



I-350

FIELD INSTALLATION HANDBOOK

Victaulic® Piping Products for CPVC/PVC Materials



PGS™-300

Revision D 10/2021

- PRODUCT INSTALLATION
- INSTALLATION INSPECTION
- HELPFUL INFORMATION

WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, foot protection, and hearing protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

Contact Victaulic with any questions regarding the safe and proper installation of products featured in this handbook.

Visit victaulic.com for the most up-to-date information on Victaulic products.

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INTRODUCTION

This handbook is intended for use by specifiers, installers, and users in the selection, design, installation, and inspection of Victaulic CPVC Piping Products. Due to the critical uses of such systems, all information contained herein is vital for proper system performance and shall be read carefully and fully understood before starting the installation. Contact Victaulic with any questions concerning the safe and proper use of these products (scan QR code on back cover for contact information for your region).

Victaulic CPVC Pipe Fittings are manufactured from Post-Chlorinated Polyvinyl Chloride (CPVC), a specialty thermoplastic material, and are made with Victaulic PGS™-300 grooved ends. Victaulic CPVC Pipe Fittings with PGS™-300 grooved ends are designed for use exclusively with Victaulic Grooved Pipe Couplings for CPVC/PVC materials.

Victaulic Styles 356/856, 357/857, and 358/858 Grooved Pipe Couplings are designed for use only with CPVC/PVC pipe, Victaulic CPVC Pipe Fittings, and accessories that are prepared in accordance with Victaulic PGS™-300 Cut Groove Specifications. The "STEEL" side of the Style 356/856 Transition Coupling is the only exception, which is designed for use with mating components prepared to Victaulic Original Groove System (OGS) specifications.

For certain Victaulic CPVC fittings that are provided with a socket end, use only primers and solvent cements designed specifically for use with CPVC/PVC material. Always reference the solvent manufacturer's published literature for primer and cement selection, installation instructions, set times, and cure times.

Before installation, CPVC/PVC materials shall be inspected for any scratches, cracks, splits, gouges, or warping. Damaged sections of CPVC/PVC materials shall be cut out and discarded. Damaged pipe ends shall be removed prior to grooving the pipe end. Any damaged Victaulic CPVC Pipe Fittings shall be discarded.

WARNING

- **Victaulic CPVC Piping Products SHALL NOT be used in a system containing compressed air or other gases.**
- **Always verify that Victaulic CPVC Piping Products are being installed with pipe and/or fittings that are made with the corresponding groove profile.**

Failure to follow these instructions could cause system failure, resulting in death or serious personal injury and property damage.

In addition to this I-350, Victaulic offers field installation handbooks, installation sheets, or installation tags for mechanical piping products that join alternate piping materials or other dedicated groove profile technologies. These instructions are shipped with the applicable product and can be downloaded at victaulic.com.



**SCAN QR CODE FOR ADDITIONAL FIELD INSTALLATION
HANDBOOKS THAT VICTAULIC OFFERS
ADDITIONAL COPIES OF FIELD INSTALLATION
HANDBOOKS ARE AVAILABLE FROM YOUR LOCAL
VICTAULIC SALES REPRESENTATIVE**

NOTICE

- Victaulic maintains a policy of continuous product improvement. Therefore, Victaulic reserves the right to change product specifications, designs, and standard equipment without notice and without incurring obligation.
- **VICTAULIC IS NOT RESPONSIBLE FOR SYSTEM DESIGN, NOR DOES THE COMPANY ASSUME ANY RESPONSIBILITY FOR SYSTEMS THAT ARE DESIGNED IMPROPERLY.**
- This handbook is not intended to be a substitute for competent, professional engineering/piping system design and installation, which are prerequisites for any product application.
- This handbook is intended for use only by professional piping system designers, engineers, and installers.
- The information published in this handbook and other Victaulic literature supersedes all previously published information.
- Drawings and/or pictures in this manual may be exaggerated for clarity.
- The field installation handbook contains trademarks, copyrights, and products with patented features that are the exclusive property of Victaulic.
- **WHILE EVERY EFFORT HAS BEEN MADE TO ENSURE ITS ACCURACY, VICTAULIC, ITS SUBSIDIARIES, AND ITS AFFILIATED COMPANIES MAKE NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND REGARDING THE INFORMATION CONTAINED OR REFERENCED IN THIS HANDBOOK. ANYONE WHO USES THE INFORMATION CONTAINED HEREIN DOES SO AT THEIR RISK AND ASSUMES ANY LIABILITY THAT RESULTS FROM SUCH USE.**

California Customers – Proposition 65 Compliance:



WARNING: The painted surface of these products can expose you to chemicals, including BBP, which are known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov.

Hazard Identification

Definitions for identifying the various hazard levels are provided below.



This safety alert symbol indicates important safety messages. When you see this symbol throughout this handbook, be alert to the possibility of personal injury. Carefully read and fully understand the message that follows.

DANGER

- The use of the word **"DANGER"** identifies an immediate hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are not followed.

WARNING

- The use of the word **"WARNING"** identifies the presence of hazards or unsafe practices that could result in death or serious personal injury if instructions, including recommended precautions, are not followed.

CAUTION

- The use of the word **"CAUTION"** identifies possible hazards or unsafe practices that could result in personal injury and product or property damage if instructions, including recommended precautions, are not followed.

NOTICE

- The use of the word **"NOTICE"** identifies special instructions that are important but not related to hazards.

INSTALLER SAFETY INSTRUCTIONS

1. Read and understand this handbook before proceeding with installation and testing of Victaulic CPVC Piping Products. This handbook contains important information.
2. Use only recommended accessories. Use of improper accessories or unapproved system components in conjunction with Victaulic CPVC Piping Products will void the warranty and may result in improper system operation.
3. When using electrically-powered tools for installation, verify that the area is free of moisture that could create an unsafe condition. Keep work areas well illuminated. Allow sufficient space for measuring and system dry fit to accommodate proper installation.
4. Prevent back injury. Always practice safe lifting and installation techniques.
5. Use only tools designed specifically for CPVC/PVC pipe and fittings.
6. Verify that all system components and necessary tools are available on the jobsite for proper installation of Victaulic CPVC Piping Products.
7. Wear safety glasses, hardhat, and safety footwear when working with Victaulic CPVC Piping Products.
8. Wear hearing protection when exposed to noisy jobsite operations.
9. Keep work areas clean. Keep all visitors a safe distance away from work areas.
10. When solvent cementing, always work in a well-ventilated area.
11. When solvent cementing, wear protective gloves. If hands come into contact with solvent cement, use a waterless, abrasive soap.
12. When solvent cementing, avoid sources of heat or open flames.



HANDLING AND STORAGE OF CPVC/PVC MATERIALS

Always reference the CPVC/PVC pipe manufacturer's recommendations for handling and storage temperatures.

Victaulic recommends indoor storage of CPVC/PVC materials, where the product will not be exposed to heat-producing sources or sunlight. For extended indoor storage, the area shall be well ventilated so that the ambient temperature does not exceed the pipe manufacturer's maximum handling or storage temperature.

When stored outdoors, CPVC/PVC materials shall be covered with a non-transparent material to reduce the risk of extended exposure to sunlight and heat absorption, which could cause discoloration and weakening of CPVC/PVC materials.

CPVC/PVC materials shall be stored in their original shipping containers.

Excessive loading (stacking, point loading, etc.) or excessive strapping or banding shall be avoided to prevent CPVC/PVC materials from being damaged. DO NOT drop, distort, or impact CPVC/PVC materials or allow objects to be dropped on them. DO NOT clamp or compress CPVC/PVC materials in a vise or any other device that could cause damage due to over-compression.

Before installation, CPVC/PVC materials shall be inspected internally and externally for any scratches, cracks, splits, gouges, stress marks, or warping that may have occurred from improper handling or storage. Damaged sections of CPVC/PVC materials shall be cut out and discarded. Damaged pipe ends shall be removed prior to grooving the pipe end. Any damaged Victaulic CPVC Pipe Fittings shall be discarded.

WARNING

- **Ambient handling and storage temperature SHALL NOT exceed the pipe manufacturer's recommendations.**
- **CPVC/PVC materials SHALL NOT be subjected to prolonged sunlight exposure.**
- **When stored outdoors, CPVC/PVC materials shall be covered with a non-transparent material.**
- **DO NOT install CPVC/PVC materials that exhibit scratches, cracks, splits, gouges, stress marks, or warping.**

Failure to follow these instructions could cause system failure, resulting in death or serious personal injury and property damage.

CHEMICAL COMPATIBILITY WITH CPVC/PVC MATERIALS

- CPVC/PVC materials may be damaged by chemicals that are not corrosive to metallic piping. These damaging chemicals can be found in common substances used in construction and residential settings. Specific chemicals or chemical vapors that contact CPVC/PVC can weaken or severely damage the material. **Always consult with the CPVC/PVC pipe manufacturer or Victaulic for a list of chemicals and products that may damage CPVC/PVC materials.**
- DO NOT stack, support, hang equipment or flexible wire/cable (especially communications cable) on CPVC/PVC material.
- Victaulic Lubricant is compatible with CPVC/PVC pipe and fittings that conform to ASTM D1784.
- Only system-compatible solvent cements, caulks, sealants, cutting oils, and thread pastes shall be used with CPVC/PVC material.
- DO NOT expose CPVC/PVC material to petroleum-based substances, cutting oils, cooking oils, esters, ketones, solvents, glycol-based antifreeze fluids, non-water-based paints, packing oils, traditional pipe thread paste and dope, fungicides, termiticides, insecticides, detergents, surfactants, plasticizers, building caulks, adhesive tape, open flame, solder, soldering flux, flexible wire/cable (especially communications cable), and certain spray foam insulation.
- DO NOT install CPVC/PVC material in combination with steel pipe that contains anti-microbial coatings, unless the coatings have been listed by a nationally-recognized test laboratory for this service.
- DO NOT store CPVC/PVC material in containers with metal products where contamination with packing oils (hydrocarbons) may occur.
- DO NOT handle CPVC/PVC material with gloves contaminated with oils (hydrocarbons) or other incompatible substances.

WARNING

- **Always verify chemical compatibility with the CPVC/PVC pipe manufacturer or Victaulic.**
- **The presence of any visible cracks due to exposure of CPVC/PVC material with an incompatible substance warrants a full system inspection and may require partial or full system replacement.**

Failure to follow these instructions could cause system failure, resulting in death or serious personal injury and property damage.

APPROVALS AND LISTINGS

For approvals and listings, refer to the following Victaulic publications:

- Style 356 Installation-Ready™ Transition Coupling – Victaulic Publication 33.06
- Style 856 Installation-Ready™ Transition Coupling for Potable Water – Victaulic Publication 33.16
- Style 357 Installation-Ready™ Rigid Coupling – Victaulic Publication 33.07
- Style 857 Installation-Ready™ Rigid Coupling for Potable Water – Victaulic Publication 33.17
- Style 358 Reducing Coupling – Victaulic Publication 33.08
- Style 858 Reducing Coupling for Potable Water – Victaulic Publication 33.18
- Potable Water Approvals ANSI/NSF – Victaulic Publication 02.06

UNDERGROUND SERVICE

Victaulic CPVC Piping Products may be used in underground water service when installation is in accordance with:

- ASTM-D2774, "Standard Practice for Underground Installation of Thermoplastic Pressure Piping"
- ASTM-F645, "Standard Guide for Selection, Design and Installation of Thermoplastic Water Pressure Piping Systems"
- ASTM F1668, "Standard Guide for Construction Procedures for Buried Plastic Pipe"

When specifying the products in this handbook for buried applications, the effects of soil conditions on buried systems shall be incorporated into system design to prevent corrosion. Consult the individual product submittal for details regarding the materials and finishes available for assembly hardware. The effect of chemical composition and pH level on the assembly hardware shall be evaluated by the system designer to confirm that the materials and finishes used will resist corrosion and will be acceptable for the intended service. Special coatings and/or cathodic protection may be applied to ensure system longevity. Refer to Grooved Piping Systems in Buried Applications (publication 26.15) for additional information.

TEMPERATURE REQUIREMENTS

Victaulic Styles 356/856, 357/857, and 358/858 Couplings for PGS™-300 grooved CPVC/PVC pipe may be specified for use within the temperature ratings of the CPVC/PVC pipe, as published by the pipe manufacturer.

CPVC/PVC pipe working pressure derates as the system operating temperature increases. Similarly, the pressure ratings of Victaulic Styles 356/856, 357/857, and 358/858 Couplings that join PGS™-300 grooved CPVC/PVC pipe and fittings are subject to pressure derating at elevated temperatures. For the maximum working pressure rating of the joint at elevated temperature, multiply the working pressure rating of the coupling (shown in the appropriate Victaulic publication listed below) at +73°F/+23°C by the appropriate derating factor in the chart below.

- Style 356 Installation-Ready™ Transition Coupling – Victaulic Publication 33.06
- Style 856 Installation-Ready™ Transition Coupling for Potable Water – Victaulic Publication 33.16
- Style 357 Installation-Ready™ Rigid Coupling – Victaulic Publication 33.07
- Style 857 Installation-Ready™ Rigid Coupling for Potable Water – Victaulic Publication 33.17
- Style 358 Reducing Coupling – Victaulic Publication 33.08
- Style 858 Reducing Coupling for Potable Water – Victaulic Publication 33.18

Maximum Working Pressure for Schedules 40 and 80 CPVC Pipe at Elevated Temperature

Pressure Capacity Derating Factors for Operating Temperatures Above 73°F/23°C		
At 80° F/27° C	Multiply By	1.00
At 90° F/32° C	Multiply By	0.91
At 100° F/37° C	Multiply By	0.82
At 110° F/43° C	Multiply By	0.72
At 120° F/49° C	Multiply By	0.65
At 130° F/54° C	Multiply By	0.57
At 140° F/60° C	Multiply By	0.50
At 150° F/66° C	Multiply By	0.42
At 160° F/71° C	Multiply By	0.40
At 170° F/77° C	Multiply By	0.29
At 180° F/82° C	Multiply By	0.25
At 200° F/93° C	Multiply By	0.20

NOTE: Derating factors are typical per the pipe manufacturer’s recommendations and in accordance with ASTM D-2837 and PPI TR-3.

Maximum Working Pressure for Schedules 40 and 80 PVC Pipe at Elevated Temperature

Pressure Capacity Derating Factors for Operating Temperatures Above 73°F/23°C		
At 80° F/27° C	Multiply By	0.88
At 90° F/32° C	Multiply By	0.75
At 100° F/37° C	Multiply By	0.62
At 110° F/43° C	Multiply By	0.51
At 120° F/49° C	Multiply By	0.40
At 130° F/54° C	Multiply By	0.31
At 140° F/60° C	Multiply By	0.22

NOTE: Derating factors are typical per the pipe manufacturer’s recommendations and in accordance with ASTM D-2837 and PPI TR-3.



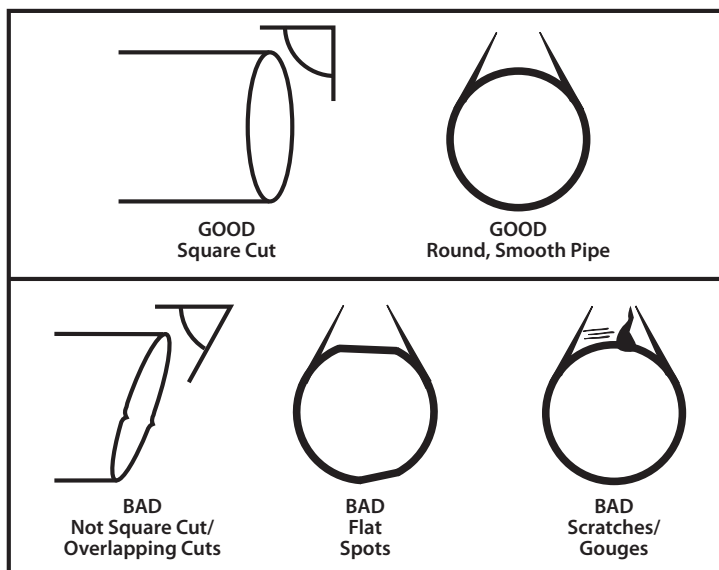
PIPE END PREPARATION

Cutting the Pipe

Pipe shall be square cut to the center axis of the pipe within the tolerances specified in the Victaulic PGS™-300 Cut Groove Specifications section on the following pages. Pipe cuts shall be straight (not wavy, angled, or have overlapping cuts).

Some factory pipe is provided with a chamfered/beveled end. Square-cut pipe ends are preferred; however, a chamfered/beveled end is acceptable, provided that the chamfer/bevel does not exceed the dimensional requirements specified in the Victaulic PGS™-300 Cut Groove Specifications section on the following pages.

If any indication of damage or cracking is evident at the pipe end, or if other damage is noted (burrs, gouges, scrapes, etc.), cut off at least 2 inches/51 mm beyond the damage or crack prior to grooving. **NOTE: It is the responsibility of the pipe handler/preparer and installer to ensure that no incompatible materials come in contact with CPVC/PVC materials. Refer to the "Chemical Compatibility with CPVC/PVC Materials" section.**



Illustrations are exaggerated for clarity

Grooving the Pipe

Only pipe grooved to Victaulic PGS™-300 Cut Groove Specifications shall be used with Style 356/856 Installation-Ready™ Transition Couplings (PGS™-300 grooved side), Style 357/857 Installation-Ready™ Rigid Couplings, and Style 358/858 Reducing Couplings.

Cut grooves shall be made with the Victaulic CG1100 Cut Grooving Tool, shown to the right. Always reference the TM-CG1100 Operating and Maintenance Instructions Manual before attempting to use this tool for cut grooving pipe.

It is acceptable to use pipe supplied by pipe manufacturers with factory-produced PGS™-300 grooves, provided that the grooves comply with the Victaulic PGS™-300 Cut Groove Specifications on the following pages.



After pipe is grooved, protect the ends to prevent damage prior to installation. Burrs, gouges, scrapes, shavings, etc. on the gasket sealing surface will prevent a proper seal between the coupling gasket and pipe; these conditions shall be corrected prior to installation.

Explanation of Critical Victaulic PGS™-300 Cut Groove Dimensions for CPVC/PVC Pipe

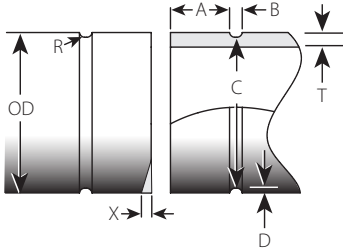
⚠ WARNING

- Pipe and groove dimensions shall be within the tolerances specified in the table on the following page to ensure proper joint performance.

Failure to follow this instruction could cause joint failure, resulting in death or serious personal injury and property damage.

Pipe Outside Diameter "OD" – Nominal Pipe Size (ASTM F441) –

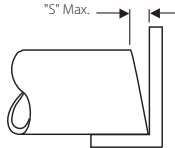
The average pipe outside diameter shall not vary from the specifications listed in the table on the following page. Maximum allowable pipe ovality shall comply with the requirements of ASTM F441. Greater variations between the major and minor diameters could result in difficult coupling assembly.



For CPVC/PVC pipe, the maximum allowable tolerance from square-cut pipe ends ("S" Max. dimension shown) is:

0.030 inch/0.8 mm for 2 – 3-inch/DN50 – DN80 sizes,
0.045 inch/1.1 mm for 4 – 6-inch/DN100 – DN150 sizes, and
0.060 inch/1.5 mm for 8-inch/DN200 and larger sizes.

This is measured from the true square line.



The outside and inside diameter of the pipe end shall be cleaned to remove burrs, dirt, and other foreign material that might interfere with the rollers or damage grooving bits. The front edge of the pipe end shall be uniform with no surface abnormalities that will cause difficulties with grooving or coupling assembly.

