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MIL-V-24761(SH)
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MILITARY SPECIFICATION

VENTILATING SETS, PORTABLE DAMAGE CONTROL

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers Navy standard portable damage control ventilating sets. Navy standard portable damage control ventilating sets are either electric-motor driven vaneaxial fans or air-turbine driven centrifugal fans.

1.2 Classification. Navy standard portable damage control ventilating sets, herein referred to as fans, shall be of the following classes as specified (see 6.2):

Class 0-1/2A	Type 0, size 1/2, alternating (A) current motor driven vaneaxial fan
Class 0-1/2D	Type 0, size 1/2, direct (D) current motor driven vaneaxial fan
Class 0-3/4T	Type 0, size 3/4, air-turbine (T) driven centrifugal fan.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 4140

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SPECIFICATIONS

FEDERAL

FF-B-171	Bearings, Ball, Annular (General Purpose)
FF-N-836	Nut: Square, Slotted, Castle, Knurled, Welding and Single Ball Seat
FF-S-85	Screw, Cap, Slotted and Hexagon Head
FF-S-86	Screw, Cap, Socket-Head
FF-S-92	Screw, Machine: Slotted, Cross-Recessed or Hexagon Head
FF-S-200	Setscrews: Hexagon Socket and Spline Socket, Headless
FF-W-84	Washers, Lock (Spring)
FF-W-92	Washer, Flat (Plain)
PPP-F-320	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes
QQ-A-225/7	Aluminum Alloy 5052, Bar, Rod, and Wire; Rolled, Drawn, or Cold Finished
QQ-A-250/7	Aluminum Alloy 5086, Plate and Sheet
QQ-A-250/8	Aluminum Alloy 5052, Plate and Sheet
QQ-A-250/11	Aluminum Alloy 6061, Plate and Sheet
QQ-A-430	Aluminum Alloy Rod and Wire; For Rivets and Cold Heading
QQ-A-596	Aluminum Alloy Permanent and Semipermanent Mold Castings
QQ-A-601	Aluminum Alloy Sand Castings
TT-E-489	Enamel, Alkyd, Gloss, Low VOC Content
TT-P-645	Primer, Paint, Zinc Molybdate, Alkyd Type
TT-V-119	Varnish, Spar, Phenolic-Resin

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MIL-P-116	Preservation, Methods of
MIL-S-901	Shock Test, HI (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for
MIL-E-917	Electric Power Equipment, Basic Requirements Naval Shipboard Use
MIL-S-1222	Studs, Bolts, Hex Cap Screws and Nuts
MIL-E-2036	Enclosures for Electric and Electronic Equipment
MIL-P-15024	Plates, Tags and Bands for Identification of Equipment
MIL-P-15024/5	Plates, Identification
MIL-C-16173	Corrosion Preventive Compound, Solvent Cutback, Cold-Application
MIL-E-16298	Electric Machines Having Rotating Parts and Associated Repair Parts: Packaging of
MIL-M-17060	Motors, 60 Hertz Alternating Current Integral HP (Shipboard Use)
MIL-M-17413	Motors, Direct Current, Integral HP, Naval Shipboard
MIL-M-17556	Motor, Direct-Current, Fractional HP, Shipboard Use
MIL-L-19140	Lumber and Plywood, Fire-Retardant Treated
MIL-S-23769	Seals, Security
DOD-G-24508	Grease, High Performance, Multipurpose (Metric)

STANDARDS

MILITARY

MIL-STD-108	Definitions of and Basic Requirements for Enclosures for Electric and Electronic Equipment
MIL-STD-167-1	Mechanical Vibrations of Shipboard Equipment (Type I – Environmental and Type II – Internally Excited)

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MIL-STD-278	Welding and Casting Standard
MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of
MIL-STD-889	Dissimilar Metals

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

803-607819	Hose 8, 10, 16 Inch and Rack for Portable Ventilating Sets
803-921629	Ventilating Set, Portable, Electric Motor Driven
803-921740	Ventilating Set, Portable, Air Turbine Driven
815-1197047	Switch Box for Explosion-proof Ventilating Set

(Application for copies should be addressed to: Commander, Portsmouth Naval Shipyard, Code 202.2, Portsmouth, NH 03804.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

S1.4(ASA 47)	Sound Level Meters, Specification for

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(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; (DOD adopted)
A 153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; (DOD adopted)
A 569	Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality; (DOD adopted)
B 6	Standard Specification for Zinc
B 633	Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; (DOD adopted)
D 2092	Standard Practice for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

UNDERWRITERS LABORATORIES (UL)

UL 547	Thermal Protectors for Motors

(Application for copies should be addressed to the Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.5) in accordance with 4.3.

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3.2 Materials. Materials for use in the construction of fans shall be as specified in 3.2.1 through 3.2.11.7. The materials shall be free from defects that might affect the serviceability or appearance of the finished product.

3.2.1 Hazardous materials. Materials for use in the construction of fans shall have no effect on the health of personnel when the materials are used for their indented purpose. Materials and parts containing asbestos, cadmium, lithium, mercury, or radioactive material shall not be used.

3.2.2 Materials not specified. Except for castings, commercial materials shall be permitted for fan parts when Government specifications are not available. When not identified by Government specifications, steel and aluminum materials other than castings shall be identified by American Iron and Steel Institute (AISI) number or range of numbers (for example, AISI 1008-1020) or by Aluminum Association number (for example, 5052). Chemical or mechanical analysis shall be required only for castings.

3.2.3 Material thickness. Aluminum scrolls, casings, and flanges shall be not less than 0.187 inch thick.

3.2.4 Aluminum alloy parts. Parts fabricated of aluminum shall be of aluminum alloys that conform to the requirements of table I (Federal Specifications for comparable alloys are enclosed in parentheses and listed for guidance, except as noted in 3.2.2).

TABLE I. *Aluminum alloy materials.*

Material	Commercial alloy	Applicable document
Plate and sheet	5086-H32[1] quarter hard 5052-H32 quarter hard 6061-T4 or T6	(QQ-A-250/7) (QQ-A-250/8) (QQ-A-250/11), T4, or T6
Bars, shapes, rod, wire, and rivets	5052-H32 quarter hard	(QQ-A-225/7) (QQ-A-430, alloy 5052)
Sand castings	–	QQ-A-601, alloys 356-0, or T6, A712.0, D712.0 or 713.0 (Tenzaloy) or equal
Permanent mold castings	–	QQ-A-596, alloy 356-T6, Tenzaloy, or equal

[1]Preferred for welded assemblies.

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3.2.4.1 Tapped holes. Tapped holes in aluminum shall have the minimum quantity of threads as a nut of equal size, and the thread shall be fitted with a corrosion-resistant steel helicoidal insert.

3.2.5 Steel parts. Parts fabricated of steel plate in accordance with ASTM A 569 shall be of low carbon or medium carbon steel having a surface smoothness suitable for electroplating.

3.2.5.1 Fastening hardware. Fastening hardware shall conform to the following specifications: cap screws, FF-S-85 or FF-S-86, as applicable; slotted-head machine screws, FF-S-92; hexagon-socket, headless set screws, FF-S-200; bolts, MIL-S-1222; nuts, FF-N-836; lockwashers, FF-W-84; and plain washers, FF-W-92. Except in non-magnetic applications that requires special hardware (see 3.2.6.2), hardware shall be of carbon steel, plated with zinc to a minimum thickness of 0.0002 inch in accordance with ASTM A 153 and ASTM B 633, SC 1. In general, the use of commercial hardware fasteners is preferred to fewer medium or high tensile strength hardware fasteners because replacements are readily available in case of loss.

3.2.6 Nonmagnetic and nonsparking construction. Fans shall be of nonmagnetic and nonsparking construction and shall conform to the requirements of 3.2.6.1 through 3.2.6.4.

3.2.6.1 Permeability. Nonmagnetic material shall be considered as that which has a permeability of less than 2.0 in the final condition.

3.2.6.2 Fan parts. Fan parts, including scroll or casing inlet cone, flanges, vanes, wheel, wheel hub inserts, motor mounting ring, support base, conduit, terminal connection (switch) box, bolts, nuts, washers, and fittings shall be constructed of nonmagnetic material.

3.2.6.3 Drives. Air-turbine and electric-motor drives shall use ferromagnetic material only in magnetic circuits.

3.2.6.4 Cast iron. Cast iron shall not be used in any part of the fans or fan components including the drives (electric-motor and air-turbine) and control devices.

