STATE OF NORTH CAROLINA
DEPARTMENT OF ADMINISTRATION
PURCHASE AND CONTRACT DIVISION

4120-1M
March 10, 2010
SUPERSEDES
4120-1L
JUNE 2, 2004

SPECIFICATION FOR AIR CONDITIONERS, ROOM

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers slide-out chassis, self contained, room air conditioners driven by an electric motor. Non slide-out chassis types which are window mounted are not covered by this specification. Portable type units are also covered by this specification. It does not include all types and sizes of air conditioners which may be commercially available, but only those generally used by state agencies and public schools. The sizes of air conditioners included in this specification are from 5,000 to 36,000 BTU per hour.

This specification is intended to emphasize performance, rather than design, and contains a life cycle cost award formula.

I. CLASSIFICATION

Air conditioners covered by this specification are classified by nameplate rated sizes as presented below. On units with dual BTU ratings, the 230 Volt BTU rating will be used to determine the size category.

CLASS	TYPE	SIZE (BTU/hr)	VOLTAGE (V)
1	Slide-Out Chassis Room Air Conditioners	5,000 - 5,999	115
2	Slide-Out Chassis Room Air Conditioners	6,000 - 6,999	115
3	Slide-Out Chassis Room Air Conditioners	7,000 - 8,999	115
4	Slide-Out Chassis Room Air Conditioners	9,000 - 10,999	115
5	Slide-Out Chassis Room Air Conditioners	11,000 - 14,000	115
6	Slide-Out Chassis Room Air Conditioners	11,000 - 12,999	230/208
7	Slide-Out Chassis Room Air Conditioners	13,000 - 14,999	230/208
8	Slide-Out Chassis Room Air Conditioners	15,000 - 16,999	230/208
9	Slide-Out Chassis Room Air Conditioners	17,000 - 19,999	230/208
10	Slide-Out Chassis Room Air Conditioners	20,000 - 22,999	230/208
11	Slide-Out Chassis Room Air Conditioners	23,000 - 25,999	230/208
12	Slide-Out Chassis Room Air Conditioners	26,000 - 28,999	230/208
13	Slide-Out Chassis Room Air Conditioners	29,000 - 30,999	230/208
14	Slide-Out Chassis Room Air Conditioners	31,000 - 32,999	230/208
15	Slide-Out Chassis Room Air Conditioners	33,000 – 35,999	230/208
16	Slide-Out Chassis Room Air Conditioners	36,000 – 39,000	230/208
17	Portable Room Air Conditioners	5,000 - 5,999	115
18	Portable Room Air Conditioners	6,000 - 6,999	115
19	Portable Room Air Conditioners	7,000 - 8,999	115
20	Portable Room Air Conditioners	9,000 - 10,999	115
21	Portable Room Air Conditioners	11,000 - 14,000	115

CLASS	TYPE	SIZE (BTU/hr)	VOLTAGE (V)
22	Portable Room Air Conditioners	11,000 - 12,999	230/208
23	Portable Room Air Conditioners	13,000 - 14,999	230/208
24	Portable Room Air Conditioners	15,000 - 16,999	230/208
25	Portable Room Air Conditioners	17,000 - 19,999	230/208
26	Portable Room Air Conditioners	20,000 - 22,999	230/208
27	Portable Room Air Conditioners	23,000 - 25,999	230/208
28	Portable Room Air Conditioners	26,000 - 28,999	230/208
29	Portable Room Air Conditioners	29,000 - 30,999	230/208
30	Portable Room Air Conditioners	31,000 - 32,999	230/208
31	Portable Room Air Conditioners	33,000 – 35,999	230/208
32	Portable Room Air Conditioners	36,000 – 39,000	230/208

II. APPLICABLE STANDARDS

The following documents shall form a part of this specification to the extent described herein under "Requirements." The issue or revision for the respective document which is in effect on date of bid opening shall apply, except where specifically otherwise called for:

10 CFR, Part 430, Energy Conservation Program for Consumer Products

ANSI/AHAM PAC-1 Portable Air Conditioners
ANSI/AHAM RAC-1 Room Air Conditioners

ASHRAE Standard 16 - Method of Testing for Rating Room Air Conditioners

Energy Star Certification through the joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy

UL-484 - Standard for Safety, Room Air Conditioner

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Energy Star certification documents may be obtained from:
US EPA
ENERGY STAR Hotline (6202J)
1200 Pennsylvania Ave NW
Washington, DC 20460 or online at http://www.energystar.gov/

UL Standards may be obtained from:
Underwriters' Laboratories, Inc. (UL)
Publications Stock
2600 N.W. Lake Rd.
Camas, WA 98607-8542 or online at http://www.ul.com/

III. REQUIREMENTS

The materials used in the construction of the units shall be of good commercial quality and shall be suitable for the purposes for which they are used. The cabinet, frame, or chassis and enclosure shall be constructed of a metal or plastic suitable for the application.

