DESIGN GUIDELINE 230040
HYDRONIC SYSTEMS AND SPECIALTIES

General

This section covers requirements for hydronics systems, including chilled water, hot water heating, and condenser water systems.

Related Sections

U-M Design Guideline Sections:
221113 – Basic Piping Materials and Methods

U-M Master Specification Sections:
221113 – Basic Piping Materials and Methods
232116 – Hydronic Piping Specialties

Design Requirements

Compression/Expansion Tanks

Provide compression tanks on all closed loop hydronics systems. Tanks shall be diaphragm/bladder type, constructed for appropriate design pressure. The tanks should be welded steel, stamped with ASME code Section VIII for appropriate psi design. Indicate system volume, and expansion tank fill and operating pressures on design drawings.

Air Separators

Install air separators to aid removal of air from hot water heating systems and as required for chilled water systems. Separators shall be a tangential type, designed and installed per manufacturers instructions

System Fill and Pressure Relief Valves

The design shall include system fill valve and pressure relief valve with a field adjustable pressure setting.

Balancing and Measuring Devices

All hydronic systems shall have a means of measuring and balancing flow at each piece of equipment and terminal device. Balancing valves shall be sized so they are not closed more than 60% for the flow and pressure expected. Do not base sizing on pipe size alone. If numerous devices are in the project, include a schedule on the drawings.

Automatic Flow Balancing Valves

Installation of automatic flow balancing valves is permitted for terminal devices (coils, finned tube radiation etc.), in lieu of installing manual balancing valves at these locations. Suitability of each application should be carefully considered by the A/E, especially in variable volume systems, and systems where design flow is likely to change and in existing systems.

Strainers and Dielectric Separation

Refer to U-M Master Specification 221113

Glycol Systems

Use of glycol in hydronic systems is generally discouraged due to environmental concerns. Glycol should only be used where other means of freeze protection are impractical. Use only concentrations required to meet design requirements. 30% ethylene glycol is typically acceptable for freeze protection on pumped hydronics systems subject to full winter conditions. Lower concentrations may be acceptable for burst protection or higher design temperature.

Do not provide an automatic cold-water makeup for glycol filled systems. Provide packaged, glycol fill system consisting of polyethylene fill tank (to hold approximately 30 gallons of pre-mixed solution) with hinged cover, fill pump and electric controls. Fill pump is to be energized to maintain system pressure as sensed by pressure switch mounted near compression tank. Provide a two stage low water alarm in the fill tank. The first stage alarms the campus BAS system (or, if BAS is not available, energizes an audible device). The second stage shuts off the pumps and requires a manual reset. Pipe relief valve back to the glycol fill tank.

Make provisions for filling glycol filled systems that ensure reasonable convenience, such that large drums will not need to be lifted up stairs.

Pre-mixed glycol is generally preferred.

Review need for containment with U-M Project Coordinator and U-M OSEH department. At minimum, include a spill pallet below the glycol fill station.

Cooling Tower Water (Condenser Water) Systems:

Tower Water systems generally require installation of side-stream aggregate filters, or possibly centrifugal separators. Consult U-M Project Coordinator. Refer to U-M details for chemical treatment and filters.

Installation Requirements

Expansion tanks and air separators shall be supported independently from piping.

Install air vents at all high points in all hydronic systems. Generally, automatic vents should be installed only in mechanical equipment rooms. All other locations will contain manual vents. Where practical, pipe outlet from automatic air vents to floor drains. Refer to Master specification and standard details.

Flow meters shall be installed with unrestricted lengths of straight pipes as required by the manufacturer.

Install unions, isolation valves and bypass lines on devices requiring removal for maintenance.

Generally, install strainers ahead of all hydronic system control valves, flow measuring devices and pumps.