Victaulic® FireLock™ Installation-Ready™ Fittings No. 101 (90° Elbow) and No. 103 (45° Elbow)

⚠ WARNING

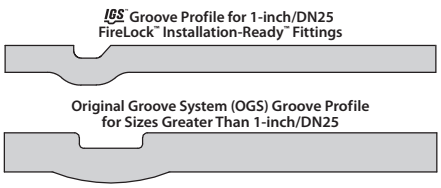
- **Read and understand all instructions before attempting to install any Victaulic products.**
- **Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Confirm that any 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, and foot protection.**

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

- **No. 101 and 103 Victaulic® FireLock™ Installation-Ready™ Fittings shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13D, 13R, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.**
- **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.**

Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

IMPORTANT INFORMATION

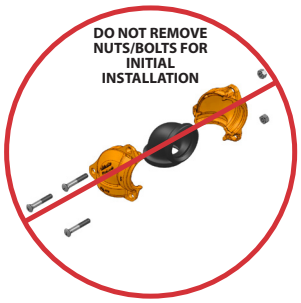


Pipe and grooves are not shown to scale

FireLock™ Installation-Ready™ Fittings in the 1-inch/DN25 size shall be used **ONLY** with mating components that are prepared to Victaulic IGS proprietary groove specifications. **DO NOT** attempt to install 1-inch/DN25 FireLock™ Installation-Ready™ Fittings on mating components that are prepared to any other groove specification.

FireLock™ Installation-Ready™ Fittings in sizes greater than 1-inch/DN25 shall be used ONLY with mating components that are prepared to Victaulic OGS groove specifications. **DO NOT** attempt to install sizes greater than 1-inch/DN25 on mating components that are prepared to any other groove specification.

NO. 101/103 INSTALLATION METHOD 1



1. DO NOT DISASSEMBLE THE FITTING FOR INITIAL INSTALLATION: Victaulic® FireLock™ No. 101 and 103 Installation-Ready™ Fittings 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 fitting.

2. CHECK MATING COMPONENT ENDS: The outside surface of the mating components, between the groove and the mating component ends, 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 mating components' outside diameter ("OD"), groove dimensions, and maximum allowable flare diameter shall be within the tolerances published in current Victaulic grooving specifications (publication 25.14 for 1-inch/DN25 IGS and publication 25.01 for 1 ¼-inch/DN32 and larger OGS), 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. **Refer to the "NOTICE" on the following page for important gasket information. For complete compatibility information, reference Victaulic publications 05.01 and GSG-100, which can be downloaded at victaulic.com.**

⚠ CAUTION

- **If any conditions listed in the "NOTICE" below are met, a thin coat of a compatible 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.**

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

3a. If any conditions listed in the "NOTICE" below are met, apply a thin coat of a compatible lubricant only to the gasket sealing lips. Refer to the "Lubricant Compatibility for Gaskets" table below.

Lubricant Compatibility for Gaskets

The following recommendations are for the gasket materials listed. Commercial lubricants may contain multiple ingredients. Always refer to the lubricant manufacturer's recommendations for material compatibility.

	Victaulic Lubricant*	Soap-Based Solutions	Glycerin	Silicone Grease	Silicone Spray	Corn Oil	Soybean Oil	Hydrocarbon-Based Oils	Petroleum-Based Greases
Compatible with EPDM Gaskets?	Yes*	Yes	Yes	Yes	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended

*Victaulic Lubricant shall not be mixed with Poly Olester (POE) Oil during installation.

NOTICE

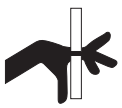
- **Gaskets for No. 101 and 103 Fittings are pre-lubricated. Additional lubrication is not required for the initial installation of wet pipe systems that are installed at or continuously operating above 0°F/–18°C.**

Supplemental lubrication is required only if any of the following conditions exist. Apply a thin coat of a compatible lubricant to the gasket sealing lips, as noted in step 3a on this page. It is not necessary to remove the gasket from the housings to apply additional lubricant to the gasket sealing lips.

- **If the installation or continuous operating temperature is below 0°F/–18°C**
- **If the gasket has been exposed to fluids prior to installation**
- **If the surface of the gasket has a dark black or shiny appearance**
- **If the gasket is being installed into a dry pipe system**
- **If the system will be subjected to air tests prior to being filled with water**
- **If the gasket was involved in a previous installation**

Lubricated gaskets will not enhance sealing capabilities on adverse mating component conditions. Mating component condition and preparation shall conform to the requirements listed in these product installation instructions (refer to step 2 on the previous page).

