VICTAULIC® IS AN ISO 9001 CERTIFIED COMPANY

Typical Specifications Grooved Piping Method

To download the electronic version of Vic-Guide Spec, please go to:
www.victaulic.com/contact/vicguidespec.asp

GROOVED PIPING METHOD

(CSI-Div. 15, Sect. 15050, Sect. A – Information, Methods and Instructions)

Mechanical grooved pipe couplings, fittings, butterfly, ball and check valves, expansion joints, Mechanical-T®'s, and other products as manufactured and/or supplied by Victaulic, shall be used for piping systems and mechanical equipment connections (in lieu of welded, flanged and threaded methods) (and also may be used as unions, seismic joints, flexible connections, expansion joints, expansion compensators, vibration reducers) in systems specified. Operating conditions not to exceed –30°F to +230°F (–34°C to +110°C) temperature range according to the gasket or valve lining selected and working pressures as shown in the coupling manufacturer's current product specifications, for the following systems, as detailed under specific systems specifications (subject to local code approval):

The contractor, at his option, may use Victaulic grooved piping products in lieu of welded, flanged or threaded joints, fittings and valves within their pressure and temperature range on all circulating water systems, installed using manufacturer's recommendations as shown in their latest General Catalog (G-100) or Field Installation Handbook (I-100).

BUILDING SERVICES

	PLUMBING		HEATING & AIR CONDITIONG		FIRE PROTECTION		OTHER
	Domestic Hot Water		Chilled Water		Wet Standpipe		Air
	Domestic Cold Water		Condenser Water		Dry Standpipe		Vacuum
	Roof Drains		Cooling Tower		Automatic Sprinklers		Elevator Hydraulic
	Storm Drains		Machinery Room		Water Supply		
	Sanitary Drains (DWV)		Heating Hot Water		Special Hazards		
			Utility Water		Halon 1301		
			Glycol				

WATER/WASTE TREATMENT SERVICES

	Sludge		Chemical Feed		Filter Lines
	Scum		Raw Water		Effluent
	Spray Water		Wash Water		Grit
	Air		Treated Water		

INDUSTRIAL SERVICES

	Air		Process (refer to Victaulic Gasket Selection Guide)
	Water		Process waste treatment (refer to Victaulic Gasket Selection Guide)
	Lubrication		
	Materials Conveyors		

MINING, OILFIELD AND POWER PLANT SERVICES

	MINING		POWER PLANT		OILFIELD

® REGISTERED TRADEMARK OF VICTAULIC – © COPYRIGHT 2005 VICTAULIC – PRINTED IN U.S.A. – SKU #WCAS-6AHM24

United States • Phone: 1-800-PICK-VIC (1-800-742-5842) • Fax: 610-250-8817 • e-mail: pickvic@victaulic.com
Canada • Phone: 905-884-7444 • Fax: 905-884-9774 • e-mail: viccanada@victaulic.com
Europe • Phone: 32-9-381-1500 • Fax: 32-9-380-4438 • e-mail: viceuro@victaulic.be
UK • Phone: 44(0)1438741100 • Fax: 44(0)1438313883 • e-mail: viceuro@victaulic.be
Central and South America • Phone: 610-559-3300 • Fax: 610-559-3608 • e-mail: vical@victaulic.com
Australasia • Phone: 86-21-58855151 • Fax: 86-21-58851298 • e-mail: vicap@victaulic.com

SECTION 1

VICTAULIC PRODUCT SPECIFICATION

Introduction – This Victaulic product specification was developed as a guide for writing detailed piping specifications that address specific project requirements. Any references made regarding service applications, product usage, and installation practices, must be verified with the latest Victaulic product literature. Contact Victaulic for information regarding specific applications not addressed in this guide.

⚠ CAUTION

Due to unique Victaulic product characteristics, Victaulic specifications, noted herein, are not interchangeable with other grooved products. Use of incompatible products may result in personal injury or property damage.

NOTICE

Victaulic maintains a continual policy of product improvement and, therefore, reserves the right to change product specifications, designs and all data contained herein without notice and without incurring obligation.

The material presented in this specification is intended as a reference guide for the utilization of Victaulic products and is not intended for design purposes.

Good piping practices should always prevail. Specific pressures, temperatures, external or internal loads, performance standards and tolerances must never be exceeded.

Many applications require recognition of special conditions, code requirements and use of safety factors. Qualified engineers must make these decisions and should refer to Victaulic Design Data and Gasket Selection (publications 26.01 & 05.01) available at no charge on request.

While every effort has been made to ensure its accuracy, Victaulic, its subsidiaries and affiliated companies, make no express or implied warranty of any kind respecting the information contained in herein or the materials referred to therein. Anyone making use of the information or material contained herein does so at his own risk and assumes any and all liability resulting from such use.

1.0 Victaulic Product Service Applications

1.1 General - Victaulic piping products generally are designed for above/below ground applications in 150# and 300# ANSI class piping systems except steam at -30° to +230° F (-34° C to +110° C) temperatures using standard Victaulic EPDM gasket material. Other special gasket materials are available for most special applications. Refer to latest published Victaulic literature for design data pertaining to pressure and temperature ratings and other design characteristics of Victaulic products.

The following are typical service applications for Victaulic products categorized by specific industries. This is not a complete list of Victaulic product usage. Please contact Victaulic Company regarding any questions involving Victaulic product capability to meet piping system service conditions not outlined in Victaulic literature.

1.2 Building Service Piping Systems –
HVAC: Air Lines; Hot Water Heating; Chilled Water; Make-up Water; Condenser Water; Vacuum Lines; Glycol
Plumbing: Domestic Hot and Cold Water; Roof Drains; Sanitary Drains (DWV); Storm Drains
Fire Protection: Automatic Sprinklers-Wet and Dry; CO2, FM-200 and Halon Systems; Fire Standpipe-Wet and Dry; Special Hazards; Water Supply

1.3 Municipal Piping Systems –
Air Flotation Effluent; Pressurized Flow; Applied Water; Primary Effluent; Backwash Water; Primary Scum; Biofilter Circulation; Primary Sludge; Biofilter Effluent; Pumped Drainage; Centrate; Raw Sewage;Centrifuge Feed; Raw Water; Chilled Water; Reclaimed Water; Circulating Sludge; Return Activated Sludge; Digested Sludge; Screened Digested Sludge; Drain; Secondary Effluent; Equalized Sludge; Secondary Scum; Filtered Water; Secondary Sludge; Filtrate; Septage; Float; Sludge Cake; Flotation Sludge; Supernatant;Grit; Tank Drain; Medium Pressure Sludge Gas; Thickened Scum; Mixed Liquor; Thickened Sludge; Mixed Sludge; Thickened Waste Activated Sludge; No. 3 Water (Secondary Effluent); Thickener Overflow; Nonpotable City Water; Transfer Sludge; Overflow; Waste Activated Sludge; Potable Soft Water; Waste Mixed Liquor; Potable Water (City Water)

1.4 Process, Power and Industrial Piping Systems –
Process Water System Piping: Ash Pond Recirculation Water; Heat Exchanger to +230° F (+110° C); Auxiliary Cooling Water; Blowdown Systems; Lube Water (+110° C); Booster Pumps; Raw Water; Circulating Hot Water to +230° F (+110° C); Recirculating Cooling Water; Recovery Boiler Water to +230° F (+110° C); Circulating Tower; Cooling Water; Sealing Water Pump Suction & Discharge; Demineralized Water; Export Water; Service Water; FGD; Turbine Auxiliary Cooling Water; Feedwater to +230° F; Turbine Cooling Water; Filtered Water; Welder Water; Gravity Filters to Clearwell

Utility and Infrastructure Piping: Ash Handling; Plant Drains; Condenser Water Vents & Drains; Recirculation Drain Piping; Drain from Auxiliary Boiler Silencer; Roof Collection Basins; Roof Drainage; Drainage Piping Floor & Wall Sleeves; Sump Pump Discharge; Vent From Overflow Sump; Fire Protection Overflow & Drains; Waste Water Underground; Fire Water Loop Below Ground; Yard Sump Waste Water; Industrial Waste Water

Chemical & Air Piping Systems: Air Coolers to Gas Turbine; Oil & Hydraulic System to 2500 psig (17250 kPa); Air Dryers; Air Preheater Wash Returns; Oil Vent Systems; Ash Handling Water Pump Suction; Overflow from Pyrites; Ash Hopper Seal Through Drains & Overflow; Plant Air; Potable Water; Chemical Feed to Cooling Towers; Powered Coal Lines; Chemical Injection System; Process Air; Coagulator and Clearwell Overflow; Condensate Cleanup System to Demineralizer; Scrubber Piping (Lined & Unlined); Cooling Tower Chlorine Solution; Seal Air; Slurry Transport Systems Collecting & Fly Ash Slurry Tank; Fly Ash Slurry Tanks; Hydrogen Cooling; Soot Blower Piping; Instrument Air; Strainers Backwash; Jet-Pulsion Sump Pump Suction; Sump Pump Discharge; Lube Oil; Vacuum

SECTION 2

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH CARBON STEEL PIPE (BLACK OR GALVANIZED)

2.0 IPS Grooved Piping System – Victaulic grooved mechanical pipe couplings, fittings, valves and other grooved components may be used as an option to welding, threading or flanged methods. All grooved components shall be of one manufacturer (Victaulic), and conform to local code approval. Victaulic products are permitted and/or Listed/Approved by codes or standards organizations including but not limited to: ASME (B31.1, 31.3, 31.9), ASTM, ANSI/AWWA (C-606), FM, IAPMO, International Code Council (IPC, IMC, IFC), NFPA, NSF, UL, ULC, and VdS. Grooved end product manufacturer to be ISO-9001 certified. Grooved couplings shall meet the requirements of ASTM F-1476.

2.1 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.

2.2 Victaulic Mechanical Couplings for Joining Carbon Steel Pipe – Couplings shall be cast of ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

2.2.a Mechanical Couplings – Mechanical couplings shall be Victaulic Style 07 (Zero-Flex®) Rigid coupling. Rigid couplings shall be of the angle pattern bolt pad type, and shall provide system support and hanging requirements in accordance with ASME B31.1, ANSI B31.4 and NFPA 13. Style HP-70 Rigid coupling is for use in high pressure service applications. Victaulic Style 77 or 75 coupling shall be used where system flexibility is desired. Noise and vibration reduction at mechanical equipment connections is achieved by installing three style 77 or 75 flexible couplings near the vibrations source.

2.2.b Reducing Mechanical Couplings – Use Victaulic Style 750 reducing couplings for direct reduction on 2" (DN50) through 8" (DN200) pipe runs.

2.2.c Snap-Joint® Quick Disconnect Mechanical Coupling – Where indicated on drawings, use Victaulic Style 78 Snap Joint couplings for quick disconnect requirements.

2.2.d Victaulic Boltless Couplings – Where indicated on drawings, use Victaulic Style 791 boltless couplings for tamper resistant requirements.

2.2.e Outlet Mechanical Coupling – Use Victaulic Style 72 outlet couplings on header sizes 1$^1/_2$" (DN40) through 6" (DN150) for grooved or threaded reduced outlet sizes $^1/_2$" (DN15) through 2" (DN50).

