

230620S01 Schedules for HVAC Piping Systems

Part 1 GENERAL REQUIREMENTS

1.01 GENERAL INFORMATION

Victaulic Piping Systems are to be an approved equal for Main Campus Projects Only, Not Med Center

1. Piping shall be new, full weight, and of sizes shown on the drawings. Ends of piping shall be cut square, reamed, and where applicable, all threads shall be sharp and true.
2. 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 automatic air vents installed at the high points, and manual drain valves installed at the low points. Any location on a steam line that holds water shall have a properly installed dirt leg and steam trap.
3. DIRECT BURY STEAM LINES ARE NOT ALLOWED, unless space constraints eliminate possibility of a tunnel. Consultant should contact the Physical Plant Division, Manager of Utilities to get approval for direct bury piping.
4. For underground piping see 230620S02 for Direct Buried Chilled Water Piping and 230620S03 for Underground and Direct Buried Steam and Condensate Piping.

1.02 GENERAL PIPE AND VALVE SPECIFICATIONS

1. All piping, fittings, valves, strainers, check valves, control valves, pressure reducing valves, etc., on the high pressure steam, boiler feedwater, and high pressure steam condensate return to be designed for 300 psig steam pressure, (300 Class) at 500 deg F.
2. Low Pressure Steam Condensate to have 300 lb fittings, not for pressure concerns, but for longer life against corrosion. 150 lb. rated valves and flanges are acceptable on steam condensate.
3. All chilled water piping systems to be designed for 250 psig working pressure, including pumps, valves, strainers and fittings.
4. Underground building drain pipe and fittings to be Cast Iron Soil Pipe ASTM A74, service weight, hub and spigot soil pipe and fittings. Pipe and Fittings shall have a heavy coating of coal tar varnish or asphaltum on both inside and outside surfaces. Hubs to have Neoprene Compression Gaskets: ASTM C564.
5. Valves for 3"-4" Chilled water supply and return:
 - a. Resilient seated, lug or grooved style Vic-300 Masterseal, Butterfly valves with bubble tight bi-directional shutoff at 250 psig pressure, Ductile iron body with locking handle, lever operators, 150 ANSI bolt pattern.
6. Valves for 6" and Up chilled water supply and return:
 - a. Resilient seated, lug or grooved style Vic-300/W761, Butterfly valves with bubble tight, bi-directional shutoff at 250 psig pressure, Ductile iron body with gear operator and hand wheels, 150 ANSI bolt pattern

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1.03 ALLOWABLE PIPING AND VALVE SCHEDULES

	SERVICE	SIZES	PIPE	FITTINGS AND VALVES
1	High Pressure Steam (above grade)	2" and Smaller	Sch 40 Black Steel ASTM A106, Grade B	300 lb. malleable iron, screwed (300 lb. bronze gate valve)
2	High Pressure Steam (above grade)	2-1/2" - 8"	Sch. 40 Black Steel ASTM A106, Grade B	Standard weight steel, welded (300 lb. cast steel flanged valves)
3	High Pressure Steam (above grade)	10' and larger	Black Steel ASTM A106, Grade B 1/2" wall thickness	Extra strong steel, welded (300 lb. cast steel flanged valves)
4	High Presssure Steam Condensate Boiler Feedwater (above grade)	2" and smaller	Sch. 80 Black Steel	300 lb. malleable iron, screwed (300 lb. screwed bronze gate valve)
5	High Presssure Steam Condensate Valves Boiler Feedwater (above grade)	2 1/2" and larger	Sch. 80 Black Steel	Extra strong steel, welded (300 lb cast steel gate flanged valve)
6	Low Pressure Steam (above grade)	2" and smaller	Sch. 40 Black Steel	150 lb. mallable iron, screwed (150 lb. bronze gate valves)
7	Low Pressure Steam (above grade)	2-1/2" and larger	Sch. 40 Black Steel	Standard weight steel, welded (150 lb. gate valves flanged)
8	Low pressure steam condensate (above grade)	2" and smaller	Sch. 80 Black Steel	300 lb. malleable iron screwed (150 lb. screwed bronze gate valve)
9	Low pressure steam condensate (above grade)	2-1/2" and larger	Sch. 80 Black Steel	Extra strong steel, welded (150 lb. steel gate valves or 125 lb. CI flanged gate valve)
10	Safety Valve Vents	2" and smaller	Sch. 40 Black Steel	125 lb. Cast iron, screwed

