

SECTION 15535
REFRIGERATION PIPING AND SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Filter-dryers.
- F. Brazing Materials.

1.2 REFERENCES

- A. ANSI/ARI 710 - Liquid Line Dryers.
- B. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
- C. ANSI/ASHRAE 34 - Number Designation of Refrigerants.
- D. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- E. ANSI/ASME B16.26 - Cast Copper Alloy Fittings For Flared Copper Tubes.
- F. ANSI/ASME B31.5 - Refrigeration Piping.
- G. ANSI/ASME B31.9 - Building Services Piping.
- H. ANSI/ASTM B32 - Solder Metal.
- I. ANSI/AWS A5.8 - Brazing Filler Metal.
- J. ANSI/AWS D1.1 - Structural Welding Code, Steel.
- K. ANSI/UL 429 - Electrically Operated Valves.
- L. ARI 760 - Solenoid Valves for Use With Volatile Refrigerants.
- M. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- N. MIL-V-23450C - Valves, Expansion, Thermostatic.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division One.
- B. Submit shop drawings indicating schematic layout of system, including equipment, critical dimensions, and sizes.
- C. Submit product data under provisions of Division One.
- D. Submit product data indicating general assembly of specialties, including manufacturers catalogue information.
- E. Submit manufacturer's installation instructions under provisions of Division One.
- F. Submit design data as a submittal under provisions of Division One.
- G. Submit data indicating pipe sizing.
- H. Submit test reports under provisions of Division One.
- I. Submit Test reports indicating results of leak test, acid test.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Division One.
- B. Accurately record exact locations of equipment and refrigeration accessories on record drawings.

1.5 REGULATORY REQUIREMENTS

- A. Conform to ANSI/ASME B31.9.

1.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Deliver and store piping and specialties in shipping containers with labeling in place.
- C. Store and protect products under provisions of Division One.
- D. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

PART 2 PRODUCTS

2.1 PIPING

- A. Copper Tubing: ASTM B280, type ACR hard drawn copper for exposed/accessible lines. Type ACR soft drawn (annealed) for inaccessible piping and for piping below slabs, and grade installed without joints.
 - 1. Fittings: ANSI/ASME B16.22 wrought copper.
 - 2. Joints: ANSI/AWS A5.8 B Cup silver braze.
- B. Brazing Compound: Minimum of 15% silver with melting point greater than 1000°F.

2.2 REFRIGERANT

- A. Refrigerant: R-410A.

2.3 MOISTURE AND LIQUID INDICATORS

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator and plastic cap; for maximum working pressure of 500 psi and maximum temperature of 200°F.

2.4 VALVES

- A. Packed Angle Valves: Forged brass or nickel plated forged steel, forged brass seal caps with copper gasket, rising stem and seat with back seating, molded stem packing, solder or flared ends; for maximum working pressure of 500 psi and maximum temperature of 275°F.
- B. Packed Ball Valves: Two piece forged brass Body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals; for maximum working pressure of 500 psi and maximum temperature of 300°F.

2.5 FILTER-DRIERS

- A. Replaceable Cartridge Angle Type: ANSI/ARI 710, UL listed, brass shell and bronze cap, perforated brass shell and molded desiccant filter core; for maximum working pressure of 350 psi.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends removing burrs.
- B. Remove scale and dirt on inside and outside before assembly.

3.2 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations and locations slope piping one percent in direction of oil return.
- E. Provide non-conducting dielectric connections when joining dissimilar metals.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Nitrogen purge lines during brazing.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access to concealed valves and fittings.
- I. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.
- J. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Section 09900.
- K. Insulate piping; refer to Section 15260.
- L. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.
- M. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.
- N. Fully charge completed system with refrigerant after evacuation and testing. Take precautions so as not to discharge refrigerant into atmosphere.

3.3 APPLICATION

- A. Provide line size liquid indicators in main liquid line leaving condenser. Install moisture indicator so it can be viewed from service area.
- B. Provide replaceable cartridge filter-dryers, with three-valve bypass assembly, one for each refrigeration circuit.
- C. Provide refrigerant charging valve connections in liquid line between receiver shut-off valve and expansion valve.

3.4 FIELD QUALITY CONTROL

- A. Field-testing will be performed under provisions of Division One.
- B. Test refrigeration system in accordance with ANSI/ASME B31.5.
- C. Pressure test system with small amount of refrigerant and dry nitrogen 200-psi. Using halide torch or electronic leak detector check for leaks. Perform final test at 30" vacuum for a 24-hour period with no deviation. Provide notification a minimum of 48 hours prior to test and submit written report to A/E verifying test results.

END OF SECTION