

SECTION 232114 - GROOVED MECHANICAL-JOINT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes 2.5-inch and larger, Victaulic piping, fittings, valves, and specialties for mechanical piping systems within the building in mechanical spaces, behind access panels, and above accessible ceiling tiles, which include hot-water heating and condenser water systems.
- B. Related Sections include the following:
 - 1. Section "Hydronic Piping" for hydronic piping including the listed Related Sections.

1.3 SUBMITTALS

- A. Product Data: For each type of special-duty valve indicated. Include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves.
- B. Shop Drawings: Detail fabrication of pipe anchors, hangers, special pipe support assemblies, alignment guides, expansion joints and loops, and their attachment to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
 - 1. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and be specifically identified with the applicable Victaulic style or series number.
- C. Field Test Reports: Written reports of tests specified in Part 3 of the "Hydronic Piping" Section. Include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- D. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

- B. To assure uniformity and compatibility of piping components in grooved end piping systems, all grooved products utilized shall be supplied by Victaulic. Grooving tools shall be supplied by the same manufacturer as the grooved components.

1.5 COORDINATION

- A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.
- B. Coordinate pipe sleeve installations for foundation wall penetrations.
- C. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations. Roof specialties are specified in Division 7 and/or 15 Sections.
- D. Coordinate pipe fitting pressure classes with products specified in related Sections.
- E. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into base. Concrete, reinforcement, and formwork requirements are specified in Division 3 Sections.
- F. Coordinate installation of pipe sleeves for penetrations through exterior walls and floor assemblies. Coordinate with requirements for firestopping specified in Division 15 Section "Through-Penetration Firestop Systems" for fire and smoke wall and floor assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grooved Mechanical-Joint Fittings and Couplings:
 - a. Victaulic
 - b. Or Approved Equal

2.2 PIPING COMPONENTS

- A. Standard Couplings: Grooved couplings consisting of two pieces of ductile iron with reverse angle pads (rigid type). Coupling gaskets will be Grade "E" EPDM pressure responsive synthetic rubber, green color-coded. Coupling bolts and nuts shall be heat-treated carbon steel, trackhead design conforming to physical properties of ASTM-A-183 and A-449. All grooved couplings shall be as manufactured by Victaulic Co. rigid Style 107 "Quick-Vic" and Style 07 "Zero-Flex" or flexible Style 77. Victaulic standard couplings may be used in lieu of welding, threading, or flanging on 2 ½" through 12" carbon steel pipe, on water services from -30 degrees F to + 230 degrees F within the manufacturer's rated working pressures. Pipe grooving shall be rolled grooved as per manufacturer's latest spec. Installation is per manufacturer's latest recommendations.

