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SUPERSEDING
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December 21, 1988

FEDERAL SPECIFICATION

AIR CONDITIONERS WITH REMOTE CONDENSING UNITS OR REMOTE AIR-COOLED, AND WATER-COOLED CONDENSER UNITS, UNITARY

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers factory-made air conditioners with remote condensing units or condensers. The separate assemblies should be designed to be used together with matched assemblies of the same manufacturer, and be rated and tested in accordance with Air-conditioning and Refrigeration Institute (ARI) Standards. When required, provisions for heating and humidification may be supplied.

1.2 Classification. Air conditioners should be of the following types, styles, classes, and arrangement, as specified (see 6.2).

Type I, ARI Classification RCU-A-CB:

Evaporator-blower unit and remote air-cooled condensing unit with capacities to 720,000 British thermal units per hour (Btu/h) (211,010 watt (W))

Type II, ARI Classification RCU-W-CB:

Evaporator-blower unit and remote water-cooled condensing unit with capacities to 720,000 Btu/h (211,010 W).

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Beneficial comments (recommendations, additions, deletions) 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. *
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FSC 4120

Type III, ARI Classification RC-A:

Evaporator-blower, compressor unit and remote air-cooled condenser unit with capacities to 240,000 Btu/h (70,337 W).

Type IV, ARI Classification RC-E:

Evaporator-blower, compressor unit and remote evaporatively cooled condenser unit with capacities ranging from 120,000 to 720,000 Btu/h (35,168 to 211,010 W)

Type V, ARI Classification RCU-A-C:

Evaporator unit and remote air-cooled condensing unit for matched furnace with capacities to 65,000 Btu/h (19,050 W).

Style A - Evaporator-blower unit with plenum for Types I, II, III, and IV (vertical) (see 6.1.5)
Style B - Evaporator-blower unit with connections for duct work for Types I, II, III, and IV (horizontal) (see 6.1.6)
Style C - Upflow evaporator and adapter for Type V
Style D - Downflow evaporator and adapter for Type V
Style E - Horizontal flow evaporator and adapter for Type V

Class 1 - Units with provisions for heating (see 6.1.7)
Class 2 - Units without provisions for heating (see 6.1.8)

Arrangement - Single zone or multizone

1.2.1 Part numbers. The specification number, type, style, and class combined to form the specification part numbers for the air conditioning units covered by this specification (see 6.5). The part numbers for the air conditioning units are established as follows:

00A374 - X - X - X - X - XXX
Specification number----------* * * * * *
Type code number (see 6.5)----------* * * * *
Style code number (see 6.5)----------* * * *
Class code number (see 6.5)----------* * *
Arrangement Code Number (see 6.5)----------* *
Capacity in 1,000 Btu/h (293 W)----------*

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).

Federal Standard

FED-STD-123 - Marking for Shipment (Civil Agencies)

Military Specifications

MIL-V-173 - Varnish, Moisture-and-Fungus-Resistant (for Treatment of Communications, Electronic, and Associated Equipment)
MIL-R-3593 - Refrigeration and Cooling Equipment (excluding Household Refrigerators), Packing of

Military Standards

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of
MIL-STD-129 - Marking for Shipment and Storage

(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.

Federal Regulations

Occupational Safety and Health Administration (OSHA)

Title 29, Code of Federal Regulations, Chapter XVII: Part 1910 Occupational Safety and Health Standards

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal Agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues

are those cited in the solicitation.

Air Conditioning and Refrigeration Institute (ARI)

ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment
ARI 270 - Sound Rating of Outdoor Unitary Equipment
ARI 360 - Commercial and Industrial Unitary Air-Conditioning Equipment

ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units

Directory of Certified Sound-Rated Outdoor Equipment.
Directory of Certified Unitary Air Conditioners.

(Application for copies should be addressed to the Air Conditioning and Refrigeration Institute, 1501 Wilson Blvd., Suite 600, Arlington, VA 22209-2403.)

American National Standards Institute, Inc. (ANSI)

ANSI B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form)

(Application for copies should be addressed to the American National Standards Institute, Inc., 11 W. 42nd Street, New York, NY 10036.)

American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)

ASHRAE No. 15 - Safety Code for Mechanical Refrigeration

(Application for copies should be addressed to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, GA 30329-2305).

ASTM

ASTM B 117 - Salt Spray (Fog) Testing
ASTM B 280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
ASTM C 534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
ASTM D 2247 - Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM F 1040 - Filter Units, Air Conditioning: Viscous-Impingement and Dry Types, Replaceable

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

National Electrical Manufacturers Association (NEMA)

NEMA MG 1 - Motors and Generators
NEMA ICS 1 - General Standards for Industrial Control and Systems
NEMA ICS 2 - Industrial Control Devices, Controllers and Assemblies
NEMA ICS 6 - Enclosures for Industrial Control and Systems
NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

(Application for copies should be addressed to the National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, DC 20037.)

National Fire Protection Association (NFPA)

NFPA No. 70 - National Electrical Code

(Application for copies should be addressed to the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269-9101).

Rubber Manufacturers Association (RMA)

RMA - Engineering Standards for Multiple V-Belt Drives

(Application for copies should be addressed to the Rubber Manufacturers Association, 1400 "K" Street, N.W., Suite 900, Washington, DC 20005-2403).

Underwriters Laboratories, Inc. (UL)

UL 1995 - Heating And Cooling Equipment

(Application for copies should be addressed to the Underwriters Laboratories, Inc., 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 (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard commercial product. The air conditioner units shall, as 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 air conditioner units 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.

3.1.1 System of measurement. The dimensions used in this specification are not intended to preclude the use of the metric system of measurement in the fabrication and production of the material, individual parts, and the finished product, provided form, fit, and function requirements are satisfied.

3.2 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.2.1, 6.2, and 6.4).

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 purpose 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 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. Unless otherwise specifically specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.4 Description. The air conditioning systems shall contain provisions for simultaneous cooling, circulating ventilation, cleaning, and dehumidifying an air stream. Units up to and including 65,000 Btu/h (19,050 W) capacity shall be completely factory wired and piped with quick acting connectors, flare fittings or sweat connections. On units 65,000 Btu/h (19,050 W) and above, a control panel which controls the entire unit operation including sequencing of compressors in a multi-compressor unit shall be factory installed and wired. Each type shall consist of complete units ready for operation when the component units are installed with electrical, cooling water, interconnecting tubing and devices, and other service connections are made, and the system is properly charged with refrigerant. Thermostats shall not be furnished.

