Grinnell

FOUNDED 1850

Mechanical Products

Installation Handbook

tyco
Mechanical Products

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GRINNELL MECHANICAL PRODUCTS

INSTALLATION INSTRUCTIONS

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GROOVED FITTINGS

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Company Information

GRINNELL Products, a premium brand of TYCO International, delivers quality piping solutions for a full range of mechanical, HVAC, mining, commercial, industrial, institutional, and governmental applications. Available products offer contractors, engineers, and distributors faster, more cost-effective tools for joining pipe over traditional welding methods. Innovative GRINNELL products include couplings, fittings, mechanical tees, valves, and accessories as well as complete systems for joining copper, stainless steel, plain end, G-PRESS press-fitting, and HDPE. Comprehensive, competitively priced engineering and planning support services provide labor and cost savings. For more information, visit www.grinnell.com.

Disclaimer

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*As used in this Table of Contents and Installation Handbook, the designation “domestic” identifies the last point of manufacture or assembly for a product. However, this designation does not represent compliance with any government regulatory standards or contract specifications and should not be relied upon for such purposes. Contact TYCO Trade Compliance to request separate certifications or other representations concerning the specific regulatory standards or contract specifications which apply to your application. In your request, identify the part numbers and specific regulatory standards or contract specifications.

Standard Warnings

⚠WARNING

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

It is the Designer’s responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data are not exceeded. Material and gasket selection should be verified to be compatible for the specific application. Always read and understand the installation instructions.

GRINNELL Mechanical Products described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the Approval agency, in addition to the standards of any other authorities having jurisdiction. Failure to do so may result in serious personal injury or impair the performance of these devices.

Owners are responsible for maintaining their mechanical system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

1. *Read and understand all instructions before installing any GRINNELL Mechanical Products.*
2. *Be sure to wear appropriate safety equipment.*
3. *Verify that the system is de-pressurized and drained before starting any installation, repair, or modification.*

Housing / Fitting Material Specifications

The applicable material specifications for ductile iron and galvanizing apply:

- *Ductile Iron Fittings*
  - *ASTM A 536 - Standard specification for ductile iron castings, Grade 65-45-12*
  - *Tensile Strength, minimum 65,000 psi (448.159 kPa)*
  - *Yield Strength, minimum 45,000 psi (310.264 kPa)*
  - *Elongation in 2" (50mm), minimum 12%*
  - *ASTM A 153 – Standard specification for hot-dip galvanizing*
- *Fabricated Steel Fittings*
  - *Carbon Steel: According to ASTM A 53, Grade B*
  - *Tensile Strength, minimum 60,000 psi (413.685 kPa)*
  - *Yield Strength, minimum 35,000 psi (241.316 kPa)*
  - *Sizes 1-1/4" – 10" (32mm – 250mm) Schedule 40*
  - *Sizes 12" – 24" (300mm – 600mm) STD (.375)*

Coupling Bolt / Nut Specifications

- *ANSI*
  - *Carbon Steel heavy hex nuts conform to the physical properties of ASTM A 183 Grade 2 and SAE J995 Grade 5.*
- *Metric*
  - *Carbon Steel oval neck track head bolts (Gold color coded) are heat treated and conform to the physical properties of ASTM F 568 M with a minimum tensile strength of 760 MPa.*
  - *Carbon Steel heavy hex nuts conform to the physical properties of ASTM A 563 M Class 9. Bolts and nuts are zinc-electroplated conforming to ASTM B 633.*
- Stainless steel bolts and nuts are available upon request.

Nominal Pipe Size		Figure 772		Figure 770	
ANSI Inches *DN*	O.D. Inches *mm*	Inches *mm*		Inches *mm*	
		Bolt Size	Socket Size	Bolt Size	Socket Size
1-1/4 *32*	1.660 *42,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	—	—
1-1/2 *40*	1.900 *48,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	—	—
2 *50*	2.375 *60,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	5/8 x 2-3/4 *M16 x 70*	1-1/16 *24*
2-1/2 *65*	2.875 *73,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	5/8 x 3-1/2 *M16 x 89*	1-1/16 *24*
— *65*	3.000 *76,1*	— *M10 x 57*	— *16*	—	—
3 *80*	3.500 *88,9*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	5/8 x 3-1/2 *M16 x 89*	1-1/16 *24*
4 *100*	4.500 *114,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16 mm*	3/4 x 4-1/4 *M20 x 108*	1-1/4 *30*
— *125*	5.500 *139,7*	— *M16 x 83*	— *24*	—	—
5 *125*	5.563 *141,3*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*	—	—
— *150*	6.500 *165,1*	— *M16 x 83*	— *24*	—	—
6 *150*	6.625 *168,3*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*	7/8 x 5-1/2 *M22 x 140*	1-7/16 *36*
8 *200*	8.625 *219,1*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*	1 x 5-1/2 *M24 x 140*	1-5/8 *41*
10 *250*	10.750 *273,1*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*
12 *300*	12.750 *323,4*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*
14[a] *350*	14.000 *355,6*	— *1 x 5-1/2*	— *1-5/8*	—	—
16[a] *400*	16.000 *406,4*	— *1 x 5-1/2*	— *1-5/8*	—	—
18[a] *450*	18.000 *457,2*	— *1 x 5-1/2*	— *1-5/8*	—	—
20[a] *500*	20.000 *508,0*	— *1-1/8 x 5-3/4*	— *1-13/16*	—	—
24[a] *600*	24.000 *609,6*	— *1-1/8 x 5-3/4*	— *1-13/16*	—	—

a. Available in ANSI bolt sizes only

Nominal Pipe Size		Figure 705		Figure 707	
ANSI Inches ***DN***	**O.D. Inches** ***mm***	***Inches / (mm)***		***Inches / (mm)***	
		Bolt Size	**Socket Size**	**Bolt Size**	**Socket Size**
1 *25*	1.315 *33,4*	—	—	1/2 x 3 *M12 x 76*	7/8 *18*
1-1/4 *32*	1.660 *42,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	—	—
1-1/2 *40*	1.900 *48,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	1/2 x 3 *M12 x 76*	7/8 *18*
2 *50*	2.375 *60,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	1/2 x 3 *M12 x 76*	7/8 *18*
2-1/2 *65*	2.875 *73,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	1/2 x 3 *M12 x 76*	7/8 *18*
— *65*	3.000 *76,1*	— *M12 x 76*	— *18*	— *M12 x 76*	— *18*
3 *80*	3.500 *88,9*	1/2 x 3 *M12 x 76*	7/8 *18*	1/2 x 3 *M12 x 76*	7/8 *18*
— *100*	4.250 *108,0*	— *M12 x 76*	— *18*	—	—
4 *100*	4.500 *114,3*	1/2 x 3 *M12 x 76*	7/8 *18*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*
— *125*	5.250 *133,0*	— *M16 x 83*	— *30*	—	—
— *125*	5.500 *139,7*	— *M16 x 83*	— *30*	—	—
5 *125*	5.563 *141,3*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*
— *150*	6.250 *159,0*	— *M16 x 83*	— *30*	—	—
— *150*	6.500 *165,1*	— *M16 x 83*	— *30*	— *M20 x 121*	— *30*
6 *150*	6.625 *168,3*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*
8 *200*	8.625 *219,1*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*	7/8 x 6-1/2 *M22 x 165*	1-7/16 *36*
10 *250*	10.750 *273,1*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*
12 *300*	12.750 *323,4*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*
14* *350*	14.000 *355,6*	—	—	*1 x 5-1/2*	1-5/8
16* *400*	16.000 *406,4*	—	—	*1 x 5-1/2*	1-5/8
18* *450*	18.000 *457,2*	—	—	*1 x 5-1/2*	1-5/8
20* *500*	20.000 *508,0*	—	—	*1-1/8 x 5-3/4*	1-13/16
24* *600*	24.000 *609,6*	—	—	*1-1/8 x 5-3/4*	1-13/16

a. Available in ANSI bolt sizes only

Nominal Pipe Size		Figure 672		Figure 61[a]	
ANSI Inches *DN*	O.D. Inches *mm*	Inches / *(mm)* Bolt Size	Inches / *(mm)* Socket Size	Inches / *(mm)* Bolt Size	Inches / *(mm)* Socket Size
2 *50*	2.125 *54,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	5/8 x 3 *M16 x 76*	1-1/16 *24*
2-1/2 *65*	2.625 *66,7*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	5/8 x 3 *M16 x 76*	1-1/16 *24*
3 *80*	3.125 *79,4*	1/2 x 3 *M12 x 76*	7/8 *18*	5/8 x 3 *M16 x 76*	1-1/16 *24*
4 *100*	4.125 *104,8*	1/2 x 3 *M12 x 76*	7/8 *18*	5/8 x 3 *M16 x 76*	1-1/16 *24*
5 *125*	5.125 *130,7*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*	3/4 x 3-1/2 *M20 x 89*	1-1/4 *30*
6 *150*	6.125 *155,6*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*	3/4 x 3-1/2 *M20 x 89*	1-1/4 *30*
8 *200*	8.125 *206,4*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*	—	—

a. ANSI Class 125/150 Flange Bolts and Nuts are not supplied.

Nominal Pipe Size		Figure 716		Figure 730	
ANSI Inches *DN*	O.D. Inches *mm*	Inches / *(mm)* Bolt Size	Inches / *(mm)* Socket Size	Inches / *(mm)* Bolt Size	Inches / *(mm)* Socket Size
2 *50*	2.375 *60,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16 mm*	3/8 x 2-1/4 *M10 x 57*	11/16 *18*
2-1/2 *65*	2.875 *73,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16 mm*	3/8 x 2-1/4 *M10 x 57*	11/16 *18*
— *65*	3.000 *76,1*	*M12 x 76*	— *18 mm*	*M10 x 57*	— *16*
3 *80*	3.500 *88,9*	1/2 x 3 *M12 x 76*	7/8 *18 mm*	1/2 x 3 *M12 x 76*	7/8 *18*
— *100*	4.500 *114,3*	*M16 x 83*	— *24 mm*	*M12 x 76*	— *18*
4 *100*	4.500 *114,3*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24 mm*	1/2 x 3 *M12 x 76*	7/8 *18*
— *125*	5.500 *139,7*	*M20 x 121*	— *30 mm*	*M16 x 121*	— *24*
5 *125*	5.563 *141,3*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30 mm*	5/8 x 4-3/4 *M16 x 121*	1-1/16 *24*
— *150*	6.500 *165,1*	*M20 x 121*	— *30 mm*	*M16 x 121*	— *24*
6 *150*	6.625 *168,3*	*3/4 x 4-3/4* *M20 x 121*	1-1/4 *30 mm*	5/8 x 4-3/4 *M16 x 121*	1-1/16 *24*
— *200*	8.515 *216,3*	—	—	*M20 x 121*	— *30*
8 *200*	8.625 *219,1*	*7/8 x 6-1/2* *M22 x 165*	1-7/16 *36 mm*	3/4 x 4-3/4 *M20 x 121*	1-5/8 *41*

Nominal Pipe Size		Figure 774	
		Inches / (mm)	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Bolt Size**	**Socket Size**
1 *25*	1.315 *33,4*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
1-1/4 *32*	1.660 *42,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
1-1/2 *40*	1.900 *48,2*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
2 *50*	2.375 *60,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
2-1/2 *65*	2.875 *73,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
76,1mm *65*	3.000 *76,1*	— *M10 x 57*	— *16*
3 *80*	3.500 *88,9*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
4 *100*	4.500 *114,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
139,7mm *125*	5.500 *139,7*	— *M12 x 76*	— *18*
5 *125*	5.563 *141,3*	1/2 x 3 *M12 x 76*	7/8 *18*
165,1mm *150*	6.500 *165,1*	— *M12 x 76*	— *18*
6 *150*	6.625 *168,3*	1/2 x 3 *M12 x 76*	7/8 *18*
8 *200*	8.625 *219,1*	5/8 x 3-1/4 *M16 x 83*	1-1/16 *24*
10 *250*	10.750 *273,1*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*
12 *300*	12.750 *323,4*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*

a. Available in ANSI bolt sizes only

Nominal Pipe Size		Figure 71[a]		Figure 71		
		Inches *mm*		*mm*		
ANSI Inches *DN*	O.D. Inches *mm*	Flange Bolt Size	Socket Size	Flange Bolt Pattern Des.	Flange Bolt Size	Socket Size
2 *50*	2.375 *60,3*	5/8 x 3 *M16 x 76*	1-1/16 *24*	PN10 / PN16	*M16 x 76*	*24*
2-1/2 *65*	2.875 *73,0*	5/8 x 3 *M16 x 76*	*1-1/16* *24*	—	—	—
76,1mm *65*	— *76,1*	—	—	PN10 / PN16	*M16 x 76*	*24*
3[c] *80*	3.500 *88,9*	—	—	PN10	*M16 x 76*	*24*
3 *80*	3.500 *88,9*	5/8 x 3 *M16 x 76*	1-1/16 *24*	PN16	*M16 x 76*	*24*
4 *100*	4.500 *114,3*	5/8 x 3 *M16 x 76*	1-1/16 *24*	PN10 / PN16	*M16 x 76*	*24*
5 *125*	5.563 *141,3*	3/4 x 3-1/2 *M20 x 89*	1-1/4 *30*	PN10 / PN16	*M16 x 89*	*24*
165,1mm 150	6.500 *165,1*	—	—	PN10 / PN16	*M20 x 89*	*30*
6 *150*	6.625 *168,3*	3/4 x 3-1/2 *M20 x 89*	1-1/4 *30*	PN10 / PN16	*M20 x 89*	*30*
8[c] *200*	8.625 *219,1*	—	—	PN10	*M20 x 89*	*30*
8 *200*	8.625 *219,1*	3/4 x 3-1/2 *M20 x 89*	1-1/4 *30*	PN16	*M20 x 89*	*30*
10[c] *250*	10.750 *273,1*	—	—	PN10	*M20 x 102*	*30*
10 *250*	10.750 *273,1*	7/8 x 4 *M22 x 102*	1-7/16 *36*	PN16	*M22 x 102*	*36*
12[c] *300*	12.750 *323,4*	—	—	PN10	*M20 x 102*	*30*
12 *300*	12.750 *323,4*	7/8 x 4 *M22 x 102*	1-7/16 *36*	PN16	*M22 x 102*	*36*
14[b] *350*	14.000 *355,6*	1 x 4-1/4	1-5/8	—	—	—
16[b] *400*	16.000 *406,4*	1 x 4-1/4	1-5/8	—	—	—
18[b] *450*	18.000 *457,2*	1-1/8 x 4-3/4	1-13/16	—	—	—
20[b] *500*	20.000 *508,0*	1-1/8 x 4-3/4	1-13/16	—	—	—
24[b] *600*	24.000 *609,6*	1-1/4 x 5-1/2	2	—	—	—

a. ANSI Class 125/150 Flange Bolts and Nuts are not supplied.
b. For Segment Bolt Torque Recommendations, refer to Technical Data Sheet G150.
c. For noted sizes, PN10 and PN16 dimensional values differ.

Nominal Pipe Size		Figure 71H	
		Inches *mm*	
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Flange Bolt Size**	**Socket Size**
2 *50*	2.375 *60,3*	5/8 x 3	1-1/16
2-1/2 *65*	2.875 *73,0*	5/8 x 3	1-1/16
3 *80*	3.500 *88,9*	5/8 x 3	1-1/16
4 *100*	4.500 *114,3*	5/8 x 3	1-1/16
5 *125*	5.563 *141,3*	3/4 x 3-1/2	1-1/4
6 *150*	6.625 *168,3*	3/4 x 3-1/2	1-1/4
8 *200*	8.625 *219,1*	3/4 x 3-1/2	1-1/4
10 *250*	10.750 *273,1*	7/8 x 4	1-7/16
12 *300*	12.750 *323,4*	7/8 x 4	1-7/16

Nominal Pipe Size		Figure 640			
		Inches *mm*			
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Pivot Bolt Size**	**Socket Size**	**Coupling Bolt Size**	**Socket[a] Size**
2 *50*	2.125 *54,0*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
2-1/2 *65*	2.625 *66,7*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
3 *80*	3.125 *79,4*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
4 *100*	4.125 *104,8*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
5 *125*	5.125 *130,7*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
6 *150*	6.125 *155,6*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
8 *200*	8.125 *206,4*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*

a. Deep Socket Wrench required

Nominal Pipe Size		Figure 740			
		Inches *mm*			
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Pivot Bolt Size**	**Socket Size**	**Coupling Bolt Size**	**Socket[a] Size**
2 *50*	2.375 *60,3*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
2-1/2 *65*	2.875 *73,0*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
76,1mm *65*	3.000 *76,2*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
3 *80*	3.500 *88,9*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*	1/2 x 3-3/4 *M12 x 95*	7/8 *18*
4 *100*	4.500 *114,3*	1/2 x 3-3/4 *M12 x 95*	7/8 (18 mm)	1/2 x 3-3/4 *M12 x 95*	7/8 (18 mm)
139,7mm *125*	5.500 *139,7*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
5 *125*	5.563 *141,3*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
165,1mm *150*	6.500 *165,1*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
6 *150*	6.625 *168,3*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*
8 *200*	8.625 *219,1*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*	5/8 x 4-1/2 *M16 x 114*	1-1/16 *24*

a. Deep Socket Wrench required

Nominal Pipe Size		Figure 472		Figure 405	
ANSI Inches *DN*	O.D. Inches *mm*	Inches *mm*		Inches *mm*	
		Bolt Size	Socket Size	Bolt Size	Socket Size
1 *25*	1.315 *33,4*	—	—	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
1-1/4 *32*	1.660 *42,4*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
1-1/2 *40*	1.900 *48,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
2 *50*	2.375 *60,3*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
2-1/2 *65*	2.875 *73,0*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*	3/8 x 2-1/4 *M10 x 57*	11/16 *16*
— *65*	3.000 *76,2*	— *M10 x 57*	11/16 *16*	— *M12 x 76*	— *18*
3 *80*	3.500 *88,9*	1/2 x 3 *M12 x 76*	7/8 *18*	1/2 x 3 *M12 x 76*	7/8 *18*
4 *100*	4.500 *114,3*	1/2 x 3 *M12 x 76*	7/8 *18*	1/2 x 3 *M12 x 76*	7/8 *18*
— *125*	5.500 *139,7*	— *M16 x 83*	— *30*	— *M16 x 83*	— *30*
5 *125*	5.563 *141,3*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*
6 *150*	6.625 *168,3*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*	5/8 x 3-1/4 *M16 x 83*	1-1/4 *30*
8 *200*	8.625 *219,1*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*	3/4 x 4-3/4 *M20 x 121*	1-1/4 *30*
10 *250*	10.750 *273,0*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	—	—
12 *300*	12.750 *323,9*	1 x 6-1/2 *M24 x 165*	1-5/8 *41*	—	—

Finishes

- *Orange, non-lead paint (standard)*
- *Red, non-lead paint (optional)*
- *Hot-dipped, zinc galvanized conforming to ASTM A 153*
- *Copper acrylic enamel for copper system couplings*

Threads

- *NPT (National Pipe Thread Tapered Thread)*
- *BSPT (British Standard Pipe Tapered Thread)*

Table Specifications Guidelines

Throughout this handbook, nominal pipe sizes are referred to in "ANSI Inches" and "DN". ANSI Inches is a nominal pipe size derived from the older IPS (Iron Pipe Size) in inches. Sizes offered in ANSI Inches directly correlate to nominal pipe sizes recognized in ANSI (American National Standard Institute) pipe standards.

DN refers to nominal pipe sizes in "diameter nominal" and is a dimensionless designator for nominal pipe sizes in metric. Certain DN sizes (for example, DN65, DN125, and DN150) are offered in multiple actual outside diameters. Consequently, when specifying by DN pipe size, the O.D. (outside diameter) must be specified as well.

Ordering Information

When placing an order, indicate the full product name. When applicable, specify the figure number and size, type of gasket, material, and quantity.

Care and Maintenance

The Owner is responsible for the inspection, testing, and maintenance of their mechanical system and associated devices in compliance with the standards of any authorities having jurisdiction. Failure to do so may result in serious personal injury or impair the performance of these devices. Contact the installing contractor or product manufacturer with any questions. Any impairment must be immediately corrected.

Availability and Service

GRINNELL Mechanical Products are available globally through a network of distribution centers. Visit www.grinnell.com or call 800-558-5236 for the nearest distributor.

Limited Warranty

Full warranty terms can be found on www.grinnell.com.

Agency Listings and Approvals

Our products bear the seal of approval from the following General Code Groups, Associations, Laboratories, Government Agencies & Approval Bodies.

ACS

ACTIVFIRE: Active Fire Protection Product Certification

AP SAD

American Bureau of Shipping (ABS)

American National Standards Institute (ANSI)

American Water Works Association (AWWA):
- AWWA C-606

American Petroleum Institute (API)

API Std. 5L, Sect. 7.5

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

American Society of Mechanical Engineers (ASME)

- *Power Piping, B31.1*
- *Chemical Plant and Petroleum Refinery Piping, B31.3*
- *Refrigeration Piping, B31.5*
- *Building Services Piping, B31.9*
- *Elevator, Escalator, A17.1*

ARPA

Building Officials and Code Administrators (BOCA)

Bureau Veritas (BV)

CNBOP: Centrum Naukowo-Badawcze Ochrony Przeciwpozarowe

Coast Guard: Approved each vessel individually

Corps of Engineers (COE)

GEGS 15000

CRN: Canadian Registration Number

CSTB

DNV: Det Norske Veritas

DVGW: Deutscher Verein des Gas-und Wasserfaches e.V.

Factory Mutual Engineering Corporation (FM):
- Approved for Fire Protection Services

Federal Aviation Administration (FAA):
- HVAC, Plumbing and Fire Protection

Federal Housing Administration (FHA)

General Services Administration (GSA)
- 15000 Series

Germanischer Lloyd

International Association of Plumbing and Mechanical Officials (IAPMO)

Agency Listings and Approvals

ICC-ES:
- National Evaluation Service, Inc.

IPC

Association Connecting Electronics Industries

LLOYD'S: Lloyd's Register of Shipping

Loss Prevention Certification Board (LPCB):
- Approved for Fire Protection Services

Material Equipment and Acceptance (MEA)

Military Specifications (MIL)

- *MIL-P – 10388 Fittings*
- *MIL-C – 10387 Couplings*
- *MIL-P – 11087A (CE) Steel Pipe*
- *Grooved MIL-I – 45208 Inspection Procedure*

NASA: National Aeronautics and Space Administration

NIH: National Institute of Health - Department of Health, 5000 Series

NAVFAC: Naval Facilities Engineering Command, NFGS 15000 Series

NFPA: National Fire Protection Association

NSF: National Sanitation Foundation:
- The Public Health and Safety Company

PAVUS

PCT

Pressure Equipment Directive

RINA: Registro Italiano Navale

T/S/U

SBCCI: Southern Building Code Congress International

Standard Plumbing

UL: Underwriters Laboratories, Inc.
- Listed for Fire Protection Services

ULC: Underwriters Laboratories of Canada
- Listed for Fire Protection Services

UPC: Uniform Plumbing Code

VdS: Verband der Sachversichere e.V.
- Approved for Fire Protective Service

VA: Veterans Affairs, 15000 Series

WaterMark: Pending Approved for Potable Water Service (AU)

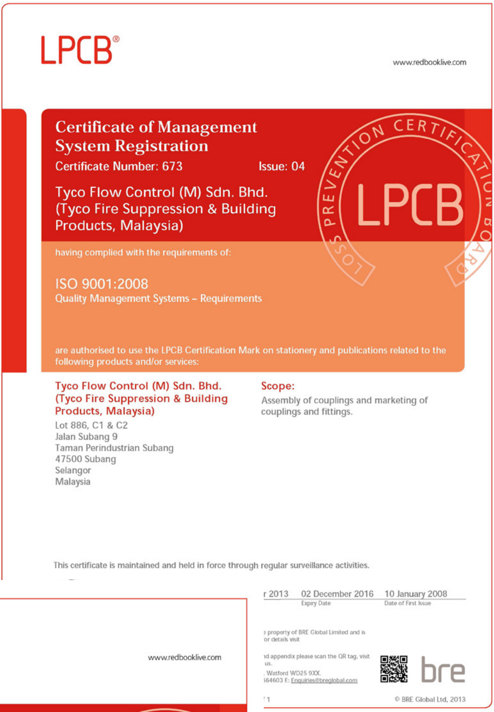
WRAS: Water Regulations Advisory Scheme (UK)

WSD: Pending Approved for Potable Water Service (HK)

97/23/EC

ISO 9001:2008 Certified

GRINNELL Mechanical Products are manufactured according to ISO 9001:2008 quality assurance standards.



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www.redbooklive.com

Certificate of Management System Registration

Certificate Number: 673 Issue: 04

Tyco Flow Control (M) Sdn. Bhd. (Tyco Fire Suppression & Building Products, Malaysia)

having complied with the requirements of:

ISO 9001:2008
Quality Management Systems – Requirements

are authorised to use the LPCB Certification Mark on stationery and publications related to the following products and/or services:

Tyco Flow Control (M) Sdn. Bhd. (Tyco Fire Suppression & Building Products, Malaysia)
Lot 886, C1 & C2
Jalan Subang 9
Taman Perindustrian Subang
47500 Subang
Selangor
Malaysia

Scope:
Assembly of couplings and marketing of couplings and fittings.

This certificate is maintained and held in force through regular surveillance activities.

r 2013	02 December 2016	10 January 2008
	Expiry Date	Date of First Issue

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Certificate of Management System Registration

Certificate Number: 570 Issue: 08

Tyco Fire & Building Products

having complied with the requirements of:

ISO 9001:2008
Quality Management Systems – Requirements

are authorised to use the LPCB Certification Mark on stationery and publications related to the following products and/or services:

Tyco Fire & Building Products
Research & Development Centre
1467 Elmwood Avenue
Cranston
RI 02910
USA

Scope:
Research, design, development and manufacturing support for the fire protection equipment, pipe couplings, fittings, related piping system components and CPVC pipe and fitting manufactures of Tyco Fire and Building Products.

This certificate is maintained and held in force through regular surveillance activities.

	Tracie Hunter	16 August 2014	15 August 2017	16 August 2002
Signed for LPCB	Technical Manager	Date of This Issue	Expiry Date	Date of First Issue

LPCB UKAS MANAGEMENT SYSTEMS 007

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Installation Guidelines

These installation instructions do not take the place of nor eliminate the need for the installer to fully read and understand the complete Grinnell Mechanical Products Installation Handbook and individual product technical data sheets for the latest instructions, techniques, and care and maintenance information. This document does not supersede or replace the individual product technical data sheets. Current documentation can be obtained by contacting Grinnell Mechanical Products or by visiting www.grinnell.com.

⚠ WARNING

Failure to follow these instructions may result in improper product installation, joint failure or leakage, serious personal injury, and/or property damage.

The following instructions should be used as a guideline for the proper installation of GRINNELL grooved products.

1. Always read and understand the instructions.
2. To avoid serious personal injury, wear safety glasses, hard hat and foot protection.
3. Never remove any piping component without verifying that the system is de-pressurized and drained. Failure to do so may result in serious personal injury.
4. Ensure that the supplied gasket is suitable for the intended application. To prevent deterioration of the gasket material, a petroleum lubricant should never be used. Use a recommended lubricant to install the gasket.
5. The pipe and tubing groove dimensions must be in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to the Prep Equipment section of this manual or tech data sheets G710 and G720 for more information.
6. Ensure that the coupling keys are engaged in the grooves.
7. Always tighten nuts evenly by alternating sides. Uneven tightening can cause the gasket to pinch or bind. If a gasket becomes pinched, replace it immediately. Not applicable to the installation-ready Figure 740 and Figure 640 Pivot-Bolt Rigid Couplings.
8. Torque values are supplied per manufacturer's instructions for power impact wrench. Always refer to the manufacturer’s instructions for settings.
9. Exceeding the suggested torque values may cause damage to the coupling and/or result in pipe-joint failure. Minimum bolt torque is required for the coupling to meet the published performance parameters.
10. Always inspect each joint to ensure that the coupling is properly installed.

Grooved Pipe and Gasket Preparation

⚠ WARNING

Always read and understand the installation instructions including the "Installation Guidelines" provided on page 15. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

EDPM Tri-Seal gaskets are recommended for freezer applications. Reducing Couplings are not recommended for freezer applications. For dry pipe and freezer applications, use the Tri-Seal freezer gasket with a petroleum-free silicone lubricant. Standard lube is not recommended for this application as it freezes and can cause leakage.

The following pipe preparation 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. Refer to the individual technical data sheets (listed below) for additional information.

Rigid Couplings

- *Figure 772 Rigid Couplings (TDS G140 and TDS G141)*
- *Figure 770 Rigid Couplings (TDS G138)*
- *Figure 774 Grooved Rigis Coupling (TDS G142)*
- *Figure 672 Copper Rigid Couplings (TDS G510)*
- *Figure 472 Stainless Steel Rigid Couplings (G560)*

Flexible Couplings

- *Figure 705 Flexible Couplings (TDS G110)*
- *Figure 707 Heavy Duty Flexible Couplings (TDS G130)*
- *Figure 405 Stainless Steel Flexible Couplings (TDS G565)*
- *Figure 716 Flexible Reducing Couplings (TDS G120)*

Grooved Snap Couplings

- *Figure 780 Grooved Snap Couplings (TDS G145)*

Installation-Ready Couplings

- *Figure 740 Rapid Installation Pivot-Bolt Rigid Couplings (TDS G144)*
- *Figure 640 Grooved Pivot-Bolt Rigid Couplings (TDS G512)*

Grooved Pipe and Gasket Preparation


Step 1.


Step 1a.


Step 2.


Step 2a.

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 is removed. Pipe end sealing surfaces must be free from sharp edges, projections, indentations, and/or other defects.

Verify that the coupling and gasket grade are correct for the application intended. Refer to Step 1a and 2a for large diameter coupling preparation. Refer to Tech Data Sheet G610 for additional gasket information.

Step 2. To help insert pipe easily and mount coupling smoothly without pinching, the sealing edges and outer surfaces of the gasket should be covered with a fine layer of lubricant.

To prevent gasket deterioration, a petroleum-free lubricant is recommended for all EPDM gaskets. For applications below 40°F (4°C), a petroleum-free, silicone-based lubricant should be used to prevent lubricant freezing.

- ***For NSF Requirement:***
  (For Figure 672 Copper Rigid Couplings, Figure 640 Copper Pivot-Bolt Rigid Couplings and "EN" Gaskets for IPS Couplings)

  In order to retain the NSF 61 certification, an NSF 61 certified lubricant must be used for the intended service.

  Dow Corning* No. 7 Release Compound is recommended by GRINNELL Mechanical Products.

Normally, no lubricant is required when using a pre-lube gasket.

*Registered Trademark of Dow Corning Corporation.

Couplings

Rigid and Flexible (2 to 12 Inch)

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

Note: *EDPM tri-seal gaskets are recommended for applications below 40°F (4°C).*

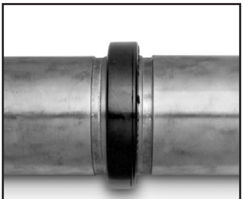
This section covers the following products, listed below with their corresponding technical data sheets.

Rigid Couplings

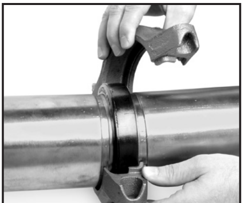
- *Figure 772 Rigid Coupling (TDS G140 and TDS G141)*
- *Figure 770 Rigid Coupling (TDS G138)*
- *Figure 774 Grooved Rigid Coupling (TDS G142)*
- *Figure 672 Copper Rigid Coupling (TDS G510)*
- *Figure 472 Stainless Steel Rigid Coupling (TDS G560)*

Flexible Couplings

- *Figure 705 Flexible Coupling (TDS G110)*
- *Figure 707 Heavy Duty Flexible Coupling (TDS G130)*
- *Figure 405 Stainless Steel Flexible Coupling (TDS G565)*



Step 2.



Step 3.

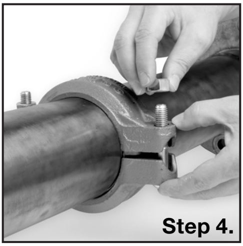
Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

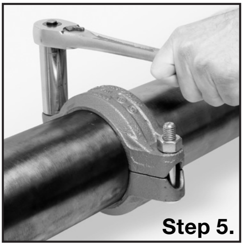
Step 2. Install the gasket by placing it over the pipe so that the gasket lip does not extend beyond the end of the pipe. Bring both pipe ends together ensuring vertical and horizontal alignment. Slide the gasket into position centering it between the grooves of each pipe end.

Step 3. With one nut and bolt removed, "swing" the coupling housing over the gasket. Verify that the housings are over the gasket and that the housing keys are fully engaged into the grooves.

Couplings

Rigid and Flexible (2 to 12 Inch)


Step 4.


Step 5.

Step 4. Insert the other bolt and nut into the coupling and rotate both nuts until finger tight. Verify that the bolt heads are fully recessed in the housing.

Step 5. Alternate between bolts when tightening nuts until properly tightened.

Note: *Always tighten the nut and bolt set evenly. Uneven tightening can cause the gasket to pinch or bind.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

- ***For Flexible Couplings Only***
  Figures 705, 707, and 405 Coupling Housing bolt pads must be in metal to metal contact. For Flexible Coupling deflection data refer to individual tech data sheets.

- ***For Rigid Couplings Only***
  Figure 772, 774, 770, 672, and 472 Rigid Couplings have an intended gap of up to 1/16 of an inch at each pad to allow for positive rigid gripping onto the pipe. The patented tongue and groove design provides protection to the back of the gasket during installation.

Couplings

Rigid and Flexible (14 to 24 Inch)

⚠ WARNING

Always read and understand the instructions including the “Installation Guidelines” provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

Note: *EDPM tri-seal gaskets are recommended for applications below 40°F (4°C).*

This section covers the following products, listed below with their corresponding tech data sheets.

Large Diameter Couplings

- *Figure 772 Rigid Coupling (TDS G140 and TDS G141)*
- *Figure 707 Heavy Duty Flexible Coupling (TDS G130)*


Step 2.


Step 3.


Step 4.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

Step 2. Install the gasket by placing it over the end of the first pipe section. For larger pipe diameters, it may be easier to roll the gasket inside out, then on to the pipe end. Ensure that the gasket does not extend beyond the end of the pipe.

Step 3. Bring both pipe ends together, ensure proper alignment and slide the gasket into position. If the gasket was turned inside out per step 2, roll the gasket over into position. Center it between the grooved portions of each pipe.

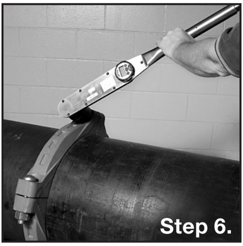
Note: The gasket should not protrude into the grooves on either pipe segment or extend between the pipe ends.

Step 4. Place the assembly over the gasket and verify that the housing keys are fully engaged into the pipe grooves.

Couplings

Rigid and Flexible (14 to 24 Inch)


Step 5.


Step 6.

Step 5. Assemble two sections of the housing by inserting a bolt into the coupling and loosely engaging the nut. For four segment couplings it may be easier to assemble two segments first.

Bring the next section of the housing into position. Insert a bolt into the coupling and finger tighten the nut.

Step 6. Alternate between bolts when tightening nuts until properly tightened.

Note: *Always tighten the nut and bolt set evenly. Uneven tightening can cause the gasket to pinch or bind.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

- ***For Flexible Couplings Only***
  Figure 707 Coupling housing bolt pads must be in metal to metal contact.

- ***For Rigid Couplings Only***
  On the Figure 772 Coupling there is an intended gap of up to 1/16 of an inch at each pad to allow for positive rigid gripping onto the pipe. The patented universal tongue and groove design provides protection to the back of the gasket during installation.

Couplings

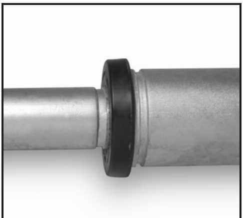
Reducing Coupling

⚠ WARNING

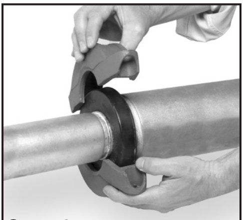
Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

Note: *Reducing Couplings are not recommended for applications below 40°F (4°C).*

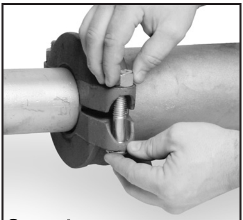
The following instructions apply to Figure 616 Reducing Coupling for Joining Copper Tubing Systems as described in Technical Data Sheet G511 and Figure 716 Flexible Reducing Coupling as described in Technical Data Sheet G120.



Step 2.



Step 3.



Step 4.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

Step 2. Install the gasket by placing the gasket over the pipe that has the larger diameter. Bring the smaller pipe end into alignment and slide the pipe into position. Slide the gasket into position, properly centering it between the grooved portions of each pipe.

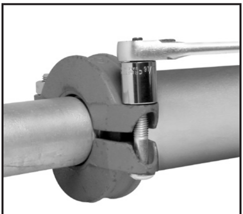
Note: *The gasket should not protrude into the grooves on either pipe segment.*

Step 3. With both bolts removed, place the coupling housings over the gasket. Verify that the housings are over the gasket and that the housing keys are fully engaged into the pipe grooves.

Step 4. Insert the bolts into the coupling and rotate the nuts until finger tight. Verify that the bolt heads are fully recessed in the housing.

Couplings

Reducing Coupling



Step 5.

Step 5. Alternate when tightening nuts until properly tightened to bring housing in contact with the bolt pads.

Note: *Always tighten the nut and bolt set evenly. Uneven tightening can cause the gasket to pinch or bind.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

GRINNELL Reducing Couplings, when properly installed, will have pad to pad contact between the housings. Use an optional Type 304 metal insert to prevent pipe telescoping when installing the Figure 716 Coupling in the vertical position. Prior to Step 2, place the insert inside the gasket aligning the insert slots with the ribs on the gasket.

Couplings

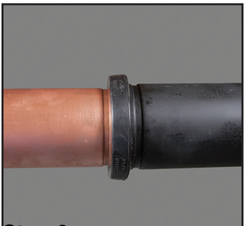
Transition Coupling

⚠ WARNING

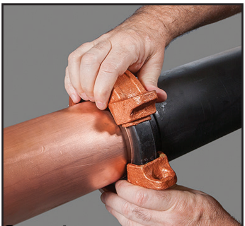
Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

The following instructions apply to Figure 617 Transition Coupling for Joining IPS to Copper Tubing Systems as described in Technical Data Sheet G513.

Step 2.



Step 3.



Step 4.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

Step 2. Install the gasket by placing it over the end of the IPS steel tube. Ensure that the gasket is installed correctly by identifying the IPS side of the gasket labeled on the flat-face side of the gasket. Push the gasket onto the end of the pipe until the IPS pipe stops at the center-stop of the gasket.

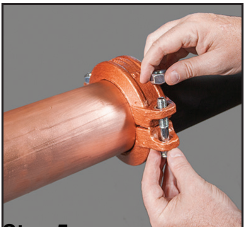
Step 3. Bring both pipe ends together, ensure proper alignment, and push the CTS pipe into the gasket until the CTS pipe stops at the center-stop of the gasket. Ensure the gasket is centered between the grooved portions of each pipe.

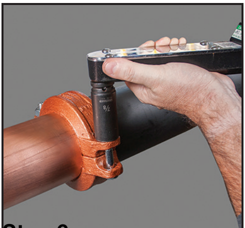
Step 4. Place the Figure 617 Copper Transition Coupling over the gasket and verify that the housing keys are fully engaged into the pipe grooves.

The GRINNELL Figure 617 Transition Coupling features a tongue and groove design. The coupling must always be installed so that the tongue and groove mate properly. Attempting to install these couplings tongue to tongue or groove to groove will result in joint failure, property damage, or serious injury.

Couplings

Transition Coupling


Step 5.


Step 6.

Step 5. Insert the bolts into the coupling and rotate the nuts until finger tight. Verify that the bolt heads are fully recessed in the housing.

Alternate when tightening nuts until properly tightened to bring housing in contact with the bolt pads.

Note: *Always tighten the nut and bolt set evenly. Uneven tightening can cause the gasket to pinch or bind.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

Couplings

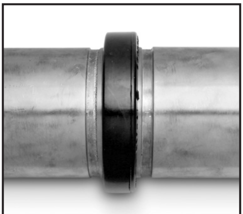
Grooved Snap Coupling

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

The following instructions apply to the Figure 780 Grooved Snap Coupling as described in technical data sheet G145.


Step 2.


Step 3.


Step 4.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

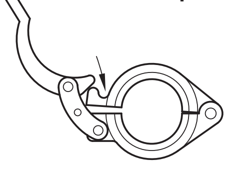
Step 2. Install the gasket by placing the gasket over the pipe that is to be fastened by the coupling, and ensure that the gasket lip does not extend beyond the end of the pipe.

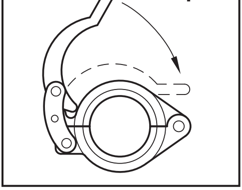
Step 3. Bring both pipe ends together, ensure proper alignment, and slide the gasket into position, properly centering it between the grooved portions of each pipe. No part of the gasket should protrude into the groove of either pipe.

Step 4. Remove the split pin. Open the hinged coupling and mount it around the gasket so that the coupling keys are securely engaged into the grooves.

Step 5. With the Lever Handle, squeeze the Housing Segments tightly together.

Hook up the Nose of the Lever Handle in the Cradle Tab of the other Housing Segment.

Step 5a.


Step 5b.


⚠ CAUTION

If the Lever Handle is difficult to open or close, using a section of steel pipe as shown to increase leverage can avoid injury such as pinched fingers.

Couplings

Grooved Snap Couplings

Step 6a.

Step 6b.

Step 6. This coupling provides a unique two-step closing feature that partially locks then closes the coupling, helping to minimize the opportunity for personal injury.

Pushing the Lever Handle initially snaps the housing segments together. Continuing to push the Lever Handle smoothly locks the coupling into position.

Step 7.

Step 7. Insert the Split Pin through the hole on the Bracket of the Lever Handle to prevent accidental opening of the coupling.

Disassembly of the Figure 780 Coupling

⚠ WARNING

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

Step 1. Verify that the system is depressurized and drained.

Step 2. Remove the Split Pin by hand or with the aid of pliers.

Step 3. Lift the Lever Handle to open the coupling. Use a screwdriver or any other similar tool when necessary for initial leverage.

Couplings

Installation-Ready Couplings

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

This section covers the following products, listed below with their corresponding tech data sheets.

Pivot-Bolt Rigid Couplings

- *Figure 740 Pivot-Bolt Rigid Coupling (TDS G144 - Ductile Iron)*
- *Figure 640 Pivot-Bolt Rigid Coupling (TDS G512 - Copper)*

Step 1.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance. Loosen the nut on the coupling bolt only. Loosen nut to the end of the bolt and swing out of slotted hole. Remove the gasket.

Step 2.

NOTICE

Do not loosen or adjust the nuts on the Pivot Bolt. The Pivot Bolt assembly is factory-preset for optimal performance. In the unlikely event that the nuts have become loosened, tighten the nuts on the Pivot Bolt to a minimum torque of 10ft.-lbs. (15 Nm).

Step 2. Verify that the coupling and gasket grade are correct for the application intended. Refer to Technical Data Sheet G610 for additional gasket information.

Step 3a.

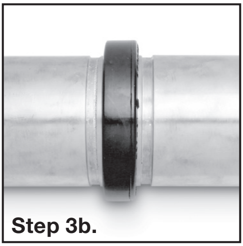
Apply a fine layer of petroleum-free silicone lubricant to the inner and outer sealing surfaces of the gasket. Be sure to include the sealing edges as well as in the outer surfaces. To prevent deterioration of the gasket material, a petroleum lubricant should never be used on Grade "E", Grade "EN" EPDM, Grade "EHT" EPDM, or Grade "L" Silicone gaskets. For assembly below 40°F (4°C), a petroleum-free silicone lubricant must be used to prevent freezing of the lubricant.

