Victaulic Standard Grooved and Advanced Grooved (AGS) Piping System for IPS Steel 2” (DN 50) through 60”(DN1500)

1.01 General:

A. Section Includes:

1. General
2. Materials:
   a. Pipe
   b. Victaulic Couplings
   c. Victaulic Fittings
   d. Victaulic Valves
   e. Victaulic Specialties
   f. Victaulic Tooling
3. Execution

B. Submittals:

1. Victaulic products shall be shown on drawings and product submittals and shall be specifically identified with the applicable Victaulic style or series number.

C. References:

1. American Society for Testing Materials (ASTM)
   a. ASTM A-53 – Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
   b. ASTM A-183 – Carbon Steel Track Bolts and Nuts
   c. ASTM A-234 – Standard Specification For Piping Fittings or Wrought Carbon Steel and Alloy Steel.
   d. ASTM A-449 – Quenched and Tempered Steel Bolts and Studs
   e. ASTM A-536 – Ductile Iron Castings
   f. ASTM F-1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications

2. American Society of Mechanical Engineers
   a. ASME B16.9 – Factory Made Wrought Butt Welded Fittings
   b. ASME B31.1 – Chemical Plant and Petroleum Refining Piping
   c. ASME B31.9 – Building Services Piping

3. American Water Works Association
   a. AWWA C-606 – Grooved and Shouldered Joints

D. Quality Assurance

1. 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.

2.01 Materials:

A. Pipe/Grooved (Standard/Lightwall): Carbon Steel, A-53B/A-106B - Roll or cut grooved-ends as appropriate to pipe material, wall thickness, pressures, size and method of joining. Pipe ends to be grooved in accordance with Victaulic current listed standards conforming to ANSI/AWWA C-606.

B. Victaulic Mechanical Couplings for Joining Carbon Steel Pipe

1. **Victaulic Standard Mechanical Couplings, 2 inch (DN50) through 12 inch (DN300)**: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. (Gaskets used for potable water applications shall be UL classified in accordance with ANSI/NSF-61 for potable water service.) Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and ASTM A-183, minimum tensile strength 110,000 psi (758450 kPa) as provided standard Victaulic.

   a. **Rigid Type**: Coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1, B31.9, and NFPA 13.
      a. 2” (DN50) through 8” (DN200): Victaulic Style 107H (Quick-Vic™). Installation ready rigid coupling for direct stab installation without field disassembly. Gasket shall be Grade “EHP” EPDM compound with red color code designed for operating temperatures from -30 deg F (-34 deg C) to +250 deg F (+120 deg C).
      b. 10” (DN250) through 12” (DN300): Victaulic Style 07 (Zero-Flex®). Standard rigid coupling. Gasket shall be Grade “E” EPDM compound with green color code designed for operating temperatures from -30 deg F (-34 deg C) to +230 deg F (+110 deg C).

b. **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, for each connector, shall be placed in close proximity to the vibration source.
   a. 2" (DN50) through 8" (DN0200): Victaulic Style 177 (Quick-Vic™). Installation ready flexible coupling for direct stab installation without field disassembly. Gasket shall be Grade "EHP" EPDM compound with red color code designed for operating temperatures from -30 deg F (-34 deg C) to +250 deg F (+120 deg C).
   b. 10" (DN250) through 12" (DN300): Victaulic Style 75 or 77 standard flexible couplings. Gasket shall be Grade "E" EPDM compound with green color code designed for operating temperatures from -30 deg F (-34 deg C) to +230 deg F (+110 deg C).

2. **Flange Adapters**: For use with grooved end pipe and fittings, flat faced, for mating to ANSI Class 125 / 150 flanges. Victaulic Style 741. For direct connection to ANSI Class 300 flanges use Victaulic Style 743.

3. Grooved couplings shall meet the requirements of ASTM F-1476.

4. **Gasket:** Synthetic rubber conforming to steel pipe outside diameter and coupling housing, manufactured of elastomers as designated in ASTM D-2000.

   a. Reference shall always be made to the latest published Selection Guide for Victaulic Gaskets for proper gasket selection for the intended service.

5. **Victaulic AGS Mechanical Couplings, 14 inch (DN350) through 60 inch (DN1500)**: Couplings shall consist of two ASTM A-536 ductile iron housing segments, a wide elastomer pressure responsive gasket, and zinc electroplated carbon steel track head bolts and nuts conforming to the physical and chemical requirements of ASTM A-449 and the physical requirements of ASTM A-183.

   a. Coupling housings designed with the wedge-shaped AGS key profile to engage the mating pipe(s)/component(s) wedge-shaped AGS grooves. Housings include lead-in chamfer to accommodate a wider acceptable range of initial pipe positions. Housings shall be coated with orange enamel or galvanized.

b. Gasket: Wide width, pressure-responsive, synthetic rubber of a FlushSeal® design, conforming to steel pipe outside diameter and coupling housing, manufactured of elastomers as designated in ASTM D-2000.

