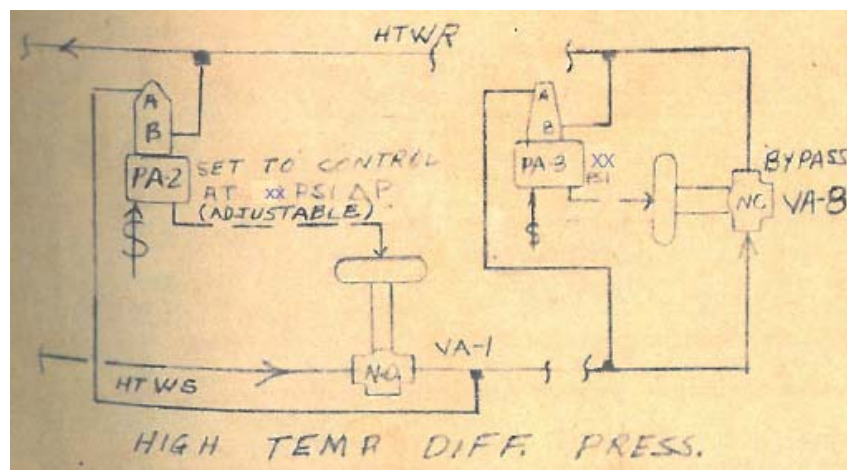


Heating, Ventilation and Air Conditioning (HVAC) HTHW Controls

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Part 1 – General:

- **Before 60% design release, high temp hot water (HTHW) system design must be submitted for Campus approval.**
- **HTHW Pressure Control:**
 - HTHW - Main Pressure Control Valve at main branches for Dutch Quad, Colonial Quad, State Quad, Indian Quad, Podium and Service Buildings:
 - Main Pressure Control Valves for each complex above shall be sized for approximately 75 psi maximum pressure drop at full flow.
 - An individual HTHW Pressure Control System is required for each branch off of the HTHW distribution loop located in the Mechanical Equipment Room.
 - Installed in the high temperature hot water supply line shall be:
 - A pneumatically controlled valve modulated by a pneumatic pressure differential controller (typical- Leslie UDDV) with its sensing elements in the supply and return water lines to that MER and it shall maintain a pressure differential between the supply and return lines to that MER in accordance with its setting.
 - Differential pressure shall be approximately 10% of main system pressure (typically 8 psi) subject to the location of the machine room in relation to the main high temperature hot water circulating pumps.
 - The typical campus installation includes a differential pressure-controlled bypass valve.
 - The HTHW pressure differential control valve in each MER shall be sized to reduce the pressure downstream of the valve to the minimum pressure necessary for design flow gpm through the downstream systems.
 - The HTHW bypass valves, one for each automatic pressure differential control valve at the end of HTHW main to each, shall be sized to pass 5% of building gpm at a pressure drop which is 20% higher than the individual system pressure drop when the valve is wide open.
- The pressure control scheme must:
 - Allow precise flow control and prevent potential system harmonic oscillation.
 - Pneumatic pressure differential control valve should fail open.
 - Typical pressure differential control diagram for a specific campus application, not a generalization:



- **HTHW Temperature Control:**
 - Temperature Control valves for each HTHW consuming unit shall be sized to pass design gpm in wide open position with a pressure drop equal to 90% of the effective upstream pressure.
 - The high temperature hot water throttling valves in the return line from the water to water heat exchanger shall be modulated by a thermostat located in the secondary water line leaving the heat exchanger:
 - With its sensing element located about ten (10) feet from the heat exchanger
 - To maintain a constant leaving secondary water temperature.
 - IF rate action is required for the controller to maintain a preset leaving temperature with a 3F +/- variation, it shall be provided.
 - Whenever the secondary water pump is stopped the high temperature water valve shall close. A hardwired differential pressure switch in the secondary distribution piping at the heat exchanger will vent air from the pneumatic valve and will shut the high temperature water valve.
 - This pneumatic valve should fail closed.
 - Whenever, due to malfunction of equipment, the leaving secondary water temperature rises above 240F the secondary water pump shall be started automatically and an alarm shall be indicated. An electric immersion thermostat (in dry-well) shall be used for the above safety control.
- **High Temperature Hot Water System Control Valves:**
 - All control valves shall be class 300 or greater with stainless steel trim, flanged connections with flanges finished to an 80 RMS smooth surface with no grooves.
 - The valves shall have an operator capable of providing sufficient force to close against the system pressure at zero flow.
 - No single control valve shall be larger than 2 inches. Where capacity requires a valve larger than 2 inches, two (2) valves shall be installed in parallel with the smaller valve sized for a maximum of 1/3 total capacity.
 - Each HTHW control valve requires a 3-valve bypass arrangement:
 - The bypass globe valve shall be of the same CV size as the control valve.
 - The shutoff valves must be located so as to permit maintenance of the control valve, while allowing the use of the heat exchanger.
 - Flanges and Flanged Fittings shall conform to ASA standard B16.5 and ASTM A181 for 300 lb. class.
 - All bolts shall be in conformance with ASTM standards A193 Grade B-7 for alloy steel bolts.
 - Gaskets shall be spiral-wound with compression limiting ring on the outer edges only. Such as Spirotallic Style 913, Tedit Metalflex 913, Flexitallic Style CG or Garlock [Flexseal RWI](#).