- ***For NSF Requirement:***
  In order to retain the NSF 61 certification, an NSF 61 certified lubricant must be used for the intended service.

  Dow Corning* No. 7 Release Compound is recommended by GRINNELL Mechanical Products.

Couplings

Installation-Ready Couplings



Step 3b.

Step 3. Install the gasket by pushing it over the pipe until the center stop of the gasket is in contact with the end of the pipe.

Slide the other pipe end into the gasket ensuring it has also made contact with the center leg of the gasket. Both ends should be aligned vertically and horizontally.

The gasket should now appear evenly spaced between the two grooves and the outside of the gasket should be parallel with the pipe.

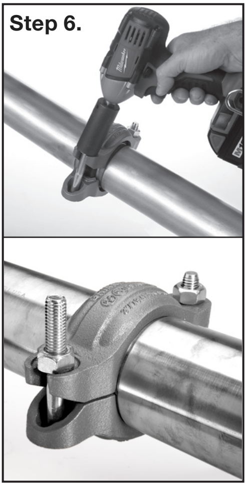
Note: *The gasket should not protrude into the grooves on either pipe segment.*

Step 4.

Step 4. "Swing" the coupling housing over the gasket. Verify that the housings are over the gasket and that the housing keys are fully engaged into the grooves.

Step 5.

Step 5. Slide the Coupling Bolt and nut into the housing and tighten the nut until finger tight. Verify that the bolt head is fully recessed in the housing and the nut is recessed into the counter-bore around the slot.



Step 6.

Step 6. Tighten the nut on the Coupling Bolt until properly tightened. There is no need to tighten the nut on the Pivot Bolt.

Visually inspect the coupling to assure that the housing keys are engaged into the grooves.

NOTICE

Figure 740 and Figure 640 Pivot-Bolt Rigid Couplings have an intended gap of up to 1/16 of an inch on the Coupling Bolt side to allow for positive rigid gripping onto the pipe. The patented tongue-and-groove design provides protection to the back of the gasket during installation.

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

Mechanical Outlet Couplings

Figure 702 Grooved Outlet Coupling

The following instructions apply to the Figure 702 Grooved Outlet Coupling as described in technical data sheet G220. The installation is based on IPS steel pipe grooved in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to Tech Data Sheet G710 for additional information.

Step 1.

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

Step 2.

Step 2. Verify that the coupling and gasket grade are correct for the application intended. Refer to Tech Data Sheet G610 for additional gasket information.

Note: *The Figure 702 gasket contains a plated steel ring inside the outlet neck to aid sealing. Do not remove this steel ring.*

To help insert pipe easily and mount couplings smoothly without pinching, the edges and outer surfaces of the gasket should be covered with a fine layer of lubricant.

To prevent gasket deterioration, a petroleum-free lubricant is required for all EPDM gaskets.

For low temperature applications, a petroleum-free silicone-based lubricant such as Dow Corning* No. 7 Release Compound should be used to prevent lubricant freezing.

Step 3.

Step 3. Mount the gasket over one end of the pipe so that the gasket lip covers the area between the pipe end and the groove.

Step 4.

Step 4. Insert the mating pipe into the other end of the gasket. Install both pipes until their ends touch the built-in internal rib of the gasket, which works as a pipe stop. No part of the gasket should protrude into the groove of either pipe.

Mechanical Outlet Couplings

Figure 702 Grooved Outlet Coupling


Step 5.


Step 6.


Step 7.


Step 8.

Step 5. Place the lower coupling housing over the gasket around the bottom side of the gasket.

Step 6. Place the upper coupling housing over the gasket so that the outlet opening of the housing properly fits on the gasket outlet opening. Make sure the housing keys engage the pipe grooves.

Step 7. Insert bolts and hand-tighten nuts. Make sure the oval neck of the bolt engages into the bolt hole of the housing.

Step 8. Alternate when tightening nuts until properly tightened to bring housing in contact with the bolt pads.

Note: *Uneven tightening of bolts and nuts may cause the gasket to be pinched, resulting in an immediate or delayed leak. Excessive tightening of nuts may cause a bolt or joint failure. The recommended bolt torque for a 3/8 inch bolt is 30 to 40 ft.-lbs. and 90 to 110 ft.-lbs. for a 1/2 inch bolt.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

Flange Adapters

Figure 61 and Figure 71 Flange Adapters (2 to 12 Inch)

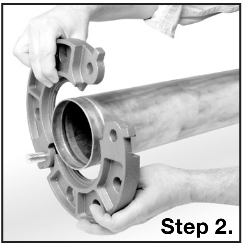
⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

This section covers the following products, listed below with their corresponding tech data sheets.

- *Figure 61 Flange Adapter (TDS G515)*
- *Figure 71 Flange Adapter (TDS G150)*

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.



Step 2.

Step 3.

Step 4.

Step 2. 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 gasket deterioration, a petroleum-free lubricant is recommended for all EPDM gaskets. For applications below 40°F (4°C), a petroleum-free, silicone-based lubricant such as Dow Corning* No. 7 Release Compound must be used to prevent freezing of the lubricant.

For NSF Requirement:
In order to retain the NSF 61 certification, an NSF 61 certified lubricant must be used for the intended service.

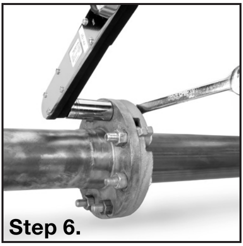
To prevent deterioration of the gasket material, a petroleum lubricant should not be used on Grade "E" or "EN" "EPDM" gaskets.

Dow Corning* No. 7 Release Compound is available through Grinnell Mechanical Products.

Flange Adapters

Figure 61 and Figure 71 Flange Adapters (2 to 12 Inch)


Step 5.


Step 6.

Step 5. Place the gasket into the gasket pocket with the gasket marking side in first. Refer to the Gaskets section of this manual for an illustration of proper gasket placement.

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 to bring the flange faces firmly together in an alternating pattern.

Note: *To achieve proper flange joint connections for the Figure 71 Flange Adapter (2 to 12 Inch), refer to the recommended flange mating bolts torque range listed in the Grooved Couplings section of this manual. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.*

- *Flange Adapters are not recommended for applications that incorporate tie rods for anchoring, or on standard fittings within 90° of each other. Refer to Tech Data Sheet G150 (Figure 71 Flange Adapter) and G515 (Figure 61 Flange Adapter) for additional information.*
- *Flange Adapter Washers are required when the Flange Adapters are used against surfaces such as:*
    1. *Rubber surfaces*
    2. *Adapting to AWWA cast flanges*
    3. *Rubber-faced wafer valves*
    4. *Serrated flange surfaces*

Flange Adapters

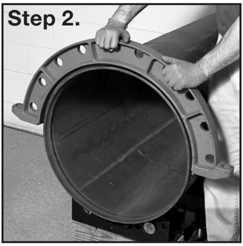
Figure 71 Flange Adapter (14 to 24 Inch)

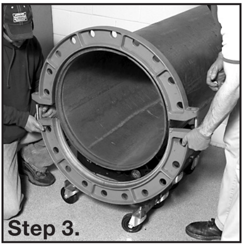
⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

This section covers the following products, listed below with their corresponding tech data sheets.

- *Figure 71 Flange Adapter (TDS G150)*


Step 2.


Step 3.


Step 4.

Step 1. Follow the preliminary set-up steps of the Grooved Pipe and Gasket Preparation section on pages 16 and 17. Failure to follow these preliminary set-up steps before product installation can adversely affect subsequent system performance.

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

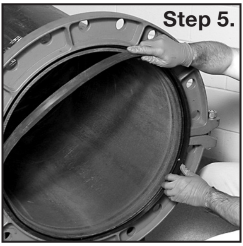
Step 3. Bring the second half of the flange assembly together into the groove of the pipe. Insert the two coupling bolts into the bolt pads and tighten the nuts, drawing the pads together but allowing the housings to remain loose enough to permit the flange adapter to be rotated for bolt hole alignment in Step 6. Verify that the housing keys are fully engaged into the groove.

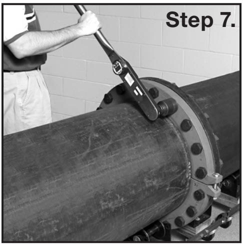
Step 4. Verify that the gasket selection is correct for the application intended. The sealing edges and outer surfaces of the gasket should be covered with a fine layer of lubricant. To prevent deterioration of the gasket material, only a petroleum-free lubricant should be used on Grade "E" "EPDM". For assembly below 40°F (4°C) a petroleum-free silicone lubricant must be used to prevent freezing of the lubricant.

Refer to Technical Data Sheet G610 for additional gasket information.

Flange Adapters

Figure 71 Flange Adapter (14 to 24 Inch)





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. Alternate when tightening nuts 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 hand-tighten the threaded nut on. Continue this procedure until all flange bolts have been inserted. Tighten the flange bolts and nuts evenly to the specified mating face bolt torque. Ensure the flange faces remain parallel and make contact around the full circumference of the flange face.

Note: To achieve proper flange joint connections for the Figure 71 Flange Adapter (14 to 24 Inch), refer to the recommended flange mating bolts torque range listed in the Grooved Couplings section of this manual. Failure to use the manufacturer's power impact wrench settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

Flange Adapters are not recommended for applications that incorporate tie rods for anchoring, or on standard fittings within 90° of each other. Refer to Tech Data Sheet G150 (Figure 71 Flange Adapter) for additional information.

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

1. Rubber surfaces
2. Adapting to AWWA cast flanges
3. Rubber-faced wafer valves
4. Serrated flange *surfaces*

For additional information on Flange Adapter Washers, refer to the Grooved Couplings section of this manual.

Plain End Couplings

Figure 909 Plain End Coupling

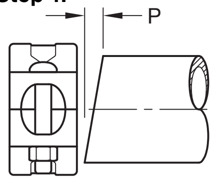
⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

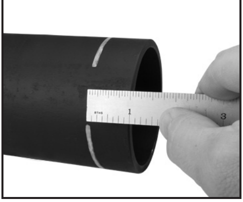
This section covers the following products, listed below with their corresponding tech data sheets.

- *Figure 909 Plain End Couplings (TDS G190) for installation on plain end or beveled standard wall steel, stainless steel, or aluminum pipe.*

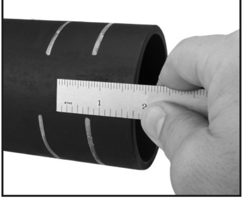
Step 1.



Step 2.



Step 3.



Step 4.

Step 1. Square cut the pipe ends. Maximum variation from perpendicular (P Dimension) is 1/32˝ (0.8 mm) for 2˝ – 6˝ pipe sizes, 1/16˝ (0.60 mm) for 8˝ – 10˝ pipe sizes. Inspect the pipe ends 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. Using a ruler or tape measure and a bright colored marking pen, make a mark 1˝ (25 mm) from the pipe ends. A minimum of 4 marks equally spaced around the pipe is recommended.

Step 3. Make a second mark from the pipe ends. Refer to the Figure 909 Plain End Coupling dimensional data listed in the Plain End Systems section of this manual. Make these marks parallel to the marks from Step 2.

Step 4. Verify that the gasket grade is correct for the application intended. Refer to the Gaskets section of this manual, or Tech Data Sheet G610 for additional gasket 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-free lubricant should only 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.

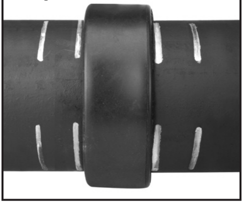
Plain End Couplings

Figure 909 Plain End Coupling

Step 5.

Step 5. Install the gasket by placing it completely over one of the pipe ends that is to be joined by the coupling and ensure that the gasket lip does not extend beyond the end of the pipe.

Step 6.



Step 6. Bring both pipe ends together, ensure proper alignment, and slide the gasket back over the second pipe end so that it is properly centered between the two inside marks made in Step 2.

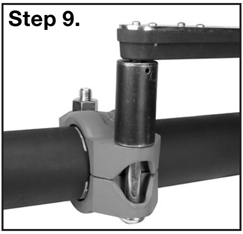
Step 7.

Step 7. With both bolts removed, place the coupling housings over the gasket. Verify that the housings are over the gasket and that the tongue and groove features are properly engaged. Ensure that the housings are properly centered between the two outer marks made in Step 3.

Step 8.

Step 8. Insert the bolts into the coupling and rotate the nuts until finger tight. Verify that the bolt heads are fully recessed in the housing.

Step 9.



Step 9. Alternate when tightening the nuts until properly tightened to the required bolt torque.

***Note:** For the recommended bolt torque values, refer to the Plain End Systems section of this manual. Use of a torque wrench is recommended to ensure proper installation. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.*

⚠ WARNING

The coupling bolts must be tightened to the bolt torques as specified in the Figure 909 Plain End Coupling dimensional data in the Plain End Systems section of this manual. Excessive torque may damage the bolts and pipe end and cause separation under pressure. Insufficient torque may result in lower pressure performance, joint leakage, or pipe separation. Separation of pipe may result in serious personal injury and/or property damage. Refer to Tech Data Sheet G190 for additional information.

HDPE Couplings

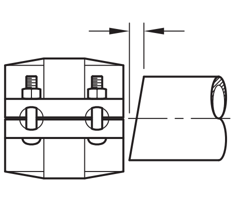
Figure 9095 HDPE Coupling

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

The following instructions apply to the Figure 9095 HDPE Coupling. They are designed to join high-density polyethylene (HDPE) pipe conforming to ASTM D2447, D3000, D3035, or F714 (metric sizes to ISO 161/1, DIN8074, and AS8074), at ambient temperatures with wall thickness from SDR 32.5 to 7.3.

The Figure 9095 Coupling is not intended for use on anything other than HDPE piping. Refer to Tech Data Sheet G580 for more information.



Step 1.

Step 2.

Step 3a.

Step 1. HDPE pipe must be cut square. The maximum allowed tolerances are 0.125 inch (3.2 mm) on HDPE pipe sizes 2 inch to 4 inch and 0.156 inch (4.0 mm) on 6 inch and larger sizes. Make sure that the pipe end, within 1 inch from the end, is clean and free from indentations, projections, scratches or other harmful surface defects such as scale, chips, and grease.

Step 2. Use a marking pen or other marking tool and measuring tape to place marks on each pipe end, 1 inch from each end.

Step 3. Cover the sealing edges and outer surfaces of the gasket with a fine layer of lubricant. Use a petroleum-free silicone-based lubricant such as Dow Corning* No. 7 Release Compound.

- Place the gasket over the pipe, ensuring that the gasket lip does not extend beyond the end of the pipe.
- Bring both pipe ends together, ensuring proper alignment.
- Slide the gasket into position, properly centering it between the marks on each pipe.

The pipe ends should always be butted together. Lubricate the back of the gasket as well as the sealing edges.

HDPE Couplings

Figure 9095 HDPE Coupling

⚠ CAUTION

To avoid injuries from sharp machined gripping teeth, wear protective gloves when handling couplings.

To prevent degradation of the polymer, do not use hydrocarbon-based oils, grease, or soap-based solutions.

Step 3b.

Step 4. Place the housings over the gasket, ensure the gasket stays centered between the marks made on the pipe ends. Also make sure that housing tongue and groove mate correctly.

⚠ WARNING

The Figure 9095 HDPE Coupling features a tongue and groove design and mechanism. This design requires the coupling is always installed so the tongue and groove mate properly. Attempting to install the coupling tongue-to-tongue or groove-to-groove will result in joint failure, property damage or serious injury.

Step 4.

Step 5. Insert the bolts and hand-tighten the nuts. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.

Step 5.

Step 6. Tighten nuts alternately and equally until the bolt pads meet and make metal-to-metal contact. Tighten nuts by another one quarter to one half turn to make sure the nuts and bolts are tight and secure. The use of a torque wrench is not required.

Note: *Uneven tightening of bolts and nuts can cause the gasket to be pinched, resulting in an immediate or delayed leak.*

Step 6.

HDPE Couplings

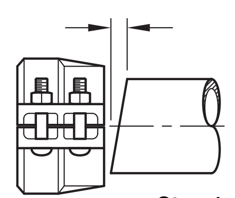
Figure 9097 HDPE Transition Coupling

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

The following instructions apply to the Figure 9097 HDPE Transition Coupling as described in technical data sheet G582. The coupling is designed to join high-density polyethylene (HDPE) to IPS steel pipe of the same outside diameter. The HDPE pipe is to conform to ASTM D2447, D3000, D3035, or F714 (metric sizes to ISO 161/1, DIN8074, and AS8074), at ambient temperatures with wall thickness from SDR 7.3 to 32.5. The IPS pipe is to be grooved in accordance with Standard Cut Groove or Roll Groove Specifications. Refer to Technical Data Sheet G710 for more information.

The Figure 9095 HDPE Coupling is not intended for use on anything other than HDPE piping. Refer to Technical Data Sheet G582 for additional information.



Step 1.

Step 1. HDPE pipe must be cut square. The maximum allowed tolerances are 0.125 inch (3.2 mm) on HDPE pipe sizes 2 inch to 4 inch and 0.156 inch (4.0 mm) on 6 inch and larger sizes. Make sure that the pipe end, within 1 inch from the end, is clean and free from indentations, projections, scratches or other harmful surface defects such as scale, chips, and grease.

Step 2.

Step 2. Use a marking pen or other marking tool and measuring tape to place a mark 1 inch from the HDPE pipe end.

Step 3a.

Step 3. Cover the sealing edges and outer surfaces of the gasket with a fine layer of lubricant. Use a petroleum-free silicone-based lubricant such as Dow Corning* No. 7 Release Compound.

- Place the gasket over the pipe, ensuring that the gasket lip does not extend beyond the end of the pipe.
- Bring both pipe ends together, ensuring proper alignment.
- Slide the gasket into position, properly centering it between the mark on the HDPE pipe and the groove of the IPS steel pipe.

HDPE Couplings

Figure 9097 HDPE Transition Coupling


Step 3b.


Step 4.


Step 5.


Step 6.

The pipe ends should always be butted together. Lubricate the back of the gasket as well as the sealing edges.

Note: *The maximum allowed space between HDPE pipe and steel pipe is 0.25 inches (6.3 mm) on 2 to 4 inch pipe, and 0.3125 inches (7.9 mm) on 6 inch and larger pipe.*

⚠ CAUTION

To avoid injuries from sharp machined gripping teeth, wear protective gloves when handling couplings.

To prevent degradation of the polymer, do not use hydrocarbon-based oils, grease, or soap-based solutions.

Step 4. Place the housings over the gasket, ensuring the gasket stay centered between the marks made on the HDPE pipe and the groove of the IPS steel pipe.

Step 5. Insert the bolts and hand-tighten nuts. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.

Step 6. Tighten nuts alternately and equally until the bolt pads meet and make metal-to-metal contact. Tighten nuts by another one quarter to one half turn to make sure the nuts and bolts are snug and secure. The use of a torque wrench is usually not required.

Note: *Uneven tightening of bolts and nuts can cause the gasket to be pinched, resulting in an immediate or delayed leak.*

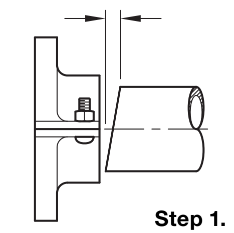
HDPE Couplings

Figure 9094 HDPE Flange Coupling

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

The following instructions apply to the Figure 9094 HDPE Flange Coupling as described in technical data sheet G584. The coupling is designed to join high-density polyethylene (HDPE) to ANSI class 125 or 150 flanged piping systems. The HDPE pipe is to conform to ASTM D2447, D3000, D3035, or F714 (metric sizes to ISO 161/1, DIN8074, and AS8074), at ambient temperatures with wall thickness from SDR 7.3 to 32.5. The Figure 9094 Coupling is not intended for use on anything other than HDPE piping. Refer to Technical Data Sheet G584 for additional information.



Step 1.

Step 1. HDPE pipe must be cut square. The maximum allowed tolerances are 0.125 inch (3.2 mm) on HDPE pipe sizes 2 inch to 4 inch and 0.156 inch (4.0 mm) on 6 inch and larger sizes. Make sure that the pipe end, within 1 inch from the end, is clean and free from indentations, projections, scratches, or other harmful surface defects such as scale, chips, and grease.

Step 2.

Step 2. Place the flange housings over HDPE pipe. The flange must be assembled with its machined teeth on the HDPE pipe. The gasket cavity must face the pipe end. Fasten the draw bolts and nuts loosely.

⚠ CAUTION

To avoid injuries from sharp machined gripping teeth, wear protective gloves when handling couplings.

Step 3.

Step 3. The HDPE pipe end must be flush with the flange face. Use a ruler or straight edge to verify.

HDPE Couplings

Figure 9094 HDPE Flange Coupling


Step 4.


Step 5.


Step 6.


Step 7.

Step 4. Tighten the draw bolts and nuts alternately and equally until the housing bolt pads meet forming metal-to-metal contact. Tighten by another 1/4 to 1/2 turn to ensure the nuts and bolts are tight and secure.

Step 5. Cover the sealing edges and outer surfaces of the gasket with a fine layer of lubricant. Use a petroleum-free silicone-based lubricant such as Dow Corning* No. 7 Release Compound.

⚠ CAUTION

To avoid injuries from sharp machined gripping teeth, wear protective gloves when handling couplings.

To prevent degradation of the polymer, do not use hydrocarbon-based oils, grease, or soap-based solutions.

Step 6. Mount the gasket into the cavity between the pipe OD and flange recess. Make sure that the bottom of the gasket (the marking side) is positioned and seated against the bottom of the flange recess.

Step 7. Bring the adjoining flange face to face with the Figure 9094 flange.

HDPE Couplings

Figure 9094 HDPE Flange Coupling

Step 8.

Step 8. Add flange bolts and hand-tighten nuts. All the bolts shall be inserted from the same direction. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.

Note: *Flange Adapter Washers are required when the Figure 71 Flange Adapter is used against surfaces such as:*

1. *Rubber surfaces*
2. *Adapting to AWWA cast flanges*
3. *Rubber-faced wafer valves*
4. *Serrated flange surfaces*

For additional information on Flange Adapter Washers, refer to the Grooved Couplings section of this manual.

Step 9.

Step 9. Tighten all nuts evenly as with a regular flange assembly, until faces contact firmly. Apply the recommended flange joint torque evenly to all the bolts. Mating Bolts and Nuts are not supplied.

Flange mating bolts must be at least SAE J429 Grade 5 or stronger. It is the responsibility of the purchaser to verify correct length for the intended application.

Expansion Joints

Figure 7550 Expansion Joint

The following instructions apply to the Figure 7550 Expansion Joint Assembly as described in technical data sheet G460. The Figure 7550 Expansion Joint must be installed in accordance with the following instructions. Refer to Tech Data Sheet G460 for additional information.

⚠WARNING

Failure to follow these instructions may result in improper product installation, joint failure or leakage, serious personal injury, and/or property damage.

Step 1. Install the Figure 7550 Expansion Joint Assembly on straight pipe runs in the pipe system in accordance with standard coupling installation instructions (Figure 1).

Step 2. Verify that the installed Expansion Joint Assembly moves in the central direction of the pipe axis.

Step 3. Anchor the pipe system and install Pipe Guides (Figure 1).

Step 4. When using a support cradle, ensure that the support cradle flanges make contact only with the tangent to the coupling housings. Ensure these flanges do not interfere with the coupling lobes, nuts, or bolts (Figure 2).

Step 5. After the pipe system is properly anchored and guided, remove the Retaining Bracket Assembly from the Figure 7550 Expansion Joint Assembly (Figure 3).

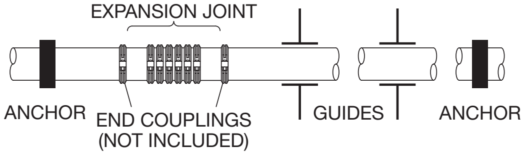


FIGURE 1
FIGURE 7550 EXPANSION JOINTS TYPICAL INSTALLATION

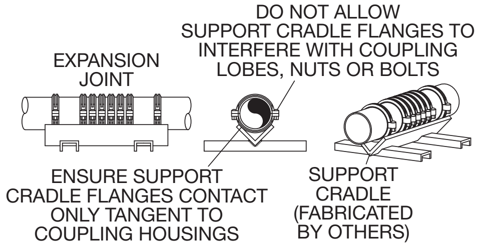


FIGURE 2
FIGURE 7550 EXPANSION JOINTS

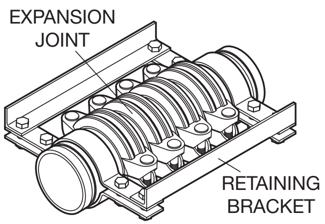


FIGURE 3
FIGURE 7550 EXPANSION JOINTS RETAINING BRACKET DETAIL

Mechanical Outlets
Figure 730 Tee and Cross

⚠ WARNING

Always read and understand the instructions including the "Installation Guidelines" provided on page 15. Failure to follow these instructions may result in improper product installation, joint failure, leakage, serious personal injury, and/or property damage.

Pipe Preparation

Step 1. Refer to the Figure 730 Outlet Hole Diameter Guide on pages 48 through 50 to verify hole size.

Step 2. Drill the hole 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.

The following installation instructions apply to Figure 730 Mechanical Outlet Tee and Cross with threaded or grooved outlets as described in technical data sheet G210. 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 Tech Data Sheet G610 for additional information.

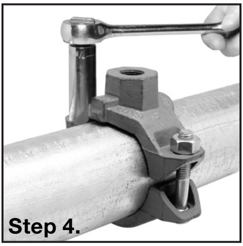
Step 1.

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. With one nut and bolt removed, "swing around" as shown.

Step 2.

Mechanical Outlets
Figure 730 Tee and Cross



Step 3. 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 recessed in the housing.

Step 4. Alternate when tightening nuts until properly torqued with even gaps between the bolt pads.

Note: *Always tighten the nut and bolt set evenly. Uneven tightening can cause the gasket to pinch or bind.*

When setting the torque on power impact wrenches, always refer to the manufacturer's recommended bolt torque specifications. Failure to use the manufacturer's settings and abide by manufacturer instructions may result in loss of warranty protection, invalidate listing certifications and/or cause personal injury or property damage.

Figure 730 Mechanical Outlet Bolt Torque Specifications		
Nominal Pipe Size ANSI Inches *DN*	**Bolt Size Inches *mm***	**Bolt Torque Range Ft. - Lbs. *Nm***
2 - 2-1/2 *50 - 65*	3/8 *M10*	30-40 *40-60*
3 - 4 *80 - 100*	1/2 *M12*	90-110 *120-150*
5 - 6 125 - 150	5/8 *M16*	100-130 *135-175*
8 *200*	3/4 *M20*	150-200 *200-270*

Mechanical Outlets

Figure 730 Outlet Hole Diameter Guide (1 of 3)

Nominal Run Size ANSI Inches *DN*	Nominal Branch Size ANSI Inches *DN*	Hole Diameter Inches *mm*	
		Minimum	**Maximum**
2 *50*	1/2 *15*	1.50 *38,1*	1.63 *41,3*
	3/4 *20*	1.50 *38,1*	1.63 *41,3*
	1 *25*	1.50 *38,1*	1.63 *41,3*
	1-1/4 *32*	1.75 *44,5*	1.88 *47,6*
	1-1/2 *40*	1.75 *44,5*	1.88 *47,6*
2-1/2 *65*	1/2 *15*	1.50 *38,1*	1.63 *41,3*
	3/4 *20*	1.50 *38,1*	1.63 *41,3*
	1 *25*	1.50 *38,1*	1.63 *41,3*
	1-1/4 *32*	2.00 *50,8*	2.13 *54,0*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.00 *50,8*	2.13 *54,0*
76,1 *65*	1/2 *15*	1.50 *38,1*	1.63 *41,3*
	3/4 *20*	1.50 *38,1*	1.63 *41,3*
	1 *25*	1.50 *38,1*	1.63 *41,3*
	1-1/4 *32*	2.00 *50,8*	2.13 *54,0*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*

Mechanical Outlets

Figure 730 Outlet Hole Diameter Guide

(2 of 3)

Nominal Run Size ANSI Inches *DN*	Nominal Branch Size ANSI Inches *DN*	Hole Diameter Inches *mm*	
		Minimum	Maximum
3 *80*	1/2 *15*	1.50 *38,1*	1.63 *41,3*
	3/4 *20*	1.50 *38,1*	1.63 *41,3*
	1 *25*	1.50 *38,1*	1.63 *41,3*
	1-1/4 *32*	1.75 *44,5*	1.88 *47,6*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*
4 *100*	1/2 *15*	1.50 *38,1*	1.63 *41,3*
	3/4 *20*	1.50 *38,1*	1.63 *41,3*
	1 *25*	1.50 *38,1*	1.63 *41,3*
	1-1/4 *32*	1.75 *44,5*	1.88 *47,6*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*
	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
	76,1 mm *65*	2.75 *69,9*)	2.88 *73,0*
	3 *80*	3.50 *88,9*	3.63 *92,1*
108,0 *100*	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
5 *125*	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*
	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
	76,1 mm *65*	2.75 *69,9*)	2.88 *73,0*
	3 *80*	3.50 *88,9*	3.63 *92,1*

Mechanical Outlets

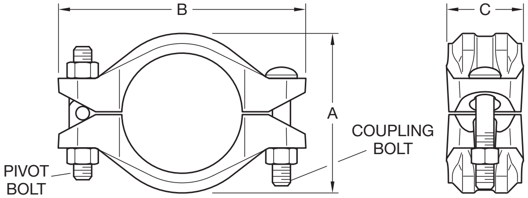
Figure 730 Outlet Hole Diameter Guide (3 of 3)

Nominal Run Size ANSI Inches *DN*	Nominal Branch Size ANSI Inches *DN*	Hole Diameter Inches *mm*	
		Minimum	Maximum
139,7 *125*	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
6 *150*	1-1/4 *32*	2.00 *50,8*	2.13 *54,0*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*
	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
	3 *80*	3.50 *88,9*	3.63 *92,1*
	4 *100*	4.50 *114,3*	4.63 *117,5*
165,1 *150*	1-1/4 *32*	2.00 *50,8*	2.13 *54,0*
	1-1/2 *40*	2.00 *50,8*	2.13 *54,0*
	2 *50*	2.50 *63,5*	2.63 *66,7*
	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
	76,1 mm *65*	2.75 *69,9*)	2.88 *73,0*
	3 *80*	3.50 *88,9*	3.63 *92,1*
	4 *100*	3.50 *88,9*	3.63 *92,1*
8 *200*	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*
	76,1 mm *65*	2.75 *69,9*)	2.88 *73,0*
	3 *80*	3.50 *88,9*	3.63 *92,1*
	4 *100*	4.50 *114,3*	4.63 *117,5*
216,3 *200*	2-1/2 *65*	2.75 *69,9*	2.88 *73,0*

Note: 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. Check gasket grade to be certain it is suitable for the service. 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.

Grooved Couplings

Figure 740 Rapid Installation Pivot-Bolt Rigid Coupling (2 Inch to 8 Inch)



Nominal Pipe Size		Max[a] Pressure psi *bar*	Max[b] End Gap Inches *mm*	Max[b] End Load Lbs. *kN*	Pivot Bolt Size Dia. x Lg.	Coupling Bolt Size Dia. x Lg.
ANSI Inches *DN*	O.D. Inches *mm*					
2 *50*	2.375 *60,3*	750 *51,7*	0.33 *8,3*	3,323 *14,78*	1/2 x 3-3/4	1/2 x 3-5/8
2-1/2 *65*	2.875 *73,0*	750 *51,7*	0.33 *8,3*	4,869 *21,66*	1/2 x 3-3/4	1/2 x 3-5/8
76,1mm *65*	3.000 *76,2*	750 *51,7*	0.33 *8,3*	5301 *23,58*	1/2 x 3-3/4	1/2 x 3-5/8
3 *80*	3.500 *88,9*	750 *51,7*	0.33 *8,3*	7,216 *32,10*	1/2 x 3-3/4	1/2 x 3-5/8
4 *100*	4.500 *114,3*	750 *51,7*	0.39 *9,8*	11,928 *53,06*	1/2 x 3-3/4	1/2 x 3-5/8
139,7mm *125*	5.500 *139,7*	750 *51,7*	0.39 *9,8*	17,819 *79,26*	5/8 x 4-1/2	5/8 x 4-1/2
5 *125*	5.563 *141,3*	750 *51,7*	0.39 *9,8*	18,229 *81,09*	5/8 x 4-1/2	5/8 x 4-1/2
165,1mm *150*	6.500 *165,1*	700 *48,2*	0.39 *9,8*	23,228 *103,18*	5/8 x 4-1/2	5/8 x 4-1/2
6 *150*	6.625 *168,3*	700 *48,2*	0.39 *9,8*	24,130 107,34	5/8 x 4-1/2	5/8 x 4-1/2
8 *200*	8.625 *219,1*	600 *41,4*	0.45 *11,3*	35,056 155,94	5/8 x 4-1/2	5/8 x 4-1/2

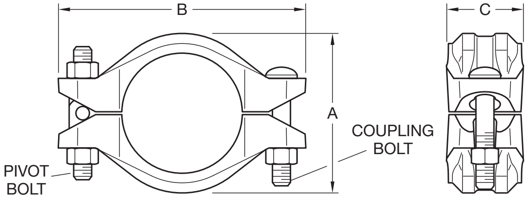
Notes:

a. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness.

b. Maximum available gap between pipe ends. Minimum Gap = 0.120

- Contact a GRINNELL Mechanical Products representative for more information.
- Gaskets: For proper gasket selection, refer to Technical Data Sheet G610.
  — Grade “EHT” EPDM, Green and Red striped color code, -30°F to 250°F (-34°C to 121°C)
  — Grade “T” Nitrile, Orange color code, -20°F to 180°F (-29°C to 82°C)
- Figure 740 Coupling requires deep sockets.

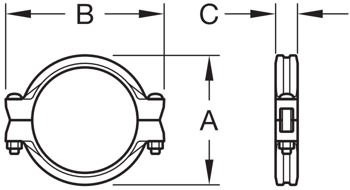
Figure 740 Rapid Installation Pivot-Bolt Rigid Coupling (2 Inch to 8 Inch)



Nominal Pipe Size		Nominal Dimensions			Net Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	
2 *50*	2.375 *60,3*	3.33 *84,5*	5.82 *147,8*	2.12 53,8	3.3 *1,5*
2-1/2 *65*	2.875 *73,0*	3.83 *97,3*	6.31 *160,3*	2.12 53,8	3.5 *1,6*
76,1mm *65*	3.000 *76,2*	3.96 *100,5*	6.44 *163,5*	2.13 54,1	3.6 *1,6*
3 *80*	3.500 *88,9*	4.44 *112,8*	6.92 *175,8*	2.14 54,4	3.7 *1,7*
4 *100*	4.500 *114,3*	5.73 *145,6*	8.10 *205,7*	2.22 56,4	5.0 *2,3*
139,7mm *125*	5.500 *139,7*	6.68 *169,7*	9.64 *244,9*	2.31 58,7	7.7 *3,5*
5 *125*	5.563 *141,3*	6.79 *172,4*	9.71 *246,6*	2.31 58,7	7.7 *3,5*
165,1mm *150*	6.500 *165,1*	7.81 *198,4*	10.66 *270,8*	2.32 58,9	8.6 *3,9*
6 *150*	6.625 *168,3*	7.94 *201,7*	10.79 *274,1*	2.32 58,9	8.6 *3,9*
8 *200*	8.625 *219,1*	10.09 *256,3*	12.84 *326,1*	2.83 71,9	12.8 *5,8*

- Refer to Technical Data Sheet G144 Figure 740 GRINNELL Rapid Installation Pivot-Bolt (GRIP) Rigid Coupling

Figure 772 Grooved Rigid Coupling (1-1/4 to 24 Inch)



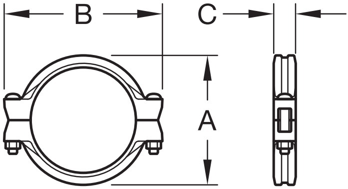
Size 1-1/4" - 14" (DN32 - DN350)

Nominal Pipe Size		Max[a] End Gap Inches *mm*	Max[a] End Load Lbs. *kN*	Max[b] Pressure psi *bar*	Coupling Bolts	
ANSI Inches *DN*	O.D. Inches *mm*				Qty.	Size[c] Dia. x Lg. *mm*
1-1/4 *32*	1.660 *42,2*	0.06 *1,5*	1,623 *7,22*	750 *51,7*	2	3/8 x 2-1/4 *M10 x 57*
1-1/2 *40*	1.900 *48,3*	0.08 *2,0*	2,127 *9,46*	750 *51,7*	2	3/8 x 2-1/4 *M10 x 57*
2 *50*	2.375 *60,3*	0.188 *4,8*	3,323 *14,78*	750 *51,7*	2	1/2 x 3 *M12 x 76*
2-1/2 *65*	2.875 *73,0*	0.188 *4,8*	4,869 *21,66*	750 *51,7*	2	1/2 x 3 *M12 x 76*
— *65*	3.000 *76,2*	0.188 *4,8*	5,301 *23,58*	750 *51,7*	2	1/2 x 3 *M12 x 76*
3 *80*	3.500 *88,9*	0.188 *4,8*	7,216 *32,10*	750 *51,7*	2	1/2 x 3 *M12 x 76*
4 *100*	4.500 *114,3*	0.188 *4,8*	11,928 *53,06*	750 *51,7*	2	1/2 x 3 *M12 x 76*
— *125*	5.500 *139,7*	0.19 *4,8*	17,819 *79,26*	750 *51,7*	2	— *M16 x 83*
5 *125*	5.563 *141,3*	0.19 *4,8*	18,229 *81,09*	750 *51,7*	2	5/8 x 3-1/4 *M16 x 83*
— *150*	6.500 *165,1*	0.19 *4,8*	23,228 *103,18*	700 *48,2*	2	— *M16 x 83*
6 *150*	6.625 *168,3*	0.19 *4,8*	24,130 *107,34*	700 *48,2*	2	5/8 x 3-1/4 *M16 x 83*
8 *200*	8.625 *219,1*	0.19 *4,8*	35,056 *155,94*	600 *41,4*	2	3/4 x 4-3/4 *M20 x 121*
10 *250*	10.750 *273,0*	0.13 *3,3*	45,381 *201,87*	500 *34,5*	2	1 x 6-1/2 *M24 x 165*
12 *300*	12.750 *323,9*	0.13 *3,3*	51,071 *227,17*	400 *27,6*	2	1 x 6-1/2 *M24 x 165*
14 *350*	14.000 *355,6*	0.13 *3,3*	53,878 *239,66*	350 24,1	2	1 x 5-1/2 •

Notes:

a. Maximum available gap between pipe ends. Minimum Gap = 0
b. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.
c. Gold color-coded metric bolt sizes are available upon request.
• Available in ANSI bolt sizes only.

Figure 772 Grooved Rigid Coupling (1-1/4 to 24 Inch)

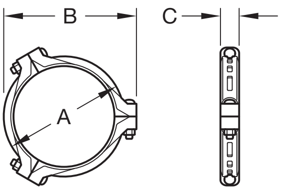


Size 1-1/4" - 14" (DN32 - DN350)

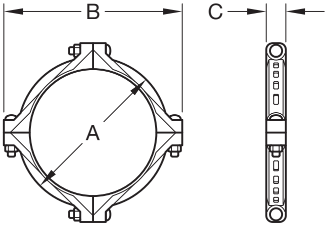
Nominal Pipe Size		Nominal Dimensions			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	
1-1/4 *32*	1.660 *42,2*	2.75 *69,9*	4.38 *111,3*	1.81 *46,0*	1.0 *0,5*
1-1/2 *40*	1.900 *48,3*	3.00 *76,2*	4.62 *117,3*	1.81 *46,0*	1.0 *0,5*
2 *50*	2.375 *60,3*	3.41 *86,6*	5.70 *145,0*	1.9 *47,8*	2.9 *1,32*
2-1/2 *65*	2.875 *73,0*	3.97 *101,0*	6.30 *160,0*	1.9 *47,8*	3.3 *1,5*
— *65*	3.000 *76,2*	4.10 *104,0*	6.43 *163,3*	1.9 *47,8*	3.6 *1,64*
3 *80*	3.500 *88,9*	4.60 *117,0*	6.93 *176,0*	1.9 *47,8*	3.7 *1,68*
4 *100*	4.500 *114,3*	5.80 *147,0*	8.07 *205,0*	1.9 *47,8*	4.3 *1,95*
— *125*	5.500 *139,7*	7.02 *178,3*	9.72 *246,9*	2.06 *52,3*	7.5 *3,4*
5 *125*	5.563 *141,3*	7.09 *180,1*	9.71 *246,6*	2.04 *51,8*	7.5 *3,4*
— *150*	6.500 *165,1*	8.09 *205,5*	10.53 *267,5*	2.13 *54,1*	7.6 *3,4*
6 *150*	6.625 *168,3*	8.09 *205,5*	10.53 *267,5*	2.13 *54,1*	7.6 *3,4*
8 *200*	8.625 *219,1*	10.56 *268,2*	13.56 *344,4*	2.62 *66,5*	18,0 *8,2*
10 *250*	10.750 *273,0*	12.84 *326,1*	16.41 *416,8*	2.62 *66,5*	24.6 *11,2*
12 *300*	12.750 *323,9*	15.41 *391,4*	18.84 *478,5*	2.62 *66,5*	42.0 *19,1*
14 *350*	14.000 *355,6*	16.68 *423,7*	20.38 *517,6*	2.93 *74,4*	48.0 *21,7*

- Refer to Technical Data Sheet G141 Figure 772 Rigid Coupling

Figure 772 Grooved Rigid Coupling (1-1/4 to 24 Inch)



Size 16” - 18” (DN400 - DN450)



Size 20” - 24” (DN500 - DN600)

Nominal Pipe Size		Max[a] End Gap Inches *mm*	Max[a] End Load Lbs. *kN*	Max[b] Pressure psi *bar*	Coupling Bolts	
ANSI Inches *DN*	O.D. Inches *mm*				Qty.	Size Dia. x Lg. *mm*
16 *400*	16.000 *406,4*	0.13 *3,3*	70,372 *313,03*	350 *24,1*	3	1 x 5-1/2 •
18 *450*	18.000 *457,2*	0.25 *6,4*	89,064 *396,18*	350 *24,1*	3	1 x 5-1/2 •
20 *500*	20.000 *508,0*	0.25 *6,4*	109,956 *489,11*	350 *24,1*	4	1-1/8 x 5-3/4 •
24 *600*	24.000 *609,6*	0.25 *6,4*	158,336 *704,31*	350 *24,1*	4	1-1/8 x 5-3/4 •

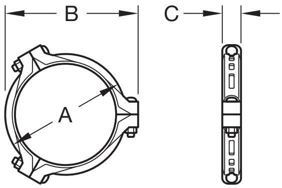
Notes:

a. Maximum available gap between pipe ends. Minimum Gap = 0

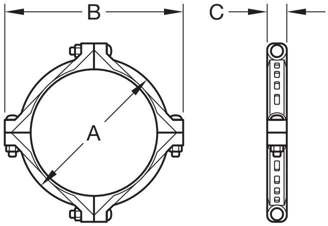
b. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

• Only available in ANSI Bolt Sizes.