The contractor shall submit to the purchasing agency proof that the commodity being furnished under this specification conforms to the standards of the Underwriters' Laboratories, Inc., regarding fire and casualty hazards. The label, marker, listing, or certified report of the Underwriters' Laboratories, Inc., or an independent testing laboratory approved by the N.C. Department of Insurance, will be accepted as evidence of compliance with this requirement.

A. PERFORMANCE

The air conditioning unit shall have a rated capacity at least equal to that specified in the Invitation For Bids. The actual capacity of any unit selected at random shall be not less than 95% of the name-plate rated capacity, when tested in accordance with the requirements of ANSI standard Z234.1. Evidence of certification by the AHAM program or by an approved independent testing laboratory shall suffice.

1. POWER FACTOR

When tested as specified in Section III, the air conditioners shall have a power, measured at the terminals, of not less than 85%.

2. MINIMUM AIR QUANTITIES

The recirculated air quantities through the air conditioner shall be not less than 20 CFM of standard air for each 1,000 BTU per hour of cooling capacity.

3. OPERATING CONDITIONS

The unit shall be designed for continuous operation under the following conditions:

Outside Air:	Dry-bulb temperature --------	110 °F.
	Wet-bulb temperature --------	78 °F.
Unit Ambient Air:	Dry-bulb temperature --------	90 °F.
	Wet-bulb temperature --------	73 °F.

4. SENSIBLE TO TOTAL COOLING RATIO

When operating at standard conditions specified in ANSI standard Z234.1, the units shall have a ratio of room sensible cooling effect to net total cooling effect between 55% and 82%.

The net room sensible cooling effect of a unit is defined as the difference between the net total cooling effect and the dehumidifying effect expressed in BTU per hour. The net total cooling effect is the total useful capacity of the unit for removing heat from the space to be treated expressed in BTU per hour. The net dehumidifying effect is the difference between the moisture content in pounds per hour of the entering and leaving air, multiplied by 1,060 and expressed in BTU per hour.

5. MEASUREMENT OF COOLING CAPACITY (BTU)

The cooling capacity in BTU of the unit offered shall be determined by testing in accordance with Appendix F to Subpart B of 10 CFR Part 430. The cooling capacity of the unit as stated on the label affixed to the housing shall be consistent with the value determined by such test. Upon request, a certified copy of the test report shall be provided to the State.

B. DESIGN AND CONSTRUCTION

1. REFRIGERATING EQUIPMENT

The refrigeration equipment shall be designed, constructed, and assembled in accordance with ANSI standards and shall consist of cooling coil, condensing unit, interconnecting piping, and controls; and shall be designed for utilizing a refrigerant meeting the applicable standards.

The condensing unit shall consist of compressor unit with motor, condenser and other necessary equipment.

The condensing unit shall be provided with an air-cooled condenser with provisions for discharge of condenser air to the outside. The condensate from the cooling coil shall be disposed of by evaporation and diffusion sufficient to prevent its collection on any part of the building in which the unit is located and to prevent overflow of the condensate receptacle when the unit is operating under the following conditions:

Unit Ambient Air and Outside Air Entering Unit:

Dry-bulb temperature ---------- 80 °F.
Wet-bulb temperature ---------- 75 °F.

Portable air conditioning units shall have a condensate holding tank of sufficient size to contain, without emptying, all condensate collected during continuous operation at the above conditions for an 8-hour period. The tank shall be a minimum of five gallon capacity and shall be located and mounted for convenient emptying. Alternatively, the unit may include a means to pump the condensate over the condenser for evaporation and expulsion to the outside through the exhaust (hot) air vent hose.

The compressor unit shall be mounted within the cabinet with provisions for vibration isolation. The oiling of all moving compressor part shall be accomplished automatically, with provisions of returning oil from suction lines to housing or crankcase.