"A" Dimension – The "A" dimension, or the distance from the pipe end to the groove, identifies the gasket seating area. This area shall be generally free from indentations, projections, and roll marks from the pipe end to the groove to ensure a leak-tight seal. All foreign material, such as loose paint, oil, grease, chips, and dirt shall be removed.

"B" Dimension – The "B" dimension, or groove width, controls expansion, contraction, and angular deflection by the distance it is located from the pipe and its width in relation to the coupling housings' "key" width. The bottom of the groove shall be free of all foreign material, such as loose paint, oil, grease, chips, and dirt that may interfere with proper coupling assembly.

"C" Dimension – The "C" dimension is the average diameter at the base of the groove. This dimension shall be within the diameter's tolerance and shall be concentric with the OD for proper coupling fit. The groove shall be of uniform depth around the entire pipe circumference.

"D" Dimension – The "D" dimension is the nominal depth of the groove and is a reference for a "trial groove" only. Variations in pipe OD affect this dimension and must be altered, if necessary, to keep the "C" dimension within tolerance. The groove diameter shall conform to the "C" dimension described above.

"T" Dimension – The "T" dimension is the lightest grade (minimum nominal wall thickness) of pipe that is suitable for cut grooving.

"R" Dimension – The "R" dimension is the radius necessary at the bottom of the groove to eliminate a point of stress concentration.

"X" Dimension – The "X" dimension is the maximum allowable pipe-end chamfer.



Victaulic PGS™-300 Cut Groove Specifications for CPVC/PVC Pipe

Nominal Size inches/ DN	Dimensions – inches/millimeters													
	Pipe Outside Diameter			Gasket Seat "A"			Groove Width "B"			Groove Diameter "C"		Groove Depth "D" (ref.)	Pipe End Chamfer "X" Max.	Min. Wall Thickness "T"
	Basic	Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Max.	Min.			
2 DN50	2.375 60.3	2.381 60.5	2.369 60.2	0.875 22.2	0.890 22.6	0.860 21.8	0.188 4.8	0.193 4.9	0.183 4.6	2.235 56.8	2.220 56.4	0.070 1.8	0.094 2.4	0.154 3.9
2½ DN65	2.875 73.0	2.882 73.2	2.868 72.9	0.875 22.2	0.890 22.6	0.860 21.8	0.188 4.8	0.193 4.9	0.183 4.6	2.695 68.5	2.677 68.0	0.090 2.3	0.094 2.4	0.203 5.2
3 DN80	3.500 88.9	3.508 89.1	3.492 88.7	0.875 22.2	0.890 22.6	0.860 21.8	0.188 4.8	0.193 4.9	0.183 4.6	3.320 84.3	3.302 83.9	0.090 2.3	0.094 2.4	0.216 5.5
4 DN100	4.500 114.3	4.509 114.5	4.491 114.1	0.875 22.2	0.890 22.6	0.860 21.8	0.188 4.8	0.193 4.9	0.183 4.6	4.320 109.7	4.300 109.2	0.090 2.3	0.094 2.4	0.237 6.0
6 DN150	6.625 168.3	6.636 168.6	6.614 168.0	1.000 25.4	1.015 25.8	0.985 25.0	0.250 6.4	0.255 6.5	0.245 6.2	6.345 161.2	6.323 160.6	0.140 3.6	0.125 3.2	0.280 7.1
8 DN200	8.625 219.1	8.640 219.5	8.610 218.7	1.000 25.4	1.015 25.8	0.985 25.0	0.250 6.4	0.255 6.5	0.245 6.2	8.305 211.0	8.280 210.3	0.160 4.1	0.125 3.2	0.322 8.2
10 DN250	10.750 273.0	10.765 273.4	10.735 272.7	1.000 25.4	1.015 25.8	0.985 25.0	0.250 6.4	0.255 6.5	0.245 6.2	10.430 264.9	10.403 264.2	0.160 4.1	0.188 4.8	0.365 9.3
12 DN300	12.750 323.9	12.765 324.2	12.735 323.5	1.000 25.4	1.015 25.8	0.985 25.0	0.250 6.4	0.255 6.5	0.245 6.2	12.390 314.7	12.360 313.9	0.180 4.6	0.188 4.8	0.406 10.3

NOTICE

- Coatings applied to the interior surfaces of Victaulic grooved pipe couplings shall not exceed 0.010 inch/0.25mm in thickness. This includes the bolt pad mating surfaces.

COUPLING INSTALLATION

Style 356 - Installation-Ready™ Transition Coupling

Style 856 - Installation-Ready™ Transition Coupling for Potable Water Applications

⚠ WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- These installation instructions are intended for an experienced, trained installer. The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- Wear safety glasses, hardhat, and foot protection.

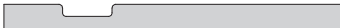
Failure to follow these instructions could result in death or serious personal injury and property damage.

Important Information

PGS™-300 Groove Profile for CPVC/PVC Mating Components



OGS Groove Profile for IPS Grooved Mating Components



Pipe and groove are not shown to scale



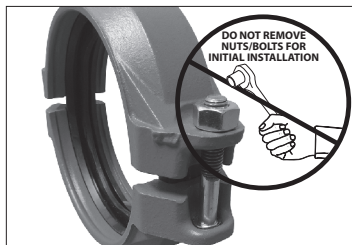
The opening of the Style 356 and 856 Installation-Ready™ Transition Coupling that is marked "CPVC/PVC" shall be used **ONLY** with CPVC/PVC mating components that are prepared to Victaulic PGS™-300 Cut Groove Specifications. The opening of the coupling that is marked "STEEL" shall be used **ONLY** with NPS mating components that are prepared to Victaulic Original Groove System (OGS) Specifications. Refer to page 11 of this handbook for Victaulic PGS™-300 Cut Groove Specifications and 25.01 for OGS groove specifications, which can be downloaded at victaulic.com.

NOTICE

- The photos in this section show installation of a Style 356 Installation-Ready™ Transition Coupling; however, the same steps apply to a Style 856 Installation-Ready™ Transition Coupling for potable water applications.



Instructions for the Initial Installation of Style 356 and 856 Couplings



1. DO NOT DISASSEMBLE THE

COUPLING: Style 356 and 856 Installation-Ready™ Transition Couplings are designed so that the installer does not need to remove the nuts and bolts for initial installation. This facilitates installation by allowing the installer to directly insert the grooved end of mating components into the coupling.

2a. CHECK CPVC/PVC MATING COMPONENT END: The outside surface of the CPVC/PVC mating component, between the groove and the mating component end, shall be generally free from indentations and projections to ensure a leak-tight seal. All oil, grease, dirt, and cutting particles shall be removed.

The CPVC/PVC mating components' outside diameter ("OD") and groove dimensions shall be within the tolerances published in current Victaulic PGS™-300 Cut Groove Specifications on page 11 of this handbook.

2b. CHECK NPS STEEL MATING COMPONENT END: The outside surface of the NPS steel mating component, between the groove and the mating component end, shall be generally free from indentations, projections, weld seam anomalies, and roll marks to ensure a leak-tight seal. All oil, grease, loose paint, dirt, and cutting particles shall be removed.

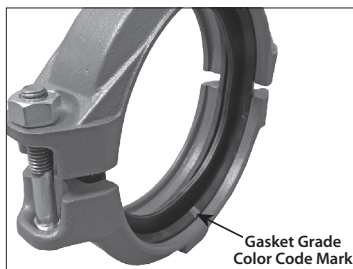
The NPS steel mating components' outside diameter ("OD"), groove dimensions, and maximum allowable flare diameter shall be within the tolerances published in current Victaulic OGS specifications, publication 25.01, which can be downloaded at victaulic.com.

NOTICE

- Victaulic does not recommend the use of any furnace butt-welded pipe in sizes NPS 2" | DN150 and smaller with Victaulic gasketed joint products. This includes, but is not limited to, ASTM A53 Type F pipe.



Scan QR
Code for
Application
Note
AN-001



3. CHECK GASKET: Check the gasket to verify that it is suitable for the intended service. The color code identifies the material grade. **For complete color code listings and compatibility information, reference Victaulic publications 05.01 and GSG-100, which can be downloaded at victaulic.com.**

! CAUTION

- A thin coat of Victaulic Lubricant shall be applied only to the gasket sealing lips to help prevent the gasket from pinching, rolling, or tearing during installation.
- DO NOT use excessive lubricant on the gasket sealing lips.
- The pipe manufacturer and Victaulic shall review any alternative lubricants to determine compatibility with the pipe and gasket.

Failure to use a compatible lubricant may cause gasket damage, resulting in joint leakage and property damage.

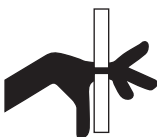


4. LUBRICATE GASKET: Apply a thin coat of Victaulic Lubricant only to the gasket sealing lips. **NOTE: The gasket exterior is supplied with a factory-applied lubricant, so it is not necessary to remove the gasket from the housings to apply additional lubricant to the exterior surface.**

⚠ WARNING



- Never leave a Style 356 or 856 Coupling partially assembled on mating component ends. **ALWAYS TIGHTEN THE HARDWARE IMMEDIATELY, IN ACCORDANCE WITH THESE INSTRUCTIONS.** A partially-assembled coupling poses a drop or fall hazard during installation and a burst hazard during testing.



- Keep hands away from the mating component ends and the openings of the coupling when attempting to insert grooved mating component ends into the coupling.
- Keep hands away from coupling openings during tightening.

Failure to follow these instructions could result in death or serious personal injury and property damage.



5. ASSEMBLE JOINT: Assemble the joint by inserting the grooved end of a CPVC/PVC mating component into the coupling opening that is marked "CPVC/PVC" and the grooved end of an NPS mating component into the coupling opening that is marked "STEEL". The grooved mating component ends shall be inserted into the coupling until contact with the center leg of the gasket occurs.

A visual check is required to verify that the coupling keys align with the groove in each mating component and that the gasket is seated properly. **NOTE:** Prior to tightening the nuts, the coupling may be rotated to verify that the gasket is seated properly on the mating component ends and within the coupling housings.



**IMPORTANT INFORMATION FOR USE OF STYLE 356 AND 856 COUPLINGS WITH
END CAPS AND FITTINGS:**

! WARNING

- Always read and follow the "Victaulic End Cap Installation Safety Instructions" section in this handbook.

Failure to follow the "Victaulic End Cap Installation Safety Instructions" section could result in death or serious personal injury and property damage.

- When assembling Style 356 and 856 Couplings onto end caps, take additional time to inspect and verify that the end cap is seated full against the center leg of the gasket.
- The end cap shall be used only on the side of the coupling that is marked "STEEL".
- Use only Victaulic No. 60 End Caps containing the "EZ QV" marking on the inside face.
- Always confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to working with an end cap.
- The "CPVC/PVC" side of the Style 356 and 856 Coupling is designed specifically for use with Victaulic CPVC/PVC fittings. **DO NOT** use other manufacturer's CPVC/PVC fittings on the "CPVC/PVC" side.
- Victaulic recommends the use of Victaulic metallic fittings and valves on the "STEEL" side of the Style 356 and 856 Coupling.

! WARNING

- Nuts shall be tightened evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads, as indicated in steps 6 and 7.

Failure to tighten nuts as instructed will cause increased loading of the hardware, resulting in the following conditions:

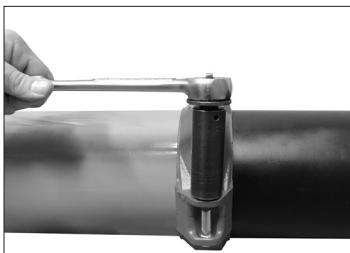
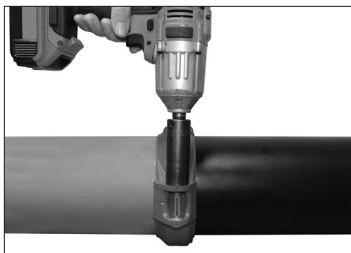
- Excessive bolt torque required to assemble the joint (incomplete assembly)
- Damage to the assembled joint (damaged or broken bolt pads or fractures to housings)
- Bolt damage or fracture
- Joint leakage and property damage
- A negative impact on system integrity
- Personal injury or death

DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved.

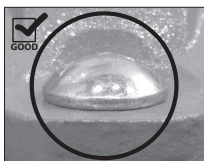
- Failure to follow this instruction could result in the conditions listed above.

NOTICE

- It is important to tighten the nuts evenly by alternating sides to prevent gasket pinching.
- An impact tool or standard socket wrench with a deep-well socket can be used to bring the bolt pads into metal-to-metal contact.
- Refer to the "Impact Tool Usage Guidelines" and "Impact Tool Selection" sections in this handbook, along with the "Helpful Information" table on the following page.



6. TIGHTEN NUTS: Using an impact tool or a standard socket wrench with a deep-well socket, tighten the nuts evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads. Verify that the oval neck of each bolt seats properly in the bolt holes. DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved. **If you suspect that any hardware has been over-tightened (as indicated by a bend in the bolt, bulging of the nut at the bolt pad interface, or damage to the bolt pad, etc.), the entire coupling assembly shall be replaced immediately.** Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the “Helpful Information” table below.



**OVAL NECK OF BOLT
SEATED PROPERLY**



**OVAL NECK OF BOLT
NOT SEATED PROPERLY**

Helpful Information

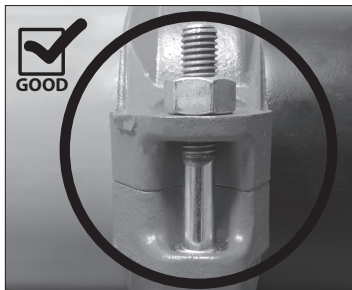
Nominal Size inches/DN	Actual Pipe Outside Diameter inches/mm	Nut Size inches/Metric	Deep-Well Socket Size inches/mm	Maximum Allowable Bolt Torque*
2 DN50	2.375 60.3	$\frac{3}{8}$ M10	$1\frac{1}{16}$ 17	55 ft-lbs 75 N•m
2½	2.875 73.0	$\frac{3}{8}$ M10	$1\frac{1}{16}$ 17	55 ft-lbs 75 N•m
3 – 6 DN80 - DN150	3.500 – 6.625 88.9 – 168.3	$\frac{1}{2}$ M12	$\frac{7}{8}$ 19	135 ft-lbs 183 N•m
8 – 12 DN200 - DN300	8.625 – 12.750 219.1 – 323.9	$\frac{3}{4}$ M20	1¼ 30	425 ft-lbs 576 N•m

*Maximum allowable bolt torque values have been derived from actual test data

WARNING

- Visual inspection of each joint is required.
- Improperly assembled joints shall be corrected before the system is filled, tested, or placed into service.
- Any components that exhibit physical damage due to improper assembly shall be replaced before the system is filled, tested, or placed into service.

Failure to follow these instructions could cause joint failure, resulting in death or serious personal injury and property damage.



7. Visually inspect each bolt pad location at every joint to verify that metal-to-metal contact is achieved across the entire bolt pad section.

WARNING



- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

Failure to follow this instruction could result in death or serious personal injury and property damage.

NOTICE

Two methods can be followed for reassembly of Style 356 and 856 Couplings.



- **METHOD 1 FOR REASSEMBLY:** The coupling can be reassembled into its "installation-ready" condition by installing the gasket into the housings, then inserting the bolts and threading a nut onto each bolt until 2 – 3 threads are exposed, as shown to the left. Verify that the sides of the two housings marked "CPVC/PVC" are facing the same direction. If this method is chosen, steps 1 – 5 on this page, along with all steps on pages 13 – 17, shall be followed.

OR

- **METHOD 2 FOR REASSEMBLY:** The gasket and housings can be assembled onto the mating component ends by following steps 1 – 5 on this page, along with all steps in the "Method 2 for Reassembly" section on the following page.

Follow these five steps for Method 1 or Method 2:

1. Verify that the system is depressurized and drained completely before attempting to disassemble any couplings.
2. Loosen the nuts of the coupling assembly to permit removal of the coupling from the mating component ends.
3. Remove the nuts, bolts, and gasket from the housings. Inspect all components for any damage or wear. If any damage or wear is present, use a new Victaulic-supplied coupling assembly.
4. Check mating component ends, as described in steps 2a and 2b on page 13.

NOTICE

- The photos in this section show reassembly of a Style 356 Coupling; however, the same steps apply to reassembly of a Style 856 Coupling.

CAUTION

- A thin coat of Victaulic Lubricant shall be used to help prevent the gasket from pinching, rolling, or tearing during reassembly.
- **DO NOT** use excessive lubricant on the gasket sealing lips and exterior.
- The pipe manufacturer and Victaulic shall review any alternative lubricants to determine compatibility with the pipe and gasket.

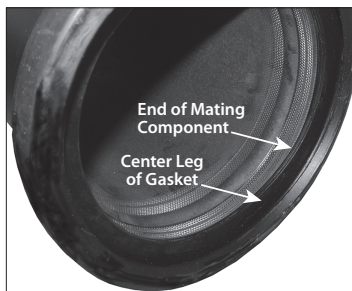
Failure to use a compatible lubricant may cause gasket damage, resulting in joint leakage and property damage.



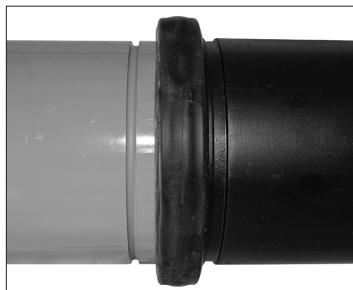
5. **FOR REASSEMBLY OF STYLE 356 AND 856 COUPLINGS, LUBRICATE GASKET:** Apply a thin coat of Victaulic Lubricant to the gasket sealing lips and exterior.

Method 2 for Reassembly

1. Verify that steps 1 – 5 in the "Instructions for Reassembly of Style 356 and 856 Couplings" section have been followed.



2. INSTALL GASKET: Insert the grooved end of a mating component into the gasket until it contacts the center leg of the gasket.

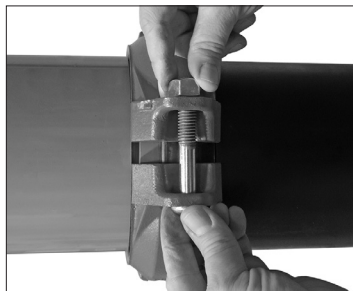


3. JOIN MATING COMPONENTS: Align the centerlines of the two grooved mating component ends. Insert the other mating component end into the gasket until it contacts the center leg of the gasket. **NOTE:** Verify that no portion of the gasket extends into the groove of either mating component.

CAUTION

- Verify that the gasket does not become rolled or pinched while installing the housings.

Failure to follow this instruction could cause gasket damage, resulting in joint leakage.



4. INSTALL HOUSINGS: Install the housings over the gasket. Verify that the sides of the two housings marked "CPVC/PVC" are facing the CPVC/PVC pipe and that the housings' keys engage the grooves completely on both mating components.

5. INSTALL BOLTS/NUTS: Install the bolts and thread a nut finger-tight onto each bolt. **NOTE:** Verify that the oval neck of each bolt seats properly in the bolt hole.

6. TIGHTEN NUTS: Follow steps 6 – 7 on pages 16 – 17 to complete the assembly.

COUPLING INSTALLATION

Style 357 - Installation-Ready™ Rigid Coupling
Style 857 - Installation-Ready™ Rigid Coupling for Potable Water Applications

⚠ WARNING

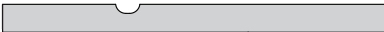


- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- These installation instructions are intended for an experienced, trained installer. The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

Important Information

PGS™-300 Groove Profile for CPVC/PVC Mating Components



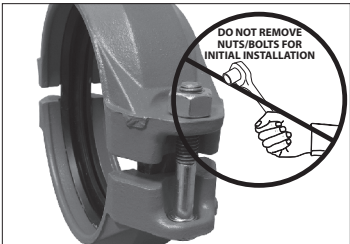
Pipe and groove are not shown to scale

Style 357 and 857 Installation-Ready™ Rigid Couplings are designed for use **ONLY** with CPVC/PVC mating components that are prepared to Victaulic PGS™-300 Cut Groove Specifications. Refer to page 11 of this handbook for Victaulic PGS™-300 Cut Groove Specifications

NOTICE

- The photos in this section show installation of a Style 357 Installation-Ready™ Rigid Coupling; however, the same steps apply to a Style 857 Installation-Ready™ Rigid Coupling for potable water applications.

