

MIL-STD-1682/1(SH)
27 October 1976

MILITARY STANDARD

SHIPYARD INSPECTION AND CLEANING
PROCEDURES FOR SUBMARINES

PART 1

NAVIGATION CENTER
SSBN 598 CLASS



FSC 1905

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DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

Shipyard Inspection and Cleaning
Procedures for Submarines, Navigation
Center SSBN 598 Class

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1. This Military Standard is approved for use by Naval shipyards during overhaul and conversion periods for submarines.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Ship Engineering Center, Center Building, SEC 6124; Prince George's Center, Hyattsville, Maryland 20782 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FOREWORD

This part provides inspection and cleaning procedures for the Navigation Center aboard SSBN 598 Class submarines.

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1. SCOPE

1.1 This part provides inspection and cleaning procedures for the Navigation Center (NC) aboard SSBN 598 Class submarines. In addition, it provides inspection and cleaning procedures for the Ventilation System cooling coil, ducts, fans, and provides filter maintenance and replacement procedures. The basic standard and this part are to be considered as an integral single document.

2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

GOVERNMENTAL

SPECIFICATION

MIL-D-16791 - Detergents, General Purpose (Liquid, Nonionic)

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. DEFINITIONS

3.1 Clean. Clean is being free of all loose scale, rust, grit, filings, and other foreign substances; and free of oil, grease, and other organic materials.

3.2 Cleaning solvent. Cleaning solvents as used in this standard refer to water-soluble (Type I) liquid detergent conforming to specification MIL-D-16791.

3.3 Dewpoint. The temperature at which condensation first occurs when a vapor is cooled.

3.4 Landing or landed. Physical placement of equipment in specified location.

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4. REQUIREMENTS

4.1 General requirement.

4.1.1 Waste solvents shall be discarded in a sanitary sewer system.

4.2 Safety and precautions.

Note: Listed below are warnings appearing in this procedure. All personnel involved in operating and maintaining equipment must fully understand the warnings.

4.2.1 Supplemental filter material used in this standard is a restricted use item and should be used only during construction and availability periods such as upkeep, conversion, and overhaul. Cyanide gas is generated when filter material burns; therefore, its use is prohibited at all other times.

4.2.2 Do not use flammable cleaning solvents or solvents in spray form.

4.2.3 Do not take MIL-D-16791 cleaning detergent internally. Keep out of eyes. If swallowed, induce vomiting and call a physician; for eyes, flush with plenty of water and get medical attention.

4.2.4 To avoid possibility of shock hazard, do not damp wipe areas around cable plugs and equipment jacks.

4.2.5 Ensure that proper warning tags are placed at power controller to prevent fans from being inadvertently energized during maintenance.

4.3 Inspection and cleaning intervals.

4.3.1 Inspection, cleaning, and maintenance shall be performed at the following time periods:

<u>Paragraph</u>	<u>Title</u>	<u>Frequency</u>
5.1	FBM NC inspection and cleaning	Daily and weekly
5.2	Check of differential pressure gage indication	Daily
5.3	Supplemental filter maintenance	Daily and weekly

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<u>Paragraph</u>	<u>Title</u>	<u>Frequency</u>
5.4	Filter replacement	As specified in procedures
5.5	Inspection and cleaning navigation ventilation system ducts	Monthly and once during overhaul
5.6	Cooling coil inspection and cleaning	Monthly and once during overhaul
5.7	Fan inspection and cleaning	As specified in procedures and once during overhaul

4.4 Materials.

4.4.1 Materials required to perform normal inspection, cleaning, and associated maintenance procedures are as follows:

- (a) Containers for cleaning solution
- (b) Cleaning solvent, MIL-D-16791 (NSN 7930-00-282-9699 or equivalent)
- (c) Supplemental filter material (NSN 1G-9330-00-965-0481 or equivalent)
- (d) Coated cloth: fire retardant curtains (NSN 8305-00-082-5586/5587 or equivalent)
- (e) Portable vacuum cleaner (nonmetallic hose)
- (f) Assortment of sponges and wiping cloths
- (g) Lint-free cloth (NSN 7920-00-514-2420 or equivalent)
- (h) Masking tape (roll)
- (i) Thermometer
- (j) Fan cleaning kit

5. INSPECTION, CLEANING, AND MAINTENANCE PROCEDURES

5.1 FBM NC inspection and cleaning.

5.1.1 After landing first piece of navigation equipment and before equipment turn-on, proceed as follows (after equipment turn-on, proceed to 5.1.2).