The air-cooled condenser shall be located within the air conditioning unit and shall be finned-tube construction using copper tubes with fins soldered or bonded to the condenser tubing. Fittings and joints shall be brazed, welded, or bonded by other acceptable means.

The evaporator cooling coil shall be of finned-tube construction and composed of copper tubes. Fins shall be of the extended type, or they shall be pinned or soldered to the tube, or they shall be firmly bonded to the tube by means of a collar integral with the fin. A suitable drip pan and drain for collecting the condensate shall be furnished. Provisions shall be made for disposal of the condensate as specified herein.

Tubing used for refrigerant piping shall conform to the requirements of ANSI standard B9.1, Safety Code for Mechanical Refrigeration.

2. ELECTRICAL EQUIPMENT

All motors and controls shall be in accordance with UL-484, Standard for Safety Room Air Conditioners. Motors and controls shall be furnished with voltage and frequency ratings as specified in the Invitation For Bids.

All wiring shall be located or otherwise protected to prevent damage from dripping oil or water. Air conditioning units shall be equipped with a National Electrical Code cord in accordance with UL-484.

All motors shall be wound for the specified voltage, and shall be of adequate capacity to start and operate the unit under the tests specified in Section VI. The starting mechanism shall be simple in design and rugged in construction. Magnetic-type motor starters shall be provided where necessary.

Motors shall be protected, in case of failure of the starting mechanism or excessive overload, by a thermal protective device of proper current rating. This device shall be reset automatically. Fuses are not acceptable in lieu of this thermal overload protective device.

Manual and automatic controls shall be furnished, mounted in the cabinet and externally operable. Each unit shall be factory-wired so that controls are easily accessible for service and to accomplish the following functions:

- Turning the air conditioner on and off
- Automatic control shall include a thermostat for controlling the conditioned air temperature
- Low cooling
- High cooling
- Fan only
- Air admittance or exhaust air (or both).

3. AIR CIRCULATING EQUIPMENT

The air circulating equipment in an air conditioning unit shall include a fan or blower with a motor, motor control, and an air cleaner or cleaners.

4. FILTERS

Air cleaning filters of the permanent type, washable and unshrinkable, shall be provided and arranged to filter all recirculated air before its entrance in any air conditioning coil or into a room. Filters shall be replaceable and generally available from sources besides the manufacturer of the air conditioning unit. The filter shall be of ample capacity and size to retain dust, pollen, and other impurities in the air, and shall have an effective face area capable of handling the recirculated and admitted air quantities through the cooling unit. The filter shall be free of obnoxious odors and

shall conform to the requirements of UL standards. Means shall be provided for screening outside air introduced for ventilation.

5. CABINET

a. Slide-Out Chassis Room Air Conditioners (Classes 1 through 16)
The cabinet shall include frame or chassis, enclosure, grilles, and insulation. The frame or chassis shall be rigid and of adequate strength to support and maintain alignment of the machinery and component parts.

The enclosure shall be of a design and style suitable for exposed installation in an office space. Provisions shall be made for removal of the chassis in order that all parts requiring servicing may be accessible, without removal of the exterior cabinet or breaking of window seal.

Inlet and outlet grilles finished to harmonize with the cabinet shall be installed in each unit. Outlet grilles shall be near the front or face of the unit so that air flow will not be reflected or obstructed when venetian blinds are used.

Cabinet or chassis shall be provided with internal insulation where necessary to prevent dripping, running off, or blowing off or moisture under operating conditions of 80 °F Dry-bulb and 75 °F Wet-bulb unit ambient-air and air-entering-unit temperatures. Insulation shall also be applied where necessary to minimize noise transmission.

Window mounted units shall be equipped with a suitable heavy metal saddle or other device to facilitate safe and easy installation of the unit on a window sill of either wood or masonry. The saddle or other device used for this purpose shall be rust-proofed to prevent staining the building or parts of it.

b. Portable Room Air Conditioners (Classes 17 through 32)
The cabinet shall include frame or chassis, enclosure, grilles, and insulation. The frame or chassis shall be rigid and of adequate strength to support and maintain alignment of the machinery and component parts.

The enclosure shall be of a design and style suitable for use indoors within an office or equipment housing space, except for ducting of exhaust cooling air to the outdoors.

Inlet and outlet grilles finished to harmonize with the cabinet shall be installed in each unit.

