



GRINNELL Mechanical Products Installation / Assembly Instructions, Flange Adapters

General Description

These installation instructions do not take the place of nor do they eliminate the need for the installer to fully read and understand the complete GRINNELL Mechanical Products Installation Handbook (refer to IH-1000M). Always review the GRINNELL Mechanical Products Installation Handbook and individual product tech data sheets for the latest instructions, techniques, and care and maintenance information. Current documentation can be obtained by contacting GRINNELL Mechanical Products or visiting 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.

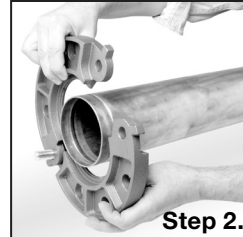
Torque values are supplied as a guideline and may be used when setting the torque on power impact wrenches. Always refer to the power impact wrench manufacturer's instructions for settings.

Flange Adapter (2 - 12 Inch) Figure 61 and 71

Installation / Assembly Instructions

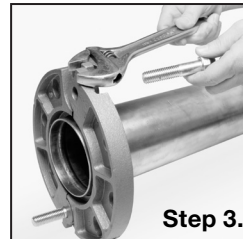
The following instructions apply to the Figure 71 Flange Adapter and the Figure 61 Flange Adapter. For more information refer to tech data sheet G150 (Figure 71) and tech data sheet G515 (Figure 61). The installation is based on pipe grooved in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to tech data sheet G710 for Steel Pipe and tech data sheet G720 for Copper Tubing.

Step 1. Inspect exterior groove and ends of the pipe to verify all burrs, loose debris, dirt, chips, paint and any other foreign material such as grease are removed. Pipe end sealing surfaces must be free from sharp edges, projections, indentations, and/or other defects.

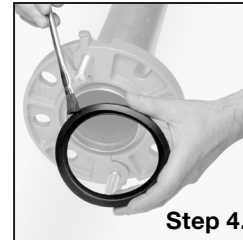


Step 2. Verify that the gasket selection is correct for the application intended. Refer to tech data sheet G610 for additional gasket information.

Insert one flange bolt (not supplied) in the hinge section of Flange Adapter. Place the hinged assembly into the groove on the pipe.



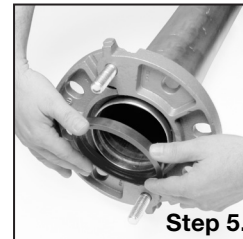
Step 3. Close the flange with another bolt. To ease in the closure of the Flange Adapter, two tabs are provided. Take an adjustable wrench and place it over the two tabs as shown. Move the wrench parallel to the pipe until the holes align. Once the holes align, insert a bolt. Verify that the housing keys are fully engaged into the groove.



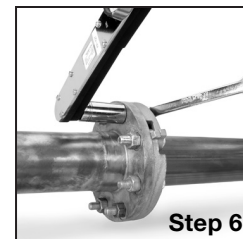
Step 4. The sealing edges and outer surfaces of the gasket should be covered with a fine layer of lubricant. To prevent deterioration of the gasket material, a petroleum lubricant should never be used on Grade "E" "EPDM". For assembly below 40°F (4°C) a petroleum-free silicone lubricant must be used to prevent freezing of the lubricant.

NSF Requirement

To retain NSF 61 Certification, an NSF 61 Certified lubricant, such as Dow Corning 7 Release Compound, offered through GRINNELL Mechanical Products, must be used for the intended service.



Step 5. Place the gasket into the gasket pocket with the gasket marking side in first.



Step 6. Bring both the Flange Adapter and the opposite Flange together. Ensure proper alignment and slide each of the remaining flange bolts (not supplied) in the remaining bolt holes. Tighten all nuts uniformly in an alternating pattern to the recommended bolt torque in Table B.

