

## PART 1 - GENERAL

- 1.01 Provide HVAC zoning as much as practical for better control and energy management. Coordinate with control specifications.
- 1.02 Configure hand operated valves and drains on all branch lines of the heating system so any one zone can be turned off and completely drained, separately, without interruption of the entire system.
- 1.03 Provide all systems with automatic balancing (Griswold or equal) or manual balancing (B&G circuit setters or equal). Do not use balancing valves as isolation valves even if designed to be so used.
- 1.04 Since remote site systems are generally constant volume, provide only balancing valves for management of system flow. No automatic balancing valves.
- 1.05 Consult with FS/DDC on whether UAF or Contractor will provide hydronic system fluids, dyes, and inhibitors.

## PART 2 – PRODUCTS

- 2.01 Hydronic heating: Use site-blended mixture of virgin polypropylene glycol, inhibitor and de-ionized water. Ethylene glycol may be allowed on certain heating applications such as combined radiant heating and cooling systems, consult with FS/DDC Project Manager
  - A. Fill heating glycol systems with blend of contractor-provided virgin propylene glycol and owner-provided DI water. DI water provided at site or delivered by UAF Facilities Services. Provide and install NALCO 2837 or ArcticTherm 1015 inhibitor.
  - B. Fill fresh water heating systems with campus DI water, available on site or provided by UAF. Contractor to provide and install NALCO corrosion inhibitor.
  - C. Test glycol concentration with optical, automatic temperature compensating high impact vinyl housed device.
  - D. Freeze Protection: negative 30 F in coils, 0 F in radiant systems.
- 2.02 Hydronic cooling with building chiller system: Use manufacturer blended/inhibited ethylene glycol and RO/DI water.
  - A. Fill with contractor-provided pre-blended/inhibited ethylene glycol. Phosphate-based inhibitor. Dowtherm SR-1.
  - B. Freeze protection level: For summer-only systems: 0 F. For process cooling systems: negative 15F

- 2.03 Remote site hydronic heating systems: Pre-blended, inhibited, phosphate based, 50/50 propylene glycol. DowFrost HD is the Basis of Design, No Alternate Brands, No Substitutions.
- 2.04 HDPE make-up tank with jet pump. Basis of design is a Goulds J-5, two other manufacturers identified by Consultant. Consultant to use UAF standard detail edited for specifics such as size of tank and system pre-charge pressure.
- A. For systems less than 50 gallons, factory assembled glycol make-up tanks with on-board pumps are acceptable. Pump must be mounted on top of tank, not below. Axiom or Alternate Brand Request or Substitution Request required.
- 2.05 Air separators:
- A. Tangential flow air separators only. Bell & Gossett Rolairtrol, TACO, Amtrol, Alternate Brand Request or Substitution Request Required.
- 2.05 Expansion Tanks:
- A. Systems over 750 gallons: Bladder or diaphragm tanks: ASME or Non-ASME as determined by system requirements. Bell & Gossett, Amtrol, Wessels, or Taco. Alternate Brand Request or Substitution Request not required.
- B. Systems up to 750 gallons: Plain Steel, Air over water tanks: ASME. Provide with air entry and drain fittings and site glass by same manufacturer as tank. Bell & Gossett, Wessels, or Taco. Alternate Brand Request or Substitution Request not required.
- 2.05 Thermometers:
- A. Solar digital only. Glass and alcohol/mercury thermometers are not allowed

### PART 3 - EXECUTION

- 3.01 Install hydronic piping to maintain minimum 1 inch clear from all other piping and ductwork. Where piping or ductwork is insulated this requirement applies to surface of insulation.
- 3.02 Piping must be accessible for repairs. No piping buried under inaccessible flooring such as concrete slab on grade.
- 3.03 Provide access doors suitably sized for access required. See associated requirements in Div 08.
- 3.04 Provide sleeves for all pipe passing through walls, ceilings, floors, etc. Size sleeves to allow for insulation and fire stopping/acoustical sealant. Provide special attention to ensure proper fire sealing at all penetrations. Require that Contractor submit U.L. listed installation instructions for proposed manufacturer's fire stop system for review and approval by UAF prior to installation.

- 3.05 Provide automatic air vents with isolation ball valves on all high points of systems. Locate air separators at the most functional locations for the system. Pipe all air vent and separator discharges to locations where discharge will not harm equipment, insulation, or finishes.
- 3.06 Pre-clean new hydronic piping with trisodium phosphate (TSP) and flush prior to initial fill. Flush modified systems with Hydrochem 280 or equal, per manufacturer.
- 3.07 System solution: mix of glycol and DI water (not domestic water).
- A. Contractor to fill and test system and establish residual inhibitor level of 400 ppm
  - C. Sample glycol at substantial completion and at the end of the one-year warranty and have contractor adjust as needed.
  - D. Install egg yolk yellow dye provided by UAF Facilities Services for heating loops. Installed blue dye provided by UAF FS for district (Utilities provided) chilled water glycol
- 3.08 Require Contractor to provide documentation in project As-built Drawings stating total volume of each separate hydronic system.
- 3.09 For smaller buildings (less than 750 gallons volume), remote sites, and localized chilled water systems, UAF prefers plain steel, air over water expansion tanks using the principle of air management. These systems frequently do not require dedicated glycol make-up tanks and pumps. Coordinate each application with FS/DDC.
- 3.10 For large buildings, UAF allows the use of diaphragm or bladder style expansion tanks using the principle of air elimination. These systems do require dedicated glycol make-up tanks and pumps. Coordinate each application with FS/DDC
- 3.11 Ensure that expansion tanks are equipped with isolation and drain valves to isolate and drain the tank during system maintenance.

END OF SECTION