⚠ WARNING



- **Never leave a No. 101 or 103 Fitting partially assembled on mating component ends. ALWAYS TIGHTEN THE HARDWARE IMMEDIATELY, IN ACCORDANCE WITH THESE INSTRUCTIONS. A partially assembled fitting 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 fitting when attempting to insert grooved mating component ends into the fitting.**
- **Keep hands away from fitting openings during tightening.**

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

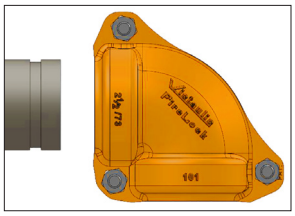
IMPORTANT INFORMATION FOR USE OF NO. 101 AND 103 FITTINGS WITH END CAPS:

⚠ WARNING

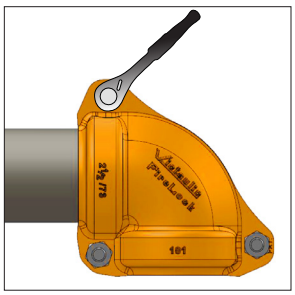
- **Always read and follow the I-ENDCAP instructions, which can be downloaded at victaulic.com.**

Failure to follow the I-ENDCAP instructions could result in death or serious personal injury and property damage.

- When assembling No. 101 or No. 103 Fittings onto end caps, take additional time to inspect and verify that the end cap is seated fully against the pipe stop of the gasket.
- For the 1-inch/DN25 size, use only No. 146 FireLock™ IGS™ End Caps containing the "PG" marking. No. 006 and No. 60 Ends Caps in the 1-inch/DN25 size SHALL NOT be used.
- For 1 ¼-inch/DN32 and larger sizes, use only Victaulic FireLock™ No. 006 End Caps containing the "EZ" marking on the inside face or Victaulic End Caps containing the "QV" or "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.



4a. INSERT FIRST MATING COMPONENT END: Assemble the joint by inserting a grooved mating component end into one opening of the fitting. The grooved mating component end shall be inserted into the fitting until contact with the pipe stop of the gasket occurs. A visual check is required to verify that the fitting's keys align with the groove in the mating component end.



4b. TIGHTEN NUT AT FIRST OUTSIDE LOCATION: Using an impact tool or standard socket wrench with a deep-well socket, tighten the nut at the first outside location until the fitting is secured safely to the pipe, but do not tighten past initial metal-to-metal bolt pad contact. Verify that the fitting's keys engage the groove completely and that the oval neck of the bolt seats properly in the bolt hole. Refer to the "Impact Tool Usage Guidelines" and "Impact Tool Selection" sections, along with the "Helpful Information" table on the following page.

OVAL NECK OF BOLT SEATED PROPERLY

OVAL NECK OF BOLT NOT SEATED PROPERLY

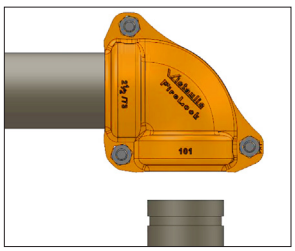
NOTICE

- **Never force installation. Mating components should insert easily into the fitting.**
- **If experiencing difficulty inserting mating components, verify that the gasket is lubricated and seated properly within the housings, that the mating component dimensions and grooves are within Victaulic specifications, and that the hardware is loose enough to accommodate mating component insertion.**

⚠ WARNING

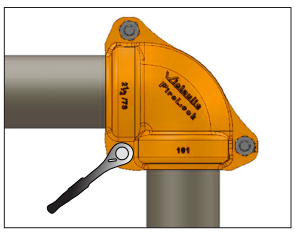
- **At this point, the fitting is only partially installed.**
- **The fitting shall be treated as a potential drop hazard and shall not be left unattended.**

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

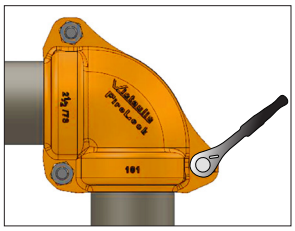


5a. INSERT SECOND MATING COMPONENT END: Insert the second grooved mating component end into the second opening of the fitting. The grooved mating component end shall be inserted into the fitting until contact with the pipe stop of the gasket occurs. A visual check is required to verify that the fitting's keys align with the groove in the mating component end.