3.2.7 Dissimilar metals. Electrolytically dissimilar materials shall not come in direct contact to prevent destructive electrolysis.

3.2.7.1 Fastening hardware. Corrosion-resistant hardware fasteners shall be insulated from aluminum or aluminum alloys. Material that is water absorbent shall not be used in contact with aluminum or aluminum alloys. Self-tapping sheet metal screws shall not be used.

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3.2.7.2 Surface contact. Aluminum or aluminum alloy surfaces in contact with similar or dissimilar metals shall minimize galvanic corrosion as required by MIL-STD-889. In addition, faying surfaces shall be painted before assembly with one coat of zinc-chromate primer in accordance with TT-P-645 and two coats of aluminum paint in accordance with TT-E-489

3.2.8 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.2.9 Corrosion protection. Corrosion-resistant steel (300 series), copper, and brass referenced herein shall be corrosion-resistant materials. Corrosion-resistant steel, when used in any fabrication method that tends to reduce corrosion-resisting properties, shall be normalized to restore those properties.

3.2.9.1 Corrosion protection methods. Parts fabricated from other than corrosion-resistant materials shall be protected against corrosion with chemical treatment, electrolytic processes, plating, or specified corrosion protection methods. Such processes include, but are not limited to the following:

a. Hot-dip galvanize in accordance with ASTM A 123, with the spelter conforming to grade 5 of ASTM B 6

b. Electroplating with zinc in accordance with ASTM B 633 SC4, followed by chromic treatment conforming to ASTM D 2092

c. Two coats of primer conforming to TT-P-645.

3.2.9.2 Plating of mating carbon steel parts. Noncorrosion-resistant steel parts of an assembly which can be disassembled shall be plated separately. Machining of the plating shall be permitted only as necessary for proper mating of parts; when the plating is removed from an area, that area shall be coated immediately with a zinc spray.

3.2.10 Welding and allied processes. Welding and allied processes shall conform to MIL-STD-278, except that only visual inspection of welds shall be required.

3.2.11 Surface cleaning and painting.

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3.2.11.1 Cleaning of aluminum alloy surfaces. Wherever practicable, cleaning of aluminum alloy shall be done prior to assembly of parts. Cleaning before assembly shall be accomplished by immersing the part in, or swabbing with a cleaner consisting of a diluted water solution of phosphoric acid and organic solvents. The solution temperature shall be approximately 70 degrees Fahrenheit (°F). The solution shall remain in contact with the metal for not over 5 minutes. Residual solution shall be removed with clear water, followed by hot water until no trace of acid is detected. As an alternative method, after assembly, parts may be cleaned with a suitable solvent.

3.2.11.2 Sandblasting. Light sandblasting, following the use of the above solvents, shall be permissible for producing a good adhering surface for paint. The force and direction of the blast shall be controlled so as not to distort or damage the material.

3.2.11.3 Welded parts. Welded parts shall have all traces of flux removed before painting. This may be accomplished by brushing the welds while immersed in boiling water. For inaccessible welds, the part may be cleaned by immersion in a cold solution of 10 percent sulfuric acid for 30 minutes, or a 5 percent solution of sulfuric acid held at 150 °F for 10 minutes. The acid shall contact both the inside and outside surfaces. The acid treatments shall be followed by a thorough rinse in clean, warm water until no trace of acid is detected. Residual flux may be detected by leaching the surface with distilled water, and adding a few drops of 5 percent silver nitrate solution to the leach. A white precipitate will indicate the presence of flux.

3.2.11.4 Cleaning of galvanized surfaces. Zinc coated surfaces shall be treated with a cleaner consisting of phosphates, phosphoric acid, solvents, and wetting agents to enable the surface to be coated with a thin phosphate coating. Where the galvanized material has not been acquired in the treated condition, the solution shall be applied to the galvanized surface with a large brush and allowed to act for not less than 1 minute. The surface shall then be washed thoroughly with cold water, then hot water, and primer applied when dry. Care shall be taken to minimize handling the surface following coating, and prior to the application of the primer.

3.2.11.5 Cleaning of corrosion-resistant material surfaces. Corrosion-resistant material surfaces that are to be painted shall be cleaned with a nonflammable solvent. Welds shall be brushed with corrosion-resisting metal wire brushes.

3.2.11.6 Painting of internal surfaces. Surface of all internal parts shall be thoroughly cleaned and coated as follows:

a. Two mils (minimum dry film thickness) of zinc-molybdate primer in accordance with TT-P-645

b. One coat of phenolic varnish in accordance with TT-V-119.

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3.2.11.7 Painting of external surfaces. All external surfaces of the fan shall be thoroughly cleaned and coated as follows:

a. Two mils (minimum dry film thickness) primer coat of zinc-molybdate primer in accordance with TT-P-645

b. One mil (minimum dry film thickness) finish coat of red enamel (formula number 40) in accordance with TT-E-489.

3.3 Vibration. Fans shall be vibration tested as an assembly and shall conform to the requirements of 3.3.1 and 3.3.2.

3.3.1 Environmental vibration (externally excited vibration). Fans shall meet the type I environmental vibration requirements as specified in MIL-STD-167-1 for frequencies up to and including 33 Hertz (Hz).

3.3.2 Balance (internally excited vibration). Fans shall meet the type II internally excited vibration requirements as specified in MIL-STD-167-1 for first order frequencies.

3.4 Identification plates. The identification plate shall be in accordance with MIL-P-15024 and MIL-P-15024/5.

3.5 Interchangeability. In no case shall parts be physically interchangeable or reversible unless such parts are also interchangeable or reversible with regard to function, performance, and strength.

3.6 Class 0-1/2A and 0-1/2D fans.

3.6.1 General. Class 0-1/2A and 0-1/2D fans shall contain all the equipment and materials as specified in this specification and their referenced drawings. The fans shall operate in any position and shall be easily transported by two individuals to any shipboard area.

3.6.2 Performance.

3.6.2.1 Capacity (volume and pressure). The rated design point for the fan set shall be the volume-pressure point of 500 cubic feet per minute (ft^3/min) at a minimum static pressure of 2.5 inches water gauge. At an airflow of 500 ft^3/min of standard air, operation shall be stable and the static pressure shall be within the limits of 2.5 and 3.0 inches water gauge.

3.6.2.2 Noise level. The noise level of the fan set operating at the design point shall not exceed 85 decibels (dB).

3.6.2.3 Efficiency. The efficiency of the fan set (fan output divided by motor input) operating at the design point shall be 34 percent or greater.

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3.6.3 Design and construction.

3.6.3.1 Fan construction. Fan materials and details of construction shall conform to Drawing 803-921629.

3.6.3.2 Aerodynamic design. The quantities of blades and vanes shall be chosen to avoid interacting frequencies within the audible range. The axial distance between blades and vanes shall be chosen with minimum noise amplitude as a prime consideration. The passing angle between a blade trailing edge and a vane leading edge shall be 10 degrees or greater. The maximum blade tip clearance (radial clearance) shall not exceed 1/4 of 1 percent of the casing minimum inside diameter.

3.6.3.3 Fan wheel.

3.6.3.3.1 Material. The wheel consisting of hub, web, rim, and blades shall be a one-piece sand casting or permanent-mold casting of aluminum alloy conforming to 3.2.4. The blades shall be of airfoil design.

3.6.3.3.2 Strength. The wheel shall have a safety factor of 8, based on the ultimate tensile strength of the material.

3.6.3.3.3 Design. To avoid unbalance, the wheel shall be constructed so as to prevent retention of water. The outside diameter of the wheel rim shall be at least as great as the outside diameter of the motor mounting flange. If there is insufficient space between blades for use of a wheel puller, means (such as puller holes) shall be provided in the hub.

3.6.3.3.4 Hub inserts. A corrosion-resistant steel insert shall be installed in the hub of each wheel. A keyway shall be machined in the bore of the insert. Inserts shall either be cast-in-place or pressed into the wheel, preference being for the former (see 3.6.3.3.4.1 and 3.6.3.3.4.2).

3.6.3.3.4.1 Cast-in-place inserts. Cast-in-place inserts shall be designed to prevent either axial or circumferential slippage after being cast into the wheel.

3.6.3.3.4.2 Pressed-in-place inserts. Inserts for installation in wheel castings shall be flanged to permit securing to the wheel by means of through-bolting. There shall be an interference fit of the insert in the wheel, requiring substantial insertion pressure or shrinkage or both.