Cabinet or chassis shall be provided with internal insulation where necessary to prevent dripping, running off, or blowing off of moisture under operating conditions of 80 °F Dry-bulb and 75 °F Wet-bulb unit ambient-air and air-entering-unit temperatures. Insulation shall also be applied where necessary to minimize noise transmission.

Units shall be equipped with four wheels to enable movement of the unit over the floor, and to provide stability against tipping during use or movement.

All exhaust (cooling) air ducting and associated fittings required for routine installations shall be included. These components shall be designed and manufactured in accordance with best industry practices and shall meet all applicable state and local building codes.

6. FINISH

All parts of the equipment subject to corrosion shall be protected against corrosion with chemicals, electrolytic processes, plating, and/or suitable paints and enamels.

7. NAMEPLATE AND OTHER DATA

Nameplate data shall be in accordance with UL Standard 484, and shall include the following:

- Name or code of the manufacturer of the completely assembled air conditioner
- Type, model, or catalog number and serial number of completely assembled air conditioner
- The operating voltage, frequency, amperes, and watts
- Cooling capacity in BTU/hr
- Type of refrigerant used
- Factory test pressure for high and low pressure sides.

The following data shall be furnished with the units, but not necessarily on the nameplate:

- The AHAM or approved independent testing laboratory certification seal, permanently attached to unit
- Underwriters' Laboratories approval shall be indicated.

C. ENERGY EFFICIENCY

Room air conditioners in classes 1 through 10 shall be Energy Star certified through the joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. Written verification of compliance with this requirement is to be provided to the State or the using agency upon its request and in the manner specified, such as by copy of the certification.

All proposals meeting the requirements of this specification will be evaluated on the basis of Energy Efficient Cost.

The Energy Efficient Cost shall be the initial purchase price plus the operating costs over an anticipated life expectancy, which in this case will be five years to coincide with the standard compressor warranty.

The Energy Efficient Cost shall be determined as follows:

Energy Efficient Cost (EEC) formula:

EEC = P + (L x A.O.C.)

where P = Purchase Price
L = Useful Life in years (5 years at 1000 hrs. Operation/year)
A.O.C. = Annual Operating Cost based on the KWH consumption of the unit at $.083/KWH.

$$(L \times A.O.C) = \frac{\text{(watts, furnished by the mfr.)}}{1000} \times \$.083 \times (1000 \times 5 \text{ yrs})$$

On units with dual BTU ratings, the 230 Volt BTU rating will serve as a basis for the EEC formula. Vendors will be responsible for supplying purchase price and the wattage rating for the unit.

IV. WARRANTY

The contractor warrants to the owner that all air conditioners furnished under this specification will be new, of good material and workmanship, and shall be guaranteed against defects in materials, workmanship and performance in accordance with the manufacturer's standard warranty, except that in no event shall such coverage be for less than a minimum period of one (1) year on the complete unit and an additional four (4) years on the sealed-in refrigeration system. Warranty coverage shall begin on the date of delivery to the ordering agency. Warranty service shall be available on site at any location within the State of North Carolina, and defective units shall be repaired or replaced during the warranty period at no cost to the owner or his representative.

V. SERVICE, PARTS, AND MANUALS

The contractor shall furnish complete instructions and wiring diagrams for maintenance and operation, and a complete list of replacement parts or assemblies indicating manufacturer and manufacturer's part numbers.

VI. ACCEPTANCE INSPECTION AND TESTING

After bid results are tabulated and analyzed, the state reserves the right to require samples of selected units for inspection and evaluation.

The state reserves the right to require any unit placed on contract to be tested by the manufacturer at his plant to certify compliance with the performance specified. Any such tests shall be at no cost to the state.

Rating standards and tests procedures shall be according to the latest issue in effect of the applicable standard(s) listed in section II of this specification.

VII. DELIVERY AND PAYMENT

Delivery of and payment for air conditioning units under this specification shall be in accordance with the terms and conditions of the Invitation For Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

VIII. ORDERING DATA (for Purchase & Contract use only)

Purchasers should exercise any desired option offered herein and should specify the following in the requisition and Invitation For Bids:

A. Title, number, and date of this specification
B. Class (type and size) of unit(s) desired: 1, 2, 3, … 32
C. Electrical characteristics
D. If installation kits are desired, particularly for classes 13, 14, 15, and 16

*****************END OF SPECIFICATION*****************