1. Rigid Type: Coupling housings cast with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ASME B31.1 and B31.9.
 - a. 2" through 6": "Installation Ready" stab-on rigid coupling designed for direct 'stab' installation onto grooved end pipe without prior disassembly of the coupling. Gasket shall be Grade "EHP" EPDM compound with red color-code designed for operating temperatures from -30°F to +250°F.
 - b. 2" through 12": Standard rigid coupling with Grade "E" EPDM gasket with green color-code designed for operating temperatures from -30°F to +230°F.
 2. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Flexible couplings may be used in lieu of flexible connectors at equipment connections. Three couplings shall be placed in close proximity to the vibration source.
- B. AGS (Advanced Grooved System) Couplings: Grooved couplings consisting of two pieces of ductile iron cast with a wedge-shaped key profile, lead-in chamfer, and flat bolt pads for metal-to-metal contact. Coupling gaskets will be Grade "E" EPDM wide-width, pressure responsive synthetic rubber of a FlushSeal design, green color-coded. Coupling bolts and nuts shall be heat-treated carbon steel, trackhead design conforming to physical properties of ASTM-A-183 and A-449. All AGS grooved couplings shall be as manufactured by Victaulic Co. rigid Style W07 "Zero-Flex" or flexible Style W77. Victaulic AGS couplings may be used in lieu of welding, threading, or flanging on 14" through 24" roll grooved carbon steel pipe, on water services from -30 degrees F to +230 degrees F within the manufacturer's rated working pressures. Pipe grooving shall be rolled grooved as per manufacturer's latest spec. Installation is per manufacturer's latest recommendations.
1. Rigid Type: Provides a rigid joint that corresponds to support spacings as defined by ASME B31.1 and B31.9.
 2. Flexible Type: Allows for linear and angular movement, vibration attenuation and stress relief.
- C. Branch Connections: For piping 2-1/2" and larger, full-size branch connections shall be made with manufactured grooved end tees. Branch connections for less than full size shall be made with Victaulic hole cut products. Style 920 or Style 920N branch connections with locating collar engaging into hold or Style 72 outlet coupling used to join grooved pipe and to create a branch connection. Gaskets for branch connection shall be Victaulic Grade "E" EPDM Compound with working temperature of -30 degrees F to 230 degrees F.
- D. Flanges: Vic-Flange Style 741 (2"-12") and Style W741 (14"-24") for connection to ANSI class 125 and 150 flanged components. Vic-Flange Style 743 (2"-12") for connection to class 300 flanged components. Flange adapter nipple W45 (14"-24") for connection to class 150 flanged components.
- E. Fittings: Standard fittings shall be full-flow cast fittings, steel fittings or segmentally welded fittings with grooves or shoulders designed to accept Victaulic grooved end standard couplings. AGS fittings shall be full-flow cast fittings, steel fittings or segmentally welded fittings with AGS wedge-shaped grooves designed to accept Victaulic "W" series couplings. Standard and AGS Fittings shall be cast of ductile iron conforming to ASTM A-536 (Grade 65-45-12); forged steel conforming to ASTM A-234 (Grade WPB); or fabricated from carbon steel pipe (Type F, E or S Grade B), painted with a rust inhibiting modified vinyl alkyd enamel or hot-dip galvanized to ASTM A-153 or zinc electroplated to ASTM B-633 as required. Standard Segmentally Welded Fittings: Shall be factory fabricated, by fitting manufacturer, of carbon steel pipe.
- F. Butterfly Valves: Vic 300 MasterSeal™ sizes 2" through 12"- a grooved end butterfly valve for all services up to and including 300 psi. Valve body shall be ductile iron with grooved ends designed to accept grooved mechanical couplings. Valves shall be bi-directional and provide

bubble-tight shut-off and dead-end service at full rated working pressure. Offset disc seal (EPDM) shall be rated for service up to 250 degrees F.

