

SECTION 232313 - REFRIGERANT PIPING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Pipe, fittings and connections.

1.2 RELATED WORK

- A. Section 232313 - Refrigerant Piping Specialties
- B. Section 230529 - Hangers and Supports for HVAC Piping and Equipment
- C. Section 230548 - Vibration and Seismic controls for HVAC Piping and Equipment

1.3 REFERENCES

- A. ANSI/ASME B16.3 - Malleable-Iron Threaded Fittings.
- B. ANSI/ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- C. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- D. ANSI/ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
- E. ANSI/ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

PART 2 PRODUCTS

2.1 PIPE AND TUBE

- A. Copper Water Tube (Refrigeration Service): ASTM B280, type, ACR or OXY grade, hard temper as scheduled; seamless

2.2 PIPE AND TUBE JOINTS AND FITTINGS

- A. Copper Pipe Fittings: ANSI/ASME B16.22 or B16.18, pressure fittings.

2.3 UNIONS AND COUPLINGS

- A. Pipe Size 2-1/2 Inches and Under: 150 psi malleable iron for threaded ferrous piping; bronze, ground joint for copper or brass pipe, soldered ends.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe, or groove where allowed.

- B. Remove scale and dirt, inside and outside, before assembly.
- C. Cut all pipes accurately to measurements established at structure. Work into place without springing or forcing, properly clearing all windows, doors or other openings. Cut pipe and nipples evenly; cut threads clean, remove burrs, ream ends to full inside bore. Install to permit free expansion and contraction without causing misalignment of piping or any damage to either building or piping. Make all changes of direction with fittings except as otherwise noted. Make pipe connections to equipment in accordance with indicated sizes and details or as directed. Cap or plug all equipment and pipe line openings during installation to exclude dirt and foreign material.
- D. Provide unions at each piece of equipment, in bypasses around equipment and in long runs or piping to permit convenient disassembly for alteration or repairs. Unions must be accessible after building is completed. Mechanical pipe couplings may be used as unions where mechanical pipe couplings are allowed elsewhere in this specification.

3.2 COPPER PIPE CONNECTIONS

- A. Form joints in refrigeration piping with non-flux type 15% silver brazing alloy. Trickle dry nitrogen through pipe during brazing process to prevent a buildup of oxidation products.

3.3 TESTS

- A. Test all piping and prove tight. Notify Architect when tests will take place and submit test results prior to covering or enclosing any piping. Before enclosing, test piping which will be concealed. Replace and re-test to Architect's satisfaction any pipe or fittings broken or damaged under test. Caulking or peening joints will not be permitted.
- B. Before testing piping systems, remove, or otherwise protect from damage, control devices, air vents, thermostatic traps and elements, other parts which are not designed to stand pressures use in testing piping.
- C. Test as follows:
 - 1. Refrigeration – discharge 450 psig dry nitrogen
 - 2. Refrigeration – suction 250 psig dry nitrogen
- D. Hold indicated pressures constant without pumping for such period of time as directed by Architect. While under pressure, visually inspect each joint, weld or other connection to determine leakage.
- E. Refrigeration Piping:
 - 1. Upon completion of installation of the air conditioning equipment, test all factory as well as field refrigerant piping with an electronic type leak detector to acquire a leak-tight refrigerant system. If leaks are detected at the time of installation or during the guarantee period, remove the entire refrigerant charge from the system, correct the leaks and retest the system.
 - 2. After system is found to be without leaks, evacuate the system using a reliable gauge and a vacuum pump capable of pulling a vacuum of at least 1 mm Hg absolute. Evacuate system in strict accordance with the triple-evacuation and blotter method or in strict accordance with equipment manufacturer's printed instructions. Hold vacuum for twenty four hours. System leak testing, evacuation, dehydration, and charging with refrigerant shall comply with ARI standard 260.

3.4 SCHEDULE OF PIPE AND FITTINGS

A. REFRIGERATION PIPING:

1. Pipe: Type K copper, type OXY, hard temper cleaned with ends capped prior to shipment
2. Fittings: Socket type wrought copper
3. Joints: 15% Non-flux silver-brazing alloy

END OF SECTION 232313