Reliable®

Grooved Installation Warnings!!

Read carefully prior to handling and installing grooved couplings and fittings!

FAILURE TO FOLLOW THESE WARNINGS CAN CAUSE DAMAGE TO GROOVED COUPLINGS AND FITTINGS RESULTING IN LEAKAGE, PROPERTY DAMAGE, INJURY, OR DEATH.

ALWAYS FOLLOW THE DESIGN AND INSTALLATION REQUIREMENTS IN THE RELIABLE TECHNICAL BULLETIN APPLICABLE TO EACH GROOVED PRODUCT. IN ADDITION, COUPLINGS AND FITTINGS MUST ONLY BE USED IN SYSTEMS INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST PUBLISHED STANDARDS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, AS WELL AS THE REQUIREMENTS OF ANY APPLICABLE GOVERNMENTAL CODES OR ORDINANCES, INSURERS, OR OTHER AUTHORITIES HAVING JURISDICTION. THESE WARNINGS SHALL REMAIN WITH THE FIRE PROTECTION SYSTEM INFORMATION WITHIN THE INSTALLED PREMISES AND A COPY SHALL BE GIVEN TO THE BUILDING OWNER AND ALL OCCUPANTS/TENANTS.

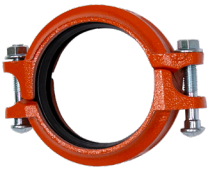
Important Precautions to Follow:

1. Prior to installation, grooved products should be maintained in the original packaging and shielded from rain until used to minimize the potential for damage to products that would cause improper installation, or leakage.
2. Prior to installation, all grooved fittings should be inspected for damage to sealing surfaces that may have occurred during shipping. Fittings with significant dents, gouges, or other deformities may leak when installed. Machining toolmarks are a normal result of manufacturing.
3. All pipe ends shall be grooved to the appropriate specification and free of dents, gouges, burrs, sharp edges, and other defects that can prevent proper sealing or damage gaskets, causing leakage. All pipe ends should be inspected prior to installation.
4. Grooved products should only be installed using original, Reliable-branded components. Components such as coupling halves, seals, or fasteners from other manufacturers should never be used in Reliable grooved product assemblies prior to or during installation. Other manufacturer's components in product assemblies may cause leakage or failure of the grooved product.
5. For lubrication of couplings and use in dry pipe and/or low-temp systems, see Page 7 of this document.
6. Ensure that all equipment used is properly functioning and in good repair, and that work is conducted in a safe manner with everyone in the vicinity using appropriate personal protective equipment.
7. Reliable fittings and coupling assemblies are interchangeable with other manufacturers' products meeting the same groove specifications. A model number cross reference sheet is available from Reliable to identify which Reliable model number corresponds to other manufacturers' comparable products.
8. DO NOT exceed fastener installation torque limitations provided in this installation guide. Exceeding the maximum allowed torque may result in damage to fasteners that may compromise the safety or performance of grooved product and any fire protection system into which it is installed . For couplings and mechanical tees utilizing 3/8" or 10mm or smaller-sized fasteners, it is strongly recommended that installers utilize a 1/4" impact driver instead of a higher-torque rated impact wrench to prevent over-torquing the fasteners.