Figure 772 Grooved Rigid Coupling (1-1/4 to 24 Inch)



Size 16” - 18” (DN400 - DN450)

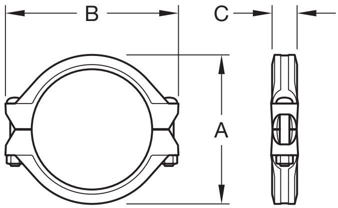


Size 20” - 24” (DN500 - DN600)

Nominal Pipe Size		Nominal Dimensions			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A Inches *mm***	**B Inches *mm***	**C Inches *mm***	
16 *400*	16.000 *406,4*	18.50 *469,9*	22.64 *575,1*	2.93 *74,4*	52.1 *23,6*
18 *450*	18.000 *457,2*	21.31 *541,3*	25.12 *638,0*	3.06 *77,7*	68.0 *30,8*
20 *500*	20.000 *508,0*	23.50 *596,9*	27.88 *708,2*	3.06 *77,7*	89.0 *40,4*
24 *600*	24.000 *609,6*	27.63 *701,8*	32.00 *812,8*	3.19 *81,0*	96.0 *43,5*

- Refer to Technical Data Sheet G141 Figure 772 Rigid Coupling

Figure 770 High Pressure Rigid Coupling



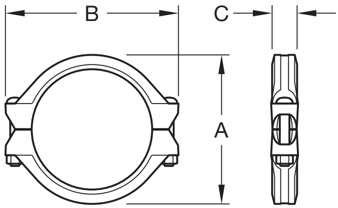
Nominal Pipe Size		Maximum[a,d] End Gap Inches *mm*	Maximum[c] End Load Lbs. *kN*	Maximum[c] Pressure psi *bar*
ANSI Inches *DN*	**O.D. Inches *mm***			
2 *50*	2.375 *60,3*	0.14 *3,6*	4,430.1 *19,71*	1000 *69,0*
2-1/2 *65*	2.875 *73,0*	0.14 *3,6*	6,491.8 *28,88*	1000 *69,0*
3 *80*	3.500 *88,9*	0.14 *3,6*	9,621.1 *42,79*	1000 *69,0*
4 *100*	4.500 *114,3*	0.25 *6,4*	15,904.3 *70,74*	1000 *69,0*
6 *150*	6.625 *168,3*	0.25 *6,4*	34,471.6 *153,33*	1000 *69,0*
8 *200*	8.625 *219,1*	0.25 *6,4*	46,741.0 *207,90*	800 *55,2*
10 *250*	10.750 *273,0*	0.25 *6,4*	72,610.1 *322,97*	800 *55,2*
12 *300*	12.750 *323,9*	0.25 *6,4*	102,141.0 *454,32*	800 *55,2*

Notes:

a. Maximum available gap between pipe ends. Minimum Gap = 0
b. Gold color-coded metric bolt sizes for DN50 - DN300 couplings are available upon request.
c. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.
d. Maximum End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe will be 1⁄2 that of cut grooved pipe.

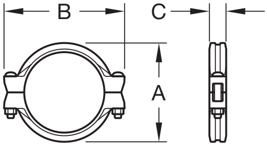
• Refer to Technical Data Sheet G138 Figure 770 High Pressure Rigid Coupling

Figure 770 High Pressure Rigid Coupling



Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[b] Inches *mm*	
2 *50*	3.53 *89,7*	5.72 *145,3*	1.88 *47,8*	2	5/8 x 2-3/4 *M16 x 70*	3.4 *1,5*
2-1/2 *65*	4.06 *103,1*	6.00 *152,4*	1.88 *47,8*	2	5/8 x 3-1/2 *M16 x 89*	4.0 *1,8*
3 *80*	4.78 *121,4*	6.76 *171,7*	1.88 *47.8*	2	5/8 x 3-1/2 *M16 x 89*	5.3 *2,4*
4 *100*	6.01 *152,7*	8.50 *215,9*	2.10 *53,3*	2	3/4 x 4-1/4 *M20 x 108*	7.3 *3,3*
6 *150*	8.51 *216,2*	11.25 *285,8*	2.10 *53,3*	2	7/8 x 5-1/2 *M22 x 140*	15.0 *6,8*
8 *200*	10.93 *277,6*	13.75 *349,3*	2.60 *66,0*	2	1 x 5-1/2 *M24 x 140*	25.0 *11,3*
10 *250*	13.46 *341,9*	16.00 *406,4*	2.60 *66,0*	2	1 x 6-1/2 *M24 x165*	34.0 *15,4*
12 *300*	15.52 *394,2*	18.00 *457,2*	2.60 *66,0*	2	1 x 6-1/2 *M24 x165*	40.0 *18,1*

Figure 774 Grooved Rigid Coupling



Nominal Pipe Size		Maximum[a, c] End Gap Inches *mm*	Maximum[b] End Load Lbs. *kN*	Maximum[b] Pressure psi *bar*
ANSI Inches ***DN***	**O.D. Inches** ***mm***			
1 *25*	1.315 *33,4*	0.06 *1,5*	679 *3,02*	500 *34,5*
1-1/4 *32*	1.660 *42,2*	0.06 *1,5*	1082 *4,81*	500 *34,5*
1-1/2 *40*	1.900 *48,3*	0.06 *1,5*	1418 *6,31*	500 *34,5*
2 *50*	2.375 *60,3*	0.06 *1,5*	2215 *9,85*	500 *34,5*
2-1/2 *65*	2.875 *73,0*	0.06 *1,5*	3246 *14,44*	500 *34,5*
76,1 mm *65*	3.000 *76,2*	0.06 *1,5*	3534 *15,72*	500 *34,5*
3 *80*	3.500 *88,9*	0.06 *1,5*	4811 *21,40*	500 *34,5*
4 *100*	4.500 *114,3*	0.06 *1,5*	7952 *35,37*	500 *34,5*
139,7 mm *125*	5.500 *139,7*	0.125 *3,2*	11,879 *52,84*	500 *34,5*
5 *125*	5.563 *141,3*	0.125 *3,2*	12,153 *54,06*	500 *34,5*
165,1 mm *150*	6.500 *165,1*	0.125 *3,2*	16,592 *73,80*	500 *34,5*
6 *150*	6.625 *168,3*	0.125 *3,2*	17,236 *76,67*	500 *34,5*
8 *200*	8.625 *219,1*	0.125 *3,2*	23,371 *103,96*	400 *27,5*
10 *250*	10.750 *273,1*	0.25 *6,4*	21,148 *94,07*	233 *16,0*
12 *300*	12.750 *323,9*	0.25 *6,4*	22,343 *99,39*	175 *12,1*

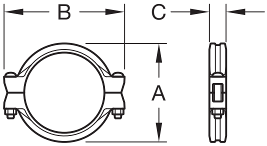
Notes:

a. Maximum available gap between pipe ends. Minimum Gap = 0

b. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

c. Maximum End Gap is for cut grooved standard weight pipe.

Figure 774 Grooved Rigid Coupling

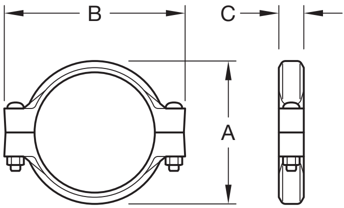


Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[d] Inches *mm*	
1 *25*	1.63 *41*	3.92 *100*	1.65 *42*	2	3/8 x 2-1/4 *M10 x 57*	1.2 *0,55*
1-1/4 *32*	2.66 *68*	4.40 *112*	1.64 *42*	2	3/8 x 2-1/4 *M10 x 57*	1.3 *0,59*
1-1/2 *40*	2.90 *74*	4.66 *118*	1.66 *42*	2	3/8 x 2-1/4 *M10 x 57*	1.5 *0,68*
2 *50*	3.38 *86*	5.20 *132*	1.70 *43*	2	3/8 x 2-1/4 *M10 x 57*	1.8 *0,82*
2-1/2 *65*	3.88 *99*	5.64 *143*	1.75 *44*	2	3/8 x 2-1/4 *M10 x 57*	2.0 *0,91*
76,1 mm *65*	4.00 *102*	5.78 *147*	1.75 *44*	2	— *M10 x 57*	2.0 *0,91*
3 *80*	4.50 *114*	6.33 *161*	1.75 *44*	2	3/8 x 2-1/4 *M10 x 57*	3.3 *1,50*
4 *100*	5.70 *145*	7.50 *191*	1.83 *46*	2	3/8 x 2-1/4 *M10 x 57*	3.3 *1,50*
139,7 mm *125*	6.80 *173*	8.75 *222*	1.91 *49*	2	— *M12 x 76*	5.3 *2,41*
5 *125*	6.86 *174*	8.82 *224*	1.91 *49*	2	1/2 x 3 *M12 x 76*	5.3 *2,41*
165,1 mm *150*	7.80 *198*	9.75 *248*	1.91 *49*	2	— *M12 x 76*	5.7 *2,59*
6 *150*	8.47 *215*	9.88 *251*	1.91 *49*	2	1/2 x 3 *M12 x 76*	5.9 *2,68*
8 *200*	10.25 *260*	12.78 *325*	2.40 *61*	2	5/8 x 3-1/4 *M16 x 83*	11.7 *5,32*
10 *250*	12.50 *318*	16.50 *416*	2.56 *65*	2	3/4 x 4-3/4 *M20 x 121*	19.5 *8,86*
12 *300*	14.50 *368*	18.50 *470*	2.56 *65*	2	3/4 x 4-3/4 *M20 x 121*	22.0 *10,00*

d. Gold color-coded metric bolt sizes for DN50 - DN300 couplings are available upon request.

- Refer to Technical Data Sheet G142 Figure 774 Grooved Rigid Coupling

Figure 705 Flexible Coupling

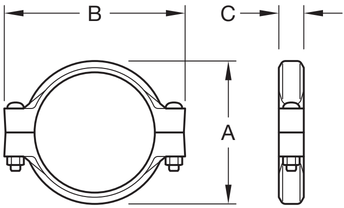


Nominal Pipe Size		Max[a, d] End Gap Inches *mm*	Max[d] End Load Lbs. *kN*	Max[c] Pressure psi *bar*	Deflection[d]	
ANSI Inches *DN*	O.D. Inches *mm*				Degrees Per Coupling	Inches/ Foot *mm/m*
1 *25*	1.315 *33,7*	0.13 *3,3*	410.0 *1,86*	500 *34,5*	5°30'	1.16 *96,7*
1-1/4 *32*	1.660 *42,4*	0.13 *3,3*	1,082.1 *4,81*	500 *34,5*	4°19'	0.90 *75,0*
1-1/2 *40*	1.900 *48,3*	0.13 *3,3*	1,417.6 *6,30*	500 *34,5*	3°46'	0.79 *65,8*
2 *50*	2.375 *60,3*	0.13 *3,3*	2,215.1 *9,85*	500 *34,5*	3°1'	0.63 *52,5*
2-1/2 *65*	2.875 *73,0*	0.13 *3,3*	3,245.9 *14,43*	500 *34,5*	2°29'	0.52 *43,3*
— *65*	3.000 *76,1*	0.13 *3,3*	3,534.3 *15,72*	500 *34,5*	2°23'	0.50 *41,7*
3 *80*	3.500 *88,9*	0.13 *3,3*	4,810.6 *21,39*	500 *34,5*	2°3'	0.43 *35,8*
4 *100*	4.500 *114,3*	0.25 *6,4*	7,952.2 *35,35*	500 *34,5*	3°11'	0.67 *55,6*
— *125*	5.500 *139,7*	0.25 *6,4*	10,691.2 *47,56*	450 *31,0*	2°36'	0.55 *45,5*
5 *125*	5.563 *141,3*	0.25 *6,4*	10,937.6 *48,63*	450 *31,0*	2°35'	0.54 *45,0*
— *150*	6.500 *165,1*	0.25 *6,4*	14,932.4 *66,36*	450 *31,0*	2°12'	0.46 *38,3*
6 *150*	6.625 *168,3*	0.25 *6,4*	15,512.2 *68,97*	450 *31,0*	2°10'	0.45 *37,8*
8 *200*	8.625 *219,1*	0.25 *6,4*	26,291.8 *116,89*	450 *31,0*	1°40'	0.35 *29,2*
10 *250*	10.750 *273,0*	0.25 *6,4*	31,766.9 *141,31*	350 *24,1*	1°20'	0.28 *23,3*
12 *300*	12.750 *323,9*	0.25 *6,4*	44,686.7 *198,78*	350 *24,1*	1°7'	0.23 *19,5*

Notes:

a. Maximum available gap between pipe ends. Minimum Gap = 0
b. Gold color-coded metric bolt sizes are available upon request.
c. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.
d. Maximum End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe are reduced by 50%.

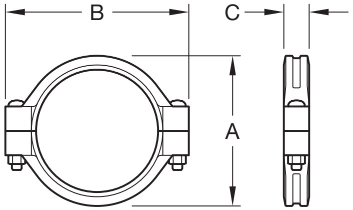
Figure 705 Flexible Coupling



Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[b] Inches *mm*	
1 *25*	2.24 *56,9*	3.94 *100,1*	1.81 *46,0*	2	3⁄8 x 1-3⁄4 (M10 x 44)	1.3 (0,6)
1-1/4 *32*	2.56 *65,0*	4.19 *106,4*	1.81 *46,0*	2	3/8 x 2-1/4 (M10 x 57)	1.8 (0,8)
1-1/2 *40*	2.75 *69,9*	4.44 *112,8*	1.81 *46,0*	2	3/8 x 2-1/4 (M10 x 57)	1.8 (0,8)
2 *50*	3.25 *82,6*	4.88 *124,0*	1.88 *47,8*	2	3/8 x 2-1/4 (M10 x 57)	1.8 (0,8)
2-1/2 *65*	3.69 *93,7*	5.50 *139,7*	1.88 *47,8*	2	3/8 x 2-1/4 (M10 x 57)	2.0 (0,9)
— *65*	4.00 *101,6*	5.75 *146,1*	1.88 *47,8*	2	M12 x 89	3.1 (1,4)
3 *80*	4.38 *111,3*	6.50 *165,1*	1.88 *47,8*	2	1/2 x 3 (M12 x 76)	3.3 (1,5)
4 *100*	5.69 *144,5*	7.75 *196,9*	2.06 *52,3*	2	1/2 x 3 (M12 x 76)	4.0 (1,8)
— *125*	6.81 *173,0*	9.75 *247,7*	2.06 *52,3*	2	M16 x 83	6.6 (3,0)
5 *125*	6.88 *174,8*	9.75 *247,7*	2.06 *52,3*	2	5/8 x 3-1/4 (M16 x 83)	6.6 (3,0)
— *150*	7.75 *196,9*	10.69 *271,5*	2.06 *52,3*	2	M16 x 83	7.0 (3,2)
6 *150*	7.94 *201,7*	10.69 *271,5*	2.06 *52,3*	2	5/8 x 3-1/4 (M16 x 83)	7.0 (3,2)
8 *200*	10.19 *258,8*	13.56 *344,4*	2.50 *63,5*	2	3/4 x 4-3/4 (M20 x 121)	11.8 (5,4)
10 *250*	12.69 *322,3*	16.38 *416,1*	2.63 *66,8*	2	1 x 6-1/2 (M24 x 165)	26.8 (12,2)
12 *300*	14.94 *379,5*	18.88 *479,6*	2.63 *66,8*	2	1 x 6-1/2 (M24 x 165)	32.2 (14,6)

- Refer to Technical Data Sheet G110 Figure 705 Flexible Coupling

Figure 707 Heavy Duty Flexible Coupling



Nominal Pipe Size		Max.[a] Pressure psi *bar*	Max[b] End Load Lbs. *kN*	Max.[b, c] End Gap Inches *mm*	Deflection[b]	
ANSI Inches *DN*	O.D. Inches *mm*				Degrees Per Coupling	Inches/ Foot *mm/m*
1 *25*	1.315 *33,7*	1000 *69,0*	1,360 *6,10*	0.13 *3,3*	5°26'	1.14 *98,4*
1-1/4 *32*	1.660 *42,4*	1000 *69,0*	2,165 *9,63*	0.13 *3,3*	4°19'	0.90 *75,0*
1-1/2 *40*	1.900 *48,3*	1000 *69,0*	2,835 *12,61*	0.13 *3,3*	3°46'	0.79 *65,8*
2 *50*	2.375 *60,3*	1000 *69,0*	4,430 *19,71*	0.13 *3,3*	3°1'	0.63 *52,5*
2-1/2 *65*	2.875 *73,0*	1000 *69,0*	6,492 *28,88*	0.13 *3,3*	2°29'	0.52 *43,3*
76,1 mm *65*	3.000 *76,1*	1000 *69,0*	7,069 *31,44*	0.13 *3,3*	2°23'	0.50 *41,7*
3 *80*	3.500 *88,9*	1000 *69,0*	9,621 *42,80*	0.13 *3,3*	2°3'	0.43 *35,8*
4 *100*	4.500 *114,3*	1000 *69,0*	15,904 *70,75*	0.25 *6,4*	3°11'	0.67 *55,8*
139,7 mm *125*	5.500 *139,7*	1000 *69,0*	23,758 *105,60*	0.25 *6,4*	2°30'	0.52 *43,6*
5 *125*	5.563 *141,3*	1000 *69,0*	24,306 *108,12*	0.25 *6,4*	2°35'	0.54 *45,1*
165,1 mm *150*	6.500 *165,1*	1000 *69,0*	33,183 *147,61*	0.25 *6,4*	2°12'	0.46 *38,3*
6 *150*	6.625 *168,3*	1000 *69,0*	34,472 *153,34*	0.25 *6,4*	2°10'	0.45 *37,5*
8 *200*	8.625 *219,1*	800 *55,1*	46,741 *207,91*	0.25 *6,4*	1°40'	0.35 *29,2*
10 *250*	10.750 *273,0*	800 *55,1*	72,610 *322,99*	0.25 *6,4*	1°20'	0.28 *23,3*
12 *300*	12.750 *323,9*	800 *55,1*	102,141 *454,35*	0.25 *6,4*	1°7'	0.23 *19,2*
14 *350*	14.000 *355,6*	350 *24,1*	53.878 *239,66*	0.25 *6,4*	1°2'	0.22 *18,3*

Notes:

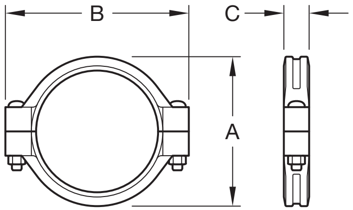
a. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

b. Maximum End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe are reduced by 50%.

c. Maximum available gap between pipe ends. Minimum Gap = 0

d. Gold color coded metric bolts sizes available upon request.

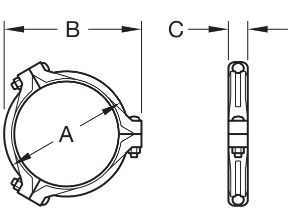
Figure 707 Heavy Duty Flexible Coupling



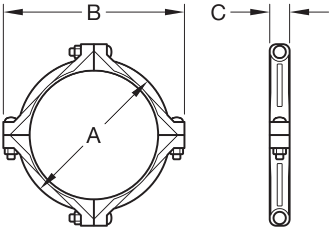
Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[d] Inches *mm*	
1 *25*	2.38 *60,5*	4.00 *101,6*	1.81 *46,0*	2	3/8 x 2-1/4 *M10 x 57*	2.0 *0,9*
1-1/4 *32*	2.76 *70,0*	4.37 *111,0*	1.81 *46,0*	2	1/2 x 3 *M12 x 76*	2.2 *1,0*
1-1/2 *40*	2.97 *75,4*	4.63 *117,6*	1.81 *46,0*	2	1/2 x 3 *M12 x 76*	2.5 *1,1*
2 *50*	3.54 *88,9*	5.25 *133,4*	1.88 *47,8*	2	1/2 x 3 *M12 x 76*	3.0 *1,4*
2-1/2 *65*	4.06 *103,1*	5.75 *146,1*	1.88 *47,8*	2	1/2 x 3 *M12 x 76*	3.5 *1,6*
76,1 mm *65*	4.19 *106,4*	5.75 *146,1*	1.88 *47,8*	2	*M12 x 76*	4.0 *1,8*
3 *80*	4.69 *119,1*	6.38 *162,1*	1.88 *47,8*	2	1/2 x 3 *M12 x 76*	4.0 *1,8*
4 *100*	5.95 *151,1*	8.25 *209,6*	2.06 *52,3*	2	5/8 x 3-1/4 *M16 x 83*	7.0 *3,2*
139,7 mm *125*	7.02 *178,3*	10.00 *254,0*	2.04 *51,8*	2	3/4 x 4-3/4 *M20 x 121*	8.3 *3,8*
5 *125*	7.08 *179,8*	10.00 *254,0*	2.06 *52,3*	2	3/4 x 4-3/4 *M20 x 121*	10.0 *4,5*
165,1 mm *150*	8.19 *208,0*	11.25 *285,8*	2.06 *52,3*	2	*M20 x 121*	12.0 *5,4*
6 *150*	8.30 *210,8*	11.25 *285,8*	2.06 *52,3*	2	3/4 x 4-3/4 *M20 x 121*	11.1 *5,0*
8 *200*	10.68 *271,3*	14.00 *355,6*	2.47 *62,7*	2	7/8 x 6-1/2 *M22 x 165*	21.4 *9,7*
10 *250*	13.06 *331,7*	16.44 *417,6*	2.63 *66,8*	2	1 x 6-1/2 *M24 x 165*	29.0 *13,2*
12 *300*	15.39 *390,9*	18.84 *478,5*	2.63 *66,8*	2	1 x 6-1/2 *M24 x 165*	37.0 *16,8*
14 *350*	16.67 *423,4*	20.38 *517,7*	2.94 *74,7*	2	1 x 5-1/2•	46.0 *20,9*

• Refer to Technical Data Sheet G130 Figure 707 Heavy Duty Flexible Coupling

Figure 707 Heavy Duty Flexible Coupling



Size 16˝ - 18˝
(DN400 - DN450)



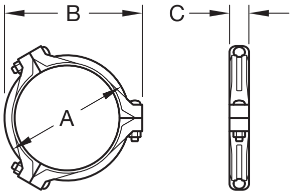
Size 20˝ - 24˝
(DN500 - DN600)

Nominal Pipe Size		Max.[a] Pressure psi *bar*	Max[b] End Load Lbs. *kN*	Max.[b, c] End Gap Inches *mm*	Deflection[b]	
ANSI Inches *DN*	O.D. Inches *mm*				Degrees Per Coupling	Inches/ Foot *mm/m*
16 *400*	16.000 *406,4*	350 *24,1*	70,372 *313,03*	0.25 *6,4*	0°54'	0.19 *15,8*
18 *450*	18.000 *457,2*	300 *20,7*	76,341 *339,58*	0.25 *6,4*	0°48'	0.17 *14,2*
20 *500*	20.000 *508,0*	300 *20,7*	94,248 *419,24*	0.25 *6,4*	0°43'	0.15 *12,5*
24 *600*	24.000 *609,6*	350 *24,1*	158,336 *704,31*	0.25 *6,4*	0°36'	0.13 *10,8*

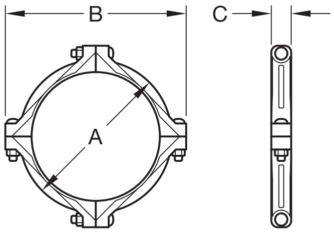
Notes:

a. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.
b. Maximum End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe are reduced by 50%.
c. Maximum available gap between pipe ends. Minimum Gap = 0
d. Gold color coded metric bolts sizes available upon request.

Figure 707 Heavy Duty Flexible Coupling



Size 16˝ - 18˝
(DN400 - DN450)

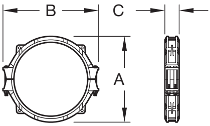


Size 20˝ - 24˝
(DN500 - DN600)

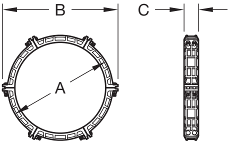
Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[d] Inches *mm*	
16 *400*	18.83 *478,3*	22.64 *575,1*	2.94 *74,7*	3	1 x 5-1/2•	59.0 *26,8*
18 *450*	21.31 *541,3*	25.12 *638,0*	3.06 *77,7*	3	1 x 5-1/2•	78.0 *35,4*
20 *500*	23.47 *596,1*	27.88 *708,2*	3.06 *77,7*	4	1-1/8 x 5-3/4•	89.0 *40,4*
24 *600*	27.58 *700,5*	32.00 *812,8*	3.19 *81,0*	4	1-1/8 x 5-3/4•	112.0 *50,8*

- Refer to Technical Data Sheet G130 Figure 707 Heavy Duty Flexible Coupling

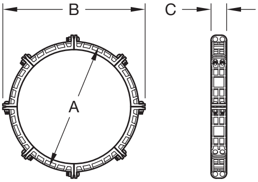
Figure 707L Large Diameter Coupling



26" (DN650)



28" (DN700) - 36" (DN900)



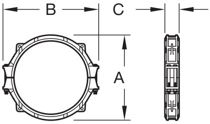
40" (DN1000) - 42" (DN1050)

Nominal Pipe Size		Max.[a] Pressure psi *bar*	Max[a] End Load Lbs. *kN*	Max.[b,c] End Gap Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*			
26 *650*	26.00 *660,4*	300 *20*	159,279 *708*	0.34 *8,6*
28 *700*	28.00 *711,2*	175 *12*	107,757 *479*	0.34 *8,6*
30 *750*	30.00 *762,0*	175 *12*	123,700 *550*	0.34 *8,6*
32 *800*	32.00 *812,8*	175 *12*	140,743 *626*	0.34 *8,6*
36 *900*	36.00 *914,4*	175 *12*	178,128 *792*	0.34 *8,6*
40 *1000*	40.00 *1016,0*	175 *12*	219,911 978	0.34 *8,6*
42 *1050*	42.00 *1066,8*	175 *12*	242,452 *1078*	0.34 *8,6*

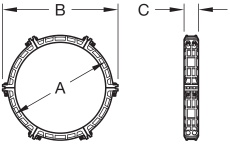
Notes:

a. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact your GRINNELL Representative for details.
b. Maximum End Gap is for rolled grooved standard weight pipe.
c. Maximum available gap between pipe ends. Minimum Gap = 0
d. 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.

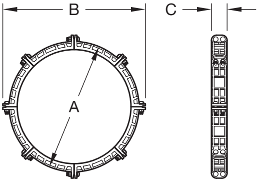
Figure 707L Large Diameter Coupling



26" (DN650)



28" (DN700) - 36" (DN900)

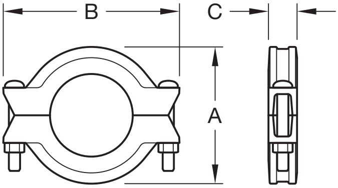


40" (DN1000) - 42" (DN1050)

Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Bolt [d] Torque Range Ft-Lbs *Nm*	Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size Inches *mm*		
26 *650*	29.68 *754,0*	33.15 *842,0*	4.94 *125,6*	4	7/8 x 9-5/8	175-225 *245-300*	147.0 *67,0*
28 *700*	32.00 *813,0*	36.30 *920,0*	5.00 *127,0*	12	7/8 x 4	175-225 *245-300*	180.0 *82,0*
30 *750*	34.00 *864,0*	38.30 *972,0*	5.00 *127,0*	12	7/8 x 4	175-225 *245-300*	209.0 *95,0*
32 *800*	36.00 *914,0*	40.30 *1022,0*	5.00 *127,0*	12	7/8 x 4	175-225 *245-300*	207.0 *94,0*
36 *900*	40.00 *1016,0*	44.30 *1124,0*	5.00 *127,0*	12	7/8 x 4	175-225 *245-300*	212.0 *96,0*
40 *1000*	43.50 *1105,0*	49.00 *1245,0*	5.50 *140,0*	16	1 x 3-1/2	200-250 *270-340*	271.0 *123,0*
42 *1050*	45.50 *1156,0*	51.50 *1295,0*	5.50 *140,0*	16	1 x 3-1/2	200-250 *270-340*	367.5 *166,7*

- Refer to Technical Data Sheet G133 Figure 707L Large Diameter Coupling

Figure 716 Flexible Reducing Coupling



Nominal Pipe Size		Max.[a, c] End Gap Inches *mm*	Max.[b] Pressure psi *bar*	Deflection	
ANSI Inches *DN*	O.D. Inches *mm*			Degrees Per Coupling	Inches/ Foot *mm/m*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,8*	0.13 *3,3*	500 *34,5*	1°53'	0.39 *32,5*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	0.13 *3,3*	500 *34,5*	1°33'	0.32 *26,7*
— *65 x 50*	3.000 x 2.375 *76,1 x 60,3*	0.13 *3,3*	500 *34,5*	1°34'	0.32 *26,7*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	0.13 *3,3*	500 *34,5*	1°17'	0.27 *22,5*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	0.13 *3,3*	500 *34,5*	1°17'	0.27 *22,5*
— *80 x 65*	3.500 x 3.000 *88,9 x 76,1*	0.13 *3,3*	500 *34,5*	1°17'	0.27 *22,5*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	0.19 *4,8*	500 *34,5*	2°38'	0.55 *45,8*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	0.19 *4,8*	500 *34,5*	2°38'	0.55 *45,8*
— *100 x 65*	4.500 x 3.000 *114,3 x 76,1*	0.19 *4,8*	500 *34,5*	2°38'	0.55 *45,8*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	0.19 *4,8*	500 *34,5*	2°38'	0.55 *45,8*
— *125 x 100*	5.500 x 4.500 *139,7 x 114,3*	0.25 *6,4*	500 *34,5*	2°38'	0.55 *45,8*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	0.25 *6,4*	500 *34,5*	2°5'	0.44 *36,4*
— *150 x 100*	6.500 x 4.500 *165,1 x 114,3*	0.25 *6,4*	400 *27,6*	1°50'	0.38 *31,7*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	0.25 *6,4*	400 *27,6*	1°44'	0.36 *30,0*
6 x 5 *150 x 125*	6.625 x 5.563 *168,3 x 141,3*	0.25 *6,4)*	400 *27,6*	1°44'	0.36 *30,0*
8 x 6 *200 x 150*	8.625 x 6.625 *219,1 x 168,3*	0.25 *6,4*	400 *27,6*	1°15'	0.26 *21,8*

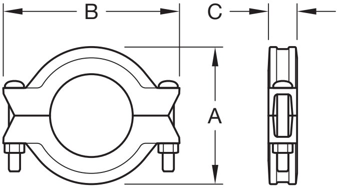
Notes:

a. Maximum available gap between pipe ends. Minimum Gap = .06"with metal insert.

b. Maximum pressure is based on standard weight steel pipe. Pressure ratings may differ on other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

c. Max End Gap and Deflection are for cut grooved standard weight pipe. Values for roll grooved pipe are reduced by 50%.

Figure 716 Flexible Reducing Coupling



Nominal Size ANSI Inches *DN*	Nominal Dimensions			Bolt Size[d] Dia. x Lg.	Net Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*		
2 x 1-1/2 *50 x 40*	3.50 *88,9*	5.06 *128,5*	1.88 *47,8*	3/8 x 2-1/4 *M10 x 57*	2.0 *0,9*
2-1/2 x 2 *65 x 50*	4.00 *101,6*	5.50 *139,7*	1.88 *47,8*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*
— *65 x 50*	4.19 *106,4*	5.88 *149,4*	1.88 *47,8*	*M12 x 76*	3.1 *1.4*
3 x 2 *80 x 50*	4.69 *119,1*	6.50 *165,1*	1.88 *47,8*	1/2 x 3 *M12 x 76*	4.5 *2,0*
3 x 2-1/2 *80 x 65*	4.69 *119,1*	6.50 *165,1*	1.88 *47,8*	1/2 x 3 *M12 x 76*	4.6 *2,1*
— *80 x 65*	4.69 *119,1*	6.50 *165,1*	1.88 *47,8*	*M12 x 76*	4.5 *2,0*
4 x 2 *100 x 50*	6.00 *152,4*	8.13 *206,5*	2.00 *50,8*	5/8 x 3-1/4 *M16 x 83*	7.0 *3,2*
4 x 2-1/2 *100 x 65*	6.00 *152,4*	8.13 *206,5*	2.00 *50,8*	5/8 x 3-1/4 *M16 x 83*	6.1 *2,8*
— *100 x 65*	6.00 *152,4*	8.13 *206,5*	2.00 *50,8*	*M16 x 83*	6.2 *2,8*
4 x 3 *100 x 80*	6.00 *152,4*	8.13 *206,5*	2.00 *50,8*	5/8 x 3-1/4 *M16 x 83*	6.2 *2,8*
— *125 x 100*	7.06 *179,3*	9.50 *241,3*	2.06 *52,3*	*M20 x 121*	11.0 *5,0*
5 x 4 *125 x 100*	7.13 *181,1*	9.56 *242,8*	2.06 *52,3*	3/4 x 4-3/4 *M20 x 121*	10.1 *4,6*
— *150 x 100*	8.18 *207,8*	10.81 *274,4*	2.06 *52,3*	*M20 x 121*	12.5 *5,7*
6 x 4 *150 x 100*	8.38 *212,9*	10.88 *276,4*	2.06 *52,3*	3/4 x 4-3/4 *M20 x 121*	12.5 *5,7*
6 x 5 *150 x 125*	8.38 *212,9*	10.88 *276,4*	2.06 *52,3*	3/4 x 4-3/4 *M20 x 121*	11.7 *5,3*
8 x 6 *200 x 150*	10.69 *271,5*	13.75 *349,3*	2.25 *57,2*	7/8 x 6-1/2 *M22 x 165*	23.5 *10,7*

d. Gold color coded metric bolts available upon request.

- Refer to Technical Data Sheet G120 Figure 716 Flexible Reducing Coupling

Figure 702 Mechanical Outlet Coupling

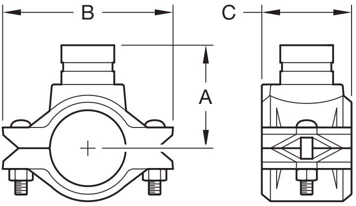


FIGURE 702
OUTLET COUPLING
WITH GROOVED OUTLET

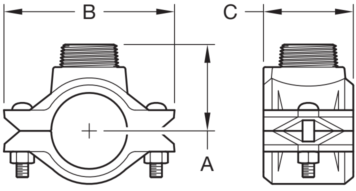


FIGURE 702
OUTLET COUPLING
WITH MALE NPT OUTLET

Nominal Run Size		Nominal Branch Size				End Gap Range Inches *mm*	Max. Run End Load Lbs. *kN*
		Grooved		Male NPT Inches *mm*	Female NPT Inches *mm*		
ANSI Inches *DN*	O.D. Inches *mm*	ANSI Inches *DN*	O.D. Inches *mm*				
1-1/2 *40*	1.900 *48,3*	—	—	—	1/2 *21,3*	0.81-0.88 *20-22*	1418 *6,3*
		—	—	—	3/4 *26,7*	0.81-0.88 *20-22*	
		—	—	—	7 *33,7*	0.81-0.88 *20-22*	
5 *50*	2.375 *60,3*	—	—	—	1/2 *21,3*	0.81-0.88 *20-22*	2215 *9,9*
		—	—	—	3/4 *26,7*	0.81-0.88 *20-22*	
		1 *25*	1.315 *33,7*	1 *33,7*	7 *33,7*	0.81-0.88 *20-22*	
2-1/2 *65*	2.875 *73,0*	—	—	—	1/2 *21,3*	1.25-1.50 *32-38*	3246 *14,4*
		—	—	—	3/4 *26,7*	1.25-1.50 *32-38*	
		—	—	—	7 *33,7*	1.25-1.50 *32-38*	
		1-1/4 *32*	1.660 *42,4*	1-1/4 *42,4*	—	1.25-1.50 *32-38*	
		1-1/2 *40*	1.900 *48,3*	1-1/2 *48,3*	—	1.25-1.50 *32-38*	

Note:

a. Center of run pipe to end of outlet pipe (dimensions approximate). Female threaded outlet only.

- Refer to Technical Data Sheet G220 Figure 702 Mechanical Outlet Coupling

Figure 702 Mechanical Outlet Coupling

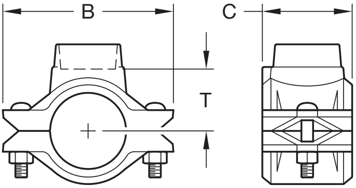


FIGURE 702
OUTLET COUPLING
WITH FEMALE NPT OUTLET

Nominal Run Size		Nominal Dimensions				Coupling Bolt Size Inches	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A Inches** ***mm***	**B Inches** ***mm***	**C Inches** ***mm***	**T[a] Inches** ***mm***		
1-1/2 *40*	1.900 *48,3*	—	4.50 *114,3*	2.75 *70,0*	2.06 *52,0*	3/8 x 2-1/8	2.6 *1,2*
		—	4.50 *114,3*	2.75 *70,0*	2.06 *52,0*		2.6 *1,2*
		—	4.50 *114,3*	2.75 *70,0*	1.94 *49,0*		2.9 *1,3*
5 *50*	2.375 *60,3*	—	5.00 *127,0*	2.75 *70,0*	2.32 *59,0*	3/8 x 2-1/8	3.1 *1,4*
		—	5.00 *127,0*	2.75 *70,0*	2.32 *59,0*		3.1 *1,4*
		3.50 *89,0*	5.00 *127,0*	2.75 *70,0*	2.20 *56,0*		3.3 *1,5*
2-1/2 *65*	2.875 *73,0*	—	6.33 *161,0*	3.25 *83,0*	2.20 *56,0*	1/2 x 2-3/8	4.8 *2,2*
		—	6.33 *161,0*	3.25 *83,0*	2.56 *65,0*		4.6 *2,1*
		—	6.33 *161,0*	3.25 *83,0*	2.44 *62,0*		4.4 *2,2*
		3.70 *94,0*	6.33 *161,0*	3.25 *83,0*	—		5.1 *2,3*
		3.70 *94,0*	6.33 *161,0*	3.25 *83,0*	—		5.9 *2,4*

Figure 702 Mechanical Outlet Coupling

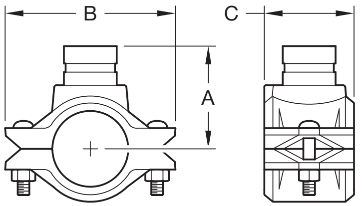


FIGURE 702
OUTLET COUPLING
WITH GROOVED OUTLET

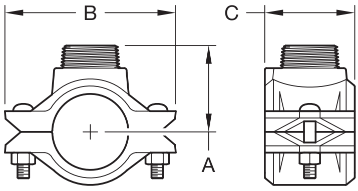


FIGURE 702
OUTLET COUPLING
WITH MALE NPT OUTLET

Nominal Run Size		Nominal Branch Size				End Gap Range Inches *mm*	Max. Run End Load Lbs. *kN*
ANSI Inches *DN*	O.D. Inches *mm*	Grooved ANSI Inches *DN*	Grooved O.D. Inches *mm*	Male NPT Inches *mm*	Female NPT Inches *mm*		
3 *80*	3.500 *88,9*	–	–	–	3/4 *26,7*	1.25-1.50 *32-38*	4811 *21,4*
		1 *25*	1.315 *33,7*	1 *33,4*	1 *33,7*	1.25-1.50 *32-38*	
		1-1/2 *40*	1.900 *48,3*	1-1/2 *48,3*	–	1.25-1.50 *32-38*	
4 *100*	4.500 *114,3*	–	–	–	3/4 *26,7*	1.63-1.81 *41-46*	7652 *35,4*
		–	–	1 *33,4*	1 *33,7*	1.63-1.81 *41-46*	
		1-1/2 *40*	1.900 *48,3*	1-1/2 *48,3*	1-1/2 *48,3*	1.63-1.81 *41-46*	
		2 *50*	2.375 *60,3*	2 *60,3*	–	1.63-1.81 *41-46*	
6 *150*	6.625 *168,3*	–	–	–	–	1.63-1.81 *41-46*	17,235 *76,7*
		–	–	–	1 *33,7*	1.63-1.81 *41-46*	
		1-1/2 *40*	1.900 *48,3*	1-1/2 *48,3*	1-1/2 *48,3*	1.63-1.81 *41-46*	
		2 *50*	2.375 *60,3*	2 *60,3*	–	1.63-1.81 *41-46*	

Note:

a. Center of run pipe to end of outlet pipe (dimensions approximate). Female threaded outlet only.

- Refer to Technical Data Sheet G220 Figure 702 Mechanical Outlet Coupling

Figure 702 Mechanical Outlet Coupling

(2 of 2)

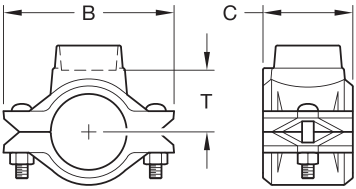
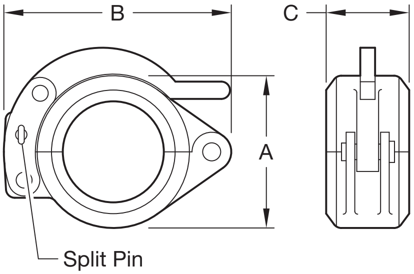


FIGURE 702
OUTLET COUPLING
WITH FEMALE NPT OUTLET

Nominal Run Size		Nominal Dimensions Inches/*mm*				Coupling Bolt Size Inches	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A	B	C	T[a]		
3 *80*	3.500 *88,9*	—	6.87 *175,0*	3.25 *83,0*	2.83 *72,0*	1/2 x 3	5.9 *2,7*
		4.00 *102,0*	6.87 *175,0*	3.25 *83,0*	2.75 *70,0*		6.2 *2,8*
		4.00 *102,0*	6.87 *175,0*	3.25 *83,0*	—		6.4 *2,9*
4 *100*	4.500 *114,3*	—	8.31 *211,0*	3.66 *93,0*	3.70 *94,0*	5/8 x 3-1/2	9.2 *4,2*
		—	8.31 *211,0*	3.66 *93,0*	3.58 *91,0*		9.5 *4,3*
		4.88 *124,0*	8.31 *211,0*	3.66 *93,0*	3.31 *84,0*		9.5 *4,3*
		4.88 *124,0*	8.31 *211,0*	3.66 *93,0*	—		9.9 *4,5*
6 *150*	6.625 *168,3*	—	10.86 *276,0*	3.70 *94,0*	—	5/8 x 3-1/2	13.2 *6,0*
		—	10.86 *276,0*	3.70 *94,0*	4.76 *121,0*		13.2 *6,0*
		6.06 *154,0*	10.86 *276,0*	3.70 *94,0*	4.76 *121,0*		13.6 *6,2*
		6.06 *154,0*	10.86 *276,0*	3.70 *94,0*	—		14.3 *6,5*

Figure 780 Grooved Snap Coupling



Nominal Pipe Size		Maximum[a, b] Working Pressure psi *bar*	Maximum[b] End Load Lbs. *kN*	Maximum End Gap Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	300 *20,7*	650 *2,9*	0.06 *1,6*
1-1/2 *40*	1.900 *48,3*	300 *20,7*	851 *3,8*	0.06 *1,6*
2 *50*	2.375 60,3	300 *20,7*	1,329 *5,9*	0.06 *1,6*
2-1/2 *65*	2.875 *73,0*	300 *20,7*	1,947 *8,7*	0.06 *1,6*
— *65*	3.000 *76,1*	300 *20,7*	2,121 *9,4*	0.06 *1,6*
3 *80*	3.500 *88,9*	300 *20,7*	2,886 *12,8*	0.06 *1,6*
4 *100*	4.500 *114,3*	300 *20,7*	4,771 *21,2*	0.13 *3,2*
— *125*	5.500 *139,7*	300 *20,7*	7,127 *31,7*	0.13 *3,2*
5 *125*	5.565 *141,3*	300 *20,7*	7,289 *32,4*	0.13 *3,2*
— *150*	6.500 *165,1*	300 *20,7*	9,955 *44,3*	0.13 *3,2*
6 *150*	6.625 *168,3*	300 *20,7*	10,341 *46,0*	0.13 *3,2*
8 *200*	8.625 *219,1*	300 *20,7*	17,528 *78,0*	0.13 *3,2*

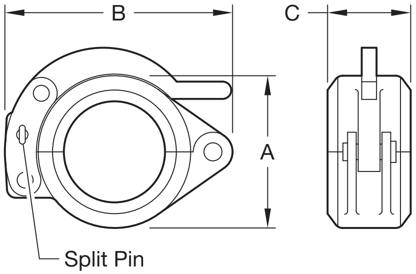
Notes:

a. Pressure ratings listed are cold water pressure or maximum working pressure within the service temperature range of the gasket used in the coupling.

b. Maximum working pressures and end loads listed are total of internal and external pressures and loads based on Schedule 40 steel pipe grooved in accordance with Standard Cut Groove or Roll Groove Specifications.