3.6.3.3.5 Provision for balancing. Balancing of the wheel shall be accomplished by removal of metal. Provision of sufficient rim thickness or of cast pads on the inside diameter of the wheel rim is recommended for this purpose.

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3.6.3.3.6 Mounting. The completed wheel assembly shall be mounted on the keyed motor shaft and held axially by a heavy steel washer and either a tanged lockwasher and locknut or a cotter pin and castellated nut. The outside diameter of the flat washer shall be greater than the outside diameter of the wheel hub insert. There shall be a slight positive clearance (loose fit) between the wheel hub assembly and the shaft to permit wheel removal. If the shaft is not of corrosion-resistant material, the shaft extension shall be coated with corrosion preventive compound, in accordance with MIL-C-16173, grade 1, before mounting of the fan wheel.

3.6.3.4 Motors.

3.6.3.4.1 Shock resistance. Motors shall conform to the requirements of grade A high-impact shock in accordance with MIL-S-901.

3.6.3.4.2 Explosion-proof. Motors shall be explosion-proof and shall conform to the requirements for explosion-proof group D enclosures in accordance with MIL-E-2036 and MIL-STD-108.

3.6.3.4.3 Manual master switch. Motors shall be provided with a manual two pole master switch which shall be of the full voltage (across the line) type with horsepower and current ratings suitable for motor operation over the voltage range of 75 to 126.5 volts direct current (Vdc), and volts alternating current (Vac), and current levels up to and including motor rated locked rotor current. The switch box shall conform to Drawing 815-1197047.

3.6.3.4.4 Thermal protection. Motors shall be thermally protected in accordance with UL 547. The thermal protector shall be the automatic reset type with a locked rotor temperature limit for class B insulation systems. The thermal protector shall be permanently mounted in close proximity to the stator winding, on the front-end bracket.

3.6.3.4.5 Bearings. Motors shall be equipped with ball bearings conforming to FF-B-171. Bearings shall be type 120 (cartridge type), with a C3 internal clearance, minimum sizes 204 (back end) and 203 (front end), mounted in accordance with 3.6.3.4.5.1. Bearings shall be prelubricated with grease in accordance with DOD-G-24508.

3.6.3.4.5.1 Mounting. Aluminum motor end brackets shall corrosion-resistant steel inserts provided for threaded portions and bearing housings. The bearings shall be mounted using the fixed-free method in accordance with MIL-M-17059 with the following exceptions:

a. Both bearings will be held axially against a shaft shoulder by either a locknut and lockwasher with shaft keyway or a locknut with nylon insert.

b. The back-end bearing end cap shall provide a 3/4-inch minimum axial flamepath along the shaft, inboard of the bearing, extending to within 1/16 inch of the rotor. The front-end bearing end cap, if provided, shall provide a flamepath as described above.

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3.6.3.4.6 Alternating current motors. Alternating current motors shall not have excessive horsepower, but shall have sufficient torque to start the fans at a motor terminal voltage of 75 volts. The motor shall drive the fan continuously at a motor terminal voltage of 104 volts when the fan is operating at its rated design point as specified in 3.6.2.1. Alternating current motors shall conform to MIL-M-17060 as augmented by the following requirements:

Design:	Split-phase
Voltage:	115 Vac, 60 Hz, single-phase
Service:	Navy service A
Horsepower:	As required by fan
Rated speed:	As required by fan
Frame:	As required by fan
Mounting:	Face
Duty:	Continuous, air over cooling
Enclosure:	Explosion-proof, group D (see 3.7.3.4.2)
Insulation:	Sealed, class B or F (see 3.7.3.4.6.2)
Bearings:	Ball (see 3.7.3.4.5)
Ambient temperature:	65 degrees Celsius (°C)
Maximum temperature rise:	55 °C
Synchronous rated speed:	3600 revolutions per minute (r/min)
Thermal protection:	UL 547 (see 3.7.3.4.4)
Minimum safelocked rotor time:	90 seconds

3.6.3.4.6.1 Starting equipment. Starting equipment for alternating current motors shall consist of a manual master switch (see 3.6.3.4.3) and an auxiliary winding (motor start winding) starter switch (see 3.6.3.4.6.1.1) connected in series with the motor auxiliary winding. Thermal protection shall be provided solely by the motor's thermal protection device (see 3.6.3.4.4). When operated, the starting sequence shall be as follows: the manual master switch shall supply line power through the thermal protection device to the main winding and the starter switch. The normally open starter switch shall close and supply line power to the auxiliary winding thereby initiating the motor starting sequence. The starter switch shall remain closed until the starting sequence is completed at which time it shall open, disconnecting the auxiliary winding. Thereafter the motor shall continue to run only on its main winding and the starter switch shall remain open until the line power varies or is removed. Both manual master switch and starter switch shall be enclosed in an explosion-proof connection (switch) box in accordance with 3.6.3.4.8.

3.6.3.4.6.1.1 Auxiliary winding disconnect switch. The auxiliary winding (motor start winding) starter switch shall be a solid state non-sparking, normally open switching device that shall operate over the voltage range of 75 to 126.5 Vac while switching auxiliary winding current at levels up to and including the start winding locked rotor current. The switch shall restart the motor at any time without requiring a recycle or cool-down period.

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3.6.3.4.6.2 Sealed insulation system. Alternating current motors shall be provided with a sealed insulation system in accordance with MIL-M-17060.

3.6.3.4.7 Direct current motors. Direct current motors shall not have excessive horsepower, but shall have sufficient torque to start the fans at a motor terminal voltage of 75 volts with acceptable commutation, sparking or overheating of the commutator is unacceptable. The motor shall drive the fan continuously at a motor terminal voltage of 104 volts when the fan is operating at its rated design point as specified in 3.6.2.1. Direct current motors shall conform to the nonmagnetic construction requirements of MIL-M-17413 and the following requirements. They shall also conform to MIL-M-17556, as required, augmented by the following requirements:

Design:	Shunt type winding
Voltage:	115 Vdc
Service:	Navy service A
Horsepower:	As required by fan
Rated speed:	As required by fan
Frame:	As required by fan
Mounting:	Face
Duty:	Continuous, air over cooling
Enclosure:	Explosion-proof, group D (see 3.6.3.4.2)
Insulation:	Class B or F (see 3.6.3.4.7.2)
Bearings:	Ball (see 3.6.3.4.5)
Ambient temperature:	65 °C
Maximum temperature rise:	55 °C
Thermal protection:	UL 547 (see 3.6.3.4.4)
Minimum safelocked rotor time:	90 seconds
Number of poles:	Four or more
Materials restriction:	Silicone materials shall not be used
Construction:	Nonmagnetic

3.6.3.4.7.1 Starting equipment. Starting equipment for direct current motors shall consist of only the manual master switch specified in 3.6.3.4.3.

3.6.3.4.7.2 Insulation system. Direct current motors shall conform to motor suitability dielectric strength, insulation resistance, and insulation system tests in accordance with MIL-M-17556.

3.6.3.4.7.3 Electromagnetic interference (EMI). First article fans shall conform to EMI requirements of MIL-STD-461. Fans shall be in accordance with conducted and validated emission requirements and limits of tests CE03 and RE02 (see 4.7.3.4).

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3.6.3.4.7.3.1 Design to minimize EMI. Low EMI is best attained by attention to certain criteria when designing the motor. In addition to design requirements specified in this specification, factors shall include bonds between assembled metal parts, brush pressure, quantity of armature coils, electrical insulation, reduction of stray fields, and shielding. Where gaskets are used, they shall be of a conductive type, with woven wire mesh impregnated with neoprene or other nonsilicone material.

3.6.3.4.7.3.2 EMI suppression. EMI suppression devices may be used when efforts to limit EMI at the source are not completely successful. Brush-to-ground capacitors installed within the motor enclosure are preferred. The standard portable fan switch box shall not be altered, and attainment of the specified EMI requirement shall be by good design and the use of suppressors which can be fitted into the motor or the standard switch box, provided that leakage current to ground shall not exceed 5 milliamperes. The voltage rating of feed-through EMI suppressors shall be sufficient to withstand the motor insulation resistance test, and in no case shall the rating be less than 500 volts.