QRS1 Push-On Coupling

FA1, FA2, FA3, and FA4 Grooved Flanges

Pages 3 & 4



RGD1, FLX1, and RCD1 Grooved Couplings
Page 5

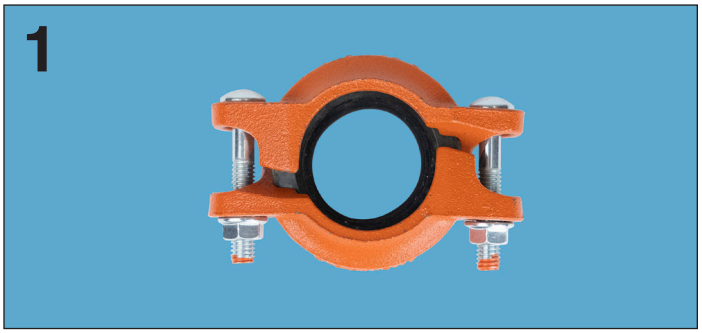
Mechanical Tees
Page 6

Bolt Torque Data

Table A

RGD1/ RGD2 Coupling Size NPS	QRS1 Push-On Coupling Size NPS	RGD3 Coupling Size NPS	RGD4 Coupling Size NPS	RGD5 Coupling Size NPS	FLX1 Coupling Size NPS	FLX2/ FLX3 Coupling Size NPS	MTT1 Mechanical Tee Pipe NPS	MTT2/ MTG1 Mechanical Tee Pipe NPS	MTT3 Mechanical Tee Pipe NPS	MTG2 Mechanical Tee Pipe NPS	041 U-Bolt Mechanical Pipe NPS	042 U-Bolt Mechanical Pipe NPS	Bolt Nominal Thread Size in (mm)	Nut Socket Size in (mm)	Bolt Torque* Range ft-lb (N-m)
-	-	-	-	-	-	-	1 - 2-1/2, 76mm	-	-	-	1-1/4 - 3, 76mm	-	3/8 (M10)	9/16 (16)	22 - 29 (30 - 39)
-	-	1-1/4 - 2-1/2, 76mm	1 - 2-1/2, 76mm	-	-	1 - 2-1/2, 76mm	-	-	2	2	-	1-1/4 - 2-1/2, 76mm	3/8 (M10)	9/16 (16)	30 - 45 (41 - 61)
1 - 3, 76mm	1-1/4 - 2-1/2, 76mm	-	-	1-1/4 - 2	1 - 3, 76mm	-	-	2	-	-	-	-	3/8 (M10)	9/16 (16)	45 - 50 (61 - 68)
4 - 6, 139mm, 165mm	3 - 4, 139mm	-	-	2-1/2 - 4, 76mm	4 - 6, 139mm, 165mm	-	-	2-1/2 - 4, 76mm	-	-	-	-	1/2 (M12)	3/4 (18)	65 - 75 (88 - 102)
-	-	3 - 6, 76mm, 139mm, 165mm	3 - 6, 139mm, 165mm	-	-	3 - 6, 139mm, 165mm	-	-	2-1/2 - 4, 76mm	2-1/2 - 4, 76mm	-	-	1/2 (M12)	3/4 (18)	80 - 100 (109 - 136)
8	6 - 8, 165mm	-	-	6, 139mm, 165mm	8	-	-	6 - 8, 139mm, 165mm	-	-	-	-	5/8 (M16)	15/16 (24)	145 - 170 (197 - 231)
-	-	8	8	-	-	8	-	-	6, 139mm, 165mm	6 - 8, 139mm, 165mm	-	-	5/8 (M16)	15/16 (24)	100 - 130 (136 - 176)
10	-	-	-	8	10 - 12	-	-	-	-	-	-	-	3/4 (M20)	1-1/8 (30)	200 - 220 (271 - 298)
-	-	-	-	-	-	-	-	-	-	-	-	-	3/4 (M20)	1-1/8 (30)	130 - 180 (176 - 244)
12 - 16	-	-	-	10 - 12	14 - 16	-	-	-	-	-	-	-	7/8 (M22)	1-15/16 (34)	200 - 220 (271 - 298)
-	-	10 - 12	10 - 12	-	-	10 - 12	-	-	-	-	-	-	7/8 (M22)	1-15/16 (34)	180 - 240 (244 - 325)