2.2.f Mechanical Coupling Bolts – Mechanical Coupling bolts shall be heat-treated plated carbon steel, track-head meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183. Optional Type 316 stainless steel bolts per ASTM A-193, Grade B8M, Class 2.

2.3 Victaulic Flange Adapters

2.3.a Vic-Flange® Adapter Style 741 – 2" - 12" (DN50 - DN300), for connection to ANSI class 125/150 flanged components. Cast of ductile iron conforming to ASTM A-395, grade 65-45-15, and ASTM A-536, Grade 65-45-12.

2.3.b Vic-Flange Adapter Style 743 – 2" - 12"* (DN50 - DN300), for connection to ANSI class 250/300 flanged components. Cast of ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.
* For 14 - 24" (DN350 - DN600), see section 2.01 for AGS products.

2.3.c Victaulic Flanged Adapter Nipples – $^3/_4$" - 24" (DN20 - DN600), No. 41, 45 and 46 for connection to ANSI class 125, 150 and 300 flanged components. Nipples of Carbon Steel, Schedule 30 or 40, ASTM A-53, Type E,F, or S, Grade B. Flanges (class 125) Cast Iron to ANSI B-16.1 and flanges (class 150 and 300) Carbon Steel to ANSI B-16.5.

Note: Victaulic Pressfit® plain end system may be used on $^3/_4$" - 2" (DN20 - DN50) piping, refer to section 8.0.

2.4 Miscellaneous Connections (Vent, Drain, Pressure, Temperature, Taps, etc.)

2.4.a Vic-Let™ Style 923 – $^1/_2$" (DN15) or $^3/_4$" (DN20) NPT outlet on 4" (DN100) and larger header sizes rated for 300 psi (2065 kPa).

2.4.b Vic-O-Well™ Style 924 – To accommodate industrial glass bulb thermometers with standard 1$^1/_4$" - 18 NEF 2B extra fine thread and 6" (152 mm) nominal bulb length on 4" (DN100) and larger header sizes rated for 300 psi (2065 kPa).

2.5 Victaulic Gaskets

2.5.a Water and Oil Free Air Service – Shall be Grade "E" EPDM compound (green color coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Temperature operating range -30° F to +230° F (-34° C to +110° C). (Note: Air systems without hydrocarbons.) Use Grade "L" Silicone compound (red color coded) conforming to ASTM D-2000 designation 5GE609A18B17 for dry air service operating temperatures up to +350° F (+177° C).

2.5.b Oil and Air Service with Oil Vapors – Shall be Grade "T" Nitrile compound (orange color coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C). Use Grade "O" Fluoroelastomer compound (blue color coded) conforming to ASTM D-2000 designation 2HK714A1-10B37EF31Z for operating temperatures above +180° F up to +300° F (+82° C up to +149° C).

2.5.c Vacuum, Dry Freezer, Slurry Systems – Shall be Grade "E", "L" or "T" FlushSeal® gaskets. Vacuum service may also use standard gaskets with a Victaulic internal metal liner.

2.5.d Chemical Service – Refer to latest published Victaulic Gasket Selection Guide for gasket type recommendations on various chemical services.

2.6 Valves – Grooved-End Butterfly Valves

2.6.a 2" - 12"* (DN50 - DN300) Victaulic Vic®-300 MasterSeal Butterfly Valve – 300 psi (2065 kPa), grooved ends, ductile iron body (ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.) coated with polyphenylene sulfide (PPS) UL classified in accordance with ANSI/NSF 61 for cold and hot potable water service. Ductile iron disc, elastomer encapsulated suited for the intended service. Bubble tight, dead-end or bi-directional service. With memory stop for throttling, metering or balancing service. Gear operators with optional chain wheel supplied as required. *For 14 - 24" (DN350 - DN600) butterfly valves, see section 2.01 for AGS products.

2.6.b 14" - 24"* (DN350 - DN600) Victaulic Series 706 and 709 Butterfly Valve – Grooved ends, ductile iron body (ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.), ductile iron disc (ASTM A-536), and two piece 17-4 PH stainless steel stem design. Body, disc, and seat coated with polyphenylene sulfide (PPS) UL classified in accordance with ANSI/NSF 61 for cold and hot potable water service. Seal material to suit intended service. Type 304 stainless steel disc bolts and nuts, reinforced Teflon bearings, gear operator, electric or pneumatic actuator. Bubble tight, dead-end, or bi-directional service. With memory stop for throttling, metering or balancing service. Series 706 rated to 300 psi (2065 kPa) and Series 709 rated to 175 psi (1200 kPa). *For 14 - 24" (DN350 - DN600) butterfly valves, see section 2.01 for AGS products.

2.6.c 1$^1/_2$" - 6" (DN40 - DN150) Series 700 Butterfly Valve – 200 psi (1375 kPa) grooved ends, carbon steel body, zinc plated (ASTM B-633) with EPDM or Nitrile liner. Ductile iron housing, ASTM A-536, Grade 65-45-12. Disc aluminum bronze (316 stainless steel optional) two piece 416 stainless steel stem design. Seat tested to MSS-SP-67. Bubble tight, dead-end or bi-directional service. With memory stop for throttling, metering or

balancing service. Gear operators with optional chain wheel supplied as required.

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

2.6.d Tri-Service Valves – Combination shut-off, throttling and non-slam check valve Series Vic 300 MasterSeal butterfly valve assembled with Series 716 Vic-Check® or Series 779 Venturi Check valves. Working pressures to 300 psi (2065 kPa). (Optional: Vic-Plug™ valve Series 377 assembled with Series 716 Vic-Check or Series 779 Venturi Check valves. Working pressure to 175 psi (1200 kPa). Memory stops standard. Transition couplings Style 307 required for plug valve assembly.)

Ball Valves

2.6.e Victaulic Series 726 Vic-Ball® standard port ball valve – 1 1/2" - 6" (DN40 - DN150) ductile iron body, ASTM A-395, Grade 65-45-15, chrome plated carbon steel ball and stem, TFE seats, 1000 psi (6900 kPa) for sizes 1 1/2" - 8" (DN40 - DN200) and 800 psi (5515 kPa) for sizes 4" - 6" (DN100 - DN150). (special coating, manual handle, lock/seal device, gear operators or valve automation available).

Note: Provide Victaulic Series 722 threaded end ball valve, forged brass body, ASTM B-16, where required for 1/4" (DN8) through 2" (DN50) threaded pipe end connections, 600 psi (4130 kPa).

2.6.f Victaulic Series 723 diverter ball valve – 2" (DN50) with three ports, 600 psi (4130 kPa), common bottom inlet for diverting flow 90 degrees left or right. Ductile iron body (ASTM A-536, Grade 65-45-12), with Type 316 stainless steel ball and stem. For 180° operation, contact Victaulic for special order.

Check Valves (Dual & Single Disc)

2.6.g Victaulic Series 716 Vic-Check valve – 2 1/2" - 3" (DN65 - DN80) PPS coated ductile iron body, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), elastomer seal mounted on an aluminum bronze non-slam tilting disc that seats against the machined area of the polyphenylene sulphide (PPS) coated body suited for the intended service, stainless steel spring and shaft, 300 psi (2065 kPa). 4" - 12" (DN100 - DN300) - Black enamel painted ductile iron body, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), ductile iron disc, elastomer encapsulated suited for the intended service, stainless steel spring and shaft, welded-in nickel seat, 300 psi (2065 kPa).

2.6.h Victaulic Series 779 Venturi Check Valve – 4" - 12" (DN100 - DN300) Black enamel painted ductile iron body, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), ductile iron disc, elastomer encapsulated suited for the intended service, stainless steel spring and shaft, welded-in nickel seat, 300 psi (2065 kPa). Valve inlet is drilled, with venturi-like taps and plugged for flow kit (included with valve). Twin taps on both sides of valve for meter connections and flow measurement.

Check Valves (Swing)

2.6.i Victaulic Series 712 Swinger® check valve – 2" - 4" (DN50 - DN100). Horizontal installation. Working pressure to 300 psi (2065 kPa). Ductile iron body, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), and 316 stainless steel clapper. EPDM, Nitrile or optional Fluoroelastomer Bumper & Bonnet seals. Stainless steel wetted parts.

Plug Valves

2.6.j Victaulic Series 365 Vic-Plug eccentric plug valves – 3" - 18" (DN80 - DN450), 175 psi (1200 kPa), unidirectional bubble-tight shut-off, bi-directional sealing to 25 psi (172 kPa) is standard with full bi-directional to 175 psi (1200 kPa) optionally available, ductile iron body, bonnet and plug to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Plug encapsulated with elastomer suitable for intended service. Welded-in nickel seat, stainless steel backed TFE self-lubricating bearings. AWWA rigid groove dimensions may be adapted to IPS sized system through the use of Victaulic Style 307 transition couplings.

2.6.k Victaulic Series 377 eccentric plug balancing valves – 3" - 18" (DN80 - DN450), 175 psi (1200 kPa), with memory stop for throttling, metering or balancing service. Ductile iron body, bonnet, and plug to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Plug encapsulated with elastomer suitable for intended service. Welded-in nickel seat, stainless steel backed TFE self-lubricating bearings. AWWA rigid groove dimensions may be adapted to IPS sized system through the use of Victaulic Style 307 transition couplings.

Balancing Valves – TA Hydronics valves for precise flow measurement, balancing, and positive shut-off. Each valve to be wye pattern, globe style with self-sealing EPDM measurement points, EPDM seat, and wheel handles with locking tamper-proof setting.

***2.6.n TA Hydronics Series 785 TBV-S Circuit Balancing Valves** – 125 psi (850 kPa), solder style ends, Ametal® brass copper alloy body, and one full turn handwheel.

***2.6.o TA Hydronics Series 786 STAS Circuit Balancing Valves** – 300 psi (2065 kPa), solder style ends, non-ferrous Ametal brass copper alloy body, and 4 turn digital readout handwheel. Optional drain kit available.

***2.6.p TA Hydronics Series 787 STAD Circuit Balancing Valves** – 300 psi (2065 kPa), threaded ends, non-ferrous Ametal brass copper alloy body, and 4 turn digital readout handwheel. Optional drain kit available.

***2.6.q TA Hydronics Series 788 STAF-SG Circuit Balancing Valves** – 250 psi (1700 kPa), Class 125 flanged ends, ASTM A-536 ductile iron body, all other metal parts of Ametal brass copper alloy, and 8, 12 or 16 turn digital readout handwheel.

***2.6.r TA Hydronics Series 789 STAG Circuit Balancing Valves** – 300 psi (2065 kPa), grooved ends, ASTM A-536 ductile iron body, all other metal parts of Ametal brass copper alloy, and 8, 12 or 16 turn digital readout handwheel.

(*FOR USE IN CANADA, MEXICO AND USA ONLY)

2.7 Test Meters

2.7.a TA Hydronics CBI Computer Balancing Instrument – Rechargeable, handheld meter, suitable for use with balancing valves of the same manufacture. Pre-programmed with valve curves, and conversion formula for Cv. Measured differential pressure shall be automatically converted to units of flow, digital readout, suitable for high and low differential pressures and shall automatically calibrate when measurement is initiated. Meter shall have the capability to compute valve

position for desired flow, compute multiple valve positions within a circuit containing several terminals using a built-in program and store flow, differential pressure or temperature data.

