

INCH-POUND

XX-C-2816A

January 8, 2016

SUPERSEDING

XX-C-2816

August 9, 1993

## FEDERAL SPECIFICATION

### COMPRESSOR, AIR, RECIPROCATING OR ROTARY, ELECTRIC MOTOR DRIVEN, STATIONARY, 10 HP AND LARGER

Inactive for new design after 23 August 2001.

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

#### 1. SCOPE

1.1 Scope. This specification covers stationary service, lubricated or non-lubricated (oil-free), electric motor driven, reciprocating or rotary air compressors with frame ratings of 10 horsepower (hp) and larger.

1.2 Classification. The compressor unit will be of the types, styles, classes, groups, drives, air end, rated capacity in cubic feet per minute (cfm) and rated discharge pressure in pound-force per square inch gage (psig) as specified (see 6.2).

1.2.1 Types. The type of compressor is as follow:

|          |   |                               |   |             |
|----------|---|-------------------------------|---|-------------|
| Type I   | – | Reciprocating (single acting) | - | PIN code: 1 |
| Type II  | – | Reciprocating (double acting) | - | PIN code: 2 |
| Type III | – | Rotary (asymmetrical screw)   | - | PIN code: 3 |
| Type IV  | – | Rotary (sliding vane)         | - | PIN code: 4 |

1.2.2 Styles. The style of compressor is as follow:

|         |   |              |   |             |
|---------|---|--------------|---|-------------|
| Style A | – | Base mounted | - | PIN code: A |
| Style B | – | Skid mounted | - | PIN code: B |
| Style C | – | Tank mounted | - | PIN code: C |

1.2.3 Classes. The class of compressor is as follow:

|         |   |                              |   |             |
|---------|---|------------------------------|---|-------------|
| Class 1 | – | With horizontal air receiver | - | PIN code: 1 |
| Class 2 | – | With vertical air receiver   | - | PIN code: 2 |
| Class 3 | – | Without air receiver         | - | PIN code: 3 |

1.2.4 Groups. The group of compressor is as follow:

|         |   |                               |   |             |
|---------|---|-------------------------------|---|-------------|
| Group a | – | With air-cooled aftercooler   | - | PIN code: a |
| Group b | – | With water-cooled aftercooler | - | PIN code: b |
| Group c | – | Without aftercooler           | - | PIN code: c |

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Columbus, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or emailed to [FluidFlow@dla.mil](mailto:FluidFlow@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil/>.

AMSC N/A

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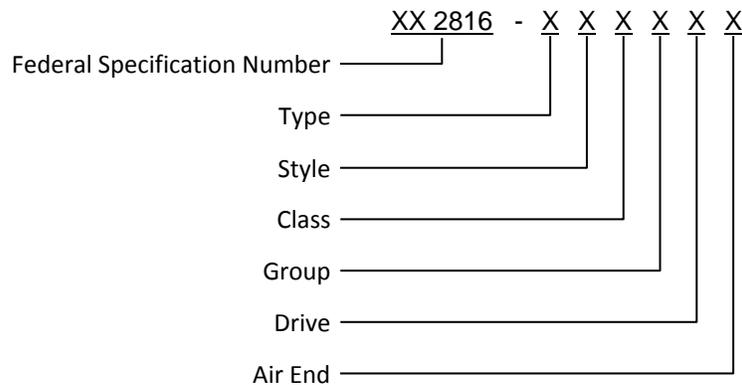
1.2.5 Drives. The drive of compressor is as follow:

- Drive 1 – Multiple V-belt - PIN code: 1
- Drive 2 – Direct connected - PIN code: 2

1.2.6 Air ends. The air end of compressor is as follow:

- Air end A – Lubricated - PIN code: A
- Air end B – Non-lubricated (oil-free) - PIN code: B

1.3 Part or Identifying Number (PIN). The PINs to be used for compressor unit acquired to this specification are created as follows:



1.3.1 Example of PIN. Requirements: Double acting reciprocating compressor, base mounted, furnished with vertical air receiver and water-cooled aftercooler, direct drive, and non-lubricated cylinder.