Instructions for the Initial Installation of Style 357 and 857 Couplings

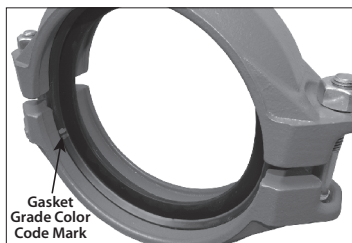


- 1. DO NOT DISASSEMBLE THE COUPLING:** Style 357 and 857 Installation-Ready™ Rigid Couplings are designed so that the installer does not need to remove the nuts and bolts for initial installation. This facilitates installation by allowing the installer to directly insert the grooved end of mating components into the coupling.



2. CHECK MATING COMPONENT ENDS: The outside surface of the CPVC/PVC mating components, between the groove and the mating component end, shall be generally free from indentations and projections to ensure a leak-tight seal. All oil, grease, dirt, and cutting particles shall be removed.

The CPVC/PVC mating components' outside diameter ("OD") and groove dimensions shall be within the tolerances published in current Victaulic PGS™-300 Cut Groove Specifications on page 11 of this handbook.



3. CHECK GASKET: Check the gasket to verify that it is suitable for the intended service. The color code identifies the material grade. **For complete color code listings and compatibility information, reference Victaulic publications 05.01 and GSG-100, which can be downloaded at victaulic.com.**

⚠ CAUTION

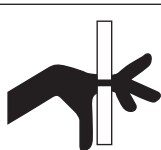
- A thin coat of Victaulic Lubricant shall be applied only to the gasket sealing lips to help prevent the gasket from pinching, rolling, or tearing during installation.
- DO NOT use excessive lubricant on the gasket sealing lips.
- The pipe manufacturer and Victaulic shall review any alternative lubricants to determine compatibility with the pipe and gasket.

Failure to use a compatible lubricant may cause gasket damage, resulting in joint leakage and property damage.



4. LUBRICATE GASKET: Apply a thin coat of Victaulic Lubricant only to the gasket sealing lips. **NOTE:** The gasket exterior is supplied with a factory-applied lubricant, so it is not necessary to remove the gasket from the housings to apply additional lubricant to the exterior surface.

⚠ WARNING



- Never leave a Style 357 or 857 Coupling partially assembled on mating component ends. **ALWAYS TIGHTEN THE HARDWARE IMMEDIATELY, IN ACCORDANCE WITH THESE INSTRUCTIONS.** A partially-assembled coupling poses a drop or fall hazard during installation and a burst hazard during testing.
- Keep hands away from the mating component ends and the openings of the coupling when attempting to insert grooved mating component ends into the coupling.
- Keep hands away from coupling openings during tightening.

Failure to follow these instructions could result in death or serious personal injury and property damage.



5. ASSEMBLE JOINT: Assemble the joint by inserting the grooved end of a CPVC/PVC mating component into each opening of the coupling. The grooved mating component ends shall be inserted into the coupling until contact with the center leg of the gasket occurs.

A visual check is required to verify that the coupling keys align with the groove in each mating component and that the gasket is seated properly. **NOTE:** Prior to tightening the nuts, the coupling may be rotated to verify that the gasket is seated properly on the mating component ends and within the coupling housings.

IMPORTANT INFORMATION FOR USE OF STYLE 357 AND 857 COUPLINGS WITH END CAPS AND FITTINGS:

⚠ WARNING

- **DO NOT ATTEMPT TO USE A STYLE 357 OR 857 COUPLING TO ATTACH TO AN END CAP.** Refer to the Style 356 and 856 Installation-Ready™ Transition Coupling instructions on page 15 of this handbook for methods of attaching an end cap to the CPVC/PVC piping system.

Failure to follow this instruction could result in death or serious personal injury and property damage.

- Style 357 and 857 Couplings are designed specifically for use with Victaulic CPVC/PVC fittings. **DO NOT** use other manufacturer's CPVC/PVC fittings with Style 357 and 857 Couplings.

⚠ WARNING

- Nuts shall be tightened evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads, as indicated in steps 6 and 7.

Failure to tighten nuts as instructed will cause increased loading of the hardware, resulting in the following conditions:

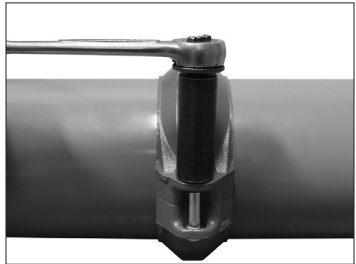
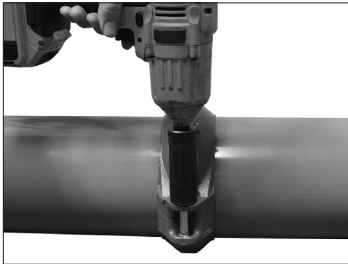
- Excessive bolt torque required to assemble the joint (incomplete assembly)
- Damage to the assembled joint (damaged or broken bolt pads or fractures to housings)
- Bolt damage or fracture
- Joint leakage and property damage
- A negative impact on system integrity
- Personal injury or death

DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved.

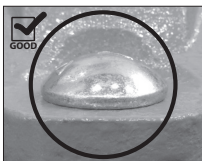
- Failure to follow this instruction could result in the conditions listed above.

NOTICE

- It is important to tighten the nuts evenly by alternating sides to prevent gasket pinching.
- An impact tool or standard socket wrench with a deep-well socket can be used to bring the bolt pads into metal-to-metal contact.
- Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the “Helpful Information” table below.



6. TIGHTEN NUTS: Using an impact tool or a standard socket wrench with a deep-well socket, tighten the nuts evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads. Verify that the oval neck of each bolt seats properly in the bolt holes. DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved. **If you suspect that any hardware has been over-tightened (as indicated by a bend in the bolt, bulging of the nut at the bolt pad interface, or damage to the bolt pad, etc.), the entire coupling assembly shall be replaced immediately.** Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the “Helpful Information” table below.



**OVAL NECK OF BOLT
SEATED PROPERLY**



**OVAL NECK OF BOLT
NOT SEATED PROPERLY**

Helpful Information

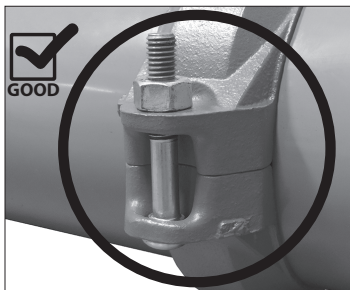
Nominal Size inches/DN	Actual Pipe Outside Diameter inches/mm	Nut Size inches/Metric	Deep-Well Socket Size inches/mm	Maximum Allowable Bolt Torque*
2 DN50	2.375 60.3	$\frac{3}{8}$ M10	$\frac{11}{16}$ 17	55 ft-lbs 75 N•m
2½	2.875 73.0	$\frac{3}{8}$ M10	$\frac{11}{16}$ 17	55 ft-lbs 75 N•m
3 – 6 DN80 - DN150	3.500 – 6.625 88.9 – 168.3	$\frac{1}{2}$ M12	$\frac{7}{8}$ 19	135 ft-lbs 183 N•m
8 – 12 DN200 - DN300	8.625 – 12.750 219.1 – 323.9	$\frac{3}{4}$ M20	1 ¼ 30	425 ft-lbs 576 N•m

*Maximum allowable bolt torque values have been derived from actual test data

⚠ WARNING

- Visual inspection of each joint is required.
- Improperly assembled joints shall be corrected before the system is filled, tested, or placed into service.
- Any components that exhibit physical damage due to improper assembly shall be replaced before the system is filled, tested, or placed into service.

Failure to follow these instructions could cause joint failure, resulting in death or serious personal injury and property damage.



7. Visually inspect each bolt pad location at every joint to verify that metal-to-metal contact is achieved across the entire bolt pad section.

⚠ WARNING



- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

Failure to follow this instruction could result in death or serious personal injury and property damage.

NOTICE

Two methods can be followed for reassembly of Style 357 and 857 Couplings.



- **METHOD 1 FOR REASSEMBLY:** The coupling can be reassembled into its "installation-ready" condition by installing the gasket into the housings, then inserting the bolts and threading a nut onto each bolt until 2 – 3 threads are exposed, as shown above. If this method is chosen, steps 1 – 5 on this page, along with all steps on pages 21 – 24, shall be followed.

OR

- **METHOD 2 FOR REASSEMBLY:** The gasket and housings can be assembled onto the mating component ends by following steps 1 – 5 on this page, along with all steps in the "Method 2 for Reassembly" section on the following page.

Follow these five steps for Method 1 or Method 2:

1. Verify that the system is depressurized and drained completely before attempting to disassemble any couplings.
2. Loosen the nuts of the coupling assembly to permit removal of the coupling from the mating component ends.
3. Remove the nuts, bolts, and gasket from the housings. Inspect all components for any damage or wear. If any damage or wear is present, use a new Victaulic-supplied coupling assembly.
4. Check mating component ends, as described in step 2 on page 21.

NOTICE

- The photos in this section show reassembly of a Style 357 Coupling; however, the same steps apply to reassembly of a Style 857 Coupling.

⚠ CAUTION

- A thin coat of Victaulic Lubricant shall be used to help prevent the gasket from pinching, rolling, or tearing during reassembly.
- DO NOT use excessive lubricant on the gasket sealing lips and exterior.
- The pipe manufacturer and Victaulic shall review any alternative lubricants to determine compatibility with the pipe and gasket.

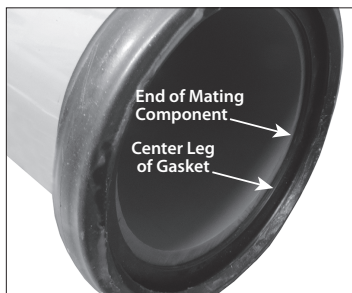
Failure to use a compatible lubricant may cause gasket damage, resulting in joint leakage and property damage.



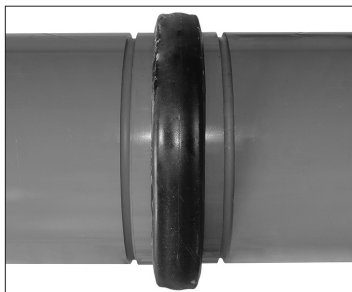
5. **FOR REASSEMBLY OF STYLE 357 AND 857 COUPLINGS, LUBRICATE GASKET:** Apply a thin coat of Victaulic Lubricant to the gasket sealing lips and exterior.

Method 2 for Reassembly

1. Verify that steps 1 – 5 in the "Instructions for Reassembly of Style 357 and 857 Couplings" section have been followed.



2. INSTALL GASKET: Insert the grooved end of a mating component into the gasket until it contacts the center leg of the gasket.

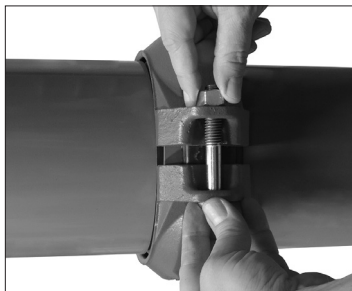


3. JOIN MATING COMPONENTS: Align the centerlines of the two grooved mating component ends. Insert the other mating component end into the gasket until it contacts the center leg of the gasket. **NOTE:** Verify that no portion of the gasket extends into the groove of either mating component.

⚠ CAUTION

- Verify that the gasket does not become rolled or pinched while installing the housings.

Failure to follow this instruction could cause gasket damage, resulting in joint leakage.



4. INSTALL HOUSINGS: Install the housings over the gasket. Verify that the housings' keys engage the grooves completely on both mating components.

5. INSTALL BOLTS/NUTS: Install the bolts and thread a nut finger-tight onto each bolt. **NOTE:** Verify that the oval neck of each bolt seats properly in the bolt hole.

6. TIGHTEN NUTS: Follow steps 6 – 7 on pages 23 – 24 to complete the assembly.

COUPLING INSTALLATION

Style 358 - Reducing Coupling

Style 858 - Reducing Coupling for Potable Water Applications

! WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- These installation instructions are intended for an experienced, trained installer. The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

Important Information

PGS™-300 Groove Profile for CPVC/PVC Mating Components



Pipe and groove are not shown to scale

Style 358 and 858 Reducing Couplings are designed for use **ONLY** with CPVC/PVC mating components that are prepared to Victaulic PGS™-300 Cut Groove Specifications. Refer to page 11 of this handbook for Victaulic PGS™-300 Cut Groove Specifications

NOTICE

- The photos in this section show installation of a Style 358 Reducing Coupling; however, the same steps apply to a Style 858 Reducing Coupling for potable water applications.

For Vertical Installations:

- An assembly washer is recommended to prevent smaller pipe from telescoping inside larger pipe in vertical installations. Contact Victaulic for details. **NOTE:** Failure to install the assembly washer where specified may result in joint leakage and property damage.

IMPORTANT INFORMATION FOR USE OF STYLE 358/858 COUPLINGS WITH END CAPS AND FITTINGS:

⚠ WARNING

- **DO NOT ATTEMPT TO USE A STYLE 358 OR 858 COUPLING TO ATTACH TO AN END CAP.** Refer to the Style 356 and 856 Installation-Ready™ Transition Coupling instructions on page 15 of this handbook for methods of attaching an end cap to the CPVC/PVC piping system.

Failure to follow this instruction could result in death or serious personal injury and property damage.

- Style 358 and 858 Couplings are designed specifically for use with Victaulic CPVC/PVC fittings. **DO NOT** use other manufacturer's CPVC/PVC fittings with Style 358 and 858 Couplings.

Installation

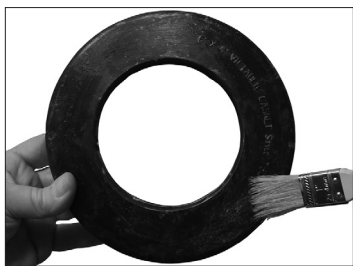
1. CHECK MATING COMPONENT ENDS: The outside surface of the CPVC/PVC mating components, between the groove and the mating component end, shall be generally free from indentations and projections to ensure a leak-tight seal. All oil, grease, dirt, and cutting particles shall be removed.

The CPVC/PVC mating components' outside diameter ("OD") and groove dimensions shall be within the tolerances published in current Victaulic PGS™-300 Cut Groove Specifications on page 11 of this handbook.

⚠ CAUTION

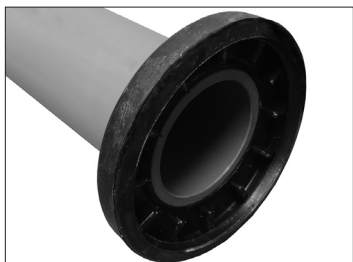
- A thin coat of Victaulic Lubricant shall be applied only to the gasket sealing lips to help prevent the gasket from pinching, rolling, or tearing during installation.
- **DO NOT** use excessive lubricant on the gasket sealing lips.
- The pipe manufacturer and Victaulic shall review any alternative lubricants to determine compatibility with the pipe and gasket.

Failure to use a compatible lubricant may cause gasket damage, resulting in joint leakage and property damage.

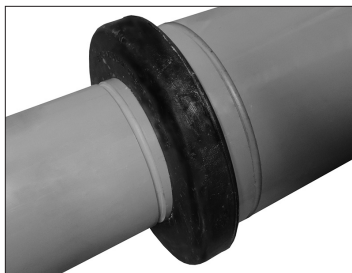


2a. CHECK GASKET: Check the gasket to verify that it is suitable for the intended service. The color code identifies the material grade. **For complete color code listings and compatibility information, reference Victaulic publications 05.01 and GSG-100, which can be downloaded at victaulic.com.**

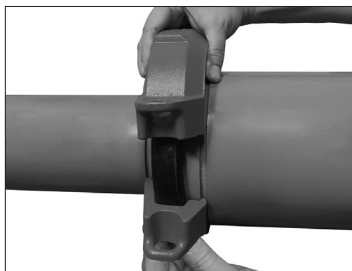
2b. LUBRICATE GASKET: Apply a thin coat of Victaulic Lubricant to the gasket sealing lips and exterior.



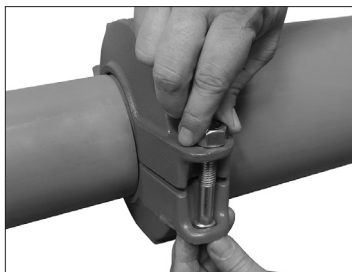
3. INSTALL GASKET: Install the smaller opening of the gasket over the smaller mating component end. **NOTE:** Verify that no portion of the gasket extends into the mating component's groove.



4. JOIN MATING COMPONENTS: Align the centerlines of the two grooved mating component ends. Insert the larger mating component end into the larger opening of the gasket. **NOTE:** Verify that no portion of the gasket extends into the groove of either mating component.



5. INSTALL HOUSINGS: Install the housings over the gasket. Verify that the housings' keys engage the grooves completely on both mating components and that each side of the housing is facing the corresponding mating component side.



6. INSTALL BOLTS/NUTS: Install the bolts and thread a nut finger-tight onto each bolt. **NOTE:** Verify that the oval neck of each bolt seats properly in the bolt hole.

WARNING

- Nuts shall be tightened evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads, as indicated in steps 6 and 7.

Failure to tighten nuts as instructed will cause increased loading of the hardware, resulting in the following conditions:

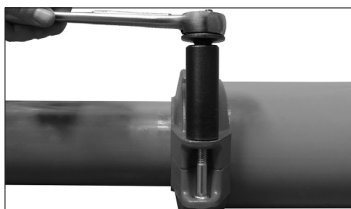
- Excessive bolt torque required to assemble the joint (incomplete assembly)
- Damage to the assembled joint (damaged or broken bolt pads or fractures to housings)
- Bolt damage or fracture
- Joint leakage and property damage
- A negative impact on system integrity
- Personal injury or death

DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved.

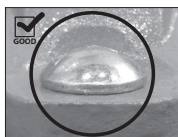
- Failure to follow this instruction could result in the conditions listed above.

NOTICE

- It is important to tighten the nuts evenly by alternating sides to prevent gasket pinching.
- An impact tool or standard socket wrench with a deep-well socket can be used to bring the bolt pads into metal-to-metal contact.
- Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the “Helpful Information” table below.



7. TIGHTEN NUTS: Using an impact tool or a standard socket wrench with a deep-well socket, tighten the nuts evenly by alternating sides, maintaining nearly uniform bolt pad gaps, until metal-to-metal contact occurs at the bolt pads. Verify that the oval neck of each bolt seats properly in the bolt holes. DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved. **If you suspect that any hardware has been over-tightened (as indicated by a bend in the bolt, bulging of the nut at the bolt pad interface, or damage to the bolt pad, etc.), the entire coupling assembly shall be replaced immediately.** Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the “Helpful Information” table below.