3.4.1 Type I and II units. The type I and II air conditioning systems shall consist of two or three complete package units. One of the units shall be an evaporator-blower unit and the other a remote condensing unit; or one unit an evaporator-blower, one unit a remote compressor, and the other a remote condenser fan unit except on type II which shall be a remote condenser (see 6.2).

3.4.1.1 Evaporator-blower unit. When specified (see 6.2), the evaporator-blower unit shall be a completely factory assembled, electrically operated unit, consisting of cooling coils, blower, motor, air filters, condensate pan and drain, expansion device, and enclosure. The unit shall also include valves, piping, wiring, plenum and grilles on style A units and duct connector on style B units, and other accessories required for operation. When specified (see 6.2), the unit shall contain equipment for heating at the capacity in Btu/h (W) as specified (see 6.2), of the type required in 3.10.6. The unit shall be for mounting in the conditioned space, or not in the conditioned space, as specified (see 6.2).

3.4.1.2 Remote condensing units. The remote condensing unit shall be a completely factory assembled, electrically operated unit consisting of a compressor, condenser, fan, and high pressure controls. For units less than 65,000 Btu/h (19,050 W), a compressor internal pressure relief device is adequate in lieu of high pressure controls. For units less than 135,000 Btu/h (39,564 W), the units may either be equipped with low pressure control or thermal protected at the option of the manufacturer. For units 135,000 Btu/h (39,564 W) and over the manufacturer shall furnish low pressure controls and sight glasses. At the option of the manufacturer, two separate units may be furnished: one unit consisting of the compressor and compressor high pressure controls, and the other unit a condenser and fan unit except for type II, which shall be a condenser only. The unit(s) shall also include condenser fan electric motor(s), piping, wiring, a relief device or relief valve required by

UL 1995 or ASHRAE No. 15 as applicable and other accessories for proper operation. The units shall be equipped for operation on the floor slab, or roof mounting as specified (see 6.2). The remote units shall be shipped with a holding charge. The holding charge may be located in the water-cooled condensing unit. The compressors shall be charged with lubricating oil.

3.4.2 Type III unit. The type III air conditioning systems shall consist of two packaged units: one unit a complete air conditioner less condenser; the other unit a remote air-cooled condenser.

3.4.2.1 Air conditioner less condenser. The air conditioner unit less condenser shall be a completely assembled, electrically operated unit employing a factory-assembled refrigeration cycle or cycles and shall consist of a compressor or compressors, compressor high-low pressure controls as required. The unit shall include a condenser-receiver or receiver (receiver may be placed in remote condenser unit). The unit shall also include evaporator, evaporator-blower, electric motor(s) with controls, relief devices, air filters, condensate pan and drain, expansion device, enclosure, valves if deemed necessary, piping, wiring, plenums, grilles and duct connectors and other accessories and controls required for operation. When specified, the unit shall contain equipment for heating at the capacity (see 6.2), in Btu/h (W) of the type required in 3.10.6. The unit shall be for mounting on the floor in the conditioned space or next to the conditioned space, as specified (see 6.2).

3.4.2.2 Remote air-cooled condenser. The remote air-cooled condenser shall be a completely assembled electrically operated unit consisting of condenser coil or coils, fans, electrical motors and controls. When specified (see 6.2), a blower automatic speed control, with a speed turndown ratio or other means of head pressure control shall be furnished as specified (see 6.2). The unit shall be interconnected to the air conditioner less condenser and when properly charged and electrically connected shall be ready for operation on the floor, slab, or roof, as specified (see 6.2).

3.4.3 Type IV unit. Type IV air conditioning system shall consist of two units; one unit containing a completely assembled unit similar to unit in 3.4.2.1, and a remote evaporatively cooled condenser unit. The evaporative condenser shall be a completely assembled, electrically operated unit consisting of a condenser coil, fan, pump, electric motors and controls, a water distributing system, and all necessary piping, valves, and wiring. When specified, the air conditioner shall contain equipment for heating at the capacity in Btu/h (W) (see 6.2), of the type required in 3.10.6. The evaporative condenser shall be suitable for slab or roof mounting as specified (see 6.2).

3.4.4 Type V unit. The type V air conditioning system shall consist of two complete assemblies: one unit shall be an evaporator and adapter, the other unit a remote condensing unit.

3.4.4.1 Evaporator and adapter. The evaporator unit shall be suitable to be attached to a forced hot-air furnace that is matched to the evaporator as to air flow requirements and to physical size as specified (see 6.2). The evaporator shall be for use downstream of the furnace. The evaporator unit shall be a complete assembly consisting of cooling coil, condensate pan and drain,

expansion device, and if required (see 6.2), controls. The adapter shall simplify the mounting of the evaporator on the furnace.

3.4.4.2 Remote condensing unit. The remote condensing unit shall consist of a unit similar in construction to the unit described in 3.4.1.2.

3.4.4.3 Coil cabinet. When specified (see 6.2), an optional coil cabinet shall be furnished separately and shall be shipped knocked down for field assembly. The cabinet shall accept a matching evaporator and shall match the plenum openings of the furnace.

3.4.5 Arrangement.

3.4.5.1 Single-zone units. Unless otherwise specified (see 6.2), the evaporator-blower unit shall be a single-zone unit. Units under 65,000 Btu/h (19,050 W) shall be draw-through and units over 65,000 Btu/h (19,050 W) shall be of the draw-through or blow-through type, as specified (see 6.2), arranged to supply conditioned air to a single-zone.

3.4.5.2 Multizone. When specified (see 6.2), the evaporator-blower shall be a multizone unit and shall be provided with zoning dampers, diffuser section and balancing means; or a device to equalize resistance through cooling and heating passages; or each zone shall be provided with both cooling and heating coils as specified (see 6.2). The unit shall be arranged to blow through the air cooling and heating sections or draw through the cooling and heating sections or blow through the individual cooling and heating coils of each zone as specified (see 6.2).

3.5 Codes and standards. The air conditioning system shall conform to requirements of ARI 210/240, ARI 270, ARI 360, and UL 1995, as applicable.

3.6 Compliance. Prior to approval of the first shipment, the contractor shall make available to the contracting officer, or his authorized representative, satisfactory evidence that the air conditioner units he proposes to furnish under this specification meet the requirements of air conditioner units as applicable.

3.6.1 ARI 210/240 standard ratings for unitary air conditioning equipment less than 135,000 Btu/h (39,564 W). Acceptable evidence of meeting the requirements of ARI 210/240 will be the ARI certification symbol or a listing in the ARI Directory of Certified Unitary Air Conditioning Equipment or a Certificate of Compliance as part of the first article tests from a recognized independent testing laboratory acceptable to the Government, indicating the equipment has been tested and conforms to ARI 210/240.