PIN designation: XX2816 – 2A2b2B

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

FEDERAL STANDARDS

- FED-STD-123 - Marking for Shipment (Civil Agencies)
- FED-STD-595 - Colors Used in Government Procedures

DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-T-152 - Treatment, Moisture and Fungus-Resistant, of Communications, Electronic, and Associated Electrical Equipment

DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-209 - Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

2.2.2 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 of these documents are those cited in the solicitation or contract.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

- 40 CFR 204 - Noise Emission Standard for Construction Equipment

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

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- Section VIII, Division 1 – Rules for Construction of Pressure Vessels.

(Copies of these documents are available online at <https://www.asme.org>).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM-D3955 - Standard Specification for Electrical Insulating Varnishes
- ASTM-D295 - Standard Test Methods for Varnished Cotton Fabrics Used for Electrical Insulation

(Copies of these documents are available online at [www.astm.org](http://www.astm.org)).

INTERNATIONAL ELECTROTECHNICAL COMMISSION

- IEC CISPR 12 - Vehicles, boats and internal combustion engines – Radio disturbance characteristics – Limits and methods of measurement for the protection of off-board receivers

(Copies of these documents are available online at [www.iec.ch](http://www.iec.ch)).

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 1217 - Displacement compressors -- Acceptance tests

(Copies of these documents are available online at [www.iso.org](http://www.iso.org)).

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- NEMA ICS 2 – Industrial Control Devices, Controllers and Assemblies.
- NEMA ICS 6 – Industrial Controls and Systems.
- NEMA MG 1 – Motors and Generators.
- NEMA MG 10 – Energy Management Guide for Selection and Use of Polyphase Motors.

(Copies of these documents are available online at [www.nema.org](http://www.nema.org)).

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 – National Electrical Code.

(Copies of these documents are available online at [www.nfpa.org](http://www.nfpa.org)).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

- SAE J534 – Lubrication Fittings.

(Copies of these documents are available online at [www.sae.org](http://www.sae.org)).

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Description. The compressor unit or the equipment as referred to in this specification consists primarily of sub-assemblies such as the air end (compressor), drive end (electric motor), required type of mounting, instruments and control panel, safety devices, wiring, interconnected piping, and when applicable, include the intercooler, aftercooler, oil cooler, air/oil separator, air receiver, and metal enclosure.

3.2 Standard commercial product. The compressor unit shall at a minimum be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product shall be included in the compressor unit being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model.

3.3 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purposes in commercial practice. Unless otherwise specified herein, all equipment material, and articles incorporated in the work covered by this specification 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 is allowed under this specification unless otherwise specified.

3.4 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2 (see also 6.3).

3.5 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.6 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.7 Performance. The compressor unit shall be capable of delivering not less than the specified rated capacity (cfm) under dry air atmospheric conditions of 14.7 pound-force per square inch absolute (psia) pressure and 60 degrees Fahrenheit temperature when operating at the specified discharge pressure (psig). The power required by the compressor shall be within  $\pm 3$  percent of the manufacturer's indicated rating. Rated capacity, pressure, and horsepower shall be measured in accordance with ISO 1217.

3.8 Design and construction. The compressor unit shall be designed for constant speed and continuous operation. The compressor shall be unitized completely assembled to the required type of mounting to form a single unit ready for service upon hook-up to field power supply and distribution piping. Instruments and controls for both the compressor and driver shall be panel mounted and conveniently located so as not to be affected by vibration, and to provide ease of operation and maintenance. All electrical components and installation shall meet the requirements of NFPA 70.

3.8.1 Environmental condition. The compressor shall be designed for outdoor or indoor installation as specified (see 6.2). Unless otherwise specified (see 6.2), the environmental condition (minimum and maximum temperature range) shall be as follows:

- a. Outdoor installation: Zero to 110 degrees F.
- b. Indoor installation: 40 to 90 degrees F.

