15542  WATER TREATMENT IN HYDRONIC SYSTEMS

PART 1  GENERAL

1.01 RELATED SECTIONS

A. Section 15545 – Chilled Water Systems

B. Section 15550 – Heat Generation

C. See Section 15556 for water treatment associated with Clean Steam Generating Systems.

1.02 SUMMARY

A. Cornell University’s continual approach of protecting its community and the environment must be adhered to in the application of chemicals pertinent to process water loops. In addition, University policy dictates that "under no circumstances should chemicals be disposed of by pouring into sinks or other drains leading to sanitary or storm sewers."

B. The use of automatic glycol make-up systems with direct connection to domestic water is not preferred. Provide means for manual fill, along with a 55 gallon drum to receive relief valve discharge.

1.03 WATER TREATMENT CRITERIA

A. All chemicals and formulations prescribed for the cleaning and treatment of process water systems at the University must meet the following specified criteria:

1. They must be ecologically compatible so that any discharge will not create an environmental impact.

2. They must be industrial and toxicologically safe so as to minimize personnel and equipment exposure to hazardous conditions.

3. Every effort must be made to maintain a sense of uniformity in chemical formulation to insure a line of continuity. Deviations from existing formulations that are applied across the University are to be kept to a minimum. This relieves the University of any burden that arises from trying to maintain adequate protection using numerous treatments.
1.04 APPROVAL PROCESS

A. All materials proposed for application must have the prior approval of Environmental Health and Safety, Facilities Engineering and the Facilities Management Pipe Shop. In order to thoroughly evaluate the products performance, it is recommended that the following be submitted at the time of proposal:

1. Material Safety Data Sheets for all products that are to be applied, which shall contain the complete formulation. Further documentation of qualitative composition must be included if Material Safety Data Sheets do not supply all product(s) components.

2. Product Data Sheets specifying overall product description and application guidelines.

3. Methods of analysis for determining product residuals. Proposals should specify specific qualitative and quantitative procedures of evaluating actual product levels. They should also include recommended parameters for all products, expressed in either terms of parts per million or milligrams per liter.

4. Expected performance levels of products; this should include expected corrosion rates, expressed in mils per year. If the product is of a biostatic nature, what levels of biological growth should be expected if the product is applied at recommended dosages.

5. Provisions should be submitted for the removal for any unused chemicals. In addition, provisions must be provided for the disposal of all empty containers.

B. The above mentioned criteria will serve as a guide as to the minimum information required for approval of any chemical treatment applied at Cornell University. No water treatment shall be purchased, delivered, or applied without consideration of the previously mentioned guidelines.

PART 2 PROCEDURES

2.01 CLEANING

A. Cleaning procedures for newly installed systems shall be as follows:

1. Step 1: Adjust all control valves and balancing valves to full open position during the cleaning and treatment process.

2. Step 2: Fill system and add standard 12% hypochlorite bleach for a residual of 2-3 parts per million (ppm) chlorine. This should require approximately one quart of bleach per 10,000 gallons of water. Test for concentration. Circulate solution for a minimum of eight hours. Clean strainers and dead end piping legs, then drain to sanitary sewer.
3. Step 3: Fill system and add a general dispersant for iron, mud, silt, and microbiological matter at a concentration of 500-1000 parts per million (ppm), or approximately seven gallons of product per 10,000 gallons of water. Test for concentration. Circulate solution for a minimum of eight hours. Flush system using bleed and feed until the bleed water pH and iron levels are consistent with the feed domestic water levels. Clean strainers and dead end piping legs.


B. For extensions to existing building systems, the above cleaning procedures shall be followed if the extension contains ferrous piping materials. Provide temporary piping, valving, and pumping system isolated from the existing building system as needed to perform cleaning procedures prior to final connection to the existing building system.

2.02 TREATMENT CHEMICALS

A. Treatment chemicals for hydronic heating and chilled water cooling systems shall be as follows:

1. Non-Glycol Systems: After cleaning and inspection, immediately add a molybdate based corrosion inhibitor. Acceptable corrosion inhibitors shall include a combination of sodium molybdate, sodium hydroxide, tolytriazole and organic polymers. Test for residual concentrations as follows:
   a. Molybdate: 100 ppm
   b. pH: 8.3-9
   c. Tolytriazole: 5 ppm

2. Glycol Heating Systems: After cleaning and inspection, drain system then refill with Metro PG#36 propylene glycol (PG) solution at a concentration of 40% propylene glycol to 60% water. The water to be added to glycol solutions shall meet manufacturer’s standards for quality.

3. Glycol Cooling Systems: After cleaning and inspection, drain system then refill with Metro PG#36 propylene glycol (PG) solution at a concentration in accordance with manufacturer’s recommendations. The water to be added to glycol solutions shall meet manufacturer’s standards for quality.

B. Arrange for inspection by a representative from the Facilities Management Pipe Shop prior to final acceptance.
2.03 IDENTIFICATION

A. Provide permanent signage on hydronic systems treated with chemicals that include the following information:

1. Chemical type, concentration, and system volume.
2. Direction to drain system to sanitary drain.

B. Chemical type, concentration and system volume shall be stenciled on the system expansion tank in a visible location.