3.6.2 ARI 270 for units less than 135,000 Btu/h (39,564 W). Acceptable evidence of meeting the requirements of ARI 270 will be the ARI certification symbol or a listing in the ARI Directory of Certified Sound-Rated Outdoor Unitary Equipment or a Certificate of Compliance as part of the first article tests from a recognized independent testing laboratory acceptable to the Government indicating the air conditioner has been tested and conforms to ARI 270.

3.6.3 ARI 360 and standard ratings and application ratings and safety requirements for commercial and industrial unitary air conditioning equipment 135,000 Btu/h (39,564 W) and over. Acceptable evidence of meeting the requirements of the manufacturer's published standard and application ratings, and safety requirements in accordance with ARI 360 and 365 shall be a Certificate of Compliance as part of the first article tests by the manufacturer indicating the air conditioning system has been tested, and conforms to the manufacturer's published ratings based on data determined by methods of testing and limits prescribed in ARI 360 and 365.

3.6.4 UL 1995. Acceptable evidence of meeting the requirements of UL shall be the UL listing and a listing in the UL Electrical Appliance and Utilization Equipment List or a Certified Test Report (see 6.3), as part of the first article, from a recognized independent testing laboratory, acceptable to the Government, indicating the air conditioner has been tested and conforms to UL 1995.

3.6.5 Design conditions. For heat building cooling loads under 135,000 Btu/h (39,564 W), ARI 210/240 standard rating for temperatures (see 6.7) shall govern and no other source shall be used. For loads 135,000 Btu/h (39,564 W) and over, ARI 360 standard rating temperatures or application rating temperatures and air quantity shall be used as specified (see 6.1.9, 6.2, and 6.7).

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

3.8 Ease of maintenance. The air conditioners shall be designed and constructed so that normal adjustments, repair, and overhaul can be readily accomplished by means of general purpose tools with a minimum removal or disturbance of other elements of the unit. Covers or plates that must be removed for component adjustment or for parts removal shall be equipped with substantial fastening devices actuated by general purpose tools.

3.9 Construction. Conditions which can be hazardous to personnel or deleterious to equipment shall not be permitted. All threads shall be in accordance with ANSI B1.1.

3.10 Component parts.

3.10.1 Enclosure. The enclosure shall be constructed of corrosion resistant materials suitable for installation in interior or exterior locations as required by UL 1995. Enclosures of the evaporator, compressor, and condenser assemblies shall be suitable for installation in interior or exterior locations, as specified (see 6.2). Unless otherwise specified (see 6.2), the enclosure of the evaporator-blower assembly required for interior location shall be suitable for exposed installation in an office space. The enclosure design shall include mechanical features which shall be suitable for floor, ceiling, roof or base mounting, or other installation methods as specified (see 6.2).

3.10.1.1 Plenums, grilles, and duct connections. Plenums, grilles, and duct connections shall be finished to harmonize with the enclosure. Outlet grilles

shall be constructed to permit adjustable directional airflow in both horizontal and vertical planes. Plenums and cabinets for the evaporator-blower assembly shall be furnished with grilles or duct connections as specified (see 6.2).

3.10.1.2 Provisions for ventilation air. When specified (see 6.2), knock-out plates or similar provisions for introducing outside air to the return air side of the evaporator-blower assembly shall be provided.

3.10.1.3 Roof mounting. Compressors and condenser assemblies shall be provided with legs, bases, or other suitable means when specified herein for mounting on the roof.

3.10.1.4 Insulation. Assemblies to be located within the conditioned space shall have the interior of the enclosure insulated to reduce noise. The evaporator-blower assembly shall have the conditioned air sections insulated to prevent excessive heat transfer, to prevent condensate drip or blowoff, and to reduce noise. Insulation shall be glass fiber or other suitable material and shall be properly secured to the inside of the metal housing. Insulation shall be of suitable thickness to meet the requirements of 3.13.9.

3.10.2 Compressor. Unless otherwise specified (see 6.2), compressors shall be hermetically or semihermetically sealed. The compressor shall be mounted with means for vibration isolation. All moving compressor parts shall be oiled automatically and provisions shall be made to return oil from suction lines to housing or crankcase. As many as four compressors may be used, but not more than two may be in parallel. For units over 240,000 Btu/h (70,337 W) with multiple compressors, there shall be a time delay relay or other means to sequence the starting of the compressors, and a multiple stage thermostat to control the number of compressors operating. Lead-lag sequencing shall not be used on stacked evaporator circuits with units less than 240,000 Btu/h (70,337 W). Provisions shall be made to protect the compressor against damage caused by liquid entering the suction side of the compressor. An accumulator mounted in the suction line or other methods will accomplish this.

3.10.3 Heat rejection exchangers.

3.10.3.1 Air-cooled for types I, III, and V. Unless otherwise specified (see 6.2), air-cooled condensers shall be finned tube construction consisting of seamless copper or aluminum tubes with copper or aluminum fins. Coils, fittings, and joints shall meet the requirements for pressures of the refrigerant employed in the system and be in accordance with the referenced standards in ARI 210/240 or ARI 360, as applicable. When specified for units 135,000 Btu/h (39,564 W) and over (see 6.2), the condenser coils shall provide not less than 5 degrees Fahrenheit (oF) (-15o Celsius (C)) liquid subcooling.

3.10.3.2 Water-cooled for type II. Unless otherwise specified (see 6.2), water-cooled condensers shall be shell and tube, shell and coil, or concentric tube consisting of nonferrous metal water tubes. Finned tubes of nonferrous metal may be used in the shell and tube heat exchanger. Soft solder containing tin shall not be permitted in the construction of the water circuit. The capacity rating of the condenser shall include a waterside fouling factor of not greater than 0.001oF hr ft^{2}/Btu (0.00018 Kelvin square meter per watt (K m^{2}/W)). Quality of water available for cooling (hardness, total dissolved solids and pH) shall be as specified (see 6.2). If required (see 6.2), a condenser water

regulating valve shall be provided. The condenser shall be designed in accordance with referenced standards in ARI 210/240 and ARI 360 as applicable. Provisions shall be made for venting and completely draining the waterside. When specified for units 135,000 Btu/h (39,564 W) and over (see 6.2), the condenser coils shall provide not less than 5oF (-15oC) liquid subcooling at standard rating.

3.10.3.3 Evaporative-cooled for type IV (over 120,000 Btu/h (35,168 W)). Unless otherwise specified (see 6.2), evaporative-cooled condensers shall be fabricated of prime surface (nonfinned) nonferrous metal tubing. Quality of water available for make-up shall be as specified (see 6.2). The condenser coils shall provide not less than 5oF (-15oC) liquid subcooling. When specified (see 6.2), evaporative-condenser coils shall have thermostatically controlled capacity modulation.