3.9 Safety. Rotating parts or parts subject to high temperatures that could be hazardous to operating personnel shall be fully enclosed or provided with protective guards or shields.

3.10 Noise level. For outdoor installation the noise level shall conform to the requirements and test procedure of EPA 40 CFR 204. For indoor installation the noise level shall not exceed 85 dBA at 3.28 feet, when measured in accordance with nationally recognized industry standards for sound measurement.

3.11 Ease of maintenance. The compressor and components shall be so arranged to provide adequate clearance area and safe access to all components for safe operation and maintenance.

3.12 Reciprocating compressor.

3.12.1 Compressor stages. Compressor shall be single stage or two stage as specified (see 6.2).

3.12.2 Cylinder arrangement. Cylinder arrangement or cylinder layout shall be in accordance with manufacturer's recommendation best suited for the compressor classification (see 1.2) as specified herein. Type I compressor cylinder heads shall be air-cooled or water-cooled (water jacketed) as specified (see 6.2). Type II compression cylinder shall be with replaceable cylinder liner or insert sleeves or designed with allowance for future and use of oversized piston rings.

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3.12.3 Frame lubrication. The reciprocating compressor's frame lubrication shall be a complete pressurized oil system, however, splash lubrication systems are acceptable when used on horizontal compressors with frame ratings of 200 hp and below and type I compressors with frame ratings of 25 hp or less. Compressors that are rated above 200 hp shall be furnished with a separate, independently driven, full capacity, full pressure, auxiliary oil pump with an automatic start feature activated by a low lube oil pressure. When specified (see 6.2), the gear case or reservoir shall be equipped with an electric thermostatically controlled immersion heater with a maximum watt density not to exceed 15 watts per square inch.

3.12.4 Force-feed lubricator. When cylinder and packing lubrication requires a mechanical lubricator, single-plunger-per-point force-feed lubricators shall be provided. The lubricators shall be driven by the crankshaft and shall be independent from frame lubrication system. Ratchet lubricator drives are unacceptable. The oil feed to each lubricating point shall have a sight flow indicator and the oil feed regulation shall be adjustable.

### 3.13 Rotary compressor.

3.13.1 Frame lubrication. The rotary compressor's frame lubrication shall be furnished with a complete pressurized oil system. The air/oil receiver shall conform to ASME Section VIII, Division 1. When specified (see 6.2), the gear case or reservoir shall be equipped with an electric thermostatically controlled immersion heater with a maximum watt density not to exceed 15 watts per square inch.

3.13.2 Metal enclosure. When specified (see 6.2), the rotary compressor shall be provided with metal enclosure which houses the motor, compressor, and instrument panel. When specified (see 6.2), the enclosure shall be furnished with electrical space heating equipment for maintaining satisfactory minimum temperature during periods of non-operation. The housing shall include quick opening side panels or hinged access openings to the motor, compressor, and instrument panel. Sheet metal for the housing and panels shall be not less than 0.0598-inch (US revised standard gage No. 16) thick. Panels shall be sized to provide maximum accessibility to the compressor components. Upward-opening hinged access panels shall be equipped with quick-disconnect fasteners. Enclosures for outdoor installation shall have provisions for preventing rain and snow ingestion.

3.14 Mounting. Each type of mounting shall be furnished with bolt holes for anchoring the unit to a concrete foundation, wood, or steel decking. The number and size of bolt holes shall be designed under the most severe condition of vibration or thrust likely to develop during operation or to resist a horizontal force with a value of not less than 1/3 of the total weight of the whole unit and applied at the center of gravity of the unit, whichever is larger.

3.14.1 Base mounted. The baseplate shall be a single fabricated steel unit with provisions to allow for grouting the load carrying structural members for installation on a concrete foundation. When specified (see 6.2) the baseplate main frame shall be provided with openings designed for forklift lifting of the whole compressor unit.