5.1.1.1 Daily check that equipments exposed to possibility of damage, water leaks, hydraulic leaks, etc., are protected by suitable covers or padding.

5.1.1.2 Maintain environmental conditions to protect all navigation equipment against dust, dirt, moisture, or other foreign matter.

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5.1.1.3 Ensure that wherever possible, access through NC is restricted to reduce traffic, dirt, and grime, using suitable local procedures.

5.1.1.4 Daily inspect NC, and clean as required, but at least once each week, as follows:

(a) Remove heavy accumulations of dust, chips, etc., from work surfaces, exposed equipment, wire raceways, readily accessible areas of overhead, space above navigation equipment, bedplate, exposed foundations, deck, etc.

(b) Empty refuse containers and splash pans.

5.1.1.5 Daily take psychrometer readings to maintain NC within conditions specified in table I.

Table I. Temperature and dewpoint limitations before equipment turn-on

DRY BULB READING		MAXIMUM DEWPOINT	
°FAHRENHEIT	°CELSIUS	°FAHRENHEIT	°CELSIUS
90*	32.2	81	27.2
85	29.4	78	25.6
80	26.7	75	23.9
75	23.9	71	21.7
70	21.1	68	20.0
65*	18.3	62	16.7

*Do not allow NC temperature to go above 90°F(32.2°C) or below 65°F(18.3°C). Use coolers, dehumidifiers, or heaters to prevent NC from going outside temperature limitations or exceeding maximum dewpoint at various temperatures.

5.1.2 After equipment turn-on, proceed as follows in 5.1.2.1 through 5.1.2.4.

5.1.2.1 Isolate NC by arranging coated cloth (fire retardant curtains) at the following locations:

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- (a) In port passageway separating ship control center directly aft of ballast control panel at frame M7.
- (b) In starboard passageway separating ship control center from NC between frames M9 and M10.
- (c) In aft passageway arch separating NC from missile compartment.
- (d) Tape or rig coated cloth (fire retardant curtains) over any openings created by removal of Type XI periscope booth.

5.1.2.2 Clean NC as follows on an as required basis, but at least as often as indicated below:

- (a) Install clean vacuum cleaner filter, and vacuum clean deck and protective coverings to remove accumulations of dust, dirt, or other foreign matter (daily).
- (b) Remove dust from following, using wiping cloths and/or vacuum cleaner, then dispose of cloths:
 - (1) Work surfaces, shelves, and equipment (daily).
 - (2) Readily accessible overhead areas, wire raceways, bulkheads, and passageways (weekly).

WARNING

To avoid possibility of shock hazard, do not damp wipe areas around energized cable plugs and equipment jacks.

- (c) Damp wipe equipment and work surfaces as necessary using a sponge and cleaning solution to remove dirt not removed by dusting or vacuuming. Follow with damp wiping using clean fresh water. Do not wipe switches, indicators, and lights.
- (d) Empty refuse containers and install replacement liner bag (daily).

5.1.2.3 Maintain NC within conditions stated in table II. Take psychrometer readings daily if NC relative humidity is 50% or less. If relative humidity is greater than 50%, take psychrometer reading every 4 hours. Each time psychrometer readings are taken, if any equipment listed below is operating, place a

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thermometer on one of the cabinets at its coldest point. If it appears that cabinet temperature will go below the dewpoint, have temporary dehumidifiers and/or heaters installed in NC to lower dewpoint to ensure against condensation on the navigation equipment or inside of an equipment if a drawer or cabinet is opened.

