

## 23 61 00 - Chilled Water Systems

### 1. Introduction

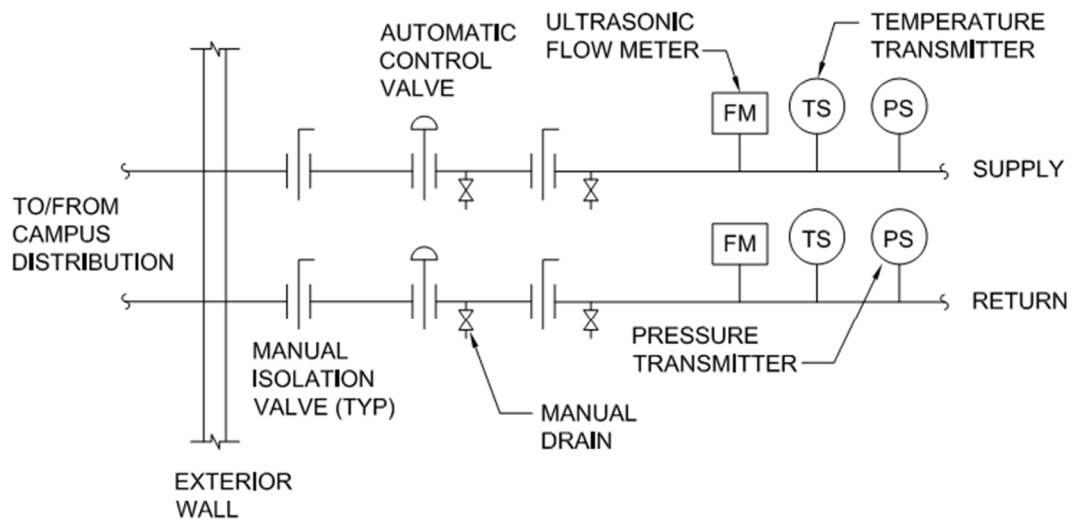
- A. The desired medium for all air conditioning systems is chilled water. Duke University has a campus chilled water system currently served by two central chilled water plants on West Campus and one central chilled water plant on East Campus, as well as several satellite chillers/chiller plants. The campus distribution system is configured in a variable primary flow arrangement, removing the need for decoupler pipes and building (secondary/tertiary) pumps.
- B. Campus chilled water is supplied to all buildings at 40°F with pressures up to 125 psi, depending on where the building is located on the distribution loop.

### 2. Design Standards

- A. All chilled water valves shall to be specified for ample close off pressures and capable of handling varying pressure gradients.
- B. All cooling coils should be designed for a 16°F-20°F chilled water temperature drop.
- C. Campus chilled water will not be used for anything other than HVAC systems or a closed heat exchanger.
  - 1. Process chilled water systems should be isolated from the campus chilled water system with a water-to-water heat exchanger.
- D. Though the central chilled water system is equipped with emergency generators, server rooms and computer rooms that require guaranteed chilled water service should be designed with a secondary cooling source.
- E. Chilled water control valves should be pressure independent (PI) valves
  - 1. Pressure independent control valves shall be able to shut off against a minimum of 200 psi. Valve manufacturer must be approved prior to installation.
  - 2. All PI valves should be installed on the coil return line.

3. A differential pressure (DP) sensor should be installed across the hydraulically most remote valve and should report back to the Central Plant Control System (Siemens Apogee) to be used in controlling the loop pump speed.
  4. Balancing devices are not necessary at chilled water coils. Flow will be measured and limited using the PI valves.
3. Documentation and Review Requirements
- A. Provide all calculations used to size PI valves.
4. Installation and Performance Requirements
- A. Building connection to campus chilled water system should include appropriate control and metering.
    1. Flow meters shall be installed in accordance with Duke Design Guideline 33 19 00 District Thermal and Water Utility Metering.
    2. Modulating standard butterfly valves should be located as close as possible to the pipe entrance/exit points.
    3. Building supply and return temperature sensors and a building differential pressure sensor are also required devices at the building entrance/exit points.
    4. All chilled water system devices are to be connected to a Siemens Apogee panel. These devices will be managed and monitored by Duke Utilities and Engineering Services Department (DUES).

## 5. Building Tie-In Schematic




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**CHILLED & HEATING WATER BUILDING CONNECTION DETAIL**

NOT TO SCALE

- B. Air separators are required in all new construction installations.
- C. Make-up water for the chilled water system is not required at each building; make-up water for the entire system is done at the central chilled water plant.
- D. Air vents should be installed at the highest system points and be equipped with ball valves for isolation.