

## **5. HVAC REQUIREMENTS**

### **A. General**

1. All boilers, pumps, expansion tanks, and heat exchangers need to include isolation valves and couplings on both sides of the units.
2. Utilize a constant volume design that utilizes VAV with reheats. Air temp should be set up on a reset schedule with a low of 60 degrees.
3. Utilize one thermostat for each area served (Example one per room or apartment).
4. If applicable utilize 4 pipe systems.
5. Any systems that have piping or coils exposed to outside air need to utilize a 30% mixture of Glycol.
6. Any systems that utilize Glycol need to have automatic Glycol feeders installed in the building to avoid diluting the Glycol mixture.
7. Separate expansion tanks on all chilled and hot water systems.
8. Provide make up water connection to boilers with automatic fill and manual bypass valve.
9. Provide and install a water meter on each make up water line.

### **B. Cooling Plant**

#### **1. General**

- a. When possible set up HVAC systems with dehumidification capability.
- b. Utilize high efficiency equipment to minimize future utility costs.
- c. All air intakes must be at least 10' off the ground.

#### **2. Under 5 Ton**

- a. Trane, York, Gibson, Carrier with others considered upon request.
- b. All units need to have a minimum 13 SEER rating.
- c. Thru the wall Heat Pump systems will be considered, depending on locations – use units with slide out chassis only (these units should be preferably York, otherwise, McQuay or GMC Cord and Plug Connected).
- d. Heat pumps are preferred, but AC systems with Electric heat will be considered.
- e. All units must have a proper size DX coil.
- f. Provide new control wires out to units, utilizing a minimum of 8 pair wire.

#### **3. Over 5 Ton**

- a. York equipment is preferred, Trane, and Carrier are also acceptable.
- b. Geothermal or Air Cooled systems preferred. Water cooled systems will be considered depending on location.
- c. Multiple compressor units only. No single compressor units.
- d. All systems should be replaced with a high efficiency system with a rating of 13 SEER or better.

**C. Hot Water Plant**

1. Areas that require large amounts of hot water (**Kitchens and Residence halls**).
  - a. Teledyne (Laars) or Burnham high efficiency propane hot water boilers (convertible to natural gas) preferred.
  - b. Redundant Gas Heating System will be provided with each sized at a minimum 2/3 of total load.
  - c. Boilers need to have a variable lead/lag controls installed, so that boilers are equally utilized.
  - d. This system should be piped in parallel so that one system can be shut down for service without affecting the building.
  - e. Plate frame heat exchangers need to be utilized when heat exchangers are specified.
2. Areas that do not require large amounts of hot water (Academic buildings).
  - a. Utilize electric water heater sized appropriately to accommodate all of the building functions without loss of hot water.

**D. Heating Plant**

1. Teledyne (Laars) or Burnham high efficiency propane hot water Boilers (convertible to natural gas) preferred.
2. Redundant Gas Heating System will be provided with each sized at a minimum 2/3 of total load.
3. When Commercial Oil Boilers/Furnaces are utilized they should be Webster Burners.
4. All Boilers need to have a variable lead/lag controls installed, so that boilers are equally utilized.
5. This system should be piped in parallel so that one system can be shut down for service without affecting the building.
6. Plate frame heat exchangers need to be utilized when heat exchangers are specified.
7. Buildings will be designed with a primary loop that is maintained at desired temperature. This loop should have a three way valve controlled by a reset schedule that will determine when the hot water is sent out to the building loop.
8. Terminal re-heat units and miscellaneous space heaters will have accessible controls and valves.

**E. A.H.U.**

1. Freez Stats need to be provided with all air handling units.
2. Utilize VFD controls to maximize energy efficiency.
3. Utilize high efficiency air filters.
4. Supply air temp.

**F. HVAC Instrumentation and Control**

1. All HVAC Controls – to be compatible with existing campus controls.
2. All controls for mechanical building systems will be DDC Bac-Net compatible and must provide full control functions.

3. A central computer station to monitor the various DDC panels will be provided at the building maintenance office.
4. Supply air temp.

**G. Insulation and Labeling Requirements**

1. All chilled water piping or line sets must be insulated with Elastomeric closed cell foam based insulating material with high water vapor diffusion (Example Armaflex).
2. All piping must be insulated and labeled with function and directional arrows, including existing cooling tower supply and return piping.
3. Any existing insulation disturbed must be replaced.
4. All valves must be labeled with their function.

**H. Training**

1. Full service training must be available to staff on all new equipment.