Navigation control console	NAVDAC C cabinet
Receiving Set, Sonar AN/BQN-3 recorder	SINS no. 1, 2, or 3
Radio Navigation Set AN/BRN-3 receiver	VERDAN spare
NAVDAC no. 1 or 2	LORAN C receivers

Table II. Temperature and dewpoint limitations after equipment turn-on

DRY BULB READING		MAXIMUM DEWPOINT* (with navigation equipment operating, utilizing cooling air from Navigation Equipment Cooling System)	
°FAHRENHEIT	°CELSIUS	°FAHRENHEIT	°CELSIUS
90 max**	32.2 max**	68	20
85	29.4	68	20
80	26.7	68	20
75	23.9	68	20
70	21.1	68	20
65 min**	18.30 min**	63	17.2

*If dewpoint conditions stated are exceeded, temporarily install dehumidifiers and/or heaters in NC to bring dewpoint condition within tolerance. Maintaining these conditions will ensure that ambient air coming in contact with navigation equipment or mixing with the cooling air will not cause condensation.

**Take corrective action, e.g., spot coolers, dehumidifiers, heaters, etc., if these conditions exceed the indicated limits. If corrective action is not adequate, shut down navigation equipment until conditions return to acceptable limits.

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5.1.2.4 Daily inspect NC to ensure that equipment exposed to dust, dirt, moisture or other foreign matter is protected as follows:

- (a) Equipments exposed to possibility of damage are protected by suitable covering or padding. Welding and grinding activities are isolated from other sections of NC by suitable containment, and access through the NC is restricted to reduce traffic, dirt, and grime.
- (b) Machined surfaces, shock mounts, open connectors, ship wiring terminations, open air conditioning penetrations, open-end pipes, etc. exposed to dust, dirt, moisture, or other foreign matter are protected by suitable sealed coverings.

5.2 Check of differential pressure gage indication.

5.2.1 Daily check (more frequently under extremely dirty conditions) that differential pressure gage VH-320-GA-2 indicates between 0.4 and 1.5 inches water. If differential pressure gage indicates below 0.4 inch water or above 1.5 inches water, replace differential pressure filters (refer to 5.4).

CAUTION

Air flow must not be restricted by stored or loose materials or damage to navigation equipment may result.

Note: Gage indications below 0.4 inch water indicate tears or or leaks in differential pressure filters or a gage malfunction. Indications between 0.4 and 1.5 inches water indicate normal filtering action. Indications greater than 1.5 inches water denote restricted air flow due to a clogged filter.

5.2.2 Daily inspect the Navigation Equipment Cooling System as indicated in 5.2.2.1 and 5.2.2.2.

5.2.2.1 Check that lint or dust producing materials (such as rags) are not stored in the vicinity of the air intake to the Navigation Cooling System.

CAUTION

Ensure that any loose articles that might be drawn into differential pressure filters are kept well clear of the intake.

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5.2.2.2 Check that an area extending up to 2 feet in front of prefilters (no. 30) is clear of all obstructions and stored materials.

5.3 Supplemental filter maintenance.

WARNING

Supplemental filter material used in this standard is a restricted use item and should be used only during construction and availability periods such as upkeep, conversion, and overhaul. Cyanide gas is generated when filter material burns; therefore, its use is prohibited at all other times.

5.3.1 Ventilation System - Before using the Navigation Ventilation System, tape supplemental filter material on the air intake prefilter assemblies of the Navigation Cooling System (see figure 1 for locations). This material is to be replaced daily throughout the test period.

5.3.2 Navigation Subsystem Equipment - Before starting operational testing of the below listed equipment, place supplemental filter material over external equipment filters. This material is to be inspected daily and replaced weekly.

Radio Navigation Set AN/BRN-3 data processor (intake and exhaust)
Radio Navigation Set AN/BRN-3 computerwriter adapter
Radio Navigation Set AN/BRN-3 computer (intake and exhaust)
Radio Navigation Set AN/BRN-3 tape punch
Frequency-Time Standard AN/BSQ-2 oscillator rack
Frequency-Time Standard AN/BSQ-2 60-Hz amplifiers (2)
Frequency-Time Standard AN/BSQ-2 10-KHz amplifiers (2)
Multispeed repeaters (MSRs)

Note: Supplemental filter material may be reused after it is cleaned in a water/detergent solution, rinsed in clean water, and air dried.