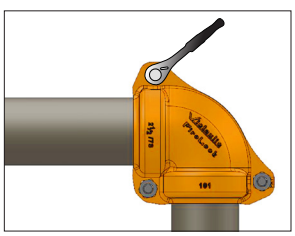
NOTE: If the mating component cannot be inserted into the fitting, incrementally loosen the nut that was tightened in step 4b just until the mating component is inserted (refer to the warning above).



5b. COMPLETELY TIGHTEN NUT AT INSIDE LOCATION: Completely tighten the nut at the inside location until metal-to-metal contact occurs at the bolt pads. Verify that the fitting's keys still engage the grooves completely and that the oval neck of the bolt seats properly in the bolt hole.



6. COMPLETELY TIGHTEN NUT AT SECOND OUTSIDE LOCATION: Completely tighten the nut at the second outside location until metal-to-metal contact occurs at the bolt pads. Verify that the fitting's keys still engage the grooves completely and that the oval neck of the bolt seats properly in the bolt hole.



7. COMPLETELY TIGHTEN NUT AT FIRST OUTSIDE LOCATION: Go back and completely tighten the nut at the first outside location to confirm metal-to-metal contact at the bolt pads.

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 fitting assembly shall be replaced immediately.** Refer to the "Impact Tool Usage Guidelines" and "Impact Tool Selection" sections, along with the "Helpful Information" table on the following page.

HELPFUL INFORMATION

Nominal Pipe Size inches/DN	Actual Pipe Outside Diameter inches/mm	Nut Size inches/Metric	Deep-Well Socket Size inches/mm	Maximum Allowable Bolt Torque*
1 DN25	1.315 33.7	⅜ M10	11⁄16 17	55 ft-lbs 75 N•m
1 ¼ DN32	1.660 42.1	⅜ M10	11⁄16 17	55 ft-lbs 75 N•m
1 ½ DN40	1.900 48.3	⅜ M10	11⁄16 17	55 ft-lbs 75 N•m
2 DN50	2.375 60.3	7⁄16 M11	11⁄16 17	100 ft-lbs 136 N•m
2 ½	2.875 73.0	7⁄16 M11	11⁄16 17	100 ft-lbs 136 N•m
DN65	3.000 76.1	7⁄16 M11	11⁄16 17	100 ft-lbs 136 N•m

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

⚠ WARNING

Nuts shall be tightened in the sequence shown on the previous page until metal-to-metal contact occurs at the bolt pads.

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

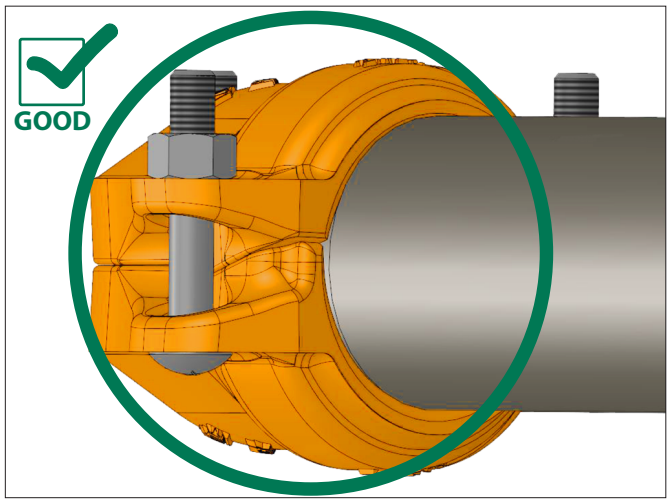
- **Excessive bolt torque required to assemble the joint (incomplete assembly)**
- **Damage to the assembled joint (damaged or broken bolt pads or fractures to housings)**
- **Bolt damage or fracture**
- **Joint leakage and property damage**
- **A negative impact on system integrity**
- **Personal injury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