Flange Washer Adapters are required when the Flange Adapters are used against surfaces such as:

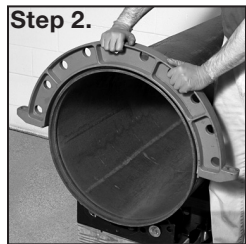
- Rubber surfaces
- Adapting to AWWA cast flanges
- Rubber faced wafer valves
- Serrated flange surfaces

Flange Adapters are not recommended for applications that incorporate tie rods for anchoring, or on standard fittings within 90° of each other.

**Flange Adapter (14 - 24 Inch)
Figure 71 (Large Diameter)
Installation / Assembly Instructions**

The installation is based on pipe grooved in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to tech data sheet G710 for more information.

Step 1. Inspect exterior groove and ends of the pipe to verify all burrs, loose debris, dirt, chips, paint and any other foreign material such as grease are removed. Pipe end sealing surfaces must be free from sharp edges, projections, indentations, and/or other defects.



Step 2. Place the first segment of the assembly into the groove on the pipe.



Step 3. Bring the second half of the flange assembly together into the groove of the pipe. Insert the two coupling bolts into the bolt pads and tighten the nuts, drawing the pads together

but allowing the housings to remain loose enough to permit the flange adapter to be rotated for bolt hole alignment in Step 6. Verify that the housing keys are fully engaged into the groove.



Step 4. Verify that the gasket selection is correct for the application intended (refer to Technical Data Sheet G610 for additional information). The sealing edges

and outer surfaces of the gasket should be covered with a fine layer of lubricant. To prevent deterioration of the gasket material a petroleum lubricant should never be used on Grade "E" "EPDM". For assembly below 40°F (4°C) a petroleum-free silicone lubricant is recommended.

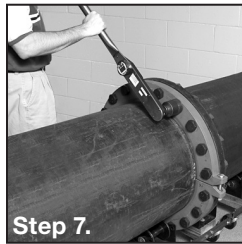


Step 5. Place the gasket into the gasket pocket with the gasket marking side in first.



Step 6. Rotate the Flange Adapter to align the bolt holes with the mating flange. Tightening nuts uniformly to the recommended bolt torque (refer

to Table C) to bring bolt pads into metal to metal contact.



Step 7. Bring both the Flange Adapter and the mating flange together. Ensure proper bolt hole alignment. Slide a flange bolt through the bolt holes and thread

a nut on hand tight. Continue this procedure until all flange bolts have been inserted. Tighten the flange bolts and nuts uniformly to the specified mating face bolt torque (refer to Table C). Ensure that the flange faces remain parallel and make contact around the full circumference of the flange face.

Figure 71 Flange Adapters are not recommended for applications that incorporate tie rods for anchoring, or on standard fittings within 90° of each other.

For more information refer to tech data sheet G150.

Nominal Pipe Size		Recommended Flange Mating Bolts † Use ANSI bolts for Class 125/150 Flanges Use Metric bolts for PN10 and PN16 flanges		
Inch DN	OD Inch (mm)	Size Dia. X Lg Inches (metric)	Qty.	Bolt Torque Range Ft.-Lbs. (Nm)
2 DN50	2.375 (60,3)	5/8 x 3 M16x76	4	110 - 140 (149 - 190)
2-1/2 DN65	2.875 (73,0)	5/8 x 3 M16x76	4	110 - 140 (149 - 190)
- DN65	3 (76,1)	5/8 x 3 M16x76	4	110 - 140 (149 - 190)
3 DN80	3.5 (88,9)	5/8 x 3 M16x76	4*	110 - 140 (149 - 190)
4 DN100	4.5 (114,3)	5/8 x 3 M16x76	8	110 - 140 (149 - 190)
- DN125	5.5 (139,7)	3/4 x 3 1/2 M20 x 89	8	220 - 250 (298 - 339)
5 DN125	5.563 (141,3)	3/4 x 3 1/2 M20 x 89	8	220 - 250 (298 - 339)
- DN150	6.5 (165,1)	3/4 x 3 1/2 M20 x 89	8	220 - 250 (298 - 339)
6 DN150	6.625 (168,3)	3/4 x 3 1/2 M20 x 89	8	220 - 250 (298 - 339)
8 DN200	8.625 (219,1)	3/4 x 3 1/2 M20 x 89	8**	220 - 250 (298 - 339)
10 DN250	10.75 (273,1)	7/8 x 4 M22 x 102	12	320 - 400 (434 - 542)
12 DN300	12.75 (323,9)	7/8 x 4 M22 x 102	12	320 - 400 (434 - 542)

