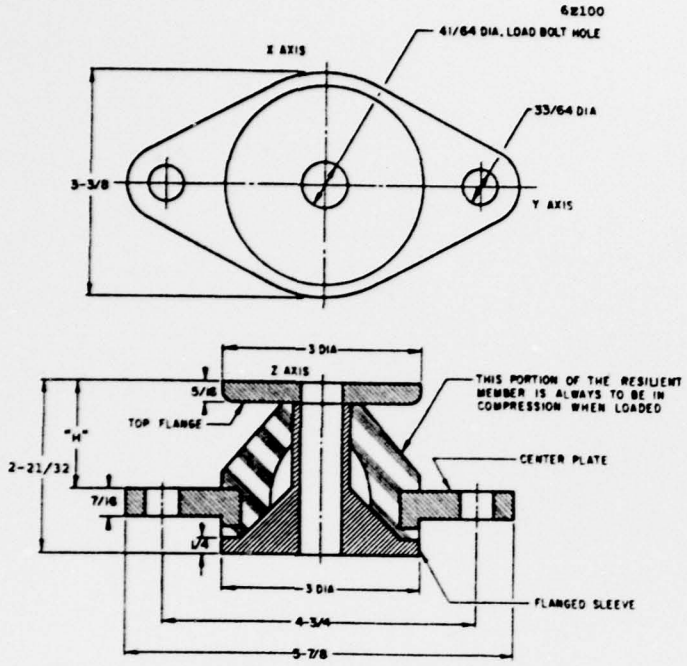
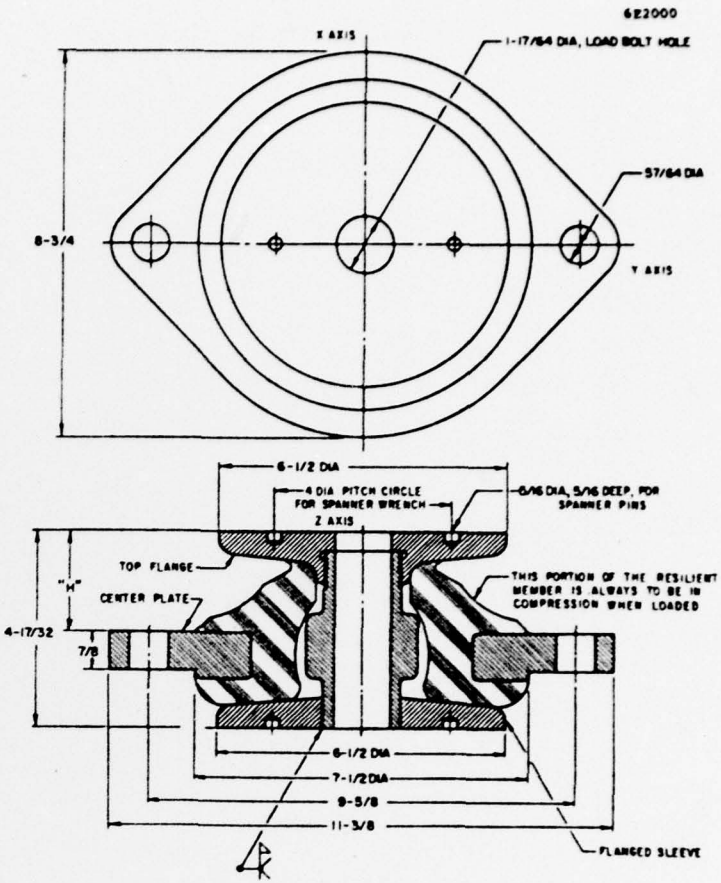



Figure 3-2. Drawings of Various Resilient Mount Types (Sheet 1 of 2)




NOTES: 1. ALL DIMENSIONS ARE IN INCHES
2. THE RESILIENT ELEMENT IS BONDED TO THE CENTER PLATE ONLY




NOTES: 1. ALL DIMENSIONS ARE IN INCHES.
2. THE RESILIENT ELEMENT IS BONDED TO THE CENTER PLATE AND TOP FLANGE.
3. A PRESS FIT IS OPTIONAL BETWEEN FLANGED SLEEVE AND TOP FLANGE.



Figure 3-2. (Sheet 2 of 2)