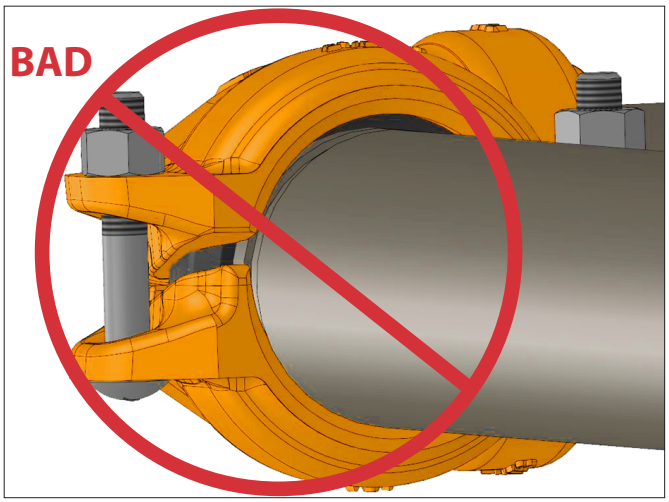
DO NOT continue to tighten the nuts after the visual, metal-to-metal bolt pad inspection requirement is achieved.

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

NOTICE

- **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, along with the "Helpful Information" table on this page.**





8. REQUIRED INSPECTION TECHNIQUE – VISUAL INSPECTION: VERIFY THAT ALL NUTS ARE TIGHTENED APPROPRIATELY AND THAT METAL-TO-METAL CONTACT IS ACHIEVED AT ALL BOLT PADS. Visually inspect all bolt pads at each joint to verify metal-to-metal contact with positive or neutral offsets at the angled bolt pads and metal-to-metal contact at the flat bolt pads. If the bolt pads do not reach metal-to-metal contact, loosen the nuts at the angled bolt pads, then retighten all nuts evenly by alternating bolt pad locations. If the bolt pads still do not reach metal-to-metal contact, remove the fitting from the mating component ends and verify that the mating components' outside diameter ("OD"), groove dimensions, and maximum allowable flare diameter are within Victaulic specifications for the applicable groove profile (publication 25.14 for 1-inch/DN25 IGS and publication 25.01 for 1 ¼-inch/DN32 and larger OGS, which can be downloaded at victaulic.com). **NOTE:** Before pressurizing the system, the fitting may be adjusted by loosening the appropriate hardware. After repositioning the fitting, the hardware shall be retightened until the installation requirements listed in these instructions are achieved.

⚠ 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.

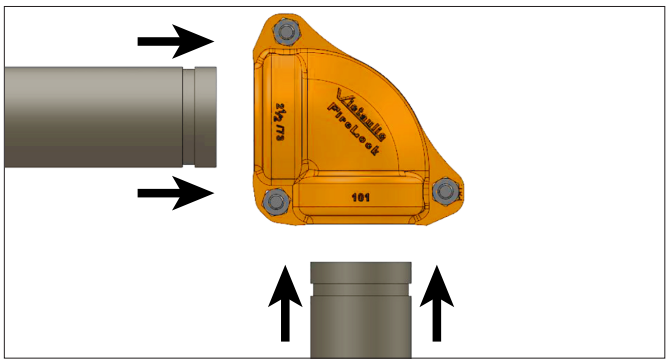
8a. INSPECTION TECHNIQUE – TORQUE WRENCH METHOD:
If additional fitting assembly inspection is determined to be necessary by others, a torque wrench method may be used.

NOTE: Satisfying step 8 is first required before proceeding with the torque wrench method. The suggested bolt torque range for an assembled fitting that satisfies the visual inspection requirements of step 8 shall be as follows:

Bolt Size inches/Metric	Minimum Assembled Bolt Torque*	Maximum Assembled Bolt Torque
⅜ M10	20 ft-lbs 27 N•m	55 ft-lbs 75 N•m
7/16 M11	25 ft-lbs 34 N•m	80 ft-lbs 108 N•m

* LPCB compliant assemblies shall meet the Minimum Assembled Bolt Torque, as noted in the table above.

NO. 101/103 INSTALLATION METHOD 2



1. Verify that all steps on pages 1 – 2 have been followed.

2. When practical, both grooved mating component ends may be inserted into the fitting prior to tightening. Verify that the mating component ends are inserted into the fitting until contact with the pipe stop of the gasket occurs. A visual check is required to verify that the fitting's keys align with the grooves in the mating component ends. The hardware shall be tightened evenly by alternating bolt pad locations until the installation requirements listed in these instructions are achieved.

