
 * NOT MEASUREMENT *
 * SENSITIVE *

A-A-50548
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SUPERSEDING
 MIL-F-16716E
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COMMERCIAL ITEM DESCRIPTION

FANS, CENTRIFUGAL, INDUSTRIAL

The General Services Administration has authorized the use of this Commercial Item Description for all federal agencies.

1. SCOPE. This specification covers electric-motor-driven centrifugal fans which are designed for ventilating uses and industrial air-handling applications.

2. CLASSIFICATION. The fans are of the following types, as specified (see 7.2).

- Type I - Forward-curved blades.
- Type II - Radial blades.
- Type III - Backward-inclined blades.

3. SALIENT CHARACTERISTICS.

3.1 Description. The unit shall consist of a centrifugal fan, electric motor, guards, and accessories. All components shall be attached to a common base which shall include provisions for fastening it to a foundation. The unit shall be completely assembled, ready for installation.

3.2 Standards compliance. Fans shall be capacity rated in accordance with AMCA 210 and sound rated in accordance with AMCA 300, prior to approval of the first article, if one is specified, or prior to approval of the first shipment, if a first article is not specified. The supplier shall submit to the contracting officer satisfactory evidence that the fan he proposes to furnish has been rated in accordance with AMCA 210 and AMCA 300.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the 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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3.3 Design. The fan assembly shall be designed to handle clean or dust-laden air at temperatures up to 250 degrees Fahrenheit (deg. F) (121 degrees Celsius (deg. C)), and up to 600 deg. F (316 deg. C) when equipped with a bearing cooling device (see 3.6.3.1). The design of the equipment and accessories shall permit accessibility for maintenance and service in the field. The design shall be such as to prevent conditions hazardous to personnel or deleterious to equipment. The fan assembly shall be built in accordance with AMCA 99.

3.4 Safety. All parts which are energized electrically shall be insulated, fully enclosed, or guarded when such parts are exposed to contact by personnel or otherwise create a hazard. All moving parts hazardous to personnel shall be enclosed or guarded. Nonfunctional sharp edges, projecting points, and excessive length of fastening devices shall be avoided. Protective devices shall be mounted on or near components containing hidden hazards. Applicable portions of OSHA Title 29, CFR, Part 1910.219 shall apply.

3.5 Performance. The fan shall deliver its rated capacity in cubic feet per minute at the static pressure in inches of water specified (see 7.2) with tolerances set forth in AMCA 210. Fan sound power level shall not exceed 90 decibels, A-weighted scale, continuous or intermittent, at five feet from the equipment.

3.6 Details of components. The unit shall consist of the components specified below; and when the motor is connected to the matching power source, the unit shall function in accordance with the performance requirements.

3.6.1 Fan wheel. Unless otherwise specified (see 7.2), the fan wheel shall be constructed of cast aluminum alloy or carbon steel plate, as specified (see 7.2). Each steel blade shall be riveted or welded to form the fan wheel.

3.6.2 Fan shaft. Unless otherwise specified (see 7.2), the shaft shall be turned, ground, and polished carbon steel alloy. The maximum allowable turnout after all machining shall be 0.001 inch (0.0254 millimeters (mm)) on shafts with diameter less than or equal to 1.5 inches (38.1 mm) in diameter and 0.002 inches (0.05 mm) on shafts greater than 1.5 inches (38.1 mm) in diameter. The shaft shall be sized for maximum speed of the size of fan involved and shall operate at not more than 80 percent of the first critical speed.

3.6.3 Fan bearings. Unless otherwise specified (see 7.2), the fan shall be equipped with precision anti-friction bearings with an average life of B-10. The bearings shall be of the self-aligning type and shall be mounted in suitable pillow blocks having provision for attachment to the fan housing or base assembly.

3.6.3.1 Bearing cooling device. When specified (see 7.2), a bearing cooling fan of suitable size, of split design, or a heat slinger shall be provided with anti-friction bearing when the air temperature in the fan is greater than 250 deg. F (121 deg. C) but less than 600 deg. F (316 deg. C).

3.6.4 Fan housing. The housing shall be constructed of carbon steel plate or sheet and of a nominal thickness not less than that listed in table I. The scroll and side plate joints shall be made airtight. The housing shall be reinforced to minimize vibration. When specified (see 7.2), the discharge direction for types I and III larger than 33 inches in fan diameter, and type

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larger than 57 inches (1448 mm) in fan diameter shall be easily converted at angles of 45 degrees. When specified (see 7.2), a threaded drain connection to accommodate a 1 inch (25.4 mm) or 3/4-inch (19.1 mm) diameter standard pipe, as specified (see 7.2). Standard pipe shall be located at the lowest point in the scroll. When specified (see 7.2), a flush type access door shall be installed on the fan scroll and held by quick-release clamps on type II fans. Inlet and outlet duct connections shall be flanged.

TABLE I. Housing gages.

