

1.0 **GENERAL**

1.1 Related UBC Guidelines

1.2 Coordination Requirements

- .1 Coordinate with UBCO Operations.
- .2 Coordinate with other design disciplines.

1.3 Description

- .1 HVAC water treatment system procedures and design requirements.

2.0 **MATERIALS AND DESIGN REQUIREMENTS**

2.1 General Requirements

- .1 The specification shall clearly state which systems are to be cleaned and subsequently treated with control agents.
- .2 Requirements
 - .1 In new buildings the scope of work will cover all new systems.
 - .2 Heating, cooling and condenser water systems shall be chemically cleaned and treated as appropriate.
 - .3 In existing buildings where existing systems are to be modified or extended the mechanical consultant shall contact UBCO Operations to determine what sections should be cleaned and treated.
 - .4 In renovation projects, where existing systems are extended or modified, the consultant shall review their original analysis of the pertinent water systems with UBCO Operations for a decision on the extent of the cleaning and whether or not it should be carried out by the contractor.
 - .5 In energy conservation retrofit projects, the consultant shall review their original analysis of all the water systems with UBCO Operations for agreement on cleaning the systems.
- .3 Technical Support
 - .1 The mechanical sub-contractor or, in the case of energy conservation retrofit projects, the controls-contractor, shall employ a Chemical Water Treatment Company approved by UBCO Operations to instruct and supervise the sub-contractor/contractor in the cleaning and treatment of the listed systems. The company shall employ technicians fully trained in the cleaning and treatment of building piping systems.
- .4 Characteristics of Control Chemicals
 - .1 Chemicals must be non-toxic when released to atmosphere, noncorrosive and non-staining if a leak occurs. Chemicals shall be compatible with all system components so that operation or life expectancy of the components is not affected by the application of the chemical treatment.

- .5 Existing Metering Pumps and Pot Feeders
 - .1 The consultant shall ensure that existing metering pumps and pot feeders are in good operative condition or shall install new devices where none exist. Refer to this Guideline.
 - .2 All water treatment heating and cooling shall have chemical pot feeders, flow indicators, bypass filters and water meters.
- .6 Cross Connection Control
 - .1 The consultant shall ensure that backflow prevention devices are incorporated to prevent control chemicals from migrating to potable water systems within the building or to the Campus Water Distribution System. Refer to Guideline Section 22 11 18 Backflow/Cross Connection Control for control devices and to AWWA requirements.

2.2 Pipe Cleaning Chemicals

- .1 Dispersant/Purging compounds must be approved by UBCO Operations. Compounds shall not cause odors.
- .2 Corrosion Inhibitors
 - .1 Chemical Water Treatment Companies and products used must be approved by UBCO Operations and Risk Management.
 - .2 Control Agent for Algae, Bacteria and Fungi (Biocide) for cooling tower water use: Sodium Hypochlorite.

2.3 Cleaning

- .1 Under the supervision of the UBCO Operations' approved Chemical Water Treatment Company and in the presence of the UBCO Operations' representative, the Mechanical Sub-Contractor/ Controls Contractor shall:
 - .1 Position all control valves and other in-line devices and remove all strainer gaskets so that all system components can be flushed.
 - .2 Drain system at all low points and flush with clean water to remove loose and suspended matter. Maintain flushing pressure and system venting to ensure that all circuits are flushed. System shall be drained and flushed a minimum of two times; continue until flushed water appears clean. Clean and replace baskets when flush complete.
 - .3 Supply and add a cleaning dispersant/purging compound to the system as recommended by the UBCO Operations' approved Chemical Water Treatment Company.
 - .4 Drain, flush, refill and repeat until water quality meets the acceptable level of 0.5 mm of suspended solids, including magnetite, as determined by the UBCO Operations' approved Chemical Water Treatment Company. For draining please follow Risk Management Environmental release procedure and contact UBCO Operations and Risk Management.
 - .5 Ensure that the system is filled and that all operational components are returned to their proper operational settings.

- .6 Ensure that the system is tight. Correct any leakage in piping installed under this contract. If leakage occurs in an existing system, report to the Mechanical Inspector of Campus Planning & Development.

2.4 Water Treatment

- .1 Supply and add the chemical scale and corrosion inhibitor to the closed circuit heating or chilled water piping system under the direction of, and according to, the concentration recommended by the UBCO Operations' approved Chemical Water Treatment Company.
- .2 All glycol systems shall be 30% by volume uninhibited propylene glycol and the glycol supplier shall require approval from UBCO Operations.
- .3 Supply and add the chemical scale and corrosion inhibitor to the open circuit condenser water system under the direction of, and according to, the concentration recommended by the chemical water treatment company.
- .4 Supply and add the algae, bacteria and fungi control agent to the cooling tower water under the direction of, and according to, the concentration recommended by the chemical water treatment company.
- .5 Obtain a receipt and give one copy to the consultant. The receipt shall be sent to UBCO Operations.

2.5 Testing

- .1 Chemical water treatment company shall provide a laboratory test report as required.
 - .1 Provide laboratory test reports confirming the correct chemical concentrations have been achieved.

2.6 Monitoring

- .1 Provide laboratory test reports and treatment recommendations for treated water samples taken by the owner's operating personnel.
- .2 Test reports will be sent to the chemical water treatment company monthly for the first three months, and once every three months thereafter for one year following the initial test.
- .3 Each analysis shall provide concentrations of significant components of each water sample as outlined by the water treatment company.
- .4 The cost of the testing is to be borne by the Contractor.
- .5 The UBCO Operations' approved Chemical Water Treatment Company shall send to the Owner on a scheduled basis, properly identified sample bottles for each of the systems to be tested as required.
- .6 Test reports shall be sent as they occur to UBCO Operations.

2.7 Reports

- .1 Test reports shall be sent as they occur to UBCO Operations.
- .2 A copy of reports shall be sent to the Consulting Engineer.
- .3 Provide four (4) copies of written instructions for the chemical testing and treatment specific to this project for insertion into the operating and maintenance manuals.

*****END OF SECTION*****