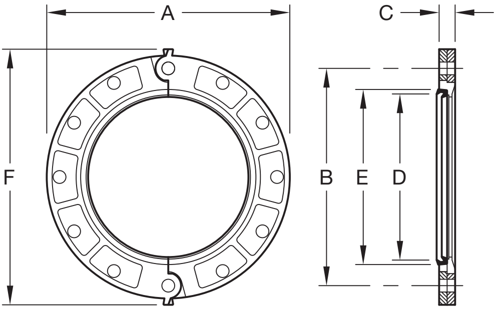
- Refer to Technical Data Sheet G145 Figure 780 Grooved Snap Coupling

Figure 780 Grooved Snap Coupling



Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Deflection		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Degrees per coupling	Inches / Foot *mm/m*	
1-1/4 *32*	3.28 *83,2*	5.14 *130,5*	1.75 *44,5*	3°6'	0.65 *54,3*	1.6 *0,7*
1-1/2 *40*	2.95 *75,0*	4.65 *118,0*	1.85 *47,0*	3°48'	0.80 *66,4*	2.2 *1,0*
2 *50*	3.39 *86,0*	4.76 *121,0*	1.89 *48,0*	3°31'	0.74 *61,5*	2.4 *1,1*
2-1/2 *65*	3.62 *92,0*	5.91 *150,0*	1.89 *48,0*	2°30'	0.52 *43,7*	3.1 *1,4*
— *65*	3.62 *92,0*	5.91 *150,0*	1.89 *48,0*	2°24'	0.50 *41,9*	3.1 *1,4*
3 *80*	4.69 *119,0*	6.42 *163,0*	1.89 *48,0*	2°24'	0.50 *41,9*	4.0 *1,8*
4 *100*	6.50 *165,0*	8.07 *205,0*	2.05 *52,0*	3°12'	0.67 *55,9*	5.9 *2,7*
— *125*	7.44 *189,0*	9.96 *253,0*	2.05 *52,0*	2°37'	0.55 *45,7*	10.8 *4,9*
5 *125*	7.44 *189,0*	9.96 *253,0*	2.05 *52,0*	2°36'	0.54 *45,4*	10.8 *4,9*
— *150*	8.39 *213,0*	10.94 *278,0*	2.05 *52,0*	2°14'	0.47 *39,0*	12.8 *5,8*
6 *150*	8.50 *216,0*	11.06 *281,0*	2.05 *52,0*	2°10'	0.45 *37,8*	12.8 *5,8*
8 *200*	10.95 *278,0*	14.02 *356,0*	2.44 *62,0*	1°40'	0.35 *29,1*	20.5 *9,3*

Figure 71 Flange Adapter - 2 to 12 Inch



ANSI CLASS 125 and 150

Nominal Pipe Size		Max.[b] Pressure psi *bar*	Recommended Flange Mating Bolts[a]			Net Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		Size Dia. x Lg.	Qty.	Torque Range Lbs. - ft. *Nm*	
2 *50*	2.375 *60,3*	300 *20,7*	5/8 x 3 *M16 x 76*	4	110-140 *150-190*	3.0 *1,4*
2-1/2 *65*	2.875 *73,0*	300 *20,7*	5/8 x 3 *M16 x 76*	4	110-140 *150-190*	5.0 *2,3*
3 *80*	3.500 *88,9*	300 *20,7*	5/8 x 3 *M16 x 76*	4	110-140 *150-190*	5.6 *2,5*
4 *100*	4.500 *114,3*	300 *20,7*	5/8 x 3 *M16 x 76*	8	110-140 *150-190*	7.0 *3,2*
5 *125*	5.563 *141,3*	300 *20,7*	3/4 x 3-1/2 *M20 x 89*	8	220-250 *300-340*	9.2 *4,2*
6 *150*	6.625 *168,3*	300 *20,7*	3/4 x 3-1/2 *M20 x 89*	8	220-250 *300-340*	10.0 *4,5*
8 *200*	8.625 *219,1*	300 *20,7*	3/4 x 3-1/2 *M20 x 89*	8	220-250 *300-340*	16.6 *7,5*
10 *250*	10.750 *273,0*	300 *20,7*	7/8 x 4 *M22 x 102*	12	320-400 *440-550*	21.8 *9,9*
12 *300*	12.750 *323,9*	300 *20,7*	7/8 x 4 *M22 x 102*	12	320-400 *440-550*	24.2 *11,0*

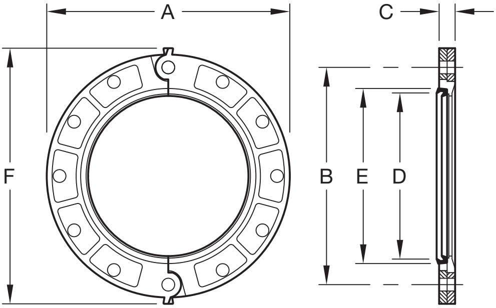
Notes:

a. Bolts and nuts are not supplied. Flange face bolts must have mechanical properties equal to or greater than SAEJ429 Grade 5. Bolt lengths shown are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

b. Maximum Pressure is based on standard weight steel pipe. Pressure ratings may differ on other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

c. Dimensions D and E represent minimum and maximum sealing surfaces.

Figure 71 Flange Adapter - 2 to 12 Inch

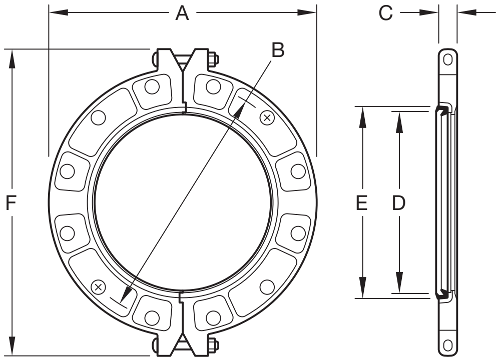


ANSI CLASS 125 and 150

Nominal Pipe Size		Nominal Dimensions Inches (mm)					
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A**	**B**	**C**	**D**[c]	**E**[c]	**F**
2 *50*	2.375 *60,3*	6.38 *162,1*	4.75 *120,7*	0.75 *19,1*	2.38 *60,5*	3.41 *86,6*	7.25 *184,2*
2-1/2 *65*	2.875 *73,0*	7.00 *178,0*	5.50 *140,0*	0.88 *22,0*	2.88 *73,0*	3.91 *99,0*	7.88 *200,0*
3 *80*	3.500 *88,9*	7.50 *190,5*	6.00 *152,4*	0.94 *23,9*	3.50 *88,9*	4.53 *115,1*	9.88 *251,0*
4 *100*	4.500 *114,3*	9.00 *228,6*	7.50 *190,5*	0.94 *23,9*	4.50 *114,3*	5.53 *140,5*	9.90 *251,5*
5 *125*	5.563 *141,3*	10.00 *254,0*	8.50 *215,9*	1.00 *25,4*	5.56 *141,2*	6.72 *170,7*	11.38 *289,1*
6 *150*	6.625 *168,3*	11.00 *279,4*	9.50 *241,3*	1.00 *25,4*	6.62 *168,1*	7.78 *197,6*	11.88 *301,8*
8 *200*	8.625 *219,1*	13.50 *342,9*	11.75 *298,5*	1.13 *28,7*	8.62 *218,9*	9.94 *252,5*	14.38 *365,3*
10 *250*	10.750 *273,0*	16.00 *406,4*	14.25 *362,0*	1.19 *30,2*	10.75 *273,1*	12.31 *312,7*	16.88 *428,8*
12 *300*	12.750 *323,9*	19.00 *482,6*	17.00 *431,8*	1.25 *31,8*	12.75 *323,9*	14.31 *363,5*	20.00 *508,0*

- Refer to the recommended Flange Mating Bolts Specifications when setting the torque on power impact wrenches. Refer to the manufacturer's instructions for settings.
- Refer to Technical Data Sheet G150 Figure 71 Flange Adapter

Figure 71 Flange Adapter - 14 to 24 Inch



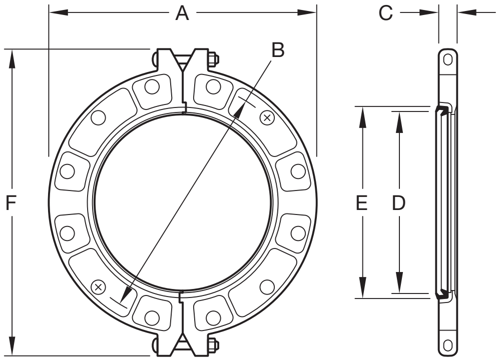
ANSI CLASS 125 and 150

Nominal Pipe Size		Max.[c] Pressure psi *bar*	Recommended Flange Mating Bolts[a]			Net Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***		**Size Dia. x Lg.**	**Qty.**	**Torque Range Lbs. - ft. *Nm***	
14 *350*	14.000 *355,6*	300 *20,7*	1 x 4-1/4	12	360-520 *490-700*	25.0 *11,3*
16 *400*	16.000 *406,4*	300 *20,7*	1 x 4-1/4	16	360-520 *490-700*	31.0 *14,0*
18 *450*	18.000 *457,2*	300 *20,7*	1-1/8 x 4-3/4	16	450-725 *600-1000*	35.0 *15,8*
20 *500*	20.000 *508,0*	300 *20,7*	1-1/8 x 4-3/4	20	450-725 *600-1000*	45.0 *20,4*
24 *600*	24.000 *609,6*	250 *17,2*	1-1/4 x 5-1/2	20	620-1000 *850-1350*	59.0 *26,8*

Notes:

a. Bolts and nuts are not supplied. Flange face bolts must have mechanical properties equal to or greater than SAEJ429 Grade 5. Bolt lengths shown are standard; it is the responsibility of the purchaser to verify correct length for the intended application.
b. Dimensions D and E represent minimum and maximum sealing surfaces.
c. Maximum pressure is based on standard weight steel pipe. Pressure ratings may differ on other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

Figure 71 Flange Adapter - 14 to 24 Inch

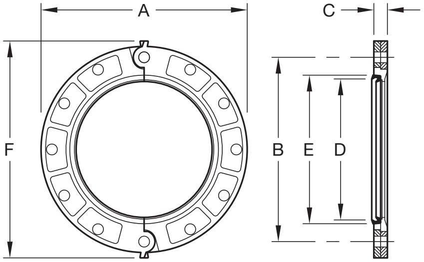


ANSI CLASS 125 and 150

Nominal Pipe Size	Nominal Dimensions - Inches/*mm*						Segment Bolts
ANSI Inches *DN*	A	B	C	D[b]	E[b]	F	Torque Range Lbs. - ft. *Nm*
14 *350*	14.000 *355,6*	18.76 *476,5*	1.44 *36,5*	14.00 *355,6*	15.03 *381,8*	24.00 *609,6*	100-130 *488-705*
16 *400*	16.000 *406,4*	21.26 *540,0*	1.50 *38,1*	16.00 *406,4*	17.00 *431,7*	26.50 *673,1*	
18 *450*	18.000 *457,2*	22.76 *578,1*	1.63 *41,3*	18.00 *457,2*	19.01 *482,8*	29.00 *736,6*	130-180 *841-1356*
20 *500*	20.000 *508,0*	25.00 *635,0*	1.75 *44,5*	20.00 *508,0*	21.03 *534,2*	31.50 *800,1*	
24 *600*	24.000 *609,6*	29.50 *749,3*	1.93 *49,0*	24.00 *609,6*	25.05 *636,3*	36.00 *914,4*	

- Refer to the recommended Flange Mating Bolts Specifications when setting the torque on power impact wrenches. Refer to the manufacturer's instructions for settings.
- Refer to Technical Data Sheet G150 Figure 71 Flange Adapter

Figure 71 Flange Adapter - Metric

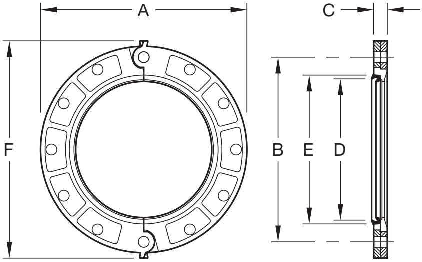


PN10 and PN16

Nominal Pipe Size		Flange Bolt Pattern Designation	Max End Load[c] Lbs. *N*	Nominal Dimensions Inches/*mm*		
ANSI Inch *DN*	O.D. *mm*			A	B	C
2 *50*	— *60,3*	PN10 / PN16	1,324 *5889*	6.38 *162,1*	4.92 125,0	0.75 *19,1*
76,1 *65*	— *76,1*	PN10 / PN16	1,948 *8665*	7.28 *184,9*	5.71 *145,0*	0.88 *22,4*
3** *80*	— *88,9*	PN10	2,886 *12,838*	7.88 *200,2*	6.30 *160,0*	0.94 *23,9*
3 *80*	— *88,9*	PN16	2,886 *12,838*	7.88 *200,2*	6.30 *160,0*	0.94 *23,9*
4 *100*	— *114,3*	PN10 / PN16	4,771 *21,222*	9.00 *228,6*	7.09 *180,1*	0.94 *23,9*
5 *125*	— *139,7*	PN10 / PN16	7,292 *32,436*	9.84 *249,9*	8.27 *210,1*	1.00 *25,4*
165.1 *150*	— *165,1*	PN10 / PN16	10,341 *45,999*	11.25 *285,8*	9.45 *240,0*	1.00 *25,4*
6 *150*	— *168,3*	PN10 / PN16	17,528 *77,968*	11.00 *279,4*	9.49 *241,1*	1.00 *25,4*
8[b] *200*	— *219,1*	PN10	27,229 *121,121*	13.38 *339,9*	11.61 *294,9*	1.13 *28,7*
8 *200*	— *219,1*	PN16	27,229 *121,121*	13.38 *339,9*	11.61 *294,9*	1.13 *28,7*
10[b] *250*	— *273,0*	PN10	38,303 *170,380*	15.56 *395,2*	13.78 *350,0*	1.19 *30,2*
10 *250*	— *273,0*	PN16	38,303 *170,380*	16.00 *406,4*	13.98 *355,1*	1.19 *30,2*
12[b] *300*	— *323,9*	PN10	29,621 *131,754*	17.52 *445,0*	15.74 *400,0*	1.25 *31,8*
12 *300*	— *323,9*	PN16	29,621 *131,754*	18.12 *460,2*	16.14 *410,0*	1.25 *31,8*

a. Dimensions D and E represent minimum and maximum sealing surfaces.
b. For noted sizes, PN10 and PN16 dimensional values differ.
c. Maximum End Load is total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ on other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.
• Maximum Pressure rating is 20,7 bar (300 psi).

Figure 71 Flange Adapter - Metric



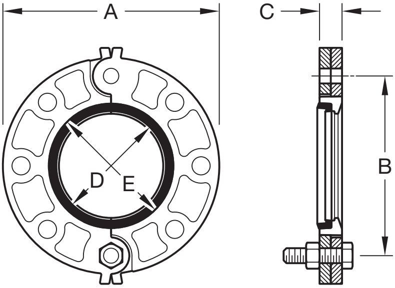
PN10 and PN16

Nominal Dimensions Inches (mm)			Recommended Flange Mating Bolts[d]			Approx. Wt. Lbs. *kg*
D[a]	E[a]	F	Size Dia. x Lg.	Qty.	Bolt Torque Range *Nm*	
2.38 *60,5*	3.41 *86,6*	7.25 *184,2*	M16 x 76	4	*149-190*	3.0 *1,4*
3.00 *76,1*	4.03 *102,4*	8.09 *205,5*	M16 x 76	4	*149-190*	5.0 *2,3*
3.50 *88,9*	4.53 *115,1*	8.75 *222,3*	M16 x 76	4	*149-190*	5.6 *2,5*
3.50 *88,9*	4.53 *115,1*	8.75 *222,3*	M16 x 76	8	*149-190*	5.6 *2,5*
4.50 *114,3*	5.53 *140,5*	9.90 *251,5*	M16 x 76	8	*149-190*	7.0 *3,2*
5.50 *139,7*	6.53 *165,9*	10.69 *271,5*	M16 x 89	8	*149-190*	9.2 *4,2*
6.50 *165,1*	7.53 *191,3*	12.12 *307,8*	M20 x 89	8	*298-339*	10.0 *4,5*
6.62 *168,1*	7.78 *197,6*	11.88 *301,8*	M20 x 89	8	*298-339*	16.6 *7,5*
8.62 *218,9*	9.94 *252,5*	14.31 *363,5*	M20 x 89	8	*298-339*	21.8 *9,9*
8.62 *218,9*	9.94 *252,5*	14.31 *363,5*	M20 x 89	12	*298-339*	21.8 *9,9*
10.75 *273,1*	12.31 *312,7*	16.50 *419,1*	M20 x 102	12	*298-339*	22.5 *10,2*
10.75 *273,1*	12.31 *312,7*	16.88 *428,8*	M22 x 102	12	*434-542*	24.2 *11,0*
12.75 *323,9*	14.31 *363,9*	16.56 *420,6*	M20 x 102	12	*298-339*	27.5 *12,5*
12.75 *323,9*	14.31 *363,9*	19.14 *486,2*	M22 x 102	12	*434-542*	28.0 *12,7*

d. 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.

- Refer to the recommended Flange Mating Bolts Specifications when setting the torque on power impact wrenches.
- Refer to Technical Data Sheet G150 Figure 71 Flange Adapter

Figure 71H Flange Adapter - Hinged



ANSI CLASS 125 and 150

Nominal Pipe Size		Max.[c] Pressure psi *bar*	Max End Load[c] (CWP) Lbs. *kN*	Recommended Flange Mating Bolts[a]			Net Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*			Size Dia. x Lg.	Qty.	Torque Range Lbs. - ft. *Nm*	
2 *50*	2.375 *60,3*	500 *34,5*	1330 *5,92*	5/8 x 3	4	110-140 *149-190*	4.0 *1,8*
2-1/2 *65*	2.875 *73,0*	500 *34,5*	1950 *8,67*	5/8 x 3	4	110-140 *149-190*	5.1 *2,3*
3 *80*	3.500 *88,9*	500 *34,5*	2880 *12,81*	5/8 x 3	4	110-140 *149-190*	6.2 *2,8*
4 *100*	4.500 *114,3*	500 *34,5*	4770 *21,22*	5/8 x 3	8	110-140 *149-190*	8.3 *3,8*
5 *125*	5.563 *141,3*	500 *34,5*	7290 *32,43*	3/4 x 3-1/2	8	220-250 *298-339*	10.3 *4,7*
6 *150*	6.625 *168,3*	500 *34,5*	10,340 *44,47*	3/4 x 3-1/2	8	220-250 *298-339*	11.1 *5,0*
8 *200*	8.625 *219,1*	400 *27,6*	17,520 *75,37*	3/4 x 3-1/2	8	220-250 *298-339*	17.2 *7,8*
10 *250*	10.750 *273,0*	400 *27,6*	27,210 *117,01*	7/8 x 4	12	320-400 *434-542*	25.7 *11,7*
12 *300*	12.750 *323,9*	400 *27,6*	38,280 *164,71*	7/8 x 4	12	320-400 *434-542*	37.6 *17,1*

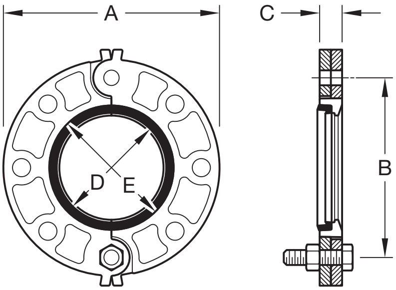
Notes:

a. Factory supplied bolt and nut must be used at the non-hinged mating end when assembling the flange segments.

b. Dimensions D and E represent minimum and maximum sealing surfaces.

c. Maximum pressure and end load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ on other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

Figure 71H Flange Adapter - Hinged

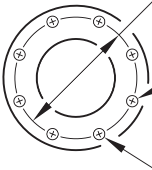


ANSI CLASS 125 and 150

Nominal Pipe Size	Nominal Dimensions - Inches/*mm*				
ANSI Inches *DN*	**A**	**B**	**C**	**D**[b]	**E**[b]
2 *50*	6.00 *152*	4.75 *121*	*0.87* *22*	2.36 *60*	3.42 *87*
2-1/2 *65*	7.00 *178*	5.50 *140*	0.88 *22*	2.87 *73*	4.00 *102*
3 *80*	7.50 *190*	6.00 *152*	0.94 *24*	3.50 *89*	4.56 *116*
4 *100*	9.00 *229*	7.50 *191*	0.94 *24*	4.50 *114*	5.56 *141*
5 *125*	10.00 *254*	8.50 *216*	1.00 *25*	5.56 *141*	6.73 *171*
6 *150*	11.00 *279*	9.50 *241*	1.00 *25*	6.62 *168*	7.78 *198*
8 *200*	13.50 *343*	11.75 *298*	1.12 *28*	8.62 *219*	9.94 *253*
10 *250*	16.00 *406*	14.25 *362*	1.18 *30*	10.75 *273*	12.31 *313*
12 *300*	19.00 *482*	17.00 *432*	1.25 *32*	12.75 *324*	14.31 *364*

- Refer to the recommended Flange Mating Bolts Specifications when setting the torque on power impact wrenches. Refer to the manufacturer's instructions for settings.
- Refer to Technical Data Sheet G155 Figure 71H Flange Adapters, Hinged.

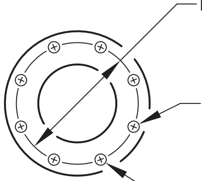
Flange Drilling Specifications



Valve Size		ANSI B16.1 (Class 125#)[a]			ISO 2084 (PN10)[b]		
Nominal Inches ***DN***	**O.D. Inches** ***mm***	**A Bolt Circle Dia.**	**B Bolt Hole Dia.**	**N Bolt Hole Qty.**	**A Bolt Circle Dia.**	**B Bolt Hole Dia.**	**N Bolt Hole Qty.**
2 *50*	2.375 *60,3*	4.75 *120,6*	0.75 *19,1*	4	4.92 *125,0*	0.75 *19,0*	4
2-1/2 *65*	2.875 *73,0*	5.50 *139,7*	0.75 *19,1*	4	5.71 *145,0*	0.75 *19,0*	4
3 *80*	3.500 *88,9*	6.00 *152,4*	0.75 *19,1*	4	6.30 *160,0*	0.75 *19,0*	8
4 *100*	4.500 *114,3*	7.50 *190,5*	0.75 *19,1*	8	7.09 *180,0*	0.75 *19,0*	8
5 *125*	5.563 *141,3*	8.50 *215,9*	0.88 *22,4*	8	8.27 *210,0*	0.75 *19,0*	8
6 *150*	6.625 *168,3*	9.50 *241,3*	0.88 *22,4*	8	9.45 *240,0*	0.91 *23,0*	8
8 *200*	8.625 *219,1*	11.75 *298,5*	0.88 *22,4*	8	11.61 *295,0*	0.91 *23,0*	8
10 *250*	10.750 *273,0*	14.25 *362,0*	1.00 *25,4*	12	13.78 *350,0*	0.91 *23,0*	12
12 *300*	12.750 *323,9*	17.00 *431,8*	1.00 *25,4*	12	15.75 *400,0*	0.91 *23,0*	12
14 *350*	14.000 *355,6*	18.76 *476,5*	1.12 *28,4*	12	18.11 *460,0*	0.91 *23,0*	16
16 *400*	16.000 *406,4*	21.25 *539,8*	1.12 *28,4*	16	20.28 *515,0*	1.10 *28,0*	16
18 *450*	18.000 *457,2*	22.75 *577,9*	1.25 *31,8*	16	22.24 *565,0*	1.10 *28,0*	20
20 *500*	20.000 *508,0*	25.00 *635,0*	1.25 *31,8*	20	24.41 *620,0*	1.10 *28,0*	20
24 *600*	24.000 *609,6*	29.50 *749,3*	1.38 *35,1*	20	28.54 *725,0*	1.22 *31,0*	20

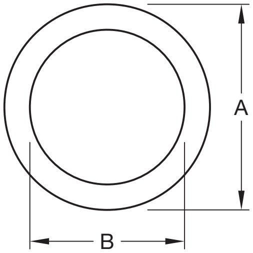
Notes:
a. Same drilling as for B16.5 (Class 150#) and B16.42 (Class 250#).
b. Same drilling as for BS 4504 Section 3.2 (PN10) and DIN 2532 (PN10).
c. Same drilling as for BS 4504 Section 3.2 (PN16) and DIN 2532 (PN16).

Flange Drilling Specifications



ISO 2084 (PN16)[c]			JIS B 2210 (10K)			AS 2129 (Table E)		
A Bolt Circle Dia.	**B Bolt Hole Dia.**	**N Bolt Hole Qty.**	**A Bolt Circle Dia.**	**B Bolt Hole Dia.**	**N Bolt Hole Qty.**	**A Bolt Circle Dia.**	**B Bolt Hole Dia.**	**N Bolt Hole Qty.**
4.92 *125,0*	0.71 *18,0*	4	4.72 *120,0*	0.75 *19,1*	4	4.49 *114,0*	0.71 *18,0*	4
5.71 *145,0*	0.71 *18,0*	4	5.51 *140,0*	0.75 *19,1*	4	5.00 *127,0*	0.71 *18,0*	4
6.30 *160,0*	0.71 *18,0*	8	5.91 *150,0*	0.75 *19,1*	8	5.75 *146,0*	0.71 *18,0*	4
7.09 *175,0*	0.71 *18,0*	8	6.89 *175,0*	0.75 *19,1*	8	7.00 *178,0*	0.71 *18,0*	8
8.27 *210,0*	0.71 *18,0*	8	8.27 *210,0*	0.91 *23,0*	8	8.27 *210,0*	0.71 *18,0*	8
9.45 *240,0*	0.87 *22,0*	8	9.45 *240,0*	0.91 *23,0*	8	9.25 *235,0*	0.87 *22,0*	8
11.61 *295,0*	0.87 *22,0*	12	11.42 *290,0*	0.91 *23,0*	12	11.50 *292,0*	0.87 *22,0*	8
13.98 *355,0*	1.02 *26,0*	12	13.98 *355,0*	0.98 *25,0*	12	14.02 *356,0*	0.87 *22,0*	12
16.14 *410,0*	1.02 *26,0*	12	15.75 *400,0*	0.98 *25,0*	16	15.98 *406,0*	1.02 *26,0*	12
18.50 *470,0*	1.02 *26,0*	16	17.52 *445,0*	0.98 *25,0*	16	18.50 *470,0*	1.02 *26,0*	12
20.67 *525,0*	1.18 *30,0*	16	20.08 *510,0*	1.06 *27,0*	16	20.51 *521,0*	1.02 *26,0*	12
23.03 *585,0*	1.18 *30,0*	20	22.24 *565,0*	1.06 *27,0*	20	22.99 *584,0*	1.02 *26,0*	16
25.59 *650,0*	1.30 *33,0*	20	24.41 *620,0*	1.06 *27,0*	20	25.24 *641,0*	1.02 *26,0*	16
30.31 *770,0*	1.42 *36,0*	20	28.74 *730,0*	1.30 *33,0*	24	29.76 *756,0*	1.30 *33,0*	16

Figure 71 Flange Adapter Washer



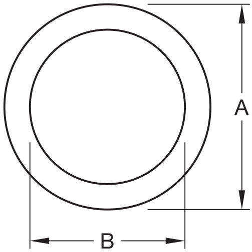
Sizes 2" - 12"

Nominal Pipe Size		Nominal Dimensions	
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A Inches** ***mm***	**B Inches** ***mm***
2 *50*	2.375 *60,3*	3.94 *100,0*	2.75 *57,2*
2-1/2 *65*	2.875 *73,0*	4.69 *119,1*	2.75 *69,9*
76,1mm *65*	3.000 *76,1*	4.89 *124,2*	2.88 *73,2*
3 *80*	3.500 *88,9*	5.19 *131,8*	3.38 *85,9*
88,9mm *80*	3.500 *88,9*	5.48 *139,2*	3.38 *85,9*
114,3mm *100*	4.500 *114,3*	6.27 *159,3*	4.38 *111,3*
4 *100*	4.500 *114,3*	6.69 *169,9*	4.38 *111,3*
139,7mm *125*	5.500 *139,7*	7.45 *189,2*	5.32 *135,1*
5 *125*	5.563 *141,3*	7.56 *192,0*	5.38 *136,7*

Notes:

- Metal Flange Adapter Washers are required when the Figure 71 Flange Adapter is used against surfaces such as: rubber surfaces, adapting to AWWA cast flanges, rubber-faced wafer valves, and serrated flange surfaces.
- Available in stainless steel ASTM A 666 Type 304-2B. Contact GRINNELL Mechanical Products for availability.
- Refer to Technical Data Sheet G150 Figure 71 Flange Adapter

Figure 71 Flange Adapter Washer



Sizes 2" - 12"

Nominal Pipe Size		Nominal Dimensions	
ANSI Inches *DN*	**O.D. Inches *mm***	**A Inches *mm***	**B Inches *mm***
165,1mm *150*	6.500 *165,1*	8.47 *215,1*	6.32 *160,5*
6 *150*	6.625 *168,3*	8.56 *217,4*	6.44 *163,6*
219,1mm *200*	8.625 *219,1*	10.64 *270,3*	8.44 *214,4*
8 *200*	8.625 *219,1*	10.81 *274,6*	8.44 *214,4*
273,0mm *250*	10.750 *273,0*	12.85 *326,4*	10.50 *266,7*
10 *250*	10.750 *273,0*	13.19 *335,0*	10.50 *266,7*
323,9mm *300*	12.750 *323,9*	15.01 *381,3*	12.50 *317,5*
12 *300*	12.750 *323,9*	15.94 *404,9*	12.50 *317,5*

Notes

Grooved Fittings

Elbow and Tee Pressure Loss

Friction Resistance[a] (Expressed as Equivalent Straight Pipe)					
Nominal Pipe Size		Elbow		Tee	
ANSI Inches *DN*	**O.D. Inches** *mm*	**90° Feet** *Meters*	**45° Feet** *Meters*	**Branch Feet** *Meters*	**Run Feet** *Meters*
1 *25*	1.315 *33,4*	1.5 *0,5*	0.8 *0,2*	3.8 *1,2*	1.5 *0,5*
1-1/4 *32*	1.600 *42,2*	1.9 *0,6*	1.0 *0,3*	4.8 *1,5*	1.9 *0,6*
1-1/2 *40*	1.900 *48,3*	2.3 *0,7*	1.2 *0,4*	5.8 *1,8*	2.3 *0,7*
2 *50*	2.375 *60,3*	3.2 *1,0*	1.6 *0,5*	8.0 *2,5*	3.2 *1,0*
2-1/2 *65*	2.875 *73,0*	3.9 *1,2*	2.0 *0,6*	9.8 *3,0*	3.9 *1,2*
— *65*	3.000 *76,1*	4.1 *1,2*	2.1 *0,6*	10.3 *3,1*	4.1 *1,2*
3 *80*	3.500 *88,9*	4.9 *1,5*	2.4 *0,7*	12.2 *3,7*	4.9 *1,5*
— *100*	4.250 *108,0*	6.5 *2,0*	3.3 *1,0*	16.3 *5,0*	6.5 *2,0*
4 *100*	4.500 *114,3*	6.5 *2,0*	3.3 *1,0*	16.3 *5,0*	6.5 *2,0*
— *125*	5.250 *133,0*	8.0 *2,4*	4.0 *1,2*	20.0 *6,1*	8.0 *2,4*
— *125*	5.500 *139,7*	8.0 *2,4*	4.1 *1,3*	20.0 *6,1*	8.0 *2,4*
5 *125*	5.563 *141,3*	8.2 *2,5*	4.1 *1,3*	20.5 *6,3*	8.2 *2,5*
— *150*	6.250 *159,0*	9.5 *2,9*	4.8 *1,4*	23.8 *7,2*	9.5 *2,9*
— *150*	6.500 *165,1*	9.5 *2,9*	4.8 *1,4*	23.8 *7,2*	9.5 *2,9*
6 *150*	6.625 *168,3*	9.9 *3,0*	5.0 *1,5*	24.8 *7,6*	9.9 *3,0*
— *200*	8.500 *216,3*	13.1 *4,0*	6.6 *2,0*	32.8 *10,0*	13.1 *4,0*
8 *200*	8.625 *219,1*	13.1 *4,0*	6.6 *2,0*	32.8 *10,0*	13.1 *4,0*
10 *250*	10.750 *273,0*	16.5 *5,0*	8.3 *2,5*	41.3 *12,6*	16.5 *5,0*

Notes:

a. Friction resistance for all elbows and tees except Figures 510S and 519S.

- For reducing tees and branches, use the value that is corresponding to the branch size. Example: for 8” x 8” x 2” tee, the branch value 2” is 8.0 feet.

Elbow and Tee Pressure Loss

Friction Resistance[a] (Expressed as Equivalent Straight Pipe)					
Nominal Pipe Size		Elbow		Tee	
ANSI Inches *DN*	**O.D. Inches** *mm*	**90° Feet** *Meters*	**45° Feet** *Meters*	**Branch Feet** *Meters*	**Run Feet** *Meters*
12 *300*	12.750 *323,9*	19.9 *6,1*	9.9 *3,0*	49.7 *15,1*	19.9 *6,1*
14 *350*	14.000 *355,6*	23.0 *7,0*	18.0 *5,5*	67.9 *20,7*	23.0 *7,0*
16 *400*	16.000 *406,4*	25.9 *7,9*	20.0 *6,1*	78.1 *23,8*	25.9 *7,9*
18 *450*	18.000 *457,2*	28.9 *8,8*	23.0 *7,0*	85.0 *25,9*	28.9 *8,8*
20 *500*	20.000 *508,0*	33.1 *10,1*	25.9 *7,9*	100.1 *30,5*	33.1 *10,1*
24 *600*	24.000 *609,6*	40.0 *12,2*	29.9 *9,1*	115.2 *35,1*	40.0 *12,2*

Figure 210 90° Cast Elbow

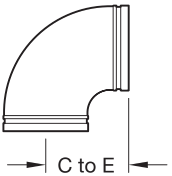


FIGURE 210
90° CAST ELBOW

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
1 *25*	1.315 *33,4*	2.25 *57,2*	0.8 *0,3*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	1.0 *0,5*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	1.3 *0,6*
2 *50*	2.375 *60,3*	3.25 *82,6*	1.8 *0,8*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	3.1 *1,4*
76,1 *65*	3.000 *76,1*	3.75 *95,3*	3.2 *1,5*
3 *80*	3.500 *88,9*	4.25 *108,0*	4.8 *2,2*
4 *100*	4.500 *114,3*	5.00 *127,0*	7.5 *3,4*
139,7 *125*	5.500 *139,7*	5.50 *139,7*	11.3 *5,1*
5 *125*	5.563 *141,3*	5.50 *139,7*	11.6 *5,3*
165,1 *150*	6.500 *165,1*	6.50 *165,1*	16.9 *7,7*
6 *150*	6.625 *168,3*	6.50 *165,1*	16.6 *7,5*
8 *200*	8.625 *219,1*	7.75 *196,9*	29.6 *13,4*
10 *250*	10.750 *273,0*	9.00 *228,6*	48.5 *22,0*
12 *300*	12.750 *323,9*	10.00 *254,0*	66.4 *30,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 210LR and Figure 310LR 90° Long Radius Elbows

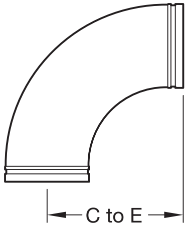


FIGURE 210LR
90° LONG RADIUS
CAST ELBOW

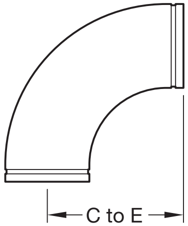


FIGURE 310LR
90° LONG RADIUS
FABRICATED ELBOW

Nominal Pipe Size		Figure 210LR		Figure 310LR	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1 *25*	1.315 *33,4*	–	–	3.5 *88,9*	3.5 *1,6*
1-1/4 *32*	1.660 *42,4*	–	–	3.88 *98,6*	1.1 *0,5*
1-1/2 *40*	1.900 *48,3*	–	–	4.25 *108,0*	1.4 *0,6*
2 *50*	2.375 *60,3*	4.38 *111,3*	2.4 *1,1*	4.38 *111,3*	2.1 *0,9*
2-1/2 *65*	2.874 *73,0*	5.00 *127,0*	5.1 *2,3*	5.75 *146,0*	3.9 *1,8*
76,1 *65*	3.000 *76,1*	5.00 *127,0*	4.4 *2,0*	5.75 *146,0*	2.9 *1,3*
3 *80*	3.500 *88,9*	5.88 *149,4*	6.6 *3,0*	5.88 *149,4*	6.1 *2,8*
108.0 *100*	4.252 *108,0*	–	–	7.50 *190,5*	6.1 *2,8*
4 *100*	4.500 (114,3)	7.50 (190,5)	11.6 (5,3)	7.50 (190,5)	11.0 4,9
133,0 *125*	5.250 *133,0*	–	–	9.50 *241,3*	11.0 *4,9*
139,7 *125*	5.500 *139,7*	9.50 *241,3*	19.0 *8,6*	9.50 *241,3*	14.3 *6,5*
5 *125*	5.563 *141,3*	9.50 *241,3*	20.0 *9,1*	9.50 *241,3*	18.7 *8,5*
159,0 *150*	6.250 *159,0*	–	–	10.75 *273,1*	16.7 *7,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 210LR and Figure 310LR 90° Long Radius Elbows

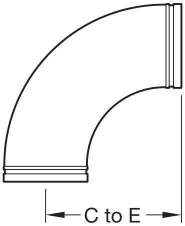


FIGURE 210LR
90° LONG RADIUS
CAST ELBOW

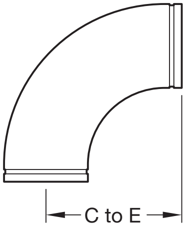


FIGURE 310LR
90° LONG RADIUS
FABRICATED ELBOW

Nominal Pipe Size		Figure 210LR		Figure 310LR	
ANSI Inches *DN*	O.D. Inches *mm*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
165,1 *150*	6.500 *165,1*	10.75 *273,1*	26.4 *12,0*	10.75 *273,1*	19.2 *8,7*
6 *150*	6.625 *168,3*	10.75 *273,1*	29.5 *13,4*	10.75 *273,1*	27.3 *12,4*
216,3 *200*	8.516 *216,3*	–	–	15.00 *381,0*	38.4 *17,4*
8 *200*	8.625 *219,1*	14.25 *362,0*	62.1 *28,2*	15.00 *381,0*	53.8 *24,4*
267,4 *250*	10.528 *267,4*	–	–	18.00 *457.2*	67.9 *30,8*
10 *250*	10.750 *273,0*	–	–	18.00 *457,2*	95.4 *43,3*
318,5 300	12.539 *318,5*	–	–	21.00 *533,4*	99.1 *44,9*
12 *300*	12.750 *323,9*	–	–	*21.00* *533,4*	139.5 *63,2*
14 *350*	14.000 *355,6*	21.00 *533,4*	131.0 *59,4*	21.00 *533,4*	154.1 *69,9*
16 *400*	16.000 *406,4*	24.00 *609,6*	180.0 *81,6*	24.00 *609,6*	201.6 *91,4*
18 *450*	18.000 *457,2*	–	–	27.00 *685,8*	255.5 *115,9*
20 *500*	20.000 *508,0*	–	–	30.00 *762,0*	304.0 *137,9*
24 *600*	24.000 *609,6*	–	–	36.00 *914,4*	453.8 *205,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 201 45° Cast Elbow

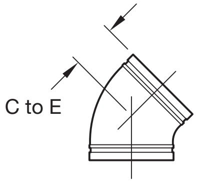


FIGURE 201
45° CAST ELBOW

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
1 *25*	1.315 *33,4*	1.75 *44,5*	0.6 *0,3*
1-1/4 *32*	1.660 *42,4*	1.75 *44,5*	0.9 *0,4*
1-1/2 *40*	1.900 *48,3*	1.75 *44,5*	0.9 *0,4*
2 *50*	2.375 *60,3*	2.00 *50,8*	1.3 *0,6*
2-1/2 *65*	2.874 *73,0*	2.25 *57,2*	2.1 *1,0*
76,1 *65*	3.000 *76,1*	2.25 *57,2*	2.2 *1,0*
3 *80*	3.500 *88,9*	2.50 *63,5*	3.5 *1,6*
4 *100*	4.500 *114,3*	3.00 *76,2*	5.5 *2,5*
139,7 *125*	5.500 *139,7*	3.25 *82,6*	7.7 *3,5*
5 *125*	5.563 *141,3*	3.25 *82,6*	8.1 *3,7*
165,1 *150*	6.500 *165,1*	3.50 *88,9*	11.0 *5,0*
6 *150*	6.625 *168,3*	3.50 *88,9*	11.2 *5,1*
8 *200*	8.625 *219,1*	4.25 *108,0*	19.0 *8,6*
10 *250*	10.750 *273,0*	4.75 *120,7*	28.0 *12,7*
12 *300*	12.750 *323,9*	5.25 *133,4*	48.0 *22,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 201LR and Figure 301LR 45° Long Radius Elbows

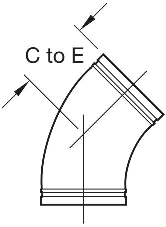


FIGURE 201LR
45° CAST ELBOW

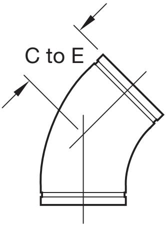


FIGURE 301LR
45° FABRICATED ELBOW

Nominal Pipe Size		Figure 201LR Cast		Figure 301LR Fabricated	
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Nominal C to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal C to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
1 *25*	1.315 *33,4*	—	—	2.5 *63,5*	0.8 *0,4*
1-1/4 *32*	1.660 *42,4*	—	—	2.50 *63,5*	0.9 *0,4*
1-1/2 *40*	1.900 *48,3*	—	—	2.50 *63,5*	1.0 *0,5*
2 *50*	2.375 *60,3*	—	—	2.75 *69,9*	1.5 *0,7*
2-1/2 *65*	2.874 *73,0*	—	—	3.00 *76,2*	2.6 *1,2*
76,1 *65*	3.000 *76,1*	—	—	3.00 *76,2*	3.1 *1,4*
3 *80*	3.500 *88,9*	—	—	3.38 *85,9*	4.6 *2,1*
108,0 *100*	4.252 *108,0*	—	—	4.00 *101,6*	3.7 *1,7*
4 *100*	4.500 *114,3*	—	—	4.00 *101,6*	7.5 *3,4*
133,0 *125*	5.250 *133,0*	—	—	5.00 *127,0*	6.7 *3,0*
139,7 *125*	5.500 *139,7*	—	—	5.00 *127,0*	12.5 *5,7*
5 *125*	5.563 *141,3*	—	—	5.00 *127,0*	12.5 *5,7*
159,0 *150*	6.250 *159,0*	—	—	5.50 *139,7*	9.9 *4,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 201LR and Figure 301LR 45° Long Radius Elbows