1) Grade “E” EPDM with green color code designed for operating temperatures from -30 deg F (-34 deg C) to +230 deg F (+110 deg C).
2) Grade “T” Nitrile with orange color code designed for operating temperatures from -20 deg F (-29 deg C) to +180 deg F (+82 deg C).
3) Grade “L” Silicone with red color code designed for operating temperatures of -30 deg F (-34 deg C) to +350 deg F (+177 deg C); recommended for dry heat service (air without hydrocarbons).
4) Reference shall always be made to the latest published Selection Guide for Victaulic Gaskets for proper gasket selection for the intended service.

c. Coupling Types:

1) **Victaulic W07 AGS Rigid Coupling**: Coupling key shall be designed to fill the wedge shaped AGS groove to provide a rigid joint that corresponds with support spacings as defined by ASME B31.1 and B31.9. Systems incorporating rigid couplings require the calculated thermal growth/contraction of the piping system to be fully compensated for in the design of the piping system through use of adequate flexible components.

2) **Victaulic W77 AGS Flexible Coupling:** Coupling key shall be designed to fit into the wedge shaped AGS groove and allow for linear and angular movement, vibration attenuation, and stress relief. Support requirements defined by Victaulic Design Data Submittal 26.01.

3) **Victaulic Style W741 Flange Adapter 14 inch (DN350) to 24 inch (DN600):** For use with AGS grooved end pipe and fittings, flat faced, for mating to ANSI Class 125 / 150 flanges.

C. Victaulic Grooved End Fittings:

1. Standard 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 0.375" wall (9,53 mm wall), or fabricated from Std. Wt. Carbon Steel pipe conforming to ASTM A-53, Type F, E or S, Grade B. Fittings provided with an alkyd enamel finish or hot dip galvanized to ASTM A-153. Zinc electroplated fittings and couplings conform to ASTM B633.

2. AGS Fittings shall be supplied with factory AGS grooved ends, for use with Victaulic W07 or W77 couplings and W741 flange adapter. Fittings shall be manufactured of ductile iron conforming to ASTM A-536, forged carbon steel conforming to ASTM A-234, or factory fabricated from carbon steel pipe conforming to ASTM A-53. Fittings shall be manufactured to the dimensional standards ASME B16.9. Orange enamel coated or galvanized.

3. **Victaulic Hole-Cut Branch Outlets**:

   a. **Bolted Branch Outlet**: Branch reductions on 2"(DN50) through 8"(DN200) header piping. Bolted branch outlets shall be manufactured from ductile iron conforming to ASTM A-536, Grade 65-45-12, with synthetic rubber gasket, and heat treated carbon steel zinc plated bolts and nuts conforming to physical properties of ASTM A-183. Victaulic Style 920 / 920N.

   b. **Strapless Outlet**: 1/2"(DN15) or 3/4"(DN20) NPT outlet on 4" (DN100) and larger header sizes rated for 300 PSI (2065 kPa). Victaulic Style 923.

   c. **Strapless Thermometer Outlet**: To accommodate industrial glass bulb thermometers with standard 1-1/4"-18 NEF 2B extra fine thread and 6" (152mm) nominal bulb length on 4" (DN100) and larger header sizes rated for 300 PSI (2065 kPa).

D. Victaulic Grooved End Valves

1. Butterfly Valves

   a. **2"(DN50) through 12"(DN300) Sizes**: 300 psi CWP (2065 kPa) suitable for bidirectional and dead-end service at full rated pressure. Body shall be grooved end black enamel coated ductile iron conforming to ASTM A536. Disc shall be [electroless nickel plated ductile iron] [stainless steel] [aluminum bronze] with blowout proof 416 stainless steel stem. Disc shall be offset from the stem centerline to allow full 360 degree seating. Seat shall be pressure responsive

[EPDM] [Lubricated Nitrile] [Fluoroelastomer]. Valve bearings shall be TFE lined fiberglass, and stem seals shall be of the same grade elastomer as the valve seat. Valve shall be complete with ISO flange for actuation mounting. Valve operators shall be lever handle or gear operator, available with memory stop feature, locking device, chainwheel, or supplied bare. (Valve with EPDM seat is UL classified in accordance with ANSI/NSF-61.) Victaulic Vic®-300 MasterSeal™.

b. 14" (DN350) through 24" (DN600) Sizes: 300 psi (2065 kPa), AGS grooved ends, polyphenylene sulfide (PPS) coated ductile iron body (ASTM A-536, Grade 65-45-12), PPS coated ductile iron disc (ASTM A-536), and two piece 17-4 PH S/S stem design. Seat and seal material to suit intended service. Reinforced PTFE bearings and gear operator. Bubble tight, dead-end, or bi-directional service. With memory stop for throttling, metering or balancing service. Victaulic Vic®-300 AGS.

