SPECIAL SPECIFICATION

SECTION 15210S

PROCESS AIR AND GAS PIPING

PART 1 - GENERAL

1.01 **This work is related to the process air and gas piping systems located in all buildings except the MicroFab.**

1.02 RELATED SECTIONS

A. Section 02316S – Trenching, Excavation and, Back fill.

B. Section 13085**S** – Seismic Protection

C. Section 15060S - Hangers and Supports.

D. Section 15075S - Mechanical Identification.

E. Section 15950S - Testing, Adjusting and Balancing.

1.03 REFERENCES

A. ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.

B. AWS D1.1 - Structural Welding Code.

C. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.

D. ASTM A 53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.

E. ASTM A 234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

1.04 SUBMITTALS

A. Include data on pipe materials, pipe fittings, valves and accessories.

1.05 QUALITY ASSURANCE

A. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.

B. Welders Certification: In accordance with ASME Section 9.

PART 2 - PRODUCTS

2.01 NATURAL GAS PIPING

A. Below Grade Within 5 Feet of Building:

1. Pipe: Black Steel ASTM A 53, Schedule 40. Cover pipe and fittings with AWWA C105 polyethylene jacket or double layer, half-lapped 10 mil polyethylene tape.

2. Fittings: ASTM A 234, forged steel welding type.

3. Joints: Welded.

B. Above Grade:

1. Pipe: Black Steel ASTM A 53, Schedule 40.

2. Fittings: ASME B16.3, malleable iron, or ASTM A 234, forged steel welding type.

3. Joints: Screwed for pipe 2 inches and under; AWS D1.1, welded, for pipe over 2 inches.

C. Flanges, Unions, and Couplings:

1. Pipe Size 2 Inches and Smaller: 150 pounds per square inch-gage malleable iron unions.

2. Pipe Size Over 2 Inches: 150 pounds per square inch-gage forged steel slip-on flanges.

3. Dielectric Connections: Union with galvanized or plated steel threaded end, water impervious isolation barrier.

4. Flange Gaskets: Non-asbestos compressed material gasket in accordance with ANSI B-16.21; 1/16-inch thick, full face or self centering flat ring type. Provide gaskets containing aramid fibers bonded with styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR) suitable for a maximum 600 degrees F service. Provide NBR for hydrocarbon service. Gaskets must be compatible with flowing product and temperature and pressure of the system.

D. Gas Cocks and Plug Valves:

1. 2 Inches and Smaller: Bronze body, bronze tapered plug, non-lubricated, teflon packing, threaded ends.

2. Over 2 Inches: Cast iron body and plug, non-lubricated, teflon packing, flanged ends, 200 pound WOG wrench operated.

E. Gas Pressure Regulator: Adjustable 5 pounds per square inch-gage to 11 inches water reduction, spring-loaded diaphragm pressure regulation, pressure operating range as required for the pressure reduction indicated, volume capacity not less than indicated (Rockwell, Fisher), and threaded ends for sizes 2 inches and smaller, otherwise flanged.

2.02 COMPRESSED AIR (CA) AND COMPRESSED DRY AIR (CDA)PIPING

A. Pipe:

1. Provide compressed air and CDA piping as specified for natural gas piping and suitable for 125 pounds per square inch-gage working pressure. Mark compressed air piping supply line and discharge terminals legibly and permanently at both ends with the name of the system and the direction of flow. Plastic pipe is unacceptable for compressed air piping. Provide oil free piping for all instrument and process air downstream of the desiccant dryer.

2. Where compressed air or CDA piping is buried in ground, wrap piping similar to wrapping for natural gas piping.

B. Pipe:

1. Pipe: Black Steel ASTM A 53, Schedule 40.

2. Fittings: ASME B16.3, malleable iron, or ASTM A 234, forged steel welding type.

3. Joints: Screwed for pipe 2 inches and under; AWS D1.1, welded, for pipe over 2 inches.

C. C. Pressure Regulators:

1. Provide the air system with the necessary regulator valves to maintain the desired pressure for the installed equipment. Design regulators for a maximum inlet pressure of 125 pounds per square inch and a maximum temperature of 200 degrees F.

2. Provide single-seated, pilot operated type regulators with valve plug, bronze body and trim and threaded connections. Size regulators as indicated.

3. Include a pressure gage, and provide with an adjustment screw for adjusting the pressure differential from 0 to 125 pounds per square inch-gage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Remove scale and dirt, on inside and outside, before assembly.

B. Prepare piping connections to equipment with flanges or unions.

C. Route piping in orderly manner.

D. Install piping to conserve building space and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance for installation of access to valves and fittings.

H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors.

3.02 NATURAL GAS INSTALLATION

A. Connect to existing gas service complete with regulators. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

B. Install unions downstream of valves and at equipment or apparatus connections.

3.03 COMPRESSED AIR AND CDA INSTALLATION

A. Route piping in order to maintain gradient.

B. Provide take off from top of main lines for all compressed air taps for drops to equipment connections.

C. Remove coating from carbon steel fittings on compressed air piping system.

D. Provide a minimum of 9-inch dirt legs on all compressed air drops unless otherwise indicated.

END OF SECTION