



## GRINNELL Mechanical Products Installation / Assembly Instructions, Outlets

### General Description

These installation instructions do not take the place of the GRINNELL Mechanical Products Installation Handbook (Refer to IH-1000M), nor do they eliminate the need for the installer to fully read and understand the handbook. Current documentation can be obtained by contacting GRINNELL Mechanical Products or visiting [www.grinnell.com](http://www.grinnell.com).

### Installation Guidelines

#### NOTICE

The following instructions are a guideline for the proper installation of GRINNELL grooved products.

Always read and understand the instructions, including the "Installation Guidelines" section in this document. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

To avoid serious personal injury, wear safety glasses, hard hat and foot protection.

Never remove any piping component without verifying that the system is depressurized and drained. Failure to do so may result in serious personal injury.

The pipe and tubing groove dimensions must be in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to tech data sheets G710 and G720 for more information.

Torque values are supplied as a guideline and may be used when setting the torque on power impact wrenches. Always refer to the power impact wrench manufacturer's instructions for settings.

### Mechanical Outlet Figure 730

For more information refer to Technical Data Sheet G210.

#### Pipe Preparation

**Step 1.** Verify hole size from Table C.

**Step 2.** The hole must be drilled on the pipe center-line. For crosses, ensure double outlet holes are aligned.

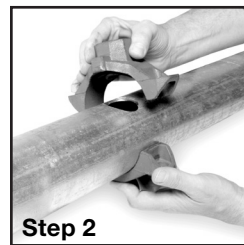
**Step 3.** Remove any sharp or rough edges from the hole or upper housing contact area. The gasket-seating surface on the pipe should be examined to verify all loose debris, dirt, chips, paint and any other foreign material such as grease are removed.

#### Installation / Assembly Instructions

The following instructions apply to Figure 730 Mechanical Outlet Tees and Crosses with threaded or grooved outlets. If a cross configuration is desired, the lower housing is replaced with an upper outlet housing.

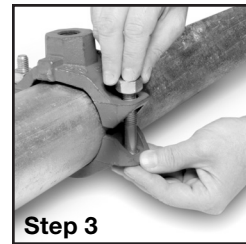
Verify that the gasket grade is correct for the application intended. Refer to Technical Data Sheet G610 for additional information.

**Step 1.** Check for proper gasket positioning in the housing. The alignment tabs on the gasket should fit into the recesses of the housing. Gasket lubrication is not required on this product for applications above 40°F (4°C). For assembly or application below 40°F (4°C), a petroleum free lubricant is recommended.



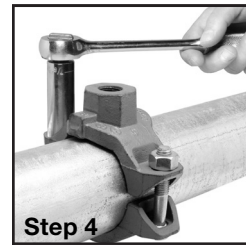
Step 2

**Step 2.** With one nut and bolt removed, swing the coupling around the pipe as shown.



Step 3

until finger tight. Verify that the bolt-heads are fully recessed in the housing.



Step 4

**Step 4.** Tighten nuts uniformly in an alternating pattern to the recommended bolt torque (refer to Table A) with even gaps between the bolt pads. Uneven tightening can cause the gasket to pinch or bind.

Bolt-torque information for Figure 730 (refer to Table A) is supplied as a guideline and may be used when setting the torque on power impact wrenches. Refer to the manufacturer's instructions for settings.

Nominal Pipe Size ANSI Inches DN	Bolt Size Inches (mm)	Bolt Torque Range Ft.- Lbs. (Nm)
2 - 2-1/2 DN50 - DN6	3/8 (M10)	30-40 (40-54)
3 - 4 DN80 - DN100	1/2 (M12)	90-110 (122-149)
5 - 6 DN125 - DN150	5/8 (M16)	100-130 (135-176)
8 DN200	3/4 (M20)	150-200 (203-271)

**TABLE A  
FIGURE 730 OUTLET  
BOLT TORQUE SPECIFICATIONS**

**Strap Outlet Figure 40-5**

For more information refer to tech data sheet TFP1720.

**Pipe Preparation**

**Step 1.** The hole size for all Figure 40-5 Strap Outlets should be 1-3/16 inches (30,2 mm).

**Step 2.** The hole must be drilled on the pipe center-line.

**Step 3.** Remove any sharp or rough edges from the hole or upper housing contact area. The gasket-seating surface on the pipe should be examined to verify all loose debris, dirt, chips, paint and any other foreign material such as grease are removed.

**Installation / Assembly Instructions**

The following instructions apply to Figure 40-5 Strap Outlet.

Verify that the gasket grade is correct for the application intended. Refer to tech data sheet TFP1895 for additional gasket information.

**Step 1.** Check for proper gasket positioning in housing. The alignment tabs on the gasket should fit into the recesses of the housing. Gasket lubrication is not required on this product for applications above 40°F (4°C). For assembly or application below 40°F (4°C), a petroleum free lubricant is recommended.