Note: Refer to latest published Victaulic literature, Butterfly Valve Material Selection section, for liner/seat and disc material recommendations for chemical service.

2. Check Valves:

a. **2"(DN50) through 3"(DN80) Sizes Spring Assisted:** Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, stainless steel non-slam tilting disc, stainless steel spring and brass shaft, nickel-plated seat surface, 365 psi (2517 kPa). Victaulic Series 716H.

b. **4"(DN100) through 12"(DN300) Sizes Spring Assisted**: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, elastomer encapsulated ductile iron disc suitable for intended service, stainless steel spring and shaft, welded-in nickel seat, 300 psi (2065 kPa). Victaulic Series 716.

c. **2"(DN50) through 4"(DN100) Sizes Horizontal Swing**: Horizontal installation, ductile iron body, ASTM A-536, Grade 65-45-12, and Type 316 stainless steel clapper. Synthetic rubber bumper & bonnet seals suitable for intended service, stainless steel wetted parts, 300 psi (2065 kPa). Victaulic Series 712.

d. **4"(DN100) through 12"(DN300) Sizes Venturi Check**: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12 with venturi-like taps, elastomer encapsulated ductile iron disc suitable for intended service, stainless steel spring and shaft, welded-in nickel seat, 300 psi (2065 kPa). Victaulic Series 779.

e. 14" (DN350) through 24" (DN600) Check Valves: 230 psi (1585 kPa), AGS grooved ends, spring-assisted dual disc check valve. ASTM

A-536, Grade 65-45-12 coated ductile iron body, EPDM seat bonded to the valve body, 304 stainless steel disc, and 300 series stainless steel spring and shaft. Victaulic Series W715.

3. **Tri-Service Valve Assembly**: Combination shut-off, throttling and non-slam check valve.

   a. **2-1/2”(DN65) through 12”(DN300) Sizes:** Vic®-300 MasterSeal™ butterfly valve with memory stop feature assembled with Series 716 (2-1/2” & 3”)(DN65 & DN75) or Style 779 Venturi Check (4” – 12”)(DN100-DN300). Series 779 check valve with venturi like taps for flow measurement. Working pressures to 300 psi (2065 kPa).
   b. **14” (DN350) through 24” (DN600) Sizes:** Victaulic AGS-Vic300 butterfly valve with gear operator and memory stop feature assembled with Series W715 Check Valve. Working pressures to 232 psi (1600 kPa).

4. **Ball Valves**: 1-1/2”(DN40) through 6”(DN150) sizes, ASTM A-536, Grade 65-45-12, ductile iron body, chrome plated carbon steel ball and stem, TFE seats, with Fluoroelastomer seals. 800 psi (5515 kPa). Victaulic Series 726.

5. **Plug Valves**: 3"(DN75) through 12"(DN300) sizes, with memory stop for throttling, metering or balancing service. Unidirectional bubble-tight shut-off, bi-directional sealing optional. ductile iron body, bonnet, and plug, ASTM A-536, Grade 65-45-12. Plug encapsulated with synthetic rubber suitable for intended service. Welded-in nickel seat, stainless steel self-lubricating bearings. 175 PSI (1200 kPa). AWWA rigid groove dimensions may be adapted to IPS sized system through the use of Victaulic Style 307 transition couplings. Victaulic Series 377 eccentric plug balancing valves.

6. **Circuit Balancing Valves:**

   a. **2”(DN50) and Smaller Sizes**: 300 psi (2065 kPa), y-pattern, globe type with soldered or threaded ends, non-ferrous Ametal® brass copper alloy body, EPDM o-ring seals. 4-turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting, and connections for portable differential meter. Victaulic / TA Hydronics Series 786 or 787 STAD.
      1. Install Series 78U union port fitting and Series 78Y strainer/ball valve combination to complete terminal hookup at coil outlet.

2. Install Series 793 differential pressure controller to stabilize differential pressure and ensure stable and accurate modulating control. Ametal® brass copper alloy body, bonnet, cone and spindles, threaded ends only.

b. **2-1/2”(DN65) and Larger Sizes**: 300 psi (2065 kPa), y-pattern, globe type with flanged or grooved ends, ASTM A536 ductile iron body, all other metal parts of Ametal® brass copper alloy, EPDM O-ring seals. 8, 12 or 16-turn digital readout handwheel for balancing, hidden memory feature with locking tamper-proof setting, and connections for portable differential meter. Victaulic / TA Hydronics Series 788 or 789 STAG.

c. **Series 739 / 794 Differential Pressure Controller**: For use in conjunction with TA Balancing valves to stabilize differential pressure and ensure stable and accurate modulating control. Ductile iron or Ametal body, Ametal® brass copper alloy bonnet, cone, and spindles, flanged ends only.

