

650-07-115

HVAC 5B and CHAPEL

ADDENDUM 2

SPECIFICATIONS

1. Modify Specification Section 01 33 00 by replacing the Submittal Register at the end of the Section with the Submittal Register marked "Addendum 2".
2. Modify Specification Section 02 82 16 Engineering Control of Asbestos Containing Materials by inserting the following text after Phase 4 text in subsection 1.3.1 Description of Work

"Phase 5 – Chapel and Related Areas - Rooms 347 Chapel, 347 Conference Room, 348A and the room directly between 347 and 348B (accessed from Room 348A). Phase 5 includes the removal of ceiling tile (2x2 pinhole white ceiling tile with gold lines 'disco tile'). Asbestos removal shall be performed under full containment negative pressure enclosure (NPE) conditions with a pressure differential, HEPA filtered ventilation and contiguous decontamination system in accordance with RIDOH R23-24.5 Part B.8, OSHA Class II and USEPA NESHAP requirements. Phase 5 reoccupancy air clearance testing shall utilize PCM analysis in accordance with RIDOH R23-24.5 Part B.8.2(p) and C.1.3(a)."
3. Delete Specification Section 23 82 23 Unit Ventilators in its entirety, and replace it with Specification Section 23 81 00.00 20, Unitary Air Conditioning Equipment.

DRAWINGS

1. Delete Drawing S-101.
2. Add Drawing A-102.
3. Replace the following drawings with the like numbered drawing bearing the revision "Addendum 2":
 - G-001
 - G-002
 - A-100
 - A-101
 - A-201
 - A-501
 - M-101
 - M-103
 - M-501
 - M-503
 - M-601
 - P-102
 - E-401
4. Revise Drawing G-004 as follows:
 - a. At notes under "During Construction Hours", delete 5th note referring to sprinkler heads, and replace it with the following – "Arrange with project manager for sprinkler

and/or smoke detectors to be shut down each day due to the likelihood construction operations will cause false alarms. Notice to shut down either or both systems requires 48 hours advance notice. Under no circumstances shall smoke detectors be covered."

- b. At notes under "During Construction Hours", add the following as the 10th note - "All cutting and welding operations shall be in accordance with NFPA 51b and shall require a hot work permit issued by PVAMC FMS and the FMS Construction Manager on a daily or weekly basis. Requests for hot work permits shall be made with 48 hours advance notice."
 - c. On the plan view titled "Life Safety Plan—Chapel 3C" the limits of work are revised to match those shown on Drawing G-002.
5. Revise Drawing MD-102 "Roof Demolition Notes" as follows:
 - a. Add to Note #1 "Existing raised equipment curbs shall be field dimensioned to verify engagement with new exhaust fan support points. If they engage, replace rusted galvanized cap flashing with new galvanized cap flashing, otherwise remove existing curbs and install new curbs with vertical flashing and new galvanized cap flashing."
 - b. Note # 2 – Change second sentence to read "Equipment curb supports shall be removed to make way for new MUA unit perimeter curb."
 - c. Add to Note #3 "Remove existing equipment curb to make way for new MUA unit raised perimeter curb."
6. Revise Drawing M-102 as follows:
 - a. Detail 1, Ward 5B Mechanical Room – Change "1" HWS&R" to "1"CWS&R".
 - b. Under 5th Floor Keyed Notes – Note #1 – It appears that running the 3"CHWS&R and the 2" HWS&R in the location shown is very unlikely due to congestion. An alternate route is likely through Rm 687 at the wall with Rm 686 where an additional chase wall to enclose the pipes in the outside corner of Rm 687 will have to be built.
7. Revise Drawing M-103 as follows:
 - a. Under 6th Floor Key Notes- Note #2- – It appears that running the 3" CHWS&R and the 2" HWS&R in the location shown is very unlikely due to congestion. An alternate route is likely through Rm 687 at the wall with Rm 686 where an additional chase wall to enclose the pipes in the outside corner of Rm 687 will have to be built. This change would result in a 180° rotation of the chiller so the 3" CHWS&R exit the roof on the side of the chiller where they would be connected.