Step 2

**Step 2.** To assemble the strap on the pipe, remove the "U" bolt. Place the outlet housing over the hole in the pipe. Verify that the housing spike is positioned in the hole.

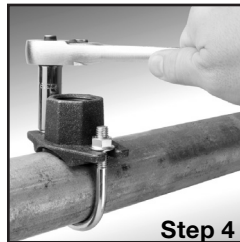


Step 3

**Step 3.** Insert the "U" bolt into the coupling and finger tighten the nuts.

Pipe Schedule	Bolt Torque Range Ft.-Lbs. (Nm)
Schedule 5	15 - 20 (20 - 27)
Schedule 10	25 - 30 (34 - 41)
Schedule 40	25 - 30 (34 - 41)

**TABLE B  
FIGURE 40-5 STRAP OUTLET  
BOLT TORQUE SPECIFICATIONS**



Step 4

**Step 4.** Tighten nuts uniformly in an alternating pattern to the recommended torque in Table B. Over-torquing can damage thin wall pipe and will not increase sealing efficiency.

**Mechanical Outlet Figure 522**

Available only in South and Central America and Europe.

The following instructions apply to Figure 522 Outlets. The 1 inch nominal outlet size is intended for use in fire protection systems with a connection leading directly to a sprinkler or to the system piping. These fittings should be used for hydraulically calculated systems only.

**Step 1.** Verify hole size from Table D. The hole must be drilled on the pipe center-line. Remove any sharp or rough edges from the hole or upper housing contact area. The gasket-seating surface on the pipe should be examined to verify all loose debris, dirt, chips, paint and any other foreign material such as grease are removed.

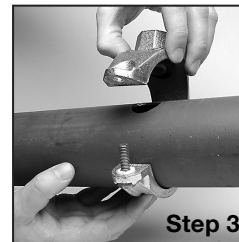
Verify that the gasket grade is correct for the application intended. Please refer to tech data sheet G610 for additional information.



Step 2

**Step 2.** Check for proper gasket positioning in the housing. The alignment tabs on the gasket should fit into the recesses of the housing.

For Wet Based applications, no lubricant is required. When used for Dry Pipe and Freezer applications, use a petroleum free silicon based lubricant.



Step 3

**Step 3.** With one nut and bolt removed and the other nut threaded out flush with the end of the screw, "swing" the housing over the hole in the pipe.

**Step 4.** Verify that the housing outlet spike is positioned in the hole. Insert the other bolt into the housing and rotate the nuts clockwise until finger tight. Verify that the bolt heads are fully seated in the housing.



Step 5

**Step 5.** Tighten nuts uniformly in an alternating pattern until properly torqued to between 15 - 20 Ft.-Lbs. (20-27 Nm) with

even gaps between the bolt pads. Uneven tightening can cause the gasket to pinch or bind. Over torquing can damage the product or thin wall pipe and will not increase sealing efficiency.