3. Before pressurizing the system, the fitting may be adjusted by loosening the appropriate hardware. After repositioning the fitting, the hardware shall be retightened until the installation requirements listed in these instructions are achieved.

REMOVAL OF A NO. 101 OR 103 FITTING FROM THE PIPING SYSTEM

⚠ WARNING

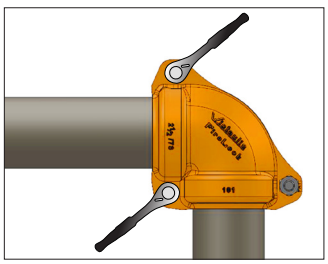
- **Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Never leave a No. 101 or 103 Fitting partially assembled on mating component ends. A partially assembled fitting poses a drop or fall hazard.**

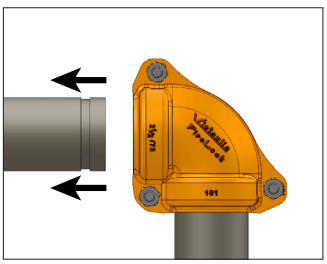
Failure to follow these instructions could result in death or serious personal injury and property damage.

NOTICE

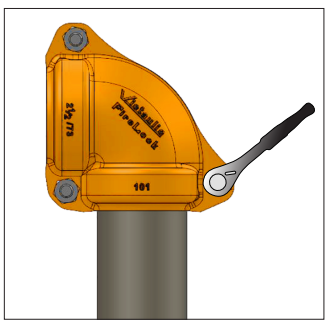
- **No. 101 and No. 103 Fittings DO NOT need to be fully disassembled for removal.**

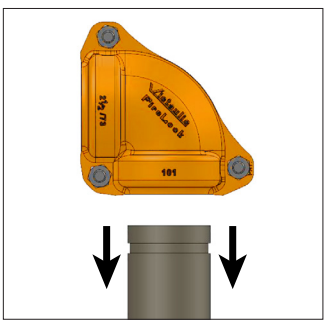
1. Verify that the system is depressurized and drained completely before attempting to remove any fittings from the piping system.





2. Loosen the nuts only on the outside and inside locations of the fitting end where the first mating component is to be removed (nuts should be threaded no further than flush with the end of the bolts). Remove the mating component from the loosened side. Verify that the fitting is secured to the other mating component to prevent the fitting from falling.





3. While supporting the fitting, loosen the nut at the second outside location. Carefully remove the fitting from the mating component.

4. Inspect all components for any damage or wear, including tears in gasket lips, deformities in gasket lips, or pinched sections at the bolt pad locations. If any damage or wear is present, use a new Victaulic-supplied fitting assembly.

5a. After inspection of the fitting, if it is determined that the fitting can be reused in its current condition, follow all steps of the applicable installation method section.

5b. If the fitting is fully disassembled for any reason, refer to the reassembly instructions on the following page.

REASSEMBLY OF A NO. 101 OR 103 FITTING THAT WAS FULLY DISASSEMBLED DURING REMOVAL FROM THE PIPING SYSTEM

NOTICE

- **No. 101 and 103 Fittings DO NOT need to be fully disassembled for removal. However, if a fitting is fully disassembled during maintenance or for any other reason, the following steps shall be completed.**
- **The fitting shall be reassembled, as shown in the steps below, before attempting to reinstall the product.**

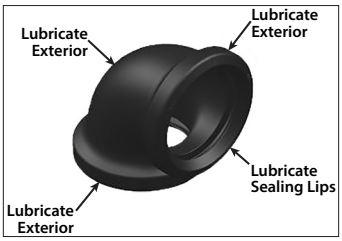
1. Inspect all components for any damage or wear. If any damage or wear is present, use a new Victaulic-supplied fitting assembly.

2. Check mating component ends, as described in step 2 on page 1.

⚠ CAUTION

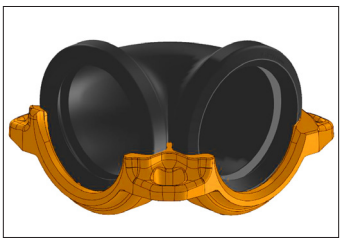
- **A thin coat of a compatible lubricant shall be used to help prevent the gasket from pinching, rolling, or tearing during reassembly.**
- **DO NOT use excessive lubricant on the gasket sealing lips and exterior.**

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

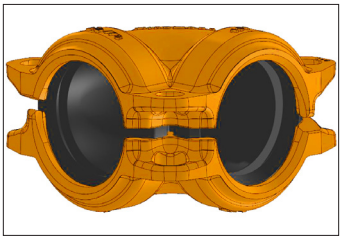


3a. VERIFY THAT THE CORRECT-SIZE GASKET IS BEING USED FOR REASSEMBLY.