OVAL NECK OF BOLT
SEATED PROPERLY



OVAL NECK OF BOLT
NOT SEATED PROPERLY

Helpful Information

Nominal Size inches/DN	Actual Pipe Outside Diameter inches/mm	Nut Size inches/Metric	Deep-Well Socket Size inches/mm	Maximum Allowable Bolt Torque*
2 ½ x 2 DN50	2.875 x 2.375 73.0 60.3	¾ M10	1 ⅞ 17	55 ft-lbs 75 N•m
3 x 2 DN80 DN50	3.500 x 2.375 88.9 60.3	½ M12	7/8 19	135 ft-lbs 183 N•m
2 ½	2.875 73.0	½ M12	7/8 19	135 ft-lbs 183 N•m
4 x 2 DN100 DN50	4.500 x 2.375 114.3 60.3	½ M12	7/8 19	135 ft-lbs 183 N•m
2 ½	2.875 73.0	½ M12	7/8 19	135 ft-lbs 183 N•m
3 DN80	3.500 88.9	½ M12	7/8 19	135 ft-lbs 183 N•m
6 x 4 DN150 DN100	6.625 x 4.500 168.3 114.3	5/8 M16	1 ⅞ 24	235 ft-lbs 319 N•m
8 x 6 DN200 DN150	8.625 x 6.625 219.1 168.3	¾ M20	1 ¼ 30	425 ft-lbs 576 N•m
10 x 8 DN250 DN200	10.750 x 8.625 273.0 219.1	¾ M20	1 ¼ 30	425 ft-lbs 576 N•m

*Maximum allowable bolt torque values have been derived from actual test data

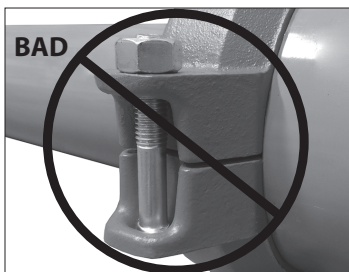


VICTAULIC® PIPING PRODUCTS
FOR CPVC/PVC MATERIALS REV_D

WARNING

- Visual inspection of each joint is required.
- Improperly assembled joints shall be corrected before the system is filled, tested, or placed into service.
- Any components that exhibit physical damage due to improper assembly shall be replaced before the system is filled, tested, or placed into service.

Failure to follow these instructions could cause joint failure, resulting in death or serious personal injury and property damage.



8. Visually inspect each bolt pad location at every joint to verify that metal-to-metal contact is achieved across the entire bolt pad section.

⚠ WARNING



- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.

Failure to follow this instruction could result in death or serious personal injury and property damage.

1. Verify that the system is depressurized and drained completely before attempting to disassemble any couplings.
2. Loosen the nuts of the coupling assembly to permit removal of the coupling from the mating component ends.
3. Remove the nuts, bolts, and gasket from the housings. Inspect all components for any damage or wear. If any damage or wear is present, use a new Victaulic-supplied coupling assembly.
4. Check mating component ends, as described in step 1 on page 28.
5. Follow steps 2a – 8 on pages 38 – 31 to reassemble the coupling.

EXPANSION JOINT INSTALLATION

Style 355 - Expansion Joint (2 – 12-inch/DN50 – DN300 Sizes)

Style 355P - Expansion Joint for Potable Water Applications (2 – 12-inch/DN50 – DN300 Sizes)

⚠ WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- These installation instructions are intended for an experienced, trained installer. The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

Introduction

Style 355/355P Expansion Joints consist of a series of Victaulic rigid couplings and specially-grooved pipe nipples. When installed in accordance with these instructions, Victaulic Style 355/355P Expansion Joints accommodate “in-line” pipe expansion and contraction generated by thermal changes in a limited amount of space. Installation lengths for Style 355/355P Expansion Joints are factory set based upon customer-supplied information and customer-specified temperature extremes.

The linear movement rating of Style 355/355P Expansion Joints is up to 4.75 inches/121 mm for 2 – 12-inch/DN50 – DN300 pipe sizes.

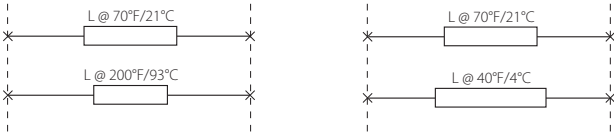
Style 355/355P Expansion Joints can be ordered to accommodate specific piping movement requirements. When the overall movement of a pipe run exceeds the maximum values listed above, multiple expansion joints, spaced along the pipe run, will be required. EXAMPLE: A 6-inch/DN150 pipe run that requires 5.50 inches/140 mm of thermal movement compensation would contain two expansion joints, each of which are capable of accommodating 2.75 inches/70 mm of movement.

Symbol Key

- = Style 355/355P
- X = Anchor
- = Guide

All illustrations in this publication have been exaggerated for clarity.

Installation Length



The installed length of Style 355/355P Expansion Joints is critical for proper operation. To determine the appropriate installation length, the customer-specified temperature extremes and the installation temperature, at the time the pipe is anchored, shall be known. In systems where the installation temperature is also one of the temperature extremes, full extension of the Style 355/355P Expansion Joint will allow reduction in length as temperature increases and the pipes grow. Similarly, full compression of the units will allow the Style 355/355P Expansion Joint to increase in length as the temperature decreases and the pipes contract. For systems where the installation temperature is within the range of extremes, the Style 355/355P Expansion Joint's installed length shall fall within the maximum and minimum unit length, inversely proportional to where the installation temperature falls within the maximum and minimum system temperatures.

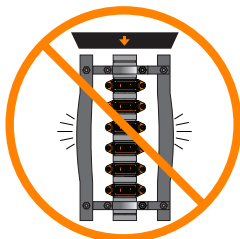
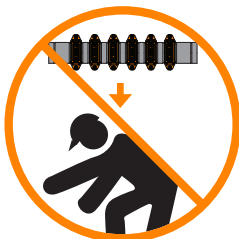
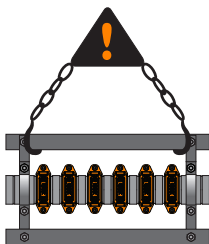
Installation Requirements

Style 355/355P Expansion Joints can be installed into the piping system using the following Victaulic couplings (depending on the type of unit ordered):

- Style 356/856 Installation-Ready™ Transition Coupling
- Style 357/857 Installation-Ready™ Rigid Coupling
- Style 358/858 Reducing Coupling

Always refer to the specific coupling section in this handbook for complete installation requirements.

! WARNING



- Lift expansion joints **ONLY** by riser clamps and tie bars.
- Always use proper rigging techniques and extreme caution when lifting expansion joints during installation. Distribute weight evenly and keep center of gravity low to secure and prevent expansion joints from shifting and sliding during installation.
- In risers, the piping above expansion joints shall be supported properly to prevent external loads from damaging riser clamps.

The purpose of the riser clamps is to maintain the expansion joint's length during shipping, installation, and placement of anchoring. Following expansion joint installation, the riser clamps shall be removed. Failure to remove the riser clamps will not allow the expansion joint to accommodate the expected piping system expansion or contraction and will void the Victaulic warranty.

- **DO NOT** use expansion joint couplings and nipples for lifting purposes.
- **DO NOT** apply force to expansion joints.
- **DO NOT** remove riser clamps until installation and anchoring are complete.

Failure to follow all instructions and warnings could result in death or serious personal injury and property damage.

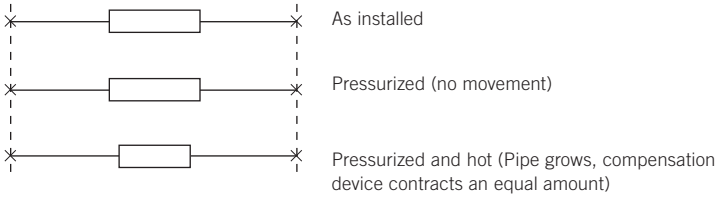
Riser clamps maintain the Style 355/355P Expansion Joint's position during shipping, installation, and placement of anchoring and shall be removed after the expansion joint is installed in the system.

Anchoring Requirements

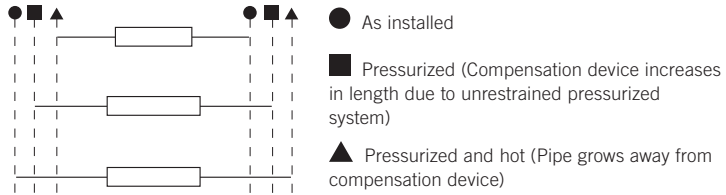


Style 355/355P Expansion Joints shall be installed on straight pipe runs between opposing anchors (main or intermediate). The anchors serve to direct thermal movement toward the expansion joint. In addition, anchors prevent expansion joints from opening up to their maximum expanded length due to system pressurization. **Good piping practice dictates that straight pipe between anchors shall have flexibility to accommodate for calculated thermal expansion or contraction.**

Anchored – Controlled Movement



No Anchors – Uncontrolled Movement



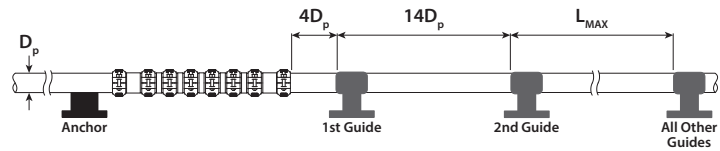
In an uncontrolled (no anchors) installation, thermal movement will occur in the path of least resistance, which is unpredictable and may occur at the Style 355/355P Expansion Joint or at the ends of the pipe runs. Victaulic Style 355/355P Expansion Joints require an activation force roughly equivalent to the end load generated by 20 psi/138 kPa of internal pressure. Without anchors, pressure-generated forces will expand the compensation device to its maximum length, and any thermal changes will be directed in the path of least resistance.

Some systems may require the installation of intermediate anchors. An intermediate anchor is installed between two anchors on a straight run of pipe. Intermediate anchors prevent thermal movement at its location but are not subject to the pressure thrust loads imparted on main anchors. The purpose of intermediate anchors is to reduce (or eliminate) thermal movement at branch connections or to “break up” long, straight pipe runs into smaller sections, thereby reducing the thermal movement compensation required at each Style 355/355P Expansion joint.

In an installed system, the distance between the anchors remains constant over the full temperature gradient. Style 355/355P Expansion Joints accommodate pipeline thermal movement by increasing or decreasing their length an amount equal and opposite to the pipeline expansion or contraction, respectively.

Guiding Requirements

The "Standards of the Expansion Joint Manufacturers Association, Inc. Tenth Edition" states, "In locating the pipe alignment guides for applications involving axial movement only, it is generally recommended that the Expansion Joint be located close to an anchor and that the first pipe guide be located a maximum distance of four pipe diameters from the end of the bellows. This arrangement will provide proper movement guiding as well as proper support for each end of the Expansion Joint. The distance between the first pipe guide and the second must be a maximum of fourteen (14) pipe diameters." The distance between the first pipe guide and the second must be a maximum of fourteen (14) pipe diameters."



The above graphic is a representation of what is shown in the "Standards of the Expansion Joint Manufacturers Association, Inc. Tenth Edition." This standard also states the following, "Note: The recommendations given for pipe anchors and guides represent the minimum requirements for controlling pipelines which contain expansion joints and are intended to protect the expansion joint and pipe system from abuse and failure. However, additional pipe supports are often required between the pipe guides in accordance with accepted piping practices." Always reference the full "Standards of the Expansion Joint Manufacturers Association, Inc." for additional information.

Installation Example

A system is designed to operate within the temperature range of 40 – 120°F/ 4°C – 49°C. The thermal movement is calculated based on the temperature range and the piping material. An expansion compensation device is selected that will accommodate the calculated movement. If the following installation temperatures are present, then the settings of the expansion compensation device within the range of its minimum and maximum lengths are as follows:

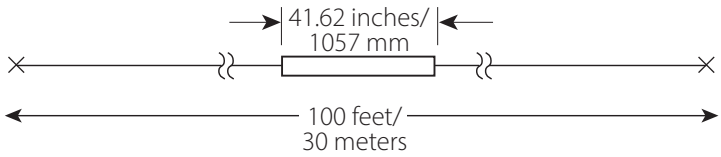
Installation Temperature	Installation Length
40°F/4°C	Maximum (Fully expanded)
80°F/27°C	50% (Halfway between fully expanded and fully compressed)
120°F/49°C	Minimum (Fully compressed)

Assume that a 4-inch/DN100 CPVC/PVC pipeline travels in a straight line with a distance of 100feet/30meters between the anchors. This distance will remain constant, since it is not affected by the pipeline temperature. The calculated thermal movement in the 100-foot/30-meter length will be 3.55inches/90mm (over a 80°F/44°C temperature difference). The 4-inch/DN100 Style 355/355P Expansion Joint is rated for 3.55 inches/ 90 mm of pipeline growth, provided that it is comprised of nine couplings. A compressed unit has an end-to-end length of 36.97 inches/939 mm and an extended length of 41.62 inches/1057 mm.



4-inch/DN100 Style 355/355P Expansion Joint

Following this methodology, if the temperature of the pipeline at the time of installation or anchoring is 40°F/4°C, then the Style 355/355P Expansion Joint should be at its fully extended length of 41.62 inches/1057 mm.

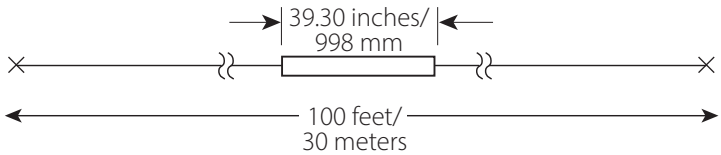


If the temperature of the pipeline at the time of installation or anchoring is 80°F/27°C, then the length of the Style 355/355P Expansion Joint should be 39.30 inches/998 mm.

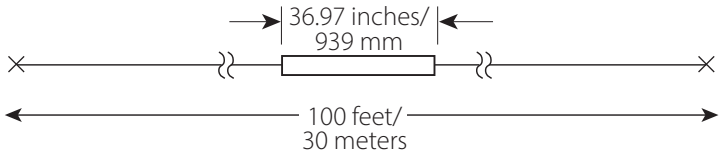
$$\{([41.62 \text{ inches} - 36.97 \text{ inches}] \times 0.50) + 36.97 \text{ inches}\}$$

OR

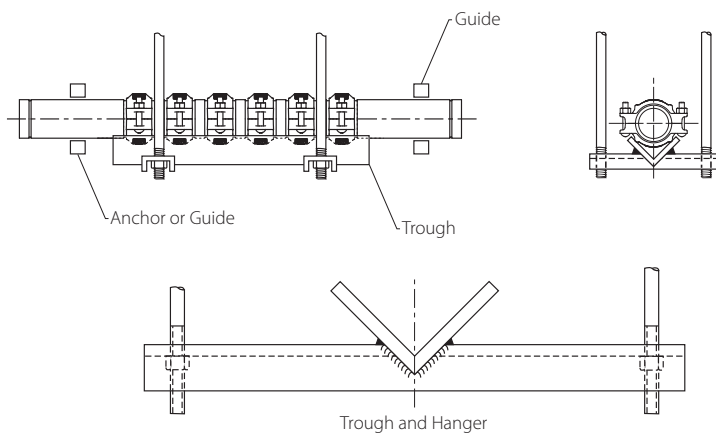
$$\{([1057 \text{ mm} - 939 \text{ mm}] \times 0.50) + 939 \text{ mm}\}$$



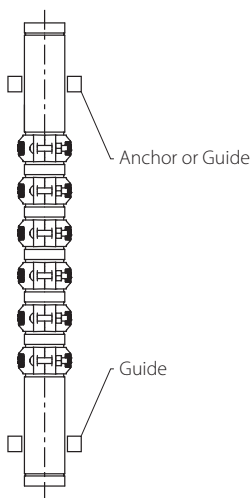
If the temperature of the pipeline at the time of installation or anchoring is 120°F/49°C, then the Style 355/355P Expansion Joint should be at its fully compressed length of 36.97 inches/939 mm.



Suggested Supports for Style 355/355P Expansion Joints – Horizontal



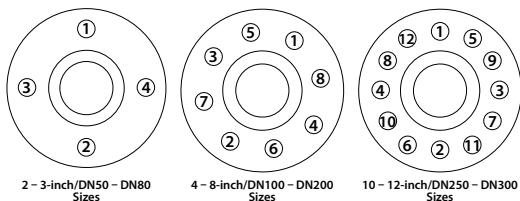
Suggested Supports for Style 355/355P Expansion Joints – Vertical



FLANGE CONNECTIONS

No. 359F Flange Adapters (Groove x Flange) can be mated to raised and flat-faced flanges. Piping runs joined to flanges shall be installed in a straight line in relation to the flange to avoid stress and damage due to misalignment. In addition, piping shall be supported to prevent lateral movement, which can create stress and cause damage to the flange. Carefully follow all instructions in this section.

1. Install the PGS™-300 grooved end of the Victaulic No. 359F Flange Adapter to the PGS™-300 grooved pipe end by following the instructions in this handbook for the applicable Victaulic Coupling.
2. With the flange gasket in place, align the bolt holes of the No. 359F with the bolt holes of the mating flange. **NOTE:** Victaulic does not supply the flange gasket. **The mating flange shall have the same number of bolt holes as the No. 359F Flange Adapter.**
3. Insert all bolts, flat washers, and nuts (place one flat washer under each bolt head and one flat washer under each nut). **NOTE:** Victaulic does not supply bolts, nuts, and flat washers.
4. Verify that the faces of the mating surfaces are flush against the gasket before bolting down the flanges.
5. Tighten each set of hardware evenly in a crossing pattern, as shown in the sequence below (and as specified in ANSI B16.5). Establish uniform pressure over the flange face by tightening the hardware evenly in increments until the required torque is achieved. Refer to the applicable "Torque Increments" table on the following page. **DO NOT exceed the torque value noted as "Max" for the applicable size.**
6. Twenty-four hours after initial installation, verify that the torque on each set of hardware complies with the applicable "Torque Increments" table on the following page. CPVC/PVC material may relax over this initial 24-hour period, resulting in loosening of hardware.



The recommendations in the following table are based on the use of two standard flat washers, standard nuts, and an 1/8-inch/3.2-mm thick EPDM full-face gasket (70 +/- 5 Shore A Hardness). Actual field conditions may require a variation in these recommendations.

Nominal Diameter inches/DN	Actual Outside Diameter inches/mm	Number of Bolt Holes	Bolt Diameter inches/mm	Minimum Bolt Length inches/mm
2 DN50	2.375 60.3	4	5/8 16	3 1/2 89
2 1/2	2.875 73.0	4	5/8 16	4 102
3 DN80	3.500 88.9	4	5/8 16	4 102
4 DN100	4.500 114.3	8	5/8 16	4 1/4 108
6 DN150	6.625 168.3	8	3/4 19	4 1/2 114
8 DN200	8.625 219.1	8	3/4 19	5 127
10 DN250	10.750 273.0	12	7/8 22	5 127
12 DN300	12.750 323.9	12	7/8 22	5 127



⚠ WARNING

- Mating flanges shall be in full circumferential contact with longitudinal and angular alignment prior to tightening the hardware. Using the hardware to align and/or draw flanges together may overstress and crack the thermoplastic material of the flange.
 - DO NOT over-torque the hardware. Excessive torque will damage the flange.
- Failure to follow these instructions may cause product failure, resulting in death or serious personal injury and property damage.

The following tables apply only to flange-to-flange connections. For other connections, such as the No. 359F to a butterfly valve, less torque will be required. Start by tightening the hardware to 50 - 60% of the torque values listed in the applicable table below for all connections that are not flange-to-flange.