2.7.b Victaulic Style 738 portable differential pressure meter – For use with TA Hydronics balancing valves. Aluminum body, Buna-N seals, and type 316 stainless steel wetted parts. Diameter of dial face $2^1/_2$" (65 mm) with a pressure range of 0-135" (0-3429 mm) of water. Securely mounted in a rugged plastic carrying case with two 6 foot connection hoses.

2.7.c Test Meter Victaulic Style 739 portable master meter – For use with Victaulic Style 733 Venturi flow sensor or Style 734 Orifice indicator. 500 psi (3447 kPa) maximum system pressure and 200° F (93° C) maximum temperature. Model S4 with 4.5" (115 mm) dial and accuracy of ±2.0% or Model S6 with 6" (150 mm) dial and accuracy of ±0.5%, each available with 0-50" (0-1270 mm) or 0-100" (0-2540 mm) range. Aluminum body in Model S4 and forged brass in Model S6. Securely mounted in a rugged plastic carrying case with two 10 foot (3,048 m) connection hoses, and $^1/_8$" (3,18 mm) female quick disconnects. Valves are provided for venting and draining of the meter.

2.8 Bolted Branch Outlet – Branch reductions on 2" (DN50) through 8" (DN200) header piping shall be made with Victaulic hole cut products. Style 920 or Style 920N Mechanical-T® Outlet with locating collar engaging into hole or Style 72 outlet coupling for use in joining grooved pipe with a branch connection at the joint.

2.9 Expansion Joints – Expansion and contraction compensation shall be achieved utilizing either Victaulic Style 150 Mover® 2" - 6" (DN50 - DN150) or Style 155 expansion joints $^3/_4$" - 24" (DN20 - DN600). Select expansion joint and support method in accordance with design conditions and performance data published in Victaulic literature.

2.10 Fittings and Coatings – Victaulic fittings shall be full flow ductile iron fittings, steel fittings or segmentally welded fittings with grooves or shoulders designed to accept Victaulic grooved end couplings. Specific style numbers are listed in the current Victaulic catalog.

Standard Fittings – Shall be cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), forged steel conforming to ASTM A-234, Grade WPB 0.375" wall (9,53 mm wall), or fabricated from Std, Wt. C.S. pipe conforming to ASTM A-53, Type F, E or S, Grade B.

Coatings – Standard Victaulic fittings and couplings are provided with an alkyd enamel finish. Fittings and couplings are available hot dip galvanized to ASTM A-153. Zinc electroplated bolts, nuts, fittings and couplings conform to ASTM B633.

Note: Use Victaulic Style 47 Dielectric Waterway when connecting dissimilar metals in liquid systems. $^1/_2$" - 8" (DN15 - DN200) size range available with grooved, or threaded ends.

2.11 Strainers - Grooved-End

2.11.a T-Type Stainer. Victaulic Style 730 Vic-Strainer®† – 300 psi (2065 kPa) T-Type Strainer shall consist of ductile iron (ASTM A-536, grade 65-45-12 [Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request]) or steel body (ASTM A-53, Type E or S, Grade B), Type 304 stainless steel convoluted removable basket with No. 12 mesh, $1^1/_2$" - 3" (DN40 - DN80) strainer sizes, or No. 6 mesh, 4" - 12" (DN100 - DN300) strainer sizes, 57% free open area.
† For 14 - 24" (DN350 - DN600), see section 2.01 for AGS products.

2.11.b Y-Type Strainer. Victaulic Style 732 Vic-Strainer – 300 psi (2065 kPa) Y-Type Strainer shall consist of ductile iron body, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), Type 304 stainless steel cylindrical removable baskets with $^1/_{16}$" (1,6 mm) diameter perforations and 41% open area 2" - 3" (DN50 - DN80) strainer sizes or $^1/_8$" (3,2 mm) diameter perforations and 40% open area 4" - 12" (DN100 - DN300) strainer sizes.

2.12 Suction Diffuser † - Grooved/Flanged End – Suction Diffuser - Series 731-G – Rated to 300 psi (2065 kPa). Ductile ASTM A-395, Grade 65-45-15 body with base support boss. Diffuser of 304 stainless sheet with $^5/_{32}$" (4 mm) diameter holes for 3" - 12" (DN80 - DN300). Removable start-up prefilter 20 mesh 304 stainless steel screen. Provide connections for pressure measurement and drain. Access coupling Style 07. Flange ANSI Class 150 standard.
† For 14 - 24" (DN350 - DN600), see section 2.01 for AGS products.

2.13 Flow Measuring Sensors - Grooved End

2.13.a Venturi-Type - Victaulic Style 733 – Rated 250 psi (1725 kPa). Housing in sizes $2^1/_2$" - 4" (DN65 - DN100) of ASTM A-53, Schedule 40, and sizes 5" - 12" (DN125 - DN300) of ASTM A-53B, Grade B. Cone is steel conforming to ASTM A-569. Stainless steel Type 304 optional. Two quick disconnects with brass needle valves provided for connection of differential pressure meter.

2.13.b Orifice Type Victaulic Style 734 – Rated 250 psi (1725 kPa). Housing in sizes $2^1/_2$" - 4" (DN65 - DN100) of ASTM A-53, Schedule 40, and sizes 5" - 12" (DN125 - DN300) of ASTM A-53B, Grade B. Orifice plate is steel conforming to ASTM A-569. Stainless steel Type 304 optional. Two quick disconnects with brass needle valves provided for connection of differential pressure meter.

Note: Flow sensors available in threaded or sweat ends. Sizes $^1/_2$" - 2" (DN15 - DN50) diameter.

2.14 Assembly – 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of Victaulic's Field Installation Handbook (I-100) or other included installation instruction prior to attempting assembly. All grooved components (couplings, fittings, valves, gaskets, bolts and nuts) and all grooving tools shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company, Copyright, 2005, Victaulic. All rights reserved.

SECTION 2.01

VICTAULIC AGS (ADVANCED GROOVE SYSTEM) PIPING SYSTEM

For AGS roll grooved standard wall carbon steel pipe sizes 14 - 24" (350 - 600 mm), designed to accommodate working pressure to 350 psig (2410 kPa).

⚠ WARNING

Victaulic AGS products use a patent-pending groove profile that requires the use of special AGS rolls. AGS products must not be used on pipe that has been grooved using standard grooving rolls.

Failure to use AGS products on AGS grooved pipe could result in serious personal injury, property damage, joint leakage or joint separation.

1. **Couplings –** Couplings shall consist of two ASTM A-536 ductile iron housing segments, a wide elastomer pressure responsive gasket, and zinc electroplated carbon steel trackhead bolts and nuts conforming to the physical and chemical requirements of ASTM A-449 and the physical requirements of ASTM A-183.

   1.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.

   1.b. **Gasket –**

   1.b.1. Grade 'E' EPDM – Suitable for water services and oil-free air from a minimum temperature of –30°F (–34°C) to a maximum temperature of +230°F (+110°C). Gasket shall be UL classified in accordance with ANSI/NSF-61 for hot (+180°F/+82°C) and cold (+86°F/+30°C) potable water services.

   1.b.2. Grade 'T' Nitrile – Suitable for service with petroleum products, hydrocarbons, air with oil vapors, vegetable and mineral oils operating from a minimum temperature of –20°F (–29°C) to a maximum temperature of +180°F (+82°C). Not recommended for hot dry air over +140°F (+60°C) and water over +150°F (+66°C).

   1.c. **Coupling Types –**

   1.c.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.

   1.c.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.

2. **Victaulic AGS Grooved End Fittings –** 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.

3. **Victaulic AGS Valves and Specialties –**

   3.a. **Butterfly Valves –** Series W709 175 psi (1270 kPa) / Series W706 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.

   3.b. **Check Valves –** Victaulic Series W715 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.

   3.c. **Strainers –** Victaulic Series W730 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" and 16" (350 and 400 mm) sizes, and 4x4 mesh for 18 - 24" (450 - 600 mm) sizes.

   3.c.1 Where required, strainers shall be supplied with magnets.

   3.d. **Suction Diffusers –** Victaulic Series W731-G 300 psi (2065 kPa), AGS grooved inlet x flanged outlet suction diffuser. Ductile iron body conforming to ASTM A-536, Grade 65-45-12, 304 stainless steel frame and perforated sheet diffuser with 5/32" (3.9 mm) diameter holes. Removable 20 mesh 304 stainless steel start-up prefilter, outlets for pressure/temperature drain connections, and base support boss. Victaulic Series W731-G.

4. All AGS components (including couplings, fittings, valves and accessories) to be supplied by one manufacturer.

5. Common wedge shaped AGS groove for pipe sizes 14 - 24" (350 - 600 mm) requiring one (1) common AGS roll set per tool, for use with approved Victaulic grooving tools. (VE414MC, VE416 FSD, VE424 MC, or VE436.)

6. **Assembly –** 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of Victaulic's Field Installation Handbook (I-100) or other included installation instruction prior to attempting assembly. All grooved components (couplings, fittings, valves, gaskets, bolts and nuts) and all grooving tools shall be of one manufacturer (Victaulic).

   Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company, Copyright, 2005, Victaulic. All rights reserved.

SECTION 3

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH STAINLESS STEEL PIPE

3.0 IPS Grooved Piping System – Victaulic grooved mechanical pipe couplings, fittings, valves and other grooved components may be used as a proprietary system and/or as an option to welding, threading or flanged methods. All grooved components shall be of one manufacturer Victaulic, and conform to local code approval and/or as listed by ASME-B-31.1, B-31.3, B-31.9, UL/ULC, FM, IAPMO or ICC. Grooved end product manufacturer to be ISO-9001 certified. Grooved couplings shall meet the requirements of ASTM F-1476.

3.1 Pipe/Grooved (Standard/Lightwall) – Stainless Steel, ASTM A-312 - 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.

3.2 Victaulic Mechanical Couplings for Joining Stainless Steel Pipe

Note: Where design conditions require use of non-ferrous piping materials for both interior and exterior piping surfaces, Victaulic stainless steel couplings described in VIC/GUIDE-SPEC sections 3.2.a are to be used.

3.2.a Mechanical Couplings – Shall be Style 489 Rigid Stainless Steel coupling conforming to ASTM A-351, A-743, A-744 Grade CF-8M and Style 89 Rigid Ductile Iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Styles 475 and 77-S Flexible Stainless Steel Coupling, Type 316, conforming to ASTM A-351, A-743, and A-744 Grade CF-8M. Refer to current Victaulic literature for pressure ratings for various pipe sizes and pipe schedules.

3.2.b Mechanical Coupling Bolts and Nuts – Shall be Type 316 Stainless Steel, oval neck track bolts and heavy hex nuts with chemical and physical properties of ASTM A-193, Grade B8M, Class 2 or ASTM F-593, Group 2, Condition CW.

Note: Where design conditions permit and where only interior piping surfaces require use of non-ferrous materials and where ferrous materials are acceptable for external piping surfaces, couplings and flange adapters described in sections 2.2, 2.3 and 3.3 are to be used.

3.3 Victaulic Flange Adapters

3.3.a Vic-Flange Style 441 – 2" - 4" (DN50 - DN150) for connection to ANSI class 125/150 flanged components. Cast of stainless steel conforming to ASTM A-351, A-743 and A-744. For larger sizes use the Style 45S Flanged Adapter Nipple.