3.6.3.4.7.4 Use of grounding brushes. Shaft grounding brushes shall not be used in motors.

3.6.3.4.8 Terminal connection (switch) box. An explosion-proof, group D, terminal connection (switch) box conforming to the requirements of MIL-E-2036, MIL-STD-108, and Drawing 815-1197047 and of sufficient size to accommodate housing of starting equipment shall be provided on the outside of the fan casing in line with the motor lead wire entrance. Fans shall be designed with the box a minimum of 45 degrees above the fan centerline to prevent drainage of motor condensate to the box. The lead wires from the motor to the box shall be enclosed in watertight conduit that forms an effective electrical ground from the motor frame to the fan casing and box, as well as an electromagnetic shield. The motor lead wires shall be connected to terminals within the box utilizing solderless wire terminal end connectors. When it is necessary to enclose electromagnetic interference feed-through suppressors within the box, shielding and partitioning shall be provided.

3.6.3.5 Electrical safety. Fans shall provide fail-safe features for the safety of personnel during the fan's operation. When the fan is properly operated, there shall be no accessible way for the operating personnel to receive an electric shock even though an internal fault between any two circuits, between any circuit and a structural member, or between any circuit and ground may exist. The design shall hold to a practical minimum the possibility of maintenance personnel being exposed to electric shock while servicing, adjusting, or checking out the fan. Sharp corners and projections which may cause injury in a rough sea or on which clothing may catch shall be avoided. Electrical equipment shall revert to its least hazardous condition or mode of operation upon failure of a circuit or part. The design shall be such that should failure occur, any resulting damage will be confined to the smallest equipment subdivision (minimum replaceable part of the subassembly) within which the failure occurred.

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3.6.3.5.1 Accidental contact. The design of the fan shall provide protection against accidental contact with voltages in excess of 30 volts root mean square (Vrms) alternating current.

3.6.3.5.2 Electrical circuitry. The fan shall operate on an ungrounded ship's power system. In the event of a single accidental ground or if high impedance circuits such as radio interference suppressors are connected to ground, the fan shall operate satisfactorily. Furthermore, the fan shall be such that it does not impose a ground upon the electrical power system from which it is grounded.

3.6.3.5.3 Exposed metal (or other conductive) parts. Design and construction of the fan shall be such that all exposed parts or panels of metal or other electrical conductive material are at ground (ships hull) potential at all times. Exposed metal portions of electrical parts (switches, rheostats, and similar parts) or other parts located near electrical circuits (including parts inside enclosures where access is required for operation or adjustment) shall be in intimate physical contact with the fan housing or electrically connected to the fan housing if these parts could touch the electrical circuits as a result of part degradation such as deformation, wear, or insulation failure.

3.6.3.6 Security seals. Security seals in accordance with MIL-S-23769, type I, crimp/wire shall be provided. To prevent unauthorized repair, one seal shall be located on the motor through bolt, and one on the switch box assembly and packing gland nut. Seals shall state manufacturer and "RED DEVIL SEAL."

3.6.3.6.1 Caution plate. A metallic warning plate shall be mounted to the fan casing near the switch box and shall read as follows:

CAUTION

> Do not operate blower without safety seals in place. One seal is located on the motor through bolt. One seal is located on the switch box assembly and packing gland nut. Seals must indicate manufacturer and "RED DEVIL SEAL."

3.7 Class 0-3/4T fans.

3.7.1 General. Class 0-3/4T fans shall contain all the equipment and materials as specified in this specification and its referenced drawings. Fans shall operate in any position and shall be easily transported by two individuals to any shipboard area.

3.7.2 Performance.

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3.7.2.1 Capacity (volume and pressure). The rated design point for the fan set shall be the volume-pressure point of 750 ft^3/min at a minimum static pressure of 3 inches water gauge. At an airflow at 750 ft^3/min of standard air, operation shall be stable and the static pressure shall be within the limits of 3.0 and 3.5 inches water gauge.

3.7.2.2 Noise level. The noise level of the fan set operating at the design point shall not exceed 102 dB.

3.7.2.3 Efficiency. The efficiency of the fan set operating at the design point shall be such that the air-turbine air consumption shall be not greater than 60 ft^3/min of free air supplied at 80 pounds per square inch (lb/in^2) gauge.

3.7.3 Design and construction.

3.7.3.1 Fan construction. Fan materials and details of construction shall conform to Drawing 803-921740.

3.7.3.2 Air-turbine design. The air-turbine shall be of the velocity compounded type having a reversing chamber. Turbine blades shall be cast into the turbine rotor with a shroud band around the periphery of the buckets or the complete rotor may be machined from one piece of cast aluminum. The compressed air supply to the air-turbine shall be a 1/2-inch nominal pipe size (nps) screwed connection, and the exhaust shall be a 1-inch nps screwed connection.

3.7.3.3 Fan wheel.

3.7.3.3.1 Material. Parts of the wheel that are not cast shall be die-formed. All parts of the wheel shall have a safety factor of not less than 8, based on the ultimate tensile strength of the materials involved.

3.7.3.4 Air-turbine rotor and fan wheel. The air-turbine rotor and the fan wheel shall be mounted on opposite ends of a common shaft supported by two ball bearings mounted in the turbine casing or support base. Bearings shall conform to FF-B-171 and shall be type 120 (cartridge type) with a C3 internal clearance and be prelubricated with grease in accordance with DOD-G-24508. Class 0-3/4T fans shall be provided with a support base with handle.

3.7.3.5 Stuffing box. If required, a stuffing box shall be provided to prevent leakage of air from the air-turbine exhaust chamber along the shaft to the fan scroll.

3.7.3.6 Safety. Fail-safe features, as applicable, shall be provided for class 0-3/4T fans to ensure the safety of personnel during operation.

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3.8 Workmanship. Workmanship shall be in accordance with high grade commercial practice for this equipment. The fan shall be uniform in quality and shall be free from irregularities, defects, or foreign matter which could adversely affect safety, performance, reliability, or durability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program (see 6.3). The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.3)
b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When specified (see 6.2), first article inspection shall consist of groups A, B, and C tests and examinations as specified in table II. If any sample fails any test or examination it shall constitute failure of first article inspection and shall be rejected. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the responsible Government activity, has been taken (see 6.3 and appendix B).

TABLE II. *First article and quality conformance inspections.*

Test/examinations	Applicability class[1]	Requirement	Test or examination	First article inspection	Quality conformance inspection
Group A:					
General examination	All	–[2]	4.5	X	X
Inspection of packing	All	–[3]	4.6		X
Material thickness	All	3.2.3	4.7.1.1	X	X
Cast wheel and casing or scroll	All	3.2.4	4.7.1.2	X	X
Aerodynamic design	0-1/2A, 0-1/2D	3.6.3.2	4.7.1.3	X	X
Starting equipment	0-1/2A, 0-1/2D	3.6.3.4.6.1	4.7.1.4	X	X
Safety seals/caution plate	0-1/2A, 0-1/2D	3.6.3.6 and 3.6.3.1	4.7.1.5	X	X
Group B:					
Balance	All	3.3.2	4.7.2.1	X	X
Capacity/efficiency	0-1/2A, 0-1/2D	3.6.2.1 and 3.6.2.3	4.7.2.2	X	X
	0-3/4T	3.7.2.1 and 3.7.2.3	4.7.2.2	X	X
Noise level	0-1/2A, 0-1/2D	3.6.2.2	4.7.2.3	X	X
	0-3/4T	3.7.2.2	4.7.2.3	X	X
Motor heat/thermal protection	0-1/2A	3.6.3.4.4	4.7.2.4	X	X
	0-1/2D	3.6.3.4.7	4.7.2.4	X	X
Insulation system	0-1/2A	3.6.3.4.6.2	4.7.2.5.1	X	X
	0-1/2D	3.6.3.4.7.2	4.7.2.5.2	X	X
Grounding/electrical safety	0-1/2A, 0-1/2D	3.6.3.5	4.7.2.6	X	X
	0-3/4T	3.7.3.6	4.7.2.6	X	X
Group C:					
Environmental vibration	All	3.3.1	4.7.3.1	X	
Shock (motor only)	0-1/2A, 0-1/2D	3.6.3.4.1	4.7.3.2	X	
Explosion-proof	0-1/2A, 0-1/2D	3.6.3.4.2 and 3.6.3.4.8	4.7.3.3	X	
EMI	0-1/2D	3.6.3.4.7.3	4.7.3.4	X	

[1]Applies to sample fan of the class indicated.
[2]All applicable sections of section 3 not otherwise covered in this column.
[3]All of section 5.
[4]Casing or scroll tightness is required only when specified (see 4.7.2.4).