3.10.4 Condenser-receiver or receiver. The condenser-receiver shall have sufficient capacity to receive the charge including the refrigerant necessary for the field-connected piping (see 3.11.4 and 3.11.5). For units over 135,000 Btu/h (39,564 W), and when the temperature of the refrigerant is 90oF (32.22oC) and higher, the liquid shall not occupy more than 80 percent of the volume of the vessel.

3.10.5 Cooling (evaporator) coil. The cooling coil shall be finned tube construction consisting of nonferrous metal tubes and nonferrous metal fins bonded to the tubing. Fittings and joints shall be brazed or welded. When specified (see 6.2 and 6.1.10), cooling coil shall be all copper.

3.10.6 Heating. Class I units shall be provided with a steam or hot water heating coil or gas heating, oil heating, or an electric open coil, strip tubular, or fin tubular heater as specified (see 1.2, 6.1.9, and 6.2). Electric tubular heaters shall have alloy sheaths, or sheaths treated to prevent corrosion. Steam or hot water heating coils shall be of finned-tube construction consisting of nonferrous metal fins securely bonded to the tubing and designed to withstand not less than 175 psig (1206.57 kilopascals (kPa) (gage)) at 400oF (204.44oC) for steam and 200 psig (1378.94 kPa (gage)) at 250oF (121.11oC) for hot water. Electric, oil, and gas heaters shall conform to the requirements of the reference standards in ARI 210/240 or ARI 360 as applicable. Acceptable evidence that electric and oil heaters meet the reference standards shall be the UL listing mark. Acceptable evidence that gas heaters meet the referenced standards shall be American Gas Association Laboratories Certification seal. Heaters shall be an indirect type, positive venting. The combustion chambers and heat exchangers shall be corrosion resistant. The seams shall be gas-tight. The average heat transfer rate shall not exceed the allowable heating element temperature rise specified in the referenced standards of ARI 210/240 or ARI 360 as applicable. Heaters shall be an integral part of the evaporator-blower unit, as a separate unit for installation in the duct work, or furnished as a separate item as specified (see 6.2). When heating is required for type V air conditioners, the matched furnace shall be for installation upstream of the evaporator and furnished as a separate item.

3.10.7 Condensate disposal pan and drain. Condensate disposal pan shall be provided under the evaporator. Drains shall be provided from the pan where means are not available for complete condensate disposal into the air stream. The pan shall be constructed of corrosion-resisting material.

3.10.8 Fans and blowers. For condensing units less than 135,000 Btu/h (39,564 W), fans and compressors shall have a maximum Sound Rating (SR) of 8.8 bels as rated in accordance with ARI 270. Acceptable evidence of meeting this rating shall be the ARI certification symbol and a listing in ARI Directory of Certified Sound-Rated Outdoor Equipment. Air flow ratings shall be established in accordance with ARI 210/240 or ARI 360 as applicable. Fans and blowers shall be adequately secured to shafts. Bearings shall be self-oiling with adequate oil reservoirs or permanent life-lubricated ball bearings. Oil or grease fittings, when used, shall be readily accessible upon removal of the service panel. When the fan or blower is belt driven, the motor shall be provided with an adjustable base and guard conforming to OSHA 1910.219 or enclosed in the unit casing. The belt drive shall be in accordance with RMA Engineering standards with service factor of at least 1.2. Where the fan or blower motor is exposed to condensate drip, proper protection shall be provided. The direction of rotation shall be clearly and permanently marked on each fan and fan housing. All centrifugal blowers shall be statically and dynamically balanced, and shall be supported by at least two self-aligning bearings.

3.10.8.1 Condenser fan or blower. Fan(s) for air-cooled condensers shall be the propeller type designed for low tip speed and be statically balanced. Blower(s) for evaporative-cooled condenser(s) for type IV units shall be the propeller or centrifugal type.

3.10.8.2 Evaporator blowers. Evaporator blower(s) shall be the centrifugal type.

3.10.9 Strainer and drier. A strainer shall be installed in the refrigerating circuit. Means shall be provided for equipping the condensing system with a filter drier (see 6.1.11).

3.10.10 Air filters. For units over 65,000 Btu/h (19,050 W), easily accessible air cleaning filters shall be provided and arranged to filter all ventilation or recirculation air before its entrance into the evaporator-blower unit. Unless otherwise specified (see 6.2), filters shall conform to the requirements of ASTM F1040. The direction of air flow shall be clearly and permanently marked on the filter frame.

3.10.11 Crankcase off cycle heaters. When specified (see 6.2), means shall be provided for heating the compressor crankcase during "OFF" cycles to minimize liquid foaming, and prevent consequent liquid slugging under compressor starting conditions caused by retention of refrigerant by the oil in the compressor. Crankcase heaters shall be readily replaceable from the exterior without breaking the refrigerant seal. Internal crankcase heaters shall use motor windings as heaters.

3.10.12 Lifting attachments. Means shall be provided to enable the equipment to be lifted in its normal position as recommended by the manufacturer. Attachments 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 is required, each attachment shall be of sufficient capacity to carry the total weight. Information as to the lifting capacity of each attachment shall be stenciled with a contrasting color enamel in a suitable location near the attachment. The letters and

numbers comprising the data shall be at least 1/2-inch (12.7 mm) in height. Spreader bars shall be provided by the installer.

3.11 Refrigeration system. The refrigeration system and all component parts, including valves, shall conform to ASHRAE No. 15 and UL 1995. Units with capacity 135,000 Btu/h (39,564 W) and over shall be provided with manufacturer's normal commercial sight glasses. On units 65,000 Btu/h (19,050 W) and over, gage ports or charge valves shall be provided for routine and periodic pressure testing of the system and for field charging and removing of refrigerant. The refrigerant circuit(s) shall be dried, evacuated, and precharged with refrigerant holding charge of the type for use in service. A complete charge of refrigerant oil shall be precharged within the compressor crankcase at the factory. The various components of the air conditioning system shall show a leakage of refrigerant not to exceed 1/2-ounce (14.17 grams (g)) per unit per year. No alcohol or other additives shall be used in the circuit.

3.11.1 Refrigerant. Unless otherwise specified (see 6.2), the refrigerant in the unit shall be refrigerant R22 ($CHClF_2$).

3.11.2 Expansion control device. Unless otherwise specified (see 6.2), for all units the manufacturer's standard device for obtaining the refrigeration effect shall be furnished. Capillary tubes and expansion valves installed in refrigerant circuits shall be such that the compressor does not show signs of refrigerant flood back on rated low operating temperature. When a capillary device is used, a strainer-drier shall be located upstream of the capillary device.

