

# STATE UNIVERSITY CONSTRUCTION FUND

## PROGRAM DIRECTIVES

DIRECTIVE 15H-3

Issue date: April 2014

### HYDRONIC SYSTEMS

#### General Requirements

1. Closed loop hydronic systems shall be used for all preheating, heating and reheating equipment as well as on chilled water systems.
2. Expansion tank shall be diaphragm or compression tank type with a specified pre-charge pressure listed. Air elimination (automatic) shall be provided at the point of lowest solubility.
3. Pumping systems shall be either primary/secondary decoupled type with dedicated primary pumps and variable speed secondary pumps or variable primary systems with provisions made to maintain minimum flows through generating equipment as required.
4. Pumping control (on variable flow systems) shall be by electronic variable speed drives (VSD). Provide NEMA premium efficiency motors, (inverter duty NEMA MG-1 for VSD applications). Use pulse width modulation variable frequency drives and provide isolation transformers where harmonics could be detrimental to Campus equipment. Provide line reactors/filters per manufacturer's recommendation when mounting location/distance requires. Provide bypass to allow equipment operation with VSD removed from service. Provide shaft grounding ring for the motor shaft to provide a path to electrical ground for induced shaft currents.
5. Pumping systems shall use a differential pressure bypass valve to control maximum pressure and provide minimum pump flow. The differential pressure transmitter shall be located at the most hydraulically-remote flow demand.
6. Pumping systems shall have standby pumps.
7. Separate piping loops shall be provided for air handling unit (AHU) preheat coils and building heating loops. Heating coils in AHU systems shall be freeze protected as required by Directive 15H-2 "Air Systems". Large glycol systems piped throughout a building should not be used if AHU's in the project are separated by substantial distances. Provide individual glycol heat exchanger systems locally at each mechanical room or penthouse.

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8. Piping system design to terminal units providing heating and cooling shall be 4 pipe systems. Use of two pipe changeover systems shall require approval from the Fund prior to any design submission.
9. Chilled and hot water temperature reset controls that automatically reset supply water temperature based on building load or outdoor air temperature shall be provided.
10. Water treatment shall be provided on all systems (hot water, chilled water, condensing water). Manual systems shall be used on closed systems. Automatic systems shall be used on open systems.
11. Make-up water supply shall be protected with an RPZ backflow preventer.
12. Self-regulating temperature control valves shall not be used.
13. All branch and pump circuits shall have a separate calibrated flow control valve and a separate shutoff valve. Strainers shall be provided upstream of terminal units and all control valves. Provision shall be provided for draining of all branch circuits.
14. Provide shut-off valves to isolate individual floors or floor areas as required permitting localized repairs with minimum impact on the building system.

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