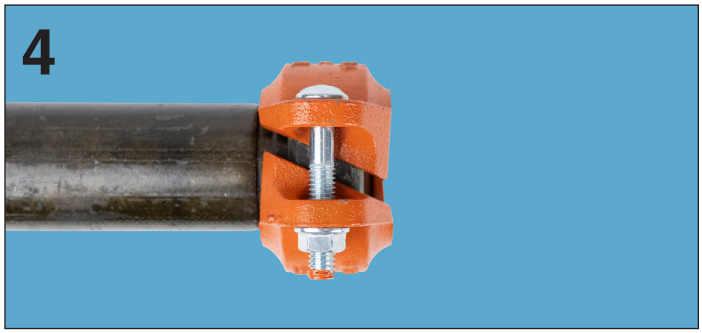
* non-lubricated bolt torque, any products not listed here may use the torque that corresponds with the bolt size



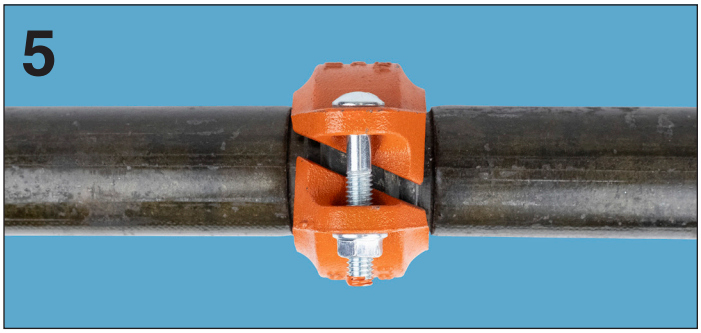
1. DO NOT DISASSEMBLE COUPLING!!! This coupling is designed and manufactured in such a way as to be installed directly onto pipe or fittings directly out of the box as assembled. Depending on coupling size and date of manufacture, the bottom of the coupling bolts will either use an o-ring in the threads or paint to retain nuts during shipping.

2. Without disassembling the coupling, inspect the gasket seal lips to ensure that they are not damaged and appropriate for intended service. Inspect pipe ends for correct grooving and lack of burrs, dents, and gouges to ensure a good sealing surface and proper coupling fit. Burrs may be removed with sandpaper or a file, if care is taken to not damage the sealing surface between the groove and the pipe-end.

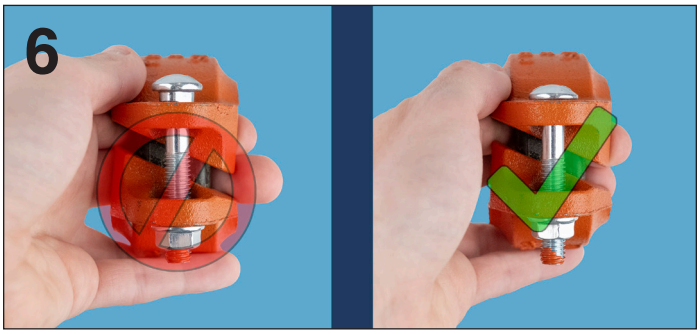
3. Note that this coupling's gasket includes an inner diameter (ID) protrusion similar to that found in a flush-gap coupling gasket, but extends further inward to act as a mechanical stop on the end face of pipe or fittings onto which this coupling is installed. If gasket is missing this feature, then check to ensure that coupling is a QRS1 push-on gasket and not a conventional RGD1 angle-pad coupling.



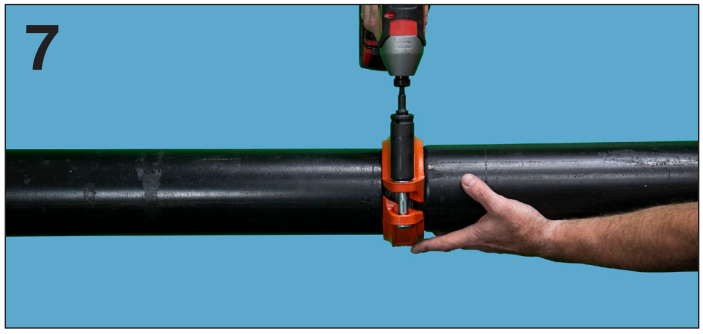
4. Install the assembled coupling onto one of the pipe ends. The coupling gasket seal lips should fit with minimal snugness but the gasket should remain generally centralized on the pipe. If the pipe is grooved correctly, then the coupling gasket's ID protrusion will result in the edge of the coupling that mates with the groove in position for easy installation.