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4.3.1 Sampling for first article. One sample fan of the specified class of fan for which production is desired shall be selected for first article inspection specified in 4.3 (see 6.5). Tests shall be conducted prior to regular production of each new fan lot unless performed previously and considered applicable and extended by the responsible Government activity. In general for these fans, such extensions will be granted if the test fan is similar aerodynamically and the motor of class 0-1/2A and 0-1/2D is of identical manufacture and of identical frame size and the motor heat tests are determined with the motor installed with the fan. For class 0-3/4T fans, the test fan shall be similar aerodynamically and be complete with an identical air-turbine.

4.4 Quality conformance inspection. A random sample of each class of fan shall be selected from each lot in accordance with 4.4.3 for quality conformance inspection. Quality conformance inspection shall consist of groups A and B tests and examinations specified in table II (see 6.3 and appendix B). Any fan in the sample that fails any test or examination shall be considered defective and shall be rejected. The manufacturer may rework the lot to correct the defects or screen out the defective fans, and resubmit the lot for reinspection. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots.

4.4.1 Noncompliance. If a sample fails to pass the inspection, the manufacturer shall notify the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on units of product which can be corrected and which are manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the responsible Government activity has been taken. After the corrective action has been taken the inspection shall be repeated on new samples. Final acceptance and shipment shall be withheld until the inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the responsible Government activity.

4.4.2 Lot. A lot shall consist of all fans produced under essentially the same conditions and offered for inspection at one time, but shall not consist of more than 100 at any one time.

4.4.3 Sampling. Sample fans of the same class shall be selected at random from each lot in accordance with table III for quality conformance inspection as specified in 4.4.

TABLE III. *Quality conformance sampling.*

Lot size (number of fans)	Sample size (number of fans)
6 and under	All
7 to 15	7
16 to 25	10
26 to 40	13
41 to 65	17
66 to 100	22

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4.5 General examination. Each sample fan selected for first article and quality conformance inspections shall be subjected to an examination, after the applicable inspection, to confirm conformance to specification requirements concerning material, finish, workmanship, safety, construction, assembly, dimensions, weight, marking and identification, and drawing requirements. The examination shall consist of, but not be limited to, the classification of defects specified in table IV. This examination shall be limited to examinations that may be performed without disassembling of fans in such a manner that the fan's performance, durability, or appearance would be affected. Any fan that contains one or more defects shall be rejected and shall not be offered for delivery until corrective action has been taken. Final acceptance and shipment will be withheld until a re-examination has shown that the corrective action was successful.

TABLE IV. *Classification of defects.*

Categories	Defects
Critical:	
1	None defined
Major:	
101	Class not as specified
102	Incomplete (component or accessory parts missing)
103	Materials defective or not as specified
104	Limited dimensions, exceeded
105	Welding incomplete, not free of cracks, nonfusion, heavy porosity, heavy undercut, slag inclusions
106	Air turbine not as specified
107	Electric motor not as specified
108	Removable end sections not interchangeable
109	Removable cover or gasket missing or defective
110	Electrical equipment not as specified
111	Cable entrance knockouts missing
112	Information or label parts (as applicable) missing
113	Sharp edges and burrs not removed from parts subject to personnel contact
114	Bolt, nuts, and screws not tight, missing (parts shall be properly fastened and secured)
115	Drawings not followed
116	Painting (as applicable) nonconforming
117	Marking, manufacturer's identification plate, not permanent, illegible or not as specified
118	Similar parts not interchangeable
Minor:	
201	None defined

4.6 Inspection of packaging. Sample packs, and the inspection of the preservation, packing and marking for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified herein

4.7 Tests and examinations. First article and quality conformance inspection tests and examinations shall be conducted at a facility satisfactory to the responsible Government activity and shall conform to 4.7.1, 4.7.2, and 4.7.3 (see 6.3 and appendix B).

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4.7.1 Group A tests and examinations.

4.7.1.1 Material thickness. Visual examination shall be performed for defects especially at the base of cast angles. Wall thickness shall be measured on at least 10 percent of the casings or scrolls for compliance with 3.2.3.

4.7.1.2 Cast wheel and casing or scroll. Test samples of castings shall be examined for chemical content and mechanical properties in accordance with QQ-A-601 for compliance with 3.2.4. There is no requirement for radiography of visually sound castings. Repairs of cast wheels are not permitted. Cast casings or scrolls may be repaired in emergencies by welding or impregnation, subject to radiographic inspection and responsible Government activity approval for each casting involved.

4.7.1.3 Aerodynamic design. The minimum passing blade angle and the maximum blade tip clearance shall be measured at four points 90 degrees apart for compliance with 3.6.3.2.

4.7.1.4 Starting equipment. Examination shall be performed at the source in accordance with applicable component manufacturer specifications as approved by the responsible Government activity for compliance with 3.6.3.4.6.1.

4.7.1.5 Safety seals/caution plate. Visual examination shall be performed for conformance to safety seal and caution plate requirements of 3.6.3.6 and 3.6.3.6.1.

4.7.2 Group B tests/examinations.

4.7.2.1 Balance (internally excited vibration) (see 4.7.3.1). Type II internally excited vibration tests in accordance with MIL-STD-167-1 shall be conducted on fans to confirm balance conformance to 3.3.2. In this test, class 0-1/2A and 0-1/2D fans shall be operated at 115 volts and at free airflow delivery with shaft horizontal. Class 0-3/4T fans shall be operated with 60 ft^3/min of free air supplied at 80 lb/in^2 gauge to their air-turbine and at free airflow delivery with shaft horizontal. Rigid brackets shall be mounted to the fan ends and these brackets shall be elastically mounted on a rigid, level floor. The internally excited vibrational displacement (single amplitude of vibration) shall be measured in mils as follows: measurements shall be taken at both ends of the fan and on the flanges. Record axial motion and motion that is horizontally and vertically perpendicular to the axis. The maximum amplitude of vibrational displacement shall be the maximum single reading and not an average. The operating frequency at which the maximum amplitude occurs shall be noted. The internally excited vibrational displacement shall be within the specified limits.

In addition to the above, the portable fan shall be tested on a rigid, level floor without brackets, for five minutes at the revolutions per minute (rpm) setting that corresponds to the fan's maximum amplitude. If this setting is different from the fan's maximum rpm setting, then the fan shall be tested again for five minutes at its maximum rpm setting. The fan shall not have any movement along the floor during these tests.

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4.7.2.2 Capacity/efficiency (see 4.7.3.1). Performance tests shall be conducted in accordance with AMCA 210, as augmented herein, to confirm capacity conformance of class 0-1/2A and 0-1/2D fans to 3.7.2.1 and class 0-3/4T fans to 3.8.2.1. Class 0-1/2A and 0-1/2D fans shall be operated at their rated design point at rated voltage at their motor terminals and their speed and efficiency determined. The set efficiency shall conform to 3.6.2.3. Any motor starting device purchased with the set shall be included in the tests. Class 0-3/4T fans shall be operated at their rated design point with 60 ft^3/min of free air supplied at 80 lb/in^2 gauge to their air-turbine and their speed and efficiency determined. The set efficiency shall conform to 3.7.2.3. The free air consumption of the air-turbine shall be measured with a flow meter (rotometer or equal with an accuracy of plus or minus 2 percent) installed on the outlet of the air-turbine.

4.7.2.3 Noise level (see 4.7.3.1). These tests consisting of sound pressure determinations and testing by sound level meter shall be conducted on fans in accordance with 4.7.2.3.1 for conformance to 3.6.2.2 and 3.7.2.2. The sound level meter and the calibration procedure shall be in accordance with ANSI S1.4(ASA 47).

4.7.2.3.1 Noise level testing. With the fan installed horizontally, connected to a discharge duct and operating at the design point, broadband sound pressure shall be measured with a sound level meter with flat response, slow needle and referenced to a sound pressure of 20 micro Pascals. Seven measurements in a horizontal plane through the fan centerline shall be made, and they shall be averaged arithmetically to determine the noise level. For class 0-1/2A and 0-1/2D fans these measurements shall be made 1 meter from the fan casing: on the inlet centerline, 45 degrees on each side of the inlet and discharge flanges, and on each side of the casing perpendicular to the axis. For class 0-3/4T fans these measurements shall be made 1 meter from the fan casing: on the inlet centerline, 45 degrees on each side of the inlet, on the side opposite the discharge connection perpendicular to the axis, 45 degrees on each side of the air-turbine and opposite from the inlet centerline. The discharge duct may terminate outside of the test space.