Nominal fan diameter (inches)	Sides and Scroll
12 (305 mm) up to 16 (406 mm)	16 gage
16 (406 mm) up to 24 (610 mm)	14 gage
24 (610 mm) up to 72 (1829 mm)	12 gage
72 (1829 mm) up to 132 (3353 mm)	10 gage

3.6.5 Motor. The motor shall conform to NEMA MG 1, and shall be capable of continuous operation when driving the fan at rated conditions, and may be single or multi-speed, unless one of these is definitely specified (see 7.2). Features of bearings, enclosure, and electrical characteristics shall be as specified (see 7.2). When specified (see 7.2), an across-the-line part-wind wye-delta or autotransformer shall be supplied. When specified (see 7.2), the motor shall be open drip proof, totally enclosed, or explosion proof.

3.6.5.1 Direct drive. When a direct drive is specified (see 7.2), the fan wheel shall be mounted on the motor shaft or driven through a suitable coupling by the motor. The motor shall be aligned to minimize drive line vibration. When specified (see 7.2), the assembly shall be mounted on resilient vibration isolators.

3.6.5.2 V-belt drive. The fan shall be driven by means of single or multiple V-belts. Quantity and cross-sectional size of the belts shall be determined by the motor horsepower rating corrected to the service and arc-of-contact factors. For the motor location specified, a standard belt length shall be used to the nearest, but not less than the recommended, motor and fan shaft center distance. Sheave pitch diameters shall be as specified by the manufacturer for the speed ratio and fan speed required. When specified (see 7.2), sheaves shall be of a variable pitch type. The motor shall be solidly mounted to a suitable base which shall provide for belt tension adjustment and for anchorage to the fan foundation. All exposed belt-driven fans shall have safety guards that conform to ANSI B15.1 and adjustable motor mounts for belt tension adjustment and belt replacement. V-belts shall conform to ZZ-B-225. Sheaves shall conform to NEMA MG 1 for minimum electric motor sheave diameter for a given horsepower motor. Motor sheaves shall be of the adjustable pitch type which provides a 20 percent speed variation, selected so that the specified capacity will be delivered with sheaves at approximately mid-position. V-belt drives shall be selected for continuous duty in accordance with RMA Engineering Standards for Multiple V-Belt Drives with a service factor of 1.5.

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3.6.5.3 Motor starter. The starter control shall be manual or magnetic as specified (see 7.2), applicable NEMA type with thermal overload protection of the size and capacity suitable for the required service outlined in NEMA ICS 1 and NEMA ICS 2. The control enclosure shall be as required by NEMA ICS 6 and shall be as specified (see 7.2).

3.7 Guards.

3.7.1 Inlet guard. Unless otherwise specified (see 7.2), the type I and type III fans shall be provided with an air-inlet screen guard of heavy gage galvanized wire. The meshes of the screen guard shall not be greater than two inches square and not less than 1/2 inch (12.7 mm) square. If required to facilitate removal, the screen shall be of split construction.

3.7.2 V-belt guard. A protective guard of heavy gage wire or sheet metal shall be mounted to the fan unit to prevent objects from being jammed between the belts and sheaves.

3.7.3 Shaft and coupling guard. A protective guard of heavy gage wire or sheet metal shall be mounted on the fan unit to completely enclose the motor shaft, coupling, and fan shaft.

3.7.4 Bearing-cooling fan guard. When a bearing-cooling fan is supplied (see 3.6.3.1), a protective guard of heavy gage wire mesh shall be mounted on the fan unit to completely enclose the bearing-cooling fan.

3.8 Lifting attachments. When specified (see 7.2), suitable lifting attachment plate(s) shall be provided to enable the equipment to be lifted in its normal position. Attachment eye(s) shall be not less than three inches in diameter, and plate(s) shall withstand any handling conditions encountered, such as rapid lowering and braking of the load. When practicable, only one attachment shall be used. Where more than one attachment is required, each attachment, when practicable, shall be of sufficient capacity to carry the total weight. A copper or zinc-base-alloy or aluminum plate securely fastened to the unit shall indicate diagrammatically the lifting capacity of each attachment.

3.9 Lubrication. Unless otherwise specified (see 7.2), means for lubricating shall be provided in accordance with the manufacturer's standard practice. Parts requiring lubrication shall be so located as to make the lubricating points easily visible and accessible. All parts requiring lubrication shall be properly lubricated before delivery. Manufacturer's standard means for pressure lubrication shall be provided.

3.10 Cleaning, treatment, and painting. Surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified herein. Surfaces to be painted shall be cleaned and dried to insure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion product, or any other contaminating substances. As soon as practicable after cleaning, and before any corrosion products or other contamination can result, the surfaces shall be prepared or treated to insure the adhesion of the coating system. The painting shall consist of at least one coat of primer and one finish coat. The primer shall be applied to a clean dry surface as soon as practicable after cleaning and treating. Painting shall be with manufacturer's current materials according to manufacturer's

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current processes and the total dry film thickness shall be not less than 2.5 mils over the entire surface. The paint shall be free from runs, sags, orange peel, or other defects.