* PN 16 has 8 bolts ** PN 16 has 12 bolts

† Mating Bolts and Nuts are not supplied. Flange Mating Bolts must be at least SAE J429 Grade 5 or stronger. Bolt lengths are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

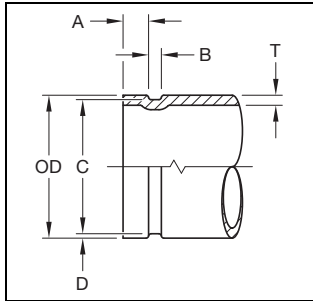
TABLE B
FIGURE 61 AND FIGURE 71 FLANGE ADAPTERS
RECOMMENDED MATING BOLT DATA

Nominal Pipe Size		Recommended Flange Mating Bolts †			Segment Bolts	
ANSI Inch DN	O.D. Inches (mm)	Size Dia. x Lg Inches	Qty.	Bolt Torque Range Ft.-Lbs. / (Nm)	Size Dia. x Lg Inches	Bolt Torque Range Ft.-Lbs. / (Nm)
14 DN350	14.000 (355,6)	1 x 4-1/4	12	360-520 / (488-705)	5/8 x 4-3/4	100-130 / (488-705)
16 DN400	16.000 (406,4)	1 x 4-1/4	16	360-520 / (488-705)		
18 DN450	18.000 (457,2)	1-1/8 x 4-3/4	16	450-725 / (610-982)	3/4 x 4-3/4	130-180 / (841-1356)
20 DN500	20.000 (508,0)	1-1/8 x 4-3/4	20	450-725 / (610-982)		
24 DN600	24.000 (609,6)	1-1/4 x 5-1/2	20	620-1000 / (841-1356)		

† Mating Bolts and Nuts are not supplied. Flange Mating Bolts must be at least SAE J429 Grade 5 or stronger. Bolt lengths are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

TABLE C
FIGURE 71 (14 - 24 INCH) FLANGE ADAPTER
RECOMMENDED BOLT DATA

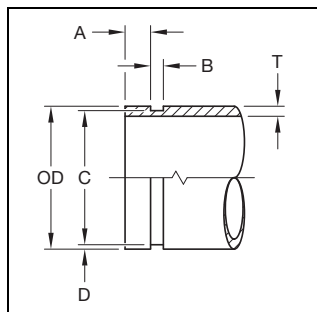
Standard Roll Groove STEEL PIPE Specifications - Figure 1



• The maximum allowable tolerances for IPS Pipe from square cut ends are:		
For sizes 1¼ to 3 (DN32 to DN80)	For sizes 4 to 6 (DN100 to DN150)	For sizes 8 (DN200) and above
0.030" (0,76mm)	0.045" (1,14mm)	0.060" (1,52mm)
• Gasket Seating Surface "A" must be free from score marks, ridges, indentations, projections, loose paint, scale, dirt chips, grease, rust, etc. that would prevent a positive seal.		
• Groove Diameter "C" must be uniform depth around the circumference of the pipe.		
• Groove Depth "D" is a reference dimension only. The Groove Diameter "C" must be maintained.		
• Minimum Wall Thickness "T" is the minimum pipe wall thickness that should be roll grooved.		
• Maximum allowable pipe end flare diameter is measured at the pipe end diameter (Roll Grooved Pipe only).		