4.7.2.4 Motor heat/thermal protection (see 4.7.3.1). Motor heat tests shall confirm motor starting and running capability requirements of 3.6.3.4.6 and 3.6.3.4.7. In each test the fans shall be operated at their rated design point which shall be obtained by means of a terminal throttle on the fan discharge. Voltages, measured at the motor terminals, shall be applied in accordance with 4.7.2.4.1 and 4.7.2.4.2. The motor shall be at normal operating temperature before each voltage start.

4.7.2.4.1 High voltage start. The fan shall successfully start without a cutout due to the motor thermal protective device from zero to maximum armature speed at its rated design point and continue to operate at its rated design point at 126.5 volts.

4.7.2.4.2 Low voltage start. The fan shall complete 10 consecutive successful starts from zero to maximum attainable armature speed at 75 volts. After 10 starts, the voltage shall be increased to 104 volts and the fan operated at its rated design point for 1/2 hour. Cutout due to the motor thermal protective device during the starts or the following 1/2 hour operation shall be considered a failure.

4.7.2.5 Insulation systems. Insulation system tests of fan motors shall be in accordance with 4.7.2.5.1 and 4.7.2.5.2.

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4.7.2.5.1 Sealed insulation system (class 0-1/2A fans). Alternating current motors shall be tested for conformance to dielectric strength, insulation resistance, and sealed insulation system suitability in accordance with MIL-M-17059 for conformance to 3.6.3.4.6.2.

4.7.2.5.2 Insulation system (class 0-1/2D fans). Direct current motors shall be tested for conformance to dielectric strength, insulation resistance, and insulation system suitability in accordance with MIL-M-17556 for conformance to 3.6.3.4.7.2.

4.7.2.6 Grounding. Fan shall be tested for adequate grounding in accordance with MIL-E-917.

4.7.3 Group C tests and examinations.

4.7.3.1 Environmental vibration (externally excited vibration). Type I environmental vibration tests in accordance with MIL-STD-167-1 shall be conducted on each first article fan to confirm fan suitability to externally excited vibration for conformance to 3.3.1. In this test, fans shall be operated as specified in 4.7.2.1. Fans shall be secured to the vibration testing machine, with shaft horizontal, by suitable blocking and strapping means. The exploratory vibration tests specified in MIL-STD-167-1 shall include frequencies up to and including 33 Hz at the table amplitude specified therein. These vibration tests shall be conducted prior to tests of 4.7.2.1, 4.7.2.2, 4.7.2.3, and 4.7.2.4 and the correction of damages which may have occurred during vibration tests shall not be performed prior to these tests.

4.7.3.2 Shock. The motor only of class 0-1/2A and 0-1/2D fans shall be grade A high-impact shock tested in accordance with MIL-M-17059 or MIL-M-17556 as applicable with the exception that fixture 4A of MIL-S-901 shall be used as the acceptable method of mounting face-mounted motors on the shock-testing machine. Motors that pass the shock test may be delivered to the Government as production units, provided that the bearings are replaced, all other parts are thoroughly inspected (and replaced, if necessary), and the motors perform as required of production units.

4.7.3.3 Explosion-proof. This test, applicable only to electrical equipment with explosion-proof enclosure, shall be performed in the specified atmosphere (petroleum ether, unless otherwise specified) in accordance with MIL-E-2036 on each first article motor. Test motors shall include the conduit, the switching device, and the terminal connection box actually used with the fan; or fans complete with motors may be utilized as test specimens. This test will be conducted normally at the Mining Health and Safety Administration laboratory, in which case arrangements will be made by the responsible Government activity.

4.7.3.4 EMI. The test fan shall be complete with motor. No shielding shall be added by the test laboratory, nor shall any device except interference suppressor be added by the laboratory. The fan shall be tested for broadband radiated emissions by method RE02 in the frequency range of 0.015 to 30 megahertz (MHz) and for broadband conducted emissions by method CE03 in the frequency range of 0.015 to 30 MHz in accordance with MIL-STD-462. The fan shall be tested as received, at its rated design point as specified in 3.6.2.1, by scanning the frequency range for

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peaks of conducted and radiated interference. If limits are exceeded, a test shall be conducted with suppressors installed. Other devices, such as grounding brushes, shall not be added by the laboratory.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging requirements of referenced documents listed in section 2, see 6.8.)

5.1 Preservation of fans. Preservation shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Fans shall be unit protected method II (submethod at manufacturer's option) in accordance with MIL-P-116. Additional or alternative packaging requirements shall be included as follows:

a. The threaded connections in the conduit switch box shall be fitted with pipe plugs.

b. Attach bagged desiccant to the inside of the scroll or casing in accordance with MIL-P-116.

c. Bolt a rubber disc gasket and a blind flange of 1/2-plywood or steel plate to the face of each of the scroll or casing inlet and outlet connections.

d. Install a humidity indicator in accordance with MIL-P-116 in one of the blind flanges.

e. Mark the package: "Method IId Modified Package. Remove Desiccant Prior to Installation".

f. No application of preservative is required.

5.1.2 Level C. Preservation shall afford adequate protection from the supply source to the first receiving activity and may conform to the contractor's commercial practice. Additional or alternative packaging requirements of 5.1.1 shall be included.

5.1.3 Navy shipboard stowage fire-retardant requirements.

5.1.3.1 Treated lumber and plywood. Unless otherwise specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping containers and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B	Type II – Weather resistant Category 1 – General use
Level C	Type I – Non-weather resistant Category 1 – General use.

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5.1.3.2 Fiberboard. Unless otherwise specified (see 6.2), fiberboard used in the construction of class-domestic, non-weather resistant fiberboard and cleated fiberboard boxes including interior packaging forms shall meet the flamespread and the specific optic density requirements of PPP-F-320.

5.2 Packing and marking of fan units. Packing shall be level A or C, as specified (see 6.2). Packing and marking shall conform to MIL-P-116, MIL-E-16298, and additional requirements of 5.1.1.

5.2.1 Wirebound wood boxes. Where wirebound boxes are permissible (see MIL-E-16298), they may be used with the package specified in 5.1.1 subject to the following conditions:

a. The blind flanges attached to the fan scroll or casing shall be square or rectangular.

b. The size of the box sides shall match the flanges, and a cleat, beveled 45 degrees on each end, shall be secured to each box side, so that the box can be wrapped around the flanges, with the cleats on the outside of the flanges.

5.3 Detached accessories. Detached accessories shall be preserved level A or C, packed level A or C, and marked as specified (see 6.2) in accordance with MIL-E-16298.

5.4 Restriction in use of polystyrene (loose-fill) material.

5.4.1 For domestic shipment and early equipment installation and level C preservation and packing. Unless otherwise specified (see 6.2), use of polystyrene (loose-fill) material for domestic shipment and early equipment installation and level C preservation and packing applications such as cushioning, filler, and dunnage is prohibited. When approved, unit packages and containers (interior and exterior) shall be marked and labeled as follows:

CAUTION

Contents cushioned with polystyrene (loose-fill) material. Not to be taken aboard ship. Remove and discard loose-fill material before shipboard storage. If required, recushion with cellulosic material bound fiber, fiberboard, or transparent flexible cellular material.

5.4.2 For level A preservation and level A and B packing. Use of polystyrene (loose-fill) material is prohibited for level A preservation and level A and B packing applications such as cushioning, filler, and dunnage.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The portable damage control ventilating sets specified herein are intended to be used for damage control purposes only aboard Navy ships.

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6.1.1 Class 0-1/2A and 0-1/2D fans. Class 0-1/2A and 0-1/2D fans, available in a single size, are rated at 500 ft^3/min at 2.5 inches water gauge static pressure. They are used with ventilation hose and fittings, which may be attached to the fan inlet or outlet. Exterior surfaces of fans and fittings are of aluminum to avoid sparking when bumped against steel bulkheads. They are vaneaxial fans driven with electrical motors that have explosionproof enclosures.