5. Install the other pipe end into the opposite side of the coupling fully. Both pipe-ends should be contacting the ID protrusion of the coupling gasket if aligned correctly.

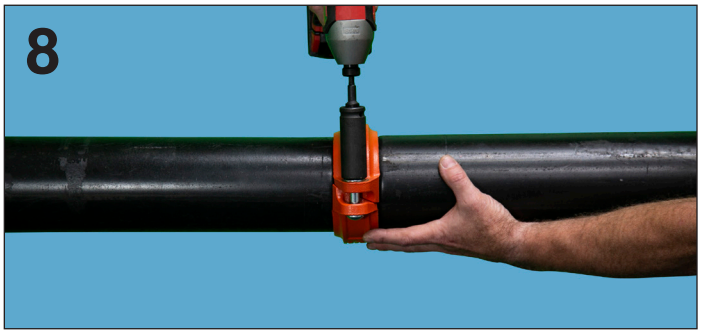


6. Ensure that oval-track bolts are properly oriented in the bolt hole on the coupling halves.

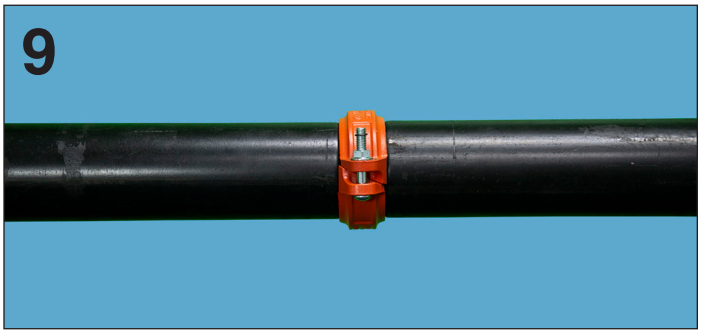


7. Tighten all nuts in even amounts while alternating between all nuts. Evenly tightening the nuts while alternating the nut being tightened is important to prevent gasket pinching and ensure proper fit and sealing of coupling assembly on pipes and fittings. This is required for both hand and power tools.

Installation Instructions for QRS1 Push-on Coupling (cont.)

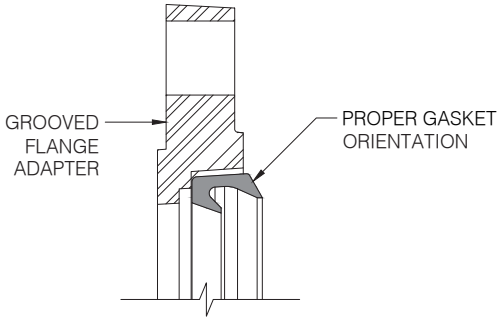


8. Stop tightening nuts when metal-to-metal contact between the upper and lower coupling halves occurs. Excessive tightening of nuts by either hand or power tools beyond torque limits specified for this product may damage components of the coupling assembly and cause the coupling to leak when pressure is applied to the fire protection system.

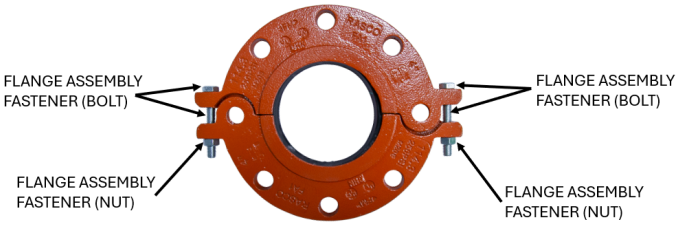


9. Visually inspect the angled bolt pads on each side of the coupling to ensure metal-to-metal contact is achieved and consistent on both sides of the coupling. Also visually inspect to confirm that both tongues on each coupling half are properly seated in the pipe / fitting grooves correctly.