Nominal Pipe Size ANSI Inches DN	Pipe O.D. Inches (mm)		A ±0.030 ±0.76mm Inches (mm)	B ±0.030 ±0.76mm Inches (mm)	C Groove Diameter Inches/mm		D Nominal Groove Depth Inches (mm)	T Minimum Wall Inches (mm)	Maximum Flare Diameter Inches (mm)	
	O.D. Inches (mm)	Tolerance			Actual	Tol. +0.000				
		+								-
1 DN25	1.315 (33,7)	0.015 (0,38)	0.015 (0,38)	0.625 (15,88)	0.281 (7,14)	1.190 (30,22)	-0.015 (-0,38)	0.062 (1,60)	0.065 (1,65)	1.36 (34,54)
1-1/4 DN32	1.660 (42,4)	0.016 (0,41)	0.016 (0,41)	0.625 (15,88)	0.281 (7,14)	1.535 (38,99)	-0.015 (-0,38)	0.062 (1,60)	0.065 (1,65)	1.77 (44,96)
1-1/2 DN40	1.900 (48,3)	0.019 (0,48)	0.019 (0,48)	0.625 (15,88)	0.281 (7,14)	1.775 (45,09)	-0.015 (-0,38)	0.062 (1,60)	0.065 (1,65)	2.01 (51,05)
2 DN50	2.375 (60,3)	0.024 (0,61)	0.024 (0,61)	0.625 (15,88)	0.344 (8,74)	2.250 (57,15)	-0.015 (-0,38)	0.062 (1,60)	0.065 (1,65)	2.48 (62,99)
2-1/2 DN65	2.875 (73,0)	0.029 (0,74)	0.029 (0,74)	0.625 (15,88)	0.344 (8,74)	2.720 (69,09)	-0.018 (-0,46)	0.078 (1,98)	0.083 (2,11)	2.98 (75,69)
- DN65	3.000 (76,1)	0.030 (0,76)	0.030 (0,76)	0.625 (15,88)	0.344 (8,74)	2.845 (72,26)	-0.018 (-0,46)	0.076 (1,93)	0.083 (2,11)	3.10 (78,74)
3 DN80	3.500 (88,9)	0.035 (0,89)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	3.344 (84,94)	-0.018 (-0,46)	0.078 (1,98)	0.083 (2,11)	3.60 (91,44)
- DN100	4.250 (108,0)	0.043 (1,09)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	4.084 (103,73)	-0.020 (-0,51)	0.083 (2,11)	0.083 (2,11)	4.35 (110,49)
4 DN100	4.500 (114,3)	0.045 (1,14)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	4.334 (110,08)	-0.020 (-0,51)	0.083 (2,11)	0.083 (2,11)	4.60 (116,84)
- DN125	5.250 (133,4)	0.053 (1,35)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	5.084 (129,13)	-0.022 (-0,56)	0.083 (2,11)	0.109 (2,77)	5.35 (135,89)
- DN125	5.500 (139,7)	0.056 (1,42)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	5.334 (135,48)	-0.022 (-0,56)	0.083 (2,11)	0.109 (2,77)	5.60 (142,24)
5 DN125	5.563 (141,3)	0.056 (1,42)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	5.395 (137,03)	-0.022 (-0,56)	0.084 (2,13)	0.109 (2,77)	5.66 (143,76)
- DN150	6.250 (159,0)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	6.084 (154,53)	-0.030 (-0,76)	0.083 (2,11)	0.109 (2,77)	6.35 (161,29)
- DN150	6.500 (165,1)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	6.330 (160,78)	-0.022 (-0,56)	0.085 (2,16)	0.109 (2,77)	6.60 (167,64)
6 DN150	6.625 (168,3)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.344 (8,74)	6.455 (163,96)	-0.022 (-0,56)	0.085 (2,16)	0.109 (2,77)	6.73 (170,94)
- DN200	8.516 (216,3)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.469 (11,91)	8.331 (211,61)	-0.025 (-0,64)	0.092 (2,34)	0.109 (2,77)	8.69 (220,73)
8 DN200	8.625 (219,1)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.469 (11,91)	8.441 (214,40)	-0.025 (-0,64)	0.092 (2,34)	0.109 (2,77)	8.80 (223,52)
10 DN250	10.750 (273,0)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.469 (11,91)	10.562 (268,27)	-0.027 (-0,69)	0.094 (2,39)	0.134 (3,40)	10.92 (277,37)
12 DN300	12.750 (323,9)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.469 (11,91)	12.531 (318,19)	-0.030 (-0,76)	0.109 (2,77)	0.156 (3,96)	12.92 (328,17)
14 DN350	14.000 (355,6)	0.063 (1,60)	0.031 (0,79)	0.938 (23,83)	0.469 (11,91)	13.781 (350,04)	-0.030 (-0,76)	0.109 (2,77)	0.156 (3,96)	14.10 (358,14)
16 DN400	16.000 (406,4)	0.063 (1,60)	0.031 (0,79)	0.938 (23,83)	0.469 (11,91)	15.781 (400,84)	-0.030 (-0,76)	0.109 (2,77)	0.165 (4,19)	16.10 (408,94)
18 DN450	18.000 457.2	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.469 (11,91)	17.781 (451,64)	-0.030 (-0,76)	0.109 (2,77)	0.165 (4,19)	18.16 (461,26)
20 DN500	20.000 (508,0)	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.469 (11,91)	19.781 (502,44)	-0.030 (-0,76)	0.109 (2,77)	0.188 (4,78)	20.16 (512,06)
24 DN600	24.000 (609,6)	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.500 (12,70)	23.656 (600,86)	-0.030 (-0,76)	0.172 (4,37)	0.218 (5,54)	24.20 (614,68)

