

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.
- **FOR ADVANCED GROOVE SYSTEM (AGS) PRODUCTS, REFER TO THE I-W100 FIELD INSTALLATION HANDBOOK FOR “IMPACT WRENCH USAGE,” “IMPACT WRENCH SELECTION,” AND “TORQUE WRENCH SELECTION” REQUIREMENTS. THE I-W100 CAN BE DOWNLOADED AT VICTAULIC.COM.**

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 product installation instructions in this handbook.

Continue to tighten the nut(s) until the visual inspection requirements, listed in the applicable product installation instructions in this handbook, 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 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 page 60.
- **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 the following 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 section.

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 009N, 101, 102, 103, 104, 108, 109, and 118 FireLock™ Products Only:**

For LPCB and VdS Certification for 3/8"/M10 bolts, the bolt torque is 55 ft-lbs/75 N•m.

‡ **For 009N, 101, 102, 103, 104, and 109 FireLock™ Products Only:**

For LPCB and VdS Certification for 7/16"/M11 bolts, the bolt torque is 75 ft-lbs/102 N•m.

§ **Style 107V QuickVic™ Installation-Ready™ Rigid Couplings Only:**

These bolt sizes are pre-lubricated. Reference the table on page 97 for the maximum allowable bolt torques for these bolt/nut sizes.

Continued on the following page



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

TORQUE WRENCH SELECTION

For products that have a required assembly torque, a torque wrench shall be selected with a range that is in accordance with the required bolt torque specified in the respective instructions in this handbook. The selected torque wrench shall be certified and calibrated in accordance with a recognized national standard. Always refer to the instructions supplied with the torque wrench for proper usage and selection of desired torque value.

REQUIRED TOOLS AND SUPPLIES FOR INSTALLATION

Confirm that the correct quantity of applicable hardware and housings has been supplied for the connection being made. Inspect gasket size, gasket material grade, and hardware size to verify suitability for the intended service.

The following tools and supplies are required for all coupling and flange adapter installations.

- PPE Required by Jobsite (hardhat, leather gloves, safety glasses, steel-toe shoes)
- Victaulic Lubricant or Other Compatible Lubricant
- Appropriate Bolt Thread Lubricant (Where Noted in Specific Product Instructions)
- Brushes for Lubrication (Where Noted in Specific Product Instructions)
- Deep-Well Sockets
- Long-Handle Ratchet Wrench or Impact Tool
- Torque Wrench (Where Noted in Specific Product Instructions)
- Towels
- Water Bottle (for misting lubricated gaskets in hot environments, as needed)

Standard Couplings for OGS Grooved- End Mating Components

**Preparatory Steps for
Installation of Couplings
Featured in this Section**

Installation Instructions

Instructions for Reassembly

PREPARATORY STEPS FOR INSTALLATION OF COUPLINGS FEATURED IN THIS SECTION

! 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.

! WARNING

OGS Roll Groove Profile Shown



Pipe and groove are not shown to scale

- Products featured in this section shall be used **ONLY** with mating components that are prepared to Victaulic OGS groove specifications.

- **DO NOT** attempt to install these products on mating components that are prepared to any other groove specification.

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



1. 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. Always verify that the correct groove profile is being used.

The mating components' outside diameter ("OD"), groove dimensions, and maximum allowable flare diameter shall be within the tolerances listed in this handbook for Victaulic OGS groove specifications.

NOTICE

- Some Victaulic® FireLock™ products may be provided with pre-lubricated gaskets.
- Refer to the "NOTICE" and the "Dry Pipe Fire Protection Systems Notes" section on page 36 for additional information.

2. CHECK GASKET: Check the gasket to verify that it is suitable for the intended service. The color code identifies the material grade. Refer to page 32 for the "Gasket Color Code Reference" table. For complete compatibility information, reference Victaulic publications 05.01 and GSG-100, which can be downloaded at victaulic.com. For FireLock™ products, refer to the "NOTICE" on page 36 for important gasket information.



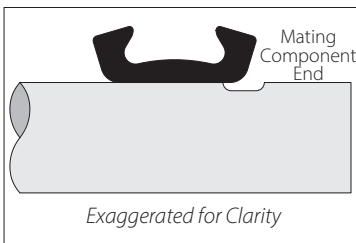
! CAUTION

- A thin coat of a compatible lubricant shall be applied to the gasket sealing lips and exterior to help prevent the gasket from pinching, rolling, or tearing during installation.
 - 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.



3. LUBRICATE GASKET: Apply a thin coat of a compatible lubricant to the gasket sealing lips and exterior. Refer to the "Lubricant Compatibility for Gaskets" table on page 34.