3.14.2 Skid mounted. The skid shall consist of two parallel steel skid runners with an integrally formed, welded, or bolted baseplate for mounting components of the unit. The skid runners shall be upturned or beveled at each end to permit skidding the unit into place. Each end of the skid shall be furnished with lifting attachment designed for four-point lifting and for pulling the equipment.

3.14.3 Tank mounted. The tank (horizontal or vertical) shall be welded to the bottom supports.

3.15 Air receiver. The receiver shall be of sufficient volume required for delivery of non-pulsating flow of compressed air at the rated capacity and discharge pressure. The receiver shall be designed and

constructed in accordance with ASME Section VIII. The receiver shall be provided with an automatic condensate drain valve.

3.16 Intercoolers and aftercoolers. Air-cooled intercoolers, aftercoolers, and oil coolers shall be of finned construction. Water-cooled intercoolers, aftercoolers, and oil coolers shall be the shell and tube type. When water-cooled aftercoolers are required, the intercoolers and oil coolers (when applicable) shall also be water-cooled. When air-cooled aftercoolers are required, the intercoolers and oil coolers (when applicable) shall also be air-cooled. Water-cooled intercoolers and aftercoolers shall be provided with sight-flow indicator to visually observe the flow of water to the cooler. All intercoolers and aftercoolers shall be provided with a moisture separator and automatic drain trap.

3.17 Drive. Direct drive units shall be either of the close-coupled, integral-coupled, or flexible-coupled type as specified (see 6.2). Multiple V-belts for belt driven compressors shall be oil resistant and shall be designed with a service factor not less than 1.75 times the motor horsepower rating. Belt-driven units shall have means for adjusting belt tension. Belt drives shall be limited to compressor applications with frame rating of 100 hp or less.

3.18 Air filter. The compressor air intake shall be fitted with an air filter-silencer which is readily removable for cleaning.

3.19 Safety valves. When no receiver is supplied a safety valve shall be installed in the discharge piping. A safety valve shall also be furnished between compressor stages. When the receiver is supplied the safety valve shall be installed on the receiver. The safety valve(s) shall be the spring-loaded type, marked to show its capacity and pressure rating, and stamped with the ASME code symbol to identify conformance to ASME Section VIII.

3.20 Discharge shut-off valve. When specified (see 6.2), the compressor discharge shall be equipped with the shutoff valve installed downstream of the safety valve.

3.21 Regulation. Regulation of the compressor shall be accomplished by one of the following methods of control as specified (see 6.2). The regulation shall have adjustments for changing discharge and differential pressures. The compressor shall automatically unload after every shutdown, and the cooling water, when applicable, shall automatically shut off.

3.21.1 Constant speed control. The compressor shall run continuously and shall automatically load and unload at the present minimum and maximum pressure setting. An adjustable (with up to 30 minutes adjustments) timed control device to shut down the motor after periods of operating unloaded shall be furnished. Loading and unloading on two-stage double acting reciprocating compressors shall be accomplished by a minimum of two steps (full load and no load).

3.21.2 Dual control. The dual control consists of a combination of constant speed control and start/stop control through a manual selector switch. When set to constant speed control, the compressor shall operate the same way as in 3.21.1. When set to start/stop control the motor shall stop automatically when the discharge pressure reaches the maximum pressure setting and start automatically when the discharge pressure falls to the minimum setting.

3.21.3 Start/stop control. The motor shall stop automatically when the discharge pressure reaches the maximum pressure setting and start automatically when the discharge pressure falls to the minimum setting. This type of control shall be limited to compressors with frame rating of 25 hp and below.

3.22 Safety devices. The safety devices as applicable to the compressor classification (see 1.2) shall include but not be limited to, those listed in table I and table II. Alarm indicator shall be by flashing red

lights. When specified (see 6.2) a sounding horn alarm (with reset button) shall be furnished. Alarms, including gages or microprocessors and indicating lights, shall be wired or piped to the control panel.