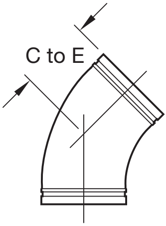


**FIGURE 201LR
45° CAST ELBOW**

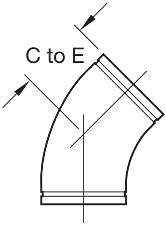


**FIGURE 301LR
45° FABRICATED ELBOW**

Nominal Pipe Size		Figure 201LR Cast		Figure 301LR Fabricated	
ANSI Inches *DN*	**O.D. Inches *mm***	**Nominal C to E Inches *mm***	**Approx. Weight Lbs. *kg***	**Nominal C to E Inches *mm***	**Approx. Weight Lbs. *kg***
165,1 *150*	6.500 *165,1*	—	—	5.50 *139,7*	12.0 *5,4*
6 *150*	6.625 *168,3*	—	—	5.50 *139,7*	12.0 *5,4*
216,3 *200*	8.516 *216,3*	—	—	7.25 *184,2*	21.8 *9,9*
8 *200*	8.625 *219,1*	—	—	7.25 *184,2*	34.0 *15,4*
267,4 *250*	10.528 *267,4*	—	—	8.50 *215,9*	38.5 *17,5*
10 *250*	10.750 *273,0*	—	—	8.50 *215,9*	56.0 *25,4*
318,5 *300*	12.539 *318,5*	—	—	10.00 *254,0*	56.1 *25,4*
12 *300*	12.750 *323,9*	—	—	10.00 *254,0*	98.0 *44,5*
14 *350*	14.000 *355,6*	8.75 *228,3*	60.0 *27,2*	8.75 *222,3*	97.4 *44,1*
16 *400*	16.000 *406,4*	10.00 *254,0*	97.0 *44,0*	10.00 *254,0*	239.2 *108,4*
18 *450*	18.000 *457,2*	—	—	11.25 *285,8*	303.0 *137,4*
20 *500*	20.000 *508,0*	—	—	12.50 *317,5*	414.0 *187,8*
24 *600*	24.000 *609,6*	—	—	15.00 *381,0*	540.0 *244,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 212 and Figure 312 22½° Elbows

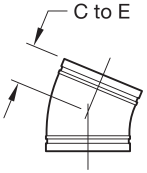


FIGURE 212
22½° CAST ELBOW

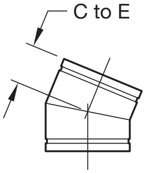


FIGURE 312
22½° FABRICATED ELBOW
(SEGMENT WELDED)

Nominal Pipe Size		Figure 212		Figure 312	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1 *25*	1.315 *33,4*	1.25 *31,8*	0.7 *0,3*	1.25 *31,8*	0.7 *0,3*
1-1/4 *32*	1.660 *42,4*	1.75 *44,5*	0.8 *0,4*	1.75 *44,5*	0.7 *0,3*
1-1/2 *40*	1.900 *48,3*	1.75 *44,5*	1.0 *0,5*	1.75 *44,5*	0.7 *0,3*
2 *50*	2.375 *60,3*	1.88 *47,8*	1.3 *0,6*	1.88 *47,8*	1.1 *0,5*
2-1/2 *65*	2.874 *73,0*	2.00 *50,8*	1.9 *0,9*	2.00 *50,8*	1.8 *0,8*
76,1 *65*	3.000 *76,1*	2.00 *50,8*	2.0 *0,9*	2.00 *50,8*	1.3 *0,6*
3 *80*	3.500 *88,9*	2.25 *57,2*	2.9 *1,3*	2.25 *57,2*	2.7 *1,2*
108,0 *100*	4.252 *108,0*	—	—	2.63 *66,8*	2.5 *1,1*
4 *100*	4.500 *114,3*	2.63 *66,8*	4.7 *2,1*	2.63 *66,8*	4.5 *2,0*
133,0 *125*	5.250 *133,0*	—	—	2.88 *73,2*	3.8 *1,7*
139,7 *125*	5.500 *139,7*	2.88 *73,2*	6.9 *3,1*	2.88 *73,2*	5.1 *2,3*
5 *125*	5.563 *141,3*	2.88 *73,2*	6.9 *3,1*	2.88 *73,2*	6.7 *3,0*
159,0 *150*	6.250 *159,0*	—	—	3.13 *79,5*	5.9 *2,7*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 212 and Figure 312 22½° Elbows

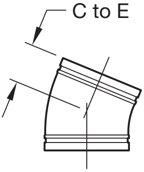


FIGURE 212
22½° CAST ELBOW

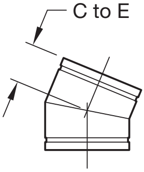


FIGURE 312
22½° FABRICATED ELBOW
(SEGMENT WELDED)

Nominal Pipe Size		Figure 212		Figure 312	
ANSI Inches *DN*	O.D. Inches *mm*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
165,1 *150*	6.500 *165,1*	—	—	3.13 *79,5*	6.6 *3,0*
6 *150*	6.625 *168,3*	3.13 *79,5*	9.4 *4,3*	3.13 *79,5*	9.5 *4,3*
216,3 *200*	8.516 *216,3*	—	—	3.88 *98,6*	12.4 *5,6*
8 *200*	8.625 *219,1*	3.88 *98,6*	17.0 *7,7*	3.88 *98,6*	17.8 *8,1*
267,4 *250*	10.528 *267,4*	—	—	4.38 *111,3*	20.0 *9,1*
10 *250*	10.750 *273,0*	—	—	4.38 *111,3*	28.7 *13,0*
318,5 *300*	12.539 *318,5*	—	—	4.88 *124,0*	27.8 *12,6*
12 *300*	12.750 *323,9*	—	—	4.88 *124,0*	39.1 *17,7*
14 *350*	14.000 *355,6*	—	—	5.00 *127,0*	44.1 *20,0*
16 *400*	16.000 *406,4*	—	—	5.00 *127,0*	50.6 *23,0*
18 *450*	18.000 *457,2*	—	—	5.50 *139,7*	63.0 *28,6*
20 *500*	20.000 *508,0*	—	—	6.00 *152,4*	76.4 *34,7*
24 *600*	24.000 *609,6*	—	—	7.00 *177.8*	106.9 *48,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 211 and Figure 311 11¼° Elbows

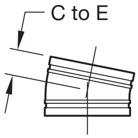


FIGURE 211
11¼° CAST ELBOW

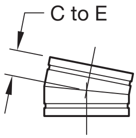


FIGURE 311
11¼° FABRICATED ELBOW
(SEGMENT WELDED)

Nominal Pipe Size		Figure 211		Figure 311	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1 *25*	1.315 *33,4*	1.38 *35,1*		1.38 *35,1*	
1-1/4 *32*	1.660 *42,4*	1.38 *35,1*	0.7 *0,3*	1.38 *35,1*	0.5 *0,2*
1-1/2 *40*	1.900 *48,3*	1.38 *35,1*	0.8 *0,4*	1.38 *35,1*	0.5 *0,2*
2 *50*	2.375 *60,3*	1.38 *35,1*	1.1 *0,5*	1.38 *35,1*	0.7 *0,3*
2-1/2 *65*	2.874 *73,0*	1.50 *38,1*	1.6 *0,7*	1.50 *38,1*	1.3 *0,6*
76,1 *65*	3.000 *76,1*	1.50 *38,1*	1.7 *0,7*	1.50 *38,1*	0.9 *0,4*
3 *80*	3.500 *88,9*	1.50 *38,1*	2.2 *1,0*	1.50 *38,1*	1.7 *0,7*
108,0 *100*	4.252 *108,0*	–	–	1.75 *44,5*	1.6 *0,7*
4 *100*	4.500 *114,3*	1.75 *44,5*	3.4 *1,5*	1.75 *44,5*	2.8 *1,3*
133,0 *125*	5.250 *133,0*	–	–	2.00 *50,8*	2.5 *1,1*
139,7 *125*	5.500 *139,7*	2.00 *50,8*	5.1 *2,3*	2.00 *50,8*	3.3 *1,5*
5 *125*	5.563 *141,3*	2.00 *50,8*	5.2 *2,4*	2.00 *50,8*	4.4 *2,0*
159,0 *150*	6.250 *159,0*	–	–	2.00 *50,8*	3.4 *1,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 211 and Figure 311 11¼° Elbows

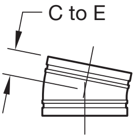


FIGURE 211
11¼° CAST ELBOW

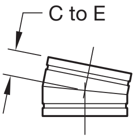


FIGURE 311
11¼° FABRICATED ELBOW
(SEGMENT WELDED)

Nominal Pipe Size		Figure 211		Figure 311	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
165,1 *150*	6.500 *165,1*	2.00 *50.8*	6.4 *2,9*	2.00 *50.8*	4.0 *1,8*
6 *150*	6.625 *168,3*	2.00 *50.8*	6.5 *2,9*	2.00 *50.8*	5.7 *2,6*
216,3 *200*	8.516 *216,3*	—	—	2.00 *50.8*	6.0 *2,7*
8 *200*	8.625 *219,1*	2.00 *50,8*	9.2 *4,2*	2.00 *50,8*	8.6 *4,0*
267,4 *250*	10.528 *267,4*	—	—	2.13 *54,1*	9.2 *4,2*
10 *250*	10.750 *273,0*	—	—	2.13 *54,1*	13.2 *6,0*
318,5 *300*	12.539 *318,5*	—	—	2.25 *57,2*	12.2 *5,5*
12 *300*	12.750 *323,9*	—	—	2.25 *57,2*	17.0 *7,7*
14 *350*	14.000 *355,6*	—	—	3.50 *88,9*	30.1 *13,7*
16 *400*	16.000 *406,4*	—	—	4.00 *101,6*	39.7 *18,0*
18 *450*	18.000 *457,2*	—	—	4.50 *114,3*	50.7 *23,0*
20 *500*	20.000 *508,0*	—	—	5.00 *127,0*	63.0 *28,6*
24 *600*	24.000 *609,6*	—	—	6.00 *152,4*	91.2 *41,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 301 & Figure 310 Fabricated Elbows

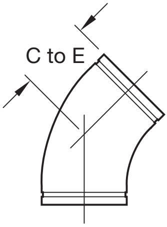


FIGURE 301
45° FABRICATED ELBOW

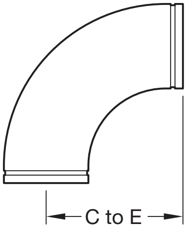


FIGURE 310
90° FABRICATED ELBOW

Nominal Pipe Size		Figure 301 45° Fabricated Elbow		Figure 310 90° Fabricated Elbow	
ANSI Inches *DN*	O.D. Inches *mm*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
14 *350*	14 *355,6*	5.75 *146,1*	101.8 *46,17*	14 *355,6*	49.5 *22,45*
16 *400*	16 *406,4*	6.625 *168,4*	133.1 *60,37*	16 *406,4*	62.8 *28,48*
18 *450*	18 *457,2*	7.46 *189,5*	168.7 *76,52*	18 *457,2*	80.2 *36,37*
20 *500*	20 *508,0*	8.28 *210,3*	208.4 *94,52*	20 *508,0*	98.9 *44,86*
24 *600*	24 *609,6*	9.94 *252,5*	299 *165,62*	24 *609,6*	144.6 *65,58*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 315 90° Fabricated Elbow

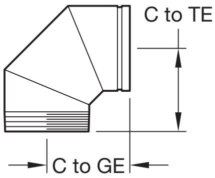


FIGURE 315
90° FABRICATED ELBOW
GROOVE X MALE THREAD
(SEGMENT WELDED)

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**C to GE Inches *mm***	**C to TE Inches *mm***	
1 *25*	1.315 *33,4*	2.25 *57,2*	2.25 *57,2*	0.6 *0,3*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	2.75 *69,9*	0.9 *0,4*
1-1/2 *40*	1.900 48,3	2.75 *69,9*	2.75 *69,9*	1.2 *0,5*
2 *50*	2.375 *60,3*	3.25 *82,6*	4.25 *108,0*	2.0 *0,9*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	3.75 *95,3*	3.1 *1,4*
76,1 mm *65*	3.000 *76,1*	3.75 *95,3*	3.75 *95,3*	3.2 *1,5*
3 *80*	3.500 *88,9*	4.25 *108,0*	6.00 *152,4*	5.7 *2,6*
108,0mm *100*	4.252 *108,0*	5.00 *127,0*	7.25 *184,2*	9.6 *4,4*
4 *100*	4.500 *114,3*	5.00 *127,0*	7.25 *184,2*	9.8 *4,4*
159,0mm *150*	6.250 *159,0*	6.50 *165,1*	6.50 *165,1*	16.8 *7,6*
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	6.50 *165,1*	17.2 *7,8*
6 *150*	6.625 168,3	6.50 *165,1*	6.50 *165,1*	17.6 *8,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 3D Elbows

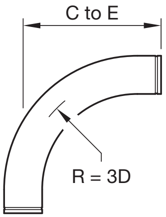


FIGURE 310-3D
(90°)

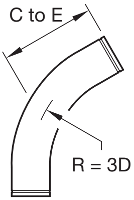


FIGURE 306-3D
(60°)

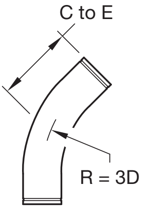


FIGURE 301-3D
(45°)

Nominal Pipe Size		Figure 310-3D		Figure 306-3D		Figure 301-3D	
ANSI Inches *DN*	**OD Inches** *mm*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*
2 *50*	2.375 *60,3*	10.00 *254,0*	5.3 *2,4*	7.50 *191,0*	4.7 *2,1*	6.50 165,0	4.2 *1,9*
2-1/2 *65*	2.874 *73,0*	11.50 *292,0*	9.5 *4,3*	8.25 210,0	8.2 *3,7*	7.25 *184,0*	7.6 *3,4*
76,1 *65*	3.000 *76,1*	11.50 *292,0*	9.7 *4,4*	8.25 *210,0*	8.6 *3,9*	7.25 *184,0*	8.2 *3,7*
3 *80*	3.500 *88,9*	13.00 *330,0*	14.7 *6,7*	9.25 *235,0*	12.6 *5,7*	7.75 *197,0*	11.2 *5,1*
3-1/2 *90*	4.000 *101,6*	—	—	10.00 254,0	14.4 *6,5*	—	—
4 *100*	4.500 *114,3*	16.00 *406,0*	24.1 *10,9*	11.00 279,0	20.4 *9,3*	9.00 *229,0*	17.8 *8,1*
108,0 *100*	4.252 *108,0*	16.00 *406,0*	39.7 *18,0*	11.00 279,0	19.2 *8,7*	9.00 *229,0*	16.9 *7,6*
5 *125*	5.563 *141,3*	20.00 *508,0*	40.9 *18,6*	13.75 *349,0*	34.5 *15,7*	11.25 *286,0*	30.1 *13,7*
133,0 *125*	5.250 *133,0*	20.00 *508,0*	39.9 *18,1*	13.75 *349,0*	32.4 *14,7*	11.25 *286,0*	28.5 *12,9*
139,7 *125*	5.500 *139,7*	20.00 *508,0*	40.1 *18,2*	13.75 *349,0*	33.2 *15,1*	11.25 *286,0*	29.1 *13,2*
6 150	6.625 *168,3*	24.00 *610,0*	63.7 *28,9*	16.50 *419,0*	53.7 *24,4*	13.50 *343,0*	46.9 *21,3*
159,0 *150*	6.250 *159,0*	24.00 *610,0*	62.2 *28,2*	16.50 *419,0*	49.8 *22,6*	13.50 *343,0*	45.8 *20,8*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 3D Elbows

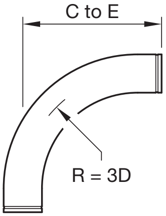


FIGURE 310-3D
(90°)

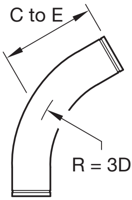


FIGURE 306-3D
(60°)

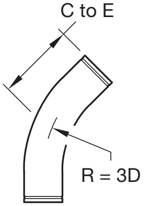


FIGURE 301-3D
(45°)

Nominal Pipe Size		Figure 310-3D		Figure 306-3D		Figure 301-3D	
ANSI Inches ***DN***	**OD Inches** ***mm***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
165,1 *150*	6.500 *165,1*	24.00 *610,0*	62.8 *28,5*	16.50 *419,0*	52.5 *23,8*	13.50 *343,0*	46.2 *21,0*
8 *200*	8.625 *219,1*	32.00 *813,0*	128.0 *58,1*	22.00 *559,0*	108.0 *49,0*	18.00 *457,0*	94.3 *42,8*
216,3 *200*	8.516 *216,3*	32.00 *813,0*	127.0 *57,6*	22.00 *559,0*	107.5 *48,8*	18.00 *457,0*	93.1 *42,2*
10 *250*	10.750 273,0	40.00 *1016,0*	226.4 *102,7*	27.25 *692,0*	189.4 *85,9*	22.50 *572,0*	166.9 *75,7*
267,4 *250*	10.528 *267,4*	40.00 *1016,0*	225.0 *102,1*	27.25 *692,0*	187.2 *84,9*	22.50 *572,0*	165.2 *74,9*
12 *300*	12.750 *323,9*	48.00 *1219,0*	332.9 *151,0*	32.75 *832,0*	278.8 *126,5*	27.00 *686,0*	245.3 *111,3*
318,5 *300*	12.539 *318,5*	48.00 *1219,0*	330.0 *149,7*	32.75 *832,0*	275.4 *124,9*	27.00 *686,0*	243,9 *110,6*
14 *350*	14.000 *355,6*	56.00 *1422,0*	427.6 *194,0*	38.25 *972,0*	358.5 *162,6*	31.50 *800,0*	315.0 *142,9*
16 *400*	16.000 *406,4*	64.00 *1626,0*	560.3 *254,1*	43.75 1111,0	470.1 *213,2*	36.00 *914,0*	412.8 *187,2*
18 *450*	18.000 *457,2*	72.00 *1829,0*	710.7 *322,4*	49.25 *1251,0*	596.9 *270,7*	40.50 *1029,0*	523.7 *237,5*
20 *500*	20.000 *508,0*	80.00 *2032,0*	879.3 *398,8*	54.75 *1391,0*	738.7 *335,1*	45.00 *1143,0*	647.8 *293.8*
24 *600*	24.000 *609,6*	96.00 *2438,0*	1270.3 *576,2*	65.50 *1664,0*	1,063.6 *482,4*	53.75 *1365,0*	931.0 *422,3*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 3D Elbows

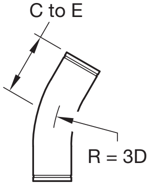


FIGURE 303-3D
(30°)

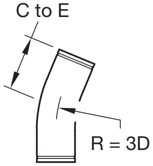


FIGURE 312-3D
(22.5°)

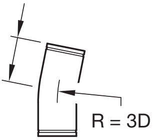


FIGURE 311-3D
(11.25°)

Nominal Pipe Size		Figure 303-3D		Figure 312-3D		Figure 311-3D	
ANSI Inches *DN*	OD Inches *mm*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*
2 *50*	2.375 *60,3*	5.75 *146,0*	3.8 *1,7*	5.25 *133,0*	3.5 *1,6*	4.50 *114,0*	2.9 *1,3*
2-1/2 *65*	2.874 *73,0*	6.00 *152,0*	6.4 *2,9*	5.50 *140,0*	5.8 *2,6*	4.75 *121,0*	4.9 *2,2*
76,1 *65*	3.000 *76,1*	6.00 *152,0*	6.9 *3,1*	5.50 *140,0*	6.2 *2,8*	4.75 *121,0*	5.7 *2,6*
3 *80*	3.500 *88,9*	6.50 *165,0*	9.7 *4,4*	5.75 *146,0*	8.5 *3,9*	5.00 *127,0*	7.3 *3,3*
3-1/2 *90*	4.000 *101,6*	—	—	—	—	—	—
4 *100*	4.500 *114,3*	7.25 *184,0*	14.8 *6,7*	6.50 *165,0*	13.4 *6,1*	5.25 *133,0*	10.5 *4,8*
108,0 *100*	4.252 *108,0*	7.25 *184,0*	13.2 *6,0*	6.50 *165,0*	12.6 *5,7*	5.25 *133,0*	9.7 *4,4*
5 *125*	5.563 *141,3*	9.00 *229,0*	24.9 *11,3*	8.00 203,0	22.2 *10,1*	6.50 *165,0*	17.6 *8,0*
133,0 *125*	5.250 *133,0*	9.00 *229,0*	22.8 *10,3*	8.00 *203,0*	20.5 *19,3*	6.50 *165,0*	16.2 *7,3*
139,7 *125*	5.500 *139,7*	9.00 *229,0*	23.6 *10,7*	8.00 *203,0*	21.8 *9,8*	6.50 *165,0*	16.8 *7,6*
6 *150*	6.625 *168,3*	10.75 *273,0*	38.6 *17,5*	9.50 *241,0*	34.2 *15,5*	7.75 *197,0*	27.1 *12,3*
159,0 *150*	6.250 *159,0*	10.75 *273,0*	36.8 *16,7*	9.50 *241,0*	32.6 *14,8*	7.75 *197,0*	25.7 *11,7*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 3D Elbows

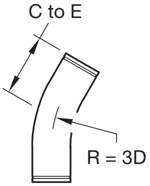


FIGURE 303-3D
(30°)

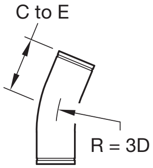


FIGURE 312-3D
(22.5°)

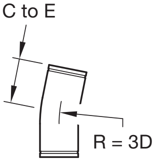


FIGURE 311-3D
(11.25°)

Nominal Pipe Size		Figure 303-3D		Figure 312-3D		Figure 311-3D	
ANSI Inches ***DN***	**OD Inches** ***mm***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
165,1 *150*	6.500 *165,1*	10.75 *273,0*	37.2 *16,9*	9.50 *241,0*	33.8 *15,3*	7.75 *197,0*	26.8 *12,2*
8 *200*	8.625 *219,1*	14.50 *368,0*	78.7 *35,7*	12.75 *324,0*	69.3 *31,4*	10.50 *267,0*	55.7 25,3
216,3 *200*	8.516 *216,3*	14.50 *368,0*	77.6 *35,2*	12.75 *324,0*	68.4 *31,0*	10.50 *267,0*	54.9 *24,9*
10 *250*	10.750 *273,0*	18.00 *457,0*	138.2 *62,7*	16.00 *406,0*	123.2 *55,9*	13.00 *330,0*	97.3 *44,1*
267,4 *250*	10.528 *267,4*	18.00 *457,0*	137.8 *62,5*	16.00 *406,0*	122.7 *55,7*	13.00 *330,0*	96.6 *43,8*
12 *300*	12.750 *323,9*	21.75 *552,0*	204.7 *92,9*	19.25 *489,0*	181.6 *82,4*	15.50 *394,0*	141.8 *64,3*
318,5 *300*	12.539 *318,5*	21.75 *552,0*	202.8 *92,0*	19.25 *489,0*	180.1 *81,7*	15.50 *394,0*	139.7 *63,4*
14 *350*	14.000 *355,6*	25.25 *641,0*	261.4 *118,6*	22.50 *572,0*	233.7 *106,0*	18.25 *464,0*	184.4 *83,6*
16 *400*	16.000 *406,4*	29.00 *737,0*	334.5 *151,7*	25.50 *648,0*	303.2 *137,5*	20.75 *527,0*	239.9 *108,8*
18 *450*	18.000 *457,2*	32.50 *826,0*	435.1 *197,4*	28.75 *730,0*	385.7 *175,0*	23.35 *593,0*	304.5 *138,1*
20 *500*	20.000 *508,0*	36.00 *914,0*	536.4 *243,3*	32.00 813,0	478.1 *216,9*	26.00 *660,0*	377.7 *171,3*
24 *600*	24.000 *609,6*	43.25 *1099,0*	775.7 *351,9*	38.25 *972,0*	687.2 *311,8*	31.00 *787,0*	540.9 *245,3*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 5D Elbows

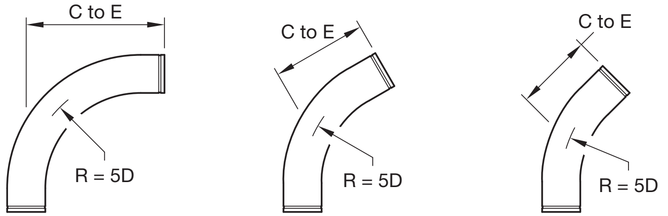


FIGURE 310-5D (90°) **FIGURE 306-5D (60°)** **FIGURE 301-5D (45°)**

Nominal Pipe Size		Figure 310-5D		Figure 306-5D		Figure 301-5D	
ANSI Inches *DN*	OD Inches *mm*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*
2 *50*	2.375 *60,3*	14.00 *356,0*	7.2 *3,3*	9.75 *248,0*	6.1 *2,8*	8.25 *210,0*	5.5 *2,5*
2-1/2 *65*	2.874 *73,0*	16.50 *419,0*	13.3 *6,0*	11.25 *286,0*	11.2 *5,1*	9.25 *235,0*	9.8 *4,4*
76,1 *65*	3.000 *76,1*	16.50 *419,0*	14.3 *6,5*	11.25 *286,0*	11.8 *5,4*	9.25 *235,0*	10.2 *4,6*
3 *80*	3.500 *88,9*	19.00 *483,0*	21.0 *9,5*	12.75 *324,0*	17.5 *7,9*	10.25 *260,0*	15.1 *6,8*
3-1/2 *90*	4.000 *101,6*	—	—	12.25 *311,0*	20 *9,1*	—	—
4 *100*	4.500 *114,3*	24.00 *610,0*	35.4 *16,1*	15.50 *394,0*	28.9 *13,1*	12.50 *318,0*	25.4 *11,5*
108,0 *100*	4.252 *108,0*	24.00 *610,0*	34.6 *15,7*	15.50 *394,0*	28.1 *12,7*	12.50 *318,0*	24.6 *11,2*
5 *125*	5.563 *141,3*	30.00 *762,0*	60.0 *27,2*	19.50 *495,0*	49.2 *22,3*	15.50 *394,0*	42.3 *19,2*
133,0 *125*	5.250 *133,0*	30.00 *762,0*	58.7 *26,6*	19.50 *495,0*	48.0 *21,7*	15.50 *394,0*	41.1 *18,6*
139,7 *125*	5.500 *139,7*	30.00 *762,0*	59.3 *26,9*	19.50 *495,0*	48.5 *22,0*	15.50 *394,0*	41.6 *18,9*
6 *150*	6.625 *168,3*	36.00 *914,0*	93.5 *42,4*	23.25 *591,0*	76.1 *34,5*	18.50 *470,0*	65.5 *29,7*
159,0 *150*	6.250 *159,0*	36.00 *914,0*	92.0 *41,7*	23.25 *591,0*	74.7 *33,8*	18.50 *470,0*	64.1 *29,1*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 5D Elbows

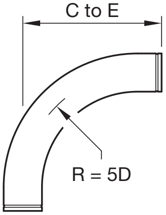


FIGURE 310-5D
(90°)

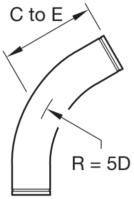


FIGURE 306-5D
(60°)

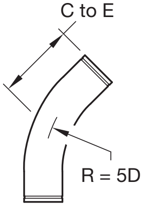


FIGURE 301-5D
(45°)

Nominal Pipe Size		Figure 310-5D		Figure 306-5D		Figure 301-5D	
ANSI Inches *DN*	OD Inches *mm*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*
165,1 *150*	6.500 *165,1*	36.00 *914,0*	92.8 *42,1*	23.25 *591,0*	75.4 *34,2*	18.50 *470,0*	64.8 *29,4*
8 *200*	8.625 *219,1*	48.00 *1219,0*	187.9 *85,2*	31.00 *787,0*	152.9 *69,4*	24.50 *622,0*	130.8 *59,3*
216,3 *200*	8.516 *216,3*	48.00 *1219,0*	187.2 *84,9*	31.00 *787,0*	152.2 *69,0*	24.50 *622,0*	130.1 *59,0*
10 *250*	10.750 *273,0*	60.00 *1524,0*	332.6 *150,9*	39.00 *991,0*	272.5 *123,6*	30.75 *781,0*	232.5 *105,5*
267,4 *250*	10.528 *267,4*	60.00 *1524,0*	331.7 *150,5*	39.00 *991,0*	271.6 *123,2*	30.75 *781,0*	231.6 *105,1*
12 *300*	12.750 *323,9*	72.00 *1829,0*	488.8 *221,7*	46.75 *1187,0*	400.0 *181,4*	37.00 *940,0*	342.7 *155,4*
318,5 *300*	12.539 *318,5*	72.00 *1929,0*	487.5 *221,1*	46.75 *1187,0*	398.5 *180,8*	37.00 *940,0*	340.9 *154,6*
14 *350*	14.000 *355,6*	84.00 *2134,0*	627.7 *284,7*	54.5 *1384,0*	513.3 *232,8*	43.00 *1092,0*	438.3 *198,8*
16 *400*	16.000 *406,4*	96.00 *2438,0*	822.5 *373,1*	62.25 *1581,0*	672.2 *304,9*	49.25 *1251,0*	575.6 *261,1*
18 *450*	18.000 *457,2*	108.00 *2743,0*	1,043.5 *473,3*	70.00 *1778,0*	852.5 *386,7*	55.25 *1403,0*	728.2 *330,3*
20 *500*	20.000 *508,0*	120.00 *3048,0*	1,290.9 *585,5*	77.75 *1975,0*	1,054.2 *478,2*	61.50 *1562,0*	902.5 *409,4*
24 *600*	24.000 *609,6*	144.00 *3658,0*	1,864.4 *845,7*	93.25 *2369,0*	1,521.8 *690,3*	73.75 *1873,0*	1,302.5 *590,8*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 5D Elbows

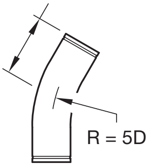


FIGURE 303-5D (30°)

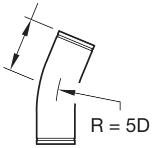


FIGURE 312-5D (22.5°)

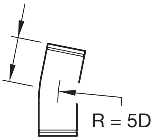


FIGURE 311-5D (11.25°)

Nominal Pipe Size		Figure 303-5D		Figure 312-5D		Figure 311-5D	
ANSI Inches *DN*	**OD Inches *mm***	**Center to End Inches *mm***	**Approx. Weight Lbs. *kg***	**Center to End Inches *mm***	**Approx. Weight Lbs. *kg***	**Center to End Inches *mm***	**Approx. Weight Lbs. *kg***
2 *50*	2.375 *60,3*	6.75 *171,0*	4.6 *2,1*	6.00 *152,0*	4.1 *1,9*	5.00 *127,0*	3.3 *1,5*
2-1/2 *65*	2.874 *73,0*	7.50 *191,0*	8.3 *3,8*	6.50 *165,0*	7.2 *3,3*	5.25 *133,0*	5.6 *2,5*
76,1 *65*	3.000 *76,1*	7.50 *191,0*	9.4 *4,3*	6.50 *165,0*	7.9 *3,6*	5.25 *133,0*	6.6 *3,0*
3 *80*	3.500 *88,9*	8.00 *203,0*	12.3 *5,6*	7.00 *178,0*	10.8 *4,9*	5.51 *140,0*	8.3 *3,8*
4 *100*	4.500 *114,3*	9.50 *241,0*	20.1 *9,1*	8.00 *203,0*	17.1 *7,8*	6.00 *152,0*	12.5 *5,7*
108,0 *100*	4.252 *108,0*	9.50 *241,0*	19.8 *9,0*	8.00 *203,0*	16.4 *7,4*	6.00 *152,0*	11.7 *5,3*
5 *125*	5.563 *141,3*	11.75 *298,0*	33.7 *15,3*	10.00 *254,0*	28.9 *13,1*	7.51 *191,0*	21.2 *9,6*
133,0 *125*	5.250 *133,0*	11.75 *298,0*	32.5 *14,7*	10.00 *254,0*	27.0 *12,2*	7.51 *191,0*	19.8 *8,9*
139,7 *125*	5.500 *139,7*	11.75 *298,0*	33.0 *15,0*	10.00 *254,0*	28.2 *12,8*	7.51 *191,0*	20.5 *9,3*
6 *150*	6.625 *168,3*	14.00 *356,0*	52.7 *23,9*	12.00 *305,0*	45.0 *20,4*	9.02 *229,0*	32.9 *14,9*
159,0 *150*	6.250 *159,0*	14.00 *356,0*	51.4 *23,3*	12.00 *305,0*	43.6 *19.7*	9.00 *229,0*	32.2 *14,6*
165,1 *150*	6.500 *165,1*	14.00 *356,0*	52.0 *23,6*	12.00 *305,0*	44.3 *20,1*	9.00 *229,0*	32.2 *14,6*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 5D Elbows

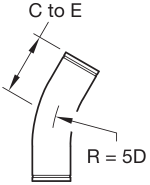


FIGURE 303-5D
(30°)

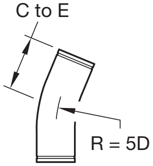


FIGURE 312-5D
(22.5°)

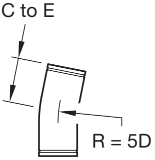


FIGURE 311-5D
(11.25°)

Nominal Pipe Size		Figure 303-5D		Figure 312-5D		Figure 311-5D	
ANSI Inches ***DN***	**OD Inches** ***mm***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Center to End Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
8 *200*	8.625 *219,1*	18.75 *476,0*	105.2 *47,7*	16.00 *406,0*	90.5 *41,1*	12.00 *305,0*	66.2 *30,0*
216,3 *200*	8.516 *216,3*	18.75 *476,0*	104.5 *47,4*	16.00 *406,0*	89.8 *40,7*	12.00 *305,0*	65.5 *29,7*
10 *250*	10.750 *273,0*	23.50 *597,0*	186.8 *84,7*	20.00 *508,0*	160.3 *72,7*	15.00 *381,0*	117.2 *53,2*
267,4 *250*	10.528 *267,4*	23.50 *597,0*	185.7 *84,2*	20.00 *508,0*	159.4 *72,3*	15.00 *381,0*	116.3 *52,8*
12 *300*	12.750 *323,9*	28.00 *711,0*	272.3 *123,5*	24.00 *610,0*	235.5 *106,8*	18.00 *457,0*	172.2 *78,1*
318,5 *300*	12.539 *318,5*	28.00 *711,0*	270.1 *122,6*	24.00 *610,0*	233.8 *106,0*	18.00 *457,0*	170.1 *77,2*
14 *350*	14.000 *355,6*	32.75 *832,0*	350.7 *159,1*	28.00 *711,0*	302.5 *137,2*	21.00 *533,0*	221.2 *100,3*
16 *400*	16.000 *406,4*	37.50 *953,0*	460.6 *208,9*	32.00 *813,0*	396.4 *179,8*	24.00 *610,0*	289.8 *131,5*
18 *450*	18.000 *457,2*	42.25 *1073,0*	585.3 *265,5*	36.00 *914,0*	506.9 *229,9*	27.00 *686,0*	367.8 *166,8*
20 *500*	20.000 *508,0*	46.75 *1187,0*	720.7 *326,9*	40.00 *1016,0*	622.1 *282,2*	30.00 *762,0*	454.9 *206,3*
24 *600*	24.000 *609,6*	56.25 *1429,0*	1,044.0 *473,6*	48.00 *1219,0*	898.5 *407,6*	35.75 *908,0*	651.2 *295,4*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 6D Elbows

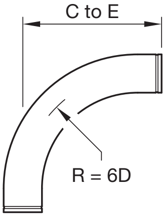


FIGURE 310-6D
(90°)

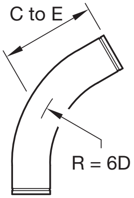


FIGURE 306-6D
(60°)

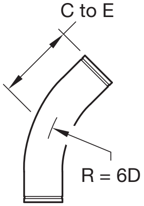


FIGURE 301-6D
(45°)

Nominal Pipe Size		Figure 310-6D		Figure 306-6D		Figure 301-6D	
ANSI Inches *DN*	**OD Inches** *mm*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*
2 *50*	2.375 *60,3*	16.00 *406,0*	8.2 *3,7*	11.00 *279,0*	6.9 *3,1*	9.00 *229.0*	6.0 *2,7*
2-1/2 *65*	2.874 *73,0*	19.00 *483,0*	13.0 *5,9*	12.75 *324,0*	12.7 *5,8*	10.25 *260,0*	11.0 *5,0*
76,1 *65*	3.000 *76,1*	19.00 *483,0*	12.2 *5,5*	12.75 *324,0*	19.9 *9,0*	10.25 *260,0*	10.2 *4,6*
3 *80*	3.500 *88,9*	22.00 *559,0*	24.1 *10,9*	14.50 *368,0*	19.9 *9,0*	11.50 *292,0*	17.1 *7,8*
3-1/2 *90*	4.000 *101,6*	—	—	16.25 *413,0*	22.8 *10,3*	—	—
4 *100*	4.500 *114,3*	28.00 *711,0*	41.1 *18,6*	18.00 *457,0*	33.6 *15,2*	14.00 *356,0*	28.4 *12,9*
108,0 *100*	4.252 *108,0*	28.00 *711,0*	40.0 *18,1*	18.00 *457,0*	32.5 *14,7*	14.00 *356,0*	27.3 *12,4*
5 *125*	5.563 *141,3*	35.00 *889,0*	69.6 *31,6*	22.25 *565,0*	56.2 *25,5*	17.50 *445,0*	48.1 *21,8*
133,0 *125*	5.250 *133,0*	35.00 *889,0*	68.4 *31,0*	22.25 *565,0*	55.0 *24,9*	17.50 *445,0*	46.9 *21,3*
139,7 *125*	5.500 *139,7*	35.00 *889,0*	69.0 *31,3*	22.25 *565,0*	55.6 *25,2*	17.50 *445,0*	47.6 *21,6*
6 *150*	6.625 *168,3*	42.00 *1067,0*	108.4 *49,2*	26.75 *679,0*	87.7 *39,8*	21.00 *533,0*	74.8 *33,9*
159,0 *150*	6.250 *159,0*	42.00 *1067,0*	105.7 *47,9*	26.75 *679,0*	86.0 *39,0*	21.00 *533,0*	73.0 *33,1*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 6D Elbows

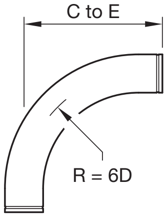


FIGURE 310-6D
(90°)

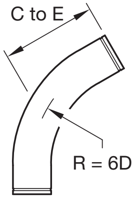


FIGURE 306-6D
(60°)

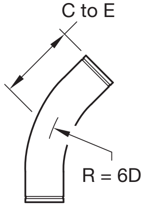


FIGURE 301-6D
(45°)

Nominal Pipe Size		Figure 310-6D		Figure 306-6D		Figure 301-6D	
ANSI Inches *DN*	**OD Inches** *mm*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Center to End Inches** *mm*	**Approx. Weight Lbs.** *kg*
165,1 *150*	6.500 *165,1*	42.00 *1067,0*	106.2 *48,2*	26.75 *679,0*	86.5 *39,2*	21.00 *533,0*	73.5 *33,3*
8 *200*	8.625 *219,1*	56.00 *1422,0*	217.8 *98,8*	35.75 *908,0*	176.7 *80,1*	28.00 *711,0*	150.4 *68,2*
216,3 *200*	8.516 *216,3*	56.00 *1422,0*	216.2 *98,1*	35.75 *908,0*	175.5 *79,6*	28.00 *711,0*	149.2 *67,7*
10 *250*	10.750 *273,0*	70.00 *1778,0*	385.6 *174,9*	44.75 *1137,0*	313.1 *142,0*	35.00 *889,0*	266.3 *120,8*
267,4 *250*	10.528 *267,4*	70.00 *1778,0*	384.8 *174,5*	44.75 *1137,0*	312.3 *141,6*	35.00 *889,0*	265.5 *120,4*
12 *300*	12.750 *323,9*	84.00 *2134,0*	566.7 *257,1*	53.50 *1359,0*	458.5 *208,0*	41.75 *1060,0*	388.9 *176,4*
318,5 *300*	12.539 *318,5*	84.00 *2134,0*	565.5 *256,5*	53.50 *1359,0*	457.0 *207,3*	41.75 *1060,0*	387.4 *175,7*
14 *350*	14.000 *355,6*	98.00 *2489,0*	727.8 *330,1*	62.50 *1588,0*	589.6 *267,4*	48.75 *1238,0*	499.9 *226,8*
16 *400*	16.000 *406,4*	112.00 *2845,0*	953.6 *432,5*	71.50 *1816,0*	773.3 *350,8*	55.75 *1416,0*	655.5 *297,3*
18 *450*	18.000 *457,2*	126.00 *3200,0*	1,209.9 *548,8*	80.50 *2045,0*	981.9 *445,4*	62.75 *1594,0*	832.7 *377,7*
20 *500*	20.000 *508,0*	140.00 *3556,0*	1,496.6 *678,8*	89.25 *2267,0*	1,212.0 *549,8*	69.75 *1772,0*	1,029.8 *467,1*
24 *600*	24.000 *609,6*	168.00 *4267,0*	2,161.6 *980,5*	107.25 *2724,0*	1,752.9 *795,1*	83.75 *2127,0*	1,488.2 *675,0*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 6D Elbows

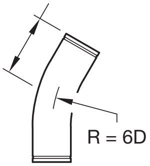


FIGURE 303-6D
(30°)

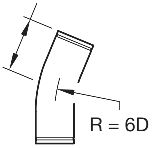


FIGURE 312-6D
(22.5°)

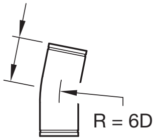


FIGURE 311-6D
(11.25°)

Nominal Pipe Size		Figure 303-6D		Figure 312-6D		Figure 311-6D	
ANSI Inches *DN*	OD Inches *mm*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*
2 *50*	2.375 *60,3*	7.25 *184.2*	5.0 *2,3*	6.50 *165,0*	4.5 *2,0*	5.25 *133,0*	3.6 *1,6*
2-1/2 *65*	2.874 *73,0*	8.00 *203,0*	8.9 *4,0*	7.00 *178,0*	7.8 *3,5*	5.51 *140,0*	6.0 *2,7*
76,1 *65*	3.000 *76,1*	8.00 *203,0*	8.1 *3,7*	7.00 *178,0*	7.0 *3,2*	5.50 *140,0*	5.3 *2,4*
3 *80*	3.500 *88,9*	8.75 *222,0*	13.6 *6,2*	7.50 *191,0*	11.7 *5,3*	5.75 *146,0*	8.7 *3,9*
4 *100*	4.500 *114,3*	10.50 *267,0*	22.5 *10,2*	8.75 *222,0*	18.9 *8,6*	6.50 *165,0*	13.8 *6,3*
108,0 *100*	4.252 *108,0*	10.50 *267,0*	21.4 *9,7*	8.75 *222,0*	17.8 *8,1*	6.50 *165,0*	12.7 *5,8*
5 *125*	5.563 *141,3*	13.00 *330,0*	37.7 *17,1*	11.00 *279,0*	32.3 *14,7*	8.00 *203,0*	22.9 *10,4*
133,0 *125*	5.250 *133,0*	13.00 *330,0*	36.6 *16,6*	11.00 *279,0*	31.2 *14,2*	8.00 *203,0*	21.7 *9,8*
139,7 *125*	5.500 *139,7*	13.00 *330,0*	37.1 *16,8*	11.00 *279,0*	31.7 *14,4*	8.00 *203,0*	22.7 *10,3*
6 *150*	6.625 *168,3*	15.75 *400,0*	59.3 *26,9*	13.25 *337,0*	50.5 *22,9*	9.50 *241,0*	35.3 *16,0*
159,0 *150*	6.250 *159,0*	15.75 *400,0*	57.5 *26,1*	13.25 *337,0*	48.5 *22,0*	9.50 *241,0*	33.1 *15,0*
165,1 *150*	6.500 *165,1*	15.75 *400,0*	58.0 *26,3*	13.25 *337,0*	49.0 *22,2*	9.50 *241,0*	33.7 *15,3*

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Long Radius 6D Elbows

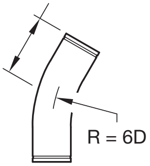


FIGURE 303-6D
(30°)

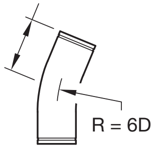


FIGURE 312-6D
(22.5°)

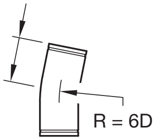


FIGURE 311-6D
(11.25°)

Nominal Pipe Size		Figure 303-6D		Figure 312-6D		Figure 311-6D	
ANSI Inches *DN*	OD Inches *mm*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*	Center to End Inches *mm*	Approx. Weight Lbs. *kg*
8 *200*	8.625 *219,1*	21.00 *533,0*	119.2 *54,1*	17.50 *445,0*	100.4 *45,5*	12.75 *324,0*	71.5 *32,4*
216,3 *200*	8.516 *216,3*	21.00 *533,0*	118.0 *53,5*	17.50 *445,0*	98.6 *44,7*	12.75 *324,0*	70.2 *31,8*
10 *250*	10.750 *273,0*	26.00 *660,0*	208.9 *94,8*	22.00 *559,0*	178.8 *81,1*	16.00 *406,0*	127.1 *57,7*
267,4 *250*	10.528 *267,4*	26.00 *660,0*	208.1 *94,4*	22.00 *559,0*	178.1 *80,8*	16.00 *406,0*	126.2 *57,2*
12 *300*	12.750 *323,9*	31.25 *794,0*	307.5 *139,5*	26.25 *667,0*	261.1 *118,4*	19.00 *483,0*	184.4 *83,6*
318,5 *300*	12.539 *318,5*	31.25 *794,0*	306.0 *138,8*	26.25 *667,0*	259.6 *117,8*	19.00 *483,0*	183.0 *83,0*
14 *350*	14.000 *355,6*	36.50 *927,0*	395.4 179,4	30.75 781,0	336.9 152,8	22.25 565,0	238.0 108,0
16 *400*	16.000 *406,4*	41.75 *1060,0*	518.6 *235,2*	35.25 *895,0*	443.0 *200,9*	25.51 *648,0*	312.9 *141,9*
18 *450*	18.000 *457,2*	47.00 *1194,0*	658.5 *298,7*	39.50 *1003,0*	559.5 *253,8*	28.75 *730,0*	398.7 *180,8*
20 *500*	20.000 *508,0*	52.25 *1327,0*	815.0 *369,7*	44.00 *1118,0*	694.1 *314,8*	31.75 *806,0*	488.7 *221,7*
24 *600*	24.000 609,6	62.50 1588,0	1,173.0 532,1	52.34 1329,0	992.5 450,2	38.25 972,0	709.3 321,7

Notes:
Sizes up to and including 4˝ are provided with 4˝ (101.6mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.

