

CHEMICAL TREATMENT, WATER CONDITIONING SYSTEMS

Top Priority: Although largely “invisible”, the water chemistry and cleanliness within hydronic and steam systems is critical to the life and proper operation of these systems.

Thus, it is essential that new or modified piping systems be thoroughly cleaned and flushed and that proper chemical treatment be provided and maintained.

Proper design and installation of chemical treatment / water conditioning systems shall be viewed as top priority when undertaking projects that address these systems. It is imperative that these systems not be installed as an afterthought or overlooked altogether.

Building Hydronic Systems: Each closed-loop hydronic heating/cooling system that serves an individual building (or portion thereof), whether filled with water or antifreeze solution, shall be manually treated with corrosion inhibitors that are appropriate to protect the materials of construction of that specific system. Since a direct connection between the domestic water system and a closed-loop hydronic system is not permitted, a valve and hose adapter with cap shall be provided at the system fill connection. This allows chemicals in liquid form to be pumped into the system via a portable fill unit. See *Drawing #23 21 00-1, Flow Diagram - Hot Water Heating System*. As shown, an air/dirt separator shall be provided in each system for the purpose of removing air and sediment from the system and a bypass bag filter shall be provided for additional sediment removal. As configured, the filter canister serves a secondary function as a chemical pot feeder.

Water Treatment Procedure: When new hydronic piping systems are installed or existing systems modified specified preoperational cleaning and treatment procedure shall be accomplished. Such flushing, cleaning and chemical treatment shall be fully administered prior to placing a system in service. Given that chilled water is typically provided from the campus central system no closed loops exist within buildings. Thus additional steps must be taken to accomplish recirculation for cleaning. See *Section 23 25 00 – Water Treatment for HVAC* for detailed information regarding chemicals and procedures.

Steam Piping Systems: Although optimal, it is rarely practical to circulate cleaning fluid through a steam system. As such, steam and condensate piping systems shall be flushed with water and energized with live steam for cleaning purposes. In some cases a “steam blow” procedure may be required. See *Section 23 22 13 – Steam and Condensate Piping* for details.

Steam Boiler Systems: Each steam boiler shall be equipped with a softener (for all boilers) and a dealkalizer (for water tube boilers) in the make-up water system as well as an automated chemical treatment system including an automated blow-down feature (removing water at the skimming level), to reduce/limit hardness, and inhibit scaling and corrosion.

Cooling Towers / Condenser Water Systems: With the extension of the campus-wide central chilled water system into virtually every building on campus, few cooling towers or evaporative coolers remain. Those that remain typically serve process loads such as water-cooled condensers for cold rooms. These are typically critical systems requiring high reliability. Each such open condenser water system shall be equipped with an automated chemical treatment system, including an automated blow-down feature, to limit hardness, inhibit scaling and corrosion, and control microbiological growth within the system. Installation of a side-stream centrifugal separator to serve each condenser water system for the purpose of removing sediment/debris is also desirable. Such shall be sized for approximately 10% of the total system flow.

Humidifiers: At a minimum, each steam-to-steam humidifier shall be supplied with softened water. The use of RO water and/or DI water to achieve additional purity shall be evaluated on a project-by-project basis.

Access: Adequate access shall be provided to safely operate and clean chemical treatment equipment as well as to transport and handle chemicals. An OSHA compliant platform with stairs and safety railing shall be provided as required to ensure such safety.

CHEMICAL TREATMENT, WATER CONDITIONING SYSTEMS

Personal Safety: An approved eye wash, safety shower and associated floor drain shall be provided at each location where hazardous chemicals are stored or handled.

Additional Information: Additional information and project-specific direction regarding chemical treatment and water conditioning systems shall be sought from UIUC Engineering.