TABLE I. Reciprocating compressor safety devices.

| Control point                             | Type I |           | Type II |           |
|---|--------|-----------|---------|-----------|
|   | Alarm  | Shut Down | Alarm   | Shut Down |
| High-lubrication oil temp                 | -      | X         | X       | X         |
| Cylinder lubrication failure              | -      | -         | -       | X         |
| High main bearing temperature             | -      | X         | -       | X         |
| High discharge air temperature            | X      | X         | X       | X         |
| High discharge air pressure               | X      | X         | X       | X         |
| High intercooler air temperature          | X      | X         | X       | X         |
| High water temperature                    | X      | X         | X       | X         |
| High intercooler moisture separator level | X      | X         | X       | X         |
| Low lube oil reservoir level              | -      | X         | -       | X         |
| Low lube oil pressure                     | X      | X         | X       | X         |
| Low force-feed lubricator oil pressure    | -      | -         | X       | -         |
| Low cooling water flow                    | -      | X         | -       | X         |
| Low water pressure                        | -      | X         | -       | X         |
| Motor overload                            | -      | X         | -       | X         |
| Excessive vibration                       | -      | X         | -       | X         |

TABLE II. Rotary compressor safety devices.

| Control point                                | Non-lubricated Type III |           | Lubricated Type III and Type IV |           |
|--|-------------------------|-----------|---------------------------------|-----------|
|  | Alarm                   | Shut Down | Alarm                           | Shut Down |
| High-lubrication oil temp                    | X                       | X         | X                               | X         |
| High discharge air temperature               | X                       | X         | X                               | X         |
| High discharge air pressure                  | X                       | X         | X                               | X         |
| High intercooler air temperature             | X                       | X         | X                               | X         |
| High water temperature                       | X                       | X         | X                               | X         |
| High intercooler moisture separator level    | X                       | X         | X                               | X         |
| Low lube oil reservoir level                 | -                       | X         | -                               | X         |
| Low lube oil pressure                        | X                       | X         | -                               | -         |
| Low cooling water flow                       | -                       | X         | -                               | X         |
| Low water pressure                           | -                       | X         | -                               | X         |
| Motor overload                               | -                       | X         | -                               | X         |
| High air/oil separator pressure differential | -                       | -         | X                               | -         |
| High oil filter pressure differential        | X                       | -         | X                               | -         |

3.23 Gages. Dial type pressure indicating gages or microprocessors shall be provided to indicate the discharge or receiver air pressure, air pressure between stages (as applicable), and oil pressure for pressurized or force feed lubrication system. Gages shall have an approximate range of twice the rated pressure or normal operating pressures.

3.24 Motors. The compressor motor shall conform to NEMA MG-1. The motor shall be designed for operation with electrical power supply having characteristics as specified (see 6.2). The motor shall have

a hp nameplate rating equal to or greater than 110 percent of the hp required for continuous operation of the compressor at full load. Drip proof motors shall be polyphase induction type. When specified (see 6.2) motors 125 hp and larger shall be the synchronous type. Motors that drive auxiliary components shall conform to NEMA MG-1 and shall have electrical power supply characteristics as specified (see 6.2).

3.24.1 Motor efficiency. Motor efficiency shall be in accordance with the criteria of NEMA MG-10 and efficiency tables of NEMA MG-1. When specified (see 6.2) a high efficiency motor shall be furnished.

3.24.2 Motor starter. A magnetic starter conforming to NEMA ICS-2 shall be furnished. When specified (see 6.2) motors rated above 50 hp shall have reduced voltage, partial winding, or other means to limit starting current inrush to 200 percent of the normal full load value for reciprocating and non-lubricated rotary compressors, 260 percent for lubricated rotary compressors with standard efficiency motors, and 300 percent for lubricated rotary compressors with high efficiency motors. The starter shall include thermal overload protection and type 1 enclosure conforming to NEMA ICS-6.

3.25 Starting control circuit. Unless otherwise specified (see 6.2) the control circuits for motors shall be nominal 110 volts alternating current. When specified (see 6.2) a spare thermal overload relay shall be furnished and securely fastened inside the starter enclosure.