3.11.3 Quick-connect couplings. On air-cooled units 65,000 Btu/h (19,050 W) and under, quick-connect couplings for refrigeration use shall be provided for field connection between outdoor and indoor units. The quick-connectors shall completely seal the system against all possible entrance of moisture and air into the system when uncoupled from or coupled to the equipment. The couplings shall have matching ends for the interconnecting tubing in 3.11.5. The quick-connectors shall be capped or plugged to protect couplings.

3.11.4 Tubing and piping. Tubing and piping connections shall be arranged in a manner that does not impair the vibration-isolation properties of absorption type mounts. All tubing and piping shall be securely supported to minimize strain and vibration. Unless otherwise specified (see 6.2), fittings shall be wrought, forged, brass, or copper. All refrigerant tubing joints and threaded joints shall meet the requirements of UL 1995.

3.11.5 Interconnecting tubing. When specified for air-cooled units 65,000 Btu/h (19,050 W) or less, interconnecting, prefabricated factory-charged tubing shall be provided with length in feet (meters), as specified (see 6.2). The interconnecting tubing shall be extra soft, deoxidized, bright annealed copper conforming to ASTM B 280 factory dehydrated and furnished with a holding charge of refrigerant recommended by the manufacturer of the air conditioner. The interconnected tubing shall be factory insulated with 3/8-inch (9.53 mm) minimum thickness of closed cell foamed plastic conforming to ASTM C 534, with a permeance rating not to exceed 1.0 perm. The refrigerant lines shall contain quick-connectors with caps or plugs to protect couplings. Couplings shall match couplings of 3.11.3.

3.12 Electrical equipment. Electrical equipment shall conform to UL 1995. Control panel shall be unit mounted or for remote mounting, and of NEMA ICS 6 type 1 or type 12 enclosure, as specified (see 6.2). The enclosures shall conform to NEMA 250, type 3 or 3R.

3.12.1 Motors and motor starters. Motors and overload protection shall have the electrical characteristics as specified (see 6.2). Motors shall be furnished for the explicit voltage specified herein. Motors shall conform to NEMA MG1. Motor starters shall conform to NEMA ICS 1, ICS 2, ICS 6 and when required (see 6.2) shall be of the reduced voltage type in order to limit excessive voltage drops. All motors shall have reduced voltage or reduced current in rush controllers in accordance with requirements of the UL 1995. Motor overload protection for motor-compressor units shall conform to the requirements of reference standards of UL 1995 and NFPA 70. Motors shall have sealed windings.

3.12.2 Safety controls. A high-limit pressure control and a low-limit pressure control (or a dual pressure control) shall be used to limit pressures on the discharge side and the suction side, respectively, of the compressor. For units under 65,000 Btu/h (19,050 W), a compressor internal pressure relief device is adequate in lieu of high pressure controls. For units less than 135,000 Btu/h (39,564 W) in lieu of a low limit pressure switch, thermal sensors or a built-in thermostat in the compressor's motor windings or other means such as amperes drawn may be used.

3.12.3 Operating controls. Manual and automatic controls, factory-wired and accessible for service and inspection, shall be provided except for thermostats. The control system shall permit operation either of the blower only or of the blower and refrigeration equipment simultaneously. When heating equipment is specified herein, a control system shall be installed for operating blowers and heating equipment simultaneously. When required, the control system shall provide means for single or multistate of heating and of cooling equipment including single and multizone equipment. Unless otherwise specified (see 6.2), connections shall be provided for connecting low voltage wiring (30 volts or less) for a remote thermostat to the unit for controlling the conditioned air.

3.12.4 Electrical resistance heater control. Unless otherwise specified (see 6.2), electrical resistance heaters shall be provided integral with the air conditioning unit. The electric heaters shall be electrically wired in accordance with NFPA 70 and controlled in one or more steps.

3.12.5 Wiring. Wiring and protective devices shall be factory-completed within each unit and shall include the wiring to all cabinet enclosed controls in accordance with UL 1995 requirements and NFPA No. 70.

3.13 Performance.

3.13.1 Cooling capacity. At a power input with the voltage equal to the rated voltage, the Btu/h cooling capacity specified herein shall be not less than 95 percent of the rated capacity. For units under 135,000 Btu/h (39,564 W), the rated capacity including motor heat mixed with chilled air shall be the standard rating in the ARI Directory of Certified Unitary Air Conditioners. For units 135,000 Btu/h (39,564 W) and over the rated capacity including motor heat mixed with chilled air shall be the manufacturer's

published rating, either standard rating or application rating specified in 3.6.1.5, as applicable in accordance with ARI 360.

3.13.2 Sensible cooling effect. The room sensible cooling effect (see 6.7) shall be not less than 60 percent of the total cooling effect in accordance with ARI 210/240 or ARI 360, as applicable.

3.13.3 Seasonal energy efficiency ratio (SEER) and energy efficiency ratio (EER). The units shall have a minimum SEER or EER as specified (see 6.1.12 and 6.2).

3.13.4 Air flow rate. For standard ratings, the air quantities shall be circulated through the air conditioning system as required in ARI 210/240 and ARI 360. For application ratings see 3.6.1, 3.6.2, and 3.6.3.

3.13.5 Locked-rotor current. The total locked-rotor current of the hermetic motor compressors designed to start simultaneously by the controls provided, is the sum of the locked-rotor currents of the individual motors operating from the same source power. The locked-rotor current shall be not greater than the name plate locked-rotor current as determined in UL 1995.

3.13.6 Maximum operating conditions. The unit shall operate continuously without damage to the motors, other electrical parts or wiring because of over-heating, and without damage to any other component from any operational cause under the maximum operating conditions specified in ARI 210/240 or ARI 360, as applicable, and without interruption caused by tripping of its motor overload protective device, under normal or rated load conditions specified herein. Type II units shall be capable of operation under these maximum conditions at a water pressure drop not to exceed 15 pounds per square inch (psi) (103.42 kPa) measured across the unit.

3.13.7 Low temperature conditions. The unit shall operate without damage to the equipment. Frost or ice shall not form on the cooling coil to the extent specified in ARI 210/240 or ARI 360 as applicable. During low temperature operation and during the defrosting period after completion of the low temperature operation, all ice or meltage must be caught by the condensate collection pan, and either dissipated into the condenser air stream or disposed by the drain.

3.13.8 Condensate disposal. For type I units less than 135,000 Btu/h (39,564 W) which reject condenser air, there shall be no dripping, running-off, or blowing-off of moisture from the unit when controls and dampers are set to produce condensate at the maximum rate.

