

**I. NAVSEA PCB ADVISORY 94-2**

**II. Subject: MAINTENANCE AND CLEANING OF VENTILATION DUCTS  
CONTAINING PCB FELT GASKETS ON SURFACE SHIPS  
AND  
SUBMARINES**

**III. References:**

(a) NAVSEA PCB Advisory 94-1, REMOVAL AND HANDLING OF PCB FELT

(b) 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions (NOTAL)

(c) OPNAVINST 5090.1A, Environmental and Natural Resources Program Manual

(d) OPNAVINST 5100.23C, Navy Occupational Safety and Health Program Manual

(e) OPNAVINST 5100.19C, Navy Safety Precautions for Forces Afloat

(f) NAVSEA-S9593-A1-MAN-010, Shipboard Management Guide for Polychlorinated Biphenyls (PCBs)

(g) MIL-G-20241, Gasket Material, Wool Felt, Impregnated Adhesive Pressure Sensitive (NOTAL)

(h) 29 CFR 1910.1000, Occupational Safety and Health Standards, Toxic and Hazardous Substance. (NOTAL)

(i) NEHC-TM90-2 May 1990, Naval Environmental Health Center Technical Manual, POLYCHLORINATED BIPHENYLS (PCBs), POLYCHLORINATED DIBENZOFURANS (PCDFs), AND POLYCHLORINATED DIBENZODIOXINS (PCDDs).

(j) Technical Manual for the Portable Shipboard Ventilation Duct Cleaning System

(k) NSTM Chapter 670, Storage, Handling, and Disposal of Hazardous General Use Consumables

(l) DOD Directive 6050.16, DoD Policy for Establishing and Implementing Environmental Standards at Overseas Installations (NOTAL)

(m) Overseas Environmental Baseline Guidance Document, October 1992, Chapter 14, POLYCHLORINATED BIPHENYLS (NOTAL)

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### **IV. Cancellations:**

(a) NAVSSES Philadelphia 151245Z JAN 92, AMPLIFYING INSTRUCTIONS FOR CONDUCTING MAINTENANCE OF DUCTS IN VENTILATION SYSTEMS ON SURFACE SHIPS CONTAINING POLYCHLORINATED BIPHENYL (PCB) CONTAMINATED FELT GASKETS

(b) COMNAVSEASYSKOM Washington DC 290556Z Apr 91, NAVSEA ADVISORY 001-56Y11-1991, FURTHER INSTRUCTIONS FOR CONDUCTING MAINTENANCE ON DUCTS IN VENTILATION SYSTEMS ON SURFACE SHIPS CONTAINING POLYCHLORINATED BIPHENYL (PCB) CONTAMINATED FELT GASKET

(c) COMNAVSEASYSKOM Washington DC 112012Z JAN 90, NAVSEA 56Y13 ADVISORY, SUBMARINE VENTILATION WOOL FELT GASKET MATERIAL

### **V. Applicability:**

**ALL NAVY ACTIVITIES, ASHORE AND AFLOAT, PERFORMING MAINTENANCE ON NAVY VESSELS AND CRAFT.**

### **VI. Background:**

1. This Advisory is to be followed when cleaning ventilation ducting in vessels and craft. Reference (a) provides procedures for management of PCB felt in all applications, including felt in ventilation systems. Reference (a) should also be followed during ventilation system cleaning.

2. The vessels and craft listed below are believed equipped with rubber ventilation system gaskets based on drawing reviews. Felt gaskets may have been installed contrary to drawing requirements. Before cleaning ship's ventilation systems, inspect the flange gaskets carefully. If they are rubber, this Advisory does not apply. Potentially exempted classes are: CVN 71 and later ships of the CVN 68 Class, LHD 1, CG 47, DDG 51, DDG 993, PC-1, MHC-51, SSN 637, SSN 688 and SSBN 726 classes.

3. Background information on PCB felt is contained in NAVSEA PCB Advisory 94-1.

4. Many ships have been provided a duct cleaning system, such as the Portable Extraction Systems Model 3607A and 3607B. This equipment uses a rotary string flail (similar to a grass string trimmer) and a vacuum cleaner to dislodge and collect dust from within a ventilation duct.

5. During operation of ventilation systems with PCB felt gaskets, PCBs can become mixed with the dust and dirt. The PCB-

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contaminated dust can spread beyond the ventilation system if not contained and collected. When ventilation ducts are mechanically cleaned PCBs can spread to the working surfaces of tools used for cleaning.