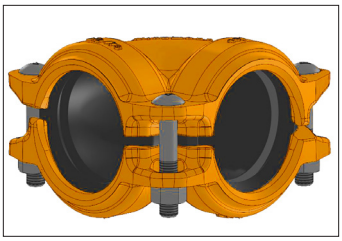
3b. FOR REASSEMBLY OF NO. 101 AND 103 FITTINGS, LUBRICATE GASKET: Apply a thin coat of a compatible lubricant to the gasket sealing lips and exterior, as shown to the left. Refer to the "Lubricant Compatibility for Gaskets" table on page 2.



4. INSTALL GASKET INTO FIRST FITTING HOUSING: Install the gasket into one of the housings. Verify that the ends of the gasket are seated in the housing's pockets, as shown to the left.



5. INSTALL SECOND FITTING HOUSING: Install the second fitting housing. Verify that the ends of the gasket are seated in the housings' pockets.



6. INSTALL BOLTS AND NUTS: Install the bolts, and thread a nut onto each bolt. **NOTE:** Verify that the oval neck of each bolt seats properly in the bolt hole. DO NOT tighten the nuts completely. The bolt pads need to be set at a gap for reinstallation of the fitting. Two to three full bolt threads, exposed above each nut, will provide the proper gap.

7. Follow all steps of the applicable installation method section to complete the assembly.

IMPACT TOOL USAGE GUIDELINES

NOTICE

- **These guidelines are for couplings that require metal-to-metal bolt pad contact without a specified assembly torque.**
- **These guidelines are for non-lubricated, zinc-electroplated carbon steel hardware only.**
- **These guidelines are for products used on metallic piping only.**

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 this 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 Victaulic installation instructions. Scan the QR code provided for a listing of product installation instructions that can be downloaded on victaulic.com.

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. **For angled-bolt-pad couplings:** Equal and positive or neutral offsets shall be present at the angled bolt pads.

During the installation process, the installation torque shall not exceed the "Maximum Allowable Bolt Torque" values specified in the table on this 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.
- **Over-shifting of the angled bolt pad –** Over-shifting of an angled bolt pad results in an offset that prevents metal-to-metal contact and equal and positive or neutral offset at the opposite angled bolt pad. This occurs when the hardware is not tightened evenly by alternating sides. Attempting to tighten the hardware on one side while the other side is over-shifted is improper installation and will result in bolt torque that exceeds the "Maximum Allowable Bolt Torque" values specified in the table on this page. Continuing to tighten the hardware in an attempt to achieve metal-to-metal bolt pad contact at the other bolt pad will cause joint failure, resulting in property damage, serious personal injury, or death. For over-shifted couplings, the hardware for the angled bolt pads shall be loosened and then re-tightened to achieve equal and positive or neutral offsets at both angled bolt pads.
- **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 this 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 Victaulic installation instructions –** 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	
5/16	–	15 ft-lbs 20 N•m
3/8†	M10	55 ft-lbs 75 N•m
7/16‡	M11	100 ft-lbs 136 N•m
1/2	M12	135 ft-lbs 183 N•m

Bolt/Nut Size		Maximum Allowable Bolt Torque*
inches	Metric	
5/8	M16	235 ft-lbs 319 N•m
3/4	M20	425 ft-lbs 576 N•m
7/8	M22	675 ft-lbs 915 N•m
1	M24	875 ft-lbs 1186 N•m

*Maximum allowable bolt torque values have been derived from actual test data
†For LPCB and VdS Certification for 3/8"/M10 bolts, the bolt torque is 55 ft-lbs/75 N•m.
‡For LPCB and VdS Certification for 7/16"/M11 bolts, the bolt torque is 75 ft-lbs/102 N•m.

Continued on the following page

Victaulic® FireLock™ Installation-Ready™ Fittings No. 101 (90° Elbow) and No. 103 (45° Elbow)

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 on the previous page.

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 on the previous page.

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**