SECTION TABLE OF CONTENTS

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 81 00.00 20

UNITARY AIR CONDITIONING EQUIPMENT

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 RELATED REQUIREMENTS
- 1.3 SUBMITTALS
- 1.4 QUALITY ASSURANCE
 - 1.4.1 Modification of References
 - 1.4.2 Detail Drawing
 - 1.4.3 Safety
 - 1.4.4 Posted Operating Instructions
 - 1.4.5 Sizing
- 1.5 REFRIGERANTS
- 1.6 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

- 2.1 SELF CONTAINED ROOM AIR CONDITIONERS
 - 2.1.1 Controls

PART 3 EXECUTION

- 3.1 EQUIPMENT INSTALLATION
 - 3.1.1 Incremental Room Air Conditioners
- 3.2 ACCESS PANELS
- 3.3 AIR FILTERS
- 3.4 IDENTIFICATION TAGS AND PLATES
- 3.5 FIELD QUALITY CONTROL
 - 3.5.1 Leak Testing
 - 3.5.2 Evacuation, Dehydration, and Charging
 - 3.5.3 Start-Up and Initial Operational Tests
- 3.6 WASTE MANAGEMENT

-- End of Section Table of Contents --

SECTION 23 81 00.00 20

UNITARY AIR CONDITIONING EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ANSI/ASHRAE 15 & 34 (2007; Std 15 Errata 2007, 2009, & Addenda a-i; Std 34 Errata 2007, 2008, Addenda a-v, x-ae) ANSI/ASHRAE Standard 15-Safety Standard for Refrigeration Systems and ANSI/ASHRAE Standard 34-Designation and Safety Classification of Refrigerants

ASHRAE 52.2 (2007; Addenda b 2008; Errata 2009) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ASHRAE 55 (2004; Addenda a, b 2008; Addenda d, e, f, g 2009; Errata 2010) Thermal Environmental Conditions for Human Occupancy

ASHRAE 62.1 (2007; Errata 2007; Errata 2008; Addenda a, b, e, f, h 2008; Errata 2009; Errata 2010) Ventilation for Acceptable Indoor Air Quality

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Star (1992; R 2006) Energy Star Energy Efficiency Labeling System

1.2 RELATED REQUIREMENTS

Section 23 03 00.00 20 BASIC MECHANICAL MATERIALS AND METHODS, applies to this section with the additions and modifications specified herein.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Control System wiring diagrams; G, AE

Control system wiring diagrams in accordance with paragraph entitled "General Requirements" of this section.

SD-03 Product Data

Room Air Conditioners; G, AE

Room air conditioners in accordance with paragraph entitled "General Requirements" of this section. Submit documentation for **Energy Star** qualifications or meeting FEMP requirements. Indicate Energy Efficiency Rating.

Thermostats; G, AE

Thermostats in accordance with paragraph entitled "General Requirements" of this section. For packaged terminal units, include indoor noise rating.

SD-06 Test Reports

Salt-Spray Tests

Start-up and Initial Operational Tests

SD-08 Manufacturer's Instructions

Room Air Conditioners

Filters

Thermostats

Refrigerant Piping and Accessories

SD-10 Operation and Maintenance Data

Room Air Conditioners

Submit Data Package 3 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

Filters

Submit Data Package 2 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

Thermostats

Submit Data Package 2 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

SD-11 Closeout Submittals

Posted Operating Instructions

1.4 QUALITY ASSURANCE

1.4.1 Modification of References

Accomplish work in accordance with the referenced publications, except as modified by this section. Consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear. Interpret reference to "the Authority having jurisdiction," "the Administrative Authority," "the Owner," or "the Design Engineer" to mean the Contracting Officer.

1.4.2 Detail Drawing

Submit control system wiring diagrams.

1.4.3 Safety

Design, manufacture, and installation of unitary air conditioning equipment shall conform to ANSI/ASHRAE 15 & 34.

1.4.4 Posted Operating Instructions

Submit posted operating instructions for each room air conditioning unit.

1.4.5 Sizing

Size equipment based on Design Manual CS from the Air Conditioning Contractors of America; do not oversize.

1.5 REFRIGERANTS

Refrigerants shall have an Ozone Depletion Factor (ODF) of 0.05 or less. The ODF shall be in accordance with the "Montreal Protocol On Substances That Deplete The Ozone Layer," September 1987, sponsored by the United Nations Environment Programme. CFCs, HCFCs, and Halons shall not be permitted. Refrigerant shall be an approved alternative refrigerant per EPA's Significant New Alternative Policy (SNAP) listing.