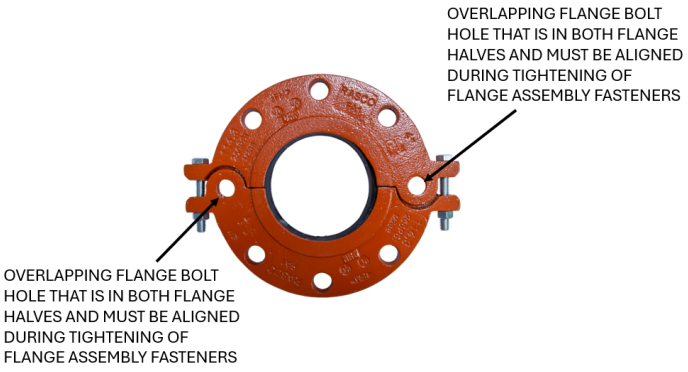
Installation Instructions for FA1, FA2, FA3, and FA4 Grooved Flanges



1. Install gasket on pipe / fitting similar to how a gasket is installed for a grooved coupling. Take care to ensure that the gasket is oriented correctly as shown in the diagram above; if the gasket is installed backward then the flanged connection will leak when pressure is applied.



2. Install the two grooved flange halves into the groove and set the flange assembly fasteners (this is two nuts and two bolts that hold the two-piece grooved flange together and are NOT the flange nuts and bolts used to mate two flanged connections together) to be finger-tight.

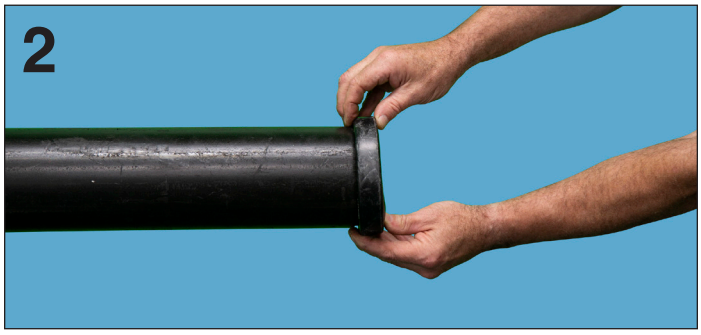


3. Each half of the grooved flange has two flange bolt holes that should overlap each other when final tightening of the flange assembly fasteners is complete; while tightening the nuts and bolts for the grooved flange it is important to apply torque in an alternating fashion to ensure that these two flange bolt holes maintain their alignment and do not shift position in a way that will prevent a flange bolt from being installed in the hole and secured with a nut. The flange assembly fasteners should be tightened to the appropriate torque outlined in the table below (see attached spreadsheet document for table information).

4. The grooved flange is now ready for assembly using flange bolts against mating equipment (e.g., flanged-end valve, blind flange, test flange, etc.). Note that the gasket included with the all Reliable groove flange products includes a feature that will seal against the mating flange face; there should only be this one gasket used. If a second gasket (such as an ASME flat flange gasket) is also used in conjunction with the grooved flange gasket, the flanged connection will leak.

5. Flange nuts and bolts shall be tightened to an appropriate torque as specified by the appropriate ASME B16 or ISO PN flange standard.

1. Remove one bolt from coupling to remove gasket (for angle pad coupling and grooved flange) or completely disassemble (for flexible or reducing couplings). Inspect gasket to ensure that it is not damaged and is appropriate for intended service. Inspect pipe ends for correct grooving and lack of burrs, dents, and gouges to ensure a good sealing surface and proper coupling fit. Burrs may be removed with sandpaper or a file, if care is taken to not damage the sealing surface between the groove and the end of the pipe.