3.3.b Vic-Flange Style 741 – 2" - 24" (DN50 - DN600) for connection to ANSI class 125/150 flanged components. Cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Refer to current Victaulic literature for pressure ratings for various pipe sizes and pipe schedules.

3.3.c Vic-Flange Style 743 – 2" - 12" (DN50 - DN300) for connection to ANSI class 250/300 flanged components. Cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Refer to current Victaulic literature for pressure ratings for various pipe sizes and pipe schedules.

Note: Victaulic Pressfit® system for Type 316 and Vic-Press 304™ for stainless steel pipe may be used on $^1/_2$" - 2" (DN15 - DN50) piping. Refer to sections 9.0 and 10.0.

3.4 Victaulic Gaskets

3.4.a Water and Oil-Free Air Service – Shall be Grade "E" EPDM compound (green color coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Temperature operating range -30° F to +230° F (-34° C to +110° C). (Note: Air systems without hydrocarbons.) Use Grade "L" Silicone compound (red color coded) conforming to ASTM D-2000 designation 5GE609A18B17 for dry air service operating temperatures up to +350° F (+177° C).

3.4.b Oil and Air Service with Oil Vapors – Shall be Grade "T" Nitrile compound (orange color coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C). Use Grade "O" Fluoroelastomer compound (blue color coded) conforming to ASTM D-2000 designation 2HK714A1-10B37EF31Z for operating temperatures above +180° F up to +300° F (+82° C up to +149° C).

3.4.c Vacuum or Slurry Systems – Shall be Grade "E" or "T" FlushSeal gaskets. Vacuum service may also use standard gaskets with a Victaulic internal metal liner.

3.4.d Chemical Service – Refer to latest published Victaulic Gasket Selection Guide for gasket type recommendations on various chemical services.

3.5 Fittings and Coatings – Victaulic fittings shall be smooth turn full flow stainless steel fittings or segmentally welded fittings with grooves designed to accept Victaulic grooved end couplings. Fittings are available in Schedule 10. Other wall thicknesses are optionally available. Specific style numbers are listed in Victaulic's current literature.

Coatings: Standard Victaulic ductile iron couplings are provided with an alkyd enamel finish. Hot dip galvanizing to ASTM A-153 and other coatings are optionally available.

3.6 Valves - Stainless Steel Butterfly Valves

3.6.a 2" - 12" (DN50 - DN300) Victaulic Series 763 butterfly valve – 300 psi (2065 kPa), grooved ends. Body and disc of Grade CF8M stainless steel conforming to ASTM A-351, A-743 and A-744. Elastomer disc seal of a grade suitable for the intended service. Bubble tight, dead-end or bidirectional service. With memory stop for throttling, metering or balancing service. Gear operators with optional chain wheel supplied as required.

Ball Valves

3.6.b 2" - 6" (DN50 - DN150) Victaulic 726S Vic-Ball® Valve – Standard port ball valve, 800 - 1000 psi (5515 - 6900 kPa), Grade CF8M stainless steel body, 316 stainless steel ball, Tetrafluoroethylene seat and Fluoroelastomer seal.

Check Valves

3.6.c 2" (DN50) Victaulic 712S Swinger check valve – 300 psi (2065 kPa), Type 316 cast stainless steel body and trim conforming to ASTM A743 for horizontal installation.

3.7 Assembly – 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.The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook (I-100). All grooved

components (couplings, fittings, valves, gaskets, bolts and nuts) shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright 2005, Victaulic. All rights reserved.

Note: Victaulic special RX tracking enhanced chrome plated rolls must be used for roll grooving lightwall Schedules 5S, 10S and 10 stainless steel piping. Use Victaulic standard rolls when roll grooving Schedule 40 stainless steel piping.

SECTION 4

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH ALUMINUM PIPE

4.0 IPS Grooved Piping System – Victaulic grooved mechanical pipe couplings and fittings may be used as a proprietary system and/or an option to welding, threading or flanged methods. All grooved components shall be of one manufacturer (Victaulic), and conform to local code approval and/or as listed by ASME-B-31.1, B-31.3, B-31.9, UL/ULC, FM, IAPMO or BOCA. Grooved end product manufacturer to be ISO-9001 certified. Grooved couplings shall meet the requirements of ASTM F-1476.

4.1 Pipe/Grooved (Standard/Lightwall) – Aluminum, ASTM B-210 - Roll or cut grooved-ends as suited to pipe material, wall thickness, pressures, size and method of joining. For grooving information regarding Aluminum pipe ratings and specific pipe material, refer to latest Victaulic published literature section 21.01. Pipe ends to be grooved in accordance with Victaulic current listed standards, conforming to ANSI/AWWA C-606.

4.2 Victaulic Mechanical Couplings for Joining Aluminum Pipe – Mechanical Couplings - Shall be Style 77A aluminum alloy 356-T6 to ASTM B-26.

Note: Where design conditions permit and where only interior piping surfaces require use of non-ferrous materials and where ferrous materials are acceptable for external piping surfaces, couplings and flange adapters described in sections 2.2 and 2.3 are to be used.

4.3 Victaulic Gaskets

4.3.a Water and Oil-Free Air Service – Shall be Grade “E” EPDM compound (green color coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Grade “E” gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Temperature operating range -30° F to +230° F (-34° C to +110° C). (Note: Air systems without hydrocarbons.) Use Grade “L” Silicone compound (red color coded) to ASTM D-2000 designation 5GE609A18B17 for dry air service operating temperatures up to +350° F (+177° C).

4.3.b Oil and Air Service with Oil Vapors – Shall be Grade “T” Nitrile compound (orange color coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C). Use grade “O” Fluoroelastomer compound (blue color coded) conforming to ASTM D-2000 designation 2HK714A1-10B37EF31Z for operating temperatures above +180° F up to +300° F (+82° C up to +149° C).

4.3.c Vacuum or Slurry Systems – Shall be Grade “E” or “T” FlushSeal gaskets. Vacuum service may also use standard gaskets with a Victaulic internal metal liner.

4.3.d Chemical Service – Refer to latest published Victaulic literature, Gasket Selection Guide section, for gaskets type recommendations for various chemical services.

4.4 Fittings – Victaulic Fittings – Shall be smooth turn full flow cast with grooves or shoulders designed to accept Victaulic grooved end couplings. Specific style numbers are listed in Victaulic’s current literature.

Standard Fittings – Shall be cast of aluminum, 356-T6 alloy conforming to ASTM B-26, or fabricated aluminum to ASTM B-210, alloy 6061-T6 or alloy 6063-T6, standard weight.

4.5 Valves – Refer to sections 2.6 and 3.6 for valve selection.

4.6 Assembly – 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.The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook. All grooved components (couplings, fittings, valves, gaskets, bolts and nuts) shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 5

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH FIRE PROTECTION PIPING SYSTEM (BLACK OR GALVANIZED)

5.0 IPS Grooved® Piping Systems – Fire protection piping systems, as further detailed below, shall be installed by using Victaulic mechanical pipe couplings of a bolted or mechanical locking device type, with central cavity pressure-responsive gaskets, for use on wet and dry automatic sprinklers, inspector drain lines, outside protection, low pressure carbon dioxide, FM-200, Halon and Halon replacement systems. All materials and products shall be either Underwriters Laboratories listed (Canada and USA) or Factory Mutual Approved, and installed in accordance with NFPA Standard 13, other applicable Standards and manufacturer’s published recommendations. Grooved end product manufacturer to be ISO-9001 certified. To assure system integrity and performance, all mechanical couplings, fittings, flanges, grooved valves and bolted branch outlets shall be furnished by the same manufacturer (Victaulic). All gaskets shall be of the central cavity-pressure-responsive design.

5.1 Pipe (Standard/Lightwall) – Pipe shall be prepared in accordance with the latest published Victaulic specifications, ANSI/AWWA C-606, UL, FM NEPA or other standards as applicable.

5.1.a Steel Pipe – Shall be steel pipe conforming to ASTM A-135, A-795 or A-53.

5.1.b Grooved End Pipe – Shall be grooved utilizing Victaulic Vic-Easy® roll grooving tools or prepared in accordance with Victaulic cut grooving specifications.

5.1.c Hole Cut Pipe – Shall have a machine cut hole at a predetermined position, on the centerline of the pipe, of a size to receive the housing locating collar, in accordance with Victaulic specifications.

5.2 Mechanical Couplings and Gaskets – As manufactured by Victaulic shall be cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, with bolts/nuts meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

5.2.a Rigid Joints – Shall be Victaulic FireLock® Style 005, FireLock EZ™ Style 009, 1¼" - 8" (DN32 - DN200), Zero-Flex Style 07, 1½" - 24" (DN40 - DN600) or Style HP-70, 2" - 12" (DN50 - DN300) couplings with gasket, and zinc electroplated bolts/nuts. Rigid couplings shall be of the angle pattern bolt pad type, and shall provide system support and hanging requirements in accordance with NFPA 13.

5.2.a.1 "Installation Ready" Rigid Joints – Shall be Victaulic FireLock EZ™ Style 009, in sizes 1¼ - 4", which shall be designed for direct "stab" installation onto grooved pipe without prior disassembly of the coupling, gasket, bolts/nuts. These couplings shall be of the angle pattern bolt pad type, and shall have Grade "E" Type A gaskets for full vacuum, wet and/or dry fire protection sprinkler service. FireLock EZ couplings shall provide system support and hanging requirements in accordance with NFPA 13. Grade "E" Type A gaskets to be supplied with the Vic-Plus™ Gasket System, a factory applied dry, non-toxic lubricant. (Refer to the Victaulic I-100 Installation Pocket Handbook for approved Vic-Plus applications.) Please refer to the latest published installation instructions for FireLock EZ Style 009 couplings.

5.2.a.2. "Standard Rigid Joints" – Shall be Victaulic FireLock Style 005, 1¼ - 8" (DN32 - DN200) with Grade "E" Type A gasket, or Zero-Flex Style 07, 10 - 12" (DN250 - DN300) with Grade "E" gasket, both supplied with zinc electroplated bolts/nuts. (Style 005 Grade "E" Type A gaskets to be supplied with the Vic-Plus Gasket System, a factory applied dry, non-toxic lubricant. Refer to the Victaulic I-100 Installation Pocket Handbook for approved Vic-Plus applications.) Rigid couplings shall be of the angle pattern bolt pad type, and shall provide system support and hanging requirements in accordance with NFPA 13. Victaulic recommends the use of FireLock Style 005 couplings with Grade "L" (silicone) FlushSeal gaskets on all dry systems operating below 0°F (–18°C).

For systems requiring higher pressure ratings than shown below, Victaulic recommends Zero-Flex Style 07, 1 - 8" (DN25 - DN200) couplings with Grade "E" gasket, or Style HP-70, 2 - 12" (DN50 - DN300) with Grade "E" gasket, both supplied with zinc electroplated bolts/nuts.

For systems requiring larger coupling sizes, Victaulic recommends its flexible Style 77, 14 - 24" (DN350 - DN600) coupling with Grade "E" gasket supplied with zinc electroplated bolts/nuts.

