Element D Services

Heating, Ventilating, and Air Conditioning D3044 Hot Water Distribution

# **PART 1 - GENERAL**

#### 1.1 OVERVIEW

A. This section addresses design criteria for the Project's heating hot water system, including all isolation valves, hydronic piping and fittings, hydronic specialties, control valves and secondary pumps required to distribute heating hot water to the building air handling units, fan coil units, unit heaters, and reheatcoils.

# PART 2 - DESIGN CRITERIA

#### 2.1 GENERAL

- A. In new facilities the hot water heating distribution system shall be designed to maintain 140 degrees F to 110 degrees F heating water temperature via the steam / hot water shell and tube heat exchangers as noted in Design Guideline Element D3020 for the building air handling units, fan coil units, unit heaters and reheat coils. During periods when heating system demand is below peak capacity, heating water supply temperature is to be reset (down to 100F) to meet the building heating demand. Reduced heating water supply temperatures are intended to reduce heat loss through piping systems while satisfying heating loads.
- B. In sizing hot water piping, do not exceed 3 feet friction loss per 100 feet equivalent length. For copper piping systems, do not exceed 2 feet per second water velocity where maximum water temperatures will be in excess of 140 degrees F. and do not exceed 4 feet per second water velocity where maximum water temperatures will be less than 140 degrees F.
- C. Minimum <sup>3</sup>/<sub>4</sub> inch pipe size except at control valves.
- D. The heating hot water system shall be designed with 2-way control valves except for the 3-way valve on a single terminal device at the end of the piping loop. A/E to recommend if 3-way valve is unnecessary on any specific project.
- E. The A/E shall allow for redundant hot water heat exchangers and pumps. Select equipment such that one pump can be placed on standby and still be capable of maintaining system capacity based on peak design load. Pumps shall be vertical split case, horizontal split case or split-coupled vertical in-line type, selected at 1750 rpm. Pump configuration will depend on the scheduled capacity limits. Provide with end suction diffuser if five (5) pipe diameters at the suction end cannot be achieved.
- F. Hot water pumps shall be equipped with variable frequency drives.
- G. Heating hot water distribution system piping shall be insulated. Heating hot water pumps are not required to be insulated.
- H. Indicate isolation valves for the piping system on each floor as appropriate to the Project.
- I. Provide line shut-off valves at locations required for proper operation, servicing and

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troubleshooting of the HVAC hydronic distribution systems and connected components. Locations shall include but not be limited to the following; at each piece of equipment, at each branch take-off from mains, at the base of each riser, where recommended by equipment manufacturers and at strategic locations to allow sectional isolation while limiting disruption of services to large portions of the system.

- J. Hot water piping shall not be routed above any rooms with rooms with electrical power distribution, IDF/MDF rooms, and elevator equipment.
- K. Heating hot water pumps shall be on emergency power. Refer also to Design Guideline Element D3000 for additional emergency power requirements.
- L. Closed loop heating hot water piping system shall have a chemical pot feeder, air/dirt separator, and captive air expansion tank.
- M. In new facilities, maximize heating water temperature differential of 30 degrees F. Provide full size air and dirt separator on the heating hot water distribution loop.
- N. Incorporate a 2 inch drain at the lowest point of each riser. If the pipe riser is not located in a mechanical room, then indicate the full size drain hard piped to the nearest suitable floor drain.
- O. Incorporate a 2 inch quick fill at the lowest point of each riser. All risers shall have full size dirt legs.
- P. Coordinate with plumbing engineer to incorporate makeup water line with backflow preventer pressure reducing valve and flow meter.
- Q. Indicate automatic air vents at the top of each riser which are to be piped to the nearest floor drain. The system shall include a safety relief piping to nearest floor drain. A pressure alarm switch shall alert MD Anderson Monitoring Services of an abnormal condition via the BAS. To prevent nuisance alarms, alarm if open for more than 1 minute (adjustable) or if the valve opens 3 or more times in 24 hours (adjustable).

# **PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS**

#### 3.1 GENERAL

A. The A/E shall include a schematic of the heating hot water system, and also include locations details of full size drip / dirt legs on the drawings that show piping risers in the Contract Documents.

# PART 4 - PRODUCTS

#### 4.1 GENERAL

A. Refer to Owner's Master Construction Specifications. These are available on the Owner's Design Guidelines website: <u>http://www2.mdanderson.org/depts/cpm/standards/specs.html</u>

**Element D** Services Conditioning

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# **PART 5 - DOCUMENT REVISION HISTORY**

Issue	Date	Revision Description	Reviser
	20190301	Initial Adoption of Element	
Rev. 1			

# **END OF ELEMENT D3044**