



Grooved Piping System for Fire Protection Services

1.01 General:

A. Section Includes:

1. General
2. Materials:
 - a. Pipe
 - b. Victaulic Couplings
 - c. Victaulic Fittings
 - d. Hole and Branch Outlets
 - e. Victaulic Valves
 - f. Sprinkler Heads
 - g. Victaulic Specialties.
3. Execution

B. Submittals:

1. Fire Protection products shall be shown on drawings and product submittals and shall be specifically identified with the applicable Victaulic series or designation.
2. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.

C. References:

1. American Society for Testing Materials (ASTM)
 - a. ASTM A53 – Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded, and Seamless.
 - b. ASTM A126-B – Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - c. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - d. ASTM A183 – Carbon Steel Track Bolts and Nuts

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- e. ASTM A449 – Quenched and Tempered Steel Bolts and Nuts
 - f. ASTM A536 – Ductile Iron Castings
 - g. ASTM B16 – Free-Cutting brass rod , Bar and Shapes for Use in Screw Machines
 - h. ASTM B62 – Composition Bronze or Ounce Metal Castings.
 - i. ASTM B124 – Copper and Copper Alloy Forging Rod, Bar, and Shapes.
 - j. ASTM B584 – Copper Alloy Sand Castings for General Applications
 - k. ASTM D-2000 – Standard Specification System for Rubber Products in Automotive Applications.
- 2. American Water Works Association:
 - a. AWWA C606 – Grooved and Shouldered Joints
 - 3. National Fire Protection Association:
 - a. NFPA-13 – Installation of Sprinkler Systems

D. Quality Assurance

- 1. All Fire Protection components (including couplings, fittings, valves and accessories) to be supplied by one manufacturer and shall be UL listed and/or FM Global approved. Grooving tools shall be of the manufacturer as the grooved components.

2.01 Materials

A. Pipe: (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 Mechanical Couplings:** 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. Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and A-183, minimum tensile strength 110,000 psi (758450 kPa) as provided standard Victaulic.

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a. **Rigid Type:**

- 1) “Installation Ready” rigid joints shall be Victaulic FireLock® EZ Style 009H and Style 107H which are designed for direct “stab” installation onto grooved pipe without prior disassembly of the coupling. Housings shall be cast with offsetting, angle-pattern bolt pads.
- 2) Standard rigid joints shall be Victaulic Style 005 (FireLock® 005) or 07 (Zero-Flex®). Housings shall be cast with offsetting, angle-pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13.
- 3) Rigid couplings shall require visual pad-to-pad verification of complete installation. Tongue and recess type couplings which require the use of a torque wrench to achieve the exact required gap between housings are not permitted.

b. **Flexible Type:** Use in seismic areas where required by NFPA 13.

- 1) “Installation Ready” flexible joints shall be Victaulic Style 177 QuickVic™, in sizes 2”(DN50) through 6”(DN150), which shall be designed for direct “stab” installation onto grooved pipe without prior disassembly of the coupling. .
- 2) Standard flexible couplings shall be Victaulic Style 004, 75, or 77.

2. **Mechanical Coupling Gaskets:** Pressure-responsive, synthetic rubber listed for use with the housings.

Fire Protection Service	Temperature Range	Gasket Recommendation
Dry Systems	Ambient	Grade EPDM, Type A
Freezer Applications	-30°F to 0°F (-34°C to -17°C)	FlushSeal®, Grade L, Silicone
Water/Wet Systems	Ambient	Grade EPDM, Type A

3. **Flange Adapters:** For use with grooved end pipe and fittings, for mating to ANSI Class 125 / 150 flanges. Victaulic Style 741 or 744. For mating to ANSI Class 300 flanges use Victaulic Style 743.

C. **Victaulic Grooved End Fittings:** Fittings shall be cast of ductile iron conforming to ASTM A-536, Grade 65-45-12 (FireLock®), forged steel conforming to ASTM A-234, Grade WPB 0.375" wall (9,53 mm wall), or fabricated from Std. Wt. Carbon Steel

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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.

1. Victaulic Hole-Cut Branch Outlets:

a. Bolted Branch Outlet:

1. 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.
2. Header connections for sprinklers, drop nipples, sprigs, gauges, and drains on 1-1/4" through 2-1/2" header piping. 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 FireLock Outlet Tee Style 922.

- 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.