Torque Increments for Lubed Bolts

Nominal Diameter inches/DN	Actual Outside Diameter inches/mm	Required Torque – ft-lbs/N•m		
		1st Pass of All Hardware	2nd Pass of All Hardware	3rd Pass of All Hardware
2 DN50	2.375 60.3	5 6.7	8 (Max) 10.8 (Max)	– –
2½	2.875 73.0	5 6.7	8 10.8	10 (Max) 13.6 (Max)
3 DN80	3.500 88.9	5 6.7	12 16.3	15 (Max) 20.3 (Max)
4 DN100	4.500 114.3	10 13.6	15 20.3	20 (Max) 27.1 (Max)
6 DN150	6.625 168.3	12 16.3	24 32.5	30 (Max) 40.7 (Max)
8 DN200	8.625 219.1	15 20.3	35 47.5	40 (Max) 54.2 (Max)
10 DN250	10.750 273.0	25 33.9	50 67.8	60 (Max) 81.3 (Max)
12 DN300	12.750 323.9	30 40.7	60 81.3	72 (Max) 97.6 (Max)

Torque Increments for Non-Lubed Bolts

Nominal Diameter inches/DN	Actual Outside Diameter inches/mm	Required Torque – ft-lbs/N•m			
		1st Pass of All Hardware	2nd Pass of All Hardware	3rd Pass of All Hardware	4th Pass of All Hardware
2 DN50	2.375 60.3	5 6.7	10 13.6	12 (Max) 16.3 (Max)	– –
2½	2.875 73.0	10 13.6	15 20.3	18 (Max) 24.4 (Max)	– –
3 DN80	3.500 88.9	15 20.3	20 27.1	25 (Max) 33.9 (Max)	– –
4 DN100	4.500 114.3	15 20.3	25 33.9	32 (Max) 43.4 (Max)	– –
6 DN150	6.625 168.3	20 27.1	32 43.4	42 (Max) 56.9 (Max)	– –
8 DN200	8.625 219.1	20 27.1	40 54.2	50 67.8	60 (Max) 81.3 (Max)
10 DN250	10.750 273.0	20 27.1	40 54.2	60 81.3	70 (Max) 94.9 (Max)
12 DN300	12.750 323.9	20 27.1	50 67.8	65 88.1	80 (Max) 108.5 (Max)

If leaks are experienced during pressure testing, completely depressurize and drain the piping system and retighten the hardware to the torque values listed in the applicable table above. **DO NOT** exceed the torque value noted as "Max" for the applicable size.

If leaks persist, contact Victaulic.

IMPACT TOOL USAGE GUIDELINES

Impact tools do not provide the installer with direct “wrench feel” to judge nut torque. Since some impact tools are capable of high output speed and torque, it is important to develop a familiarity with the impact tool to avoid over-shifting and/or over-torquing, which may damage or fracture the bolts or the coupling’s bolt pads during installation.

WARNING

- **DO NOT** exceed the “Maximum Allowable Bolt Torque” values specified in the table on the following page for the applicable bolt/nut size.

Failure to follow these instructions could cause joint failure, resulting in property damage, serious personal injury, or death.

Assemble couplings per the applicable installation instructions in this handbook.

Continue to tighten the nut(s) until the visual inspection requirements are achieved.

Visual inspection of each joint is required for verification of proper assembly.

During the installation process, the installation torque shall not exceed the “Maximum Allowable Bolt Torque” values specified in the table on the following page for the applicable bolt/nut size. Conditions that may result in over-shifting and/or excessive bolt torque include, but are not limited to, the following:

- **Improperly-Sized Impact Tool** – Refer to the “Impact Tool Selection” section on the following page.
- **Uneven tightening of hardware** – For couplings containing two or more bolts, the nuts shall be tightened evenly by alternating sides until the visual inspection requirements for the particular coupling are achieved.
- **Out-of-specification grooved pipe end dimensions (particularly large and out-of-specification “C” diameters)** – If proper visual assembly is not achieved, remove the coupling and confirm that all grooved pipe end dimensions are within Victaulic specifications. If grooved pipe end dimensions are not within Victaulic specifications, rework the pipe ends by following all instructions in the applicable pipe preparation tool’s operating and maintenance manual.
- **Continued tightening of nut(s) after the visual inspection requirements are achieved** – DO NOT continue to tighten the nut(s) after the visual inspection requirements are achieved. Continuing to tighten the hardware after proper visual inspection requirements are achieved will cause joint failure, resulting in property damage, serious personal injury, or death. In addition, continued tightening may cause excessive stresses that compromise the long-term integrity of the bolts and may cause joint failure, resulting in property damage, serious personal injury, or death. Additional bolt torque will not provide a better installation; bolt torque that exceeds the “Maximum Allowable Bolt Torque” values specified in the table on the following page could damage or fracture the bolts and/or the coupling’s bolt pads during installation.
- **Pinched gasket** – A pinched gasket could result in the inability to achieve proper visual inspection requirements. The coupling shall be disassembled and inspected to verify that the gasket is not pinched. If the gasket is pinched, a new coupling assembly shall be used.
- **Coupling was not assembled per the applicable installation instructions in this handbook** – Adherence to installation instructions will help to avoid the conditions covered in this document.

If you suspect that any hardware has been over-torqued, the entire coupling assembly shall be replaced immediately (as indicated by a bend in the bolt, bulging of the nut at the bolt pad interface, or damage to the bolt pad, etc.).

Maximum Allowable Bolt Torque

Bolt/Nut Size		Maximum Allowable Bolt Torque*
inches	Metric	
⅜	M10	55 ft-lbs 75 N•m
½	M12	135 ft-lbs 183 N•m

Bolt/Nut Size		Maximum Allowable Bolt Torque*
inches	Metric	
⅝	M16	235 ft-lbs 319 N•m
¾	M20	425 ft-lbs 576 N•m

*Maximum allowable bolt torque values have been derived from actual test data

IMPACT TOOL SELECTION

Appropriate selection of an impact tool is required to ensure proper installation in accordance with the applicable coupling installation instructions. Improper impact tool selection could cause coupling mis-assembly and damage, resulting in property damage, serious personal injury, or death.

To determine the suitability of an impact tool, perform trial installation assemblies with a standard socket wrench or a torque wrench. These trial coupling assemblies shall meet the visual installation requirements for the particular coupling. After visual installation requirements are achieved, measure the torque applied to each nut with a torque wrench. Using the torque value measured, select an impact tool with a torque output or torque output setting that conforms to the measured value but does not exceed the “Maximum Allowable Bolt Torque” values specified in the table above.

Selection of an Impact Tool:

Impact Tools with Single Output Torque – Selection of an impact tool with an output torque considerably higher than the required installation torque could result in hardware and/or coupling damage due to the possibility of hardware over-torque. Under no circumstances shall an impact tool be selected for use that has a torque output setting that exceeds the “Maximum Allowable Bolt Torque” values specified in the table above.

Impact Tools with Multiple Output Torque Settings – If an impact tool with multiple output torque settings is selected, the impact tool shall have at least one torque setting that satisfies the above requirements for an “Impact Tool with Single Output Torque.”

Use of impact tools with excessive output torques creates installation difficulties for the installer due to the tool's unmanageable rotational speed and power. Using the same method above, periodically check nut torque on coupling assemblies throughout the system installation process.

For safe and proper use of impact tools, always refer to the impact tool manufacturer's operating instructions. In addition, verify that proper impact grade sockets are being used for coupling installation.

WARNING

Failure to follow instructions for tightening hardware could result in:

- Bolt damage or fracture
- Damaged or broken bolt pads or fractures to housings
- Joint leakage and property damage
- A negative impact on system integrity
- Personal injury or death

SOLVENT CEMENTING GUIDELINES

The following standards shall be followed for solvent cementing:

- ASTM D2855, Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
- Primer, NSF 61 Approved, Conforming to ASTM F656, Purple Colored
- Heavy-Bodied Cement, NSF 61 Approved, Conforming to ASTM F493, Orange Colored

For No. 354 Reducing Tees (Groove x Groove x Socket) and No. 361 Reducing Adapters (Groove x Socket), follow the solvent cement manufacturer's instructions for using only primer and solvent cement that is compatible with CPVC/PVC material. The solvent cement manufacturer's instructions for applying primer and solvent cement, along with set and cure times, shall be followed.

Solvent cement set and cure times are a function of pipe size, temperature, relative humidity, and tightness of fit. Curing time is faster in dry environments, smaller pipe sizes, higher temperatures, and tighter fits. Curing times shall be increased when moisture is present. The assembly shall be allowed to set without any stress on the joint; set time is dependent upon pipe size, temperature, and humidity (refer to solvent cement manufacturer's instructions).

Perform all solvent cement applications before any Victaulic Couplings are installed on the fitting. Verify that no solvent cement comes into contact with the gaskets contained in Victaulic Couplings.

WARNING

- **Follow the solvent cement manufacturer's instructions when solvent cementing Victaulic CPVC/PVC Pipe Fittings.**
- **Avoid puddling solvent cement on or within the fitting or pipe. Improper installation techniques that result in excess solvent cement will weaken CPVC/PVC material.**
- **DO NOT allow solvent cement to run into the inside or on the outside of the pipe or fitting.**
- **DO NOT allow solvent cement or primer to come into contact with gaskets contained in Victaulic Couplings.**

Failure to follow these instructions may cause system failure, resulting in death or serious personal injury and property damage.

SYSTEM ACCEPTANCE TESTING

WARNING

- Air or compressed gas **SHALL NOT** be used for system acceptance testing. System failure when using compressed air/gas for system acceptance testing can result in death or serious personal injury and property damage.

When installation is complete, Victaulic PGS™-300 couplings and fittings may be hydrostatically (water) pressure tested up to 1.5 times the maximum rated working pressure of the lowest-rated component. Verify that the pressure test limitations on non-Victaulic-supplied components will not be exceeded.

Victaulic T-60 Test Caps or No. 60 End Caps may be used, connected via Victaulic Style 356 or 856 Installation-Ready™ Transition Couplings. When assembling Style 356 or 856 Couplings onto end caps, use only Victaulic No. 60 End Caps containing the "EZ QV" marking on the inside face. The end cap shall be used only on the side of the coupling that is marked "STEEL". Take additional care to verify that the end cap is seated fully against the center leg of the gasket. Always read and follow the I-ENDCAP instructions, starting on page 62 of this handbook.

When pressure testing, the system shall be filled slowly with water. Air shall be bled from the highest and furthest location from the fill point before pressure is applied. Air shall be removed from the piping systems (plastic or metal) to prevent it from being locked in the system when pressure is applied. Entrapped air can generate excessive surge pressures that can result in death or serious personal injury and property damage, regardless of the piping material used. **CPVC/PVC piping systems SHALL NOT be tested with air or compressed gas.**

PAINTING PIPE AND FITTINGS

WARNING

- CPVC/PVC material that is installed in an area exposed to direct sunlight may be painted with a light-colored acrylic or latex paint that is chemically-compatible with the CPVC/PVC material.
- Always confirm material compatibility by contacting the paint manufacturer.
- **DO NOT** use oil-based paints on CPVC/PVC material.

Failure to follow these instructions may cause product failure, resulting in death or serious personal injury and property damage.

In certain installation locations (i.e. installations with direct sunlight exposure), water based latex paint may be applied to CPVC/PVC material. Use of certain paints, such as oil-based, can damage CPVC/PVC material. Before painting any CPVC/PVC material, consult with the local authority having jurisdiction for restrictions, and contact the paint supplier to confirm compatibility with the CPVC/PVC material.

NOTICE

- Coatings applied to the interior surfaces of Victaulic grooved pipe couplings shall not exceed 0.010 inch/0.25 mm in thickness. This includes the bolt pad mating surfaces.

MAXIMUM RECOMMENDED HANGER/SUPPORT SPACING

Hanger/support spacing shall be in accordance with the CPVC pipe manufacturer's recommendations or the values shown in the tables below. These values are derived from ASME B31.9 Support Spacing recommendations. For continuous, non-insulated spans conveying fluids that exceed a specific gravity of 1.0, refer to the CPVC pipe manufacturer for recommendations.

Schedule 40 CPVC Only

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Operating Temperatures					
		60°F 16°C	80°F 27°C	100°F 38°C	120°F 49°C	140°F 60°C	180°F 82°C
		Support Spacing in feet/meters (Schedule 40 CPVC Only)					
2 DN50	2.375 60.3	6.00 1.8	5.50 1.7	5.50 1.7	5.00 1.5	4.50 1.4	2.50 0.8
2½	2.875 73.0	6.75 2.1	6.25 1.9	6.25 1.9	5.75 1.8	5.25 1.6	2.75 0.8
3 DN80	3.500 88.9	7.25 2.2	6.25 1.9	6.25 1.9	6.25 1.9	5.25 1.6	2.75 0.8
4 DN100	4.500 114.3	8.00 2.4	7.00 2.1	7.00 2.1	6.50 2.0	6.00 1.8	3.50 1.1
6 DN150	6.625 168.3	9.00 2.7	8.00 2.4	7.50 2.3	7.00 2.1	6.50 2.0	4.00 1.2
8 DN200	8.625 219.1	9.00 2.7	8.00 2.4	7.50 2.3	7.00 2.1	6.50 2.0	4.50 1.4
10 DN250	10.750 273.0	9.50 2.9	9.00 2.7	8.50 2.6	7.50 2.3	7.00 2.1	5.00 1.5
12 DN300	12.750 323.9	10.00 3.0	10.00 3.0	9.50 2.9	8.50 2.6	7.50 2.3	5.50 1.7

NOTES:
For operating temperatures above 180°F/82°C, refer to the pipe manufacturer for recommendations.
Heavy items/concentrated loads should be supported separately or independent of pipe supports.

Schedule 80 CPVC Only

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Operating Temperatures					
		60°F 16°C	80°F 27°C	100°F 38°C	120°F 49°C	140°F 60°C	180°F 82°C
		Support Spacing in feet/meters (Schedule 80 CPVC Only)					
2 DN50	2.375 60.3	6.50 2.0	6.50 2.0	6.50 2.0	6.00 1.8	5.50 1.7	3.00 0.9
2½	2.875 73.0	7.25 2.2	6.75 2.1	6.75 2.1	6.75 2.1	5.75 1.8	3.25 1.0
3 DN80	3.500 88.9	7.50 2.3	7.50 2.3	7.50 2.3	7.00 2.1	6.50 2.0	3.50 1.1
4 DN100	4.500 114.3	8.50 2.6	8.50 2.6	8.50 2.6	8.00 2.4	7.00 2.1	4.00 1.2
6 DN150	6.625 168.3	9.50 2.9	9.50 2.9	9.00 2.7	8.50 2.6	7.50 2.3	4.50 1.4
8 DN200	8.625 219.1	10.50 3.2	10.50 3.2	10.00 3.0	9.50 2.9	8.50 2.6	5.00 1.5
10 DN250	10.750 273.0	11.00 3.4	11.00 3.4	10.50 3.2	10.00 3.0	9.00 2.7	5.50 1.7
12 DN300	12.750 323.9	12.00 3.7	12.00 3.7	12.00 3.7	10.50 3.2	10.00 3.0	6.00 1.8

NOTES:
For operating temperatures above 180°F/82°C, refer to the pipe manufacturer for recommendations.
Heavy items/concentrated loads should be supported separately or independent of pipe supports.



MAXIMUM RECOMMENDED HANGER/SUPPORT SPACING (CONTINUED)

Hanger/support spacing shall be in accordance with the PVC pipe manufacturer's recommendations or the values shown in the tables below. These values are derived from ASME B31.9 Support Spacing recommendations. For continuous, non-insulated spans conveying fluids that exceed a specific gravity of 1.0, refer to the PVC pipe manufacturer for recommendations.

Schedule 40 PVC Only

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Operating Temperatures				
		60°F 16°C	80°F 27°C	100°F 38°C	120°F 49°C	140°F 60°C
		Support Spacing in feet/meters (Schedule 40 PVC Only)				
2 DN50	2.375 60.3	5.50 1.7	5.00 1.5	4.50 1.4	3.00 0.9	2.50 0.8
2½	2.875 73.0	6.50 2.0	6.00 1.8	5.50 1.7	3.50 1.1	3.00 0.9
3 DN80	3.500 88.9	6.50 2.0	6.50 2.0	5.50 1.7	3.50 1.1	3.00 0.9
4 DN100	4.500 114.3	7.00 2.1	6.50 2.0	6.00 1.8	4.00 1.2	3.50 1.1
6 DN150	6.625 168.3	8.00 2.4	7.50 2.3	7.00 2.1	4.50 1.4	4.00 1.2
8 DN200	8.625 219.1	8.50 2.6	8.00 2.4	7.50 2.3	4.50 1.4	4.00 1.2
10 DN250	10.750 273.0	9.50 2.9	8.50 2.6	8.00 2.4	5.00 1.5	4.50 1.4
12 DN300	12.750 323.9	11.00 3.4	10.00 3.0	9.00 2.7	6.00 1.8	5.00 1.5

NOTE:

Heavy items/concentrated loads should be supported separately or independent of pipe supports.

Schedule 80 PVC Only

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Operating Temperatures				
		60°F 16°C	80°F 27°C	100°F 38°C	120°F 49°C	140°F 60°C
		Support Spacing in feet/meters (Schedule 80 PVC Only)				
2 DN50	2.375 60.3	6.50 2.0	6.00 1.8	5.50 1.7	3.50 1.1	3.00 0.9
2½	2.875 73.0	7.00 2.1	7.00 2.1	6.00 1.8	4.25 1.3	3.75 1.1
3 DN80	3.500 88.9	7.50 2.3	7.00 2.1	6.50 2.0	4.00 1.2	3.50 1.1
4 DN100	4.500 114.3	8.50 2.6	8.00 2.4	7.00 2.1	4.50 1.4	4.00 1.2
6 DN150	6.625 168.3	9.50 2.9	9.00 2.7	8.50 2.6	5.50 1.7	4.50 1.4
8 DN200	8.625 219.1	10.50 3.2	10.00 3.0	9.00 2.7	6.00 1.8	5.00 1.5
10 DN250	10.750 273.0	11.50 3.5	10.50 3.2	9.50 2.9	6.50 2.0	5.50 1.7
12 DN300	12.750 323.9	11.50 3.5	10.50 3.2	9.50 2.9	6.50 2.0	5.50 1.7

NOTE:

Heavy items/concentrated loads should be supported separately or independent of pipe supports.

RISER SUPPORTS

Risers shall be supported by pipe clamps or by hangers located on the horizontal connection close to the riser. Vertical lines shall be supported at intervals to avoid placing excessive load on a fitting at the lower end.

Hangers and supports shall not distort, cut, or abrade the piping, and they shall allow free movement of the pipe for thermal expansion and contraction. Use only riser clamps and hangers that are designed for use with CPVC/PVC pipe.

Maintain vertical piping in straight alignment with supports at each floor level. A mid-story guide is required for 2-inch/DN50 CPVC/PVC piping systems.

Under no circumstances shall Victaulic couplings be allowed to bear against, rest on, or come into contact with riser clamps or floor penetrations.

⚠ WARNING

- **CPVC/PVC pipe and/or system components SHALL NOT be used to provide structural support for the system. Care shall be used when installing, hanging, or bracing to prevent unnecessary stress loads on the CPVC/PVC piping system.**
- Failure to follow this instruction could cause system failure, resulting in death or serious personal injury and property damage.**

EXPANSION AND CONTRACTION

Temperature variations in piping systems affect the length of the piping. Any increase or decrease in length shall be accommodated to prevent damage to the piping system, adjacent equipment, or building structure.

CPVC/PVC and other plastic pipe materials have a coefficient of thermal expansion that is greater than carbon steel, copper, or stainless steel, as shown in the table below. Any movement caused by temperature variations shall be considered.

Pipe Material	Coefficient of Thermal Expansion (α)
PVC	29.0 x 10 ⁻⁶ in/(in °F) 52.2 x 10 ⁻⁶ mm/(mm °C)
CPVC	37.0 x 10 ⁻⁶ in/(in °F) 66.7 x 10 ⁻⁶ mm/(mm °C)
Carbon Steel	6.7 x 10 ⁻⁶ in/(in °F) 12.1 x 10 ⁻⁶ mm/(mm °C)
Copper	9.3 x 10 ⁻⁶ in/(in °F) 16.7 x 10 ⁻⁶ mm/(mm °C)
Stainless Steel (Type 304)	9.6 x 10 ⁻⁶ in/(in °F) 17.3 x 10 ⁻⁶ mm/(mm °C)

The actual change in length is linearly dependent on the initial length of the pipe run and on the change in temperature, in accordance with equation $\Delta L = L \times \alpha \times \Delta T$, where:

- ΔL is the change in pipe length
- L is the original pipe length
- α is the coefficient of thermal expansion of the pipe material
- ΔT is the change in temperature

For CPVC/PVC material over various temperature changes, this translates into changes in length of the original span shown in the tables on the following pages.