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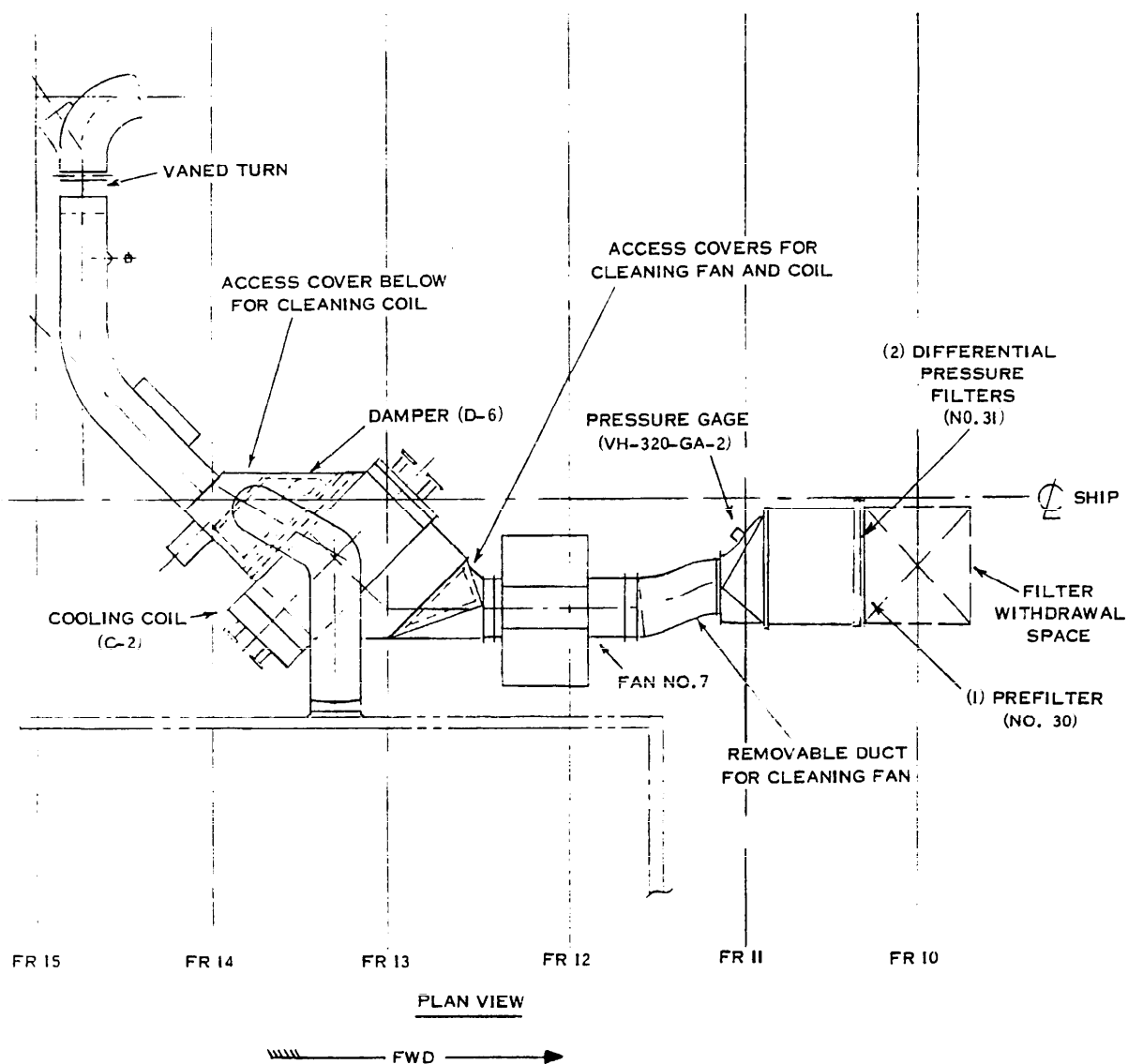


Figure 1. 598 Class navigation ventilation system equipment configuration (including ShipAlt 1142)

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5.4 Filter replacement.

5.4.1 When the Ventilation System differential pressure gage (magnehelic) observed in 5.2 indicates below 0.4 or above 1.5 inches water, replace the system filter assemblies as described below.