1.6 ENVIRONMENTAL REQUIREMENTS

For proper Indoor Environmental Quality, maintain positive pressure within the building. Ventilation shall meet or exceed ASHRAE 62.1 and all published addenda. Meet or exceed filter media efficiency as tested in accordance with ASHRAE 52.2. Thermal comfort shall meet or exceed ASHRAE 55.

PART 2 PRODUCTS

2.1 SELF CONTAINED ROOM AIR CONDITIONERS

Furnish packaged incremental comfort conditioners of the sizes and capacities shown on the schedule. The units shall be located as shown on the drawings and each shall include a wall box, room cabinet, separate cooling chassis, heating section, separate control box, and outdoor louver. All units shall be ETL listed for safety. Units shall be tested and rated in accordance with ARI Standards 310 and 380. The minimum energy efficiency ratio (EER) in Btu per hour per watt for each packaged incremental comfort conditioner must be 8.0 for all sizes.

Cooling chassis shall be slide-in, plug-in with a self-contained, hermetically sealed refrigerant circuit. All chassis sheet metal parts shall be constructed of heavy-gauge steel. The chassis shall be insulated with a waterproof material to prevent sweating and reduce sound levels. The cooling chassis shall consist of the following components: Vibration isolated, permanent split capacitor, rotary-type compressor with built in thermal overload; rifled copper tube evaporator (indoor) and condenser (outdoor) coils with high efficiency raised lance aluminum plate fins mechanically expanded to the tubes for maximum heat transfer and a capillary restrictor type refrigerant metering device supplemented with a constant pressure automatic expansion valve. Coils shall be factory tested at 600 psig. Condenser airflow system shall consist of a separate, single speed PSC motor with an aluminum blade centrifugal fan. The motor shall be totally enclosed and permanently lubricated with external oilers for prolonged life. The fan shall be forward curved and statically and dynamically balanced to provide for quiet and smooth operation. The cooling chassis shall also be furnished with a positive closing, automatic, motorized outdoor air damper that opens whenever the indoor fan is energized, except during night setback operation. A toggle switch shall be provided for manual override of the damper. During the cooling cycle, the compressor and both the outdoor/condenser and indoor/evaporator fan motors shall be energized. Condensation accumulated in the indoor/evaporator drain pan shall be drained into the outdoor section of the unit where it is to be completely removed by evaporation. Evaporation shall be accomplished by uniformly distributing the condensate over the condenser coil via airflow generated by the outdoor/condenser fan. Condensate shall not come in contact with fan or fan motor. Slinger rings and propeller fans are not an acceptable solution for condensate removal.

The heat section shall be separate from the cooling chassis and shall incorporate an indoor/evaporator fan assembly. This assembly shall consist of two centrifugal fans that are forward curved and constructed out of aluminum with steel hubs and directly connected to a two-speed motor. Fans shall be statically and dynamically balanced to provide for quiet and smooth operation. The indoor/evaporator fan motor shall be two speed, permanent split capacitor, totally enclosed and permanently lubricated with external oilers for prolonged life. Built-in overload protection shall come standard with the motor. The heating coil shall be suitable for hot water and have a factory furnished 2-way control valve. During the heating cycle only the indoor/evaporator fan motor, the control valve and automatic fresh air damper shall be energized. The outdoor/condenser fan motor and compressor shall not be energized. The heating coil shall have copper tubes with aluminum fins mechanically bonded for maximum heat transfer. Return piping shall be 5 /8 " O.D. plain copper tube.

The room cabinet shall be made of heavy-gauge steel and coated with oven baked polyurethane powder paint for maximum protection. To accommodate various wall opening locations and floor irregularities, an adjustable kickplate shall be furnished with a standard adjustment of +/- 1". A removable front panel shall be supplied for service access of the filter, electrical connections, cooling chassis and heat section. Hidden latches shall be provided to prevent unauthorized personnel from removing the front panel. Indoor air discharge grilles shall be equipped with four-way positional stamped steel covered with an oven baked epoxy powder paint for maximum protection.

Filtration shall be accomplished using a permanent, cleanable aluminum wire mesh filter.

The wall box shall be constructed from 16-gauge steel and welded for strength and durability. Once assembled, the wall box shall be coated with an oven baked epoxy powder paint to assure maximum corrosion protection.

Outside air louvers shall be stamped anodized aluminum as shown on plans. Louver shall be finished natural. Stamped louvers shall be heavy gauge anodized aluminum of no less than 16 gauge. Special field fabricated louvers must be approved.