6.1.2 Class 0-3/4T fans. Class 0-3/4T fans, available in a single size, are rated at 750 ft^3/min and 3.0 inches water gauge static pressure. They are used with ventilation hose and fittings, which may be attached to the fan inlet or outlet. Exterior surfaces of fans and fittings are of aluminum to avoid sparking when bumped against steel bulkheads. They are air-turbine driven centrifugal fans.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification

b. Quantity required

c. Class required (see 1.2)

d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)

e. When first article inspection is required (see 3.1 and 4.3)

f. Fan PIN in accordance with 6.7, including fan class (see 1.2), fan drive; if electric motor: type of motor current, voltage and phase, motor enclosure, and permissible ambient temperature (see 3.6.3.4.6 and 3.6.3.4.7), and nonmagnetic and nonsparking construction (see 3.2.6); or air-turbine drive (see 3.7.3.2).

g. When casing or scroll tightness test is required (see 4.7.2.4)

h. Level of preservation and packing required (see 5.1, 5.2, 5.3 and 5.4)

i. When polystyrene (loose-fill) material is approved (see 5.4.1)

j. When fire-retardant materials are not required (see 5.1.3.1 and 5.1.3.2).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

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Reference Paragraph	DID Number	DID Title	Suggested Tailoring
4.1.1	DI-E-2121	Certificate of Compliance	–
3.2 and Appendix A	DI-DRPR-80651	Engineering Drawings	–
4.3, 4.4, 4.7 and Appendix B	DI-MISC-80653	Test Reports	–

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Technical manuals. The requirement for technical manuals should be considered when this specification is applied on a contract. If technical manuals are required, military specifications and standards that have been cleared and listed in DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL) must be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract. The content and format for technical manuals are included in appendix C.

6.5 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.1), and the number of items to be tested as specified in 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.6 Part or identifying number (PIN). Fans should be identified by a PIN number arranged sequentially by military specification, class (see 1.2), voltage "1" (115 Vac or 115 Vac single phase), motor enclosure "X" (explosionproof), maximum operating ambient temperature "6" (65 °C), and motor protection "TP" (thermal protected) as defined in the following example.

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XXXXX 0–1/2A 1 X 6 TP Example of PIN: XXXXX-0-1/2A1X6TP

- TP — Motor protection
- 6 — Max. operating ambient temperature
- X — Motor enclosure
- 1 — Voltage
- 0–1/2A — Class
- XXXXX — Military specification number. (Does not include the revision letter or activity symbol.)

6.7 Subcontracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.8 Subject term (key word) listing.

Air-turbine driven
Alternating current motors
Direct current motors
Electric-motor driven
Fan sets
Fan units
Portable fans

Preparing activity:
Navy – SH
(Project 4140-N064)

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APPENDIX A

ENGINEERING DRAWINGS TECHNICAL CONTENT REQUIREMENTS

10. SCOPE

10.1 Scope. This appendix covers the technical content requirements that shall be included on drawings when required by the contract or order. This appendix is mandatory only when data item description DI-DRPR-80651 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

MILITARY

MIL-T-31000 Technical Data Packages, General Specification for

STANDARDS

MILITARY

DOD-STD-100 Engineering Drawing Practices

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

30. DRAWINGS

30.1 Drawings and associated technical data. When required by the contract or order, drawings and associated technical data accompanying those drawings shall include the following information.

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APPENDIX A

30.1.1 Drawings. Drawings shall conform to MIL-T-31000 as augmented herein and shall include the type of drawings specified in 30.1.1.1.

30.1.1.1 Drawing requirements. The fans shall be delineated in single, type II, form 2 drawings (see 30.1.2 and 30.1.3).

30.1.1.2 Drawing format. The type II (assembly) drawings shall be in the format specified in DOD-STD-100 as augmented herein:

a. Contract or other application data shall be omitted.

b. A revision indication box shall be provided to the right of the drawing number box in the title block.

c. A revision description list shall be provided in the upper right corner of the drawing.

d. A list of material shall be provided in the lower right corner of the drawing and shall include the following columns: Piece Number (Pc No.), Name, Quantity Required (Qnty, or No. Req.), Material, Material Specification (Mat'l. Spec), Manufacturer's Part Number (Mfr's Part No.), and Remarks.

e. Space for General Notes shall be provided in the upper left corner of the drawing.

30.1.1.3 Drawing of fan drives. Auxiliary drawings of fan drives (electric-motor or air-turbine) shall be provided for identification and acquisition of repair parts, as applicable. These drawings shall conform to the current specification for the related drive, as applicable and to manufacturer drawings and standards.

30.1.2 Class 0-1/2A and 0-1/2D fans drawings. The fan assembly drawings shall include the following (unless otherwise stated, all dimensions shall be to the nearest 1/16 inch):

a. A longitudinal, sectional view of the fan, showing arrangement of component parts which are identified by piece number flagging. All welds shall be indicated by standard weld symbols. The following additional data shall be shown in this view:

(1) Overall (flange face-to-face) fan length and mounting flange outside diameter

(2) Fan casing inside diameter and wheel (blade) tip diameter to thousandths of an inch with tolerance

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(3) Axial distance from the face of the motor mounting flange to the conduit centerline

(4) Keyway dimensions of the wheel hub, and wheel hub bore diameter to ten thousandths of an inch with tolerance

(5) Axial length of vanes

(6) Indication of the area of wheel from which metal is to be removed in balancing, and the permissible depth of such removal

(7) The nominal axial distance between the trailing edge of a blade at midpoint to the leading edge of a vane.

(8) Location on the casing of identification plate.

b. An end view of the fan showing the following:

(1) Direction of the wheel rotation

(2) Inside diameter of the motor-mounting flange or the diameter of the rabbet in the motor mounting flange (whichever surface is used for positioning the motor) in thousandths of an inch with tolerance.

(3) The quantity and size of equally spaced mounting holes and the bolt center diameter in the fan flanges and motor-mounting flange.

c. If necessary for clarity, separate details of the motor face mounting (and secondary mounting if provided), conduit, and terminal connection (switch) box (Drawing 815-1197047)

d. Separate details of the motor-mounting gasket; fan identification plate; a section of the wheel showing undimensioned, end profile of a blade with stagger angle at blade root and blade tip indicated; the wheel hub insert; the access cover (for direct-current fans only), and the fit of the nose to the wheel (if the wheel has a separate nose or cap); and the ventilation hose adapters and connectors necessary for connecting to hose provided by Drawing 803-607819

e. A complete list of material. The quantity of blades and vanes shall be indicated, as well as the thickness of casing, vanes, and motor-mounting flange, unless the thickness is dimensioned in a view. Thread data of threaded fasteners shall be given.

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f. General notes, including the following:

(1) A statement that the fan conforms to this specification and Drawing 803-921629, and shall be used with ventilation hose in accordance with Drawing 803-607819.

(2) A statement directing reference to a fan certification data sheet for identification of electrical components and specific fan-motor test data, center of gravity, and moments of inertia

(3) A statement of the permissible tolerance for all untoleranced dimensions

(4) Indication of the method of securing the wheel hub insert in the wheel; if by press fit, the interference fit and the minimum insertion pressure shall be stated.

(5) A caution statement directing connections of a ground wire if applicable

(6) Statements identifying the plating, welding, and painting of components or assemblies

(7) Indication of the method of balancing the fan wheel

(8) Indication of the passing angle, viewed axially, of a blade trailing edge and a vane leading edge

(9) A statement of the minimum casing wall thickness (including the fan raceway which is normally machined)

(10) Identification of any carbon steel surface which may be machined after plating, and a statement of the treatment of such area prior to painting

(11) Any other statements necessary for clarity

(12) At the manufacturer's option, statements for manufacturer's use only, so designated.

g. A nonlogarithmic graph, with airflow (ft^3/min) as the abscissa, and total pressure (inches water gauge), static pressure (inches water gauge), speed (r/min), brake horsepower (Bhp), power input in kilowatts (kW) or input horsepower (Ihp), overall (set) efficiency, and broad band sound pressure (dB) as ordinates. The graph shall be identified by fan code and by the test number and date.

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h. A detail of the cable clamp, cable hook, carrying handle, and intake bell with protective screen

i. An electrical diagram showing how the manual master switch and the thermal protector are connected (alternating current and direct current motors), and how the auxiliary winding disconnect switch is connected (alternating current motors). If necessary for clarity, an electrical schematic showing sequence of operation shall be provided.

30.1.3 Class 0-3/4T fan drawing. The fan assembly drawing shall include the following (unless otherwise stated, all dimensions shall be to the nearest 1/16 inch):

a. A longitudinal, sectional view of the fan, showing arrangement of component parts which are identified by piece number flagging. All welds shall be indicated by standard weld symbols. The following additional data shall be shown in the view.