UL/FM approved pressure ratings with Schedule 40 steel pipe:

Coupling	Size	Maximum Pressure Rating	
		UL	FM
Style 009	1¼ - 4"	300	300
Style 005	5 - 8"	300	300
Style 07	10 - 12"	400	400

5.2.b Flexible Joints – Shall be Victaulic Style 75, FireLock VIC-FLEX 1½" - 8" (DN40 - DN200), Style 77, ¾" - 24" (DN20 - DN600), or Style 791, 2" - 8" (DN50 - DN200) couplings with Grade "E" standard gaskets and zinc electroplated bolts/nuts.

5.2.c Reducing Joints – Shall be Victaulic 750 Reducing Couplings 2" - 8" (DN50 - DN200) with Grade "E" standard gaskets and zinc electroplated bolts/nuts for direct connection of pipe of different sizes.

5.2.d Outlet Couplings – All joints designated Outlet Couplings, or where feasible to replace reducing outlet tees, shall be Victaulic Style 72 outlet couplings 1½" - 6" (DN40 - DN150) (specify grooved, female or male threaded outlet) with Grade "E" standard gaskets and zinc electroplated bolts/nuts.

5.3 Victaulic Flange Adapters

5.3.a Victaulic-FireLock Flange Adapter Style 744 – 2" - 8" (DN50 - DN200) for connection to ANSI CL 125 or CL 150 flanged components.

5.4 Victaulic Fire Protection Fittings

5.4.a Fittings for Grooved End Steel Pipe – Shall be cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with grooved or shouldered ends for direct connection into grooved piping systems with steel pipe - prepared as in Section 5.1.b. Fittings may be standard dimension ductile iron/steel or FireLock type.

5.4.b Branch Outlets – Shall be made from Victaulic Style 920 and 920N Mechanical T's or Style 922 FireLock Outlet-T's with locating collar engaging into hole. Grade "E" standard pressure-responsive gasket and zinc electroplated bolts/nuts. (Specify outlet/branch connection type - grooved, or female threaded, as available.) 2½" - 6" (DN65 - DN150) No. 10 DR 90 degree elbow optional.

5.4.c Sprinkler Connections – Direct sprinkler connections, branch connections, drop nipples and sprigs shall be made with Victaulic Style 925 Snap-Let® outlet connections with locating collar engaging into hole, Grade "E" standard pressure responsive gasket and standard plated bolt or No. 67 Vic-End II End of Run Fitting with grooved inlet (specify ½" (DN15), ¾" (DN20) or 1" (DN25) female threaded outlet).

Note: Victaulic Pressfit plain-end system may be used on ¾"-2" (DN20 - DN50) piping, refer to section 8.0.

5.5 Valves - Grooved End

5.5.a Check Valves – Shall be Victaulic Series 717 FireLock Check Valve. Ductile iron body to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), stainless steel spring and shaft, rated to 250 psi (1725 kPa). Suitable for anti-water hammer service and horizontal or vertical installation. 2½" - 3" (DN65 - DN80) PPS coated, aluminum bronze non-slam tilting disc with Grade "E" EPDM seal, and Underwriters Laboratories Listed (Canada and USA). 4" - 12" (DN100 - DN300) - Black enamel painted body with integrally welded on nickel alloy seat, Grade "E" EPDM encapsulated ductile iron disc, Underwriters Laboratories Listed (Canada and USA), and Factory Mutual Approved.

Shall be Victaulic Series 717R FireLock Check Valve – Black enamel painted ductile iron body to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), 4" - 8" (DN100 - DN200), Grade "E" EPDM encapsulated ductile iron disc, stainless steel spring and shaft, rated to 200 psi (1370 kPa). Suitable for anti-water hammer service and horizontal or vertical installation. Provided drilled, tapped and plugged downstream for 2" (DN50) drainage outlet and ½" (DN15) pressure taps both upstream and downstream of the disc . Underwriters Laboratories Listed (Canada and USA), and Factory Mutual Approved.

5.5.b Butterfly Valves – Shall be Victaulic Series 705W, Underwriters Laboratories Listed (Canada and USA)

for UL Butterfly Specification 1091 and Factory Mutual Approval Standard 1112, sizes 2$^1/_2$" - 12" (DN65 - DN300), supplied with a ductile iron body conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), coated with a polyphenylene sulfide blend, a disc of ductile iron conforming to ASTM A-536, Grade 65-45-12, with EPDM coating providing bubble tight shut-off. Sizes 2$^1/_2$" - 12" (DN65 - DN300) shall have an approved weatherproof manual actuator suitable for indoor or outdoor use with two pre-wired single pole, double throw supervisory switches monitoring the open position as specified on the drawings. The Series 705 is supplied with grooved ends for installation with Victaulic grooved end couplings and rated for service up to 300 psi (2065 kPa) working pressure. The Series 705W can be supplied with a $^1/_4$" (DN8) tap on the inlet side of the valve for use with Victaulic Series 756 Dry and Series 758 Actuated Check Valves. Valves shall be installed in accordance with the latest published Victaulic specifications.

5.5.c Ball Valves – Shall be Victaulic FireLock Series 728, Underwriters Laboratories Listed (Canada and USA) with flow characteristics exceeding UL Specification 1091 and Factory Mutual Approval Standard 1112, sizes 1" - 2" (DN25 - DN50), supplied with bronze body conforming to ASTM 584 Alloy 844, chrome plated brass ball, 316 stainless steel blowout proof stem, and TFE seat. They shall have an approved weatherproof manual actuator suitable for indoor or outdoor use with two pre-wired single pole, double throw supervisory switches monitoring the open position as specified on the drawings. Supplied with grooved ends in 1$^1/_4$" - 2" (DN35 - DN50) for installation with Victaulic grooved end couplings, with threaded ends available in all sizes. The Series 728 is rated for service up to 350 psi (2410 kPa) working pressure and can be supplied with a $^1/_4$" tap on the inlet side of the valve for use with Victaulic Series 756 Dry and Series 758 Actuated Check Valves. Valves shall be installed in accordance with the latest published Victaulic specifications.

5.5.d Alarm Check Valves – Shall be Victaulic FireLock Series 751 1$^1/_2$" - 8" (DN40 - DN200) spring assisted Alarm Check Valves, as Underwriters Laboratories Listed (Canada and USA) and Factory Mutual Approved, for vertical or horizontal installation, supplied with Grade “E” EPDM clapper seal, housing cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, serviceable without removal from the line, with grooved 1$^1/_2$" - 8" (DN40 - DN200) or flange by groove 4" - 8" (DN100 - DN200) ends for installation with ANSI Class 150 flange or Victaulic grooved end couplings as applicable, 1$^1/_2$" - 6" (DN40 - DN150) rated for service up to 300 psi (2065 kPa) working pressure, 8" (DN200) rated for service up to 225 psi (1550 kPa) working pressure.

5.5.e Dry Pipe Valves – Shall be Victaulic FireLock Series 756 1$^1/_2$" - 8" (DN40 - DN200) low differential, latched closed spring assisted, self resetting clapper, Dry Pipe Valves as Underwriters Laboratories Listed (Canada and USA) and Factory Mutual Approved, for vertical or horizontal installation, supplied with Grade “E” EPDM seal, housing cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, serviceable without removal from the line, with grooved 1$^1/_2$" - 8" (DN40 - DN200) or flange by groove 4" - 8" (DN100 - DN200) ends for installation with ANSI Class 150 flange or Victaulic grooved end couplings as applicable, 1$^1/_2$" - 6" (DN40 - DN150) rated for service up to 300 psi (2065 kPa) working pressure, 8" (DN200) rated for service up to 225 psi (1550 kPa) working pressure.

5.5.f Actuated Check Valve with Deluge Trim – Shall be Victaulic FireLock Series 758 1$^1/_2$" - 8" (DN40 - DN200) low differential, latched closed spring assisted, self resetting clapper, pneumatic, hydraulic, or electric release, Actuated Check Valve with Deluge Trim as Underwriters Laboratories, Listed (Canada and USA) and Factory Mutual Approved, for vertical or horizontal installation, supplied with Grade “E” EPDM clapper seal, housing cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, serviceable without removal from the line, with grooved 1$^1/_2$" - 8" (DN40 - DN200) or flange by groove 4" - 8" (DN100 - DN200) ends for installation with ANSI Class 150 flange or Victaulic grooved end couplings as applicable, 1$^1/_2$" - 6" (DN40 - DN150) rated for service up to 300 psi (2065 kPa) working pressure, 8" (DN200) rated for service up to 225 psi (1550 kPa) working pressure.

5.5.g Actuated Check Valve with Pre-Action Trim – Shall be Victaulic FireLock Series 758 1$^1/_2$" - 8" (DN40 - DN200) low differential, latched closed spring assisted, self resetting clapper, pneumatic, electric, pneumatic/electric, electric-pneumatic/electric, or pneumatic/pneumatic release, non, single, or double interlock Actuated Check Valve with Pre-Action Trim as Underwriters Laboratories Listed (Canada and USA) and Factory Mutual Approved, for vertical or horizontal installation, supplied with Grade “E” EPDM clapper seal, housing cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, serviceable without removal from the line, with grooved 1$^1/_2$" - 8" (DN40 - DN200) or flange by groove 4" - 8" (DN100 - DN200) ends for installation with ANSI Class 150 flange or Victaulic grooved end couplings as applicable, 1$^1/_2$" - 6" (DN40 - DN150) rated for service up to 300 psi (2065 kPa) working pressure, 8" (DN200) rated for service up to 225 psi (1550 kPa) working pressure.

5.6 Alarm Test Module – Shall be Test Master II Alarm Test Module Style 720 with grooved ends 1$^1/_4$" - 2" (DN32 - DN50) or threaded 1" - 2" (DN25 - DN50) (optional pressure relief valve for threaded), bronze body, dual polycarbonate sight glasses, Bronze valve bonnet, and Malleable Iron handwheel. Rated for service up to 300 psi (2065 kPa) working pressure.

5.7 Meters – Fire Pump Test Meters – Shall be Victaulic Style 735, 2$^1/_2$" - 12" (DN65 - DN300) Fire Pump Test Meter, Factory Mutual Approved, incorporating a calibrated venturi and attached GPM meter, to be installed on the discharge side of the fire pump, to accurately measure pump performance. Test Meter shall be supplied with grooved ends for installation with Victaulic grooved end couplings.

5.8 Sprinklers – Shall be Victaulic Model V, Underwriters Laboratories Listed (Canada and USA), with frame of die cast brass, Teflon encapsulated Belleville spring seal, and frangible glass bulb. The glass bulbs are available in standard and quick response with various temperature ratings according to application requirement.

5.8.a Standard Commercial – For light and ordinary hazards, standard or quick response, in upright, pendent, recessed pendent, horizontal sidewall, or recessed horizontal sidewall configurations. Standard Orifice (K=5.6): Victaulic Model V27; Large Orifice (K=8.0): Victaulic Model V34.

5.8.b Storage – For light and ordinary hazards, standard or quick response, in upright, or pendent configurations. Extra Large Orifice (K=11.2): Victaulic Model V34; Standard Orifice (K=5.6): Victaulic Model V27 (Intermediate level – rack storage); Large Orifice (K=8.0): Victaulic Model V34 (Intermediate level – rack storage).

