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SECTION 23 25 00_WATER TREATMENT FOR HVAC SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

This standard includes water treatment requirements for hydronic, steam and condensate piping systems.

The intent of these standards are to provide input to the design team on the University's preference of manufacturers, design, equipment options and quality assurance to maintain the longevity of its assets.

1.2 REFERENCES

- A. Common Work for HVAC Systems 23 05 00
- B. Common Requirements for HVAC Systems 23 05 01
- C. Identification for HVAC Piping & Equipment 23 05 53
- D. Steam and Condensate Piping Systems Above Grade 23 22 13
- E. Steam and Condensate Piping Systems Below Grade 23 22 13.1
- F. Hydronic Piping Systems Above Grade 23 22 23
- G. Hydronic Piping Systems Below Grade 23 22 23.2

1.3 DESIGN REQUIREMENTS

1.3.1 Provide chemical cleaning and install water treatment equipment for the following systems:

- Hot water closed heating systems
- Chilled water closed systems
- Open recirculating cooling water systems (Cooling Towers)
- Steam generating systems
- Inhibited propylene glycol freeze protection systems.

1.3.2 Provide complete water treatment equipment for open recirculating, steam generating and closed systems. Type of chemical, storage and feed rates shall be supplied from the University's water treatment contractor. Design and selection of systems can be made from the Universities

water treatment contractor.

1.3.3 All equipment and chemical selections shall be issued as submittals for approval. (And shown on bid documents, including all MEP drawings)

1.3.4 A corrosion rack for all open recirculating systems on cooling water, and closed hot water & chilled water systems shall be provided. The rack shall include the following as the minimum:

- Inlet and outlet shut off valves
- Wye Strainer
- Corrosion probe connection fittings
- Corrosion coupon holders
- Specimens of mild steel and yellow steel
- Flow meter

1.3.5 The following equipment is required for open recirculating (bleed, feed and blow down of) cooling tower water systems:

- Local Control/Power Panel
 - Completely wired for 120 VAC power/control.
 - 120 VAC (female) receptacles dedicated for chemical feed pump power cords
 - Main power switch and indicating lamp
 - Manual/auto/off switch for bleed off and chemical feed pumps
 - Selector switch to feed inhibitor based on makeup, bleed off or time
 - Indicating conductivity meter
 - Control of feed for two biocides with seven day programmable timers
 - Biocide pre-bleed and lockout
 - Flow switch
 - Audible and visual alarm
- Poly bulk tank, pump from bulk tank/ drum with secondary containment..
- Solenoid type chemical feed pumps of proper size and pressure for application.
- Water meter with electric contacting head connected to BAS for both make-up and blow down to capture sewer credit.
- Full ported ball valve, brass/bronze body, TFE seats, stainless wetting parts, electrically actuated w/ 120 VAC male power cord plugged into controller.

1.3.6 For closed hot water, chilled water and process chilled water a (5) five gallon by-pass shot feeder including a funnel (or two inch wide mouth), air vent, sample valve and drain. The feeder shall be able to accept filters bags. The feeder shall be installed around the circulating pump. A corrosion rack shall be installed upstream of feeder.

1.3.7 For small outlying steam generating systems the following equipment is required:

- Duplex water softeners appropriately sized for the anticipated make-up requirements plus return losses. Water softeners shall be alternating, fully automatic, electronically programmable, with regeneration based on throughput. Water softeners should be of corrosion resistant design. Brine storage based on enough brine charge needed for one month of peak output.
- Neat feed w/ liquid inhibitor, sulfite, polymer treatment to feed water via bulk tank /drum, solenoid metering pump and secondary containment.
- Automatic conductivity controller shall be installed on each boiler continuous blow down line w/ blow down controller that includes a conductivity sensor and motor operated ball valve. A sample cooler is for manual grab sample.

1.3.8 For closed loops that require freeze protection, an automatic glycol feed system containing the following:

- A completely mounted and wired 115 volt control panel w/ hand-off-auto switch for pump motor, pump “on” indicator light, “low” tank level indicator light w/ audible alarm, and electric plug in cord.
- A 50-gallon polyethylene tank mounted in a steel frame which is primed and painted.
- Positive displacement pump with internal relief valve that relieves to the tank shall be automatically started with make-up water meter and be proportioned to maintain required concentration.
- A suction assembly including PVC tubing and fittings, a PVC ball valve, and PVC “Y” strainer.
- A discharge assembly including schedule 80 PVC pipe and fittings, PVC ball valve, PVC check valve and PVC relief valve with return to the tank.
- A float switch mounted in the tank for low level pump shut off and alarm, 0-100 psi pressure gauge and adjustable pressure switch.
- Pressure switches for pump start set at fill pressure, off at 5 psig + fill pressure