5.4.1.1 If no system testing is in progress, deenergize individual equipments and perform the following:

- (a) Deenergize fan 7 at power transfer switch in NC.
- (b) Verify that differential pressure gage VH-320-GA-2 indicates 0.
- (c) Remove prefilters and perform the following:
 - (1) Inspect prefilters for accumulations of dirt, grease, or other foreign matter.
 - (2) Remove small accumulations of dirt by vacuuming.
 - (3) Clean prefilters in ultrasonic cleaner or by soaking in a solution of soap and water, if necessary. Do not oil. Dry by applying low-pressure air.
- (d) Remove differential pressure filters.

CAUTION

Handle new differential pressure filters with care to prevent damage. Prevent any foreign matter from dropping into filters or filter casing.

- (e) Remove dirt or dust exposed using vacuum cleaner or a clean, lint-free cloth after removal of the prefilters and differential pressure filters inside filter casing. Inspect fan blades for verification of cleanliness. If cleaning is required, proceed to 5.7.
- (f) Install new differential pressure filters. Ensure that each filter is properly seated in the filter casing. Note that the arrow on the filters, indicating direction of air flow, points in the proper direction.

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- (g) Install prefilters and tape in place supplemental filter material (refer to 5.3.1).
- (h) Energize fan 7 at power transfer switch in NC.
- (i) Verify that differential pressure gage VH-320-GA-2 indicates greater than 0.4 inch of water.

5.4.1.2 When system testing precludes shutdown of the system fan, perform filter replacement as follows:

- (a) Isolate as many individual equipment dampers as testing activities will permit to minimize total system flow.
- (b) Remove the prefilter.
 - (1) Remove differential pressure filter.

CAUTION

Handle new differential pressure filters with care to prevent damage. Prevent any foreign matter from dropping into the filters or filter casing.

- (2) Install new differential pressure filters. Ensure that each filter is properly seated in the filter casing and the arrow on the filters points in the proper direction.
- (3) Install clean prefilters and tape in place supplemental filter material (refer to 5.3.1).
- (c) Verify that differential pressure gage VH-320-GA-2 indicates greater than 0.4 inch water.

5.5 Inspection and cleaning of navigation ventilation system ducts.

5.5.1 Monthly inspect FBM Navigation Ventilation System ducts for cleanliness at the following locations. (Wipe duct to lift sample of dirt/dust in ducting.)

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Note: Open one access cover in the main supply header downstream of the cooling coil and inspect the duct. If testing status does not permit securing fan 7 for this inspection, inspect only at locations specified in a, b, and c below.

- (a) In NC - Radio Navigation Set AN/BRN-3 base plenum
- (b) In NC - NAVDAC C cabinet base
- (c) In NC - NAVDAC supply at base of computers no. 1 and 2

5.5.2 At least once during the conversion, clean or perform a demonstration of cleaning as follows.

5.5.2.1 Ensure all cabinets cooled by Navigation Ventilation System are secured. Shut chilled water isolation valves CW-185 and CW-187.

WARNING

Ensure that proper warning tags are placed at power controller to prevent fans from being inadvertently energized during maintenance.

5.5.2.2 Deenergize fan 7.

5.5.2.3 Perform the following steps to open the Ventilation System as much as possible:

- (a) Open the following equipment doors to gain access to duct and/or supply plenums.

Radio Navigation Set AN/BRN-3 receiver

NAVDAC C cabinet

NAVDAC no. 1 and 2

- (b) Remove flexible tubing from the spare VERDAN.
- (c) Remove the four access covers on main supply header downstream of cooling coils.
- (d) Remove access cover just downstream of cooling coils.

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CAUTION

In step (e) below, if orifice plates are installed at any disassembled sections, mark the plates for exact replacement during reassembly. Failure to do so may result in serious equipment cooling problems.

- (e) Disassemble sections of ductwork that are readily accessible to facilitate cleaning.
- (f) Position and tape a piece of plastic sheeting over coil discharge face to maintain cleanliness.