- G. Butterfly Valves: Vic 300 AGS sizes 14" through 24", AGS grooved end BFV. Has a single piece ductile cast body, PPS coated for corrosion resistance. The ductile iron disc is PPS coated and rides on a stainless steel stems with stainless steel wetted hardware. The EPDM seal mounted on the offset disc seals on the body for bi-directional working pressure and dead end service of 300 psi.
- H. Butterfly Valves: Series 608 Butterfly Valves 2-½" through 6" with grooved end body for all services up to and including 300 psi. Valve body shall be Bronze per CDA-836 (85-5-5-5) with grooved ends designed to accept grooved Victaulic couplings. Valves shall be bi-directional and provide bubble-tight shut-off and dead-end service at full rated working pressure. Disc seal (EPDM) shall be rated for service up to 230 degrees F.
- I. Plug Valves: Plug Valve Series 377 sizes 3" through 12" eccentric grooved end valve for throttling services. The body is ductile iron (ASTM-A-536) and coated with alkyd enamel. The eccentric plug, integral with the upper and lower stems is of high strength ductile iron (ASTM-A-536). The plug is encapsulated with Grade E EPDM rubber rated at 230 degrees F for services.
- J. Ball Valves: Ball Valves shall be Vic Ball Style 726 Ball Valves, designed for 800 psi (CWP) bubble tight working pressure.
- K. Check Valves: Series 716 2-½" through 12" Vic-Check Valve with a tilting disc design spring loaded. The disc is aluminum bronze or encapsulated with grade EPDM rubber rated at 230 degrees F for water services. Body seat is an integrally welded on nickel alloy. It is rated for 300 psi.
- L. Check Valves: Series W715, 14" through 24" Vic-Check Valve with AGS grooved ends, dual disc design, spring loaded. The disc is 304 stainless steel with grade EPDM rubber seat bonded to the valve body, rated at 230 degrees F for water services, 230 psi.
- M. Swing Check Valves: Swing Check Valves shall be Vic Swinger Series 712 in sizes 2" through 4" with full port opening and bolted coupling closure access. Valves shall be rated for 300 psi working pressure, "E" EPDM Disc Seat ASTM D-2000.
- N. Tri-Service Valve Assembly: 2-½" through 12", straight pattern, combination shutoff, throttling and non-slam check service in one unit. Victaulic Vic-300 MasterSeal butterfly valve and Series 779 Venturi check valve with flow measurement capabilities assembled with Victaulic couplings (style to be determined by system requirements). Assembly shall be rated for 300 psi working pressure.
- O. Tri-Service Valve Assembly: 14" through 24", straight pattern, combination shutoff, throttling, and non-slam check service in one unit. Victaulic Vic 300 AGS butterfly valve and Series W715 check valve assembled with AGS couplings (style to be determined by system requirements). Assembly shall be rated for 232 psi working pressure.
- P. Suction Diffuser: Suction Diffuser Style 731-G and W731-G: Ductile iron body conforming to ASTM A-536. Diffuser stainless steel type 304 frame and perforated sheet with 3/16" or 5/32" diameter holes.
- Q. Strainer: Strainer Style 730 2" through 12" Tee Pattern Strainer for easy access and cleaning with grooved ends for installation in vertical down flow or horizontal flow position.

- R. Strainer: Strainer Style W730 14" through 24" Tee Pattern Strainer for easy access and cleaning with AGS grooved ends for installation in vertical down flow or horizontal flow position.
- S. Strainer: Strainer Style 732 2" through 12" WYE type strainer for easy access and cleaning with grooved ends. It is rated for 300 PSI.

2.3 TOUR & ANDERSON BALANCING VALVES

- A. ½" through 2" Series 786 solder style end and Series 787 Threaded-end 300-psi Y-Pattern non-rising stem Circuit Balancing Valves, non-ferrous Ametal brass copper alloy body, EPDM O-Ring seals with pressure taps. 4 turn digital readout handwheel for balancing, hidden memory feature with locking tamper proof setting. Positive shut-off with no drip seat.
- B. 2-½" through 12" Series 788 Y-Pattern non-rising stem Circuit Balancing Valve with 125 flanged ends, 250 PSI. ASTM-A-536 ductile iron body, all other parts of Ametal brass copper alloy, EPDM-O- Ring seal with pressure taps. Valve shall have 8, 12, or 16-turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting. Positive shut-off with no drip seat.
- C. 2-½" through 12" Series 789 Y-Pattern non-rising stem Circuit Balancing Valve with grooved ends, 300 PSI. ASTM-A-536 ductile iron body, all other parts of Ametal brass copper alloy, EPDM O-Ring seals with pressure taps. 8, 12 or 16-turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting. Positive shut-off with no drip seat.
- D. Victaulic Style 738 portable differential pressure meter for use with Tour & Anderson balancing valves. Aluminum body, Buna-N seals, and Type 316 stainless steel wetted parts. Diameter of dial face to be 2-1/2" with a pressure range of 0-135" (0-3429 mm) of water. Securely mounted in a rugged plastic carrying case with two six foot connection hoses.
- E. Install Series 78U union port fitting and Series 78Y strainer/ball valve combination to complete terminal hookup at coil outlet.