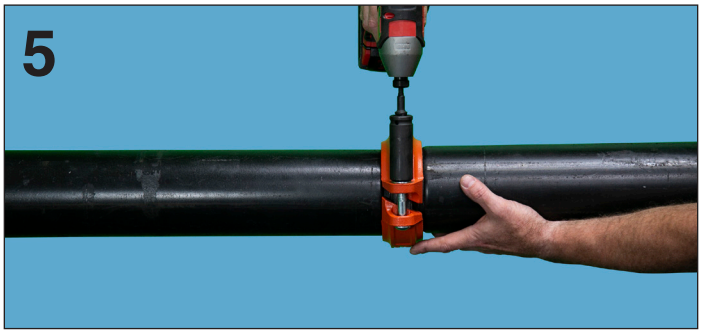


2. Install the gasket fully over the pipe end so that the gasket lip does not overhang. Some stretching of the gasket is required to fit on the pipe. If no stretching is required, check to ensure that all equipment is the correct size.

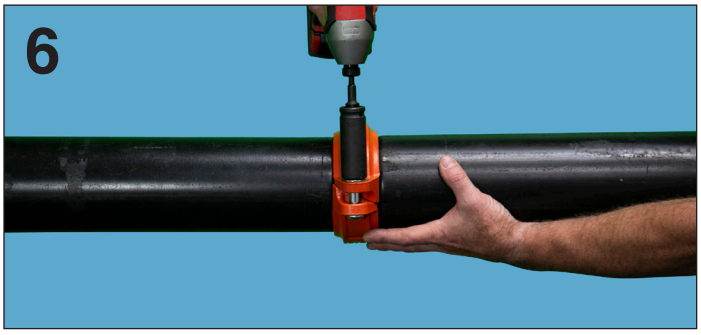
3. Align and position mating pipe ends together. Slide the gasket into position centered between the grooves on each pipe end. Both grooves should be visible.

4. Loosen remaining nut (for angle pad) to allow coupling assembly to swing around pipe and gasket.

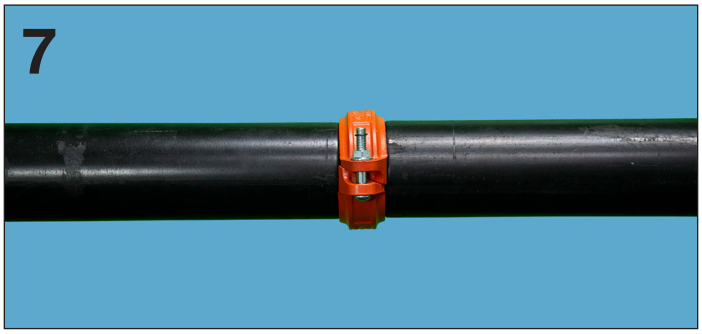
4. (cont.) Reorient both coupling halves to fit around gasket, ensuring that tongue on the coupling aligns with grooves in pipe. Install all previously-removed bolting, and thread nuts to finger-tight on both bolts. The oval track of the bolt should seat fully into the bolt hole in the coupling halves.



5. Tighten all nuts in even amounts while alternating between all nuts. Evenly tightening the nuts while alternating the nut being tightened is important to prevent gasket pinching and ensure proper fit and sealing of coupling assembly on pipes and fittings. This is required for both hand and impact tools.



6. Stop tightening nuts when metal-to-metal contact between the upper and lower coupling halves occurs. Excessive tightening of nuts by either hand or impact tools beyond torque limits specified in Table A for a given bolt size may damage the coupling and cause leaks.