5.5.2.4 Clean all accessible system ducting as outlined in the steps below. The remainder of the supply ducting (4-inch diameter and smaller) need not be cleaned unless equipment cooling difficulty is experienced or the system is found to be excessively dirty. This ducting will be cleaned by blowing down.

- (a) Remove all loose dirt and foreign matter from ductwork with a vacuum cleaner. Loosen all dirt and foreign matter not removed by vacuuming with dry brushes and dry, lint-free cloths, and then remove with a vacuum cleaner. Use flexible wire or other suitable extension to facilitate wipe-down of maximum duct area. Wipe from the access covers and openings. Clean, lint-free cloth dampened in a detergent and warm water solution may be used on smooth metal ductwork. Dry with a clean, lint-free cloth.
- (b) If necessary to use soap and water to clean perforated ducting, proceed as follows:
 - (1) To prevent water from being introduced into ductwork sound treatment, squeeze lint-free cloth as dry as possible prior to wiping.
 - (2) Rinse lint-free cloth frequently to prevent any collected dirt from being forced into perforations and crevices.
 - (3) Rinse ductwork with a clean, lint-free cloth squeezed as dry as possible and then dry with a clean, dry, lint-free cloth. Do not use 20-psi air for drying perforated ductwork.

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5.5.2.5 Remove plastic sheeting on discharge side of cooling coil upon completion of cleaning system ducting.

5.5.2.6 Verify that all equipment dampers below are shut.

NAVDAC no. 1 and 2

NAVDAC C cabinet

LORAN C (2 units)

Receiving Set, Sonar AN/BQN-3

NCC

Radio Navigation Set AN/BRN-3

SINS navigation consoles

Spare VERDAN

5.5.2.7 Energize fan 7.

5.5.2.8 Allow air to discharge for several minutes through the access openings until all evidence of moisture and loose dirt are removed.

5.5.2.9 Deenergize fan 7.

5.5.2.10 Replace all access covers removed in 5.5.2.3(c) and (d).

5.5.2.11 Reassemble any ductwork disassembled in 5.5.2.3 except the flexible tubing to the spare VERDAN.

5.5.2.12 Open AN/BRN-3 receiver doors and remove filter in the bottom of each cabinet. To prevent cooling air from entering the equipment, arrange a deflector around the ventilation opening so cooling air will deflect into the NC when fan 7 is energized. Attach a cheesecloth windsock to deflector to preclude blowing dust into NC.

5.5.2.13 Remove NAVDAC drum from NAVDAC no. 1 and 2.

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5.5.2.14 Arrange a deflector and cheesecloth windsock around the ventilation opening in NAVDAC A and B cabinets, and in the C cabinet similar to AN/BRN-3 in 5.5.2.12.

5.5.2.15 Remove the VERDAN computer drawer from each SINS console.

5.5.2.16 In each SINS console, arrange a deflector and windsock around the ventilation opening similar to the AN/BRN-3 in 5.5.2.12.

5.5.2.17 Open ventilation damper to SINS consoles, spare VERDAN, Radio Navigation Set AN/BRN-3, NAVDAC no. 1 and 2 and NAVDAC C cabinet. Check that remaining dampers mentioned in 5.5.2.6 are shut.

5.5.2.18 Energize fan 7.

5.5.2.19 After operating fan 7 for several minutes, check the cheesecloth at each piece of equipment for dirt accumulation. If dirt is accumulating, shut down fan 7, replace cheesecloth with clean cheesecloth, and reenergize fan 7. Continue this process until there is no noticeable further accumulation of dirt on the cheesecloth.

5.5.2.20 Deenergize fan 7 and restore equipment and ducting to normal, including reopening chilled water valves CW-185 and CW-187. When the Ventilation System is operated, check that differential pressure gage VH-320-GA-2 indicates 0.4 inch water or more.

5.6 Cooling coil inspection and cleaning.

Note: At least once during conversion, clean cooling coils or perform a demonstration of cleaning.

5.6.1 Monthly remove one of the access plates between fan 7 and the cooling coil. Inspect the cooling coils. If cleaning the coils is necessary, proceed as follows:

5.6.1.1 Ensure all cabinets cooled by the Navigation Equipment Ventilation System are secured and all navigation equipment ventilation dampers are shut (refer to 5.5.2.6).