5.8.c Extended Coverage – For light hazard, standard or quick response, in pendent, recessed pendent, hori-

zontal sidewall, or recessed horizontal sidewall configurations. Extended coverage extra large orifice (K=8.0 and 11.2): Victaulic Model V34. For light hazard, standard or quick response, in pendent, or recessed pendent configurations. Extended coverage very extra large orifice (K=14.0): Victaulic Model V34. For ordinary hazard, standard or quick response, in pendent, or recessed pendent configurations. Extended coverage very extra large orifice (K=14.0): Victaulic Model V34.

5.8.d **Residential** – Quick response, in pendent, recessed pendent, horizontal sidewall, recessed horizontal sidewall, adjustable flush pendent, low flow concealed pendent. Victaulic Models V27, V29, and V38.

5.8.e **Dry** – For light and ordinary hazards, standard or quick response, in upright, pendent, recessed pendent, concealed pendent, horizontal sidewall, or recessed horizontal sidewall configurations. Victaulic Model V36. For light hazard, standard or quick response, in horizontal sidewall, or recessed horizontal sidewall configurations. Victaulic Model V36.

5.8.f **Nozzles** – Window sprinklers: Victaulic Model V10. Open foam nozzles: Victaulic Model V26.

5.9 **Assembly** – 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook (I-100). All grooved components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Note: Refer to Victaulic G-100 general catalog section 10.01 for a complete listing of Victaulic products which are Underwriters Laboratory Listed (Canada and USA) and/or Factory Mutual System Approved for Fire Protection Piping Systems.

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 6

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH AWWA GROOVED PIPE

6.0 **Grooved Piping System for AWWA Ductile Pipe** – Victaulic AWWA Grooved Piping System - Mechanical grooved pipe couplings and fittings as manufactured by Victaulic or equal shall be used on all ductile iron piping systems. Grooved pipe couplings and fittings shall conform to the following requirements. Grooved end product manufacturer to be ISO-9001 certified.

6.1 **Pipe Materials** – Grooved end cast or ductile iron pipe shall be grooved in accordance with ANSI/AWWA Standard C-606. Rigid radius groove dimensions shall be utilized where flexibility is neither required or desired. Flexible grooves shall be provided as necessary for settlement or expansion as determined and approved by the engineer.

6.2 **Victaulic Mechanical Couplings**

6.2.a **Mechanical Couplings** – Mechanical couplings shall be Victaulic Style 31 cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with an alkyd-phenolic primer coating (unless specified otherwise) with a FlushSeal synthetic rubber gasket and plated nuts and bolts, 3" - 36" (DN80 - DN900) size range.

6.2.b **Couplings Bolts/Nuts** – Bolts shall be heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183, or optional - bolts and nuts shall be Type 304 (or 316) stainless steel conforming to ASTM A-193, Grade B-8, (or B-8M), Class 2 or heavy hex head bolt and nut to ASTM A-325 Type 3 (Cor-Ten) as an alternate for buried service.

6.3 **Grooved/Flanged Transition Components** – Victaulic Style 341 Vic-Flange Adapter shall be used to facilitate connection from grooved fittings to flanged valves, pumps, pipe, fittings, and other Class 125 flanged components. The flange adapters shall be ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), 3" - 24" (DN80 - DN600) size range. Gaskets shall have properties as designated by ASTM D-2000 of the same specially compounded elastomer as the couplings, and shall be suitable for the required service. Transition between 3" - 12" (DN80 - DN300) IPS pipe and ductile iron pipe shall be made with a grooved coupling, Victaulic Style 307, designed to make this transition.

6.4 **Victaulic Gaskets** – Gaskets shall be FlushSeal design molded of synthetic rubber specially compounded to conform to ductile pipe surfaces with a short center leg which shall bridge the pipe ends offering an initial seal on the leading edge of the pipe ends. Elastomers shall have properties as designated in ASTM D-2000. Reference shall always be made to the latest published Selection Guide for Victaulic gaskets for proper gasket selection for the intended service.

6.4.a **Water Service/Ductile Iron Pipe** – Gasket supplied for water service from -20° F to +200° F (-29° C to +93° C) on ductile iron pipe, from 3" - 36" (DN80 - DN900) shall be Grade “M” halogenated butyl, with brown color code, specially compounded to conform to ductile pipe surfaces recommended for water service within the specified temperature range plus a variety of diluted acids, oil-free air, and many chemical services. Grade “M” gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) potable water service. Not recommended for petroleum services.

6.4.b **Oil Service/Ductile Iron Pipe** – Gasket supplied from -20° F to +180° F (-29° C to +82° C) on ductile iron pipe from 3" - 36" (DN80 - DN900), shall be Grade “S” nitrile, with red color code, specially compounded to conform to ductile pipe surfaces recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range, except hot dry air over +140° F (+60° C) and water over +150° F (+66° C). Not recommended for hot water services.

6.5 **Fittings** – Fittings shall be ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), or cast iron, ASTM A-48, Class 30-A, and conform to the requirements of ANSI/AWWA-C110/A21.10 or ANSI/AWWA C153/A21.53 for center to end dimensions and AWWA C-153 or ANSI 21.10/AWWA C-110 for wall thickness and ANSI/AWWA-C606 rigid radius grooving dimensions for end preparation.

Coatings and Linings - Provide coatings and linings for specified piping systems in accordance with applicable section of mechanical piping specification.

6.6 **Valves**

6.6.a **Plug Valves** – 3" - 18" (DN80 - DN450) shall be Victaulic Series 365 Vic-Plug grooved end eccentric plug valves, with a ductile iron resilient faced plug and valve

body conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request) with end-to-end dimensions conforming to the requirements of ANSI/AWWA C-509 for 3" - 12" (DN80 - DN300) and ASTM A-126B for 14" - 18" (DN350 - DN450). Plug face shall be coated with a resilient material suitable for the intended service. Valves shall have self-lubricating stainless steel bearings and be rated at 175 psi (1200 kPa) for 3" - 12" (DN80 - DN300), and 150 psi (1034 kPa) for 14" - 18" (DN350 - DN450). The body shall be cast of cast iron conforming to ASTM A-126, Grade B or ductile iron conforming to ASTM A-536, Grade 65-45-12 with end-to-end dimensions conforming to the requirements of AWWA C-509 for "resilient seat gate valves 3" - 12" (DN80 - DN300) for water and sewage services." The port shall be circular and have a minimum flow area of 81% of the full pipe area. Flow direction shall be indicated on valve body. The end configuration shall be rigid groove conforming to ANSI/AWWA C-606 rigid grooving dimensions.

6.7 Check Valve – Valves shall be Victaulic Series 317 check valves 3" - 12" (DN80 - DN300), designed for working pressures up to 175 psi (1200kPa). The end-to-end dimensions shall conform to ANSI/AWWA C-508 with rigid groove specifications to ANSI/AWWA C-606. Cast iron body, ASTM A-126 Class B, standard alkyd phenolic primer coating, other coatings available as options. Removable bronze seat, ASTM B-584, with optional elastomeric coating appropriate for service. Ductile iron closure coupling and cap for maintenance access, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with appropriate gasketing elastomer for service. Disc: 3" - 4" (DN80 - DN100) bronze, ASTM B-584 and 6" - 12" (DN150 - DN300) ductile iron, ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with welded nickel seat. Accessories available: arm (lever) and spring, arm (lever) and counterweight and arm (lever) and air cushion.

6.8 Grooving – Grooving dimensions shall conform to AWWA C-606, or the Victaulic published specifications.

6.9 Assembly – 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook (I-100). All grooved components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Normally Vic-Plug valves will be oriented with the shaft vertical and the handle/operator at the top when installed in a horizontal position. For easier access and cramped locations Vic-Plug valves may be installed on their side with the plug horizontal and rotating to the top of the valve when open. This orientation is recommended for sludge, slurries and suspended solids services such as encountered in municipal waste treatment, industrial and mining. This orientation reduces the tendency of the plug cavity to fill up and allows the eccentric plug to close in a manner similar to a gate valve.

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company.
Copyright, 2005, Victaulic. All rights reserved.

SECTION 7

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH COPPER GROOVED PIPING SYSTEM

7.0 Victaulic CTS Copper Grooved Piping System – Victaulic grooved mechanical pipe couplings, fittings, valves and other grooved components may be used as an option to brazing, soldering, threading or flanged methods. All grooved components shall be of one manufacturer (Victaulic), and conform to local code approval. Victaulic products are permitted and/or Listed/Approved by codes or standards organizations including but not limited to: ASME (B31.1, 31.3, 31.9), ASTM, ANSI/AWWA (C-606), IAPMO, International Code Council (IPC, IMC, IFC), NFPA, NSF, UL, ULC, and VdS. Grooved end product manufacturer to be ISO-9001 certified. Grooved couplings shall meet the requirements of ASTM F-1476.

7.1 Copper Tube/Grooved – ASTM B-88 (Type K, L, or M) and ASTM B-306 (Type DWV), roll grooved in accordance with Victaulic current listed standards.

7.2 Victaulic Mechanical Couplings for Joining Copper Pipe – Coupling shall be cast of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), as manufactured by Victaulic.

7.2.a Mechanical Couplings – Shall be Style 606 rigid couplings 2" - 8"(DN50 - DN200). Housings are cast with an angle pattern bolt pad for direct connection of copper tubing without flaring to IPS dimensions. Coupling bolts shall be zinc plated (ASTM B-633) heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183 as provided standard Victaulic. Optional Type 316 stainless steel bolts per ASTM A-193, Grade B8M, Class 2.

7.3 Victaulic Flange Adapters

7.3.a Vic-Flange Adapter Style 641 – 2" - 6" (DN50 - DN150), for connection to ANSI class 125/150 flanged components. Cast of durable ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request).

7.4 Victaulic Gaskets – Shall be molded of synthetic rubber in a FlushSeal configuration conforming to the copper tube size (CTS) outside diameter and coupling housing.

7.4.a Water and Oil Free Air Service – Shall be Grade "E" EPDM compound (copper color-coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Temperature operating range -30° F to +230° F (-34° C to +110° C).

7.5 Valves - Grooved End Butterfly Valves

7.5.a Butterfly Valves – $2^1/_2$" - 6" (DN65 - DN150) Victaulic Series 608 Butterfly valve, 300 psi (2065 kPa), CTS grooved ends. Cast bronze body to CDA-836 (85-5-5-5). Ductile iron disc, ASTM A-536, synthetic rubber encapsulated suited for the intended service. Seat test to MSS-SP-67. Bubble tight, dead-end or bi-directional service. With memory stop for throttling, metering or balancing service.

7.6 Fittings and Coatings – Fittings shall be Victaulic full flow smooth turn elbows) copper fittings with CTS grooves designed to accept Victaulic grooved end couplings. Standard Fittings – Shall be copper per ASTM B-75 alloy

C12200 and ANSI B16-22; bronze sand castings per ASTM B-584 copper alloy CDA 836 (85-5-5-5) per ANSI B16.18.

Note: Use Victaulic Style 47 dielectric waterway when connecting dissimilar metals in liquid systems. 1/2" - 8" (DN15 - DN200) size range available with combinations of grooved, or threaded ends.

Coatings: Standard Victaulic couplings and fittings are provided with a copper colored alkyd enamel paint. Zinc electroplated bolts and nuts conform to ASTM B-633.