1.4 SUBMITTALS

1.4.1 Inhibited Propylene Glycol data sheets.

1.4.2 Clean flush, treatment and lay-up procedure.

1.5 CLOSE-OUT SUBMITTALS

1.5.1 Softener parameter set-up data sheet.

1.6 QUALITY ASSURANCE

1.7 DELIVERY, STORAGE AND HANDLING

PART 2 PRODUCTS

APPROVED MANUFACTURERS:

- 2.1 Cooling Tower Water Control Systems: LMI, Walchem
- 2.2 Solenoid type Chemical Feed Pumps; LMI, Prominent
- 2.3 By-pass Pot Feeder: Neptune w/ qty (5) 10 micron filter bags.
- 2.4 Steam Generator Blow down Controllers: Walchem, Pulsafeeder
- 2.5 Glycol Feeder: Neptune
- 2.6 Softener Head – Fleck, electronic
- 2.7 Chemical Treatment Program: GE-Betz

PART 3 EXECUTION

SYSTEM CLEANING, HYDRO, LAY-UP

- 3.1 Contractor shall insure that all pipe (or piping subsystems) systems remain clean and free from all corrosion/debris during testing, filling, draining, and while waiting to be turned over. Under no circumstances shall untreated water be introduced into piping system and be allowed to remain in place for more than one week.
- 3.2 Upon completion of piping construction, and following a thorough forced flush using pumping and start-up strainers, the system shall be cleaned by the installation contractor using appropriate chemicals as specified by the University's water treatment contractor. The cleaning operation shall be completed by sampling results by the Owner.

Note: During underground installations, contractor is to use his own pumping to ensure a circulation rate of at least 2 ft/sec

- 3.3 City of Newark shall be notified in advance in writing w/ estimated volumes, flow rates, chemicals in solution, time duration and time of release to the sanitary sewer system prior to draining the system.
- 3.4 Once flush/cleaning is passed, system shall be laided up wet w/ inhibitor ready for hydro testing.
- 3.5 After hydro testing is completed, the water in the system shall be routinely recirculated and monitored. If inhibitor level shall be maintained by the contractor until the system is officially turned over to the University.
- 3.6 Contractor to provide written procedures for chemical cleaning, flushing and laying-up hydronic and steam/condensate systems for Owners review. Procedures to include piping boundaries, use of temporary pumping and estimated volumes to drain.
- 3.7 At turnover, contractor to provide a full charge of glycol at system concentration in bulk tank.