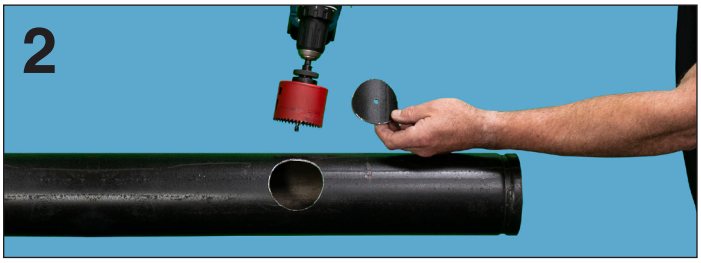


7. Visually inspect the bolt pads on each side of the coupling to ensure metal-to-metal contact is achieved and consistent. Also inspect to ensure that the tongue on the coupling halves are fully engaged in the pipe grooves.

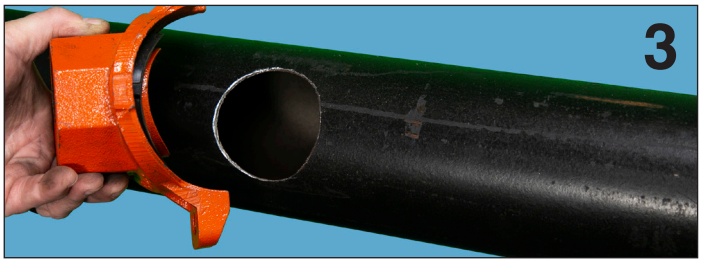
1. Disassemble the mechanical tee, and inspect gasket to ensure that it is not damaged and is appropriate for the intended service. Inspect the pipe where the mechanical tee is intended to be installed, ensuring that it is round and does not have any damage to the pipe that might impair sealing of the gasket.

Mechanical Tee Hole Preparation Data — **Table B**

Model	Nominal Run Pipe Size NPS (DN)	Nominal Run Branch	Hole Saw Size in (mm)	Max. Hole Diameter in (mm)
MTT2	All sizes	1 (25)	1-1/2 (38)	1-5/8 (31)
MTT3	All sizes	1 (25)	1-1/2 (38)	1-9/16 (39)
MTT2/MTG1	All sizes	1-1/4 (32)	1-3/4 (45)	1-7/8 (48)
MTT3	2 (50)	1-1/4 (32)	1-3/4 (45)	1-13/16 (46)
MTT3	All other sizes	1-1/4 (32)	2 (51)	2-1/16 (52)
MTG2	All sizes	1-1/4 (32)	1-3/4 (45)	1-13/16 (46)
MTT2/MTG1	2 (50)	1-1/2 (40)	1-3/4 (45)	1-7/8 (48)
MTT2/MTG1	All other sizes	1-1/2 (40)	2 (51)	2-1/8 (53)
MTT3/MTG2	2 (50)	1-1/2 (40)	1-3/4 (45)	1-13/16 (46)
MTT3/MTG2	All other sizes	1-1/2 (40)	2 (51)	2-1/16 (52)
MTT2/MTG1	All sizes	2 (50)	2-1/2 (64)	2-5/8 (67)
MTT3/MTG2	All sizes	2 (50)	2-1/2 (64)	2-9/16 (65)
MTT2/MTG1	All sizes	2-1/2 (65)	2-3/4 (70)	2-7/8 (73)
MTT3/MTG2	All sizes	2-1/2 (65)	2-3/4 (70)	2-13/16 (71)
MTT2/MTG1	All sizes	3 (80)	3-1/2 (89)	3-5/8 (92)
MTT2/MTG1	All sizes	4 (100)	4-1/2 (114)	4-5/8 (117)
041/MTT1	All sizes	All sizes	1-3/16 (30)	1-1/4 (31)
042	All sizes	All sizes	1-3/16 (30)	1-1/4 (31)



2. Cut the appropriate size hole in the pipe in accordance with Table B. Be sure to remove the cutout plug from the inside of the pipe before installing the mechanical tee. Remove any burrs or rough edges left from the cutting process. Clean the sealing surface at least 5/8" (16 mm) around the cut hole, removing any debris or deposits that may impact sealing performance of the gasket. Visually inspect the sealing surface for any defects that may impair sealing performance of the gasket.