7.7 Assembly – 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Grooved end fittings, couplings, flange adapters, and valves shall be sized to copper-tube dimensions. Flaring of pipe ends to IPS dimensions is not allowed. See the latest copy of the Victaulic Field Installation Handbook (I-100). All grooved components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 8

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH PRESSFIT SCHEDULE 5 CARBON STEEL PIPE (AUSTRALIA, CANADA, MEXICO, NEW ZEALAND AND USA ONLY)

8.0 Victaulic Pressfit System - Carbon Steel – Carbon Steel Victaulic Pressfit System, 3/4" - 2" (DN20 - DN50) Schedule 5, .065 wall (1,65 mm wall) pipe conforming to ASTM A-135, A-795 or A-53, having a maximum yield strength of 45,000 psi (310275 kPa) and a maximum hardness of Rb70. Water, air, chemical, oil and vacuum systems with working pressures to 300 psi (2065 kPa). UL/ULC Listed and FM Approved to 175 psi (1200 kPa) for fire protection systems. Victaulic Pressfit products are permitted and/or Listed/Approved by codes or standards organizations including but not limited to: ASME (B31.1, 31.3, 31.9), ASTM, ANSI/AWWA (C-606), FM, IAPMO, International Code Council (IPC, IMC, IFC), NFPA, NSF, UL, ULC, and VdS. Request BOCA-ES research report No.93.3, SBCCI-ES report No.9535 and ICBO-ES report No.5079 for details.

8.1 Couplings, Fittings – Coupling and fitting housings shall be Pressfit products formed of precision cold drawn steel pipe, as manufactured by Victaulic, with self contained O-ring seals in the couplings/fitting ends. Couplings and fittings shall be zinc electroplated ASTM B-633 (external only).

8.2 O-Ring Seals

8.2.a Water and Oil Free Air – Shall be molded of Grade"E" EPDM compound, UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service with an operating temperature range of -30° F to +230° F (-34° C to +110° C).

8.2.b Oil and Air Service with Oil Vapors – Shall be Grade "T" (Nitrile) compound with an operating temperature range of -20° F to 180° F (-29° C to +82° C). (Grade "T" is not to be used for hot water services.) Use Grade "O" (Fluoroelastomer) for oxidizing acids and high temperature petroleum services +20° F to +300° F (-7° C to +149° C).

8.3 Valves – 3/4" - 2" (DN20 - DN50) Victaulic Series 522 standard port ball valve with carbon steel Pressfit ends, 300 psi (2056 kPa), forged brass body, ball and stem conforming to ASTM B-16. Brass ball and stem to be chrome plated. TFE seats and O-ring seals of a material suitable for intended service.

8.4 Pipe Preparation – Schedule 5 steel pipe shall be square cut plus or minus 0.030" (0,76 mm), properly deburred and cleaned to ensure leak-tight O-ring seal.

8.5 Assembly – Pipe ends must be marked at the required location and fully inserted into the coupling/fitting housing up to the pipe stop (except for Style 506 Slip Coupling which does not contain internal pipe stops). All instructions as found in the Victaulic "Pressfit Product Assembly Instructions", I-500 must be followed. Fitting ends shall be pressed onto the pipe using only a Victaulic Pressfit Tool equipped with the proper size pressing jaws in accordance with the latest Victaulic Tool operating and maintenance instruction manual.

Note: Pressfit products for carbon steel pipe are externally zinc electroplated. It is the responsibility of designers of piping systems to verify that an adequate corrosion allowance, corrosion inhibitors or experience confirms system life will be adequate for the intended service. Schedule 5 carbon steel pipe compatible with Pressfit products provides corrosion resistance equivalent to ASTM A-53, A-135 and A-795 pipe.

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 9

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH VIC-PRESS 304 STAINLESS STEEL SYSTEM (AUSTRALIA, CANADA, MEXICO, NEW ZEALAND AND USA ONLY)

9.0 Victaulic Vic-Press 304 Stainless Steel System – The Vic-Press 304 stainless steel system, 1/2" - 2" (DN15 - DN50), shall contain Victaulic stainless steel Pressfit fittings, couplings and Vic-Press 304 certified pipe. Vic-Press 304 couplings and fittings and approved pipe are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. This system shall be rated to a maximum working pressure of 300 psi (2065 kPa) for water, oil, gas, chemical, air, and vacuum services. Approved for medical vacuum service per NFPA 99-2002.

9.1 Pipe – Pipe shall be stainless steel Vic-Press 304 pipe, .065 wall (1,65 mm wall), ASTM A-312 grade 304/304L and be Certified for use with Pressfit products. Pipe shall be full finished annealed.

9.2 Couplings, Fittings – Coupling and fitting housings shall be Pressfit products formed of approved austenitic stainless steel tubing, as manufactured by Victaulic, with self contained O-ring seals in the coupling/fitting ends.

9.3 O-Ring Seals

9.3.a Water and Oil Free Air – Shall be molded of Grade "E" EPDM compound, UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service with an operating temperature range of -30° F to +230° F (-34° C to +110° C).

9.3.b Oil and Air Service with Oil Vapors – Shall be Grade "T" (Nitrile) compound with an operating temperature range of -20° F to +180° F (-29° C to +82° C). (Grade "T" is not to be used for hot water services.) Use Grade

"O" (Fluoroelastomer) for oxidizing acids and high temperature petroleum services +20° F to +300° F (-7° C to +149° C).

9.4 Valves – 1/2" - 2" (DN15 - DN50) Victaulic Series 589 standard port ball valve with stainless steel Pressfit ends, 300 psi (2056 kPa), forged brass body, ball and stem conforming to ASTM B-16. Brass Ball and stem to be chrome plated. TFE seats and O-ring seals of a material suitable for intended service.

1/2" - 2" (DN15 - DN50) Victaulic Series 569 full port ball valve with type 316 stainless steel plain ends for Pressfit assembly, 300 psi (2056 kPa), Type 316 Grade CF8M stainless steel body, cap, and ball, type 316 stainless steel stem, and PTFE seats.

9.5 Pipe Preparation – Schedule 5 steel pipe shall be square cut plus or minus 0.030" (0,76 mm), properly deburred and cleaned to ensure leak-tight O-ring seal.

9.6 Assembly – Pipe ends must be marked at the required location and fully inserted into the coupling/fitting housing up to the pipe stop (except for Style 598 Slip Coupling which does not contain internal pipe stops). All instructions as found in the Victaulic "Pressfit Product Assembly Instructions", I-500 must be followed. Fitting ends shall be pressed onto the pipe using only a Victaulic Pressfit Tool equipped with the proper size pressing jaws in accordance with the latest Victaulic Tool operating and maintenance instruction manual.

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 10

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH PRESSFIT TYPE 316 STAINLESS STEEL SYSTEM (AUSTRALIA, CANADA, MEXICO, NEW ZEALAND AND USA ONLY)

10.0 Victaulic Vic-Press 316 Stainless Steel System – The Vic-Press 316 stainless steel system, 1/2" - 2" (DN15 - DN50) schedule 5S, shall contain Victaulic stainless steel Pressfit fittings, couplings and Vic-Press 316 certified pipe. Vic-Press 316 couplings, fittings, and approved pipe are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. This system shall be valid to a maximum working pressure of 300 psi (2065 kPa) for water, oil, gas, chemical, air and vacuum services. Approved for medical vacuum service per NFPA 99-2002.

10.1 Pipe – Pipe shall be Vic-Press 316 stainless steel pipe, .065 wall, (1,65mm wall) ASTM A-312 grade 316/316L and be Certified for use with Pressfit products. Pipe shall be full finished annealed with polished O.D.

10.2 Couplings, Fittings – Coupling and fitting housings shall be Pressfit products formed of approved 316/316L stainless steel tubing, as manufactured by Victaulic, with self contained O-ring seals in the coupling/fitting ends.

10.3 O-Ring Seals

10.3.a Water and Oil Free Air – Shall be molded of Grade "E" EPDM compound, UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service with an operating temperature range of -30° F to +230° F (-34° C to +110° C).

10.3.b Oil and Air Service with Oil Vapors – Shall be Grade "T" (Nitrile) compound with an operating temperature range of -20° F to 180° F (-29° C to +82° C). (Grade "T" is not to be used for hot water services.) Use Grade "O" (Fluoroelastomer) for oxidizing acids and high temperature petroleum services +20° F to +300° F (-7° C to +149° C).

10.4 Valves – 1/2" - 2" (DN15 - DN50) Victaulic Series 569 full port ball valve with type 316 stainless steel plain ends for Pressfit assembly, 300 psi (2056 kPa), Type 316 Grade CF8M stainless steel body, cap, and ball, type 316 stainless steel stem, and PTFE seats.

10.5 Pipe Preparation – Schedule 5 steel pipe shall be square cut plus or minus 0.030" (0,76 mm), properly deburred and cleaned to ensure leak-tight O-ring seal.

10.6 Assembly – Pipe ends must be marked at the required location and fully inserted into the coupling/fitting housing up to the pipe stop (except for Style 508 Slip Coupling which does not contain internal pipe stops). All instructions as found in the Victaulic "Pressfit Product Assembly Instructions", I-500 must be followed. Fitting ends shall be pressed onto the pipe using only a Victaulic Pressfit Tool equipped with the proper size pressing jaws in accordance with the latest Victaulic Tool operating and maintenance instruction manual.

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 11

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH CARBON STEEL PLAIN END PIPING SYSTEM (BLACK OR GALVANIZED)

11.0 Victaulic Plain End System - Carbon Steel – Where shown on drawings, provide Victaulic plain end fittings and couplings in conjunction with plain end or beveled end carbon steel pipe.

11.1 Couplings

11.1.a Victaulic Style 99 Roust-A-Bout® Coupling – 1" - 18" (DN25-DN450)

Housing: Ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request).

Housing Coating: Orange enamel

Jaws: Carbon steel, case hardened, electroplated. Except sizes 1" (DN25), 76,1 mm, and 139,7 mm which utilize Stainless Steel type 416, hardened material.

11.2 Victaulic Gaskets

11.2.a Water and Oil Free Air Service – Shall be Grade "E" EPDM compound (green color coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Temperature operating range -30° F to +230° F (-34° C to +110° C). Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. (Note: Air systems without hydrocarbons.) Use Grade "L" Silicone compound (red color coded)) conforming to ASTM D-2000 designation 5GE609A18B17 for dry air service operating temperatures +350° F (+177° C).

11.2.b Oil and Air Service with Oil Vapors – Shall be Grade "T" Nitrile compound (orange color coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C).

11.2.c Vacuum Systems – Shall be Grade "E" or "T" gaskets with a Victaulic internal metal liner.

11.2.d Chemical Service – Refer to latest published Victaulic literature, Gasket Selection Guide section, for gasket type recommendations for various chemical services.

11.3 Fittings – Full Flow Victaulic Plain End Fittings designed for use with Style 99 Roust-A-Bout couplings in conjunction with plain end or beveled end pipe. Fittings are cast of ductile iron in accordance with ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with orange enamel coating. Swaged and Adapter Nipples are carbon steel conforming to ASTM A-53, Type F for 1" - 1$^1/_2$" (DN25 - DN40) and ASTM A-53, Type E or S for sizes 2" - 12" (DN50 - DN300).