6. Reference (d) invokes PCB airborne limits of reference (h) for all Navy activities. Reference (h) permits airborne levels up to  $0.5 \text{ mg/m}^3$  of the heavy-weight PCBs (such as found in PCB felt), averaged over an 8 hour work day. PCBs in felt do not evaporate in normal service and can only become airborne if heated or carried on dust released from the ventilation system.

7. The maximum airborne PCB concentration observed during cleaning tests performed on two ships was  $0.15 \text{ mg/m}^3$ . This level was observed in ventilation system exhaust air during post cleaning startup of the cleaned system when a puff of loosened dust was blown out. This level is less than the limit of reference (h).

8. PCBs are moderately toxic, but are very stable compounds with low vapor pressures. Therefore, occupational exposure by inhalation above the Permissible Exposure Limit (PEL) is unlikely unless there are large quantities of liquid PCBs present, and/or they are subject to heating or mechanical dispersion. Dermal contact can, however, contribute to occupational exposure. To ensure worker protection, engineering controls, protective clothing, and good work practices (including personal hygiene) are recommended where there is a potential exposure to PCBs. For specific information on chemical and physical properties, and toxicity, refer to reference (i). High temperatures can cause PCBs to decompose and form highly toxic dioxin and furan compounds. Furans in low concentrations have been formed at temperatures as low as  $570^\circ \text{ F}$ . Therefore, processes which may heat PCB felt or felt residues should be avoided.

9. Reference (b) requires controlled handling and disposal of all waste materials containing 50 ppm or more of PCBs. Reference (b) also requires all wastes from cleaning of PCB-contaminated surfaces to be handled as PCB waste regardless of the PCB concentration. The PCB concentration in ventilation system dust averages 3600 to 6000 ppm based on tests run in two ships. Therefore, any waste generated in cleaning duct systems should be managed as PCB waste in accordance with reference (b) or applicable State, and local regulations.

### VII. Action:

1. In the event that a gaskets ventilation system flange is broken for cleaning, follow NAVSEA PCB Advisory 94-1, reference (a), for managing the felt and the exposed duct flanges.

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2. Do not perform hot work on ventilation system components, including welding, torch cutting, brazing, grinding, and sawing within twelve inches of either side of flanges containing felt gaskets. If cutting of ventilation system components is required within 12 inches, use manual or machine tin snips, slow speed drills or other metal working techniques which do not generate notable heat in the metal and which minimize the generation of free particles.

3. Label and store all reusable cleaning equipment used in cleaning ventilation systems which have come in contact with ventilation system surfaces and the vacuum cleaner used for cleaning ventilation systems per references (b) and/or (f). This includes items such as the vacuum cleaner tank, vacuum hoses and working end tools, brushes, Vent Duct Cleaning System drive shafts, dust pans, scrapers, putty knives, etc.

4. Proper control of PCBs is required by Federal Regulation and Law. This Advisory provides the proper procedures for cleaning of ventilation systems with PCB felt gaskets and shall be followed. Notify supervisors immediately if there is any doubt about procedures, equipment, or conditions in effect.

5. Personnel Protective Equipment: Following are the minimum personnel protective equipment requirements for the worker engaged in removing dust from ventilation systems. Worker assistants may also be suited with this equipment or less, depending on the level of dust encountered during work. Alternate equipment which provides superior protection to that specified below may be used if desired.

a. Gloves. Latex gloves inside, followed by butyl rubber, neoprene, viton, or nitrile gloves outside taped to the coveralls to provide a seal, if coveralls are worn.

b. Safety goggles or a face shield.

c. Respirator. Use of a respirator is not mandatory, but shall be used at the discretion of supervising safety/industrial hygiene personnel. Personnel using respirators must be trained, medically certified, and fit-tested in accordance with reference (e).

d. Disposable coveralls. Use of disposable coveralls, such as Tyvsk® suit with attached hood and booties, is not mandatory, but shall be used at the discretion of supervising safety/industrial hygiene personnel.

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6. Ventilation system cleaning: Follow one of the procedures below:

a. Cleaning Ducts Using the Vent Duct Cleaning System

(1) Follow manufacturer's instructions of reference(s) for use and operation of the machine except where noted below.

(2) Secure and tag out ventilation systems to be cleaned in accordance with current shipboard instructions. Secure access to the area directly surrounding the vent cleaning operations.

(3) Remove the lid and the dual polypropylene filter from the vacuum canister and insert a large clean plastic bag draped over the flange of the vacuum canister. Replace the plastic bag after each use.

(4) Cover all ventilation terminal openings on the system being cleaned, except the terminal used for the duct cleaning machine, with a filter capable of removing 400 microns or larger particulates. 400 micron "Scott Foam" is suitable.

