# GENERAL

## SECTION INCLUDES

### Expansion tanks.

### Air vents.

### Air/Dirt separators.

### Strainers.

### Relief valves.

### Flexible connections.

### Glycol feeder.

### Glycol solution.

### Terminal unit coil hookup packages including hose kits and automatic flow limiters.

## REFERENCE SECTION 23 05 00 FOR THE FOLLOWING:

### References.

### Submittals.

### Project record documents

#### Record actual locations of hydronic specialties.

### OPERATION AND MAINTENANCE DATA

#### Furnish service and maintenance of glycol system for one year from date of substantial completion.

#### Monthly visit 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.

#### Provide full laboratory analysis of fluid at 6 months and 12 months from the date of substantial completion.

### QUALIFICATIONS

### DELIVERY, STORAGE AND HANDLING

# PRODUCTS

## EXPANSION TANKS

### Construction: Welded steel, tested and stamped in accordance with ASME SEC VIII, Division 1; supplied with National Board Form U 1, rated for working pressure of 125 psig, with flexible, replaceable, butyl rubber bladder sealed into tank and steel support stand.

### Accessories: Pressure gauge and air‑charging fitting, tank drain.

## AIR VENTS

### Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8inch brass needle valve at top of chamber.

### High Capacity Float Type:

#### 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.

#### Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

### Washer Type:

#### Brass with hygroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

## AIR/DIRT SEPARATORS

### Air/Dirt Separators:

#### Basis of Design: Spirotherm – NO EQUIVALENT.

#### Steel construction, rated for 150 psig, and entering velocity not to exceed 10 feet per second at specified water flow rate.

#### Unit shall be capable of removing 100% of the free air, 100% of the entrained air, and up to 99.6% of the dissolved air in the system.

#### Dirt separation shall be at least 80% of all particles 30 micron or larger within 100 passes.

#### Internal bundle filling the entire vessel consisting of a copper core tube with continuous wound copper medium permanently affixed to the core. A separate copper medium is to be wound completely around and permanently affixed to the internal element. Each eliminator shall have a separate venting chamber to prevent system contaminants from harming the float and venting valve operation. At the top of the venting chamber shall be an integral full port float actuated brass venting mechanism. Units shall include a valved side tap to flush floating dirt or liquids and for quick bleeding of large amounts of air during system fill or refill. Separator shall have the vessel extended below the pipe connections an equal distance for dirt separation. Bottom connection for use as a blowdown.

#### Integral mounting lugs on large units (14” and larger) for use with contractor-provided mounting legs.

## STRAINERS

### Size 2 inch and Under:

#### Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch Type 304 stainless steel perforated screen.

### Size 2‑1/2 inch to 4 inch:

#### Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch Type 304 stainless steel perforated screen.

### Size 5 inch and Larger:

#### Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch Type 304 stainless steel perforated screen.

### Provide blowdown valves where shown on plan.

## SAFETY RELIEF VALVES

### Cast iron or Bronze body, EPDM seat, brass internal parts, automatic, direct pressure actuated, capacities ASME certified and labeled.

## FLEXIBLE CONNECTIONS

### Spherical, Rubber, Flexible Connectors:

#### Body: Peroxide-cured EPDM synthetic rubber and Kelvar tire cord reinforcement.

#### End Connections: Steel flanges drilled to align with Classes 150 and 300 steel flanges.

#### Control Rods: Steel with oversized washers and rubber bushings.

#### Performance: Capable of misalignment.

#### CWP Rating: 150 psig.

#### Maximum Operating Temperature: 250 deg F.

#### Manufacturer: Mason Industries model Safeflex or equivalent.

### Stainless steel braided connection with steel flange rated for 225 psig and 16" Hg vacuum. Operating temperature 20 degrees F. to 240 degrees F.

### Minimum allowable movement shall be as follows:

 Lateral Deflection 1/2"

 Elongation 3/8"

 Compression 1/2"

 Angular Deflection 15 degrees

## GLYCOL FEEDER

### Mixing Tank: 55 gallon polyethylene drum with hinged cover. Fully supported by a carbon steel bottom mount stand, painted with water based enamel.

### Control Panel: NEMA 4X with 2-position main power switch and light, 3-position, hand-off-auto, switch and light for gear pump, red low light and 15 A fuse.

### Low Level Switch: Polypropylene side entry low level switch with 10 A relay.

### Gear Pump: Includes PVC ball valve, flexible tubing and cast iron Y-strainer. Pump discharge tubing includes brass construction spring check valve, PVC piping, and ¼” NPT back tap pressure gauge.