Thermal Expansion (ΔL) of CPVC Pipe

Length of Run	$\Delta T = 20^{\circ}\text{F}$ 11°C	$\Delta T = 40^{\circ}\text{F}$ 22°C	$\Delta T = 60^{\circ}\text{F}$ 33°C	$\Delta T = 80^{\circ}\text{F}$ 44°C	$\Delta T = 100^{\circ}\text{F}$ 56°C	$\Delta T = 120^{\circ}\text{F}$ 67°C
feet/meters	Thermal Expansion (ΔL) of CPVC Pipe in inches/mm					
20	0.18	0.36	0.53	0.71	0.89	1.07
6	4.6	9.1	13.5	18.0	22.6	27.2
40	0.36	0.71	1.07	1.42	1.78	2.13
12	9.1	18.0	27.2	36.1	45.2	54.1
60	0.53	1.07	1.60	2.13	2.66	3.20
18	13.5	27.2	40.6	54.1	67.6	81.3
80	0.71	1.42	2.13	2.84	3.55	4.26
24	18.0	36.1	54.1	72.1	90.2	108.2
100	0.89	1.78	2.66	3.55	4.44	5.33
30	22.6	45.2	67.6	90.2	112.8	135.4
125	1.11	2.22	3.33	4.44	5.55	6.66
38	28.2	56.4	84.6	112.8	141.0	169.2
150	1.33	2.66	4.00	5.33	6.66	7.99
46	33.8	67.6	101.6	135.4	169.2	202.9
175	1.55	3.11	4.66	6.22	7.77	9.32
53	39.4	79.0	118.4	158.0	197.4	236.7
200	1.78	3.55	5.33	7.10	8.88	10.66
61	45.2	90.2	135.4	180.3	225.6	270.8

Thermal Expansion (ΔL) of PVC Pipe

Length of Run	$\Delta T = 20^{\circ}\text{F}$ 11°C	$\Delta T = 40^{\circ}\text{F}$ 22°C	$\Delta T = 60^{\circ}\text{F}$ 33°C	$\Delta T = 80^{\circ}\text{F}$ 44°C
feet/meters	Thermal Expansion (ΔL) of PVC Pipe in inches/mm			
20	0.14	0.28	0.42	0.56
6	3.6	7.1	10.7	14.2
40	0.28	0.56	0.84	1.11
12	7.1	14.2	21.3	28.2
60	0.42	0.84	1.25	1.67
18	10.7	21.3	31.8	42.4
80	0.56	1.11	1.67	2.23
24	14.2	28.2	42.4	56.6
100	0.70	1.39	2.09	2.78
30	17.8	35.3	53.1	70.6
125	0.87	1.74	2.61	3.48
38	22.1	44.2	66.3	88.4
150	1.04	2.09	3.13	4.18
46	26.4	53.1	79.5	106.2
175	1.22	2.44	3.65	4.87
53	31.0	62.0	92.7	123.7
200	1.39	2.78	4.18	5.57
61	35.3	70.6	106.2	141.5

Expansion loops or "U" bends, piping offsets, and changes in direction can be used to accommodate pipeline expansion and/or contraction due to thermal changes. The tables and figures on the following pages show corresponding lengths "L" to accommodate thermal growth given a run length and temperature change. Expansion loop sizing is consistent with the equations included in IAPMO Standard IS-20.

CPVC

Configuration Lengths "£" for ΔT of 20°F/11°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 20°F/11°C							
2 DN50	2.375 60.3	13 330	18 457	22 559	26 660	29 737	32 813	35 889	41 1041
2½	2.875 73.0	14 356	20 508	24 610	28 711	32 813	35 889	39 991	45 1143
3 DN80	3.500 88.9	16 406	22 559	27 686	31 787	35 889	39 991	43 1092	49 1245
4 DN100	4.500 114.3	18 457	25 635	31 787	35 889	40 1016	44 1118	48 1219	56 1422
6 DN150	6.625 168.3	21 533	30 762	37 940	43 1092	48 1219	54 1372	59 1499	68 1727
8 DN200	8.625 219.1	24 610	35 889	42 1067	49 1245	55 1397	61 1549	67 1702	77 1956
10 DN250	10.750 273.0	27 686	39 991	47 1194	55 1397	61 1549	68 1727	75 1905	86 2184
12 DN300	12.750 323.9	30 762	42 1067	52 1321	60 1524	67 1702	74 1880	81 2057	94 2388

CPVC

Configuration Lengths "£" for ΔT of 40°F/22°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 40°F/22°C							
2 DN50	2.375 60.3	19 483	27 686	33 838	38 965	42 1067	47 1194	52 1321	60 1524
2½	2.875 73.0	21 533	29 737	36 914	41 1041	46 1168	52 1321	57 1448	66 1676
3 DN80	3.500 88.9	23 584	32 813	40 1016	46 1168	51 1295	57 1448	63 1600	72 1829
4 DN100	4.500 114.3	26 660	37 940	45 1143	52 1321	58 1473	65 1651	71 1803	82 2083
6 DN150	6.625 168.3	31 787	44 1118	54 1372	63 1600	70 1778	79 2007	86 2184	99 2515
8 DN200	8.625 219.1	36 914	51 1295	62 1575	72 1829	80 2032	90 2286	98 2489	113 2870
10 DN250	10.750 273.0	40 1016	57 1448	69 1753	80 2032	90 2286	100 2540	110 2794	127 3226
12 DN300	12.750 323.9	44 1118	62 1575	76 1930	87 2210	98 2489	109 2769	119 3023	138 3505



CPVC

**Configuration Lengths "£" for ΔT of 60°F/33°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling**

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 60°F/33°C							
2 DN50	2.375 60.3	25 635	36 914	44 1118	51 1295	57 1448	64 1626	70 1778	81 2057
2½	2.875 73.0	28 711	40 1016	49 1245	56 1422	63 1600	70 1778	77 1956	89 2261
3 DN80	3.500 88.9	31 787	44 1118	54 1372	62 1575	69 1753	77 1956	85 2159	98 2489
4 DN100	4.500 114.3	35 889	50 1270	61 1549	70 1778	78 1981	88 2235	96 2438	111 2819
6 DN150	6.625 168.3	43 1092	60 1524	74 1880	85 2159	95 2413	106 2692	117 2972	135 3429
8 DN200	8.625 219.1	49 1245	69 1753	84 2134	97 2464	109 2769	121 3073	133 3378	154 3912
10 DN250	10.750 273.0	54 1372	77 1956	94 2388	108 2743	121 3073	136 3454	148 3759	171 4343
12 DN300	12.750 323.9	59 1499	83 2108	102 2591	118 2997	132 3353	148 3759	162 4115	187 4750

CPVC

**Configuration Lengths "£" for ΔT of 80°F/44°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling**

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 80°F/44°C							
2 DN50	2.375 60.3	32 813	46 1168	56 1422	65 1651	72 1829	81 2057	89 2261	102 2591
2½	2.875 73.0	36 914	50 1270	62 1575	71 1803	80 2032	89 2261	97 2464	113 2870
3 DN80	3.500 88.9	39 991	56 1422	68 1727	79 2007	88 2235	98 2489	108 2743	124 3150
4 DN100	4.500 114.3	45 1143	63 1600	77 1956	89 2261	100 2540	111 2819	122 3099	141 3581
6 DN150	6.625 168.3	54 1372	76 1930	94 2388	108 2743	121 3073	135 3429	148 3759	171 4343
8 DN200	8.625 219.1	62 1575	87 2210	107 2718	123 3124	138 3505	154 3912	169 4293	195 4953
10 DN250	10.750 273.0	69 1753	97 2464	119 3023	138 3505	154 3912	172 4369	188 4775	218 5537
12 DN300	12.750 323.9	75 1905	106 2692	130 3302	150 3810	168 4267	187 4750	205 5207	237 6020

CPVC

Configuration Lengths "£" for ΔT of 100°F/56°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 100°F/56°C							
2 DN50	2.375 60.3	43 1092	61 1549	74 1880	86 2184	96 2438	107 2718	117 2972	135 3429
2½	2.875 73.0	47 1194	67 1702	82 2083	94 2388	105 2667	118 2997	129 3277	149 3785
3 DN80	3.500 88.9	52 1321	74 1880	90 2286	104 2642	116 2946	130 3302	142 3607	164 4166
4 DN100	4.500 114.3	59 1499	83 2108	102 2591	118 2997	132 3353	147 3734	161 4089	186 4724
6 DN150	6.625 168.3	72 1829	101 2565	124 3150	143 3632	160 4064	179 4547	196 4978	226 5740
8 DN200	8.625 219.1	82 2083	115 2921	141 3581	163 4140	183 4648	204 5182	224 5690	258 6553
10 DN250	10.750 273.0	91 2311	129 3277	158 4013	182 4623	204 5182	228 5791	250 6350	288 7315
12 DN300	12.750 323.9	99 2515	140 3556	172 4369	198 5029	222 5639	248 6299	272 6909	314 7976

NOTICE

- For operating temperatures above 180°F/82°C or for a ΔT above 120°F/67°C, contact Victaulic for configuration lengths "£".



PVC

**Configuration Lengths "£" for ΔT of 20°F/11°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling**

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 20°F/11°C							
2 DN50	2.375 60.3	12 305	17 432	21 533	24 610	27 686	30 762	32 813	38 965
2½	2.875 73.0	13 330	18 457	23 584	26 660	29 737	33 838	36 914	41 1041
3 DN80	3.500 88.9	14 356	20 508	25 635	29 737	32 813	36 914	39 991	46 1168
4 DN100	4.500 114.3	16 406	23 584	28 711	33 838	37 940	41 1041	45 1143	52 1321
6 DN150	6.625 168.3	20 508	28 711	34 864	40 1016	44 1118	50 1270	54 1372	63 1600
8 DN200	8.625 219.1	23 584	32 813	39 991	45 1143	51 1295	57 1448	62 1575	71 1803
10 DN250	10.750 273.0	25 635	36 914	44 1118	50 1270	56 1422	63 1600	69 1753	80 2032
12 DN300	12.750 323.9	27 686	39 991	48 1219	55 1397	61 1549	69 1753	75 1905	87 2210

PVC

**Configuration Lengths "£" for ΔT of 40°F/22°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling**

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 40°F/22°C							
2 DN50	2.375 60.3	20 508	28 711	34 864	40 1016	44 1118	49 1245	54 1372	63 1600
2½	2.875 73.0	22 559	31 787	38 965	44 1118	49 1245	54 1372	60 1524	69 1753
3 DN80	3.500 88.9	24 610	34 864	42 1067	48 1219	54 1372	60 1524	66 1676	76 1930
4 DN100	4.500 114.3	27 686	39 991	47 1194	54 1372	61 1549	68 1727	75 1905	86 2184
6 DN150	6.625 168.3	33 838	47 1194	57 1448	66 1676	74 1880	83 2108	91 2311	105 2667
8 DN200	8.625 219.1	38 965	53 1346	65 1651	75 1905	84 2134	94 2388	103 2616	119 3023
10 DN250	10.750 273.0	42 1067	60 1524	73 1854	84 2134	94 2388	105 2667	115 2921	133 3378
12 DN300	12.750 323.9	46 1168	65 1651	79 2007	92 2337	103 2616	115 2921	126 3200	145 3683

PVC

Configuration Lengths "£" for ΔT of 60°F/33°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 60°F/33°C							
2 DN50	2.375 60.3	32 813	46 1168	56 1422	65 1651	72 1829	81 2057	88 2235	102 2591
2½	2.875 73.0	36 914	50 1270	61 1549	71 1803	79 2007	89.00 2261	97.00 2464	112 2845
3 DN80	3.500 88.9	39 991	55 1397	68 1727	78 1981	88 2235	98 2489	107 2718	124 3150
4 DN100	4.500 114.3	44 1118	63 1600	77 1956	89 2261	99 2515	111 2819	122 3099	140 3556
6 DN150	6.625 168.3	54 1372	76 1930	93 2362	108 2743	121 3073	135 3429	148 3759	170 4318
8 DN200	8.625 219.1	61 1549	87 2210	107 2718	123 3124	138 3505	154 3912	168 4267	194 4928
10 DN250	10.750 273.0	69 1753	97 2464	119 3023	137 3480	154 3912	172 4369	188 4775	217 5512
12 DN300	12.750 323.9	75 1905	106 2692	130 3302	150 3810	167 4242	187 4750	205 5207	236 5994

PVC

Configuration Lengths "£" for ΔT of 80°F/44°C Using the
Style 357/857 Installation-Ready™ Rigid Coupling

Nominal Diameter inches/ DN	Actual Outside Diameter inches/ mm	Pipe Run Length in feet/meters (L)							
		20 6	40 12	60 18	80 24	100 31	125 38	150 46	200 61
		Configuration Lengths "£" in inches/mm for ΔT of 80°F/44°C							
2 DN50	2.375 60.3	37 940	53 1346	65 1651	75 1905	83 2108	93 2362	102 2591	118 2997
2½	2.875 73.0	41 1041	58 1473	71 1803	82 2083	92 2337	102 2591	112 2845	130 3302
3 DN80	3.500 88.9	45 1143	64 1626	78 1981	90 2286	101 2565	113 2870	124 3150	143 36.2
4 DN100	4.500 114.3	51 12.4	73 18.2	89 2261	103 2616	115 2921	128 3251	140 3556	162 4115
6 DN150	6.625 168.3	62 1575	88 2235	108 2743	124 3150	139 3531	156 3962	170 4318	197 5004
8 DN200	8.625 219.1	71 1803	100 2540	123 3124	142 3607	159 4039	178 4521	194 4928	225 5715
10 DN250	10.750 273.0	79 2007	112 2845	137 3480	159 4039	177 4496	198 5029	217 5512	251 6375
12 DN300	12.750 323.9	86 2184	122 3099	150 3810	173 4394	193 4902	216 5486	236 5994	273 6934

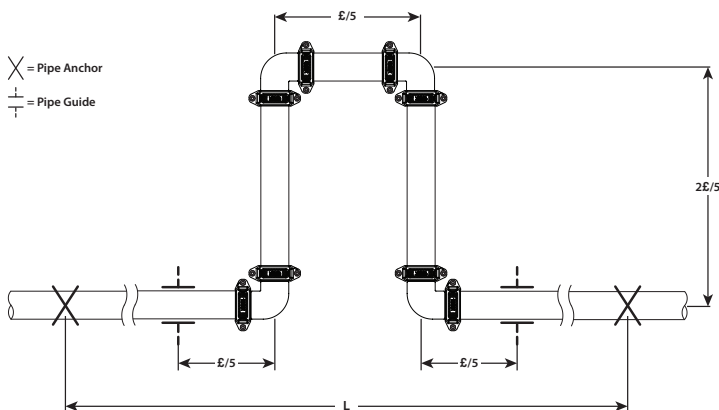


EXPANSION LOOP AND OFFSET CONFIGURATION EXAMPLES

NOTICE

- Piping restraints should restrict lateral movement and should direct axial movement into the expansion loop, offset, or change in direction.

Loop



LOOP EXAMPLE: 125 feet/38 meters (L) of 6-inch/DN150 Schedule 80 CPVC pipe will be installed at 60°F/16°C and will operate at 150°F/66°C. An expansion loop will be used to accommodate the thermal expansion. What are the minimum required dimensions of the expansion loop?

First, find ΔT (Change in Temperature)

$$\Delta T = T_2 - T_1$$

$$\Delta T = 150^\circ\text{F}/66^\circ\text{C} - 60^\circ\text{F}/16^\circ\text{C}$$

$$\Delta T = 90^\circ\text{F}/50^\circ\text{C}$$

Reference the tables on pages 51 – 52. These tables list CPVC configuration lengths (E) for $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. A conservative approach will use the configuration lengths listed for $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. More accurate results can be obtained through linear interpolation.

The $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$ table lists the minimum required configuration length for the described system as 179 inches/4547 mm or 15 feet/4.6 meters. The loop dimensions are calculated as follows:

$$\text{Perpendicular leg} = 2/5 \times E$$

$$\text{Perpendicular leg} = 2/5 \times 179 \text{ inches}/4547 \text{ mm}$$

$$\text{Perpendicular leg} = 71.6 \text{ inches}/1818 \text{ mm or } 6 \text{ feet}/1.8 \text{ meters}$$

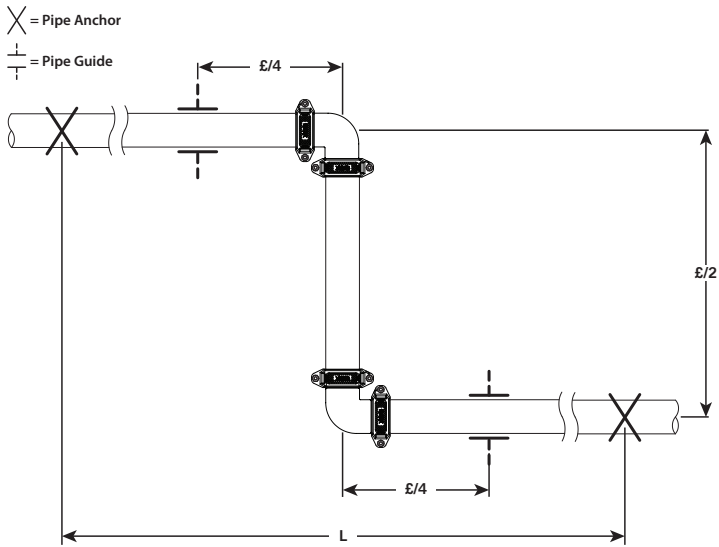
$$\text{Parallel leg} = 1/5 \times E$$

$$\text{Parallel leg} = 1/5 \times 179 \text{ inches}/4547 \text{ mm}$$

$$\text{Parallel leg} = 35.8 \text{ inches}/909 \text{ mm or } 3 \text{ feet}/0.9 \text{ meters}$$

$$\text{Guide Spacing} = \text{Parallel leg} = 3 \text{ feet}/0.9 \text{ meters}$$

Offset



OFFSET EXAMPLE: 125 feet/38 meters (L) of 6-inch/DN150 Schedule 80 CPVC pipe will be installed at 60°F/16°C and will operate at 150°F/66°C. A piping offset will be used to accommodate the thermal expansion. What are the minimum required dimensions of the piping offset?

First, find ΔT (Change in Temperature)

$$\Delta T = T_2 - T_1$$

$$\Delta T = 150^{\circ}\text{F}/66^{\circ}\text{C} - 60^{\circ}\text{F}/16^{\circ}\text{C}$$

$$\Delta T = 90^{\circ}\text{F}/50^{\circ}\text{C}$$

Reference the tables on pages 51 – 52. These tables list CPVC configuration lengths (£) for $\Delta T = 80^{\circ}\text{F}/44^{\circ}\text{C}$ and $\Delta T = 100^{\circ}\text{F}/56^{\circ}\text{C}$. A conservative approach will use the configuration lengths listed for $\Delta T = 100^{\circ}\text{F}/56^{\circ}\text{C}$. More accurate results can be obtained through linear interpolation.