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	SERVICE	SIZES	PIPE	FITTINGS AND VALVES
11	Safety Valve Vents	2-1/2" and larger	Sch. 40 Black Steel	Standard weight steel, welded
12	Gas (above grade)	2" and smaller	Sch. 40 Black Steel	150 lb. malleable iron, screwed (175 lb. WOG plug valves, screwed)
13	Gas (above grade)	2-1/2" and larger	Sch. 40 Black Steel	Standard weight steel, welded (175 lb. WOG plug valves, flanged)
14	Compressed air for control air	All sizes	Type L (1/8" to 1/2" soft copper) (3/4" and up, hard copper)	Compression brass for small piping Wrought copper for large piping
15	Condensate drains for air handlers	All sizes	DWV copper	Wrought copper Lead free solder
16	Chilled Water Supply and Return (above grade)	2-1/2" and smaller Victaulic only on 2" and larger	Type L Hard Copper	Wrought copper. Lead free solder. Victaulic grooved style 607N rigid couplings and fittings (bronze ball, gate valve, Victaulic style 608N butterfly, 300 psig WOG)
17	Chilled Water (above grade)	3" - 4"	Type L Hard Copper	Wrought copper. Lead free solder. Victaulic grooved style 607N rigid couplings and fittings 150 lb. bronze solder flanges
18	Chilled Water (above grade)	6" and up	Sch. 40 Black Steel	Standard weight steel, welded. Victaulic grooved style 107N for 2"-12" and W07 for 14" and above. (150lb or 250lb flanges to match valves.)
19	Domestic Cold Water, Underground	All sizes	Type K Hard Copper	Wrought copper lead free solder (150 lb. flanged or screwed gate or ball bronze valves)

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	SERVICE	SIZES	PIPE	FITTINGS AND VALVES
20	Domestic Cold Water, Underground	4" and above	Cement lined ductile iron pipe	Restrained Joint Ductile Iron Pipe Suitable for 150 psig working pressure
21	Domestic Hot and Cold Water	All sizes Victaulic only on 2" and larger	Type L Hard Copper	Wrought copper lead free solder, Victaulic grooved style 607N rigid couplings and fittings (150 lb., flanged, screwed, gate, ball or style 608N grooved butterfly bronze valves)
22	Heating Hot Water	4" and less Victaulic only on 2" and larger	Type L Hard Copper	Wrought Copper, lead free solder. Victaulic grooved style 107N rigid couplings and fittings (150 lb, gate flanged, screwed or style Vic-300 grooved butterfly bronze valves)
23	Heating Hot Water	6" and up	Sch. 40 Black Steel	Standard weight steel, welded. Victaulic grooved style 107N rigid couplings for 2-12" and W07 for 14" and above and fittings (150 lb, gate flanged cast iron valves, style Vic-300/W761 grooved butterfly)
24	Plumbing drain and waste	4" and less	DWV copper	DWV copper. Lead free solder. Iron soil pipe fittings
25	Plumbing drain and waste	Over 4" except for 2" to 4" in lieu of Copper	Service weight Hubless Cast Iron Soil pipe	Service weight, hubless cast above concrete, hub and spigot below concrete and extra heavy duty 4 band clamps
26	Acid waste	All sizes	Standard weight, ASTM C 599 glass pipe	Glass fittings, Compression type couplings

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27	Acid waste substitute	All sizes	Standard weight, flame retardant polypropylene Pipe and fittings, ASTM F1412	Grooved mechanical joint couplings and fittings. Couplings of 300 series Stainless Steel outer band, and 5/16" bolts. The polypropylene material shall conform to ASTM D4101
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1.03 MANUFACTURERS