3.13.9 Insulation efficiency. For units less than 135,000 Btu/h (39,564 W) condensate water shall not drip, run, or blow-off the outer surfaces of the unit

when controls, fans, dampers, and grilles are set to produce the maximum tendency to sweat.

3.13.10 External resistance for style B units. Unless otherwise specified (see 6.2), when delivering the rated capacity and air quantity specified herein, the air conditioner shall be designed to work against the minimum external resistance as noted in ARI 210/240 and ARI 360 as applicable. The external

resistance for style B units so noted shall be available for the duct system with all the specified equipment for the air conditioner in place.

3.13.11 Heating capacity. The Btu/h (W) heating capacity shall be not less than specified in 3.4.1.1, 3.4.2.1, and 3.4.3 as applicable, with design temperatures, pressures, and voltage as specified in 3.10.6 (see 6.1.7).

3.13.12 Low voltage start. The compressor motors shall start at 10 percent below rated voltage as prescribed in ARI 210/240 and ARI 360 as applicable.

3.14 Corrosion protection. All materials in the air conditioners shall be so constructed that the units can meet the requirements of UL 1995 for corrosion protection. When finishes of 3.14.1 and 3.14.2 are required, acceptable evidence of meeting the requirements shall be a Certificate of Compliance as part of the first article tests by the manufacturer indicating that all the finishes of the unit have been tested and do conform to the referenced standards based on data determined by the methods prescribed in the reference standards.

3.14.1 Indoor components. When specified (see 6.1.10 and 6.2), indoor components having factory finish applied in accordance with 3.15, as well as hardware (fasteners), shall withstand 125 hours of 100 percent relative humidity at 70 to 80oF (21.11 to 26.67oC) per ASTM D 2247.

3.14.2 Outdoor components. When specified (see 6.2), outdoor components having factory finish applied in accordance with 3.15, as well as hardware (fasteners) shall withstand salt spray per ASTM B 117 at dry bulb temperature of 97 +/-2oF (36.11 +/-1.11oC) for 125 hours or 500 hours, as specified (see 6.2 and 6.1.10).

3.15 Finishes. Unless otherwise specified (see 3.14.1, 3.14.2 and 6.2), the finish on each packaged unit shall be the manufacturer’s normal commercial finish.

3.16 Identification marking. Identification shall be permanently and legibly marked directly on the air conditioner units or on a corrosion-resisting metal plate securely attached to the air conditioner units 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.

3.17 Lubrication. Means for lubrication shall be in accordance with the manufacturer’s standard practice. The lubricating points shall be easily visible and accessible. Where use of high-pressure lubricating equipment, 1,000 pound-force per square inch (psi) (6894 kPa) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location. The unit shall be lubricated prior to delivery with type of lubricant specified in the operator’s manual and grade of lubricant recommended for ambient temperature at the delivery point. The unit shall be conspicuously tagged to identify the lubricants and their temperature range.

3.18 Electromagnetic interference control. When specified (see 6.2), the air conditioner shall be designed and equipped for electromagnetic interference control in accordance with class C3 Group II equipment of MIL-STD-461 (see 4.6.1).

3.19 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-V-173, except that:

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.

3.20 Workmanship.

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

3.20.2 Bolted connections. All bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided. All nuts, bolts, and screws shall be tight.

3.20.3 Riveted connections. All rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall completely fill the hole. Rivet heads shall be concentric with the rivet and shall make full contact with the intended surface. The rivets shall be so fabricated as to develop a joint strength not less than the design value.

3.20.4 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.

3.20.5 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 ensure uniformity of size and shape.

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 the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must 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. 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.

4.1.2 Material inspection. The contractor is responsible for ensuring that supplies and materials are inspected for compliance with all the requirements specified herein and in applicable referenced documents.

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

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on air conditioner units when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.5 and the tests of 4.6. The first article may be either a first production item or a standard 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.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.5, the tests of 4.6, and the packaging inspection of 4.7. This inspection shall be performed on the samples selected in accordance with 4.4.

4.3 Inspection lot. All units of the same type, style, class, capacity, and mounting offered to the Government at one time shall be considered a lot for purposes of inspection. The sample unit shall be one complete air conditioner.

4.4 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one air conditioner. All air conditioner units offered for delivery at one time shall be considered a lot for the purpose of inspection.

4.4.1 Sampling for examination. Recommended inspection level II of MIL-STD-105 and acceptable quality level (AQL) is 2.5 percent defective.

4.4.2 Sampling for tests. Recommended inspection level is S-3 of MIL-STD-105, and AQL of 4.0 percent defective.

4.5 Examination. Each air conditioner 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.

4.5.1 Standards compliance. The contractor shall make available to the contracting officer or his authorized representative evidence of compliance with the applicable standard(s) cited in 3.5. The Government reserves the right to examine and test all air conditioners to determine the validity of the certification.

4.6 Tests. The contractor shall have an established test system which shall assure compliance with the requirements of the specification and of the referenced standards. The system shall include the methods, procedures, controls, records, and maintenance of the system to provide verification of compliance with the requirements of this specification and of the referenced standards.

4.6.1 Electromagnetic interference tests. When electromagnetic interference control is specified (see 3.18), the first article shall be tested in accordance with MIL-STD-462, to verify compliance with the pertinent provisions of MIL-STD-461.

4.7 Preparation for delivery inspection. An examination shall be made to determine compliance with the requirements of section 5. The sample unit shall be one unit prepared for shipment. Sampling shall be in accordance with MIL-STD-105. The inspection level shall be S-2 with an AQL of 4.0 percent defective.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, and packing. Preservation, packaging, and packing shall be in accordance with the requirements of MIL-R-3593 with the levels of preservation, and level of packing as specified (see 6.2).

5.2 Marking.

5.2.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.2.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

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

6.1 Intended use. This specification covers split-systems air conditioners designed for a large office space or space consisting of several rooms. A general guide to selection of types and classes are as follows.

6.1.1 Types I and III. Types I and III air conditioners are generally specified where condenser cooling water and drain facilities are not available.

6.1.2 Type II. Type II air conditioners can be used only in areas where there is a cooling tower or readily available water supply and drain facilities.

6.1.3 Type IV. Type IV air conditioners can be used only in areas where cooling water and drain facilities are available. Generally they are used in lieu of Type II units in localities where water is in short supply and is restricted for cooling purposes. Type IV air conditioners are not readily available as Type I or II units.

6.1.4 Type V. Type V air conditioners are generally specified for use with residential furnaces and must be matched with furnace. The make, model, air flow data (volume and static pressure), size of opening of plenum, whether upflow (style C) or down flow (style D) is required, and manufacturer should be specified.