3.26 Electromagnetic interference characteristics. When specified (see 6.2) the compressor shall conform to the electromagnetic interference suppression requirements and test limits of IEC CISPR 12.

3.27 Fungus resistance. When specified (see 6.2) electrical components and circuit elements, including terminal and circuit connections, shall be coated with varnish conforming to MIL-T-152, ASTM-D3955, and ASTM-D295 except:

- a. Components and elements inherently inert to fungi or in hermetically sealed enclosures need not be coated.
- b. Current-carrying contact surfaces, such as relay contact points, shall not be coated.

3.28 Cleaning, treatment, and painting. Surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified herein. The color of the finish coat, conforming to FED-STD-595, shall be as specified (see 6.2). Surfaces to be painted shall be cleaned and dried to insure that they are free from contaminants such as soil, grease, welding slag and splatter, loose mill scale, water, dirt, corrosion product, or any other contaminating substances. As soon as practicable after cleaning and before any corrosion product 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 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.

3.29 Lubrication. Unless otherwise specified (see 6.2) means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high-pressure lubricating equipment, 1,000 pound-force per square inch (psi) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

3.30 Lifting and tie-down attachments. When specified (see 6.2) the compressor shall be equipped with lifting and tie-down attachments. Lifting and tie-down attachments shall conform to type II or type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the compressor. Transportation plates shall be inscribed with a diagram showing the lifting attachments and

lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tie-down attachments may be identified by stenciling or other suitable marking. Tie-down marking shall clearly indicate that the attachments are intended for the tie-down of the compressor on the carrier when shipped.

3.31 Instruction plates. The compressor unit shall be equipped with instruction plates or decals suitably located describing any special or important procedures to be followed in operating and servicing the equipment. Plates or decals shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 1/8-inch diameter.

3.32 Identification marking. Identification shall be permanently and legibly marked directly on the compressor and sub-assemblies or on a corrosion-resisting metal plate securely attached to the compressor and sub-assemblies at the source of manufacture. Identification shall include the manufacturer's model and serial number, name, and trademark to be readily identifiable to the manufacturer.

3.33 Rotation arrow. Rotation arrow shall be cast in or attached near the drive end of the compressor. If attached the rotation arrow and attachment pins shall be of corrosion resisting materials.

3.34 Spare parts and maintenance tools. When specified (see 6.2) spare parts and maintenance tools shall be furnished. Special tools shall be kept to a minimum.

3.35 Toolbox. When specified (see 6.2) a toolbox shall be provided. The toolbox shall be large enough to store specialized tools not carried in mechanics' toolbox and required for field service or maintenance, but shall not have external closed dimensions less than 14 inches in length, 6 inches in width and 6 inches in height. The toolbox shall be nominal 0.0747-inch (U.S. revised standard gage No. 14) thick steel with a hinged lid and trunk drawbolt to keep the lid secured. The toolbox shall be mounted in a protected, accessible location.

### 3.36 Workmanship.

3.36.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.36.2 Bolted connections. Bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.36.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads when not countersunk or flattened shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.36.4 Welding. Welding procedures shall be in accordance with a nationally recognized welding code. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by

the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

3.36.5 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or other defect which reduces the casting's ability to perform its intended function.

#### 4. VERIFICATION

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

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.1.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 First article inspection. The first article inspection shall be performed on one compressor unit when a first article is required (see 3.4 and 6.3). This inspection shall include the examination of 4.4 and the tests of production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.3 Conformance inspection. Conformance inspection shall include the examination of 4.4, the tests of 4.5.1, 4.5.2, and 4.5.4, and the preparation for delivery inspection of 4.6.

4.4 Examination. Each compressor unit shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.5 Tests. Failure to pass any of the following tests shall constitute cause for rejection.

4.5.1 Receiver test. The receiver shall be hydrostatically tested in accordance with the requirements of ASME Section VIII, Division 1. Leaks or distortion shall constitute failure of this test.

