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.
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.
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.
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