6.1.5 Style A. Style A evaporator-blower unit should be specified where the conditioned air can be discharged directly into the conditioned space. To accomplish this, the air conditioner should be located either within the conditioned space or adjacent to the space.

6.1.6 Style B. Style B evaporator-blower unit should be specified where duct work is necessary to supply the cooled air to the conditioned space. The unit is usually located outside the conditioned space and duct work is required to deliver the cooled air to the conditioned space, or where the unit is located in a conditioned space and connected to other spaces by duct work.

6.1.7 Class 1. Class 1 air conditioners should be specified when heating of the space to be conditioned is required. Where hot water, gas, electricity or light fuel oil is available for heating, the appropriate type of heating coil or heat exchanger should be specified. For steam and hot water coils, the following information should be supplied:

a. Velocity of air across coil face, ft/min (m/min) - standard air
b. Entering air dry-bulb temperature, oF (oC)
c. Water velocity range, ft/min (m/min) - hot water coil
d. Entering water temperature, oF (oC) - hot water coil
e. Steam pressure at coil inlet, psi (kPa) - steam coil
f. Maximum superheat in steam at coil inlet; oF (oC) - steam coil

6.1.8 Class 2. Class 2 air conditioners should be specified when no heating is required.

6.1.9 Application ratings. Many applications of unitary air conditioners require ratings under conditions other than standard rating conditions of ARI 360 (see 3.6.5 and 6.10.e). The following information should be supplied by the procuring authority to the contractor as indicated by the "X" in the applicable blocks.

OPERATING CONDITIONS FOR APPLICATION RATING AND PERFORMANCE TESTS

	Indoor coil air entering DB oF (oC)	Indoor coil air entering WB oF (oC)	Condenser cooling means: Water In oF (oC)	Water Out oF (oC)	Air Air to condenser DB oF (oC)	Evaporative condenser DB oF (oC)	Evaporative condenser WB oF (oC)
Maximum operating conditions	X	X	X	X	X	X	X
Low temperature operation	X	X	-	X	X	X	X
Condensate disposal							

6.1.10 Corrosion protection. Indoor air conditioner components made of ferrous metals located in coastal areas should withstand 125 hours at 100 percent relative humidity per ASTM D 2247. Out door components made of ferrous and nonferrous metals located in coastal areas should withstand 125 hours and in severe coastal areas 500 hours of salt spray per ASTM B 117 (see 3.14.1 and 3.14.2). In coastal areas, condenser should be made of copper tube and copper fins and insulated for protection against galvanic corrosion from ferrous metal parts. For units 65,000 Btu/h (19,050 W) or less, condenser may be made of aluminum tubes and aluminum fins, and coated to resist corrosion, providing units pass the reference standards tests.

6.1.11 Filter-drier. Filter-driers are furnished with remote condensing units less than 65,000 Btu/h (19,050 W), and are sized for 25 feet (7.62 m) of interconnecting tubing (see 3.10.9). On remote condensing units 65,000 Btu/h (19,050 W) and over, the drier should be furnished as a separate item, size of which should be determined by the piping and installation of the unit on location, and should be field installed by the contractor.

6.1.12 For military acquisitions. For all single phase, 230 volt air conditioning units 65,000 Btu/h (19,050 W) or less, the SEER applies and the minimum SEER should be 8.0 (see 3.13.3). Other air conditioning units should conform to the Energy Policy Act of 1992 (EPACT), as listed in the following:

Unitary Air-Conditioners and Heat Pumps

Air-Cooled

< 65,000 Btu/h (19,050 W), 3 phase, Split System - 10.00 SEER & 6.8 HSPF

>= 65,000 Btu/h (19,050 W), and <= 135,000 Btu/h (39,564 W) - 8.9 EER & 3.0 COP (47oF)

Water-Cooled and Evaporatively-Cooled

< 65,000 Btu/h (19,050 W) - 9.3 EER
>= 65,000 Btu/h (19,050 W), and <= 135,000 Btu/h (39,564 W) - 10.5 EER

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type, style, class, arrangement, single or multizone, and type of multizone draw-through or blow-through, and mounting of the air conditioner required (see 1.2, 3.4.1.1, 3.4.1.2, 3.4.2.1, 3.4.2.2, 3.4.3, 3.4.4.3, 3.4.5.1 and 3.4.5.2)
c. Issue of DoDISS to be cited on the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
d. Cooling capacity required in Btu/h (W) and operating conditions (outside wet- and dry-bulb temperatures, inside wet- and dry-bulb temperatures and condenser water entering and leaving temperature, where applicable) and air quantity for other standard ratings (see 1.2, 3.6.1.5, and 6.1.9)
e. When first article is required for inspection and approval (see 3.2, 4.2.1, and 6.4)
f. When type I, II, III, IV, and V units shall contain equipment for heating, with capacity and type, and as a part of the evaporator-blowers of air conditioner or as a separate unit (see 3.4.1.1, 3.4.2.1, 3.4.3, 3.4.4.1, 3.10.6, and 3.12.4)
g. When evaporator-blower unit shall be acceptable as separate units (see 3.4.1)
h. When type III remote air-cooled condenser shall have blower automatic speed control with required speed turndown ratio, wiring, and other necessary controls (see 3.4.2.2)
i. When type IV units shall be specified to have a remote compressor (see 3.4.3)
j. When controls are required on evaporator unit (see 3.4.4.1)
k. Air flow, physical size, and matched furnace requirements for evaporator and adaptor for type IV unit (see 3.4.4.1 and 6.1.6)
l. When coil cabinet is required on type IV unit (see 3.4.4.3)
m. Whether enclosures of the evaporator, compressor, and condenser assemblies are for interior or exterior locations (see 3.10.1)
n. When interior located evaporator-blower assembly is not required to be suitable for exposed installation in an office space (see 3.10.1)
o. Mechanical features of the enclosure design required for mounting and component air conditioner assemblies (see 3.10.1)
p. Whether grille or duct connections are required on plenums and cabinets (see 3.10.1.1)
q. When knock-out plates or similar provisions are required for introducing outside air to the return side of the evaporator-blower assembly (see 3.10.1.2)
r. When compressor shall be other than specified (see 3.10.2)
s. Air-cooled condenser material, if different (see 3.10.3.1 and 6.1.10)
t. When units 135,000 Btu/h (39,564 W) and over shall be provided with not less than 10oF (-12.22oC) liquid subcooling (see 3.10.3.1 and 3.10.3.2)