NOTE: This step shall also be completed for FireLock™ products that meet any of the conditions listed in the "NOTICE" on page 36.

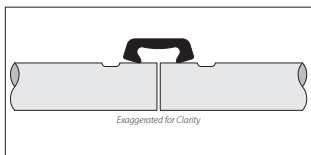


4. INSTALL GASKET: Install the gasket over the mating component end.

For 14-inch/DN350 and larger coupling sizes: It may be easier to turn the gasket inside out to install it over the mating component end. **NOTE:** Verify that the gasket does not overhang the mating component end.



5. JOIN MATING COMPONENTS: Align the centerlines of the two grooved mating component ends and bring them to within the appropriate pipe-end separation dimension. Slide the gasket into position and center it between the groove of each mating component. **NOTE:** Verify that no portion of the gasket extends into the groove of either mating component.



5a. If the gasket was turned inside out in step 4: Roll the gasket into position and center it between the groove of each mating component. **NOTE:** Verify that no portion of the gasket extends into the groove of either mating component.

! 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.

NOTICE

- The following installation steps feature photos of a Style 77 Coupling; however, the same steps apply to installation of Style 75, L77, 77A, 77S, 77DX, 475, and 475DX Couplings in the size ranges listed above.

1. Follow all instructions in the “Preparatory Steps” section on pages 148 – 149.

! CAUTION

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

Failure to follow this instruction may cause gasket damage, resulting in joint leakage and property damage.



2. INSTALL HOUSINGS: Install the housings over the gasket. Verify that the housings’ keys engage the grooves completely on both mating components. Refer to the “NOTICE” above for Style 475/475DX Couplings.



3. INSTALL BOLTS/NUTS: Install the bolts, and thread a nut finger-tight onto each bolt.

For couplings supplied with stainless steel hardware, verify that an anti-seize compound is applied to the bolt threads.

For $\frac{3}{4}$ – 4-inch/DN25 – DN100 Style 77S Couplings and for $\frac{3}{4}$ – 6-inch/DN25 – DN150 Style 77DX Couplings with bronze nuts only: A flat washer shall be installed under each nut.

NOTE: Verify that the oval neck of each bolt seats properly in the bolt hole.

IMPORTANT INFORMATION FOR USE OF STYLE 75, 77, L77, 77A, 77S, 77DX, 475, AND 475DX COUPLINGS WITH END CAPS:

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.

- 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.

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 4 and 5.

- Keep hands away from coupling openings during tightening.

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.

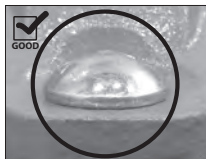
NOTICE

- 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 applicable “Helpful Information” table on pages 172 – 174.



4. 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..

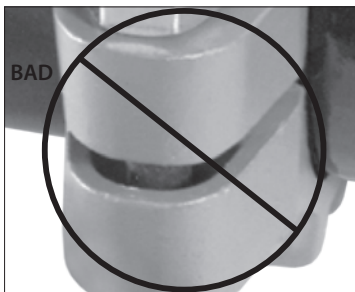
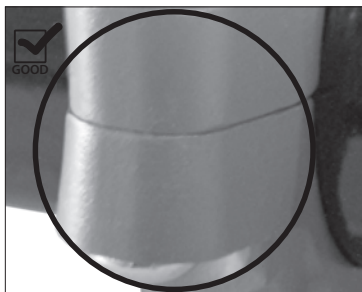
If you suspect that any hardware has been over-tightened (as indicated by a bend in the bolt, bulging of the nut at the bolt pad interface, or damage to the bolt pad, etc.), the entire coupling assembly shall be replaced immediately. Refer to the “Impact Tool Usage Guidelines” and “Impact Tool Selection” sections in this handbook, along with the applicable “Helpful Information” table on the following pages.



OVAL NECK OF BOLT SEATED PROPERLY



OVAL NECK OF BOLT NOT SEATED PROPERLY



5. 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

- 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.

Style 77A Helpful Information

Nominal Pipe Size inches/ DN	Actual Pipe Outside Diameter inches mm	Style 77/L77‡/77A		
		Nut Size inches/ Metric	Deep- Well Socket Size inches/ mm	Maximum Allowable Bolt Torque*
8 DN200	8.625 219.1	7/8 M22	1 7/16 36	675 ft-lbs 915 N·m

‡ The Style L77 may not be available in all sizes listed.

† Style 75 and 77/77A housings are marked 33.4 mm and 42.2 mm, respectively.

Applies to JIS metric pipe sizes 200A, 250A, and 300A, respectively (JIS Specification G 3452; G 3454).

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