2.4 CLEARFLOW DIELECTRIC WATERWAYS

- A. The units shall be Style 47. The units have an electro-zinc-plated casing with a chemically inert, NSF/FAD listed dielectric thermoplastic lining. Designed to effectively isolated ferrous from non-ferrous piping (electrical conductance, prevent galvanic action, and stop corrosion).

2.5 MICELLANEOUS CONNECTIONS

- A. VIC-LET STYLE 923: Provides an easy pipe outlet, on pipe sizes 4" and larger, without the need for a strap or low housing to wrap around the pipe. Units have either a ½ or ¾ inch outlet and are rated for 300 psi.
- B. VIC-LET STYLE 924: Provides an easy connection combining the features of thermo-well and strapless mechanical outlet. Vic-O-Well is machined to 1-1/4-18 NEF 2B extra find threads to receive thermometers with 6" nominal bulb length.

2.6 EXPANSION OF PIPES

- A. All piping within building shall be so installed as to avoid serious strain or distortion from expansion and contraction. Expansion and contraction shall be provided by means of loops or bends consisting of (8) Victaulic Style 75 or 77 flexible couplings, (4) Victaulic 90 degree elbows and (4) grooved end pipe spools in accordance with Victaulic recommendations for expansion compensation.
- B. Install Victaulic in-line expansion joints in water piping systems that are installed in enclosures where pipe bends or loops cannot be applied:
 - 1. 2" through 6" Sizes: Packless, gasketed, slip-type expansion joint with grooved end telescoping body for installation with Style 07 rigid couplings providing up to 3" axial end movement, designed for working pressures up to 350 psi. Victaulic Style 150 Mover®.
 - 2. ¾" and Larger Sizes: Combination of grooved end short nipples and Style 75 or 77 flexible couplings joined in tandem to provide increased expansion. Joint movement and expansion capabilities determined by number of couplings/nipples used in the joint. Pressure rating dependent on size and style of flexible couplings used. Victaulic Style 155.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Victaulic couplings may be used in lieu of welding, threading, or flanging on 2-½" through 24" carbon steel pipe, on water services from -30 degrees F to + 230 degrees F within the manufacturer's rated working pressures. Pipe grooving shall be rolled grooved as per manufacturer's latest spec. Installation is per manufacturer's latest recommendations.
- B. Dual Temperature Water, NPS 2-1/2 and Larger: Schedule 40 steel pipe with grooved mechanical-joint couplings.

3.2 PIPING INSTALLATIONS

- A. Pipe grooving shall be rolled grooved as per manufacturer's latest spec. Installation is per manufacturer's latest recommendations.
- B. Refer to Section "Hydronic Piping" for additional piping installation requirements.
- C. All Victaulic components installed and requirements for hanging, supporting, anchoring, expansion and contraction shall be accordance with the latest published instructions from Victaulic.
- D. Pressure and temperature ratings are shown in manufacturer's latest published literature for individual style of coupling and gasket.
- E. Victaulic Pipe Hanging (Victaulic Hanging Standard A-130) Style 07 Zero-Flex for rigid piping systems should be supported as per Building Services B31.9 Hanging.
- F. Style 77 flexible piping systems a supported as per Victaulic hanging Standard A-130.

- G. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove.
- H. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Gaskets shall be supplied by Victaulic.
- I. Install the Victaulic AGS piping system in accordance with the latest Victaulic installation instructions. Pipe ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Use Victaulic grooving tools with AGS roll sets to groove the pipe. Follow Victaulic guidelines for tool selection and operation.
- J. Coupling installation shall be complete when visual metal-to-metal contact is reached. AGS products shall not be installed with standard grooved end pipe or components. Installing AGS products in combination with standard grooved end products could result in joint separation and/or leakage.
- K. A Victaulic factory trained field representative shall provide on-site training to contractor's field personnel in the installation of grooved piping products. Factory trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

END OF SECTION 232114