### Pressure Switch: ¼” NPT

### Pressure Relief Valves: 50-250 PSI brass valve

## GLYCOL SOLUTION

## [Note to A/E: Edit glycol percentages based on project needs. Provide percentage schedule if multiple hydronic systems are involved]

### Inhibited propylene glycol and water solution mixed [50] percent glycol ‑ [50] percent water, suitable for operating temperatures from [‑40] degrees F to 250 degrees F.

## TERMINAL UNIT COIL HOOKUP

### The components specified in this section shall be installed on the following devices:

#### Air terminal unit reheat coils.

#### Fintubes

#### Unit heaters

#### Cabinet unit heaters

#### Fan coils

#### Radiant ceiling panels

#### Chilled beams

#### Small (1-5 Ton), unitary, water source heat pumps.

### Acceptable Manufacturers

#### Griswold

#### Pro Hydronics

#### Flow Design

#### Nexus

### Piping package components

#### Automatic flow limiter

##### Shall have the capability to measure flow.

##### Automatic flow limiting cartridge(s) will be made of stainless steel. No brass or plastic components allowed.

##### Flow rate accuracy will be +/- 5% of design flow rate.

##### Shall be of a pressure independent, clog resistant design.

##### Valve cartridge shall have a single spring range of 3-50 psid.

##### Cartridges shall be easily removable from valve body without disturbing existing piping.

#### Wye-strainers

##### Strainers shall have a 20 mesh rating. Strainers shall have at minimum an 8:1 ratio of total area vs. internal pipe diameter.

##### The strainer screen shall be constructed of stainless steel.

##### The strainer shall be removable without disturbing existing piping.

##### The strainer shall be provided with blow-down valve with hose end connection and cap.

#### Valves

##### Shall have a full-port ball.

##### Shall have a blow-out proof stem with renewable o-ring and Teflon stem seals.

#### Stainless steel braided hoses

##### Hose liners shall be made of EPDM or CPE.

##### Hoses shall be factory built and incorporate stainless steel ferrules.

##### Hoses shall withstand working pressures of at least 200psi at 200degF.

##### Hoses shall be equipped with one swivel end to allow for equipment movement.

#### Package to include the following in order of flow;

##### Supply side: Isolation valve, y type strainer with blow down with pressure temperature test ports, union, stainless steel braided hose.

##### Return side: Stainless steel braided hose, union, prep for owner provided automatic control valve, union, automatic flow limiter with pressure temperature test ports, isolation valve.

# EXECUTION

## INSTALLATION

### Install specialties in accordance with manufacturer's instructions and as shown on drawings.

### Provide manual air vents at all system high points and in accessible locations. Provide automatic air vents where shown on drawings / details.

### Provide drain valves at all low points and in accessible locations.

### Provide heat trap piping arrangement for all expansion tanks as shown on drawings or per manufacturer instructions.

### Provide appropriately sized structural supports for air/dirt separators. Support air/dirt separator independently of piping system for larger sizes per manufacturer’s instruction.

### Terminal unit coil piping packages shall be supported from structure within 12” of the assembly to prevent stress on the coil piping.

### Terminal unit coil piping packages will be fully accessible and located within 2’ of the terminal unit served and will be within 2’ of the ceiling line height.

### Provide valved drain and hose connection on strainer blow down connection.

### Triple-duty valves are not allowed. Provide separate shut-off, check valve, venturi flow measuring device, and balancing valve.

### Provide flexible connectors on pump suction and discharge.

### Provide flexible connectors on all pipe connections that serve vibration isolated mechanical equipment.

### Provide full-size piping from relief valve outlet to nearest floor drain. In glycol systems, provide full-size piping from relief valve to glycol feeder or catch tank.

### Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

### Clean and flush glycol system before adding glycol solution. Refer to Section 23 25 00.

### Feed glycol solution to system through glycol feeder make‑up line with pressure regulator, venting system high points.

### Perform tests determining strength of glycol and water solution and submit written test results.

### Alignment-Guide and Anchor Installation

#### Install alignment guides to guide expansion and to avoid end-loading and torsional stress. Coordinate with expansion joint manufacturer recommendations as required.

#### Attach guides to pipe and secure guides to building structure.

#### Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.

#### Anchor Attachments:

##### Anchor Attachment to Steel Pipe: Attach by welding. Comply with ASME B31.9 and ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

##### Fabricate and install steel anchors by welding steel shapes, plates, and bars. Comply with ASME B31.9 and AWS D1.1/D1.1M.

##### Anchor Attachment to Steel Structural Members: Attach by welding.

##### Anchor Attachment to Concrete Structural Members: Attach by fasteners. Follow fastener manufacturer's written instructions.

##### Use grout to form flat bearing surfaces for guides and anchors attached to concrete.

END OF SECTION 23 21 16