2.1.1 Controls

The control box shall be a separate component with plug-in connections to the heating section and cooling chassis. When placed in "Cycle" mode, the indoor/evaporator fans shall be automatically controlled by the thermostat when the HEAT, COOL, or FAN modes are selected. When placed in "Constant" mode, the fan shall run continuously except when the "STOP" button is depressed. Unit sizes above 12,000 Btuh shall always be furnished with constant fan operation only. The control overlay must be designed for the visually-impaired by containing large, raised function indicators and color-coded selector buttons placed on a white polycarbonate membrane. Raised function indicators must conform to standards set by the National Federation of the Blind and comply with the federally mandated American Disabilities Act (ADA).

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION

Install equipment and components in a manner to ensure proper and sequential operation of equipment and equipment controls. Install equipment not covered in this section, or in manufacturer's instructions, as recommended by manufacturer's representative. Provide proper foundations for mounting of equipment, accessories, appurtenances, piping and controls including, but not limited to, supports, vibration isolators, stands, guides, anchors, clamps and brackets. Foundations for equipment shall conform to equipment manufacturer's recommendation, unless otherwise indicated. Set anchor bolts and sleeves using templates. Provide anchor bolts of adequate length, and provide with welded-on plates on the head end embedded in the concrete. Level equipment bases, using jacks or steel wedges, and neatly grout-in with a nonshrinking type of grouting mortar. Locate equipment to allow working space for servicing including shaft removal, disassembling compressor cylinders and pistons, replacing or adjusting drives, motors, or shaft seals, access to water heads and valves of shell and tube equipment, tube cleaning or replacement, access to automatic controls, refrigerant charging, lubrication, oil draining and working clearance under overhead lines. Provide electric isolation between dissimilar metals for the purpose of minimizing galvanic corrosion.

3.1.1 Incremental Room Air Conditioners

Wall sleeve installation shall provide a positive weathertight and airtight seal. Install in accordance with manufacturer's installation and operational instructions. Provide structural mountings, closures, and seals for weathertight assembly. Pitch unit as recommended by manufacturer to ensure condensate drain.

3.2 ACCESS PANELS

Provide access panels for concealed valves, controls, dampers, and other

fittings requiring inspection and maintenance.

3.3 AIR FILTERS

Allow access space for servicing filters. Install filters with suitable sealing to prevent bypassing of air.

3.4 IDENTIFICATION TAGS AND PLATES

Provide equipment, gages, thermometers, valves, and controllers with tags numbered and stamped for their use. Provide plates and tags of brass or suitable nonferrous material, securely mounted or attached. Provide minimum letter and numeral size of 1/8 inch high.

3.5 FIELD QUALITY CONTROL

3.5.1 Leak Testing

Upon completion of installation of incremental room air conditioning equipment, test factory- and field-installed refrigerant piping with an electronic-type leak detector. Use same type of refrigerant to be provided in the system for leak testing. When nitrogen is used to boost system pressure for testing, ensure that it is eliminated from the system before charging. Minimum refrigerant leak field test pressure shall be as specified in ANSI/ASHRAE 15 & 34, except that test pressure shall not exceed 150 psig on hermetic compressors unless otherwise specified as a low side test pressure on the equipment nameplate. If leaks are detected at time of installation or during warranty period, remove the entire refrigerant charge from the system, correct leaks, and retest system.

3.5.2 Evacuation, Dehydration, and Charging

After field charged refrigerant system is found to be without leaks or after leaks have been repaired on field-charged and factory-charged systems, evacuate the system using a reliable gage and a vacuum pump capable of pulling a vacuum of at least one mm Hg absolute. Evacuate system in accordance with the triple-evacuation and blotter method or in accordance with equipment manufacturer's printed instructions and recharge system.

3.5.3 Start-Up and Initial Operational Tests

Test the air conditioning systems and systems components for proper operation. Adjust safety and automatic control instruments as necessary to ensure proper operation and sequence. Conduct operational tests for not less than 8 hours.

3.6 WASTE MANAGEMENT

Separate waste in accordance with the Waste Management Plan, placing copper materials in designated areas for reuse. Close and seal tightly all partly used adhesives and solvents; store protected in a well-ventilated, fire-safe area at moderate temperature.

-- End of Section --