C to E tolerances:
2˝ through 6˝ ± 1/8˝ (3,2mm); 8˝ through 16 ± 1/4˝ (6,4 mm); 18˝ through 24˝ + 3/8˝ (9,5mm).

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 316 Reducing Base Support Elbow

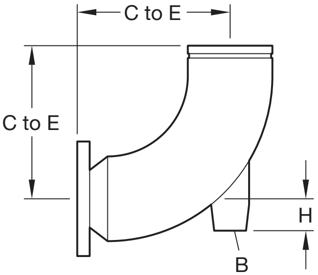


FIGURE 316
REDUCING BASE
SUPPORT ELBOW
GROOVED X FLANGE

Nominal Pipe Size			Nominal Dimensions		
ANSI Inches *DN*	Grooved End O.D. Inches *mm*	Flanged End O.D. Inches *mm*	C to E Inches *mm*	H Inches *mm*	B Diameter NPSC Threaded Inches *mm*
165,1mm x 4 *150 x 100*	6.500 *165,1*	4.504 *114,3*	12.00 *304.8*	2.50 *63,5*	1.50 *38,1*
6 x 4 *150 x 100*	6.625 *168,3*	4.504 *114,3*	12.00 *304,8*	2.50 *63,5*	1.50 *38,1*
165,1mm x 5 *150 x 125*	*6.500* *165,1*	5.563 *141,3*	12.50 *317,5*	2.50 *63,5*	1.50 *38,1*
6 x 5 *150 x 125*	6.625 *168,3*	5.563 *141,3*	12.50 *317,5*	2.50 *63,5*	1.50 *38,1*
165,1mm x 139,7mm *150 x 125*	6.500 *165,1*	5.476 *139,1*	12.50 *317,5*	2.50 *63,5*	1.50 *38,1*
8 x 139,7mm *200 x 125*	8.625 *219,1*	5.476 *139,1*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
8 x 5 *200 x 150*	8.625 *219,1*	5.563 *141,3*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
8 x 165mm *200 x 150*	8.625 *219,1*	6.500 *165,1*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
8 x 6 *200 x 150*	8.625 *219,1*	6.625 *168,3*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
216,3mm x 5 *200 x 125*	8.516 *216,3*	5.563 *141,3*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
216,3mm x 6 *200 x 150*	8.516 *216,3*	6.625 *168,3*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
216,3mm x 139,7mm *200 x 125*	8.516 *216,3*	5.476 *139,1*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
216,3mm x 165,1mm *200 x 150*	8.516 *216,3*	6.500 *165,1*	15.50 *393,7*	3.00 *76,2*	1.50 *38,1*
267,4mm x 165,1mm *250 x 150*	10.528 *267,4*	6.500 *165,1*	18.50 *469,9*	3.50 *88,9*	1.50 *38,1*
267,4mm x 6 *250 x 150*	10.528 *267,4*	6.625 *168,3*	18.50 *469,9*	3.50 *88,9*	1.50 *38,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 316 Reducing Base Support Elbow

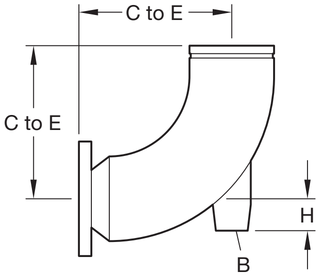


FIGURE 316
REDUCING BASE
SUPPORT ELBOW
GROOVED X FLANGE

Nominal Pipe Size			Nominal Dimensions		
ANSI Inches ***DN***	**Grooved End O.D. Inches** ***mm***	**Flanged End O.D. Inches** ***mm***	**C to E Inches** ***mm***	**H Inches** ***mm***	**B Diameter NPSC Threaded Inches** ***mm***
10 x 165mm *250 x 150*	10.750 *273,0*	6.500 *165,1*	18.50 *469,9*	3.50 *88,9*	1.50 *38,1*
10 x 6 *250 x 150*	10.750 *273,0*	6.625 *168,3*	18.50 *469,9*	3.50 *88,9*	1.50 *38,1*
267,4mm x 8 *250 x 200*	10.528 *267,4*	8.625 *219,1*	19.00 *482,6*	3.50 *88,9*	1.50 *38,1*
267,4mm x 216,3mm *250 x 200*	10.528 *267,4*	8.516 *216,3*	19.00 *482,6*	3.50 *88,9*	1.50 *38,1*
10 x 216,3mm *250 x 200*	10.750 *273,0*	8.516 *216,3*	19.00 *482,6*	3.50 *88,9*	1.50 *38,1*
10 x 8 *250 x 200*	10.750 *273,0*	8.625 *219,1*	19.00 *482,6*	3.50 *88,9*	1.50 *38,1*
12 x 216,3mm *300 x 200*	12.750 *323,9*	8.516 *216,3*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
318,5mm x 216,3mm *300 x 200*	12.539 *318,5*	8.516 *216,3*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
318,5mm x 8 *300 x 200*	12.539 *318,5*	8.625 *219,1*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
12 x 8 *300 x 200*	12.750 *323,9*	8.625 *219,1*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
12 x 267,4mm *300 x 250*	12.750 *323,9*	10.528 *267,4*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
12 x 10 *300 x 250*	12.750 *323,9*	10.750 *273,1*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
318,5mm x 267,4mm *300 x 250*	12.539 *318,5*	10.528 *267,4*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*
318,5mm x 10 *300 x 200*	12.539 *318,5*	10.750 *273,1*	22.00 *558,8*	4.00 *101,6*	1.50 *38,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 219 and Figure 319 Tees

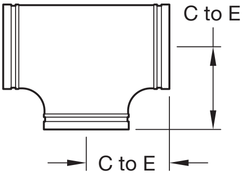


FIGURE 219
CAST TEE

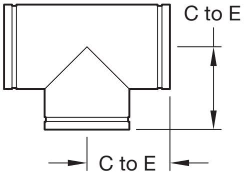


FIGURE 319
FABRICATED TEE
(SEGMENT WELDED)

Nominal Pipe Size		Figure 219 Cast Tee		Figure 319 Fabricated Tee	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1 *25*	1.315 *33,4*	2.25 *57,2*	1.1 *0,5*	2.25 *57,2*	1.8 *0,8*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	1.7 *0,8*	2.75 *69,9*	2.2 *0,9*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	2.1 *1,0*	2.75 *69,9*	2.6 *1,2*
2 *50*	2.375 *60,3*	3.25 *82,6*	2.7 *1,2*	3.25 *82,6*	3.6 *1,6*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	4.4 *2,0*	3.75 *95,3*	5.8 *2,6*
76,1mm *65*	3.000 *76,1*	3.75 *95,3*	6.5 *2,9*	3.75 *95,3*	4.5 *1,9*
3 *80*	3.500 *88,9*	4.25 *108,0*	6.5 *2,9*	4.25 *108,0*	7.6 *3,4*
4 *100*	4.500 *114,3*	5.00 *127,0*	10.7 *4,8*	5.00 *127,0*	10.7 *4,9*
139,7mm *125*	5.500 *139,7*	5.50 *139,7*	15.2 *6,9*	5.50 *139,7*	10.6 *4,8*
5 *125*	5.563 *141,3*	5.50 *139,7*	15.5 *7,0*	5.50 *139,7*	13.9 *6,3*
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	24.2 *11,0*	6.50 *165,1*	13.2 *5,9*
6 *150*	6.625 *168,3*	6.50 *165,1*	23.0 *10,4*	6.50 *165,1*	18.9 *8,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 219 and Figure 319 Tees

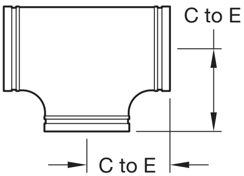


FIGURE 219
CAST TEE

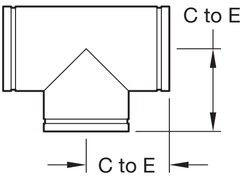


FIGURE 319
FABRICATED TEE
(SEGMENT WELDED)

Nominal Pipe Size		Figure 219 Cast Tee		Figure 319 Fabricated Tee	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
216,3mm *200*	8.500 *216,3*	7.75 *196,9*	43.0 *19,5*	7.75 *196,9*	19.9 *9,0*
8 *200*	8.625 *219,1*	7.75 *196,9*	43.7 *19,8*	7.75 *196,9*	28.3 *12,8*
267,4mm *250*	10.528 *267,4*	—	—	9.00 *228,6*	30.8 *13,9*
10 *250*	10.750 *273,0*	9.00 *228,6*	57.0 *25,9*	9.00 *228,6*	44.4 *20,1*
318,5mm *300*	12.539 *318,5*	—	—	10.00 *254,0*	45.3 *20,5*
12 *300*	12.750 *323,9*	10.00 *254,0*	110.0 *49,9*	10.00 *254,0*	63.3 *28,7*
14 *350*	14.000 *355,6*	11.00 *279,0*	135.0 *61,2*	11.00 *279,0*	76.0 *34,5*
16 *400*	16.000 *406,4*	12.00 *305,0*	136.0 *61,7*	12.00 *305,0*	94.0 *42,6*
18 *450*	18.000 *457,2*	—	—	15.50 *394,0*	129.0 *58,5*
20 *500*	20.000 *508,0*	—	—	17,25 *438,0*	158.0 *71,6*
24 *600*	24.000 *609,6*	—	—	20.00 *508,0*	216.0 *97,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 320 Grooved Fabricated Tee

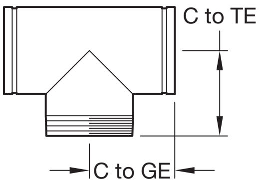
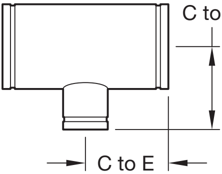


FIGURE 320
FABRICATED TEE
GROOVE x GROOVE x MALE THREAD
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to GE Inches *mm*	Nominal C to TE Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	2.75 *69,9*	1.5 *0,7*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	2.75 *69,9*	1.9 *0,9*
2 *50*	2.375 *60,3*	3.25 *82,6*	4.25 *108,0*	3.2 *1,5*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	3.75 *95,3*	4.0 *1,8*
76mm *65*	3.000 *76,1*	3.75 *95,3*	3.75 *95,3*	4.2 *1,9*
3 *80*	3.500 *88,9*	4.25 *108,0*	6.00 *152,4*	6.0 *2,7*
4 *100*	4.500 *114,3*	5.00 *127,0*	7.25 *184,2*	11.0 *5,0*
139mm *125*	5.500 *139,7*	5.50 *139,7*	5.50 *139,7*	22.2 *10,1*
5 *125*	5.563 *141,3*	5.50 *139,7*	5.50 *139,7*	22.6 *10,3*
165mm *150*	6.500 *165,1*	6.50 *165,1*	6.50 *165,1*	23.0 *10,4*
6 *150*	6.625 *168,3*	6.50 *165,1*	6.50 *165,1*	23.0 *10,5*
8 *200*	8.625 *219,1*	7.75 *196,9*	7.75 *196,9*	38.7 *17,6*
10 *250*	10.750 *273,0*	9.00 *228,6*	9.00 *228,6*	72.1 32,8
12 *300*	12.750 *323,9*	10.00 *254,0*	10.00 *254,0*	92.5 *42,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

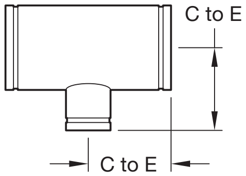
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***		
1-1/2 x 1-1/2 x 1-1/4 *40 x 40 x 32*	1.900 x 1.900 x 1.660 *48,3 x 48,3 x 42,4*	2.75 *69,9*	1.5 *0,7*
2 x 2 x 1 *50 x 50 x 25*	2.375 x 2.375 x 1.315 *60,3 x 60,3 x 33,4*	3.25 *82,6*	2.1 *0,9*
2 x 2 x 1-1/2 *50 x 50 x 40*	2.375 x 2.375 x 1.900 *60,3 x 60,3 x 48,3*	3.25 *82,6*	2.3 *1,0*
2-1/2 x 2-1/2 x 1 *65 x 65 x 25*	2.874 x 2.874 x 1.315 *73,0 x 73,0 x 33,4*	3.75 *95,3*	2.8 *1,3*
2-1/2 x 2-1/2 x 1-1/4 *65 x 65 x 32*	2.874 x 2.874 x 1.660 *73,0 x 73,0 x 42,4*	3.75 *95,3*	3.0 *1,4*
2-1/2 x 2-1/2 x 1-1/2 *65 x 65 x 40*	2.874 x 2.874 x 1.900 *73,0 x 73,0 x 48,3*	3.75 *95,3*	3.0 *1,4*
2-1/2 x 2-1/2 x 2 *65 x 65 x 50*	2.874 x 2.874 x 2.375 *73,0 x 73,0 x 60,3*	3.75 *95,3*	3.1 *1,4*
76,1mm x 76,1mm x 1 *65 x 65 x 25*	3.000 x 3.000 x 1.315 *76,1 x 76,1 x 33,4*	3.75 *95,3*	3.6 *1,6*
76,1mm x 76,1mm x 1-1/4 *65 x 65 x 32*	3.000 x 3.000 x 1.660 *76,1 x 76,1 x 42,4*	3.75 *95,3*	3.7 *1,7*
76,1mm x 76,1mm x 1-1/2 *65 x 65 x 40*	3.000 x 3.000 x 1.900 *76,1 x 76,1 x 48,3*	3.75 *95,3*	3.8 *1,7*
76,1mm x 76,1mm x 2 *65 x 65 x 50*	3.000 x 3.000 x 2.375 *76,1 x 76,1 x 60,3*	3.75 *95,3*	4.0 *1,8*
3 x 3 x 1 *80 x 80 x 25*	3.500 x 3.500 x 1.315 *88,9 x 88,9 x 33,4*	4.25 *108,0*	5.5 *2,5*
3 x 3 x 1-1/2 *80 x 80 x 40*	3.500 x 3.500 x 1.900 *88,9 x 88,9 x 48,3*	4.25 *108,0*	5.6 *2,5*
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	4.25 *108,0*	5.8 *2,6*
3 x 3 x 2-1/2 *80 x 80 x 65*	3.500 x 3.500 x 2.874 *88,9 x 88,9 x 73,0*	4.25 *108,0*	6.0 *2,7*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	4.25 *108,0*	6.1 *2,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

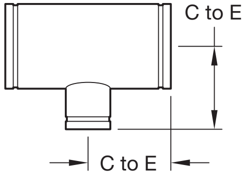
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
108,0mm x 108,0mm x 2 *100 x 100 x 50*	4.252 x 4.252 x 2.375 *108,0 x 108,0 x 60,3*	5.00 *127,0*	5.7 *2,6*
108,0mm x 108,0mm x 2-1/2 *100 x 100 x 65*	4.252 x 4.252 x 2.874 *108,0 x 108,0 x 73,0*	5.00 *127,0*	6.0 *2,7*
108,0mm x 108,0mm x 76,1mm *100 x 100 x 65*	4.252 x 4.252 x 3.000 *108,0 x 108,0 x 76,1*	5.00 *127,0*	6.1 *2,8*
108,0mm x 108,0mm x 3 *100 x 100 x 80*	4.252 x 4.252 x 3.500 *108,0 x 108,0 x 88,9*	5.00 *127,0*	6.6 *2,9*
4 x 4 x 1 *100 x 100 x 25*	4.500 x 4.500 x 1.315 *114,3 x 114,3 x 33,4*	5.00 *127,0*	9.0 *4,0*
4 x 4 x 1-1/4 *100 x 100 x 32*	4.500 x 4.500 x 1.660 *114,3 x 114,3 x 42,4*	5.00 *127,0*	9.1 *4,1*
4 x 4 x 1-1/2 *100 x 100 x 40*	4.500 x 4.500 x 1.900 *114,3 x 114,3 x 48,3*	5.00 *127,0*	9.2 4,1
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	5.00 *127,0*	9.3 *4,2*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.874 *114,3 x 114,3 x 73,0*	5.00 *127,0*	9.7 *4,4*
4 x 4 x 76,1mm *100 x 100 x 65*	4.500 x 4.500 x 3.000 *114,3 x 114,3 x 76,1*	5.00 *127,0*	9.7 *4,4*
4 x 4 x 3 *100 x 100 x 88,9*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	5.00 *127,0*	10.1 *4,6*
133,0mm x 133,0mm x 2 *125 x 125 x 50*	5.250 x 5.250 x 2.375 *133,0 x 133,0 x 60,3*	5.50 *139,7*	8.2 *3,7*
133,0mm x 133,0mm x 2-1/2 *125 x 125 x 65*	5.250 x 5.250 x 2.874 *133,0 x 133,0 x 73,0*	5.50 *139,7*	8.6 *3,9*
133,0mm x 133,0mm x 76,1mm *125 x 125 x 65*	5.250 x 5.250 x 3.000 *133,0 x 133,0 x 76,1*	5.50 *139,7*	8.7 *3,9*
133,0mm x 133,0mm x 3 *125 x 125 x 80*	5.250 x 5.250 x 3.500 *133,0 x 133,0 x 88,9*	5.50 *139,7*	9.1 *4,1*
133,0mm x 133,0mm x 108,0mm *125 x 125 x 100*	5.250 x 5.250 x 4.252 *133,0 x 133,0 x 108,0*	5.50 *139,7*	8.5 *3,9*
133,0mm x 133,0mm x 4 *125 x 125 x 100*	5.250 x 5.250 x 4.500 *133,0 x 133,0 x 114,3*	5.50 *139,7*	9.8 *4,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

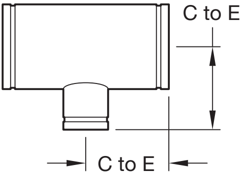
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
139,7mm x 139,7mm x 2 *125 x 125 x 50*	5.500 x 5.500 x 2.375 *139,7 x 139,7 x 60,3*	5.50 *139,7*	10.1 *4,6*
139,7mm x 139,7mm x 2-1/2 *125 x 125 x 65*	5.500 x 5.500 x 2.874 *139,7 x 139,7 x 73,0*	5.50 *139,7*	10.5 *4,8*
139,7mm x 139,7mm x 76,1mm *125 x 125 x 65*	5.500 x 5.500 x 3.000 *139,7 x 139,7 x 76,1*	5.50 *139,7*	10.5 *4,8*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	5.50 *139,7*	11.0 *4,9*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	5.50 *139,7*	11.5 *5,2*
5 x 5 x 2 *125 x 125 x 50*	5.563 x 5.563 x 2.375 *141,3 x 141,3 x 60,3*	5.50 *139,7*	13.6 *6,2*
5 x 5 x 2-1/2 *125 x 125 x 65*	5.563 x 5.563 x 2.874 *141,3 x 141,3 x 73,0*	5.50 *139,7*	14.0 *6,4*
5 x 5 x 76,1mm *125 x 125 x 65*	5.563 x 5.563 x 3.000 *141,3 x 141,3 x 76,1*	5.50 *139,7*	14.0 *6,4*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	5.50 *139,7*	14.3 *6,5*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	5.50 *139,7*	14.8 *6,7*
159,0mm x 159,0mm x 2-1/2 *150 x 150 x 65*	6.250 x 6.250 x 2.874 *159,0 x 159,0 x 73,0*	6.50 *165,1*	13.3 *6,0*
159,0mm x 159,0mm x 76,1mm *150 x 150 x 65*	6.250 x 6.250 x 3.000 *159,0 x 159,0 x 76,1*	6.50 *165,1*	13.4 *6,1*
159,0mm x 159,0mm x 3 *150 x 150 x 80*	6.250 x 6.250 x 3.500 *159,0 x 159,0 x 88,9*	6.50 *165,1*	13.9 *6,3*
159,0mm x 159,0mm x 108,0mm *150 x 150 x 100*	6.250 x 6.250 x 4.252 *159,0 x 159,0 x 108,0*	6.50 *165,1*	13.2 *6,0*
159,0mm x 159,0mm x 4 *150 x 150 x 100*	6.250 x 6.250 x 4.500 *159,0 x 159,0 x 114,3*	6.50 *165,1*	14.7 *6,7*
159,0mm x 159,0mm x 133,0mm *150 x 150 x 125*	6.250 x 6.250 x 5.250 *159,0 x 159,0 x 133,0*	6.50 *165,1*	13.7 *6,2*
159,0mm x 159,0mm x 139,7mm *150 x 150 x 125*	6.250 x 6.250 x 6.500 *159,0 x 159,0 x 139,7*	6.50 *165,1*	14.5 *6,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

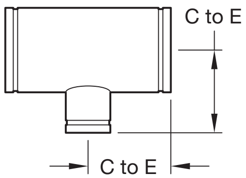
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
159,0mm x 159,0mm x 5 *150 x 150 x 125*	6.250 x 6.250 x 5.563 *159,0 x 159,0 x 141,3*	6.50 *165,1*	15.7 *7,1*
165,1mm x 165,1mm x 2-1/2 *150 x 150 x 65*	6.500 x 6.500 x 2.874 *165,1 x 165,1 x 73,0*	6.50 *165,1*	15.2 *6,9*
165,1mm x 165,1mm x 76,1mm *150 x 150 x 65*	6.500 x 6.500 x 3.000 *165,1 x 165,1 x 76,1*	6.50 *165,1*	15.2 *6,9*
165,1mm x 165,1mm x 139,7mm *150 x 150 x 125*	6.500 x 6.500 x 5.500 *165,1 x 165,1 x 139,7*	6.50 *165,1*	15.2 *6,9*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	6.50 *165,1*	15.7 *7,1*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	6.50 *165,1*	16.4 *7,4*
165,1mm x 165,1mm x 5 *150 x 150 x 125*	6.500 x 6.500 x 5.563 *165,1 x 165,1 x 141,3*	6.50 *165,1*	17.3 *7,8*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 60,3*	6.50 *165,1*	20.8 *9,4*
6 x 6 x 2-1/2 *150 x 150 x 65*	6.625 x 6.625 x 2.874 *168,3 x 168,3 x 73,0*	6.50 *165,1*	21.2 *9,6*
6 x 6 x 76,1mm *150 x 150 x 65*	6.625 x 6.625 x 3.000 *168,3 x 168,3 x 76,1*	6.50 *165,1*	21.2 *9,6*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	6.50 *165,1*	21.6 *9,8*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	6.50 *165,1*	22.2 *10,1*
6 x 6 x 139,7mm *150 x 150 x 125*	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	6.50 *165,1*	21.7 *9,8*
6 x 6 x 5 *150 x 150 x 125*	6.625 x 6.625 x 5.563 *168,3 x 168,3 x 141,3*	6.50 *165,1*	22.9 *10,4*
216,3mm x 216,3mm x 2 *200 x 200 x 50*	8.516 x 8.516 x 2.375 *216,3 x 216,3 x 60,3*	7.75 *196,9*	26.2 *11,8*
216,3mm x 216,3mm x 2-/12 *200 x 200 x 65*	8.516 x 8.516 x 2.874 *216,3 x 216,3 x 73,0*	7.75 *196,9*	26.7 *12,1*
216,3mm x 216,3mm x 76,1mm *200 x 200 x 65*	8.516 x 8.516 x 3.000 *216,3 x 216,3 x 76,1*	7.75 *196,9*	26.7 *12,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

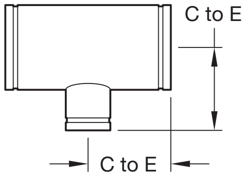
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
216,3mm x 216,3mm x 3 *200 x 200 x 80*	8.516 x 8.516 x 3.500 *216,3 x 216,3 x 88,9*	7.75 *196,9*	27.2 *12,3*
216,3mm x 216,3mm x 4 *200 x 200 x 100*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,1*	7.75 *196,9*	27.8 *12,6*
216,3mm x 216,3mm x 139,7mm *200 x 200 x 125*	8.516 x 8.516 x 5.500 *216,3 x 216,3 x 139,7*	7.75 *196,9*	27.5 *12,5*
216,3mm x 216,3mm x 5 *200 x 200 x 125*	8.516 x 8.516 x 5.563 *216,3 x 216,3 x 141,3*	7.75 *196,9*	28.7 *13,0*
216,3mm x 216,3mm x 165,1mm *200 x 200 x 150*	8.516 x 8.516 x 6.500 *216,3 x 216,3 x 165,1*	7.75 *196,9*	28.3 *12,8*
216,3mm x 216,3mm x 6 *200 x 200 x 150*	8.516 x 8.516 x 6.625 *216,3 x 216,3 x 168,3*	7.75 *196,9*	29.8 *13,5*
8 x 8 x 2 *200 x 200 x 50*	8.625 x 8.625 x 2.375 *219,1 x 219,1 x 60,3*	7.75 *196,9*	36.9 *16,7*
8 x 8 x 2-1/2 *200 x 200 x 65*	8.625 x 8.625 x 2.874 219,1 x 219,1 x 73,0	7.75 *196,9*	37.3 *17,0*
8 x 8 x 76,1mm *200 x 200 x 65*	8.625 x 8.625 x 3.000 219,1 x 219,1 x 76,1	7.75 *196,9*	37.3 *17,0*
8 x 8 x 3 *200 x 200 x 80*	8.625 x 8.625 x 3.500 *219,1 x 219,1 x 88,9*	7.75 *196,9*	37.7 *17,1*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	7.75 *196,9*	38.2 *17,3*
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 139,7*	7.75 *196,9*	37.7 *17,1*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.500 *219,1 x 219,1 x 141,3*	7.75 *196,9*	38.8 *17,6*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	7.75 *196,9*	38.2 *17,3*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	7.75 *196,9*	38.2 *17,3*
267,4mm x 267,4mm x 4 *250 x 250 x 100*	10.528 x 10.528 x 4.500 *267,4 x 267,4 x 114,3*	9.00 *228,6*	44.3 *20,1*
267,4mm x 267,4mm x 139,7mm *250 x 250 x 125*	10.528 x 10.528 x 5.500 *267,4 x 267,4 x 139,7*	9.00 *228,6*	43.9 *19,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

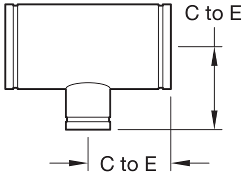
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
267,4mm x 267,4mm x 5 *250 x 250 x 125*	10.528 x 10.528 x 5.563 *267,4 x 267,4 x 141,3*	9.00 *228,6*	45.1 *20,4*
267,4mm x 267,4mm x 165,1mm *250 x 250 x 150*	10.528 x 10.528 x 6.500 *267,4 x 267,4 x 165,1*	9.00 *228,6*	44.6 *20,2*
267,4mm x 267,4mm x 6 *250 x 250 x 150*	10.528 x 10.528 x 6.625 *267,4 x 267,4 x 168,3*	9.00 *228,6*	44.6 *20,2*
267,4mm x 267,4mm x 216,3mm *250 x 250 x 200*	10.528 x 10.528 x 8.516 *267,4 x 267,4 x 216,3*	9.00 *228,6*	45.6 *20,7*
267,4mm x 267,4mm x 8 *250 x 250 x 200*	10.528 x 10.528 x 8.625 *267,4 x 267,4 x 219,1*	9.00 *228,6*	45.6 *20,7*
10 x 10 x 2 *250 x 250 x 50*	10.750 x 10.750 x 2.375 *273,0 x 273,0 x 60,3*	9.00 *228,6*	60.5 *27,4*
10 x 10 x 3 *250 x 250 x 80*	10.750 x 10.750 x 3.500 *273,0 x 273,0 x 88,9*	9.00 *228,6*	61.2 *27,8*
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	9.00 *228,6*	61.7 *27,9*
10 x 10 x 139,7mm *250 x 250 x 125*	10.750 x 10.750 x 5.500 *273,0 x 273,0 x 139,7*	9.00 *228,6*	61.0 *27,6*
10 x 10 x 5 *250 x 250 x 125*	10.750 x 10.750 x 5.563 *273,0 x 273,0 x 141,3*	9.00 *228,6*	62.3 *28,3*
10 x 10 x 165,1mm *250 x 250 x 150*	10.750 x 10.750 x 6.500 *273,0 x 273,0 x 165,1*	9.00 *228,6*	61.5 *27,8*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	9.00 *228,6*	61.4 *27,8*
10 x 10 x 216,3mm *250 x 250 x 200*	10.750 x 10.750 x 8.516 *273,0 x 273,0 x 216,3*	9.00 *228,6*	61.6 *27,9*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	9.00 *228,6*	61.6 *27,9*
318,5mm x 318,5mm x 4 *300 x 300 x 100*	12.539 x 12.539 x 4.500 *318,5 x 318,5 x 114,3*	10.00 *254,0*	60.5 *27,4*
318,5mm x 318,5mm x 139,7mm *300 x 300 x 125*	12.539 x 12.539 x 5.500 *318,5 x 318,5 x 139,7*	10.00 *254,0*	60.0 *27,2*
318,5mm x 318,5mm x 5 *300 x 300 x 125*	12.539 x 12.539 x 5.563 *318,5 x 318,5 x 141,3*	10.00 *254,0*	61.2 *27,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

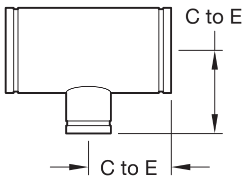
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
318,5mm x 318,5mm x 165,1mm *300 x 300 x 150*	12.539 x 12.539 x 6.500 *318,5 x 318,5 x 165,1*	10.00 *254,0*	60.7 *27,5*
318,5mm x 318,5mm x 6 *300 x 300 x 150*	12.539 x 12.539 x 6.625 *318,5 x 318,5 x 168,3*	10.00 *254,0*	60.7 *27,5*
318,5mm x 318,5mm x 216,3mm *300 x 300 x 200*	12.539 x 12.539 x 8.516 *318,5 x 318,5 x 216,3*	10.00 *254,0*	61.5 *27,9*
318,5mm x 318,5mm x 8 *300 x 300 x 200*	12.539 x 12.539 x 8.625 *318,5 x 318,5 x 219,1*	10.00 *254,0*	61.5 *27,9*
318,5mm x 318,5mm x 267,4mm *300 x 300 x 250*	12.539 x 12.539 x 10.528 *318,5 x 318,5 x 267,4*	10.00 *254,0*	62.2 *28,2*
318,5mm x 318,5mm x 10 *300 x 300 x 250*	12.539 x 12.539 x 10.750 *318,5 x 318,5 x 273,0*	10.00 *254,0*	62.2 *28,2*
12 x 12 x 3 *300 x 300 x 80*	12.750 x 12.750 x 3.500 *323,9 x 323,9 x 88,9*	10.00 *254,0*	82.7 *37,5*
12 x 12 x 4 *300 x 300 x 100*	12.750 x 12.750 x 4.500 *323,9 x 323,9 x 141,3*	10.00 *254,0*	83.1 *37,7*
12 x 12 x 139,7mm *300 x 300 x 125*	12.750 x 12.750 x 5.500 *323,9 x 323,9 x 139,7*	10.00 *254,0*	82.5 *37,4*
12 x 12 x 5 *300 x 300 x 125*	12.750 x 12.750 x 5.563 *323,9 x 323,9 x 114,3*	10.00 *254,0*	83.7 37,9
12 x 12 x 165,1mm *300 x 300 x 150*	12.750 x 12.750 x 6.500 *323,9 x 323,9 x 165,1*	10.00 *254,0*	82.8 *38.0*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 *323,9 x 323,9 x 168,3*	10.00 *254,0*	82.8 *38.0*
12 x 12 x 216,3mm *300 x 300 x 200*	12.750 x 12.750 x 8.516 *323,9 x 323,9 x 216,3*	10.00 *254,0*	82.8 *38.0*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	10.00 *254,0*	82.8 *38.0*
12 x 12 x 267,4mm *300 x 300 x 250*	12.750 x 12.750 x 10.528 323,9 x 323,9 x 267,4	10.00 *254,0*	82.5 *37,4*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	10.00 *254,0*	82.4 *37,4*
14 x 14 x 6 *350 x 350 x 150*	14.000 x 14.000 x 6.625 *355,6 x 355,6 x 168,3*	11.00 *279,4*	100.5 *45,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

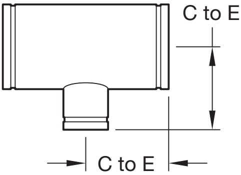
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
14 x 14 x 8 *350 x 350 x 200*	14.000 x 14.000 x 8.625 *355,6 x 355,6 x 219,1*	11.00 *279,4*	100.7 *45,7*
14 x 14 x 10 *350 x 350 x 250*	14.000 x 14.000 x 10.750 *355,6 x 355,6 x 273,0*	11.00 *279,4*	100.5 *45,6*
14 x 14 x 12 *350 x 350 x 300*	14.000 x 14.000 x 12.750 *355,6 x 355,6 x 323,9*	11.00 *279,4*	101.3 45,9
16 x 16 x 4 *400 x 400 x 100*	16.000 x 16.000 x 4.500 *406,4 x 406,4 x 114,3*	12.00 *304,8*	125.5 *56,9*
16 x 16 x 8 *400 x 400 x 200*	16.000 x 16.000 x 8.625 *406,4 x 406,4 x 219,1*	12.00 *304,8*	125.6 57,0
16 x 16 x 10 *400 x 400 x 250*	16.000 x 16.000 x 10.750 *406,4 x 406,4 x 273,0*	12.00 *304,8*	125.7 57,0
16 x 16 x 12 *400 x 400 x 300*	16.000 x 16.000 x 12.750 *406,4 x 406,4 x 323,9*	12.00 *304,8*	125.8 57,1
16 x 16 x 14 *400 x 400 x 350*	16.000 x 16.000 x 14.000 *406,4 x 406,4 x 355,6*	12.00 *304,8*	132.3 *60,0*
18 x 18 x 8 *450 x 450 x 200*	18.000 x 18.000 x 8.625 *457,2 x 457,2 x 219,1*	15.50 *393,7*	186.7 84,7
18 x 18 x 10 *450 x 450 x 250*	18.000 x 18.000 x 10.750 *457,2 x 457,2 x 273,0*	15.50 *393,7*	187.7 *85,1*
18 x 18 x 12 *450 x 450 x 300*	18.000 x 18.000 x 12.750 *457,2 x 457,2 x 323,9*	15.50 *393,7*	190.2 *86,2*
18 x 18 x 14 *450 x 450 x 350*	18.000 x 18.000 x 14.000 *457,2 x 457,2 x 355,6*	15.50 *393,7*	199.8 *90,6*
18 x 18 x 16 *450 x 450 x 400*	18.000 x 18.000 x 16.000 *457,2 x 457,2 x 406,4*	15.50 *393,7*	202.1 *91,7*
20 x 20 x 14 *500 x 500 x 350*	20.000 x 20.000 x 14.000 *508,0 x 508,0 x 355,6*	17.25 *450,9*	246.0 *111,6*
20 x 20 x 16 *500 x 500 x 400*	20.000 x 20.000 x 16.000 *508,0 x 508,0 x 406,4*	17.25 *450,9*	248.5 *112,7*
20 x 20 x 18 *500 x 500 x 450*	20.000 x 20.000 x 18.000 *508,0 x 508,0 x 457,2*	17.25 *450,9*	251.0 *113,8*
24 x 24 x 10 *600 x 600 x 250*	24.000 x 24.000 x 10.750 *609,6 x 609,6 x 273,0*	20.00 *508,0*	321.3 *145,7*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

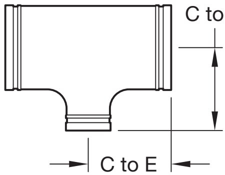
Figure 321 Fabricated Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
24 x 24 x 12 *600 x 600 x 300*	24.000 x 24.000 x 12.750 *609,6 x 609,6 x 323,9*	20.00 *508,0*	324.6 *147,2*
24 x 24 x 14 *600 x 600 x 350*	24.000 x 24.000 x 14.000 *609,6 x 609,6 x 355,6*	20.00 *508,0*	335.8 *152,3*
24 x 24 x 16 *600 x 600 x 400*	24.000 x 24.000 x 16.000 *609,6 x 609,6 x 406,4*	20.00 *508,0*	338.3 *153,5*
24 x 24 x 18 *600 x 600 x 450*	24.000 x 24.000 x 18.000 *609,6 x 609,6 x 457,2*	20.00 *508,0*	340.7 *154,5*
24 x 24 x 20 *600 x 600 x 500*	24.000 x 24.000 x 20.000 *609,6 x 609,6 x 508,0*	20.00 *508,0*	343.1 155,6

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

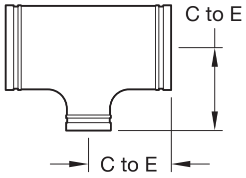
Figure 221 Cast Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
2 x 2 x 1-1/2 *50 x 50 x 40*	2.375 x 2.375 x 1.900 *60,3 x 60,3 x 48,3*	3.25 *82,6*	2.7 *1,2*
2-1/2 x 2-1/2 x 2 *65 x 65 x 50*	2.874 x 2.874 x 2.375 *73,0 x 73,0 x 60,3*	3.75 *95,3*	4.2 *1,9*
76,1mm x 76,1mm x 1-1/2 *65 x 65 x 40*	3.000 x 3.000 x 1.900 *76,1 x 76,1 x 48,3*	3.75 *95,3*	4.5 *2,0*
76,1mm x 76,1mm x 2 *65 x 65 x 50*	3.000 x 3.000 x 2.375 *76,1 x 76,1 x 60,3*	3.75 *95,3*	4.3 *2,0*
3 x 3 x 1 *80 x 80 x 25*	3.500 x 3.500 x 1.315 *88,9 x 88,9 x 33,4*	4.25 *108,0*	5.6 *2,5*
3 x 3 x 1-1/2 *80 x 80 x 40*	3.500 x 3.500 x 1.900 *88,9 x 88,9 x 48,3*	4.25 *108,0*	5.9 *2,7*
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	4.25 *108,0*	6.0 *2,7*
3 x 3 x 2-1/2 *80 x 80 x 65*	3.500 x 3.500 x 2.874 *88,9 x 88,9 x 73,0*	4.25 *108,0*	6.2 *2,8*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	4.25 *108,0*	6.0 *2,7*
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	5.00 *127,0*	9.1 *4,1*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.874 *114,3 x 114,3 x 73,0*	5.00 *127,0*	9.5 *4,3*
4 x 4 x 76,1mm *100 x 100 x 65*	4.500 x 4.500 x 3.000 *1114,3 x 114,3 x 76,1*	5.00 *127,0*	9.5 *4,3*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	5.00 *127,0*	9.7 *4,4*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	5.50 *139,7*	12.7 *5,8*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	5.50 *139,7*	13.4 *6,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 221 Cast Reducing Tee



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
5 x 5 x 2-1/2 *125 x 125 x 65*	5.563 x 5.563 x 2.874 *141,3 x 141,3 x 73,0*	5.50 *139,7*	18.0 *8,2*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	5.50 *139,7*	14.0 *6,4*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	5.50 *139,7*	13.9 *6,3*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	6.50 *165,1*	18.0 *8,2*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	6.50 *165,1*	19.5 *8,9*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 60,3*	6.50 *165,1*	19.4 *8,8*
6 x 6 x 2-1/2 *150 x 150 x 65*	6.625 x 6.625 x 2.874 *168,3 x 168,3 x 73,0*	6.50 *165,1*	21.2 *9,8*
6 x 6 x 76,1mm *150 x 150 x 65*	6.625 x 6.625 x 3.000 *168,3 x 168,3 x 76,1*	6.50 *165,1*	21.2 *9,8*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	6.50 *165,1*	21.0 *9,5*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	6.50 *165,1*	21.8 *9,9*
6 x 6 x 139,7mm *150 x 150 x 125*	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	6.50 *165,1*	23.0 *10,4*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	7.75 *196,9*	37.2 *16,9*
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 139,7*	7.75 *196,9*	37.7 *17,1*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	7.75 *196,9*	37.7 *17,1*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	7.75 *196,9*	37.4 *17,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

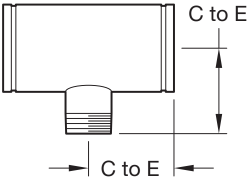


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
2 x 2 x 1 *50 x 50 x 25*	2.375 x 2.375 x 1.315 *60,3 x 60,3 x 33,4*	3.25 *82,6*	2.2 *1,0*
2 x 2 x 1-1/4 *50 x 50 x 32*	2.375 x 2.375 x 1.660 *60,3 x 60,3 x 42,4*	3.25 *82,6*	2.3 *1,0*
2 x 2 x 1-1/2 *50 x 50 x 40*	2.375 x 2.375 x 1.900 *60,3 x 60,3 x 48,3*	3.25 *82,6*	1.4 *1,1*
2-1/2 x 2-1/2 x 1 *65 x 65 x 25*	2.874 x 2.874 x 1.315 *73,0 x 73,0 x 33,4*	3.75 *95,3*	3.6 *1,6*
2-1/2 x 2-1/2 x 1-1/4 *65 x 65 x 32*	2.874 x 2.874 x 1.660 *73,0 x 73,0 x 42,4*	3.75 *95,3*	3.8 *1,7*
2-1/2 x 2-1/2 x 1-1/2 *65 x 65 x 40*	2.874 x 2.874 x 1.900 *73,0 x 73,0 x 48,3*	3.75 *95,3*	4.0 *1,8*
2-1/2 x 2-1/2 x 2 *65 x 65 x 50*	2.874 x 2.874 x 2.375 73,0 x 73,0 x 60,3	3.75 *95,3*	4.2 *1,9*
76,1mm x 76,1mm x 1 *65 x 65 x 25*	3.000 x 3.000 x 1.315 *76,1 x 76,1 x 33,4*	3.75 *95,3*	3.7 *1,7*
76,1mm x 76,1mm x 1-1/4 *65 x 65 x 32*	3.000 x 3.000 x 1.660 *76,1 x 76,1 x 42,4*	3.75 *95,3*	3.9 *1,8*
76,1mm x 76,1mm x 1-1/2 *65 x 65 x 40*	3.000 x 3.000 x 1.900 *76,1 x 76,1 x 48,3*	3.75 *95,3*	4.1 *1,9*
76,1mm x 76,1mm x 2 *65 x 65 x 50*	3.000 x 3.000 x 2.375 *76,1 x 76,1 x 60,3*	3.75 *95,3*	4.4 *2,0*
3 x 3 x 1 *80 x 80 x 25*	3.500 x 3.500 x 1.315 *88,9 x 88,9 x 33,4*	4.25 *108,0*	5.7 2,6
3 x 3 x 1-1/2 *80 x 80 x 40*	3.500 x 3.500 x 1.900 *88,9 x 88,9 x 48,3*	4.25 *108,0*	5.8 *2,6*
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	4.25 *108,0*	5.9 *2,7*
3 x 3 x 2-1/2 *80 x 80 x 65*	3.500 x 3.500 x 2.874 *88,9 x 88,9 x 73,0*	4.25 *108,0*	6.3 *2,9*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	4.25 *108,0*	6.4 *2,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