5.6.1.2 At power transfer switch in the NC, deenergize fan 7.

5.6.1.3 Check that backup system damper (D-6) is closed.

5.6.1.4 Shut chilled water isolation valves CW-185 and CW-187.

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5.6.1.5 Remove the following system access covers (see figure 1).

- (a) Between cooling coil C-2 and fan 7.
- (b) Downstream of cooling coil C-2.

5.6.1.6 Tape a plastic cover over the opening of the main equipment supply duct to keep dirt and water from entering the supply duct while cleaning the coils. Also, tape a piece of plastic sheeting over the fan discharge to prevent dust, dirt, and water from entering fan.

5.6.1.7 Inspect cooling coil fins and accessible system ducting for accumulation of dirt or other foreign matter.

Note: A film of dirt or other foreign matter can adversely affect fan or cooling coil performance.

CAUTION

Take care to prevent fin damage when using brush to loosen dirt or other foreign matter from cooling coil fins.

5.6.1.8 Working through the fan side access opening, carefully loosen dirt and other foreign matter from the face of cooling coil C-2 using a scrub brush, paint brush, or other bristle brush. Remove loosened dirt with a vacuum cleaner.

5.6.1.9 Blow 20-psi air through coil fin area to loosen dirt and foreign matter, working through access on outlet side of cooling coil. Vacuum fan side of cooling coil to remove loosened dirt and foreign matter.

5.6.1.10 Inspect cooling coil fins for grease or other foreign matter. If necessary, clean as follows using a solution of dishwashing detergent and warm water:

- (a) Using a fine spray, saturate entire cooling coil fin surface area. Spray solution into coil from the air discharge side. Allow solution to remain on coil approximately 5 minutes.
- (b) Adjust bleed for high velocity spray and wash coil from the air discharge side using clean water. To ensure water does not enter ventilation supply duct to fan, block off duct with a plastic sheet.

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- (c) Wipe away any solution remaining in the cooling coils and bottom of sump. If necessary, 20-psi air may be used from the air discharge side of cooling coil.

5.6.1.11 When cooling coil is dry, remove plastic sheeting from fan discharge installed in 5.6.1.6. Ensure that upper and lower transition sections are clean and dry. Check that no dirt or water entered fan outlet area. Clean and dry fan outlet area if necessary.

5.6.1.12 Install access cover between cooling coil and fan.

5.6.1.13 Energize fan 7 at power transfer switch in NC.

5.6.1.14 Allow system air to discharge through open access cover until residual cleaning water is removed.

5.6.1.15 Deenergize fan 7 at power transfer switch in NC.

5.6.1.16 Remove plastic cover over main supply duct opening.

5.6.1.17 Install remaining system access cover.

5.6.1.18 Open chilled water isolation valves CW-185 and CW-187.

5.6.1.19 Restore Navigation System ventilation to pretest conditions.

5.7 Fan inspection and cleaning.

5.7.1 Inspect the navigation fan for cleanliness during differential filter replacement when the fan is deenergized. Also, clean the fan or perform a demonstration of cleaning at least once during overhaul. Cleaning of fan is necessary to assure that system flow will not fall below specified minimum.

5.7.1.1 Fan cleaning.

- (a) Ensure that all cabinets cooled by the Navigation Equipment Cooling System are secured and all equipment dampers are shut (refer to 5.5.2.6).
- (b) Deenergize fan 7 at power transfer switch in NC.
- (c) Remove prefilters and differential filters.
- (d) Shut chilled water isolation valves CW-185 and CW-187.

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- (e) Remove duct section between fan 7 and filter casing, accessible access covers between fan 7 and cooling coil, and access cover just downstream of cooling coil. Tape a plastic cover over the opening to main supply duct to keep dirt and water from entering supply duct while cleaning fan (see figure 1).
- (f) Using a vacuum cleaner or a clean, lint-free cloth, remove any dirt or dust from filter casing.
- (g) Working through the opening created by removal of the duct section between filter casing and fan, use the most convenient bristle brushes to loosen dirt and other foreign matter from slotted fan blades and fan housing (see figure 2).
- (h) Working through the access on the outlet side of fan, use the most convenient bristle brushes to loosen dirt and other foreign matter from back side of slotted fan blades and fan housing.
- (i) Remove loosened dirt using a vacuum cleaner. If necessary, a length of clear plastic tubing may be used to reach areas inaccessible with normal vacuum cleaner attachments.