Nominal Run Size ANSI Inches DN	Nominal Branch Size ANSI Inches DN	Hole Diameter Inches (mm)		Nominal Run Size ANSI Inches DN	Nominal Branch Size ANSI Inches DN	Hole Diameter Inches (mm)	
		Min.	Max.			Min.	Max.
2 DN50	1/2 / DN15	1.50 / (38,1)	1.63 / (41,3)	139,7 / DN125	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)
	3/4 / DN20	1.50 / (38,1)	1.63 / (41,3)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
	1 / DN25	1.50 / (38,1)	1.63 / (41,3)		2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)
	1-1/4 / DN32	1.75 / (44,5)	1.88 / (47,6)		76,1 mm / DN65	2.75 / (69,9)	2.88 / (73,0)
	1-1/2 / DN40	1.75 / (44,5)	1.88 / (47,6)		3 / DN80	3.50 / (88,9)	3.63 / (92,1)
2-1/2 DN65	1/2 / DN15	1.50 / (38,1)	1.63 / (41,3)	6 DN150	1-1/4 / DN32	2.00 / (50,8)	2.13 / (54,0)
	3/4 / DN20	1.50 / (38,1)	1.63 / (41,3)		1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)
	1 / DN25	1.50 / (38,1)	1.63 / (41,3)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
	1-1/4 / DN32	2.00 / (50,8)	2.13 / (54,0)		2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)
	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)		76,1 mm / DN65	2.75 / (69,9)	2.88 / (73,0)
76,1 DN65	2 / DN50	2.50 / (63,5)	2.63 / (66,7)	165,1 DN150	3 / DN80	3.50 / (88,9)	3.63 / (92,1)
	1/2 / DN15	1.50 / (38,1)	1.63 / (41,3)		4 / DN100	4.50 / (114,3)	4.63 / (117,5)
	3/4 / DN20	1.50 / (38,1)	1.63 / (41,3)		1-1/4 / DN32	2.00 / (50,8)	2.13 / (54,0)
	1 / DN25	1.50 / (38,1)	1.63 / (41,3)		1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)
	1-1/4 / DN32	2.00 / (50,8)	2.13 / (54,0)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
3 DN80	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)	8 DN200	2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)
	2 / DN50	2.50 / (63,5)	2.63 / (66,7)		76,1 mm / DN65	2.75 / (69,9)	2.88 / (73,0)
	1/2 / DN15	1.50 / (38,1)	1.63 / (41,3)		3 / DN80	3.50 / (88,9)	3.63 / (92,1)
	3/4 / DN20	1.50 / (38,1)	1.63 / (41,3)		4 / DN100	4.50 / (114,3)	4.63 / (117,5)
	1 / DN25	1.50 / (38,1)	1.63 / (41,3)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
4 DN100	1-1/4 / DN32	1.75 / (44,5)	1.88 / (47,6)	216,3 / DN200	2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)
	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)		76,1mm / DN65	2.75 / (69,9)	2.88 / (73,0)
	2 / DN50	2.50 / (63,5)	2.63 / (66,7)		3 / DN80	3.50 / (88,9)	3.63 / (92,1)
	2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)		4 / DN100	4.50 / (114,3)	4.63 / (117,5)
	76,1 mm / DN65	2.75 / (69,9)	2.88 / (73,0)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
5 DN125	3 / DN80	3.50 / (88,9)	3.63 / (92,1)	5 DN125	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)
	1 / DN25	1.50 / (38,1)	1.63 / (41,3)		2 / DN50	2.50 / (63,5)	2.63 / (66,7)
	1-1/4 / DN32	1.75 / (44,5)	1.88 / (47,6)		2-1/2 / DN65	2.75 / (69,9)	2.88 / (73,0)
	1-1/2 / DN40	2.00 / (50,8)	2.13 / (54,0)		76,1 mm / DN65	2.75 / (69,9)	2.88 / (73,0)
	2 / DN50	2.50 / (63,5)	2.63 / (66,7)		3 / DN80	3.50 / (88,9)	3.63 / (92,1)

Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within 5/8" of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area that might affect assembly, proper seating of the locating collar, or flow from the outlet. For crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded products other than steel pipe, such as dry pendants, may not be compatible with the female threaded outlet on the Mechanical Tee. Always confirm compatibility by contacting GRINNELL Mechanical Products.

**TABLE C**  
**FIGURE 730 OUTLET HOLE CUTTING DIAMETERS**

Nominal Run Size ANSI Inches DN	Nominal Branch Size ANSI Inches DN	Hole Diameter		Nominal Run Size ANSI Inches DN	Nominal Branch Size ANSI Inches DN	Hole Diameter	
		Inches (mm)	Tolerance Inches (mm)			Inches (mm)	Tolerance Inches (mm)
1 DN25	1/2 / DN15	0.94 / (24.0)	0.02 / (0.5)	1-1/2 DN40	1/2 / DN15	0.94 / (24.0)	0.02 / (0.5)
	3/4 / DN20						
	1 / DN25						
1-1/4 DN32	3/8 / DN10	0.94 / (24.0)	0.02 / (0.5)	2 DN50	1/2 / DN15	1.38 / (34.9)	0.02 / (0.5)
	1/2 / DN15						
	3/4 / DN20						
	1 / DN25						
76.1mm DN65	1/2 / DN15	0.94 / (24.0)	0.02 / (0.5)	76.1mm DN65	1/2 / DN15	1.38 / (34.9)	0.02 / (0.5)
	3/4 / DN20						
	1 / DN25						

Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within 5/8 inches (15.88 mm) of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area that might affect assembly, proper seating of the locating collar, or flow from the outlet. Check gasket grade to be certain it is suitable for the service. The use of threaded products other than steel pipe, such as dry pendants, etc. may not be compatible with the female threaded outlet on the Figure 522. Always confirm compatibility by contacting GRINNELL Mechanical Products.