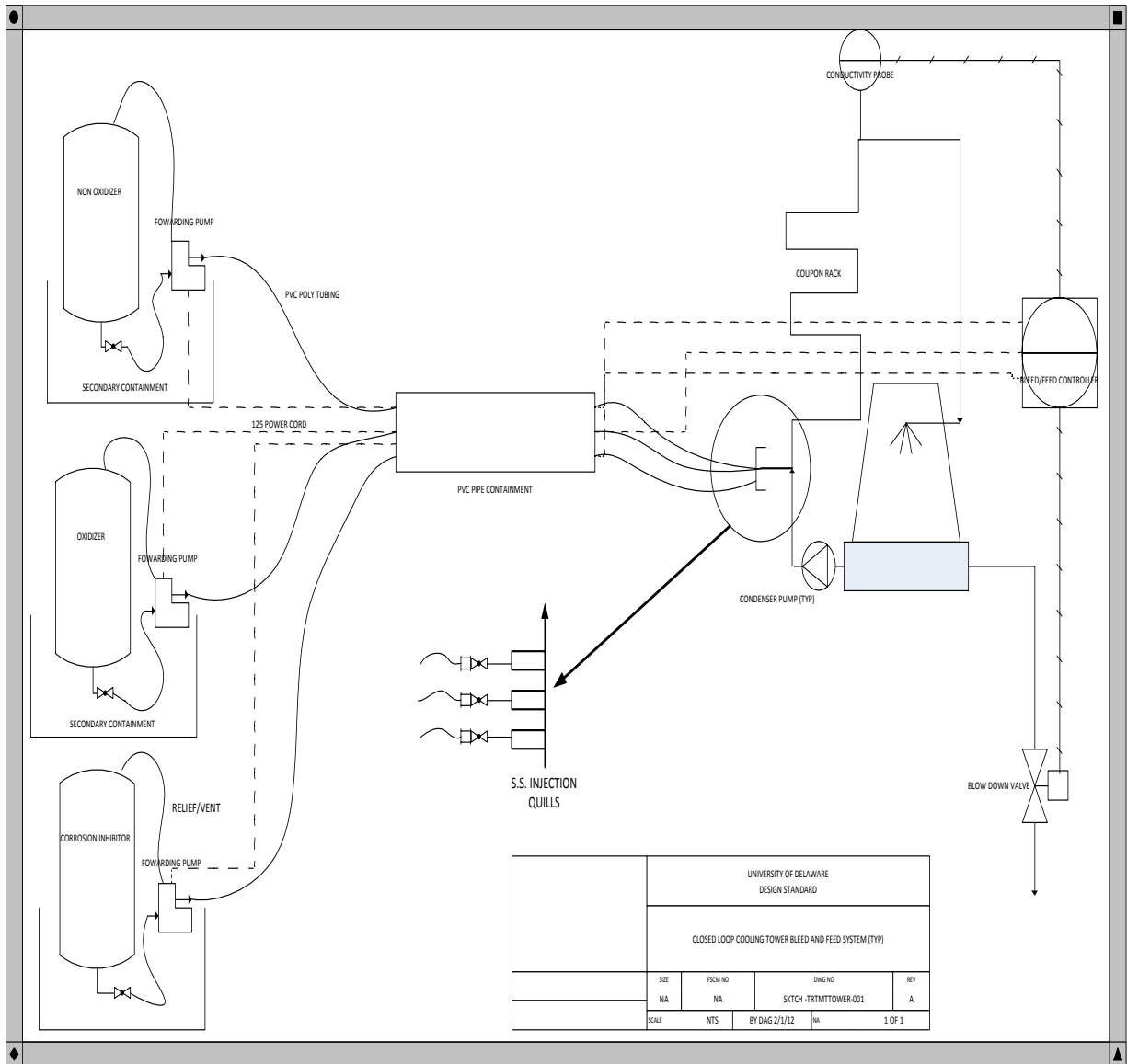
PART 4 – ATTACHMENTS

Attachment 1 – Typical Closed Loop Tower Bleed and Feed Arrangement

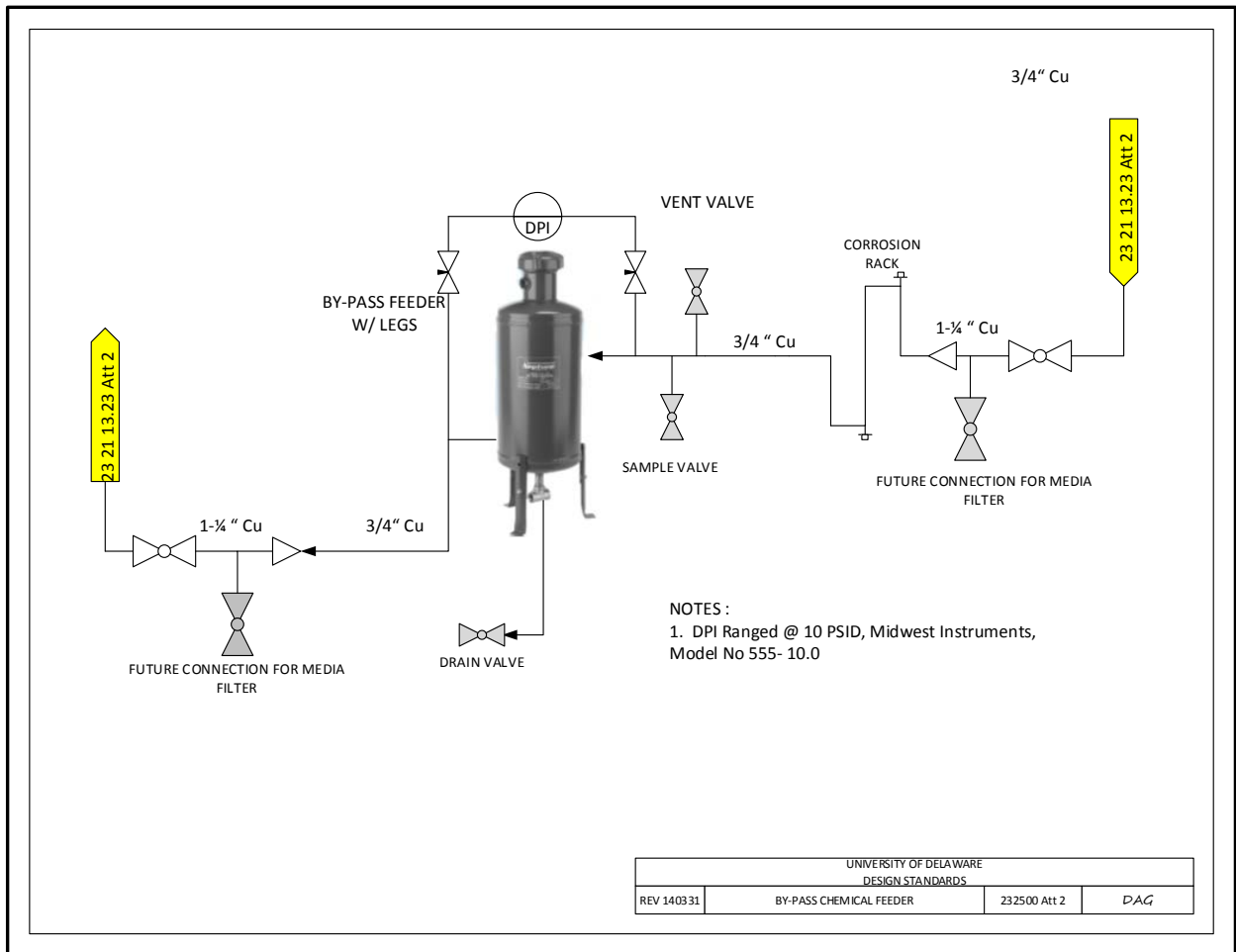
Attachment 2 – Typical Chemical By-Pass Feeder Arrangement

