

## **236000S01 CENTRAL COOLING EQUIPMENT - Secondary Chilled Water Pumping with Return Chilled Water Temperature Control for Campus Buildings (Ameresco)**

See [006290S01 to 006290S04](#) for ESCO Buildings List / Compliance Requirements.

### 1. GENERAL

1. The University utilizes secondary building pumping with a decoupled loop for controlling campus/building chilled water return temperature and campus/building chilled water pressure.
2. Refer to Drawing No. 15541D01 for typical schematic layout for building chilled water piping with pumps, valves, accessories, and controls.
3. Pumps, piping, valves, controls, and accessories shall be new, full weight, and of sizes shown on the drawings.
4. Piping shall be installed at the locations shown on the construction drawings, properly graded and secured to insure noiseless circulation throughout the system. Supply and Return piping shall be properly erected to prevent the formation of air and water pockets. Any location that tends to trap air or hold water shall have air vents installed at the high points, and manual drain valves installed at the low points.
5. All buildings shall be installed with a chilled water meter. The metered data shall be communicated to the Delta room. Refer to electrical specifications for additional metering information. Refer to 15541D01 schematic for meter location.

### 2. MATERIALS AND EQUIPMENT

1. Building chilled water pump shall be sized to handle peak load building chilled water requirements.
2. Building chilled water control valve will accommodate a 150 PSI close-off pressure, operate with 100 PSI differential pressure, and be rated for 250 PSI.
3. All system valves, accessories, and piping shall be rated for 250 PSI.
4. Pumps, control valve sizing, and control sequencing shall be reviewed and approved by LCPPD prior to final design
5. Pumping shall utilize a VFD (see Electrical Section) for speed control of the building chilled water pump.

### 3. CONTROL WITH MULTIPLE AIR HANDLING SYSTEMS

The building pump shall be controlled locally by a hand/off/auto switch. If the switch is in the automatic position, the pump shall be controlled by the DDC. The frequency drive shall be controlled to maintain the differential pressure read on the sensor located at the end of the most remote piping run. This pressure shall be adjustable from the FMS. The drive shall be capable of being turned on or off or placed in bypass at the FMS. All VFDs shall be provided with internal bypass and line reactors. Refer to electrical specifications for additional information.

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**Page 1 of 2**

**Dated: 12/2015  
Applies to: All Buildings with chilled water  
University of Kentucky**

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The building chilled water control valve (normally closed) shall be modulated to maintain the return water temperature to a reset set point. Control point shall reset based on outside air temp. The supply water temperature after the pump should also be monitored. If this temperature rises above a supply limit set point, which shall be reset based on outside air temp, the control valve should be driven open to maintain this set point.

The decoupled loop valve (normally open) shall be remotely commanded to any set position from the FMS.

(Alternate) The decoupled loop valve (normally open) shall be modulated closed if the chilled water valve is fully open and mixed water temperature is more than 2°F (adjustable) higher than the supply water temperature.

Provide an outdoor air sensor to allow the owner to reset the return and maximum supply water temperatures based on outdoor air temperature.

**4. CONTROL WITH A SINGLE AIR HANDLING SYSTEM**

On the start of cooling, the building chilled water control valve (normally closed) shall be closed, the bypass valve (normally open) shall be open and the building chilled water pump shall be running to maintain 50% flow (work with the TAB contactor to determine this frequency). On a rise in cooling load the building chilled water control valve shall start to modulate open to maintain the air handlers discharge air temperature. The decoupled loop valve shall be controlled inversely to the building chilled water control valve. After the building chilled water control valve has reached 100% open and the cooling load is continuing to rise the pump's VFD shall modulate up to 100% as required to maintain the air handler's discharge air temperature.

The building pump shall be controlled locally by a hand/off/auto switch. If the switch is in the automatic position, the pump shall be controlled by the DDC. The frequency shall be adjustable from the FMS. If the pump is energized and the flow switch indicates no flow, the drive shall be shut down and alarm the DDC. The drive shall be capable of being turned on or off or placed in bypass at the FMS.

**5. PUMPS, CONTROLS, VALVE SIZING, AND CONTROL SEQUENCING SHALL BE REVIEWED AND APPROVED BY LCPPD PRIOR TO FINAL DESIGN.**