

SPECIAL SPECIFICATION

SECTION 15120S

PIPING SPECIALTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Positive displacement meters, heat consumption meters, pressure Gauges and pressure Gauge taps, thermometers and thermometer wells, static pressure Gauges, filter Gauges. Section also includes, expansion tanks, air vents, air separators, strainers, pump suction fittings, combination fittings, flow indicators, controls, meters. Section also includes glycol specialties.

1.02 RELATED SECTIONS

- A. Section 15051S – **Piping Systems**

1.03 REFERENCES

- A. ASME - Boiler and Pressure Vessel Codes, SEC VIII-D - Rules for Construction of Pressure Vessels.
- B. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
- C. ASTM A 105 - Forgings, Carbon Steel, for Piping Components.
- D. ASTM A 126 - Grey Iron Castings for Valves, Flanges, and Pipe Fittings.
- E. ASTM A 216 - Steel Casings, Carbon, Suitable for Fusion Welding, for High Temperature Service.
- F. ASTM A 395 - Ferric Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- G. ASTM E 1 - Standard Specification for ASTM Thermometers.
- H. ASTM E 77 - Standard Test Method for Inspection and Verification of Thermometers.
- I. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.

- J. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
- K. AWWA C702 - Cold-Water Meters - Compound Type.
- L. AWWA C706 - Direct-Reading Remote-Registration Systems for Cold-Water Meters.
- M. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
- N. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.
- O. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.04 SUBMITTALS

- A. Product Data: Submit for manufactured products and assemblies required for this Project.
 - 1. Manufacturer's data and list indicating use, operating range, total range, accuracy, and location for manufactured components.
 - 2. Submit product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.
 - 3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each specialty.
 - 4. Submit electrical characteristics and connection requirements.
- B. Samples: Submit two pressure Gauges and thermometers.
- C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures, application, selection, and hookup configuration. Include pipe and accessory elevations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Project Record Documents: Record actual locations of actual locations of components and instrumentation, [flow controls] [flow meters]. Submit inspection certificates for pressure vessels [from Authority having jurisdiction].
- F. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum three years [documented] experience [, and with service facilities within 100 miles of Project].
- B. Installer Qualifications: Company specializing in performing Work of this Section with minimum three years [documented] experience [approved by manufacturer].

1.06 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install instruments when areas are under construction, except for required rough in, taps, supports and test plugs.

1.09 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Provide five-year manufacturer warranty for piping specialties.

1.11 MAINTENANCE SERVICE

- A. Provide monthly visit for one year starting from Date of Substantial Completion to make glycol fluid concentration analysis on site with refractive index measurement instrument. Detail findings with maintenance personnel in writing of corrective actions needed including analysis and amounts of glycol or water added.

1.12

MAINTENANCE MATERIALS

- A. Provide two bottles of red Gauge oil for static pressure Gauges.

1.13 EXTRA MATERIALS

- A. Supply two pressure Gauges with pulsation damper and dial thermometers.
- B. Supply two service kits for each size and type of steam trap.

PART 2 - PRODUCTS

2.01 PRESSURE GAUGES

- A. Manufacturers: Terrice, Weiss
- B. Gauge: ASME B40.1, [UL 393] [UL 404] with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
 - 1. Case: Stainless steel.
 - 2. Bourdon Tube: Brass Phosphor bronze Type 316 stainless steel.
 - 3. Dial Size: 4-1/2 inch diameter.
 - 4. Mid-Scale Accuracy: 1/2 percent.
 - 5. Scale: Pounds per square inch.

2.02 PRESSURE GAUGE TAPS

- A. Manufacturers: Terrice, Weiss
- B. Needle Valve: Brass, 1/4-inch NPT for minimum 300 pounds per square inch.
- C. Ball Valve: Brass 1/4-inch NPT for 250 pounds per square inch.
- D. Pulsation Damper: Pressure snubber, brass with 1/4-inch NPT connections.
- E. Siphon: Brass, 1/4-inch NPT angle or straight pattern.

2.03 STEM TYPE THERMOMETERS

- A. Manufacturers: Terrice, Weiss

- B. Thermometer: ASTM E 1, red appearing mercury, lens front tube, cast aluminum case with enamel finish.
 - 1. Size: 12-inch scale.
 - 2. Window: Clear Lexan.
 - 3. Stem: Brass, 3/4 inch-NPT, 3-1/2 inches long.
 - 4. Accuracy: ASTM E 77, 2 percent.
 - 5. Calibration: Degrees F.