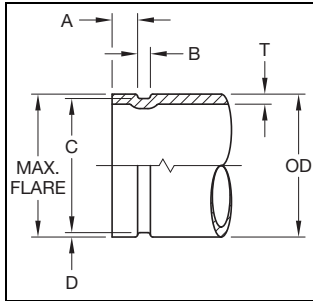
Standard Cut Groove STEEL PIPE Specifications - Figure 2



• The maximum allowable tolerances for IPS Pipe from square cut ends are:		
For sizes 1¼ to 3 (DN32 to DN80)	For sizes 4 to 6 (DN100 to DN150)	For sizes 8 (DN200) and above
0.030" (0,76mm)	0.045" (1,14mm)	0.060" (1,52mm)
• Gasket Seating Surface "A" must be free from score marks, ridges, indentations, projections, loose paint, scale, dirt chips, grease, rust, etc. that would prevent a positive seal.		
• Groove Diameter "C" must be uniform depth around the circumference of the pipe.		
• Groove Depth "D" is a reference dimension only. The Groove Diameter "C" must be maintained.		
• Minimum Wall Thickness "T" is the minimum wall thickness that should be cut grooved.		

Nominal Pipe Size ANSI Inches DN	Pipe O.D. Inches (mm)			A ±0.030 ±0.76mm Inches (mm)	B ±0.030 ±0.76mm Inches (mm)	C Groove Diameter Inches/mm		D Nominal Groove Depth Inches (mm)	T Minimum Wall Inches (mm)
	O.D. Inches (mm)	Tolerance				Actual	Tol. +0.000		
		+	-						
1 DN25	1.315 (33,7)	0.015 (0,38)	0.015 (0,38)	0.625 (15,88)	0.313 (7,95)	1.190 (30,23)	-0.015 (-0,38)	0.062 (1,60)	0.133 (3,38)
1-1/4 DN32	1.660 (42,4)	0.016 (0,41)	0.016 (0,41)	0.625 (15,88)	0.313 (7,95)	1.535 (38,99)	-0.015 (-0,38)	0.062 (1,60)	0.140 (3,56)
1-1/2 DN40	1.900 (48,3)	0.019 (0,48)	0.019 (0,48)	0.625 (15,88)	0.313 (7,95)	1.775 (45,09)	-0.015 (-0,38)	0.062 (1,60)	0.145 (3,68)
2 DN50	2.375 (60,3)	0.024 (0,61)	0.024 (0,61)	0.625 (15,88)	0.313 (7,95)	2.250 (57,15)	-0.015 (-0,38)	0.062 (1,60)	0.154 (3,91)
2-1/2 DN65	2.875 (73,0)	0.029 (0,74)	0.029 (0,74)	0.625 (15,88)	0.313 (7,95)	2.720 (69,09)	-0.018 (-0,46)	0.078 (1,98)	0.188 (4,78)
- DN65	3.000 (76,1)	0.030 (0,76)	0.030 (0,76)	0.625 (15,88)	0.313 (7,95)	2.845 (72,26)	-0.018 (-0,46)	0.076 (1,93)	0.188 (4,78)
3 DN80	3.500 (88,9)	0.035 (0,89)	0.031 (0,79)	0.625 (15,88)	0.313 (7,95)	3.344 (84,94)	-0.018 (-0,46)	0.078 (1,98)	0.188 (4,78)
- DN100	4.250 (108,0)	0.042 (1,07)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	4.084 (103,73)	-0.020 (-0,51)	0.083 (2,11)	0.203 (5,16)