(1) Overall fan dimensions (length, width, and height)

(2) Fan scroll inlet diameter and wheel diameter

(3) Fan scroll outlet arrangement with dimensions

(4) Keyway dimensions of the wheel hub, and wheel hub bore diameter to ten thousandths of an inch with tolerance

(5) Indication of the area of the wheel from which metal is to be removed in balancing, and the permissible depth of such removal

(6) Overall turbine dimensions with air pressure connections size and location

(7) Location on the scroll of identification plate

b. An end view of the fan showing the following:

(1) Direction of wheel rotation

(2) Turbine mounting arrangement with dimensions

(3) The quantity and size of equally spaced mounting holes and the bolt center diameter in the fan scroll and turbine mounting flange

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c. If necessary for clarity, separate details of the turbine mounting and air pressure connections

d. Separate details of fan identification plate; a section of the wheel showing undimensioned, end profile of a blade, the wheel hub insert and the fit; and the ventilation hose adapters and connectors necessary for connecting to hose provided by Drawing 803-607819

e. A complete list of material shall be indicated, as well as the thickness of scroll and turbine-mounting flange, unless the thickness is dimensioned in a view. Thread data of threaded fasteners shall be given.

f. General notes, including the following:

(1) A statement that the fan conforms to this specification and Drawing 803-921740, and shall be used with ventilation hose in accordance with Drawing 803-607819

(2) A statement directing reference to a fan certification data sheet for identification of turbine components and specific fan-turbine test data, center of gravity, and moments of inertia

(3) A statement of the permissible tolerance for all untoleranced dimensions

(4) Indication of the method of securing the wheel hub in the backplate and the hub insert in the wheel; if by press fit, the interference fit and the minimum insertion pressure shall be stated.

(5) A caution statement directing connections of a ground wire if applicable

(6) Statements identifying the plating, welding, and painting of components or assemblies

(7) Indication of the method of balancing the wheel

(8) A statement of the minimum scroll wall thickness (including the fan raceway which is normally machined)

(9) Identification of any carbon steel surface which may be machined after plating, and a statement of the treatment of such area prior to painting

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(10) Any other statements necessary for clarity

(11) At the manufacturer's option, statements for manufacturer's use only, so designated.

g. A nonlogarithmic graph, with airflow (ft^3/min) as the abscissa, and total pressure (inches water gauge), static pressure (inches water gauge), speed (r/min), brake horsepower (Bhp), power input (kW) or input horsepower (Ihp), overall (set) efficiency, and broad band sound pressure (dB) as ordinates. The graph shall be identified by fan code and by the test number and date.

h. A detail of the compressed air hose connectors, carrying handle, and intake and discharge protective screen installations in transition sections of ventilation hose adapters.

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APPENDIX B

TEST REPORTS TECHNICAL CONTENT REQUIREMENT

10. SCOPE

10.1 Scope. This appendix covers the technical content requirement that shall be included in test reports when required by the contract or order. This appendix is mandatory only when data item description DI-MISC-80653 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

20.1 Non-Government publications.

20.1.1 Non-Government publications. The following publication forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the publication which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in this solicitation.

AIR MOVEMENT AND CONTROL ASSOCIATION, INC. (AMCA)

210 Laboratory Methods of Testing Fans for Rating

(Application for copies should be addressed to the Air Movement and Control Association, Inc., 30 West University Drive, Arlington Heights, IL 60004.)

(Non-Government publications are normally available from the organizations that prepare or distribute the documents. These documents may also be available in or through libraries or other informational services.)

30. TEST REPORTS CONTENT

30.1 Tests and examinations reports. When required by the contract or order, test reports shall contain the following information:

a. Test and examinations:

(1) Group A: Group A examination reports shall state what was done and the results, and shall include specific information as specificed in the applicable test section (see 4.7.1).

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(2) Group B:

(a) *Balance test report (see 4.7.2.1).* Balance test with the report of maximum amplitude of vibration at free airflow delivery and frequency at which it occurs.

(b) *Capacity/efficiency (performance) test report (see 4.7.2.2).* Performance test with the following unique technical features.

1. The figure number of AMCA 210 shall be identified.

2. Related test equipment and its dimensions shall be identified.

3. The following values shall be reported in tabular form: ambient barometric pressure, dry bulb and wet bulb temperatures, and air density; voltage and current; motor input, kW or horsepower (hp); air quantity (ft^3/min); set efficiency; sound pressure.

4. A performance curve sheet shall be included in the report showing motor input, fan speed, total and static pressures of standard air at fan discharge as ordinates, and cubic feet of standard air per minute at fan inlet as the abscissa.

(c) *Noise level test report (see 4.7.2.3).* Noise test with the report of sound pressure reading at the specified locations with the fan operating at its rated design point.

(d) *Motor heat/thermal protection test report (see 4.7.2.4).* The report shall state what was done and the results. The base speed, and the speed of the rated design point for alternating-current and direct-current motors shall be stated. Also for direct-current motors the value of shunt field resistance in ohms, and any evidence of excessive sparking shall be stated.

(e) *Insulation system test report (see 4.7.2.5).* The report shall state what was done and the results, and shall include specific information as specified in the applicable test section.

(f) *Grounding/electrical safety test report (see 4.7.2.6).* The report shall identify the test specimen by drawing number and the test method used. State any discrepancies or additional grounding requirements.

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(3) Group C:

(a) *Environmental vibration test report (see 4.7.3.1).* Vibration test with the report of incremental frequency range covering 0 to 33 Hz inclusive in 5-Hz increments.

(b) *Shock test report (see 4.7.3.2).* The report shall be made by the shock test laboratory on the forms specified in MIL-S-901 and shall include drawing number identification of the fan motor, as well as photographs of the fan motor in each test mounting. It shall be submitted by the fan contractor, together with post test inspection reports of fan and motor, to the responsible Government activity for approval. If there is any derangement or partial failure, the report shall be submitted to the responsible Government activity for approval.

(c) *Explosionproof test report (see 4.7.3.3).* The report shall identify the test specimen by drawing number and the explosive vapor used. Any discrepancies shall be stated.

(d) *EMI test report (see 4.7.3.4).* The report shall identify the test specimen by drawing number and any discrepancies between the specimen and the drawing which might affect electromagnetic emissions. A description, sketch, or annotated photograph of the test set-up and identification of test instrumentation shall be included. If suppressors are installed by the laboratory, their dimensions, rating, manufacturer's identification, and location shall be stated. In any case, the capacitance required to meet specified interference levels shall be stated.

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APPENDIX C

TECHNICAL MANUAL TECHNICAL CONTENT REQUIREMENTS

10. SCOPE

10.1 Scope. This appendix covers the technical content requirements that should be included in technical manuals when required by the contract or order. This appendix is not a mandatory part of the specification. The information contained herein is intended for guidance only.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

MILITARY

MIL-M-15071	Manuals, Technical: Equipments and Systems Content Requirements for
MIL-M-38784	Manuals, Technical: General Style and Format Requirements
MIL-M-85337	Manuals, Technical: Quality Assurance Programs; Requirements for

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

30. MANUAL CONTENTS

30.1 Technical manuals. When required by the contract or order, the contractor should furnish technical manuals for all classes of fans. The manuals should include the following:

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APPENDIX C

a. The technical manuals shall comply with type I, commercial of MIL-M-15071 for technical content.

b. The technical manuals shall comply with MIL-M-38784 for format and style.

c. The technical manuals shall comply with MIL-M-85337 for quality assurance.

d. Technical manuals shall contain a description of fan operation, maintenance, and repair procedures.

e. Technical manuals shall include isometric illustrations of the fans with a section containing reduced copies of all drawings required to amplify or illustrate the text including diagrams, assembly drawings, and detail drawings of repair parts.

f. Technical manuals shall be reviewed by the responsible Government activity for approval.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER MIL-V-24761(SH)

2. DOCUMENT DATE *(YYMMDD)* 17 June 1991

3. DOCUMENT TITLE VENTILATING SETS PORTABLE DAMAGE CONTROL

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) AUTOVON *(If applicable)*

7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

a. NAME Technical point of contact (TPOC):
Mark Campbell, Code 55X23
PLEASE ADDRESS ALL CORRESPONDENCE AS FOLLOWS:

b. TELEPHONE *(Include Area Code)*
(1) Commercial 703-602-7217
(2) AUTOVON 332-7217

c. ADDRESS *(Include Zip Code)*
COMMANDER, NAVAL SEA SYSTEMS COMMAND
DEPARTMENT OF THE NAVY, CODE 55Z3
WASHINGTON, DC 20360-5101

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
Telephone (703) 756-2340 AUTOVON 289-2340