The $\Delta T = 100^{\circ}\text{F}/56^{\circ}\text{C}$ table lists the minimum required configuration length for the described system as 179 inches/4547 mm or 15 feet/4.6 meters. The offset dimensions are calculated as follows:

$$\text{Perpendicular leg} = 1/2 \times \text{£}$$

$$\text{Perpendicular leg} = 1/2 \times 179 \text{ inches}/4547 \text{ mm}$$

$$\text{Perpendicular leg} = 89.5 \text{ inches}/2273 \text{ mm or } 7.5 \text{ feet}/2.3 \text{ meters}$$

$$\text{Guide Spacing} = 1/4 \times \text{£}$$

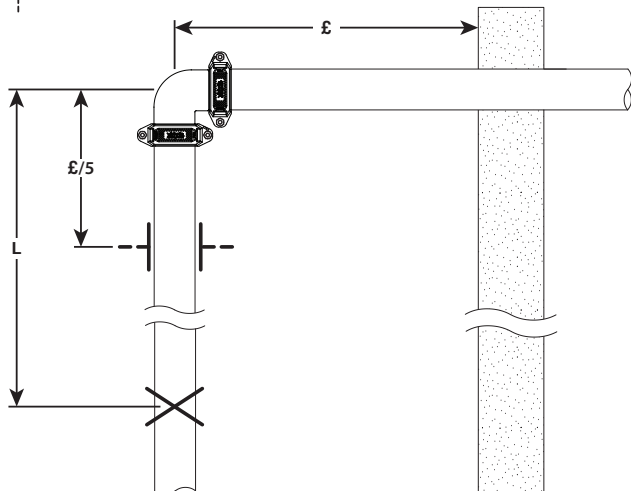
$$\text{Guide Spacing} = 1/4 \times 179 \text{ inches}/4547 \text{ mm}$$

$$\text{Guide Spacing} = 44.8 \text{ inches}/1136 \text{ mm or } 3.7 \text{ feet}/1.1 \text{ meters}$$

Change of Direction

✕ = Pipe Anchor

⊥ = Pipe Guide



CHANGE OF DIRECTION EXAMPLE: 125 feet/38 meters (L) of 6-inch/DN150 Schedule 80 CPVC pipe will be installed at 60°F/16°C and will operate at 150°F/66°C. A piping offset will be used to accommodate the thermal expansion. What are the minimum required dimensions of the change of direction?

First, find ΔT (Change in Temperature)

$$\Delta T = T_2 - T_1$$

$$\Delta T = 150^\circ\text{F}/66^\circ\text{C} - 60^\circ\text{F}/16^\circ\text{C}$$

$$\Delta T = 90^\circ\text{F}/50^\circ\text{C}$$

Reference the tables on pages 51 – 52. These tables list CPVC configuration lengths (ϵ) for $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. A conservative approach will use the configuration lengths listed for $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. More accurate results can be obtained through linear interpolation.

The $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$ table lists the minimum required configuration length for the described system as 179 inches/4547 mm or 15 feet/4.6 meters. The change of direction dimensions are calculated as follows:

Perpendicular leg = ϵ

Perpendicular leg = 179 inches/4547 mm or 15 feet/4.6 meters

Guide Spacing = $1/5 \times \epsilon$

Guide Spacing = $1/5 \times 179$ inches/4547 mm

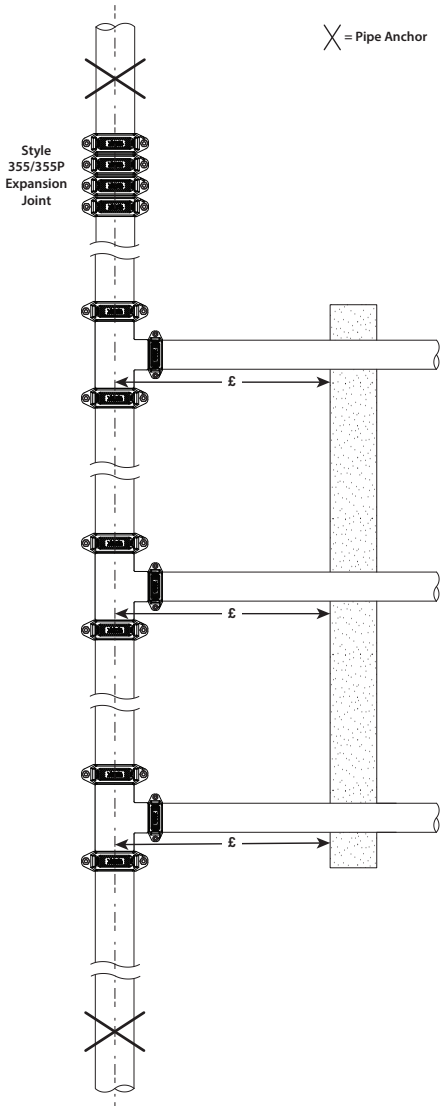
Guide Spacing = 35.8 inches/909 mm or 3 feet/0.9 meters

RISER EXAMPLES

To accommodate thermal expansion and contraction in a CPVC piping riser, Victaulic recommends the use of the Style 355/355P Expansion Joint with placement of anchors at the top and bottom of the riser to direct movement into the expansion joint. Systems with larger amounts of thermal movement can be divided into smaller sections by using intermediate anchors and multiple expansion joints.

Branch lines should be allowed to deflect as the riser piping expands or contracts. The space between the branch line connection and a wall penetration should not be less than the values listed for a specified ΔT , branch line OD, and riser height. The following figures show methods for accommodating thermal movement in a CPVC piping riser.

Riser Example 1



RISER EXAMPLE 1: A 125-foot/38-meter, 8-inch/DN200 Schedule 80 CPVC piping riser will be installed at 60°F/16°C and will operate at 150°F/66°C. The riser will have 4-inch/DN100 branch lines on each floor. An expansion joint will be used to accommodate the movement. How much expansion is expected in the riser? How much space is required between the branch line connections and the first wall penetration? Where should an expansion joint be installed in the riser?

First, find ΔT (Change in Temperature)

$$\Delta T = T_2 - T_1$$

$$\Delta T = 150^\circ\text{F}/66^\circ\text{C} - 60^\circ\text{F}/16^\circ\text{C}$$

$$\Delta T = 90^\circ\text{F}/50^\circ\text{C}$$

Reference to the tables on pages 51 – 52. These tables list CPVC configuration lengths (£) for $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. A conservative approach will use the configuration lengths listed for $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$. More accurate results can be obtained through linear interpolation. The table on page 49 shows that the riser piping will expand 5.55 inches/141 mm at $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$ and $L = 125$ feet/38 meters.

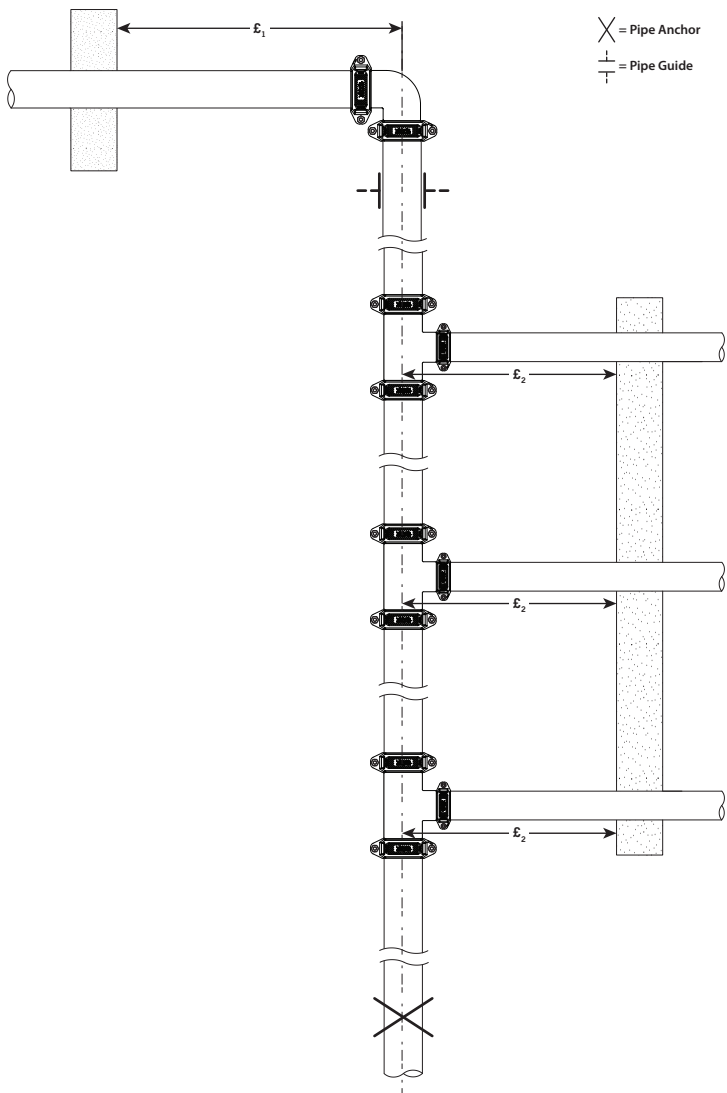
The Victaulic Style 355/355P Expansion Joint accommodates up to 4.75 inches/121 mm maximum of movement. In this application, it would be necessary to install an intermediate anchor halfway up the 125-foot/38-meter riser and utilize two expansion joints to accommodate the full movement.

The table on page 52 lists the minimum required configuration length "£" for 4-inch/DN100 branch lines at $\Delta T = 100^\circ\text{F}/56^\circ\text{C}$ and $L = 125/2 = 62.5$ feet/19 meters as 102 inches/2591 mm or 8.5 feet/2.6 meters, indicating 8.5 feet/2.6 meters of space is required between the branch line connections and the first wall penetration (£2 dimension in the figure on the previous page). This spacing is required to prevent over-stressing the branch lines as the riser expands.*

The riser in the example will be subject to thermal expansion, indicating the expansion joint should be installed at the top of each riser section so that any floor clamps will be able to follow the pipe unimpeded as the pipe grows up and into the joint. Installing the expansion joint in the middle of the riser or at the bottom of the riser will cause a portion of the pipe to grow downward, resulting in any floor clamps to follow the pipe downward into the floor. This can result in stress in the pipe and floor clamp.

***NOTE:** The whole riser length does not need to be considered for each branch line. The branch lines furthest from the expansion joint will experience less movement. In this example, a 4-inch/DN100 branch line installed 20 feet/6 meters up from the bottom anchor requires only 50 inches/1270 mm between the branch line connection and the first wall penetration.

Riser Example 2



RISER EXAMPLE 2: A 60-foot/18-meter, 6-inch/DN150 Schedule 80 CPVC piping riser will be installed at 70°F/21°C and will operate at 150°F/66°C. The riser will have 4-inch/DN100 branch lines on each floor. The movement will be accommodated at the direction change at the top of the riser. How much expansion is expected in the riser? How much space is required between the branch line connections and the first wall penetration? How much space is required at the top of the riser between the elbow and first wall penetration?

First, find ΔT (Change in Temperature)

$$\Delta T = T_2 - T_1$$

$$\Delta T = 150^\circ\text{F}/66^\circ\text{C} - 70^\circ\text{F}/21^\circ\text{C}$$

$$\Delta T = 80^\circ\text{F}/44^\circ\text{C}$$

The table on page 49 shows that the riser piping will expand 2.13 inches/54 mm at $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $L = 60$ feet/18 meters.

The table on page 51 lists the minimum required configuration length "£" for 6-inch/DN150 Schedule 80 CPVC pipe at $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $L = 60$ feet/18 meters as 94 inches/2388 mm or 7.8 feet/2.4 meters, indicating 7.8 feet/2.4 meters of space is required between the top of the riser and the first wall penetration.

The table on page 51 lists the minimum required configuration length "£" for 4-inch/DN100 branch lines at $\Delta T = 80^\circ\text{F}/44^\circ\text{C}$ and $L = 60$ feet/18 meters as 77 inches/1956 mm or 6.4 feet/2.0 meters, indicating 6.4 feet/2.0 meters of space is required between the branch line connections and the first wall penetration.*

***NOTE:** The whole riser length does not need to be considered for each branch line. The branch lines furthest from the expansion joint will experience less movement. In this example, a 4-inch/DN100 branch line installed 20 feet/6 meters up from the bottom anchor requires only 50 inches/1270 mm between the branch line connection and the first wall penetration.

VICTAULIC END CAP INSTALLATION SAFETY INSTRUCTIONS

⚠ WARNING



- Read and understand all instructions before attempting to install, remove, adjust, or maintain the coupling/end cap, any end cap connections, and any other Victaulic piping products.
- Always depressurize and drain the piping system completely before attempting to install, remove, adjust, or maintain the coupling/end cap, any end cap connections, and any other Victaulic piping products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of the coupling/end cap, any end cap connections, and any other Victaulic piping products.
- Under no circumstances should coupling hardware or any other system component be loosened to check if the system is pressurized or to depressurize the system.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

This document provides safety instructions for the installation, use, and removal of Victaulic-manufactured end caps with Victaulic-manufactured couplings in all size ranges and groove profiles, along with other important information that is critical for proper use of Victaulic end caps.

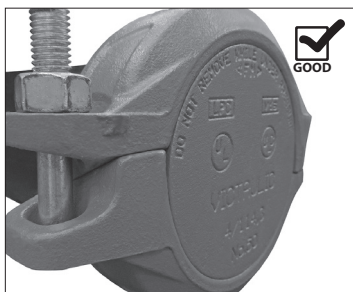
For Installation-Ready™ Couplings, refer to the “NOTICE” on page 64 for important Victaulic end cap marking information.

Always verify that the Victaulic end cap being used is designed for the specific groove profile. For example, the Victaulic No. W60 End Cap shall be used only with Victaulic Advanced Groove System (AGS) products.

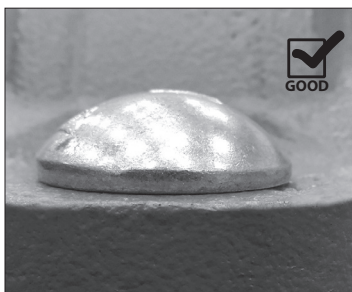
When installing, using, or removing a Victaulic end cap, always reference the specific installation instructions for the Victaulic coupling that is being used with the Victaulic end cap. For the Victaulic No. T-60 Test Caps, always refer to the additional instructions provided with the kit. Installation instructions for couplings and the No. T-60 Test Caps may be downloaded at victaulic.com.



After installation, always inspect the assembly to verify proper installation.

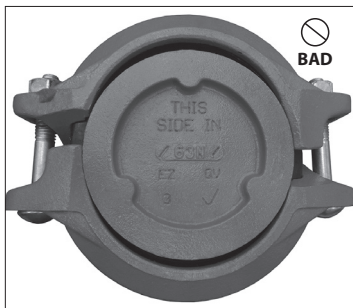


GOOD ASSEMBLY
(END CAP IS SEATED WITHIN THE
COUPLING WITH THE CORRECT SIDE
FACING OUT AND COUPLING BOLT PADS
ARE IN METAL-TO-METAL CONTACT)

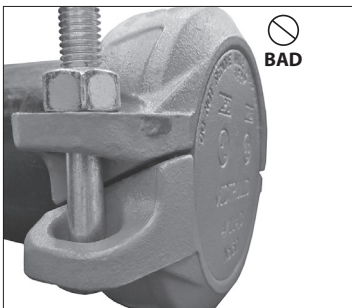


GOOD BOLT ENGAGEMENT
(OVAL NECK OF EACH BOLT
IS SEATED PROPERLY
IN THE BOLT HOLE)

The following conditions are not acceptable and shall be corrected before any system pressure testing occurs.



BAD ASSEMBLY
(INCORRECT SIDE OF END CAP IS
FACING OUT – HARDWARE WILL NOT
BE ABLE TO BE TIGHTENED TO BRING
THE BOLT PADS INTO METAL-TO-METAL
CONTACT)



BAD ASSEMBLY
(BOLT PADS ARE NOT IN
METAL-TO-METAL CONTACT)



BAD BOLT ENGAGEMENT
(OVAL NECK IS NOT SEATED PROPERLY
IN THE BOLT HOLE)

NOTICE

For Installation of Victaulic End Caps with Victaulic Installation-Ready Couplings:

- Victaulic Installation-Ready couplings shall be used with specific types of Victaulic end caps. These end caps are identified by markings that are listed below. Always verify that the proper Victaulic end cap is being used.
- When assembling a Victaulic Installation-Ready coupling onto a Victaulic end cap, verify that the end cap is seated fully against the center leg of the gasket. Always refer to the specific instructions for the Victaulic coupling for full installation requirements. Installation instructions may be downloaded at victaulic.com.

For Victaulic Style 009N Couplings

- Use only Victaulic FireLock™ No. 006 End Caps containing the “EZ” marking on the inside face or Victaulic No. 60 End Caps containing the “EZ QV” marking on the inside face.

For Victaulic Style 607 Couplings

- Use only Victaulic No. 660 End Caps with the “QV” marking on the inside face.

For All Other Styles of Victaulic Installation-Ready Couplings for the Original Groove System (OGS)

- Use only Victaulic No. 60 End Caps containing the “EZ QV” marking on the inside face.

SAFETY INSTRUCTIONS FOR NO. T-60 TEST CAPS OR END CAPS INSTALLED FOR SYSTEM PRESSURE TESTING

- Victaulic end caps that are installed for system pressure testing shall be equipped with a ball valve that can be opened to verify if the system is depressurized.
- The Victaulic No. T-60 Test Cap should be used whenever possible for purposes of system pressure testing. If a Victaulic No. T-60 Test Cap is not available in the applicable size, contact Victaulic about ordering a tapped end cap that the customer can fit with an appropriately-rated ball valve for the system conditions.
Under no circumstances should coupling hardware or any other system component be loosened to check if the system is pressurized or to depressurize the system.
- Before system pressure testing, verify that no valves within the tested system (or portion of the system being tested) are closed in order to prevent pressure from being trapped inadvertently.
- Immediately after completing the system pressure test, the system pressure shall be relieved through an appropriate valve.

NOTICE

- A pressure gauge alone is not an acceptable method of verifying system pressure. Always use a secondary means of verification, such as a second pressure gauge or valve, to confirm that the system is depressurized in accordance with national and local codes and standards for the jobsite.



VICTAULIC END CAP REMOVAL SAFETY INSTRUCTIONS

! WARNING



- **COUPLING/END CAP MAY BE PRESSURIZED.**
- Always depressurize and drain the piping system completely before attempting to install, remove, adjust, or maintain the coupling/end cap, any end cap connections, and any other Victaulic piping products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of the coupling/end cap, any end cap connections, and any other Victaulic piping products.
- Under no circumstances should coupling hardware or any other system component be loosened to check if the system is pressurized or to depressurize the system.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

1. Depressurize and drain the piping system completely, and verify that there is no residual pressure.
2. Loosen the nuts of the coupling slowly and, depending on the orientation of the coupling and end cap, be prepared to support the end cap as it releases from the coupling.

VICTAULIC RECOMMENDS:

- Hydrostatic (water) testing instead of pneumatic (air) testing whenever possible
- Use of a tapped end cap with a pressure-relieving device at each test point location (the No. T-60 Test Cap Kit and made-to-order tapped end caps are available for order through Victaulic)
- Removal of pressure immediately after completing a test (follow all applicable national and local codes and standards for the specific jobsite)
- Lockout/tagout procedures approved by the installing contractor
- Following the testing procedures recommended by technical experts, such as those found in the "Guide to Pressure Testing Safety" published by the Mechanical Contractors Association of America, Inc. (MCAA)

HELPFUL INFORMATION – ENGLISH AND METRIC CONVERSION CHART

The following chart is a guideline for converting English and metric measurements. The English measurements, given throughout this handbook, are the actual values. It is important that accurate metric conversions are made to ensure proper installation of Victaulic products for CPVC/PVC materials.