4 DN100	4.500 (114,3)	0.045 (1,14)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	4.334 (110,08)	-0.020 (-0,51)	0.083 (2,11)	0.203 (5,16)
- DN125	5.250 (133,4)	0.052 (1,35)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	5.084 (129,13)	-0.020 (-0,51)	0.083 (2,11)	0.203 (5,16)
- DN125	5.500 (139,7)	0.056 (1,42)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	5.334 (135,48)	-0.022 (-0,56)	0.083 (2,11)	0.203 (5,16)
5 DN125	5.563 (141,3)	0.056 (1,42)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	5.395 (137,03)	-0.022 (-0,56)	0.084 (2,13)	0.203 (5,16)
- DN150	6.250 (159,0)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	6.084 (154,53)	-0.022 (-0,56)	0.083 (2,11)	0.219 (5,56)
- DN150	6.500 (165,1)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	6.330 (160,78)	-0.022 (-0,56)	0.085 (2,16)	0.219 (5,56)
6 DN150	6.625 (168,3)	0.063 (1,60)	0.031 (0,79)	0.625 (15,88)	0.375 (9,53)	6.455 (163,96)	-0.022 (-0,56)	0.085 (2,16)	0.219 (5,56)
- DN200	8.516 (216,3)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.438 (11,13)	8.331 (211,61)	-0.025 (-0,64)	0.092 (2,34)	0.238 (6,05)
8 DN200	8.625 (219,1)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.438 (11,13)	8.441 (214,40)	-0.025 (-0,64)	0.092 (2,34)	0.238 (6,05)
10 DN250	10.750 (273,0)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.500 (12,70)	10.562 (268,27)	-0.027 (-0,69)	0.094 (2,39)	0.250 (6,35)
12 DN300	12.750 (323,9)	0.063 (1,60)	0.031 (0,79)	0.750 (19,05)	0.500 (12,70)	12.531 (318,19)	-0.030 (-0,76)	0.109 (2,77)	0.279 (7,09)
14 DN350	14.000 (355,6)	0.063 (1,60)	0.031 (0,79)	0.938 (23,83)	0.500 (12,70)	13.781 (350,04)	-0.030 (-0,76)	0.109 (2,77)	0.281 (7,14)
16 DN400	16.000 (406,4)	0.063 (1,60)	0.031 (0,79)	0.938 (23,83)	0.500 (12,70)	15.781 (400,84)	-0.030 (-0,76)	0.109 (2,77)	0.312 (7,92)
18 DN450	18.000 (457,2)	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.500 (12,70)	17.781 (451,64)	-0.030 (-0,76)	0.109 (2,77)	0.312 (7,92)
20 DN500	20.000 (508,0)	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.500 (12,70)	19.781 (502,44)	-0.030 (-0,76)	0.109 (2,77)	0.312 (7,92)
24 DN600	24.000 (609,6)	0.063 (1,60)	0.031 (0,79)	1.000 (25,40)	0.562 (14,27)	23.656 (600,86)	-0.030 (-0,76)	0.172 (4,37)	0.375 (9,53)