- C. Thermometer: ASTM E 1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
 - 1. Size: 12-inch scale.
 - 2. Window: Clear Lexan.
 - 3. Stem: Brass, 3/4 inch NPT, 3-1/2 inch long.
 - 4. Accuracy: ASTM E 77, 2 percent.
 - 5. Calibration: Degrees F.

2.04 DIAL THERMOMETERS

- A. Manufacturers: Terrice, Weiss

- B. Thermometer: ASTM E 1, stainless steel case, adjustable angle with front calibration, bimetallic helix actuated with silicone fluid damping, white with black markings and black pointer hermetically sealed lens, stainless steel stem.
 - 1. Size: 5-inch diameter dial.
 - 2. Lens: Clear [glass] [Lexan].
 - 3. Accuracy: 1 percent.
 - 4. Calibration: Degrees F.

2.05 THERMOMETER SUPPORTS

- A. Socket: Brass separable sockets for thermometer stems with or without extensions as required[, and with cap and chain].

- B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.06 TEST PLUGS

- A. Manufacturers: Trerice, Watts
- B. 1/4-inch NPT or 1/2-inch NPT [brass] [stainless steel] fitting and cap for receiving 1/8-inch outside diameter pressure or temperature probe with:
 - 1. Neoprene core for temperatures up to 200 degrees F.
 - 2. Nordel core for temperatures up to 350 degrees F.
 - 3. Viton core for temperatures up to 400 degrees F.
- C. Test Kit:
 - 1. Carrying case, internally padded and fitted containing:
 - a. Two 3-1/2 inch diameter pressure Gauges.
 - (1) Scale range: 0 to 2 pounds per square inch Scale range: 0 to 150 pounds per square inch
 - b. Two Gauge adapters with 1/8-inch probes.
 - c. Two 1-1/2-inch dial thermometers.
 - (1) Scale range: 0 to 200 degrees F.
 - (2) Scale range: 5 to degrees F.

2.10 STATIC PRESSURE GAUGES

- A. Manufacturers: Trerice, Watts
- B. Dial Gauges: 3-1/2-inch diameter dial in metal case, diaphragm actuated, black figures on white background, front calibration adjustment, 2 percent of full scale accuracy.
- C. Inclined Manometer: Plastic with red liquid on white background with black figures, front calibration adjustment, 3 percent of full scale accuracy.
- D. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4-inch diameter tubing.

2.13 AIR VENTS

- A. Manufacturers: Armstrong

- B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8-inch brass needle valve at top of chamber.
- C. Float Type:
 - 1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
 - 2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- D. Washer Type: Brass with hydropscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.14 AIR SEPARATORS

- A. Manufacturers: Bell and Gossett
- B. Dip Tube Fitting: For 125 pounds per square inch-Gauge operating pressure; to prevent free air collected in boiler from rising into system.
- C. In-line Air Separators: Cast iron for sizes 1-1/2 inch and smaller, or steel for sizes 2 inches and larger; tested and stamped in accordance with ASME SEC VIII-D; for 125 pounds per square inch-Gauge operating pressure.
- D. Combination Air Separators/Strainers: Steel, tested and stamped in accordance with ASME SEC VIII-D; for 125 pounds per square inch-Gauge operating pressure, with integral bronze strainer, tangential inlet and outlet connections, and internal stainless steel air collector tube.

2.15 STRAINERS

- A. Manufacturers: Armstrong
- B. Size 2 inch and Under: Screwed brass or iron body for 175 pounds per square inch-Gauge working pressure, Y pattern with 1/32-inch stainless steel perforated screen.
- C. Size 2-1/2-inch to 4 inch: Flanged iron body for 175 pounds per square inch-Gauge working pressure, Y pattern with 3/64-inch stainless steel perforated screen.
- D. Size 5 inch and Larger: Flanged iron body for 175 pounds per square inch-Gauge working pressure, basket pattern with 1/8-inch stainless steel perforated screen.

2.21 RELIEF VALVES

- A. Manufacturers: Kunkle, Sarco
- B. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.