COPPER

- A. Wrought-Copper Fittings: ASME B16.22.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Victaulic Company of America.
 2. Grooved-End Tube Couplings: Rigid pattern, unless otherwise indicated; gasketed fitting. Ductile-iron housing with keys matching pipe and fitting grooves. Gasket shall be Grade "P" fluoroelastomer compound designed for potable water service. Couplings shall be Victaulic Style 607 and Butterfly Valve Victaulic Style 608N. If contractor elects to use stainless steel, Victaulic style 889 Couplings may be utilized in conjunction with Style 861 Butterfly Valve.

CARBON STEEL

- B. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work for Heating Hot Water, Condenser Water and Chilled Water include, but are not limited to, the following:
 - a. Couplings shall be Victaulic Styles 107N for 2" – 12" and W07 for 14" and above. Gaskets shall be grade "EHP" EDPM designed for operating temperatures from -30 deg F to +250 deg F.
 - b. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Three flexible couplings may be used in lieu of flexible connectors at equipment connections and shall be placed in close proximity to the vibration source. Victaulic Style 177/W77. Equipment may be dressed with Style 380, 381 and 385 assemblies in conjunction with Victaulic headers.
 - c. All grooved components must be of one manufacturer.
 - d. Victaulic 300-Series/WVic-300 Butterfly Valve and 716/W716 Check Valve may be used with grooved piping system. Utilization of "Tri-Service" Assembly is acceptable
 - e. Victaulic Style 730/W730 Strainers are acceptable. Contractor may utilize Victaulic Style 731D Suction Diffuser with grooved end piping system.

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- f. Victaulic Y-Patterson Globe Style Balance Valve shall be utilized on coil connections.
 - g. Contractor may elect to utilize prefabrication services through Victaulic.
- C. Grooved Joining Method. Assemble joints with coupling and gasket, lubricant and bolts. Cut or Roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions, which may or may not include torque settings, torque wrenches, extreme lubricant and specified gaps. Engineer and Owner reserve the right to inspect any and all installation of product. Factory trained representative must periodically visit the job site and provide on-site training. Grooved pipe shall be produced using the Victaulic RG5200i/5200i fully automated grooving tool, where applicable, that provides groove traceability documents, corresponding identification marks on the pipe, and confirm all critical dimensions fall into the required tolerance range as listed by the tool manufacturer.

1.04 INSPECTION SERVICES AND WARRANTY

Base Version:

1. The installing contractor shall be certified by the grooved coupling manufacturer. A Victaulic factory trained representative (direct employee) shall provide on-site certification training for the contractor's field personnel in the use of grooving tools, application of groove, and product installation. Applicable pipe shall be grooved utilizing Victaulic RG5200i grooving machine. A manufacturer's factory trained inspector shall visit the job site and review grooved joint products installation. The installing contractor shall remove and replace any improperly installed products. Upon completion of the manufacturer's inspection of the installation, the manufacturer will supply the owner and engineer with an inspection log and subsequent extended ten-year warranty on the inspected products.

Extended Version:

- a. Tooling:
 - i. Applicable pipe shall be grooved utilizing Victaulic automated roll grooving tool (RG5200i). Documented grooving dimensions shall be given to engineer/owner at their request.
- b. Training
 - i. A Victaulic factory trained representative (direct employee) shall provide on-site training for the contractor's field personnel in the use of grooving tools, application of groove, and product installation.
- c. Inspection
 - i. A manufacturer's factory trained inspector shall visit the job site and review all grooved joint product installation. The products must be inspected prior to insulation being applied and is contractor's responsibility to coordinate with manufacture. The installing contractor shall remove and replace any improperly installed products.
- d. Warranty
 - i. Upon completion of the manufacturer's inspection of the installation, the manufacturer will supply the owner with an extended ten-year warranty on the inspected products.