Standard Roll Groove COPPER TUBING Specifications - Figure 3



- Nominal Tubing, ASTM B-88 drawn copper tubing size.
- The maximum allowable tolerances for square end cuts on copper tubing are:
For sizes 2 to 3 inch — 0.030" (0,76 mm) For sizes 4 to 6 inch — 0.045" (1,14 mm)
- Gasket Seating Surface "A" must be free from roll marks, indentations, projections, loose scale, dirt, chips, grease, etc. that would prevent a positive seal.
- Groove Width Bottom, to be free of loose dirt, chips and scale that may interfere with proper coupling assembly.
- The Groove Diameter "C" must be uniform in depth for the entire circumference of the tubing. Groove must be maintained within the tolerance listed.
- Groove Depth "D" is a reference dimension only. The Groove Diameter "C" must be maintained.
- Minimum Wall Thickness "T", per ASTM B-306 drain waste and vent (DWV), is minimum wall thickness copper tubing, which may be roll grooved.
- Maximum flare diameter is the OD at the most extreme tubing diameter.

Nominal Tubing Size ANSI Inches	Tubing O.D. Inches (mm)			A ± 0.030" ± 0.76 Inches (mm)	B ± 0.030" ± 0.76 Inches (mm)	C Groove Diameter Inches/mm		D Nominal Groove Depth Inches (mm)	T Minimum Wall Inches (mm)	Maximum Flare Diameter Inches (mm)
	O.D. Inches (mm)	Tolerance				Actual	Tol. +0.000			
		+	-							
2	2.125 (54,0)	0.002 (0,05)	0.002 (0,05)	0.610 (15,5)	0.300 (7,6)	2.029 (51,5)	-0.020 (-0,51)	0.048 (1,2)	0.058 (1,5)	2.220 (56,4)
2-1/2	2.625 (66,7)	0.002 (0,05)	0.002 0.05	0.610 (15,5)	0.300 (7,6)	2.525 (64,1)	-0.020 (-0,51)	0.050 (1,2)	0.065 (1,7)	2.720 (69,1)
3	3.125 (79,4)	0.002 (0,05)	0.002 (0,05)	0.610 (15,5)	0.300 (7,6)	3.025 (76,8)	-0.020 (-0,51)	0.050 (1,2)	DWV	3.220 (81,8)
4	4.125 (104,8)	0.002 (0,05)	0.002 (0,05)	0.610 (15,5)	0.300 (7,6)	4.019 (102,1)	-0.020 (-0,51)	0.053 (1,4)	DWV	4.220 (107,2)
5	5.125 (130,2)	0.002 (0,05)	0.002 (0,05)	0.610 (15,5)	0.300 (7,6)	4.999 (127,0)	-0.020 (-0,51)	0.053 (1,4)	DWV	5.220 (132,6)
6	6.125 (155,6)	0.002 (0,05)	0.002 (0,05)	0.610 (15,5)	0.300 (7,6)	5.999 (152,3)	-0.020 (-0,51)	0.063 (1,6)	DWV	6.220 (158,0)
8	8.125 (206,4)	0.002 (0,05)	0.004 (0,10)	0.610 (15,5)	0.300 (7,6)	7.959 (202,2)	-0.020 (-0,51)	0.083 (2,1)	DWV	8.220 (208,8)

Tolerances for 8" (206.4mm) are +0.002 (0.5mm); -0.004 (-0.10mm).