**TABLE D**  
**FIGURE 522 OUTLET HOLE CUTTING DIAMETERS**

Nominal Size Run x Branch ANSI Inches (DN)	Equivalent Length of Sch. 40 Steel Pipe, Feet (Meters) <sup>a</sup>		Nominal Size Run x Branch ANSI Inches (DN)	Equivalent Length of Sch. 40 Steel Pipe, Feet (Meters) <sup>a</sup>	
	Threaded	Grooved		Threaded	Grooved
2 x 1 (DN50 x DN25)	2 (0,60)	N/A	139,7mm x 2 (DN125 x DN50)	5 (1,52)	
2 x 1-1/4 (DN50 x DN32)	4 (1,22)		139,7mm x 2-1/2 (DN125 x DN65)	10 (3,05)	
2 x 1-1/2 (DN50 x DN40)	13 (3,96)		139,7mm x 76,1mm <sup>b</sup> (DN125 x DN65)	11 (3,35)	
2-1/2 x 1 (DN65 x DN25)	2 (0,60)	N/A	139,7mm x 3 (DN125 x DN80)	13 (3,96)	
2-1/2 x 1-1/4 (DN65 x DN32)	4 (1,22)		6 x 1-1/4 (DN150 x DN32)	4 (1,22)	
2-1/2 x 1-1/2 (DN65 x DN40)	3 (0,91)		6 x 1-1/2 (DN150 x DN40)	3 (0,91)	
2-1/2 x 2 (DN65 x DN50)	26 (7,92)		6 x 2 (DN150 x DN50)	5 (1,52)	
76,1mm x 1 (DN65 x DN25)	2 (0,60)	N/A	6 x 2-1/2 (DN150 x DN65)	10 (3,05)	
76,1mm x 1-1/4 (DN65 x DN32)	4 (1,22)		6 x 76,1mm <sup>b</sup> (DN150 x DN65)	11 (3,35)	
76,1mm x 1-1/2 (DN65 x DN40)	3 (0,91)		6 x 3 (DN150 x DN80)	9 (2,74)	
76,1mm x 2 (DN65 x DN50)	26 (7,92)		6 x 4 (DN150 x DN100)	14 (4,27)	
3 x 1 (DN80 x DN25)	2 (0,60)		165,1mm x 1-1/4 (DN150 x DN32)	4 (1,22)	
3 x 1-1/4 (DN80 x DN32)	4 (1,22)		165,1mm x 1-1/2 (DN150 x DN40)	3 (0,91)	
3 x 1-1/2 (DN80 x DN40)	3 (0,91)		165,1mm x 2 (DN150 x DN50)	5 (1,52)	
3 x 2 (DN80 x DN50)	5 (1,52)		165,1mm x 2-1/2 (DN150 x DN65)	10 (3,05)	
4 x 1 (DN100 x DN25)	2 (0,60)	N/A	165,1mm x 76,1mm <sup>b</sup> (DN150 x DN65)	11 (3,35)	
4 x 1-1/4 (DN100 x DN32)	4 (1,22)		165,1mm x 3 (DN150 x DN80)	9 (2,74)	
4 x 1-1/2 (DN100 x DN40)	3 (0,91)		165,1mm x 4 (DN150 x DN100)	14 (4,27)	
4 x 2 (DN100 x DN50)	5 (1,52)		8 x 2 (DN200 x DN50)	5 (1,52)	
4 x 2-1/2 (DN100 x DN65)	10 (3,05)		8 x 2-1/2 (DN200 x DN65)	10 (3,05)	
4 x 76,1mm <sup>b</sup> (DN100 x DN65)	11 (3,35)		8 x 76,1mm <sup>b</sup> (DN200 x DN65)	11 (3,35)	
4 x 3 (DN100 x DN80)	13 (3,96)		8 x 3 (DN200 x DN80)	N/A	9 (2,74)
5 x 1-1/2 (DN125 x DN40)	3 (0,91)		8 x 4 (DN200 x DN100)	N/A	14 (4,27)
5 x 2 (DN125 x DN50)	5 (1,52)		216,3mm x 2 (200 JIS x DN50)	5 (1,52)	
5 x 2-1/2 (DN125 x DN65)	10 (3,05)		216,3mm x 2-1/2 (200 JIS x DN65)	10 (3,05)	
5 x 76,1mm <sup>b</sup> (DN125 x DN65)	11 (3,35)		216,3mm x 76,1mm <sup>b</sup> (200 JIS x DN65)	11 (3,35)	
5 x 3 (DN125 x DN80)	13 (3,96)		216,3mm x 3 (200 JIS x DN80)	N/A	9 (2,74)
139,7mm x 1-1/2 (DN125 x DN40)	3 (0,91)		216,3mm x 4 (200 JIS x DN100)	N/A	14 (4,27)

a. Hazen Williams coefficient = 120  
 b. Equivalent Length of EN10255:2004 Heavy Pipe

**TABLE E**  
**FIGURE 730 MECHANICAL OUTLETS**  
**FRICTION LOSS AS EQUIVALENT PIPE LENGTH**

Fitting Size ANSI Inches	Equivalent Length ft. (1 inch Schedule 40 pipe)	
	Figure 40-5	Figure 522
1-1/4 x 1	8	15
1-1/2 x 1	6	
2 x 1		
2-1/2 x 1	4	

Hazen Williams coefficient = 120

**TABLE F**  
**FIGURE 40-5 AND FIGURE 522 OUTLETS**  
**FRICTION LOSS AS EQUIVALENT PIPE LENGTH**



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