E. Victaulic Grooved End Specialties

1. Expansion Joints:

a. **2”(DN50) through 6”(DN150) Sizes**: Packless, gasketed, type with grooved end telescoping body, suitable for axial end movement to 3”. 350 psi (2410 kPa). Victaulic Style 150 Mover®.
b. **3/4"(DN20) and Larger Sizes**: Expansion joint consisting of a series of grooved end nipples joined with flexible-type couplings. Joint movement and expansion capabilities determined by number of couplings / nipples used in the joint. Victaulic Style 155.

2. Dielectric Waterways: 1”(DN25) through 8”(DN200) sizes, grooved, plain end, or threaded end, ASTM A-53 carbon steel or ASTM A-536 ductile iron body, zinc electroplated, with LTHS high temperature stabilized polyolefin polymer liner. Victaulic Style 47.

3. Strainers - Grooved-End

a. T-Type Strainer. 2” (DN50) through 12”(DN300) sizes, 300 PSI (2065 kPa) T-Type Strainer shall consist of ductile iron (ASTM A-536, Grade 65-45-12) body, Type 304 stainless steel frame and mesh removable basket with No. 12 mesh, 2"-3" (DN50-DN75) strainer

sizes, or No. 6 mesh, 4"-12" (DN100-DN300) strainer sizes, 57% free open area. Victaulic Style 730.

b. **T-Type Strainer:** 14” (DN350) through 24” (DN600) sizes, 300 PSI (2065 kPa), AGS grooved end “Tee” strainer. Factory fabricated carbon steel body conforming to ASTM A-53, Grade B, carbon steel T-bolt hinged closure/cap, and type 304 stainless steel frame and mesh basket, (6x6 mesh for 14”(DN350) and 16”(DN400) sizes, and 4x4 mesh for 18”(DN450) through 24”(DN600) sizes). Victaulic Series W730.

c. Y-Type Strainer. 2”(DN50) through 18”(DN450) sizes, 300 PSI (2065 kPa) Y-Type Strainer shall consist of ductile iron body, ASTM A-536, Grade 65-45-12, Type 304 stainless steel perforated metal removable baskets with 1/16" (1,6mm) diameter perforations 2"-3" (DN50-DN75) strainer sizes, 1/8" (3,2mm) diameter perforations 4"-12" (DN100-DN300) strainer sizes, and 0.156” (4mm) diameter perforations 14” -18” (DN350-DN450) strainer sizes. Victaulic Style 732 and W732.

4. Suction Diffuser – Flanged outlet with grooved inlet connections, rated to 300 psi (2065 kPa). Ductile iron (ASTM A-536) body, 304 stainless steel frame and perforated sheet diffuser with 5/32" (4,0mm) diameter holes. Removable 20 mesh 304 stainless steel start-up pre-filter, outlets for pressure/temperature drain connections, and base support boss. Victaulic Series 731-G and W731-G.

F. Victaulic Tooling:

1. Tools shall be manufactured and supplied by Victaulic. Use roll sets or cut groovers compatible with the pipe material and wall thickness per Victaulic installation instructions (I-100).

2. Common wedge shaped AGS groove for pipe sizes 14” (DN350) through 24”(DN600) requiring one (1) common AGS roll set per tool, for use with approved Victaulic grooving tools. (VE414MC, VE416 FSD, VE424 MC, or VE436.)

3.01 Execution:

A. Installation:

1. Pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing.

2. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.

3. Install the Victaulic AGS piping system in accordance with the latest Victaulic installation instructions.

4. 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.)

5. Use Victaulic grooving tools with AGS roll sets to groove the pipe. Follow Victaulic guidelines for tool selection and operation.

6. Couplings installation shall be complete when visual metal-to-metal contact is reached.

7. See the latest copy of Victaulic's Field Assembly and Installation Instruction Pocket Handbook (I-100).

B. Training:

1. A Victaulic factory trained representative (direct employee) shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and product installation.

C. Application:

1. A Victaulic representative shall periodically visit the job site and review installation. Contractor shall remove and replace any improperly installed products.

2. Victaulic grooved mechanical pipe couplings, fittings, valves and other grooved components may be used as an option to welding, threading or flanged methods.

3. All grooved components shall conform to local code approval and/or as listed by ANSI-B-31.1, B-31.3, B-31.9, ASME, UL/ULC, FM, IAPMO or BOCA.

4. Grooved end product manufacturer to be ISO-9001 certified.