Attachment 3 – Glycol Makeup System

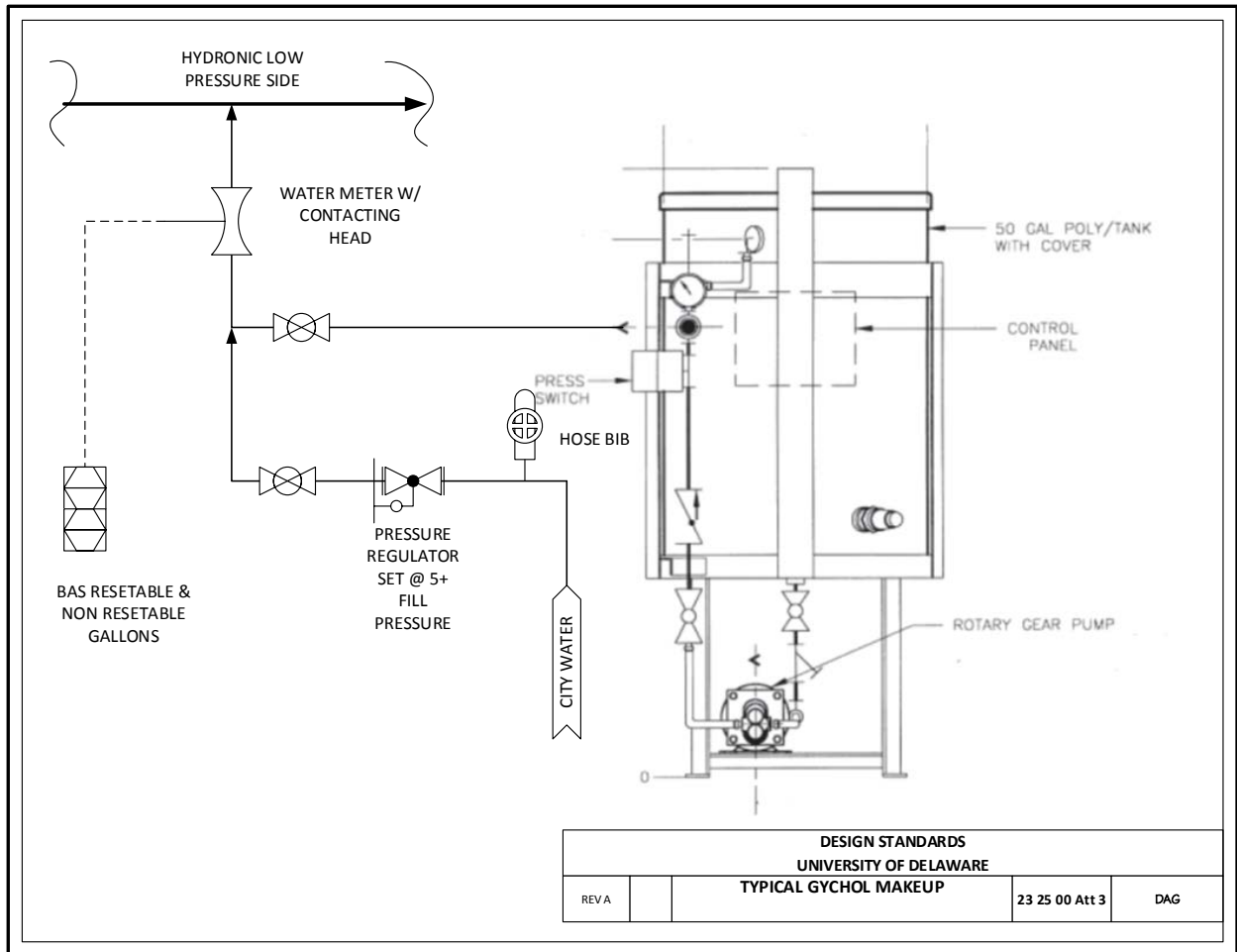
Attachment 1 : Typical Closed Loop Tower Bleed and Feed Arrangement



Attachment 2 – Typical Chemical By-Pass Feeder Arrangement



Attachment 3 – Glycol Makeup System



END OF SECTION