Convert Imperial (U.S.) to Metric				Convert Metric to Imperial (U.S.)		
25.4	×	inch (in)	↔	millimeter (mm)	×	0.03937
0.3048	×	feet (ft)	↔	meter (m)	×	3.281
0.4536	×	pound mass (lb)	↔	kilogram (kg)	×	2.205
28.35	×	ounce (oz)	↔	gram (g)	×	0.03527
6.894	×	pound per square inch (psi)	↔	kilopascal (kPa)	×	0.145
.069	×	pound per square inch (psi)	↔	Bar (bar)	×	14.5
4.45	×	pound force (lbf)	↔	newton (N)	×	0.2248
1.356	×	pound-foot (lbf-ft)	↔	Newton-meter (N•m)	×	0.738
$(F - 32) \div 1.8$		Fahrenheit (°F)	↔	Celsius (°C)		$(C + 17.78) \times 1.8$
745.7	×	Horsepower (hp)	↔	Watts (W)	×	1.341×10^{-3}
3.785	×	Gal. per Min. (GPM)	↔	Liters per min. (L/min)	×	0.2642
0.0038	×	Gal. per Min. (GPM)	↔	Cubic Meters per min. (m³/min)	×	264.2

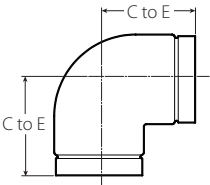
Product Data

NOTICE

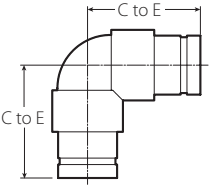
- The following information contains center-to-end, end-to-end, take-out, and similar overall dimensions for couplings, flange adapters, and fittings.
- Always refer to the current Victaulic product publication for the most up-to-date dimensional information and for products not listed in this section. Product publications can be downloaded at victaulic.com.

FITTINGS

No. 350 90° Elbow



Molded



Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/mm
2 DN50	2.375 60.3	5.00 (f) 127
2 ½	2.875 73.0	3.75 95
3 DN80	3.500 88.9	4.25 108
4 DN100	4.500 114.3	5.00 127
6 DN150	6.625 168.3	6.50 165
8 DN200	8.625 219.1	7.75 197
10 DN250	10.750 273.0	13.50 (f) 343
12 DN300	12.750 323.9	15.50 (f) 394

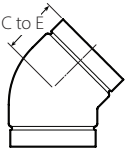
(f) = Fabricated fitting



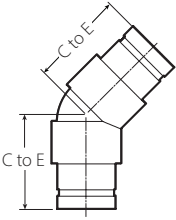
For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

FITTINGS

No. 351 45° Elbow



Molded



Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/mm
2 DN50	2.375 60.3	4.38 (f) 111
2½	2.875 73.0	2.25 57
3 DN80	3.500 88.9	2.50 64
4 DN100	4.500 114.3	3.00 76
6 DN150	6.625 168.3	3.50 89
8 DN200	8.625 219.1	4.25 108
10 DN250	10.750 273.0	10.20 (f) 259
12 DN300	12.750 323.9	11.62 (f) 295

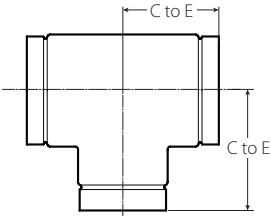
(f) = Fabricated fitting



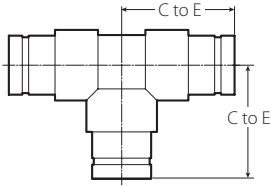
For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

FITTINGS

No. 352 Tee



Molded



Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/mm
2 DN50	2.375 60.3	5.00 (f) 127
2½	2.875 73.0	3.75 95
3 DN80	3.500 88.9	4.25 108
4 DN100	4.500 114.3	5.00 127
6 DN150	6.625 168.3	6.50 165
8 DN200	8.625 219.1	7.75 197
10 DN250	10.750 273.0	13.50 (f) 343
12 DN300	12.750 323.9	15.50 (f) 394

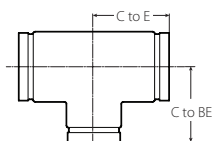
(f) = Fabricated fitting



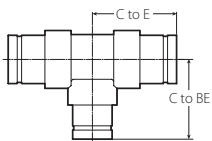
For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

FITTINGS

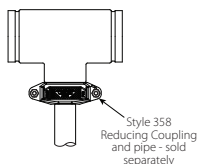
No. 353 Reducing Tee (Groove x Groove x Groove)



Molded



Fabricated



With Reducing Coupling

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/mm	C to BE (Branch) inches/mm
2 1/2 x 2 1/2 x 2 DN50	2.875 x 2.875 x 2.375 73.0 73.0 60.3	Use 2 1/2" No. 352 Tee with 2 1/2" x 2" Style 358/858 Reducing Coupling	
3 x 3 x 2 DN80 DN80 DN50	3.500 x 3.500 x 2.375 88.9 88.9 60.3	Use 3" No. 352 Tee with 3" x 2" Style 358/858 Reducing Coupling	
2 1/2	2.875 73.0	Use 3" No. 352 Tee with 3" x 2 1/2" Style 358/858 Reducing Coupling	
4 x 4 x 2 DN100 DN100 DN50	4.500 x 4.500 x 2.375 114.3 114.3 60.3	Use 4" No. 352 Tee with 4" x 2" Style 358/858 Reducing Coupling	
2 1/2	2.875 73.0	Use 4" No. 352 Tee with 4" x 2 1/2" Style 358/858 Reducing Coupling	
3 DN80	3.500 88.9	Use 4" No. 352 Tee with 4" x 3" Style 358/858 Reducing Coupling	
6 x 6 x 2 DN150 DN150 DN50	6.625 x 6.625 x 2.375 168.3 168.3 60.3	Use 6" x 3" No. 353 Reducing Tee with 3" x 2" Style 358/858 Reducing Coupling	
2 1/2	2.875 73.0	Use 6" x 3" No. 353 Reducing Tee with 3" x 2 1/2" Style 358/858 Reducing Coupling	
3 DN80	3.500 88.9	6.50 165	6.50 165
4 DN100	4.500 114.3	Use 6" No. 352 Tee with 6" x 4" Style 358 Reducing Coupling	
8 x 8 x 4 DN200 DN200 DN100	8.625 x 8.625 x 4.500 219.1 219.1 114.3	7.75 197	7.75 197
6 DN150	6.625 168.3	Use 8" No. 352 Tee with 8" x 6" Style 358/858 Reducing Coupling	
10 x 10 x 4 DN250 DN250 DN100	10.750 x 10.750 x 4.500 273.0 273.0 114.3	Use 10" x 6" No. 353 Reducing Tee with 6" x 4" Style 358/858 Reducing Coupling	
6 DN150	6.625 168.3	13.59 (f) 345	13.83 351
8 DN200	8.625 219.1	Use 10" No. 352 Tee with 10" x 8" Style 358/858 Reducing Coupling	
12 x 12 x 6 DN300 DN300 DN150	12.750 x 12.750 x 6.625 323.9 323.9 168.3	Use 12" x 8" No. 353 Reducing Tee with 8" x 6" Style 358/858 Reducing Coupling	
8 DN200	8.625 219.1	15.57 (f) 396	16.08 408
10 DN250	10.750 273.0	15.57 (f) 396	16.38 416

(f) = Fabricated fitting

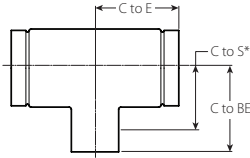


For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

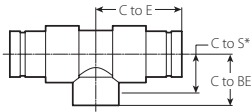


FITTINGS

No. 354 Reducing Tee (Groove x Groove x Socket)



Molded




Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/ mm	C to S* (Socket) inches/ mm	C to BE (Branch) inches/ mm
2 x 2 x 1 DN50 DN50 DN25	2.375 x 2.375 x 1.315 60.3 60.3 33.7	4.50 (f) 114	1.26 32	2.44 62
1 ¼ DN32	1.660 42.4	5.00 (f) 127	1.84 (b) 47	3.11 79
1 ½ DN40	1.900 48.3	4.80 (f) 122	1.29 35	2.69 68
2 DN50	2.375 60.3	5.00 (f) 127	1.32 34	2.82 72
2 ½ x 2 ½ x 1 DN25	2.875 x 2.875 x 1.315 73.0 73.0 33.7	3.75 95	2.91 (b) 74	4.06 103
1 ¼ DN32	1.660 42.4	3.75 95	2.81 (b) 71	4.07 103
1 ½ DN40	1.900 48.3	3.75 95	2.65 (b) 67	4.05 103
2 DN50	2.375 60.3	3.75 95	2.25 57	3.75 95
3 x 3 x 1 DN80 DN80 DN25	3.500 x 3.500 x 1.315 88.9 88.9 33.7	4.25 108	3.41 (b) 87	4.56 116
1 ¼ DN32	1.660 42.4	4.25 108	3.31 (b) 84	4.57 116
1 ½ DN40	1.900 48.3	4.25 108	3.15 (b) 80	4.55 116
2 DN50	2.375 60.3	4.25 108	2.75 70	4.25 108
4 x 4 x 1 DN100 DN100 DN25	4.500 x 4.500 x 1.315 114.3 114.3 33.7	5.00 127	4.16 (b) 106	5.31 135
1 ¼ DN32	1.660 42.4	5.00 127	4.06 (b) 106	5.32 135
1 ½ DN40	1.900 48.3	5.00 127	3.90 (b) 99	5.30 135
2 DN50	2.375 60.3	5.00 127	3.50 89	5.00 127

(f) = Fabricated fitting

(b) = Bushing

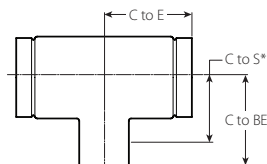
* C to S is the distance from the center to the branch end, minus the socket depth
All socket sizes are supplied to NPS dimensions

 For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

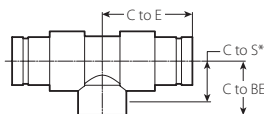


FITTINGS

No. 354 Reducing Tee (Groove x Groove x Socket)



Molded



Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	C to E inches/ mm	C to S* (Socket) inches/ mm	C to BE (Branch) inches/ mm
6 x 6 x 1 DN150 DN150 DN25	6.625 x 6.625 x 1.315 168.3 168.3 33.7	6.50 165	5.66 (b) 144	6.81 173
1 ¼ DN32	1.660 42.4	6.50 165	5.56 (b) 141	6.82 173
1 ½ DN40	1.900 48.3	6.50 165	5.40 (b) 137	6.80 173
2 DN50	2.375 60.3	6.50 165	5.00 127	6.50 165
8 x 8 x 1 DN200 DN200 DN25	8.625 x 8.625 x 1.315 219.1 219.1 33.7	7.75 197	6.91 (b) 176	8.06 205
1 ¼ DN32	1.660 42.4	7.75 197	6.81 (b) 173	8.07 205
1 ½ DN40	1.900 48.3	7.75 197	6.65 (b) 169	8.05 204
2 DN50	2.375 60.3	7.75 197	6.25 159	7.75 197
10 x 10 x 2 DN250 DN250 DN50	10.750 x 10.750 x 2.375 273.0 273.0 60.3	13.56 (f) 344	10.75 273	12.00 305
12 x 12 x 2 DN300 DN300 DN50	12.750 x 12.750 x 2.375 323.9 323.9 60.3	14.63 (f) 372	11.75 298	13.25 337

(f) = Fabricated fitting

(b) = Bushing

* C to S is the distance from the center to the branch end, minus the socket depth
All socket sizes are supplied to NPS dimensions

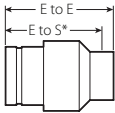
Style 358 Reducing Couplings can be used to create additional fitting configurations not shown here. Consideration shall be given when conducting system designs. Contact Victaulic for more information.



For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

FITTINGS

No. 361 Reducing Adapter (Groove x Socket)




Fabricated

Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	E to E (End to End) inches/mm	E to S* (End to Socket) inches/mm
2½ x 2 DN50	2.875 x 2.375	6.28 (f)	4.66
	73.0 60.3	160	118
3 x 2 DN80 DN50	3.500 x 2.375	5.87 (f)	4.40
	88.9 60.3	149	112

(f) = Fabricated fitting

* E to S is the distance from end to end, minus the socket depth

All socket sizes are supplied to NPS dimensions

 For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

FLANGE ADAPTER

No. 359F Flange Adapter (Groove x Flange)



Nominal Fitting Size inches/DN	Actual Pipe Outside Diameter inches/mm	E to E (End to End) inches/mm
2 DN50	2.375 60.3	4.00 (f) 102
2½	2.875 73.0	4.25 (f) 108
3 DN80	3.500 88.9	4.50 (f) 114
4 DN100	4.500 114.3	5.13 (f) 130
6 DN150	6.625 168.3	6.00 (f) 152
8 DN200	8.625 219.1	7.00 (f) 178
10 DN250	10.750 273.0	8.38 (f) 213
12 DN300	12.750 323.9	9.25 (f) 235

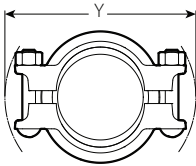
(f) = Fabricated fitting



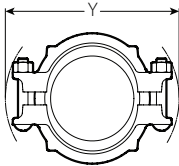
For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

COUPLINGS

Style 356 and 856 Installation-Ready™ Transition Coupling Style 357 and 857 Installation-Ready™ Rigid Coupling



Style 356/856
Pre-Assembled



Style 357/857
Pre-Assembled

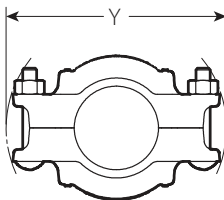
Nominal Coupling Size inches/DN	Actual Pipe Outside Diameter inches/mm	“Y” Dimension – inches/mm	
		356/856	357/857
2 DN50	2.375 60.3	5.61 142	5.73 146
2 ½	2.875 73.0	6.23 158	6.23 158
3 DN80	3.500 88.9	7.31 186	7.31 186
4 DN100	4.500 114.3	8.69 221	8.75 222
6 DN150	6.625 168.3	10.69 272	10.71 272
8 DN200	8.625 219.1	14.39 366	14.06 357
10 DN250	10.750 273.0	16.91 430	16.94 430
12 DN300	12.750 323.9	18.75 476	18.79 477



For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

COUPLINGS

Style 358/858 Reducing Coupling



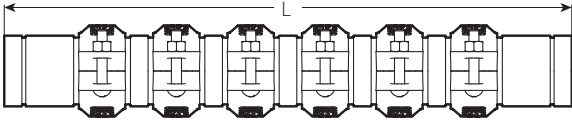
Nominal Coupling Size inches/DN	Actual Pipe Outside Diameter inches/mm	“Y” Dimension – inches/mm	
		358/858	
2½ x 2 DN50	2.875 x 2.375 73.0 x 60.3	5.05 128	
3 x 2 DN80 DN50	3.500 x 2.375 88.9 x 60.3	7.17 182	
		2½ 2.875 73.0 7.13 181	
4 x 2 DN100 DN50	4.500 x 2.375 114.3 x 60.3	8.50 216	
		2½ 2.875 73.0 8.50 216	
		3 3.500 88.9 8.50 216	
		DN80	
6 x 4 DN150 DN100	6.625 x 4.500 168.3 x 114.3	10.94 278	
8 x 6 DN200 DN150	8.625 x 6.625 219.1 x 168.3	14.16 360	
10 x 8 DN250 DN200	10.750 x 8.625 273.0 x 219.1	16.76 426	



For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.

EXPANSION JOINT

Style 355/355P Expansion Joint

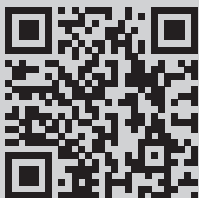


Nominal Exp. Joint Size inches/ DN	Actual Pipe Out. Dia. inches/ mm	Coupling Style Number	Rated Mvmt.* inches/ mm	Length "L"		
				Compressed inches/mm	Neutral inches/mm	Expanded inches/mm
2 DN50	2.375 60.3	357 857	0.35 8.9	9.17 ± 0.07 233 ± 1.8	9.41 ± 0.08 239 ± 2.1	9.69 ± 0.06 246 ± 1.6
			4.75 120.7	44.05 ± 0.63 1119 ± 16.1	46.97 ± 0.76 1193 ± 19.4	50.24 ± 0.54 1276 ± 13.6
2½	2.875 73.0	357 857	0.35 8.9	9.17 ± 0.07 232.9 ± 1.8	9.38 ± 0.08 238.2 ± 2.1	9.62 ± 0.06 244.3 ± 1.6
			4.75 120.7	44.05 ± 0.63 1118.9 ± 16.1	46.55 ± 0.76 1182.3 ± 19.4	49.40 ± 0.54 1254.9 ± 13.6
3 DN80	3.5 88.9	357 857	0.35 8.9	9.17 ± 0.07 233 ± 1.8	9.41 ± 0.08 239 ± 2.1	9.69 ± 0.06 246 ± 1.6
			4.75 120.7	44.05 ± 0.63 1119 ± 16.1	46.97 ± 0.76 1193 ± 19.4	50.24 ± 0.54 1276 ± 13.6
4 DN100	4.5 114.3	357 857	0.35 8.9	11.22 ± 0.07 285 ± 1.8	11.46 ± 0.08 291 ± 2.1	11.74 ± 0.06 298 ± 1.6
			4.75 120.7	46.63 ± 0.63 1184 ± 16.1	49.54 ± 0.76 1258 ± 19.4	52.82 ± 0.54 1342 ± 13.6
6 DN150	6.625 168.3	357 857	0.35 8.9	13.22 ± 0.08 336 ± 1.9	13.47 ± 0.08 342 ± 2.1	13.74 ± 0.06 349 ± 1.6
			4.75 120.7	48.68 ± 0.68 1236 ± 17.3	51.59 ± 0.76 1310 ± 19.4	54.82 ± 0.54 1392 ± 13.6
8 DN200	8.625 219.1	357 857	0.35 8.9	13.23 ± 0.08 336 ± 1.9	13.47 ± 0.08 342 ± 2.1	13.74 ± 0.06 349 ± 1.6
			4.75 120.7	48.77 ± 0.68 1239 ± 17.3	51.69 ± 0.76 1313 ± 19.4	54.92 ± 0.54 1395 ± 13.6
10 DN250	10.75 273.0	357 857	0.35 8.9	13.23 ± 0.08 336 ± 1.9	13.47 ± 0.08 342 ± 2.1	13.74 ± 0.06 349 ± 1.6
			4.75 120.7	48.77 ± 0.68 1239 ± 17.3	51.69 ± 0.76 1313 ± 19.4	54.92 ± 0.54 1395 ± 13.6
12 DN300	12.75 323.9	357 857	0.35 8.9	13.23 ± 0.08 336 ± 1.9	13.47 ± 0.08 342 ± 2.1	13.74 ± 0.06 349 ± 1.6
			4.75 120.7	48.77 ± 0.68 1239 ± 17.3	51.69 ± 0.76 1313 ± 19.4	54.92 ± 0.54 1395 ± 13.6

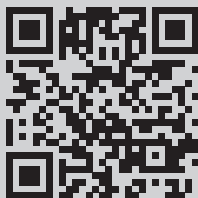
* The 0.35-inch/8.9-mm rated movement is the minimum movement (one coupling). The 4.75-inch/120.7-mm rated movement is the maximum movement (12 couplings). For additional movement ratings, refer to Victaulic publication 33.05.

 For the most up-to-date dimensional information, always refer to the current Victaulic product publication, which can be downloaded at victaulic.com.





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U.S./World Headquarters

4901 Kesslersville Road
Easton, PA 18040 USA

EMEA

Prijskelstraat 36
9810 Nazareth, Belgium

Asia Pacific

Unit 808, Building B
Hongwell International Plaza
No.1602 West Zhongshan Road
Shanghai, China 200235

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