3.11 Dissimilar metals. Metals dissimilar with respect to the galvanic scale shall not be used unless separated by an insulating material which will avoid electrolytic corrosion.

4.0 REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR) unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible 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 are allowed under this description unless otherwise specified.

4.2 Metric products. Products manufactured to metric dimension will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of Federal Standard No. 376, and all other requirements of this Commercial Item Description including form, fit and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch/pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

4.3 Capacity test. The fan shall be subjected to air volume and pressure tests in accordance with AMCA 210. The test shall be performed as outlined in the test code.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Contractor certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of the Commercial Item Description, and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices, and is the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract. Contractor certifications shall include satisfactory evidence that the product meets requirements of AMCA 99, 210, 300, ANSI B15.1, NEMA ICS 1,2,6, NEMA MG 1 and RMA Engineering Standards for Multiple V-Belt Drives as applicable.

6.0 PRESERVATION, PACKAGING, PACKING AND MARKING. Unless otherwise specified (see 7.2), preservation, packaging, packing and marking for shipment shall be in accordance with ASTM D 3951.

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7. NOTES.

7.1 Intended use. The three types of centrifugal fans covered in this specification apply to fans which are not integral parts of equipment designed as complete units by manufacturers, and are intended to be used as follows. Type I, forward-curved fans, should be used where compactness of site is a factor in packaged unit applications (example: in a heating or a high efficiency air conditioning system). Type II, radial blade fans, should be used in systems handling such materials as heavy dust (example: in a woodworking shop). Type III, backward-inclined blade fans, which may be used in air conditioning applications, should be used when high efficiency and nonoverloading characteristics are required to move air containing no condensable fume or vapors (example: in a power generating plant).

7.1.1 Selection factors.

- a) Fungus resistant varnish conforming to MIL-V-173 should be used to coat electrical components and circuit elements, including terminal and circuit connections, when the fan is to be installed in humid conditions.
Components and elements inherently inert to fungi or in hermetically sealed enclosures or current-carrying contact surfaces should not be coated.
- b) Electromagnetic interference suppression (EMI), when required, should conform to the EMI suppression requirements and test limits for class C3, group I equipment as specified in MIL-STD-461. The fan should be subjected to tests to determine conformance in accordance with MIL-STD-462.

7.2 Ordering data.

- a) Title, number, and date of the Commercial Item Description.
- b) Type of fan required (see 2.).
- c) Capacity at the required static pressure (see 3.5).
- d) Fan wheel and fan shaft material required (see 3.6.1 and 3.6.2).
- e) Requirement for bearings if other than specified (see 3.6.3).
- f) When bearing-cooling fan is required (see 3.6.3.1).
- g) Angle of discharge if other than specified (see 3.6.4).
- h) When a drain connection is to be fitted to the scroll and size required (see 3.6.4).
- i) When an access door is to be installed on the fan scroll of type II fans (see 3.6.4).
- j) Whether motor is to be single or multi-speed; features of bearing, enclosure, and electrical characteristics; and when an across-the-line part-wind wye-delta or autotransformer is required (see 3.6.5).
- k) When the motor is to be open, drip proof, totally enclosed, or explosion proof (see 3.6.5).
- l) When a direct drive is required, and whether resilient vibration isolators are required (see 3.6.5.1).
- m) Sheave type requirements (see 3.6.5.2).
- n) Type of motor starter control, and control enclosure requirements (see 3.6.5.3).
- o) Requirement for air inlet guard if other than specified (see 3.7.1).
- p) When lifting devices are required (see 3.8).

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- q) Lubrication requirements (see 3.9).
- r) When preservation and packing is other than specified (see 6.0).

7.3 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs to be used for the items acquired to this description are created as follows:

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Commercial Item Description Number_____	
Type code number (see 7.3.1) _____	

7.3.1 Type code number. The type of fans is identified by a single digit number as follows:

Type I	- 1
Type II	- 2
Type III	- 3

7.4 Source of documents.

7.4.1 AMCA Standards are available from the Air Movement and Control Association (AMCA), 30 West University Drive, Arlington Heights, IL 60004.

7.4.2 ANSI Standards are available from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036.

7.4.3 ASTM Standards are available from the American Society For Testing And Materials, 1916 Race Street, Philadelphia, PA 19103-1187.

7.4.4 NEMA Standards are available from the National Electrical Manufacturers Association (NEMA), 2101 L Street, NW, Suite 300, Washington, DC 20037.

7.4.5 RMA Standards are available from the Rubber Manufacturers Association, 1400 "K" Street, NW, Suite 900, Washington, DC 20005-2403.

7.5 Subject term (key word) listing.

Air handling
Ventilation

MILITARY INTERESTS:
ACTIVITIES:

CIVIL AGENCY COORDINATING

Custodians
Army - ME
Navy - YD1

GSA-FSS

Preparing Activity:
Navy - YD1

Review Activities
Army - CE
Navy - MC

(Project 4140-0150)