(5) Don personnel protective equipment (PPE).

(6) Clean the ventilation inlet screens, if installed, using the duct cleaning machine vacuum.

(7) Gain access to the duct to be cleaned either through a ventilation cleaning access port, removing a screen, or by breaking open a flange joint.

(8) Using the duct cleaning machine and reference (s), clean the accessible duct work. Ensure that the majority of the debris knocked loose by the auger is removed by the vacuum system. If necessary, remove the adapter plate and manually vacuum as much of the loose debris from the system as possible.

(9) Clean ventilation vane turns and fan blades by removing the access covers and wire brushing the turns and blades and vacuuming accessible surfaces clean.

NOTE: It is particularly important to clean vane turns and fan blades to restore ventilation system flow. Most of the pressure drop in a ventilation system occurs in these components when they are dirty.

(10) Repeat, as necessary, for each leg of the system being cleaned.

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(11) Remove the temporary filters covering the ventilation openings and vacuum the accessible surfaces of the openings. Dispose of the filters as PCB-contaminated waste.

(12) Before restoring ventilation air flow to the cleaned system, cover all ventilation terminals with a double layer of cheesecloth. Remove the tags and run the ventilation system on fast speed for a minimum of two hours. Remove the cheesecloth and discard as PCB contaminated waste. Vacuum or wipe the openings if as necessary to remove accumulated dust. Dispose of the dust, and wiping cloths as PCB waste.

(13) Before removing any personnel protective equipment, de-energize the duct cleaning machine and clean the tools (auger, adapter plate, outside of extractor hose, and power shaft of power unit), putty knives or other equipment. Clean equipment following the procedure described in reference (a), paragraph VII.5.b., using Butcher's "Hot Springs" Cleaner (NSN 7930-01-379-5706). Wipe dry with clean dry rags. Dispose of rags as PCB-contaminated waste in accordance with paragraph VII.8.

(14) Vacuum each operator's PPE and the area where the cleaning was performed. When all vacuuming is complete, remove the plastic bag from the vacuum canister by carefully slipping it over the inlet nozzle. Dispose of the dust as PCB-contaminated waste.

(15) Remove PPE in accordance with paragraph VII.7.

b. Manual Cleaning of the Ventilation Ducts.

(1) Follow procedure in paragraph VII.6.a., except use manual tools for dislodging dust and debris instead of the Vent Duct Cleaning Machine.

(2) Clean accessible portions of the ventilation system using brushes, scrapers, putty knives or other suitable tools and a vacuum cleaner. Avoid contact with felt gaskets during cleaning. The vacuum cleaner from the duct cleaning machine may be used or if not available, any comparable vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) Filter on the cleaner exhaust and with a plastic bag insert as discussed in paragraph VII.6.a(3).

(3) Clean equipment Per paragraph VII.6.(a)(13).

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7. Removal of PPE: After all cleaning operations are complete, remove the PPEs in accordance with the following guidance.

a. Wipe any remaining dust or debris from the PPE using a wet rag. Place the rag in a plastic bag for disposal as PCB waste.

b. Remove tape, if used, and outer gloves and place in a plastic bag for disposal as PCB waste.

c. If disposable coveralls are used, unzip coveralls and step out by turning the coveralls inside out. Place the coveralls in a plastic bag for disposal as PCB waste.

d. Remove goggles, face shields and respirators (if used). Remove cartridges from the respirator and dispose. Goggles, face shields and respirators which have visible traces of grease or oil on them from the vent cleaning operation should be disposed of as PCB-contaminated waste. Otherwise, wash goggles and face shields per reference (k) and respirators per reference (e). Because of the extremely small chance of there being detectable PCBs on goggles or face shields which are not visibly contaminated, the wash solution and the cleaned equipment is not controlled as PCB waste.

e. Remove the latex gloves and dispose of as PCB-free waste.

8. Waste Management: Manage waste in accordance with reference (a).

9. The information in this Advisory will be incorporated in a future revision to reference (f).

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VIII. Advisories in effect:

<u>PCB ADVISORY NO.</u>	<u>SUBJECT</u>
93-1A	MANAGEMENT OF ELECTRICAL CABLES REMOVED FROM VESSELS AND CRAFT (REVISED)
93-2	MANAGEMENT OF SCRAP STEEL GENERATED DURING THE SUBMARINE INACTIVATION, DISMANTLEMENT AND RECYCLING PROCESS
94-1	REMOVAL AND HANDLING OF PCB FELT MAINTENANCE AND CLEANING OF VENTILATION DUCTS CONTAINING FELT GASKETS ON SURFACE SHIPS AND SUBMARINES