E. Victaulic Grooved End Valves

1. **Ball Valves:** UL/FM Global approved, 350 psi (2410 kPa), grooved or threaded ends, bronze body (ASTM B-584 Alloy 844), standard port, chrome-plated brass ball, stainless steel stem, TFE seats, brass gearbox, with pre-wired supervisory switches. Victaulic Series 728 FireLock®.
2. **Butterfly Valves:** UL/FM Global approved, 300 psi (2065 kPa), grooved ends, polyphenylene sulfide (PPS) coated ductile iron body (ASTM A-536, Grade 65-45-12). Ductile iron disc, synthetic rubber encapsulated suited for the intended service, with integrally cast stem. Complete with weatherproof actuator and pre-wired supervisory switches. Victaulic Series 705 FireLock® or Series 707 FireLock® developed for fire pump metering test lines per NFPA 20 and rooftop test units, as well as pressure reducing valve by-pass lines per

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NFPA 14. Victaulic FireLock® Series 765 shall be used for high pressure systems up to 365 psi CWP.

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

3. **Gate Valves:** UL/FM Global approved.
 - a. **2-1/2”(DN65) through 12”(DN300) Sizes OS&Y Gate Valves:** 250 psi (1725 kPa), grooved ends. Ductile iron body conforming to ASTM A-536, cast iron yoke and handwheel conforming to ASTM A-126-B; EPDM coated ASTM A-126-B cast iron disc; ASTM B16 brass rising stem; flanged and epoxy coated cast iron bonnet; EPDM o-ring stem seals and body gasket. Victaulic Series 771.
 - b. **2-1/2”(DN65) through 12”(DN300) Sizes NRS Gate Valves:** 250 psi (1375 kPa), grooved ends. Ductile iron body conforming to ATSM A-536, bronze mounted; EPDM coated ASTM A-126-B cast iron disc; ASTM B-16 brass non-rising stem; flanged and epoxy coated cast iron bonnet; EPDM o-ring stem steals and body gasket. Victaulic Series 772.
 - c. **Wall Type Indicator Post:** ASTM A-126-B cast iron wall type indicator post, with ASTM B-62 bronze operating stem and carbon steel operating rod. Victaulic Series 773.
 - d. **Adjustable Indicator Post Vertical Type:** ASTM A-126-B cast iron adjustable indicator post vertical type with ASTM A-126-B cast iron extension sleeve, ASTM B-62 bronze operating stem and carbon steel extension rod. Victaulic Series 774.

4. **Check Valves:** UL/FM Global approved.
 - a. **2”(DN50) through 3”(DN75) Sizes Spring Assisted:** Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, non-slam tilting disc, stainless steel disc and spring, brass shaft, 365 psi (2517 kPa). Victaulic Series 717H.
 - 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, 250 psi (1725 kPa). Victaulic Series 717. Designed to accept a riser check kit. Victaulic Series 717R.

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5. **Alarm Check Valve:** Black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, EPDM seal, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed position. Water working pressure is 300 psi. Suitable for constant and variable pressure systems with optional Series 752 retard chamber. Victaulic FireLock® Series 751.

a. Optional Accessories:

- **Series 752 Retard Chamber:** High strength ductile iron body with corrosion resistant exterior and interior coating, suitable for operating pressures to 300 psi (2065 kPa).
- **Series 752V Retard Vent Kit:** For use with Series 752 retard chamber when an electric alarm pressure switch is installed without a water motor alarm.
- **Series 760 Water Motor Alarm:** Red enamel finished gong shell, with internal components of non-corrosive stainless-steel or aluminum, with upstream strainer.
- **Alarm Pressure Switch:** System Sensor Model “EPS”.
- **Waterflow Detectors:** System Sensor Model “WFD”.

6. **Dry System Check Valve:** Low differential, latched clapper design, black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, peroxide cured EPDM diaphragm, EPDM seal, brass seat, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed position. Valve shall be externally resettable. Required air pressure is 13 psi. Water working pressure is 300 psi. Valve is available bare, pre-trimmed, as a Vic®-Quick Riser, or in a Fire-Pac cabinet. Victaulic FireLock® NXT Series 768.

a. Optional Accessories:

- **Series 746-LPA Dry Accelerator:** Bronze body, stainless steel spring, restrictor, and bolts, with EPDM diaphragm, seal, and O-ring, for use with system air pressures ranging from 13 psi (90kPa) to 18 psi (124 kPa).
- **Series 760 Water Motor Alarm:** Red enamel finished gong shell, with internal components of non-corrosive stainless-steel, aluminum, etc., with upstream strainer.
- **Series 75B Supplemental Alarm Device:** For use with systems using a water motor gong as the alarm device. 304 stainless steel flexible

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braided hose, with brass pilot valve and galvanized steel trim and nipples, rated to 300 psi (2065 kPa).