PART 3 - PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install positive displacement meters in accordance with AWWA M6, with isolating valves on inlet and outlet. [Provide full line size bypass with globe valve for liquid service meters.]
- B. Install one pressure Gauge per pump, with taps before strainers and on suction and discharge of pump; pipe to Gauge.
- C. Install Gauge taps in piping
- D. Install pressure Gauges with pulsation dampers. Provide needle or ball valve to isolate each Gauge. Extend nipples to allow clearance from insulation.
- E. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
- F. Install thermometers in air duct systems on flanges.
- G. Install thermometer sockets adjacent to controls systems thermostat, transmitter, or sensor sockets.
- H. Locate duct-mounted thermometers minimum 10 feet downstream of mixing-dampers, coils, or other devices causing air turbulence.
- I. Coil and conceal excess capillary on remote element instruments.
- J. Install static pressure Gauges to measure across filters and filter banks, (inlet to outlet). On multiple banks, provide manifold and single Gauge.

- K. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- L. Install Gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- M. Adjust Gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- N. Locate test plugs adjacent to thermometers and thermometer sockets, adjacent to pressure Gauges and pressure Gauge taps, adjacent to control device sockets.
- O. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- P. Provide manual air vents at system high points and as indicated.
- Q. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- R. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- S. Provide drain and hose connection with valve on strainer blow down connection.
- T. Support pump fittings with floor mounted pipe and flange supports.
- U. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.
- V. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- W. Pipe relief valve outlet to nearest floor drain.
- X. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.
- Y. Provide pressure-reducing stations with pressure reducing valve, bypass with valve, strainer and pressure Gauge on upstream side, relief valve and pressure Gauge on downstream side of pressure reducing valve.

- Z. Pressure-reducing station shall be one or two stages as required or indicated, to produce flat reduced pressure curve over range of capacity. Locate pilot operator control minimum 6 feet downstream of valve.
- AA. Rate relief valves for pressure upstream of pressure reducing station, for full operating capacity. Set relief at maximum 20 percent above reduced pressure.
- BB. Terminate relief valves to outdoors 2-1/2 feet minimum above roof. Provide drip pan elbow with drain connection to nearest floor drain.
- CC. When several relief valve vents are connected to a common header, header cross section area shall equal sum of individual vent outlet areas.

3.02 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not install hydronic pressure gauges until after systems are pressure treated.

3.03 SCHEDULES

- A. Pressure Gauges.
 - 1. Pumps:
 - a. Location.
 - b. Scale range.
 - 2. Expansion tanks:
 - a. Location.
 - b. Scale range.
 - 3. Pressure tanks:
 - a. Location.
 - b. Scale range.
 - 4. Standpipe, highest points:
 - a. Location.
 - b. Scale range.

5. Standpipe and sprinkler water supply connection:
 - a. Location.
 - b. Scale range.
 6. Sprinkler system:
 - a. Location.
 - b. Scale range.
 7. Pressure reducing valves:
 - a. Location.
 - b. Scale range.
 8. Back-flow preventing device:
 - a. Location.
 - b. Scale range.
- B. Pressure Gauge Tapping Location:
1. Control Valves 3/4-inch and Larger: Inlets and outlets.
 2. Major Coils: Inlets and outlets.
 3. Heat Exchangers: Inlets and outlets.
 4. Chiller: Inlets and outlets.
 5. Boiler: Inlets and outlets.
- C. Stem Type Thermometers:
1. Headers to central equipment:
 - a. Location.
 - b. Scale range.
 2. Coil banks - inlets and outlets:
 - a. Location.
 - b. Scale range.

3. Heat exchangers - inlets and outlets:
 - a. Location.
 - b. Scale range.
 4. Boilers - inlets and outlets:
 - a. Location.
 - b. Scale range.
 5. Chiller - inlets and outlets:
 - a. Location.
 - b. Scale range.
 6. Water-zone supply and return:
 - a. Location.
 - b. Scale range.
 7. After major coils:
 - a. Location.
 - b. Scale range.
 8. Domestic hot water supply and circulating lines:
 - a. Location.
 - b. Scale range.
- D. Thermometer Socket Location:
1. Control Valves 1 inch and Larger: Inlets and outlets.
 2. Reheat Coils: Inlets and outlets.
 3. Unit Heaters: Inlets and outlets.
- E. Dial Thermometer Location:
1. Each supply air zone.
 2. Outside air.

3. Return air.
 4. Mixed air.
- F. Static Pressure and Filter Gauges.
1. Built up filter banks:
 - a. Location.
 - b. Scale range.
 2. Unitary filter sections:
 - a. Location.
 - b. Scale range.
 3. Supply fan discharge:
 - a. Location.
 - b. Scale range.
 4. Building static:
 - a. Location.
 - b. Scale range.

END OF SECTION