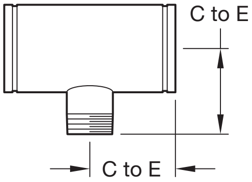


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

108,0mm x 108,0mm x 1 *100 x 100 x 25*	4.252 x 4.252 x 1.315 *108,0 x 108,0 x 33,4*	5.00 *127,0*	6.8 *3,1*
108,0mm x 108,0mm x 1-1/4 *100 x 100 x 32*	4.252 x 4.252 x 1.660 *108,0 x 108,0 x 42,4*	5.00 *127,0*	7.5 *3,4*
108,0mm x 108,0mm x 1-1/2 *100 x 100 x 40*	4.252 x 4.252 x 1.900 *108,0 x 108,0 x 48,3*	5.00 *127,0*	8.2 *3,7*
108,0mm x 108,0mm x 2 *100 x 100 x 50*	4.252 x 4.252 x 2.375 *108,0 x 108,0 x 60,3*	5.00 *127,0*	9.5 *4,3*
108,0mm x 108,0mm x 2-1/2 *100 x 100 x 65*	4.252 x 4.252 x 2.874 *108,0 x 108,0 x 73,0*	5.00 *127,0*	9.7 *4,4*
108,0mm x 108,0mm x 76,1mm *100 x 100 x 65*	4.252 x 4.252 x 3.000 *108,0 x 108,0 x 76,1*	5.00 *127,0*	9.8 *4,4*
108,0mm x 108,0mm x 3 *100 x 100 x 80*	4.252 x 4.252 x 3.500 *108,0 x 108,0 x 88,9*	5.00 *127,0*	9.9 *4,5*
4 x 4 x 1 *100 x 100 x 25*	4.500 x 4.500 x 1.315 *114,3 x 114,3 x 33,4*	5.00 *127,0*	6.9 *3,1*
4 x 4 x 1-1/4 *100 x 100 x 32*	4.500 x 4.500 x 1.660 *114,3 x 114,3 x 42,4*	5.00 *127,0*	7.6 *3,4*
4 x 4 x 1-1/2 *100 x 100 x 40*	4.500 x 4.500 x 1.900 *114,3 x 114,3 x 48,3*	5.00 *127,0*	8.3 *3,8*
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	5.00 *127,0*	9.6 *4,4*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.874 *114,3 x 114,3 x 73,0*	5.00 *127,0*	10.0 *4,5*
4 x 4 x 76,1mm *100 x 100 x 65*	4.500 x 4.500 x 3.000 *114,3 x 114,3 x 76,1*	5.00 *127,0*	10.2 *4,6*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	5.00 *127,0*	10.3 *4,7*
133,0mm x 133,0mm x 2 *125 x 125 x 50*	5.250 x 5.250 x 2.375 *133,0 x 133,0 x 60,3*	5.50 *139,7*	13.8 *6,3*
133,0mm x 133,0mm x 2-1/2 *125 x 125 x 65*	5.250 x 5.250 x 2.874 *133,0 x 133,0 x 73,0*	5.50 *139,7*	14.1 *6,4*
133,0mm x 133,0mm x 76,1mm *125 x 125 x 65*	5.250 x 5.250 x 3.000 *133,0 x 133,0 x 76,1*	5.50 *139,7*	14.2 *6,4*
133,0mm x 133,0mm x 3 *125 x 125 x 80*	5.250 x 5.250 x 3.500 *133,0 x 133,0 x 88,9*	5.50 *139,7*	14.4 *6,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

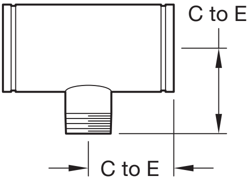


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

133,0mm x 133,0mm x 4 *125 x 125 x 100*	5.250 x 5.250 x 4.500 *133,0 x 133,0 x 114,3*	5.50 *139,7*	14.9 *6,8*
139,7mm x 139,7mm x 2 *125 x 125 x 50*	5.500 x 5.500 x 2.375 *139,7 x 139,7 x 60,3*	5.50 *139,7*	13.9 *6,3*
139,7mm x 139,7mm x 2-1/2 *125 x 125 x 65*	5.500 x 5.500 x 2.874 *139,7 x 139,7 x 73,0*	5.50 *139,7*	14.2 *6,4*
139,7mm x 139,7mm x 76,1mm *125 x 125 x 65*	5.500 x 5.500 x 3.000 *139,7 x 139,7 x 76,1*	5.50 *139,7*	14.3 *6,5*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	5.50 *139,7*	14.5 *6,6*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	5.50 *139,7*	15.0 *6,8*
5 x 5 x 2 *125 x 125 x 50*	5.563 x 5.563 x 2.375 *141,3 x 141,3 x 60,3*	5.50 *139,7*	14.0 *6,4*
5 x 5 x 76,1mm *125 x 125 x 65*	5.563 x 5.563 x 3.000 141,3 x 141,3 x 76,1	5.50 *139,7*	14.4 *6,5*
5 x 5 x 2-1/2 *125 x 125 x 65*	5.563 x 5.563 x 2.874 *141,3 x 141,3 x 73,0*	5.50 *139,7*	14.3 *6,5*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	5.50 *139,7*	14.6 *6,6*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	5.50 *139,7*	15.1 *6,8*
159,0mm x 159,0mm x 2 *150 x 150 x 50*	6.250 x 6.250 x 2.375 *159,0 x 159,0 x 60,3*	6.50 *165,1*	20.9 *9,5*
159,0mm x 159,0mm x 76,1mm *150 x 150 x 65*	6.250 x 6.250 x 3.000 *159,0 x 159,0 x 76,1*	6.50 *165,1*	21.3 *9,7*
159,0mm x 159,0mm x 2-1/2 *150 x 150 x 65*	6.250 x 6.250 x 2.874 *159,0 x 159,0 x 73,0*	6.50 *165,1*	21.2 *9,6*
159,0mm x 159,0mm x 3 *150 x 150 x 80*	6.250 x 6.250 x 3.500 *159,0 x 159,0 x 88,9*	6.50 *165,1*	21.6 *9,8*
159,0mm x 159,0mm x 4 *150 x 150 x 100*	6.250 x 6.250 x 4.500 *159,0 x 159,0 x 114,3*	6.50 *165,1*	22.1 *10,0*
159,0mm x 159,0mm x 139,7mm *150 x 150 x 125*	6.250 x 6.250 x 5.500 *159,0 x 159,0 x 139,7*	6.50 *165,1*	22.4 *10,2*
159,0mm x 159,0mm x 5 *150 x 150 x 125*	6.250 x 6.250 x 5.563 *159,0 x 159,0 x 141,3*	6.50 *165,1*	22.7 *10,3*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

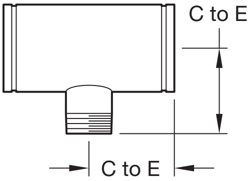


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

165,1mm x 165,1mm x 2 *150 x 150 x 50*	6.500 x 6.500 x 2.375 *165,1 x 165,1 x 60,3*	6.50 *165,1*	21.1 *9,6*
165,1mm x 165,1mm x 76,1mm *150 x 150 x 65*	6.500 x 6.500 x 3.000 *165,1 x 165,1 x 76,1*	6.50 *165,1*	21.5 *9,8*
165,1mm x 165,1mm x 2-1/2 *150 x 150 x 65*	6.500 x 6.500 x 2.874 *165,1 x 165,1 x 73,0*	6.50 *165,1*	21.4 *9,7*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	6.50 *165,1*	21.8 *9,9*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	6.50 *165,1*	22.3 *10,1*
165,1mm x 165,1mm x 139,7mm *150 x 150 x 125*	6.500 x 6.500 x 5.500 *165,1 x 165,1 x 139,7*	6.50 *165,1*	22.6 *10,3*
165,1mm x 165,1mm x 5 *150 x 150 x 125*	6.500 x 6.500 x 5.563 *165,1 x 165,1 x 141,3*	6.50 *165,1*	22.9 *10,4*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 60,3*	6.50 *165,1*	21.3 *9,7*
6 x 6 x 2-1/2 *150 x 150 x 65*	6.625 x 6.625 x 2.874 *168,3 x 168,3 x 73,0*	6.50 *165,1*	21.7 *9,8*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	6.50 *165,1*	22.0 *10,0*
6 x 6 x 4 150 x 150 x 100	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	6.50 *165,1*	22.5 *10.2*
6 x 6 x 139,7mm 150 x 150 x 125	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	6.50 *165,1*	22.8 *10,3*
6 x 6 x 5 *150 x 150 x 125*	6.625 x 6.625 x 5.563 *168,3 x 168,3 x 141,3*	6.50 *165,1*	23.1 *10,5*
216,3mm x 216,3mm x 2 *200 x 200 x 50*	8.516 x 8.516 x 2.375 *216,3 x 216,3 x 60,3*	7.75 *196,9*	32.5 *14,7*
216,3mm x 216,3mm x 76,1mm *200 x 200 x 65*	8.516 x 8.516 x 3.000 *216,3 x 216,3 x 76,1*	7.75 *196,9*	32.7 *14,8*
216,3mm x 216,3mm x 3 *200 x 200 x 80*	8.516 x 8.516 x 3.500 *216,3 x 216,3 x 88,9*	7.75 *196,9*	33.3 *15,1*
216,3mm x 216,3mm x 4 *200 x 200 x 100*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,3*	7.75 *196,9*	34.3 *15,5*
216,3mm x 216,3mm x 139,7mm *200 x 200 x 125*	8.516 x 8.516 x 5.500 *216,3 x 216,3 x 139,7*	7.75 *196,9*	34.4 *15,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

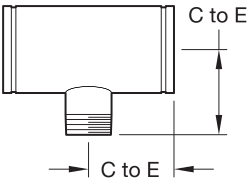


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

216,3mm x 216,3mm x 5 *200 x 200 x 125*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,3*	7.75 *196,9*	34.5 *15,6*
216,3mm x 216,3mm x 165,1mm *200 x 200 x 150*	8.516 x 8.516 x 6.500 *216,3 x 216,3 x 165,1*	7.75 *196,9*	35.2 *15,9*
216,3mm x 216,3mm x 6 *200 x 200 x 150*	8.516 x 8.516 x 6.625 *216,3 x 216,3 x 168,3*	7.75 *196,9*	35.4 16,0
8 x 8 x 2 *200 x 200 x 50*	8.625 x 8.625 x 2.375 *219,1 x 219,1 x 60,3*	7.75 *196,9*	32.7 *14,8*
8 x 8 x 76,1mm *200 x 200 x 65*	8.625 x 8.625 x 3.000 *219,1 x 219,1 x 76,1*	7.75 *196,9*	32.9 14,9
8 x 8 x 3 *200 x 200 x 80*	8.625 x 8.625 x 3.500 219,1 x 219,1 x 88,9	7.75 *196,9*	33.5 *15,2*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	7.75 *196,9*	34.5 *15,6*
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.500 *219,1 x 219,1 x 139,7*	7.75 *196,9*	34.6 *15,7*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	7.75 *196,9*	35.4 *16,0*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 141,3*	7.75 *196,9*	34.7 *15,7*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	7.75 *196,9*	35.6 *16,1*
267,4mm x 267,4mm x 2 *250 x 250 x 50*	10.528 x 10.528 x 2.375 *267,4 x 267,4 x 60,3*	9.00 *228,6*	52.0 *23,6*
267,4mm x 267,4mm x 76,1mm *250 x 250 x 65*	10.528 x 10.528 x 3.000 *267,4 x 267,4 x 76,1*	9.00 *228,6*	52.2 *23,7*
267,4mm x 267,4mm x 3 *250 x 250 x 80*	10.528 x 10.528 x 3.500 *267,4 x 267,4 x 88,9*	9.00 *228,6*	52.8 *23,9*
267,4mm x 267,4mm x 4 *250 x 250 x 100*	10.528 x 10.528 x 4.500 *267,4 x 267,4 x 114,3*	9.00 *228,6*	53.4 *24,2*
267,4mm x 267,4mm x 139,7mm *250 x 250 x 125*	10.528 x 10.528 x 5.500 *267,4 x 267,4 x 139,7*	9.00 *228,6*	53.6 *24,3*
267,4mm x 267,4mm x 5 *250 x 250 x 125*	10.528 x 10.528 x 5.563 *267,4 x 267,4 x 141,3*	9.00 *228,6*	54.0 *24,5*
267,4mm x 267,4mm x 165,1mm *250 x 250 x 150*	10.528 x 10.528 x 6.500 *267,4 x 267,4 x 165,1*	9.00 *228,6*	53.8 *24,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

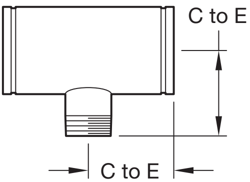


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

267,4mm x 267,4mm x 6 *250 x 250 x 150*	10.528 x 10.528 x 6.625 *267,4 x 267,4 x 168,3*	9.00 *228,6*	54.7 *24,8*
267,4mm x 267,4mm x 8 *250 x 250 x 200*	10.528 x 10.528 x 8.625 *267,4 x 267,4 x 219,1*	9.00 *228,6*	55.1 *25,0*
10 x 10 x 2 *250 x 250 x 50*	10.750 x 10.750 x 2.375 *273,0 x 273,0 x 60,3*	9.00 *228,6*	52.2 *23,7*
10 x 10 x 76,1mm *250 x 250 x 65*	10.750 x 10.750 x 3.000 *273,0 x 273,0 x 76,1*	9.00 *228,6*	52.4 *23,8*
10 x 10 x 3 *250 x 250 x 80*	10.750 x 10.750 x 3.500 *273,0 x 273,0 x 88,9*	9.00 *228,6*	53.0 *24,0*
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	9.00 *228,6*	53.6 *24,3*
10 x 10 x 139,7mm *250 x 250 x 125*	10.750 x 10.750 x 5.500 *273,0 x 273,0 x 139,7*	9.00 *228,6*	53.8 *24,4*
10 x 10 x 5 *250 x 250 x 125*	10.750 x 10.750 x 5.563 *273,0 x 273,0 x 141,3*	9.00 *228,6*	54.2 *24,6*
10 x 10 x 165,1mm *250 x 250 x 150*	10.750 x 10.750 x 6.500 *273,0 x 273,0 x 165,1*	9.00 *228,6*	54.0 *24,5*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	9.00 *228,6*	54.9 *24,9*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	9.00 *228,6*	55.3 *25,1*
318,5mm x 318,5mm x 3 *300 x 300 x 80*	12.539 x 12.539 x 3.500 *318,5 x 318,5 x 88,9*	10.00 *254,0*	74.2 *33,7*
318,5mm x 318,5mm x 4 *300 x 300 x 100*	12.539 x 12.539 x 4.500 *318,5 x 318,5 x 114,3*	10.00 *254,0*	74.9 *33,9*
318,5mm x 318,5mm x 139,7mm *300 x 300 x 125*	12.539 x 12.539 x 5.500 *318,5 x 318,5 x 139,7*	10.00 *254,0*	75.2 *34,1*
318,5mm x 318,5mm x 5 *300 x 300 x 125*	12.539 x 12.539 x 5.563 *318,5 x 318,5 x 141,3*	10.00 *254,0*	75.4 *34,2*
318,5mm x 318,5mm x 165,1mm *300 x 300 x 150*	12.539 x 12.539 x 6.500 *318,5 x 318,5 x 165,1*	10.00 *254,0*	75.8 *34,4*
318,5mm x 318,5mm x 6 *300 x 300 x 150*	12.539 x 12.539 x 6.625 *318,5 x 318,5 x 168,3*	10.00 *254,0*	76.0 *34,5*
318,5mm x 318,5mm x 8 *300 x 300 x 200*	12.539 x 12.539 x 8.625 *318,5 x 318,5 x 219,1*	10.00 *254,0*	76.1 *34,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 323 Fabricated Reducing Tee

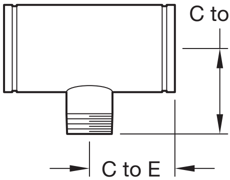


FIGURE 323
FABRICATED REDUCING TEE
GR x GR x MALE THREAD

318,5mm x 318,5mm x 10 *300 x 300 x 250*	12.539 x 12.539 x 10.750 *318,5 x 318,5 x 273,0*	10.00 *254,0*	77.4 *35,1*
12 x 12 x 3 *300 x 300 x 80*	12.750 x 12.750 x 3.500 *323,9 x 323,9 x 88,9*	10.00 *254,0*	74.6 *33,8*
12 x 12 x 4 *300 x 300 x 100*	12.750 x 12.750 x 4.500 *323,9 x 323,9 x 141,3*	10.00 *254,0*	75.1 *34,1*
12 x 12 x 139,7mm *300 x 300 x 125*	12.750 x 12.750 x 5.500 *323,9 x 323,9 x 139,7*	10.00 *254,0*	75.4 *34,2*
12 x 12 x 5 *300 x 300 x 125*	12.750 x 12.750 x 5.563 *323,9 x 323,9 x 114,3*	10.00 *254,0*	75.6 *34,3*
12 x 12 x 165,1mm *300 x 300 x 150*	12.750 x 12.750 x 6.500 *323,9 x 323,9 x 165,1*	10.00 *254,0*	76.0 *34,5*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 323,9 x 323,9 x 219,1	10.00 *254,0*	76.2 *34,6*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	10.00 *254,0*	76.3 *34,6*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	10.00 *254,0*	77.6 *35,2*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 324 True Y, 90°

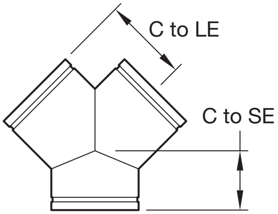


FIGURE 324
FABRICATED 90° TRUE Y
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***			
1 *25*	1.315 *33,4*	2.25 *57,2*	2.25 *57,2*	1.1 *0,5*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	2.50 *63,5*	1.4 *0,6*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	2.75 *69,9*	1.7 *0,8*
2 *50*	2.375 *60,3*	3.25 *82,6*	2.75 *69,9*	2.5 *1,1*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	3.00 *76,2*	4.4 *2,0*
76,1mm *65*	3.000 *76,1*	3.75 *95,3*	3.00 *76,2*	4.4 *2,0*
3 *80*	3.500 *88,9*	4.25 *108,0*	3.25 *82,6*	6.4 *2,9*
108,0mm *100*	4.252 *108,0*	5.00 *127,0*	3.75 *95,3*	10.3 *4,7*
4 *100*	4.500 *114,3*	5.00 *127,0*	3.75 *95,3*	10.5 *4,8*
133,0mm *125*	5.250 *133,0*	5.50 *139,7*	4.00 *101,6*	14.8 *6,7*
139,7mm *125*	5.500 *139,7*	5.50 *139,7*	4.00 *101,6*	15.0 *6,8*
5 *125*	5.563 *141,3*	5.50 *139,7*	4.00 *101,6*	15.2 *6,9*
159,0mm *150*	6.250 *159,0*	6.50 *165,1*	4.50 *114,3*	21.6 *9,8*
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	4.50 *114,3*	22.9 *10,4*
6 *150*	6.625 *168,3*	6.50 *165,1*	4.50 *114,3*	22.9 *10,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 324 True Y, 90°

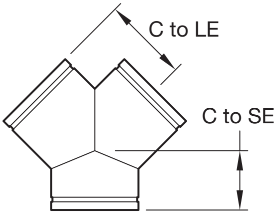
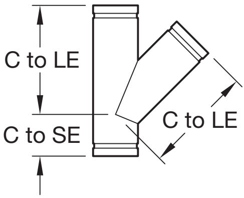


FIGURE 324
FABRICATED 90° TRUE Y
(SEGMENT WELDED)

216,3mm *200*	8.516 *216,3*	7.75 *196,9*	6.00 *152,4*	41.5 *18,8*
8 *200*	8.625 *219,1*	7.75 *196,9*	6.00 *152,4*	41.9 *19,0*
267,4mm *250*	10.528 *267,4*	9.00 *228,6*	6.50 *165,1*	65.8 *29,8*
10 *250*	10.750 *273,0*	9.00 *228,6*	6.50 *165,1*	66.2 *30,0*
318,5mm *300*	12.539 *318,5*	10.00 *254,0*	7.00 *177,8*	87.2 *39,5*
12 *300*	12.750 323,9	10.00 *254,0*	7.00 *177,8*	87.7 *39,8*
14 *350*	14.000 *355,6*	11.00 *279,4*	7.50 *190,5*	105.3 *47.8*
16 *400*	16.000 *406,4*	12.00 *304,8*	8.00 *203,2*	129.1 *58,6*
18 *450*	18.000 *457,2*	15.50 *393,7*	8.50 *215,9*	184.4 *83,6*
20 *500*	20.000 *508,0*	17.25 *438,2*	9.00 *238,6*	225.8 *102,4*
24 *600*	24.000 *609,6*	20.00 *508,0*	10.00 *254,0*	308.5 *139,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

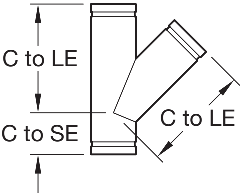
Figure 314 Fabricated 45° Lateral



Nominal Pipe Size		Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***			
1 *25*	1.315 *33,4*	5 *127,0*	2.25 *57,2*	1.1 *0,5*
1-1/4 *32*	1.660 *42,4*	5.75 *146,1*	2.50 *63,5*	1.4 *0,6*
1-1/2 *40*	1.900 *48,3*	6.25 *158,8*	2.75 *69,9*	1.7 *0,8*
2 *50*	2.375 *60,3*	7.00 *177.8*	2.75 *69,9*	2.5 *1,1*
2-1/2 *65*	2.874 *73,0*	7.75 *196,9*	3.00 *76,2*	4.4 *2,0*
76,1mm *65*	3.000 *76,1*	7.75 *196,9*	3.00 *76,2*	4.4 *2,0*
3 *80*	3.500 *88,9*	8.50 *215,9*	3.25 *82,6*	6.4 *2,9*
108,0mm *100*	4.252 *108,0*	10.50 *266,7*	3.75 *95,3*	9.7 *4,4*
4 *100*	4.500 *114,3*	10.50 *266,7*	3.75 *95,3*	10.5 *4,8*
133,0mm *125*	5.250 *133,0*	12.50 *317,5*	4.00 *102,0*	15.6 *7,1*
139,7mm *125*	5.500 *139,7*	12.50 *317,5*	4.00 *102,0*	30.0 *13,6*
5 *125*	5.563 *141,3*	12.50 *317,5*	4.00 *101,6*	15.2 *6,9*
159,0mm *150*	6.250 *159,0*	14.00 *355,6*	4.50 *114,3*	20.6 *9,4*
165,1mm *150*	6.500 *165,1*	14.00 *355,6*	4.50 *114,3*	22.9 *10,4*
6 *150*	6.625 *168,3*	14.00 *355,6*	4.50 *114,3*	22.9 *10,4*
216,3mm *200*	8.516 *216,3*	18.00 *457,2*	6.00 *152,4*	38.4 *17,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 314 Fabricated 45° Lateral



8 *200*	8.625 *219,1*	18.00 *457,2*	6.00 *152,4*	41.9 *19,0*
267,4mm *250*	10.528 *267,4*	20.50 *520,7*	6.50 *165,7*	59.1 *26,8*
10 *250*	10.750 *273,0*	20.50 *520,7*	6.50 *165,7*	66.2 *30,0*
318,5mm *300*	12.539 *318,5*	23.00 *584,2*	7.00 *177,8*	84.0 *38,1*
12 *300*	12.750 *323,9*	23.00 *584,2*	7.00 *177,8*	87.7 *39,8*
14 *350*	14.000 *355,6*	26.50 *673,1*	7.50 *190,5*	105.3 *47,8*
16 *400*	16.000 *406,4*	29.00 *736,6*	8.00 *203,2*	129.1 *58,6*
18 *450*	18.000 *457,2*	32.00 *812,8*	8.50 *215,9*	184.4 *83,6*
20 *500*	20.000 *508,0*	35.00 *889,0*	9.00 *238,6*	225.8 *102,4*
24 *600*	24.000 *609,6*	40.00 *1016,0*	10.00 *254,0*	308.5 *139,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

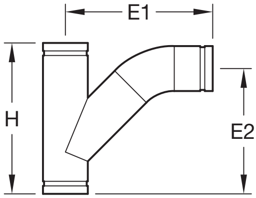


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size ANSI Inches *DN*	Nominal Pipe Size O.D. Inches *mm*	Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
2 x 2 x 2 *50 x 50 x 50*	2.375 x 2.375 x 2.375 *60,3 x 60,3 x 60,3*	9.00 *228,6*	7.37 *187,2*
2-1/2 x 2-1/2 x 2-1/2 *65 x 65 x 65*	2.874 x 2.874 x 2.874 73,0 x 73,0 x 73,0	10.50 *266,7*	8.88 *225,6*
76,1mm x 76,1mm x 2-1/2 *65 x 65 x 65*	3.000 x 3.000 x 3.000 *76,1 x 76,1 x 76,1*	10.50 *266,7*	8.88 *225,6*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	11.50 *292,1*	9.31 *236,5*
3 x 3 x 3 *80 x 80 x 80*	3.500 x 3.500 x 3.500 *88,9 x 88,9 x 88,9*	11.50 *292,1*	9.31 *236,5*
108,0mm x 108,0mm x 76,1mm *100 x 100 x 65*	4.252 x 4.252 x 3.000 *108,0 x 108,0 x 76,1*	12.88 *327,2*	10.19 *258,8*
108,0mm x 108,0mm x 3 *100 x 100 x 80*	4.252 x 4.252 x 3.500 *108,0 x 108,0 x 88,9*	12.88 *327,2*	10.19 *258,8*
108,0mm x 108,0mm x 108,0mm *100 x 100 x 100*	4.252 x 4.252 x 4.500 *108,0 x 108,0 x 108,0*	13.63 *346,2*	11.87 *301,5*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	12.88 *327,2*	10.19 *258,8*
4 x 4 x 4 *100 x 100 x 100*	4.500 x 4.500 x 4.500 *114,3 x 114,3 x 114,3*	13.63 *346,2*	11.87 *301,5*
133,0mm x 133,0mm x 3 *125 x 125 x 80*	5.250 x 5.250 x 3.500 *133,0 x 133,0 x 88,9*	14.25 *362,0*	13.25 *336,6*
133,0mm x 133,0mm x 108,0mm *125 x 125 x 100*	5.250 x 5.250 x 4.252 *133,0 x 133,0 x 108,0*	15.13 *384,3*	13.63 *346,1*
133,0mm x 133,0mm x 4 *125 x 125 x 100*	5.250 x 5.250 x 4.500 *133,0 x 133,0 x 114,3*	15.13 *384,3*	13.63 *346,1*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	14.25 *362,0*	13.25 *336,6*
139,7mm x 139,7mm x 108,0mm *125 x 125 x 100*	5.500 x 5.500 x 4.252 *139,7 x 139,7 x 108,0*	15.13 *384,3*	13.63 *346,1*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	15.13 *384,3*	13.63 *346,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

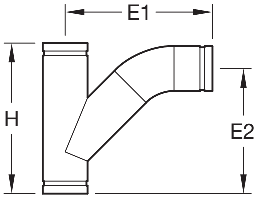


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches** *mm*		
2 x 2 x 2 *50 x 50 x 50*	2.375 x 2.375 x 2.375 *60,3 x 60,3 x 60,3*	9.75 *247,7*	5.7 *2,6*
2-1/2 x 2-1/2 x 2-1/2 *65 x 65 x 65*	2.874 x 2.874 x 2.874 73,0 x 73,0 x 73,0	10.75 *273,1*	10.2 4,6
76,1mm x 76,1mm x 2-1/2 *65 x 65 x 65*	3.000 x 3.000 x 3.000 *76,1 x 76,1 x 76,1*	10.75 273,1	10.8 *4,9*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	11.75 *298,5*	13.5 *6,1*
3 x 3 x 3 *80 x 80 x 80*	3.500 x 3.500 x 3.500 *88,9 x 88,9 x 88,9*	11.75 298,5	14.4 *6,5*
108,0mm x 108,0mm x 76,1mm *100 x 100 x 65*	4.252 x 4.252 x 3.000 *108,0 x 108,0 x 76,1*	14.25 *362,0*	19.8 *8,9*
108,0mm x 108,0mm x 3 *100 x 100 x 80*	4.252 x 4.252 x 3.500 *108,0 x 108,0 x 88,9*	14.25 *362,0*	20.0 *9,1*
108,0mm x 108,0mm x 108,0mm *100 x 100 x 100*	4.252 x 4.252 x 4.500 *108,0 x 108,0 x 108,0*	14.25 *362,0*	23.6 *10,7*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	14.25 *362,0*	20.5 9,3
4 x 4 x 4 *100 x 100 x 100*	4.500 x 4.500 x 4.500 *114,3 x 114,3 x 114,3*	14.25 *362.0*	24.6 *11,2*
133,0mm x 133,0mm x 3 *125 x 125 x 80*	5.250 x 5.250 x 3.500 *133,0 x 133,0 x 88,9*	16.50 *419,1*	25.8 *11,7*
133,0mm x 133,0mm x 108,0mm *125 x 125 x 100*	5.250 x 5.250 x 4.252 *133,0 x 133,0 x 108,0*	16.50 *419,1*	27.2 *12,3*
133,0mm x 133,0mm x 4 *125 x 125 x 100*	5.250 x 5.250 x 4.500 *133,0 x 133,0 x 114,3*	16.50 *419,1*	30.5 *13,8*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	16.50 *419,1*	26.4 *11,9*
139,7mm x 139,7mm x 108,0mm *125 x 125 x 100*	5.500 x 5.500 x 4.252 *139,7 x 139,7 x 108,0*	16.50 *419,1*	31.0 *14,1*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	16.50 *419,1*	32.8 *14,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

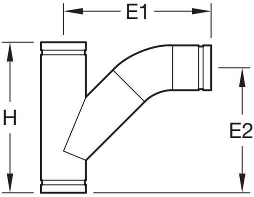


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	**O.D. Inches** *mm*		
139,7mm x 139,7mm x 133,0mm *125 x 125 x 125*	5.500 x 5.500 x 5.250 *139,7 x 139,7 x 133,0*	16.13 *409,7*	14.00 *355,6*
139,7mm x 139,7mm x 139,7mm *125 x 125 x 125*	5.500 x 5.500 x 5.500 *139,7 x 139,7 x 139,7*	16.13 *409,7*	14.00 *355,6*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	14.25 *362,0*	13.25 *336,6*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	15.13 *384,3*	13.63 *346,1*
5 x 5 x 139,7mm *125 x 125 x 125*	5.563 x 5.563 x 5.500 *141,3 x 141,3 x 139,7*	16.13 *409,7*	14.00 *355,6*
5 x 5 x 5 *125 x 125 x 125*	5.563 x 5.563 x 5.563 *141,3 x 141,3 x 141,3*	16.13 *409,7*	14.00 *355,6*
159,0mm x 159,0mm x 3 *150 x 150 x 80*	6.250 x 6.250 x 3.500 *159,0 x 159,0 x 88,9*	15.31 *388,9*	14.81 *376,2*
159,0mm x 159,0mm x 108,0mm *150 x 150 x 100*	6.250 x 6.250 x 4.252 *159,0 x 159,0 x 108,0*	16.25 *412,8*	15.25 *387,4*
159,0mm x 159,0mm x 4 *150 x 150 x 100*	6.250 x 6.250 x 4.500 *159,0 x 159,0 x 114,3*	16.25 *412,8*	15.25 *387,4*
159,0mm x 159,0mm x 133,0mm *150 x 150 x 125*	6.250 x 6.250 x 5.250 *159,0 x 159,0 x 133,0*	17.25 *438,2*	15.63 *396,9*
159,0mm x 159,0mm x 5 *150 x 150 x 125*	6.250 x 6.250 x 5.563 *159,0 x 159,0 x 114,3*	17.25 *438,2*	15.63 *396,9*
159,0mm x 159,0mm x 159,0mm *150 x 150 x 150*	6.250 x 6.250 x 6.250 *159,0 x 159,0 x 159,0*	18.25 *463,6*	16.00 *406,4*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	15.31 *388,9*	14.81 *376,2*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	16.25 *412,8*	15.25 *387,4*
165,1mm x 165,1mm x 139,7mm *150 x 150 x 125*	6.500 x 6.500 x 5.500 *165,1 x 165,1 x 139,7*	17.25 *438,2*	15.63 *396,9*
165,1mm x 165,1mm x 5 *150 x 150 x 125*	6.500 x 6.500 x 5.563 *165,1 x 165,1 x 141,3*	17.25 *438,2*	15.63 *396,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

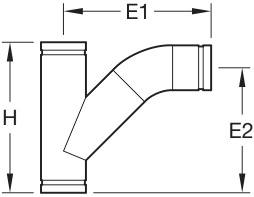


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
139,7mm x 139,7mm x 133,0mm *125 x 125 x 125*	5.500 x 5.500 x 5.250 *139,7 x 139,7 x 133,0*	16.50 *419,1*	35.5 *16,1*
139,7mm x 139,7mm x 139,7mm *125 x 125 x 125*	5.500 x 5.500 x 5.500 *139,7 x 139,7 x 139,7*	16.50 *419,1*	36.8 *16,7*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	16.50 *419,1*	28.4 *12,9*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	16.50 *419,1*	32.8 *14,9*
5 x 5 x 139,7mm *125 x 125 x 125*	5.563 x 5.563 x 5.500 *141,3 x 141,3 x 139,7*	16.50 *419,1*	37.6 *17,0*
5 x 5 x 5 DN125 x DN125 x D125	5.563 x 5.563 x 5.563 (141,3 x 141,3 x 141,3)	16.50 *419,1*	38.8 *17,6*
159,0mm x 159,0mm x 3 *150 x 150 x 80*	6.250 x 6.250 x 3.500 *159,0 x 159,0 x 88,9*	18.50 *469,9*	38.2 *17,3*
159,0mm x 159,0mm x 108,0mm *150 x 150 x 100*	6.250 x 6.250 x 4.252 *159,0 x 159,0 x 108,0*	18.50 *469,9*	39.4 *17,8*
159,0mm x 159,0mm x 4 *150 x 150 x 100*	6.250 x 6.250 x 4.500 *159,0 x 159,0 x 114,3*	18.50 *469,9*	41.5 *18,8*
159,0mm x 159,0mm x 133,0mm *150 x 150 x 125*	6.250 x 6.250 x 5.250 *159,0 x 159,0 x 133,0*	18.50 *469,9*	43.2 *19,5*
159,0mm x 159,0mm x 5 *150 x 150 x 125*	6.250 x 6.250 x 5.563 *159,0 x 159,0 x 114,3*	18.50 *469,9*	47.3 *21,5*
159,0mm x 159,0mm x 159,0mm *150 x 150 x 150*	6.250 x 6.250 x 6.250 *159,0 x 159,0 x 159,0*	18.50 *469,9*	53.5 *24,3*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	18.50 *469,9*	40.0 *18,1*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	18.50 *469,9*	41.8 *18,9*
165,1mm x 165,1mm x 139,7mm *150 x 150 x 125*	6.500 x 6.500 x 5.500 *165,1 x 165,1 x 139,7*	18.50 *469,9*	42.8 *19,4*
165,1mm x 165,1mm x 5 *150 x 150 x 125*	6.500 x 6.500 x 5.563 *165,1 x 165,1 x 141,3*	18.50 *469,9*	43.6 *19,7*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

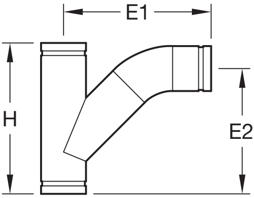


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*		
165,1mm x 165,1mm x 165,1mm *150 x 150 x 150*	6.500 x 6.500 x 6.500 *165,1 x 165,1 x 165,1*	18.25 *463,6*	16.00 *406,4*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	15.31 *388,9*	14.81 *376,2*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	16.25 *412,8*	15.25 *387,4*
6 x 6 x 139,7mm *150 x 150 x 125*	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	17.25 *438,2*	15.63 *396,9*
6 x 6 x 5 *150 x 150 x 125*	6.625 x 6.625 x 5.563 *168,3 x 168,3 x 141,3*	17.25 *438,2*	15.63 *396,9*
6 x 6 x 165,1mm *150 x 150 x 150*	6.625 x 6.625 x 6.500 *168,3 x 168,3 x 165,1*	18.25 *463,6*	16.00 *406,4*
6 x 6 x 6 *150 x 150 x 150*	6.625 x 6.625 x 6.625 *168,3 x 168,3 x 168,3*	18.25 *463,6*	16.00 *406,4*
216,3mm x 216,3mm x 3 *200 x 200 x 80*	8.516 x 8.516 x 3.500 *216,3 x 216,3 x 88,9*	18.19 *462,0*	19.19 *487,4*
216,3mm x 216,3mm x 4 *200 x 200 x 100*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,3*	19.00 *482,6*	19.50 *495,3*
216,3mm x 216,3mm x 139,7mm *200 x 200 x 125*	8.516 x 8.516 x 5.500 *216,3 x 216,3 x 139,7*	20.00 *508,0*	19.87 *504,7*
216,3mm x 216,3mm x 5 *200 x 200 x 125*	8.516 x 8.516 x 5.563 *216,3 x 216,3 x 141,3*	20.00 *508,0*	19.87 *504,7*
216,3mm x 216,3mm x 165,1mm *200 x 200 x 150*	8.516 x 8.516 x 6.500 *216,3 x 216,3 x 165,1*	21.13 *536,7*	20.37 *517,4*
216,3mm x 216,3mm x 6 *200 x 200 x 150*	8.516 x 8.516 x 6.625 *216,3 x 216,3 x 168,3*	21.13 *536,7*	20.37 *517,4*
216,3mm x 216,3mm x 216,3mm *200 x 200 x 200*	8.516 x 8.516 x 8.516 *216,3 x 216,3 x 216,3*	23.25 *590,6*	21.25 *539,8*
8 x 8 x 3 *200 x 200 x 80*	8.625 x 8.625 x 3.500 *219,1 x 219,1 x 88,9*	18.19 462,0	19.19 487,4
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,3*	19.00 *482,6*	19.50 *495,3*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

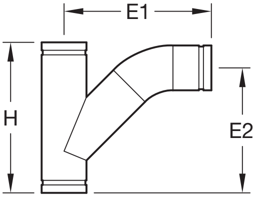


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
165,1mm x 165,1mm x 165,1mm *150 x 150 x 150*	6.500 x 6.500 x 6.500 *165,1 x 165,1 x 165,1*	18.50 *469,9*	54.2 *24,5*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	18.50 *469,9*	37.9 *17,2*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	18.50 *469,9*	42.5 *19,3*
6 x 6 x 139,7mm *150 x 150 x 125*	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	18.50 *469,9*	45.6 *20,6*
6 x 6 x 5 *150 x 150 x 125*	6.625 x 6.625 x 5.563 *168,3 x 168,3 x 141,3*	18.50 *469.9*	48.5 *22,0*
6 x 6 x 165,1mm *150 x 150 x 150*	6.625 x 6.625 x 6.500 *168,3 x 168,3 x 165,1*	18.50 *469.9*	52.3 *23,7*
6 x 6 x 6 DN150 x DN150 x DN150	6.625 x 6.625 x 6.625 (168,3 x 168,3 x 168,3)	18.50 *469.9*	56.3 *25,5*
216,3mm x 216,3mm x 3 *200 x 200 x 80*	8.516 x 8.516 x 3.500 *216,3 x 216,3 x 88,9*	24.00 *609,6*	67.3 *30,5*
216,3mm x 216,3mm x 4 *200 x 200 x 100*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,3*	24.00 *609,6*	72.3 *32,8*
216,3mm x 216,3mm x 139,7mm *200 x 200 x 125*	8.516 x 8.516 x 5.500 *216,3 x 216,3 x 139,7*	24.00 *609,6*	74.2 *33,6*
216,3mm x 216,3mm x 5 *200 x 200 x 125*	8.516 x 8.516 x 5.563 *216,3 x 216,3 x 141,3*	24.00 *609,6*	78.8 *35,7*
216,3mm x 216,3mm x 165,1mm *200 x 200 x 150*	8.516 x 8.516 x 6.500 *216,3 x 216,3 x 165,1*	24.00 *609,6*	84.9 *38,5*
216,3mm x 216,3mm x 6 *200 x 200 x 150*	8.516 x 8.516 x 6.625 *216,3 x 216,3 x 168,3*	24.00 *609,6*	87.4 *39,6*
216,3mm x 216,3mm x 216,3mm *200 x 200 x 200*	8.516 x 8.516 x 8.516 *216,3 x 216,3 x 216,3*	24.00 *609,6*	102.2 *46,4*
8 x 8 x 3 *200 x 200 x 80*	8.625 x 8.625 x 3.500 *219,1 x 219,1 x 88,9*	24.00 *609,6*	67.3 *30,5*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,3*	24.00 *609,6*	72.3 *32,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

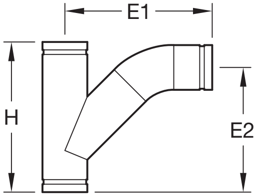


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.500 *219,1 x 219,1 x 139,7*	20.00 *508,0*	19.87 *504,7*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 141,3*	20.00 *508,0*	19.87 *504,7*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	21.13 *536,7*	20.37 *517,4*
8 x 8 x 6 200 x 200 x 150	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	21.13 *536,7*	20.37 *517,4*
8 x 8 x 216,3mm *200 x 200 x 200*	8.625 x 8.625 x 8.625 *219,1 x 219,1 x 219,1*	23.25 *590,6*	21.25 *539,8*
8 x 8 x 8 *200 x 200 x 200*	8.625 x 8.625 x 8.625 *219,1 x 219,1 x 219,1*	23.25 *590,6*	21.25 *539,8*
267,4mm x 267,4mm x 3 *250 x 250 x 80*	10.528 x 10.528 x 3.500 *267,4 x 267,4 x 88,9*	19.88 *505,0*	21.38 *543,1*
267,4mm x 267,4mm x 4 *250 x 250 x 100*	10.528 x 10.528 x 4.500 *267,4 x 267,4 x 114,3*	20.75 *527,1*	21.75 *552,5*
267,4mm x 267,4mm x 139,7mm *250 x 250 x 125*	10.528 x 10.528 x 5.500 *267,4 x 267,4 x 139,7*	21.88 *555,8*	22.25 *565,2*
267,4mm x 267,4mm x 5 *250 x 250 x 125*	10.528 x 10.528 x 5.563 *267,4 x 267,4 x 141,3*	21.88 *555,8*	22.25 *565,2*
267,4mm x 267,4mm x 165,1mm *250 x 250 x 150*	10.528 x 10.528 x 6.500 *267,4 x 267,4 x 165,1*	22.88 *581,2*	22.63 *574,7*
267,4mm x 267,4mm x 6 *250 x 250 x 150*	10.528 x 10.528 x 6.625 *267,4 x 267,4 x 168,3*	22.88 *581,2*	22.63 *574,7*
267,4mm x 267,4mm x 216,4mm *250 x 250 x 200*	10.528 x 10.528 x 8.516 *267,4 x 267,4 x 216,3*	27.25 *692,2*	25.75 *654,1*
267,4mm x 267,4mm x 8 *250 x 250 x 200*	10.528 x 10.528 x 8.625 *267,4 x 267,4 x 219,1*	27.25 *692,2*	25.75 *654,1*
267,4mm x 267,4mm x 267,4mm *250 x 250 x 250*	10.528 x 10.528 x 10.528 *267,4 x 267,4 x 267,4*	27.25 *692,2*	24.38 *619,1*
10 x 10 x 3 *250 x 250 x 80*	10.750 x 10.750 x 3.500 *273,0 x 273,0 x 88,9*	19.88 *505,0*	21.38 *543,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