- **Series 75D Water Column Kit:** Ductile iron body with stainless steel internal components and Nitrile seal, rated to 300 psi (2065 kPa), designed to minimize residual water in the riser.
- **Series 757 Air Maintenance Trim Assembly:** Consisting of a pressure-reducing air regulator, strainer, brass restrictor, spring-loaded in-line check valve, and associated piping components.
- **Series 7C7 Compressor Package:** Consisting of a riser-mounted compressor, Series 757P air maintenance device and flexible hoses for installation. Available with 1/3 HP compressor for an up to 500 gallon system.
- **Alarm Pressure Switch:** System Sensor Model “EPS”.

7. **Actuated Deluge Valve:** [Pneumatic] [Hydraulic] [Electric] Actuation, low differential, latched clapper design, black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, peroxide cured EPDM diaphragm, EPDM seal, brass seat, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed position. Valve shall be externally resettable. Required air pressure is 13 psi. Water working pressure is 300 psi. Valve is available bare, pre-trimmed, as a Vic®-Quick Riser, or in a Fire-Pac cabinet. Victaulic FireLock® NXT Series 769.

a. Optional Accessories:

- **Series 776 Low-Pressure Actuator:** Cast bronze lower chamber with brass middle and upper chambers and brass internal components and strainer, with stainless steel springs, and EPDM seals. Rated for water supply to 300 psi (2065 kPa) and air supply pressure of 13 psi (90kPa).
- **Series 753-E Solenoid Valve:** Forged brass body, stainless steel spring, fluoroelastomer seal and diaphragm, 24 VDC wiring and voltage, with 8.7 watts power rating, 66 ohms resistance, and current at .364 amps. Valve shall be rated to 300 psi (2065 kPa).
- **Series 760 Water Motor Alarm:** Red enamel finished gong shell, with internal components of non-corrosive stainless-steel, aluminum, etc., with upstream strainer.
- **Series 757 Air Maintenance Trim Assembly:** Consisting of a pressure-reducing air regulator, strainer, brass restrictor, spring-loaded in-line check valve, and associated piping components.

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- **Series 7C7 Compressor Package:** Consisting of a riser-mounted compressor, Series 757P air maintenance device and flexible hoses for installation. Available with 1/3 HP compressor for an up to 500 gallon system.
 - **Alarm Pressure Switch:** System Sensor Model “EPS”.
8. **Preaction Valve:** Low differential, latched clapper design, black enamel coated ductile iron body conforming to ASTM A-536, grade 65-45-12, aluminum bronze clapper, stainless steel spring and shaft, peroxide cured EPDM diaphragm, EPDM seal, brass seat, and Nitrile seat O-rings. Valve internal parts shall be replaceable without removing the valve from the installed position. Valve shall be externally resettable. Water working pressure is 300 psi. Does not require a separate check valve downstream of preaction valve. Valve is available bare, pre-trimmed, as a Vic®-Quick Riser, or in a Fire-Pac cabinet. Victaulic FireLock® NXT Series 769.

a. Optional Accessories:

- **Series 746-LPA Dry Accelerator:** Bronze body, stainless steel spring, restrictor, and bolts, with EPDM diaphragm, seal, and O-ring, for use with system air pressures ranging from 13 psi (90kPa) to 18 psi (124 kPa).
- **Series 760 Water Motor Alarm:** Red enamel finished gong shell, with internal components of non-corrosive stainless-steel, aluminum, etc., with upstream strainer.
- **Series 75B Supplemental Alarm Device:** For use with systems using a water motor gong as the alarm device. 304 stainless steel flexible braided hose, with brass pilot valve and galvanized steel trim and nipples, rated to 300 psi (2065 kPa).
- **Series 75D Water Column Kit:** Ductile iron body with stainless steel internal components and Nitrile seal, rated to 300 psi (2065 kPa), designed to minimize residual water in the riser.
- **Series 757 Air Maintenance Trim Assembly:** Consisting of a pressure-reducing air regulator, strainer, brass restrictor, spring-loaded in-line check valve, and associated piping components.
- **Series 7C7 Compressor Package:** Consisting of a riser-mounted compressor, Series 757P air maintenance device and flexible hoses for installation. Available with either a 1/6 HP compressor for an up to 400 gallon system using only a solenoid valve and no Auto-Vent, or a 1/3 HP compressor for an up to 750 gallon system using only a solenoid valve and no Auto-Vent.

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- **Alarm Pressure Switch:** System Sensor Model “EPS”.

F. Victaulic Sprinkler Heads: Die-cast brass frame, teflon encapsulated Belleville spring seal and frangible glass bulb. Body cast with hex shaped wrench boss. (Sprinklers shall not contain O-rings.) Quick or standard response type.