CAUTION

Use care when cleaning fan with soap and water to prevent water from entering connecting ducting.

- (j) If necessary, perform additional fan cleaning with mild soap and water solution, lint-free cloths, and brushes as required. Dry fan with clean, lint-free cloths.
- (k) Clean connecting ductwork between filter casing and fan as follows:

CAUTION

Use soap and water to clean perforated ductwork only if brushing and wiping with dry brushes and cloths will not remove all dirt and foreign matter. Do not use 20-psi air for drying perforated ductwork.

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The following cleaning tools are recommended for use by shipyards when conducting in-place or off location cleaning of the Navigation Cooling System fan. Equivalent tools may be used.

RADIATOR BRUSH-HORSEHAIR, TWISTED-IN-WIRE CONSTRUCTION. BRUSH AREA: 2 1/4" DIA. X 6" LONG. OVERALL LENGTH IS 23".



NSN-7920-00-234-9317

COTTON YARN ON FLEXIBLE WIRE FRAME THAT CAN BE REFORMED TO DESIRED SHAPES. 3" DIA. WITH 6" PLASTIC HANDLE.



OVERHEAD PIPE SWAB-4 PLY

NOTE: To facilitate cleaning, suitable plastic tubing or wood extensions may be attached to these tools. Also, the wire handle brushes may be bent to a convenient angle to clean the fan blades.

WARNING - DO NOT USE FLAMMABLE SOLVENT OR SOLVENT IN SPRAY FORM.

GREY HAIR AND POLYPROPYLENE 11 1/2" OVERALL LENGTH, 1 1/2" BRUSH TRIM AND 1 1/2" BRUSH FLARE.



PAINTED STYLE, WIRE HANDLE, ROUND FERRULE

BRUSH DESIGNED FOR USE WITH APPROVED CLEANING SOLVENTS AND SOAP COMPOUNDS WITH WATER. SIZE 10 WITH FIBER FILLER OF RED MIX TAMPICO. 11 1/2" LONG.



WATER TOOL BRUSH

NSN-7920-00-252-4084

Figure 2. Cleaning kit

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- (1) Remove loose dirt and foreign matter from ductwork with a vacuum cleaner. Loosen all dirt and foreign matter not removed by vacuuming with dry brushes and dry lint-free cloths, and then remove it with a vacuum cleaner.
- (2) If necessary to use soap and water for cleaning perforated ducting, proceed as follows:
 - a. To prevent water from being introduced into ductwork sound treatment, squeeze lint-free cloth as dry as possible prior to wiping.
 - b. Rinse lint-free cloth frequently to prevent any collected dirt from being forced into perforations and crevices.
 - c. Rinse ductwork with a clean, lint-free cloth squeezed as dry as possible and dry with a clean, dry, lint-free cloth. Do not use 20-psi air for drying perforated ductwork.
- (1) Reinstall duct section between fan 7 and filter casing and access covers between fan 7 and cooling coil.
- (m) Inspect area around the navigation equipment cooling filter section for the following:
 - (1) That lint or dust-producing materials such as rags are not stored in the area.
 - (2) That the area extending two feet in front of the Navigation Equipment Cooling System prefilter is clear of all obstructions and stored materials.
 - (3) That loose material cannot get drawn into the system while the system filters are removed.
- (n) Energize fan 7.
- (o) Operate fan 7 with the system air discharging through the open access cover downstream of the cooling coil for about 15 minutes to ensure that residual cleaning water has been evaporated.
- (p) Remove plastic cover from supply duct and reinstall access cover downstream of cooling coil.

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- (q) Install new differential filter elements, clean prefilter, and supplemental filter material.
- (r) Open equipment dampers to equipment to be energized, energize fan 7, and verify proper filter differential pressure (0.4 inch water or greater).

Preparing activity:
Navy - SH
(Project 1905-M006-1)

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