u. Water-cooled condenser type and material, if different (see 3.10.3.2 and 6.1.10)
v. Specify the quality of water available for water-cooled and/or evaporative-cooled condensers in terms of hardness, total dissolved solids and pH (see 3.10.3.2 and 3.10.3.3)
w. When a condenser water regulating valve is required (see 3.10.3.2)
x. Evaporative-cooled condenser material for types IV and V, if different (see 3.10.3.3)
y. When evaporative-condenser coils over 10 tons (35,170 W) are required to have thermostatically controlled capacity modulation (see 3.10.3.3)
z. When cooling coil is required to be all copper (see 3.10.5 and 6.1.10)
aa. When filters shall be other than as specified (see 3.10.10)
bb. When means is required for heating the compressor crankcase (see 3.10.11)
cc. When refrigerant is to be different (see 3.11.1)
dd. When other than manufacturer's standard device shall be used (see 3.11.2)
ee. When fittings shall be other than wrought, forged, brass, or copper (see 3.11.4)
ff. When interconnecting, prefabricated factory-charged tubing shall be provided and length in feet (meters) (see 3.11.5)
gg. When control panel shall be unit-mounted or for remote mounting and type of enclosure required (see 3.12)
hh. Required electrical characteristics of motors, voltage, phases, frequency, and ac or dc (see 3.12.1)
ii. When motor starters shall be of the reduced voltage type (see 3.12.1)
jj. When electrical connections are to be different (see 3.12.3)
kk. Required Seasonal Energy Efficiency Ration (SEER) or Energy Efficiency Ratio (EER) (see 3.13.3)
ll. Required minimum external resistance if different (see 3.13.10)
mm. When indoor components are required to withstand 100 percent relative humidity (see 3.14.1)
nn. Outdoor components are required to withstand 125 or 500 hours salt spray (see 3.14.2)
oo. When finish of unit is to be different (see 3.15)
pp. When electromagnetic interference control is required (see 3.18)
qq. When fungus resistance treatment is required (see 3.19)
rr. Level of preservation, packaging, and level of packing required (see 5.1)

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.4 First article. When a first article 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 4.2.1. 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.

6.5 Definitive specification part number. The specification part number is a definitive part number which corresponds to the type, style, and class of air conditioner covered by this specification and defines the requirements of the options presented under this specification. The specification number (OO-A-374C), and the type, style, class, and arrangement code numbers are combined to form the definitive specification part number.

6.5.1 Cataloging data. For cataloging purposes, part numbers for the air conditioners are as follows:

```
                              OOA374 - 1 - A - 1 - 1 - 100
Specification part number-------*     *   *   *   *    *
Type code number (see 6.5.2)----------*   *   *   *    *
Style code number (see 6.5.3)-------------*   *   *    *
Class code number (see 6.5.4)-----------------*   *    *
Arrangement code number (see 6.5.5)---------------*    *
Capacity in 1,000 Btu/h (293 W) (see 6.5.5)------------*
```

6.5.2 Types. The types of the air conditioners (see 1.2) are identified by a one-digit number (see Table I).

TABLE I. Code number to type.

Type	Code
Type I (RCU-A-CB)	1
Type II (RCU-W-CB)	2
Type III (RC-A)	3
Type IV (RC-E)	4
Type V (RCU-A-C)	5

6.5.3 Style. The style of the air conditioners (see 1.2) is identified by a one-digit letter (see Table II).

TABLE II. Code number to style.

Style	Code
Style A	A
Style B	B
Style C	C
Style D	D
Style E	E

6.5.4 Class. The class of the air conditioners (see 1.2) is identified by a one-digit number (see Table III).

TABLE III. Code number to class.

Class 1	1
Class 2	2

6.5.5 Arrangement. The arrangement of the air conditioners (see 1.2) is identified by a one-digit number (see Table IV).

TABLE IV. Code number to arrangement.

Single Zone	1
Multizone	2

6.5.6 Capacity. The capacity of the air conditioners (see 1.2) is identified by a three-digit number in 1,000 Btu/h (293 W).

6.6 Reduced voltage starters. Reduced voltage starters should be specified when critical voltage-regulation problems are anticipated because of such factors as excessive loads and presence of electrical or electronic equipment sensitive to voltage fluctuation. In general, the voltage dip should not exceed 5 percent at the motor.

6.7 Sensible cooling effect. The sensible cooling effect in Btu/h (W) is the difference between the total cooling effect and dehumidifying effect. The dehumidifying effect in Btu/h (W) shall be computed as the product of 1,060 and the difference in moisture content, expressed in pounds per hour (kilograms per second (kg/s)), between the entering air and that of the leaving air.

6.8 Refrigerant tubing, pipe, and fittings. The attention of the contracting officer is directed to the fact that substitute refrigerant tubing, pipe, and fittings may not be available at the time of invitation for bids. He should, therefore, assure himself of such availability prior to requesting bids from prospective contractors.

6.9 Standard lubricants. When requested by the contractor, the contracting officer should furnish a list of standard Military lubricants applicable to the equipment covered by this specification. Standard military lubricants are listed in the DoD section of the Federal Supply Catalog C9100-IL.

6.10 Definitions.

a. Compressors, hermetically sealed: A hermetically sealed compressor shall consist of a compressor and motor enclosed in a welded or brazed shell and connected within a refrigerant circuit wherein all refrigerant liquid- or gas-containing parts shall be permanently sealed to prevent the circuit from being opened without cutting or melting.

b. Compressors, semihermetically sealed: A semihermetically sealed circuit shall consist of a compressor and motor enclosed in a gastight shell and connected within a refrigerant circuit wherein refrigerant gas or liquid parts may be replaced or repaired. Sealed systems shall be provided with a suction and discharge service valves.

c. Energy Efficiency Ratio: A ratio calculated by dividing the cooling capacity in watts by the power input in watts at any given set of rating conditions, expressed in watt per watt.

d. Seasonal Energy Efficiency Ratio: Seasonal Energy Efficiency Ratio means the total cooling of a central air-conditioner watts during its normal usage period for cooling (not to exceed 12 months) divided by the total electric energy input in watt-hours during the same period, as determined in Appendix A of ARI 210/240.

e. Temperature, application rating: Other than standard rating temperatures.

6.11 Subject term (key word) listing.

Cooling
Compressor
Dehumidifying
Evaporator
Refrigeration system
Ventilation
Air conditioner
Condensing units
Unitary

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

MILITARY INTERESTS:

Custodians
Army - ME
Navy - YD1
Air Force - 99

Review Activities

Army - ER, CE
Navy - MC
Air Force - 82

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS
INTERIOR - MIN
VA - OSS

PREPARING ACTIVITY:

Navy - YD1

(Project 4120-1019)