4.5.2 Safety valve test. The safety valve shall be tested to determine if its relieving capacity and popping pressure are in accordance with requirements of ASME Section VIII, Division 1.

4.5.3 Performance test. The compressor shall be tested to determine conformance to 3.7. The test results shall be corrected from the atmospheric conditions on the test site to the atmospheric conditions in 3.7. Inability of the compressor to meet the performance requirements of the specification or to operate satisfactorily shall constitute failure of this test.

4.5.4 Operational test. Each compressor shall be tested for not less than 15 minutes to verify satisfactory operation of the compressor and all controls. During the test all necessary adjustments in controls shall be made as required to insure that performance requirements relating to the compressor output and regulation shall be met.

4.5.5 Test for electromagnetic interference characteristics. When electromagnetic interference characteristics are required the compressor shall be tested to determine conformance to IEC CISPR 12.

In lieu of tests, the manufacturer may furnish a certification that the compressor meets the requirements with a list of the suppression devices installed. The list shall be sufficiently detailed to allow visual determination that the devices are installed.

4.6 Preparation for delivery inspection. The preservation, packaging, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 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 air compressor is intended for stationary service in installations where a steady volume of air is required.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type, style, class, group, drive, air end, rated capacity (cfm), and rated discharge pressure (psig) required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1).
- d. When first article is required for inspection (see 3.4).
- e. When installation is for outdoor or indoor (see 3.8.1).
- f. When environmental conditions are other than as specified (see 3.8.1).
- g. Number of stages required (see 3.12.1).
- h. When air-cooled or water jacketed cooling is required for type I compressor (see 3.12.2).
- i. When an electrically controlled immersion heater is required (see 3.12.3 and 3.13.1).
- j. When enclosure is required (see 3.13.2).
- k. When enclosure is to be furnished with space heating equipment (see 3.12.2).
- l. When baseplate frame is to be provided with openings for forklift lifting (see 3.14.1).
- m. When direct drive is to be close-coupled, integral-coupled, or flexible-coupled (see 3.17).
- n. When a shutoff valve is required in compressor discharge (see 3.20).
- o. Required method of compressor regulation (see 3.21).
- p. When sounding horn alarm is to be furnished (see 3.22).
- q. Required electrical power supply characteristics for compressor motor (see 3.24).
- r. Required electrical power supply characteristics for auxiliary motor (see 3.23).
- s. When motors 125 hp and larger is to be synchronous motor (see 3.23).
- t. When high efficiency motor is required (see 3.24.1).
- u. When reduced voltage, partial winding or other means of limiting starting current is required (see 3.24.2).
- v. Required electrical power supply characteristics for control circuits if other than specified (see 3.25).

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- w. When a spare overload relay is to be furnished (see 3.24).
- x. When electromagnetic interference characteristic is required (see 3.26).
- y. When fungus resistance is required (see 3.27).
- z. Color of finished coat required (see 3.28).
- aa. When lubrication is to be other than specified (see 3.29).
- bb. When lifting and tie-down attachment is required (see 3.30).
- cc. When spare parts and maintenance tools are to be furnished (see 3.34).
- dd. When toolbox is required (see 3.35).
- ee. Packaging requirements (see 5.1).

6.3 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Classification cross reference. Classifications used in this specification (see 1.2) are identical to those found in the superseded military specification MIL-C-17596, except for the following:

| MIL-C-17596       | XX-C-2816    |
|-------------------|--------------|
| Sizes A Through R | Not included |
| Not included      | Air End A    |
| Not included      | Air End B    |

6.5 Subject term (key word) listing.

Axial screw  
Base mounted  
Double acting  
Drive, direct connected  
Drive, multiple V-belt  
Lubricated  
Oil-free  
Single acting  
Skid mounted  
Sliding vane  
Tank mounted

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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CONCLUDING MATERIAL

Custodians:  
Navy - SH  
DLA - CC

Preparing activity:  
DLA - CC

(Project 4310-2015-005)

Review activity:  
Navy - SA

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil/>.