11.4 Valves – Refer to section 2.6 and 3.6 for valve selection. Grooved by plain end adapter nipples with Style 07 couplings are required for assembly.

11.5 Pipe Preparation – Pipe ends shall be properly deburred, cleaned and free of indentations and projections on the OD.

11.6 Assembly – The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook (I-100). All plain-end piping components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 12

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH PVC PIPE

12.0 IPS Grooved Piping Connections - For PVC Pipe – Utilize Victaulic Style HP-70, Style 77, Style 75, Style 78, Style 791, Style 750 or Style 72 couplings for connecting radius cut grooved or standard roll grooved PVC pipe. Contact Victaulic for joint pressure ratings specific to the type of PVC pipe and other determining factors.

Use Victaulic IPS products listed in sections 2.0 and 3.0, i.e.: fittings, valves, etc. (excluding rigid couplings and hole cut products) where necessary in conjunction with PVC plastic piping system.

12.1 Coupling Housings – Ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request).

12.2 Victaulic Gasket

12.2.a Water Service – Shall be Grade "E" EPDM compound (green color coded) conforming to ASTM D-2000 designation 2CA615A25B24F17Z. Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Temperature operating range -30° F to +230° F (-34° C to +110° C). Generally, PVC is not recommended for use on systems operating at greater than +100° F (+38° C).

12.2.b Water and Chemical Service – Shall be Grade "T" Nitrile compound (orange color coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C). Generally, PVC is not recommended for use on systems operating at greater than +100° F (+38° C).

Note: System temperatures will be limited by the piping material. Gasket recommendations may exceed the permissible operating temperature of the pipe.

12.3 Fittings and coatings – Refer to sections 2.9 and 3.5, for additional information.

12.4 Valves – Refer to sections 2.6 and 3.6, for valve selection where non-PVC valves are acceptable.

12.5 Assembly – 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. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. See the latest copy of the Victaulic Field Installation Handbook (I-100). All grooved components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: All Victaulic products described herein are to be installed in accordance with latest Victaulic published literature. Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 13

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH PLAIN END PIPING CONNECTIONS FOR HDPE PIPE

13.0 Piping Connections - For HDPE Pipe – For joining plain end HDPE pipe conforming to ASTM D-2447, D-3000, D-3035 or F-714 with wall thickness from SDR 32.5 to 7.3. Victaulic products for HDPE pipe are rated to pressures equal to the pipe with which they are used. The pipe manufacturer's listing is dependent upon wall thickness, pipe composition and temperature.

13.1 Couplings – Couplings shall be of ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request). Coupling bolts shall be heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183 zinc plated to ASTM B-633 standard as provided by Victaulic. Optional stainless steel to ASTM A-193 Grade B8, Class 2 (type 304) or grade B8M, class 2 (type 316). Gasket shall be pressure responsive synthetic rubber of a grade to suit the intended service. Couplings shall contain gripping teeth machined into coupling housing which will bite into the entire circumference of the HDPE pipe.

Victaulic Style 995 couplings shall be used to join plain end HDPE pipe.

Victaulic Style 997 Transition Coupling shall be used to join plain end HDPE pipe to IPS pipe with grooves conforming to ANSI/AWWA C606 specifications.

13.2 HDPE Pipe Flange Adapters – For direct connection to ANSI Class 125 and 150 flanged components. Adapters shall consist of ductile iron housings, conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request), with integral rows of gripping teeth machined into the HDPE side of housing. Adapter bolts shall be heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183 zinc plated to ASTM B-633 standard as provided by Victaulic. Optional stainless steel to ASTM A-193 Grade B8, Class 2 (Type 304) or grade B8M, class 2 (Type 316). Gasket shall be pressure responsive synthetic rubber. (Grade to suit the intended service.) Victaulic Style 994.

13.3 Gaskets – Standard gaskets for HDPE products shall be Victaulic Grade "E" EPDM compound (green color code) conforming to ASTM D-2000 designation 2CA615A25B24F17Z, for water, air without hydrocarbons, or certain chemical services to 230° F (110° C). Grade "E" gaskets are UL/ULC classified to ANSI/NSF 61 for cold +86° F (+30° C) and hot +180° F (+82° C) potable water service. Optional gaskets shall be Grade "T" Nitrile compound (orange color-coded) conforming to ASTM D-2000 designation 5BG615A14B24. Temperature operating range -20° F to +180° F (-29° C to +82° C).

13.4 Assembly – Assembly of HDPE couplings and flange adapters shall be in accordance with latest published edition of the Victaulic Field Installation Handbook (I-100).

Note: Gasket shall be lubricated with corn oil, glycerin, silicone oil, or silicone release agent. Do not use Victaulic Lubricant, hydrocarbon based oils, greases or soap-based solutions. All plain end components (couplings, fittings, valves, gaskets, bolts and nuts shall be of one manufacturer (Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 14

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH AQUAMINE® HIGH IMPACT PVC PIPING CONNECTIONS

14.0 Spline-Type Piping Connections - For High Impact PVC – Quick-joining reusable system using Aquamine Aqualink couplings for joining spline-grooved high impact PVC 1120 Aquamine pipe. All products shall be listed under NSF Standard 14 and certified NSF-PW for use in all potable water piping systems.

Note: Not to be used in compressed air/gas services.

14.1 Pipe – 2" - 12" (DN50 - DN300) Aquamine high impact PVC 1120 defined as type 1, grade 1 (class 12454-B) according to ASTM D-1784. Pipe shall be designed to meet all PVC pipe requirements as specified in ASTM D-2241. Victaulic Series 2900.

14.2 Couplings

14.2.1 Aqualink Couplings – 2" - 12" (DN50 - DN300) Aquamine Aqualink couplings shall be of high impact PVC 1120 (type 1, grade 1 or class 12454-B according to ASTM D-1784). Couplings are designed to meet ASTM D-3139 standards for joints for plastic pressure pipes using flexible elastomeric seals. Couplings utilize a pre-lubricated permanent type polyisoprene o-ring conforming to ASTM F-477C.

14.2.2 Plain End Coupling – 2" - 8" (DN50 - DN200) Made of Ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request) with standard Grade "T" Nitrile elastomer gasket. Used to mechanically join plain end Aquamine pipe without the use of solvent cement. Victaulic Series 2970.

14.2.3 Transition Couplings – 2" - 8" (DN50 - DN200) Made of Ductile iron conforming to ASTM A-536, grade 65-45-12 (Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request) with standard Grade "T" Nitrile elastomer gasket. Used to mechanically join plain end Aquamine pipe to plain end HDPE pipe or grooved steel IPS pipe without the use of solvent cement. Victaulic Series 2791 or 2972.

14.3 Fittings – 2" - 12" (DN50 - DN300) Aquamine fittings with spline-grooved ends for use with Aquamine pipe and couplings.

14.4 Valves – 2" - 6" (DN50 - DN150) Valves shall be Aquamine butterfly valves, 250 psi at 73° F (1725 kPa at 23° C) reduced operating pressure at temperatures greater than 70° F. Ductile iron (ASTM A-536, Grade 65-45-12) housing, PVC 1120 body. Ductile iron disc, rubber encapsulated with Grade "T" Nitrile compound conforming to ASTM D-2000 designation 5BG615A14B24. Victaulic Series AQV.

14.5 Assembly – Assembly of Aquamine couplings and pipe shall be in accordance with the latest revision of the Aquamine Assembly and Installation Instructions AM-I-100). All components (couplings, fittings, valves, gaskets, PVC pipe) shall be of one manufacturer (Aquamine, LLC or Victaulic).

Note: Refer to the latest Victaulic G-100 general catalog for additional pressure ratings and application information.

General Note: Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

SECTION 15

VICTAULIC PRODUCT SPECIFICATION FOR USE WITH CPVC PIPE

15.1 CPVC Pipe – Victaulic FireLock CPVC sprinkler pipe shall be produced in SDR 13.5 dimensions in accordance to the requirements of ASTM F442, UL Listed and FM Approved for services to 175 psi (1205 kPa) at 150°F (66°C), and approved per the National Sanitation Foundation (NSF-pw) for potable water service.

15.2 CPVC Fittings – Victaulic FireLock CPVC fittings shall be produced in conformance to the requirements of ASTM F437, F438, and F439, UL Listed and FM Approved for services to 175 psi (1205 kPa) at 150°F (66°C), and approved per the National Sanitation Foundation (NSF-pw) for potable water service.

15.3 CPVC One-Step Solvent Cement – Victaulic Series 899 FireLock CPVC Fire Sprinkler One-Step Solvent Cement shall be beige in color, contain low VOC's, and shall be used to join all FireLock products eliminating the need for primers typical of two-step cementing processes.

15.4 Application of Victaulic FireLock CPVC Products in wet pipe fire sprinkler systems – Victaulic FireLock CPVC Fire Sprinkler Products, when installed in accordance with Victaulic's installation instructions, are UL Listed for use in the following: Light Hazard Occupancies as defined in NFPA 13, Reisidential occupancies up to and including four stories in height per NFPA 13R, and in One and Two Family Dwelling and Manufactured Homes per NFPA 13D. They shall meet the combustibility requirements for use in return air plenums per NFPA 90A. Other listings include, garages per NFPA 13R, system risers to NFPA 13R and 13D, exposed installations, and underground fire service per ASTM D2774, ASTM F645, and NFPA 24. Victaulic FireLock CPVC Fire Sprinkler Products shall be approved by Factory Mutual for use in unexposed, non-removable, fire-resistant barriers as defined in NFPA 13, 13R, 13D and NFPA 24.

15.5 Application of Victaulic FireLock CPVC Products in potable water systems – Victaulic FireLock CPVC Fire Sprinkler Products shall meet all applicable performance standards for a pressure rated application as required in ANSI-NSF Standard 14, comply with ANSI-NSF Standard 61 for health effects, and shall be marked with the NSF-pw end use marking.

15.6 Installation of Victaulic FireLock CPVC Fire Sprinkler Products – Installation shall be in strict accordance with Victaulc FireLock CPVC Fire Sprinkler System Design and Installation Manual including product storage and handling,

joining methods, supporting and bracing, expansion and contraction allowance, and testing etc.

SECTION 16

VICTAULIC PRODUCT SPECIFICATION PIPING SYSTEM DRAWINGS

16.0 Victaulic Piping System Drawings – The Victaulic Construction Piping Services Division shall provide equipment location drawings, piping layout drawings and piping detail drawings for fabrication and erection of 2$^1/_2$" (DN65) and larger Victaulic piping systems required for main mechanical rooms. All of the above data will be provided in reliance upon mechanical drawings, specifications and other project information furnished by the contractor. Bills of material and pipe cutting sheets will be provided by Victaulic Construction Piping Services and will be cross-referenced to related drawings. The drawings provided will govern only those systems directly related to Victaulic piping systems exclusively employing Victaulic products installed in strict accordance with the latest customer specifications and the latest Victaulic literature. Pipe sizing, flow diagrams, structural analysis, piping stress analysis, piping seismic design, piping support design and thermal design, or any other design functions, are not included.

General Note: Victaulic is a registered trademark of Victaulic Company. Copyright, 2005, Victaulic. All rights reserved.

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.