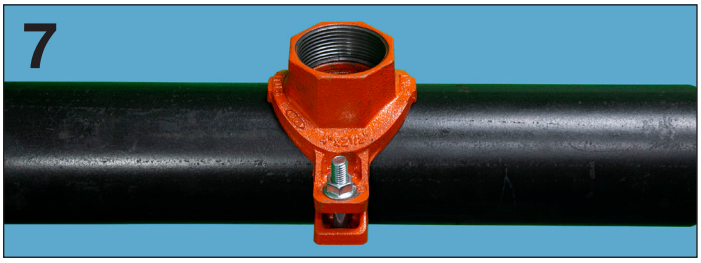


3. The gasket has lubricant embedded in the rubber, and a dry powder lubricant applied on the surface during assembly at the factory. No additional lubricant is required. Ensure that the gasket is properly installed in the mechanical tee outlet housing, and then align the housing with the cut hole in the pipe, ensuring that the mechanical tee's locating feature fits into the cut hole in the pipe.

4. Insert u-bolt (for 041/042) or align the strap housing of the mechanical tee (MTT or MTG) with the outlet housing, and install fasteners finger-tight to hold the mechanical tee assembly in place on the pipe.

5. Tighten all nuts in even amounts while alternating between all nuts. Evenly tightening the nuts while alternating the nut being tightened is important to prevent gasket pinching and ensure proper fit and sealing of mechanical tee assembly on pipes. This is required for both hand and impact tools.

6. Stop tightening nuts when metal-to-metal contact between the housings (MTT or MTG), or when the u-bolt is tight against the pipe and the mechanical tee will not move (041/042). Excessive tightening of nuts by either hand or impact tools beyond torque limits specified in Table A may damage the joint and cause leaks. It is important to ensure that fasteners are tightened appropriately within the specified range of this document to ensure that mechanical tees function as intended and do not leak.



7. Visually inspect all components of the mechanical tee to ensure that it is properly installed on the pipe.

Gaskets and Gasket Lubrication

1. Reliable grooved coupling gaskets include both an embedded lubricant that is mixed into the rubber prior to molding, and a dry powder lubricant that is applied to finished gaskets prior to assembly into grooved couplings at the factory. This dual-lubrication is intended to aid in the reduction of gasket pinching when the coupling is properly installed.

2. Standard rigid couplings (RGD1 and RGD2) and flexible couplings (FLX1) that require complete disassembly as part of the installation process may, at the discretion of the installer, be treated with additional supplemental petroleum free EPDM-compatible silicon lubrication on the inside of the coupling housings that contacts the OD of the gasket prior to / during the installation process in order to further reduce sensitivity to gasket pinching.

3. Push-on couplings (QRS1) do not require disassembly for installation and SHOULD NOT be disassembled in order to apply lubrication to the inside of the coupling.

4. All Reliable couplings have been qualified by UL and FM for use with dry pipe systems to minimum temperature of -40˚ F (-40˚ C). For extreme low-temperature dry pipe systems the installer may, at their discretion, choose to add supplemental petroleum free EPDM-compatible silicon lubricant to the coupling. This practice may be performed on any coupling, and while not explicitly necessary, it is not a prohibited practice.

5. LUBRICANTS THAT ARE PETROLEUM-BASED OR CONTAIN PETROLEUM DERIVATIVES SUCH AS AUTOMOTIVE JOINT GREASE, BEARING / WHEEL HUB GREASE, WHITE LITHIUM GREASE, WD-40, CRC 3-36, OR ANY GREASE OR OIL MANUFACTURED USING MINERAL OIL OR PETROLEUM INGREDIENTS WILL DEGRADE THE RUBBER GASKET MATERIAL AND SHOULD NOT BE USED UNDER ANY CIRCUMSTANCES!!!

P/N 89241306