

SECTION 11 53 23
LABORATORY REFRIGERATORS

SPEC WRITER NOTE: Delete between // // if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs. VA Standard equipment schedules and installation details may be shown on architectural (Kitchen Consultant) drawings or on H (HVAC) drawings.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Refrigerators for Laboratories. Refer to architectural drawings for dimensions and arrangement of units.
- B. Refer to the // H drawings // architectural drawings // for refrigeration equipment schedules and installation details.
- C. Refer to Section 23 23 00, REFRIGERANT PIPING, for piping and insulation.
- D. Refer to electrical drawings for lighting.

1.2 RELATED WORK

- A. Section 09 30 13, CERAMIC TILING: Quarry tile floor.
- B. Section 13 21 29, CONSTANT TEMPERATURE ROOMS.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- D. Section 23 23 00, REFRIGERANT PIPING.
- E. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

1.3 QUALITY ASSURANCE

- A. Safety Standard: ASHRAE 15 describes requirements for refrigerant containing parts.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Condensing units, with mounting rack where required.
 - 2. Unit coolers.
 - 3. Temperature controls and alarms.
 - 4. Diagrams and details of piping, wiring and controls.
- C. Operating Test Data.

satisfactorily at winter ambient temperatures down to //____//
degrees C (F), and be provided with crankcase and receiver heaters.

SPEC WRITER NOTE: Insert temperature of 6
degrees C (10 degrees) below the 99%
column in ASHRAE Handbook weather data.

2. The condenser fans shall be driven by permanent split capacitor
motors.

2.2 UNIT COOLERS

- A. Comply with ARI Standard 420. Units shall be UL listed,
forced-ventilation type integral defrosting, internal or external
refrigerant distributor, single or multiple fans and motors, drip-pan,
deflectors, aluminum or baked-enamel steel housing, hangers, and all
accessories.
- B. Motors: Permanent split capacitor type in accordance with Section 11 05
12, General Motor Requirements for Equipment. Provide motors with
thermal overload protection. Provide manual starting switch.
- C. Drain Pans: Galvanized sheet steel. Provide additional drain pans under
uncovered refrigerant connections, and interconnect them with main
drain pan. For freezer units provide electrically heated drain pan.
- D. Defrost Provision:
 - 1. Refrigerators: Defrost shall occur during compressor off cycle with
evaporator fan running continuously.

2.3 PIPING, PIPE INSULATION, AND REFRIGERANT AND OIL CHARGES

- A. Refer to Section 23 23 00, REFRIGERANT PIPING

2.4 EQUIPMENT IDENTIFICATION REQUIREMENTS

- A. Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM
GENERATION.
- B. Identify all refrigeration equipment and alarm devices.

SPEC WRITER NOTE: Where both, a freezer
and a refrigerator is required, then the
preferred configuration is as specified.
The designer may modify to have separate
entry to refrigerator and freezer, if so
required by the user.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install refrigeration equipment as described in the respective
manufacturer's instructions. Make panel joints tight and seal all panel
penetrations to prevent condensation or frosting.

1. Unit cooler: NSF approval requires that the unit be suspended at 90 mm (3-1/2 inches) minimum distance below the ceiling to allow cleaning the top of the unit cooler.
 2. To the extent feasible, mount pipe, conduit, and instrumentation on the exterior and pass thru neatly drilled penetrations to the lights or other devices.
- B. Piping, Pipe Insulation and Refrigerant: Provide in accordance with Section 23 23 00, REFRIGERANT PIPING.
- C. Controls Installation: As specified in Section 23 09 23, Direct-Digital Controls Systems for HVAC.

3.2 REFRIGERATOR START-UP, AND PERFORMANCE TESTS AND INSTRUCTIONS

- A. Start-up Temperature Reduction: On start-up, reset the room thermostats daily for a maximum temperature drop of 8 degrees, on C scale (15 degrees on F scale per day down to 2 degrees C (36 degrees F), and a maximum of 6 degrees on C scale, (10 degrees on F scale) per day between 2 degrees C (36 degrees F) and final operating temperature.
- B. Perform test in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Operate each system and record conditions hourly for eight hours. Submit the following information:
1. Station, Building and System Identification, Contractor, Date and Time.
 2. Compressor nameplate data: Make, model, horsepower, RPM, refrigerant and charge in pounds.
 3. Compressor operation: Approximate percentage running time, pressure gage readings, actual amps (starting and running), condenser water temperature in and out, or condenser entering air temperature.
 4. Room temperatures.
 5. Defrost and drain functions of unit coolers. Demonstrate alarm functions.
- C. By arrangement with the Resident Engineer, 24 hours in advance, use the start-up and test period for required operation and maintenance instructions to VA personnel in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

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