- 1. Guards and Escutcheons:** Guards and escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
- 2. Victaulic VicFlex™ Stainless Steel Sprinkler Fitting System:** In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic VicFlex™ Multiple-Use Flexible Stainless Steel Sprinkler Drop System [with captured coupling] may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel Male threaded nipple or Victaulic FireLock IGS Groove Style 108 coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to the sprinkler head.
 - a. The IGS Groove Style 108 coupling is single-bolt, consisting of two ductile iron housings, Grade E “EPDM” gasket, and a zinc electroplated steel bolt and nut conforming to ASTM A449.

The drop shall include a UL approved Series AH1, AH2, or AH2CC braided hose with a bend radius to 2” to allow for proper installation in confined spaces. The hose shall be listed for [(4) bends at 31” length] [(5) bends at 36” length] [(8) bends at 48” length] [(10) bends at 60” length] [(12) bends at 72” length].

Union joints shall be provided for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 or AB2 bracket. The bracket shall allow installation before the ceiling tile is in place. The braided drop system is UL listed for sprinkler services to 175 psi (1206 kPa) and FM Approved to 200 psi (1380 kPa).

- a. All hoses shall be factory-pressure tested to 400 psi. (2760 kPa).
- b. AB6 Bracket Assembly, for use in cold storage applications with Victaulic Model V36 dry sprinklers.
- c. Approvals:
 - 1) FM-1637
 - 2) UL 2443

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Refer to the Victaulic I-VICFLEX installation manual and the Victaulic VicFlex™ Design Guide, as shown in product submittal 10.85 to ensure proper installation.

3. **Victaulic VicFlex™ Dry Sprinkler:** In lieu of rigid connections to dry sprinkler heads, a Victaulic VicFlex™ dry sprinkler, Model VS1, may be used. The sprinkler shall provide a vertical or horizontal flexible connection with a bend radius to 2", and allow for up to 4 bends. The sprinkler body shall be die cast brass with brass deflector, supplied [(VC-250) (chrome plated) (white) (flat-black) coated] [plain brass], and glass bulb with glycerin solution. The product shall consist of a braided type 300 stainless steel flexible hose with a swivel type branch line threaded connection, EPDM gasket seal, with PTFE-coated Beryllium Nickel and stainless-steel spring-seal assembly. The bracket shall be [open gate] [metal strap] to provide for sprinkler placement and alignment. The flexible dry sprinkler and bracket system is UL listed for sprinkler services to 175 psi (1206 kPa).

G. **Victaulic Fire Protection Specialties:**

1. **Fire Pump Test Meters:** Grooved end calibrated venturi meter manufactured of carbon steel (ASTM A-53) zinc electroplated body, brass needle valve conforming to ASTM B-124, with attached GPM meter. Minimum straight pipe installation of five diameters upstream and two diameters downstream. Victaulic Style 735.
2. **Alarm Test Module:** Grooved or threaded ends, bronze body and bonnet, bronze and copper alloy internals with stainless steel spring, dual polycarbonate sight glasses, and malleable iron handwheel. UL listed and FM Approved for services to 300 psi (2065 kPa). Victaulic Series 720 TestMaster™ II.
3. **Riser Manifold Assembly:** Grooved end riser manifold assembly consisting of an orange enamel coated steel body, System Sensor model WFD flow switch, Victaulic Series 720 TestMaster™ II alarm test module, and pressure gauge. UL listed and FM approved for wet sprinkler system services to 250 psi (1725 kPa).

H. **Victaulic FireLock® Fire-Pac:**

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Provide a pre-assembled [Deluge] [Preaction] [Dry] fire protection valve mounted completely within a 12 gauge steel cabinet. Cabinet shall be coated with red ASA-61 electrostatically applied polyester powder coating. Unit shall be UL Listed and FM-Global Approved with all materials and wiring conforming to NFPA requirements. Unit shall be provided with all necessary valves, switches, gauges, and air supply system for proper operation and shall be pre-wired to a control panel. All external electrical connections shall be accessible through an enclosure on the outside of the cabinet. Water inlet, system supply, and drain connections shall be grooved for ease of installation. Victaulic Style 745 FireLock® Fire-Pac.

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.
2. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.
3. See the latest copy of Victaulic's Field Assembly and Installation Instruction Pocket Handbook (I-100) for grooved fittings. Supplemental handbooks for specific product installations (I-009/009V, I-40, I-705W, etc.) shall be provided by Victaulic and used by the contractor.
4. Do not install sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs. Sprinkler bulb protector shall be removed by hand after installation. Do not use tools or any other device(s) to remove the protector that could damage the bulb in any way.

B. Training:

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

C. Application:

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1. Victaulic's 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 UL/ULC, FM, or NFPA.
4. Grooved end product manufacturer to be ISO-9001 certified.

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