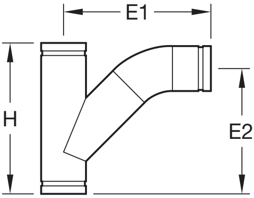


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.500 *219,1 x 219,1 x 139,7*	24.00 *609,6*	75.2 *34,1*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 141,3*	24.00 *609,6*	78.8 *35,7*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	24.00 *609,6*	85.2 *38,6*
8 x 8 x 6 200 x 200 x 150	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	24.00 *609,6*	87.4 *39,6*
8 x 8 x 216,3mm *200 x 200 x 200*	8.625 x 8.625 x 8.625 *219,1 x 219,1 x 219,1*	24.00 *609,6*	106.7 *48,4*
8 x 8 x 8 *200 x 200 x 200*	8.625 x 8.625 x 8.625 *219,1 x 219,1 x 219,1*	24.00 *609,6*	109.0 *49,4*
267,4mm x 267,4mm x 3 *250 x 250 x 80*	10.528 x 10.528 x 3.500 *367,4 x 267,4 x 88,9*	27.00 *685,8*	106.7 *48,4*
267,4mm x 267,4mm x 4 *250 x 250 x 100*	10.528 x 10.528 x 4.500 *367,4 x 267,4 x 114,3*	27.00 *685,8*	111.8 *50,7*
267,4mm x 267,4mm x 139,7mm *250 x 250 x 125*	10.528 x 10.528 x 5.500 *367,4 x 267,4 x 139,7*	27.00 *685,8*	112.7 *51,1*
267,4mm x 267,4mm x 5 *250 x 250 x 125*	10.528 x 10.528 x 5.563 *367,4 x 267,4 x 141,3*	27.00 *685,8*	113.6 *51,5*
267,4mm x 267,4mm x 165,1mm *250 x 250 x 150*	10.528 x 10.528 x 6.500 *367,4 x 267,4 x 165,1*	27.00 *685,8*	147.3 *66,8*
267,4mm x 267,4mm x 6 *250 x 250 x 150*	10.528 x 10.528 x 6.625 *267,4 x 267,4 x 168,3*	27.00 *685,8*	151.1 *68,5*
267,4mm x 267,4mm x 216,4mm *250 x 250 x 200*	10.528 x 10.528 x 8.516 *267,4 x 267,4 x 216,3*	27.00 *685,8*	167.8 *76,1*
267,4mm x 267,4mm x 8 *250 x 250 x 200*	10.528 x 10.528 x 8.625 *267,4 x 267,4 x 219,1*	27.00 *685,8*	175.1 79,4
267,4mm x 267,4mm x 267,4mm *250 x 250 x 250*	10.528 x 10.528 x 10.528 *267,4 x 267,4 x 267,4*	27.00 *685,8*	184.4 *83,6*
10 x 10 x 3 *250 x 250 x 80*	10.750 x 10.750 x 3.500 *273,0 x 273,0 x 88,9*	27.00 *685,8*	101.7 *46,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

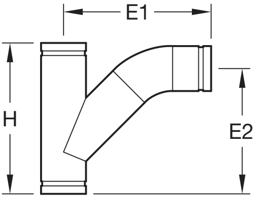


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	20.75 *527,1*	21.75 *552,5*
10 x 10 x 139,7mm *250 x 250 x 125*	10.750 x 10.750 x 5.500 *273,0 x 273,0 x 139,7*	21.88 *555,8*	22.25 *565,2*
10 x 10 x 5 *250 x 250 x 125*	10.750 x 10.750 x 5.563 *273,0 x 273,0 x 141,3*	21.88 *555,8*	22.25 *565,2*
10 x 10 x 165,1mm *250 x 250 x 150*	10.750 x 10.750 x 6.500 *273,0 x 273,0 x 165,1*	22.88 *581,2*	22.63 *574,7*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	22.88 *581,2*	22.63 *574,7*
10 x 10 x 216,3mm *250 x 250 x 200*	10.750 x 10.750 x 8.516 *273,0 x 273,0 x 216,3*	27.25 *692,2*	25.75 *654,1*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	27.25 *692,2*	25.75 *654,1*
10 x 10 x 267,4mm *250 x 250 x 250*	10.750 x 10.750 x 10.528 *273,0 x 273,0 x 267,4*	27.25 *692,2*	24.38 *619,1*
10 x 10 x 10 *250 x 250 x 250*	10.750 x 10.750 x 10.750 *273,0 x 273,0 x 273,0*	27.25 *692,2*	24.38 *619,1*
318,5mm x 318,5mm x 3 *300 x 300 x 80*	12.539 x 12.539 x 3.500 *318,5 x 318,5 x 88,9*	22.75 *577,9*	20.75 *527,1*
318,5mm x 318,5mm x 4 *300 x 300 x 100*	12.539 x 12.539 x 4.500 *318,5 x 318,5 x 114,3*	21.50 *546,1*	23.00 *584,2*
318,5mm x 318,5mm x 165,1mm *300 x 300 x 150*	12.539 x 12.539 x 6.500 *318,5 x 318,5 x 165,1*	23.75 *603,3*	24.00 *609,6*
318,5mm x 318,5mm x 6 *300 x 300 x 150*	12.539 x 12.539 x 6.625 *318,5 x 318,5 x 168,3*	23.75 *603,3*	24.00 *609,6*
318,5mm x 318,5mm x 216,3mm *300 x 300 x 200*	12.539 x 12.539 x 8.516 *318,5 x 318,5 x 216,3*	26.00 *660,4*	25.00 *635,0*
318,5mm x 318,5mm x 8 *300 x 300 x 200*	12.539 x 12.539 x 8.625 *318,5 x 318,5 x 219,1*	26.00 *660,4*	25.00 *635,0*
318,5mm x 318,5mm x 267,4mm *300 x 300 x 250*	12.539 x 12.539 x 10.528 *318,5 x 318,5 x 267,4*	28.00 *771,2*	25.75 *654,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

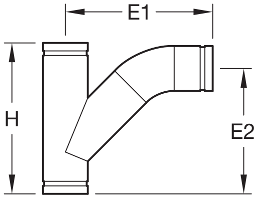


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	27.00 *685,8*	106.9 *48,5*
10 x 10 x 139,7mm *250 x 250 x 125*	10.750 x 10.750 x 5.500 *273,0 x 273,0 x 139,7*	27.00 *685,8*	108.7 *49,3*
10 x 10 x 5 *250 x 250 x 125*	10.750 x 10.750 x 5.563 *273,0 x 273,0 x 141,3*	27.00 *685,8*	113.8 *51,6*
10 x 10 x 165,1mm *250 x 250 x 150*	10.750 x 10.750 x 6.500 *273,0 x 273,0 x 165,1*	27.00 *685,8*	118.7 *53,8*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	27.00 *685,8*	122.1 *55,4*
10 x 10 x 216,3mm *250 x 250 x 200*	10.750 x 10.750 x 8.516 *273,0 x 273,0 x 216,3*	27.00 *685,8*	147.6 *67,0*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	27.00 *685,8*	151.1 *68,5*
10 x 10 x 267,4mm *250 x 250 x 250*	10.750 x 10.750 x 10.528 *273,0 x 273,0 x 267,4*	27.00 *685,8*	171.8 *77,9*
10 x 10 x 10 *250 x 250 x 250*	10.750 x 10.750 x 10.750 *273,0 x 273,0 x 273,0*	27.00 *685,8*	175.1 *79,4*
318,5mm x 318,5mm x 3 *300 x 300 x 80*	12.539 x 12.539 x 3.500 *318,5 x 318,5 x 88,9*	30.00 *762,0*	132.2 *60,0*
318,5mm x 318,5mm x 4 *300 x 300 x 100*	12.539 x 12.539 x 4.500 *318,5 x 318,5 x 114,3*	30.00 *762,0*	134.6 *61,1*
318,5mm x 318,5mm x 165,1mm *300 x 300 x 150*	12.539 x 12.539 x 6.500 *318,5 x 318,5 x 165,1*	30.00 *762,0*	150.7 *68,4*
318,5mm x 318,5mm x 6 *300 x 300 x 150*	12.539 x 12.539 x 6.625 *318,5 x 318,5 x 168,3*	30.00 *762,0*	152.7 *69,3*
318,5mm x 318,5mm x 216,3mm *300 x 300 x 200*	12.539 x 12.539 x 8.516 *318,5 x 318,5 x 216,3*	30.00 *762,0*	171.6 *77,8*
318,5mm x 318,5mm x 8 *300 x 300 x 200*	12.539 x 12.539 x 8.625 *318,5 x 318,5 x 219,1*	30.00 *762,0*	174.1 *78,9*
318,5mm x 318,5mm x 267,4mm *300 x 300 x 250*	12.539 x 12.539 x 10.528 *318,5 x 318,5 x 267,4*	30.00 *762,0*	234.5 *106,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

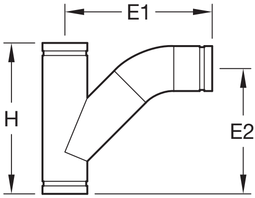


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*		
318,5mm x 318,5mm x 10 *300 x 300 x 250*	12.539 x 12.539 x 10.750 *318,5 x 318,5 x 273,0*	28.00 *771,2*	25.75 *654,1*
318,5mm x 318,5mm x 318,5mm *300 x 300 x 300*	12.539 x 12.539 x 12.539 *318,5 x 318,5 x 318,5*	31.00 *787,4*	27.50 *698,5*
12 x 12 x 3 300 x 300 x 80	12.750 x 12.750 x 3.500 *323,9 x 323,9 x 88,9*	22.75 *577,9*	20.75 *527,1*
12 x 12 x 4 *300 x 300 x 100*	12.750 x 12.750 x 4.500 *323,9 x 323,9 x 114,3*	21.50 *546,1*	23.00 *584,2*
12 x 12 x 165,1mm *300 x 300 x 150*	12.750 x 12.750 x 6.500 *323,9 x 323,9 x 165,1*	23.75 *603,3*	24.00 *609,6*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 *323,9 x 323,9 x 168,3*	23.75 *603,3*	24.00 *609,6*
12 x 12 x 216,3mm *300 x 300 x 200*	12.750 x 12.750 x 8.516 *323,9 x 323,9 x 216,3*	26.00 *660,4*	25.00 *635,0*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	26.00 *660,4*	25.00 *635,0*
12 x 12 x 267,4mm *300 x 300 x 250*	12.750 x 12.750 x 10.528 *323,9 x 323,9 x 267,4*	28.00 711,2	25.75 *654,1*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	28.00 711,2	25.75 *654,1*
12 x 12 x 318,5mm *300 x 300 x 300*	12.750 x 12.750 x 12.539 *323,9 x 323,9 x 318,5*	31.00 *787,4*	27.50 *698,5*
12 x 12 x 12 *300 x 300 x 300*	12.750 x 12.750 x 12.750 *323,9 x 323,9 x 323,9*	31.00 *787,4*	27.50 *698,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 330 Tee Wye, Fabricated

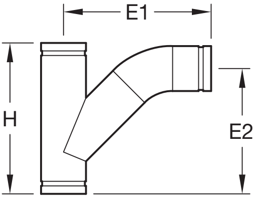


FIGURE 330
TEE WYE FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Nominal H	Approx. Wt.
ANSI Inches *DN*	**O.D. Inches** *mm*	**Inches** *mm*	**Lbs.** *kg*
318,5mm x 318,5mm x 10 *300 x 300 x 250*	12.539 x 12.539 x 10.750 *318,5 x 318,5 x 273,0*	30.00 *762,0*	238.7 *108,3*
318,5mm x 318,5mm x 318,5mm *300 x 300 x 300*	12.539 x 12.539 x 12.539 *318,5 x 318,5 x 318,5*	30.00 *762,0*	232.1 *105,3*
12 x 12 x 3 300 x 300 x 80	12.750 x 12.750 x 3.500 *323,9 x 323,9 x 88,9*	30.00 *762,0*	134.5 *61,0*
12 x 12 x 4 *300 x 300 x 100*	12.750 x 12.750 x 4.500 *323,9 x 323,9 x 114,3*	30.00 *762,0*	139.4 *63,2*
12 x 12 x 165,1mm *300 x 300 x 150*	12.750 x 12.750 x 6.500 *323,9 x 323,9 x 165,1*	30.00 *762,0*	145.7 *66,1*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 *323,9 x 323,9 x 168,3*	30.00 *762,0*	154.5 *70,0*
12 x 12 x 216,3mm *300 x 300 x 200*	12.750 x 12.750 x 8.516 *323,9 x 323,9 x 216,3*	30.00 *762,0*	166.7 *75,6*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	30.00 *762,0*	175.8 *79,7*
12 x 12 x 267,4mm *300 x 300 x 250*	12.750 x 12.750 x 10.528 *323,9 x 323,9 x 267,4*	30.00 *762,0*	184.1 *83,5*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	30.00 *762,0*	205.4 *93,2*
12 x 12 x 318,5mm *300 x 300 x 300*	12.750 x 12.750 x 12.539 *323,9 x 323,9 x 318,5*	30.00 *762,0*	228.7 *103,7*
12 x 12 x 12 *300 x 300 x 300*	12.750 x 12.750 x 12.750 *323,9 x 323,9 x 323,9*	30.00 *762,0*	240.1 *108,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

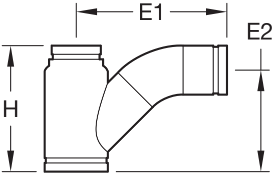


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*		
108,0mm x 3 x 3 *100 x 80 x 80*	4.252 x 3.500 x 3.500 *108,0 x 88,9 x 88,9*	10.75 *273,1*	7.25 *184,2*
108,0mm x 3 x 108,0mm *100 x 80 x 100*	4.252 x 3.500 x 4.252 *108,0 x 88,9 x 108,0*	10.75 *273,1*	7.25 *184,2*
4 x 3 x 3 *100 x 80 x 80*	4.500 x 3.500 x 3.500 *114,3 x 88,9 x 88,9*	10.75 *273,1*	7.25 *143,0*
4 x 3 x 108,0mm *100 x 80 x 100*	4.500 x 3.500 x 4.252 *114,3 x 88,9 x 108,0*	13.63 *346,2*	11.87 *301,5*
4 x 3 x 4 *100 x 80 x 100*	4.500 x 3.500 x 4.500 *114,3 x 88,9 x 114,3*	13.63 *346,2*	11.87 *301,5*
133,0mm x 3 x 3 *125 x 80 x 80*	5.250 x 3.500 x 3.500 *133,0 x 88,9 x 88,9*	11.50 *292,1*	7.71 *195,8*
133,0mm x 3 x 133,0mm *125 x 80 x 125*	5.250 x 3.500 x 5.250 *133,0 x 88,9 x 133,0*	16.13 *409,7*	13.95 *354,3*
133,0mm x 4 x 3 *125 x 100 x 80*	5.250 x 4.500 x 3.500 *133,0 x 114,3 x 88,9*	11.88 *301,9*	8.71 221,2
133,0mm x 108,0mm x 3 *125 x 100 x 80*	5.250 x 4.252 x 3.500 *133,0 x 108,0 x 88,9*	11.88 *301,9*	8.71 221,2
133,0mm x 4 x 4 *125 x 100 x 100*	5.250 x 4.500 x 4.500 *133,0 x 114,3 x 114,3*	12.75 *323,9*	9.00 *228,6*
133,0mm x 108,0mm x 108,0mm *125 x 100 x 100*	5.250 x 4.252 x 4.252 *133,0 x 108,0 x 108,0*	12.75 *323,9*	9.00 *228,6*
133,0mm x 108,0mm x 4 *125 x 100 x 100*	5.250 x 4.252 x 4.500 *133,0 x 108,0 x 114,3*	12.75 *323,9*	9.00 *228,6*
133,0mm x 4 x 108,0mm *125 x 100 x 100*	5.250 x 4.500 x 4.252 *133,0 x 114,3 x 108,0*	12.75 *323,9*	9.00 *228,6*
139,7mm x 3 x 3 *125 x 80 x 80*	5.500 x 3.500 x 3.500 *139,7 x 88,9 x 88,9*	11.50 *292,1*	7.71 *195,8*
139,7mm x 3 x 139,7mm *125 x 80 x 125*	5.500 x 3.500 x 5.500 *139,7 x 88,9 x 139,7*	16.13 *409,7*	13.95 *354,3*
139,7mm x 4 x 3 *125 x 100 x 80*	5.500 x 4.500 x 3.500 *139,7 x 114,3 x 88,9*	11.88 *301.9*	8.71 *221,2*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

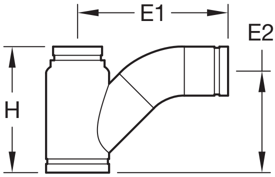


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
108,0mm x 3 x 3 *100 x 80 x 80*	4.252 x 3.500 x 3.500 *108,0 x 88,9 x 88,9*	9.01 *228,9*	13.5 *6,1*
108,0mm x 3 x 108,0mm *100 x 80 x 100*	4.252 x 3.500 x 4.252 *108,0 x 88,9 x 108,0*	9.01 *228,9*	14.0 *6,4*
4 x 3 x 3 *100 x 80 x 80*	4.500 x 3.500 x 3.500 *114,3 x 88,9 x 88,9*	9.00 *228,6*	13.7 *6,2*
4 x 3 x 108,0mm *100 x 80 x 100*	4.500 x 3.500 x 4.252 *114,3 x 88,9 x 108,0*	14.25 *362,0*	13.9 *6,3*
4 x 3 x 4 *100 x 80 x 100*	4.500 x 3.500 x 4.500 *114,3 x 88,9 x 114,3*	14.25 *362,0*	24.5 *11,1*
133,0mm x 3 x 3 *125 x 80 x 80*	5.250 x 3.500 x 3.500 *133,0 x 88,9 x 88,9*	11.00 *279,5*	19.0 *8,6*
133,0mm x 3 x 133,0mm *125 x 80 x 125*	5.250 x 3.500 x 5.250 *133,0 x 88,9 x 133,0*	16.50 *419,1*	19.7 *8,9*
133,0mm x 4 x 3 *125 x 100 x 80*	5.250 x 4.500 x 3.500 *133,0 x 114,3 x 88,9*	11.00 *279,4*	19.5 *8,8*
133,0mm x 108,0mm x 3 *125 x 100 x 80*	5.250 x 4.252 x 3.500 *133,0 x 108,0 x 88,9*	11.00 *279,4*	19.5 *8,8*
133,0mm x 4 x 4 *125 x 100 x 100*	5.250 x 4.500 x 4.500 *133,0 x 114,3 x 114,3*	11.00 *279,4*	23.1 *10,5*
133,0mm x 108,0mm x 108,0mm *125 x 100 x 100*	5.250 x 4.252 x 4.252 *133,0 x 108,0 x 108,0*	11.00 *279,4*	23.0 *10,4*
133,0mm x 108,0mm x 4 *125 x 100 x 100*	5.250 x 4.252 x 4.500 *133,0 x 108,0 x 114,3*	11.00 *279,4*	23.3 *10,6*
133,0mm x 4 x 108,0mm *125 x 100 x 100*	5.250 x 4.500 x 4.252 *133,0 x 114,3 x 108,0*	11.00 *279,4*	18.8 *8,5*
139,7mm x 3 x 3 *125 x 80 x 80*	5.500 x 3.500 x 3.500 *139,7 x 88,9 x 88,9*	11.00 *279,4*	19.0 *8,6*
139,7mm x 3 x 139,7mm *125 x 80 x 125*	5.500 x 3.500 x 5.500 *139,7 x 88,9 x 139,7*	16.50 *419,1*	19.7 *8,9*
139,7mm x 4 x 3 *125 x 100 x 80*	5.500 x 4.500 x 3.500 *139,7 x 114,3 x 88,9*	11.00 *279,4*	19.5 *8,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

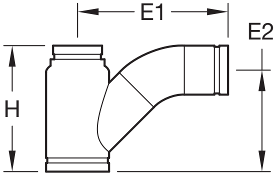


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*		
139,7mm x 4 x 4 *125 x 100 x 100*	5.500 x 4.500 x 4.500 *139,7 x 114,3 x 114,3*	12.75 *323,9*	9.00 *228,6*
5 x 3 x 3 *125 x 80 x 80*	5.563 x 3.500 x 3.500 *141,3 x 88,9 x 88,9*	11.50 *292,1*	7.71 *195,8*
5 x 3 x 133,0mm *125 x 80 x 125*	5.563 x 3.500 x 5.250 *141,3 x 88,9 x 133,0*	16.13 *409,7*	13.95 *254,0*
5 x 3 x 139,7mm *125 x 80 x 125*	5.563 x 3.500 x 5.500 *141,3 x 88,9 x 139,7*	16.13 *409,7*	13.95 *254,0*
5 x 3 x 5 *125 x 80 x 125*	5.563 x 3.500 x 5.563 *141,3 x 88,9 x 141,3*	16.13 *409,7*	13.95 *254,0*
5 x 4 x 3 *125 x 100 x 80*	5.563 x 4.500 x 3.500 *141,3 x 114,3 x 88,9*	11.88 *301,9*	8.71 *221,2*
5 x 4 x 4 *125 x 100 x 100*	5.563 x 4.500 x 4.500 *141,3 x 114,3 x 114,3*	12.75 *323,9*	9.00 *228,6*
159,0mm x 4 x 159,0mm *150 x 100 x 150*	6.250 x 4.500 x 6.250 *159,0 x 114,3 x 159,0*	18.25 *463,6*	13.75 *349,3*
159,0mm x 108,0mm x 159,0mm *150 x 100 x 150*	6.250 x 4.252 x 6.250 *159,0 x 108,0 x 159,0*	18.25 *463,6*	13.75 *349,3*
159,0mm x 133,0mm x 108,0mm *150 x 125 x 100*	6.250 x 5.250 x 4.252 *159,0 x 133,0 x 108,0*	13.88 *352,5*	9.63 *244,6*
159,0mm x 5 x 3 *150 x 125 x 80*	6.250 x 5.563 x 3.500 *159,0 x 141,3 x 88,9*	13.00 *330,2*	9.25 *235,0*
159,0mm x 5 x 4 *150 x 125 x 100*	6.250 x 5.563 x 4.500 *159,0 x 141,3 x 114,3*	13.88 *352,6*	9.62 *244,3*
159,0mm x 5 x 108,0mm *150 x 125 x 100*	6.250 x 5.563 x 4.252 *159,0 x 141,3 x 108,0*	13.88 *352,6*	9.62 *244,3*
165,1mm x 4 x 165,1mm *150 x 100 x 150*	6.250 x 4.500 x 6.250 *159,0 x 114,3 x 159,0*	18.25 *463,6*	13.75 *349,3*
165,1mm x 139,7mm x 3 *150 x 125 x 80*	6.250 x 5.500 x 3.500 *159,0 x 139,7 x 88,9*	13.00 *330,2*	9.25 *235,0*
165,1mm x 139,7mm x 4 *150 x 125 x 100*	6.250 x 5.500 x 4.500 *159,0 x 139,7 x 114,3*	13.88 *352,5*	9.63 *244,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

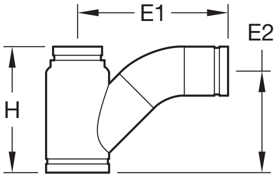


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
139,7mm x 4 x 4 *125 x 100 x 100*	5.500 x 4.500 x 4.500 *139,7 x 114,3 x 114,3*	11.00 *279,4*	23.0 *10,4*
5 x 3 x 3 *125 x 80 x 80*	5.563 x 3.500 x 3.500 *141,3 x 88,9 x 88,9*	11.00 *279,4*	19.0 *8,6*
5 x 3 x 133,0mm *125 x 80 x 125*	5.563 x 3.500 x 5.250 *141,3 x 88,9 x 133,0*	16.50 *419,1*	19.7 *8,9*
5 x 3 x 139,7mm *125 x 80 x 125*	5.563 x 3.500 x 5.500 *141,3 x 88,9 x 139,7*	16.50 *419,1*	19.9 *9,0*
5 x 3 x 5 *125 x 80 x 125*	5.563 x 3.500 x 5.563 *141,3 x 88,9 x 141,3*	16.50 *419,1*	38.5 *17,5*
5 x 4 x 3 *125 x 100 x 80*	5.563 x 4.500 x 3.500 *141,3 x 114,3 x 88,9*	11.00 *279,4*	19.5 *8,8*
5 x 4 x 4 *125 x 100 x 100*	5.563 x 4.500 x 4.500 *141,3 x 114,3 x 114,3*	11.00 *279,4*	23.1 *10,5*
159,0mm x 4 x 159,0mm *150 x 100 x 150*	6.250 x 4.500 x 6.250 *159,0 x 114,3 x 159,0*	18.50 *469,9*	54.1 *24,5*
159,0mm x 108,0mm x 159,0mm *150 x 100 x 150*	6.250 x 4.252 x 6.250 *159,0 x 108,0 x 159,0*	18.50 *469,9*	56.2 *25,5*
159,0mm x 133,0mm x 108,0mm *150 x 125 x 100*	6.250 x 5.250 x 4.252 *159,0 x 133,0 x 108,0*	12.00 *304,9*	55.1 *25,0*
159,0mm x 5 x 3 *150 x 125 x 80*	6.250 x 5.563 x 3.500 *159,0 x 141,3 x 88,9*	12.00 *304,9*	45.6 *20,7*
159,0mm x 5 x 4 *150 x 125 x 100*	6.250 x 5.563 x 4.500 *159,0 x 141,3 x 114,3*	12.00 *304,9*	55.0 *24,9*
159,0mm x 5 x 108,0mm *150 x 125 x 100*	6.250 x 5.563 x 4.252 *159,0 x 141,3 x 108,0*	12.00 *304,9*	54.0 *24,5*
165,1mm x 4 x 165,1mm *150 x 100 x 150*	6.250 x 4.500 x 6.250 *159,0 x 114,3 x 159,0*	18.50 *469,9*	56.2 *25,5*
165,1mm x 139,7mm x 3 *150 x 125 x 80*	6.250 x 5.500 x 3.500 *159,0 x 139,7 x 88,9*	12.00 *304,9*	45.6 *20,7*
165,1mm x 139,7mm x 4 *150 x 125 x 100*	6.250 x 5.500 x 4.500 *159,0 x 139,7 x 114,3*	12.00 *304,9*	54.0 *24,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

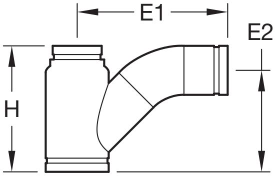


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal E1 Inches *mm*	Nominal E2 Inches *mm*
ANSI Inches *DN*	**O.D. Inches** *mm*		
165,1mm x 5 x 3 *150 x 125 x 80*	6.500 x 5.563 x 3.500 *165,1 x 141,3 x 88,9*	13.00 *330,2*	9.25 *235,0*
165,1mm x 5 x 4 *150 x 125 x 100*	6.500 x 5.563 x 4.500 *165,1 x 141,3 x 114,3*	13.88 *352,5*	9.62 *244,3*
6 x 4 x 165,1mm *150 x 100 x 150*	6.500 x 4.500 x 6.500 *168,3 x 114,3 x 165,1*	18.25 *463,6*	13.75 *349,3*
6 x 4 x 6 *150 x 100 x 150*	6.625 x 4.500 x 6.625 *168,3 x 114,3 x 168,3*	18.25 *463,6*	13.75 *349,3*
6 x 139,7mm x 3 *150 x 125 x 80*	6.625 x 5.500 x 3.500 *168,3 x 139,7 x 88,9*	13.00 *330,2*	9.25 *235,0*
6 x 5 x 3 *150 x 125 x 80*	6.625 x 5.563 x 3.500 *168,3 x 141,3 x 88,9*	13.00 *330,2*	9.25 *235,0*
6 x 5 x 4 *150 x 125 x 100*	6.625 x 5.563 x 4.500 *168,3 x 141,3 x 114,3*	13.88 *352,6*	9.62 *244,3*
216,3mm x 6 x 4 *200 x 150 x 100*	8.516 x 6.625 x 4.500 *216,3 x 168,3 x 114,3*	14.75 *374,7*	10.25 *260,3*
216,3mm x 6 x 216,3mm *200 x 150 x 200*	8.516 x 6.625 x 8.516 *216,3 x 168,3 x 216,3*	23.25 *590,5*	21.25 *539,7*
216,3mm x 165,1mm x 4 *200 x 150 x 100*	8.516 x 4.500 x 4.500 *216,3 x 114,3 x 114,3*	14.75 *374,7*	10.25 *260,3*
216,3mm x 165,1mm x 216,3mm *200 x 150 x 200*	8.516 x 4.500 x 8.516 *216,3 x 114,3 x 216,3*	23.25 *590,5*	21.25 *539,7*
8 x 6 x 4 *200 x 150 x 100*	8.625 x 6.625 x 4.500 *219,1 x 168,3 x 114,3*	14.75 *374,7*	10.25 *260,3*
8 x 6 x 8 *200 x 150 x 200*	8.625 x 6.625 x 8.625 *219,1 x 168,3 x 219,1*	23.25 *590,6*	21.25 539,8
8 x 165,1mm x 4 *200 x 150 x 100*	8.625 x 4.500 x 4.500 *219,1 x 114,3 x 114,3*	14.75 *374,7*	10.25 *260,3*
8 x 165,1mm x 8 *200 x 150 x 200*	8.625 x 4.500 x 8.625 *219,1 x 114,3 x 219,1*	23.25 *590,6*	21.25 539,8

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 331 Reducing Tee Wye, Fabricated

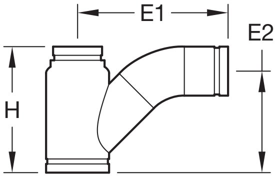


FIGURE 331
REDUCING TEE WYE
FABRICATED (SEGMENT WELDED)

Nominal Pipe Size		Nominal H Inches *mm*	Approx. Wt. Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
165,1mm x 5 x 3 *150 x 125 x 80*	6.500 x 5.563 x 3.500 *165,1 x 141,3 x 88,9*	12.00 *304,9*	45.6 *20,7*
165,1mm x 5 x 4 *150 x 125 x 100*	6.500 x 5.563 x 4.500 *165,1 x 141,3 x 114,3*	12.00 *304,9*	54.0 *24,5*
6 x 4 x 165,1mm *150 x 100 x 150*	6.500 x 4.500 x 6.500 *168,3 x 114,3 x 165,1*	18.50 *469,9*	56.2 *25,5*
6 x 4 x 6 *150 x 100 x 150*	6.625 x 4.500 x 6.625 *168,3 x 114,3 x 168,3*	18.50 *469,9*	56.2 *25,5*
6 x 139,7mm x 3 *150 x 125 x 80*	6.625 x 5.500 x 3.500 *168,3 x 139,7 x 88,9*	12.00 *304,9*	25.0 *11,3*
6 x 5 x 3 *150 x 125 x 80*	6.625 x 5.563 x 3.500 *168,3 x 141,3 x 88,9*	12.00 *304,9*	25.6 *11,6*
6 x 5 x 4 *150 x 125 x 100*	6.625 x 5.563 x 4.500 *168,3 x 141,3 x 114,3*	12.00 *304,9*	29.3 *13,3*
216,3mm x 6 x 4 *200 x 150 x 100*	8.516 x 6.625 x 4.500 *216,3 x 168,3 x 114,3*	13.00 *330,2*	42.1 *19,0*
216,3mm x 6 x 216,3mm *200 x 150 x 200*	8.516 x 6.625 x 8.516 *216,3 x 168,3 x 216,3*	24.00 *609,6*	107.0 *48,5*
216,3mm x 165,1mm x 4 *200 x 150 x 100*	8.516 x 4.500 x 4.500 *216,3 x 114,3 x 114,3*	13.00 *330,2*	44.0 *20,0*
216,3mm x 165,1mm x 216,3mm *200 x 150 x 200*	8.516 x 4.500 x 8.516 *216,3 x 114,3 x 216,3*	24.00 *609,6*	107.0 *48,5*
8 x 6 x 4 *200 x 150 x 100*	8.625 x 6.625 x 4.500 *219,1 x 168,3 x 114,3*	13.00 *330,2*	40.2 *18,2*
8 x 6 x 8 *200 x 150 x 200*	8.625 x 6.625 x 8.625 *219,1 x 168,3 x 219,1*	24.00 *609,6*	108.6 *49,3*
8 x 165,1mm x 4 *200 x 150 x 100*	8.625 x 4.500 x 4.500 *219,1 x 114,3 x 114,3*	13.00 *330,2*	44.0 *20,0*
8 x 165,1mm x 8 *200 x 150 x 200*	8.625 x 4.500 x 8.625 *219,1 x 114,3 x 219,1*	24.00 *609,6*	106.0 *48,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

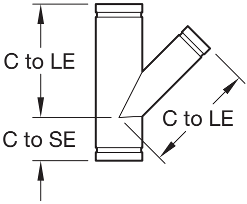


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	8.50 *215,9*	3.25 *82,6*	9.0 *4,1*
3 x 3 x 2-1/2 *80 x 80 x 65*	3.500 x 3.500 x 2.874 *88,9 x 88,9 x 73,0*	8.50 *215,9*	3.25 *82,6*	9.9 *4,5*
3 x 3 x 76,1mm *80 x 80 x 65*	3.500 x 3.500 x 3.000 *88,9 x 88,9 x 76,1*	8.50 *216,0*	3.25 *83,0*	9.0 *4,1*
108,0mm x 108,0mm x 2 *100 x 100 x 50*	4.252 x 4.252 x 2.375 *108,0 x 108,0 x 60,3*	10.50 *266,7*	3.75 *95,3*	12.3 *5,6*
108,0mm x 108,0mm x 2-1/2 *100 x 100 x 65*	4.252 x 4.252 x 2.874 *108,0 x 108,0 x 73,0*	10.50 *266,7*	3.75 *95,3*	13.6 *6,2*
108,0mm x 108,0mm x 76,1mm *100 x 100 x 65*	4.252 x 4.252 x 3.000 *108,0 x 108,0 x 76,1*	10.50 *266,7*	3.75 *95,3*	12.6 *5,7*
108,0mm x 108,0mm x 3 *100 x 100 x 80*	4.252 x 4.252 x 3.500 *108,0 x 108,0 x 88,9*	10.50 *266,7*	3.75 *95,3*	14.6 *6,6*
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	10.50 *266,7*	3.75 *95,3*	14.5 *6,6*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.874 *114,3 x 114,3 x 73,0*	10.50 *266,7*	3.75 *95,3*	15.7 *7,1*
4 x 4 x 76,1mm *100 x 100 x 65*	4.500 x 4.500 x 3.000 *114,3 x 114,3 x 76,1*	10.50 *266,7*	3.75 *95,3*	14.7 *6,7*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	10.50 *266,7*	3.75 *95,3*	16.6 *7,5*
133,0mm x 133,0mm x 2 *125 x 125 x 50*	5.250 x 5.250 x 2.375 *133,0 x 133,0 x 60,3*	12.50 *317,5*	4.00 *102,0*	13.8 *6,3*
133,0mm x 133,0mm x 2-1/2 *125 x 125 x 65*	5.250 x 5.250 x 2.874 *133,0 x 133,0 x 73,0*	12.50 *317,5*	4.00 *102,0*	15.3 *6,9*
133,0mm x 133,0mm x 76,1mm *125 x 125 x 65*	5.250 x 5.250 x 3.000 *133,0 x 133,0 x 76,1*	12.50 *317,5*	4.00 *102,0*	14.2 *6,4*
133,0mm x 133,0mm x 3 *125 x 125 x 80*	5.250 x 5.250 x 3.500 *133,0 x 133,0 x 88,9*	12.50 *317,5*	4.00 *102,0*	16.6 *7,5*
133,0mm x 133,0mm x 4 *125 x 125 x 100*	5.250 x 5.250 x 4.500 *133,0 x 133,0 x 114,3*	12.50 *317,5*	4.00 *102,0*	18.9 *8,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

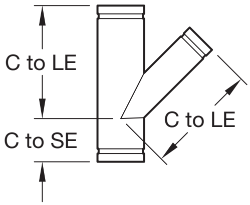


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
139,7mm x 139,7mm x 2 *125 x 125 x 50*	5.500 x 5.500 x 2.375 *139,7 x 139,7 x 60,3*	12.50 *317,5*	4.00 *102,0*	17.2 *7,8*
139,7mm x 139,7mm x 2-1/2 *125 x 125 x 65*	5.250 x 5.250 x 2.874 *139,7 x 139,7 x 73,0*	12.50 *317,5*	4.00 *102,0*	18.7 *8,5*
133,0mm x 1333,0mm x 76,1mm *125 x 125 x 65*	5.250 x 5.250 x 2.874 *139,7 x 139,7 x 76,1*	12.50 *317,5*	4.00 *102,0*	17.5 *7,9*
139,7mm x 139,7mm x 3 *125 x 125 x 80*	5.500 x 5.500 x 3.500 *139,7 x 139,7 x 88,9*	12.50 *317,5*	4.00 *102,0*	19.8 *8,9*
139,7mm x 139,7mm x 4 *125 x 125 x 100*	5.500 x 5.500 x 4.500 *139,7 x 139,7 x 114,3*	12.50 *317,5*	4.00 *102,0*	21.2 *9,6*
5 x 5 x 2 *125 x 125 x 50*	5.563 x 5.563 x 2.375 *141,3 x 141,3 x 60,3*	12.50 *317,5*	4.00 *101,6*	21.7 *9,8*
5 x 5 x 2-1/2 *125 x 125 x 65*	5.563 x 5.563 x 2.874 *141,3 x 141,3 x 73,0*	12.50 *317,5*	4.00 *101,6*	23.2 *10,5*
5 x 5 x 76,1mm *125 x 125 x 65*	5.563 x 5.563 x 3.000 *141,3 x 141,3 x 76,1*	12.50 *317,5*	4.00 *101,6*	22.0 *9,9*
5 x 5 x 3 *125 x 125 x 80*	5.563 x 5.563 x 3.500 *141,3 x 141,3 x 88,9*	12.50 *317,5*	4.00 *101,6*	24.2 *11,0*
5 x 5 x 4 *125 x 125 x 100*	5.563 x 5.563 x 4.500 *141,3 x 141,3 x 114,3*	12.50 *317,5*	4.00 *101,6*	26.2 *11,8*
159,0mm x 159,0mm x 2 *150 x 150 x 50*	6.250 x 6.250 x 2.375 *159,0 x 159,0 x 60,3*	14.00 *355,6*	4.50 *114,0*	19.8 *8,9*
159,0mm x 159,0mm x 76,1mm *150 x 150 x 65*	6.250 x 6.250 x 3.000 *159,0 x 159,0 x 76,1*	14.00 *355,6*	4.50 *114,0*	20.2 *9,1*
159,0mm x 159,0mm x 3 *150 x 150 x 80*	6.250 x 6.250 x 3.500 *159,0 x 159,0 x 88,9*	14.00 *355,6*	4.50 *114,0*	22.8 *110,3*
159,0mm x 159,0mm x 4 *150 x 150 x 100*	6.250 x 6.250 x 4.500 *159,0 x 159,0 x 114,3*	14.00 *355,6*	4.50 *114,0*	25.2 *11,4*
159,0mm x 159,0mm x 133mm *150 x 150 x 125*	6.250 x 6.250 x 5.250 *159,0 x 159,0 x 133,0*	14.00 *355,6*	4.50 *114,0*	23.0 *10,4*
159,0mm x 159,0mm x 139,7mm *150 x 150 x 125*	6.250 x 6.250 x 5.500 *159,0 x 159,0 x 139,7*	14.00 *355,6*	4.50 *114,0*	25.2 *11,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

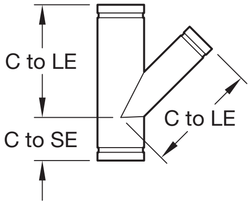


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
165,1mm x 165,1mm x 2 *150 x 150 x 50*	6.500 x 6.500 x 2.375 (165,1 x 165,1 x 60,3)	14.00 *355,6*	4.50 *114,0*	22.4 *10,2*
165,1mm x 165,1mm x 76,1mm *150 x 150 x 65*	6.500 x 6.500 x 3.000 *165,1 x 165,1 x 76,1*	14.00 *355,6*	4.50 *114,0*	22.8 *10,3*
165,1mm x 165,1mm x 3 *150 x 150 x 80*	6.500 x 6.500 x 3.500 *165,1 x 165,1 x 88,9*	14.00 *355,6*	4.50 *114,0*	25.3 *11,5*
165,1mm x 165,1mm x 4 *150 x 150 x 100*	6.500 x 6.500 x 4.500 *165,1 x 165,1 x 114,3*	14.00 *355,6*	4.50 *114,0*	27.6 *12,5*
165,1mm x 165,1mm x 133,0mm *150 x 150 x 125*	6.500 x 6.500 x 5.250 *165,1 x 165,1 x 133,0*	14.00 *355,6*	4.50 *114,0*	25.3 *11,5*
165,1mm x 165,1mm x 139,7mm *150 x 150 x 125*	6.500 x 6.500 x 5.500 *165,1 x 165,1 x 139,7*	14.00 *355,6*	4.50 *114,0*	27.5 *12,5*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 60,3*	14.00 *355,6*	4.50 *114,3*	31.0 *14,1*
6 x 6 x 2-1/2 *150 x 150 x 65*	6.625 x 6.625 x 2.874 *168,3 x 168,3 x 73,0*	14.00 *355,6*	4.50 *114,3*	32.5 *14,7*
6 x 6 x 76,1mm *150 x 150 x 65*	6.625 x 6.625 x 3.000 *168,3 x 168,3 x 76,1*	14.00 *355,6*	4.50 *114,3*	31.2 *14,2*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	14.00 *355,6*	4.50 *114,3*	33.6 *15,2*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	14.00 *355,6*	4.50 *114,3*	35.7 *16,2*
6 x 6 x 139,7mm *150 x 150 x 125*	6.625 x 6.625 x 5.500 *168,3 x 168,3 x 139,7*	14.00 *355,6*	4.50 *114,0*	35.2 *15,9*
6 x 6 x 5 *150 x 150 x 125*	6.625 x 6.625 x 5.563 *168,3 x 168,3 x 141,3*	14.00 *355,6*	4.50 *114,3*	38.2 *17,3*
216,3mm x 216,3mm x 4 *200 x 200 x 100*	8.516 x 8.516 x 4.500 *216,3 x 216,3 x 114,3*	18.00 *457,2*	6.00 *152,4*	49.2 *22,3*
216,3mm x 216,3mm x 139,7mm *200 x 200 x 125*	8.516 x 8.516 x 5.500 *216,3 x 216,3 x 139,7*	18.00 *457,2*	6.00 *152,4*	49.0 *22,2*
216,3mm x 216,3mm x 5 *200 x 200 x 125*	8.516 x 8.516 x 5.563 *216,3 x 216,3 x 141,3*	18.00 *457,2*	6.00 *152,4*	52.7 *23,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

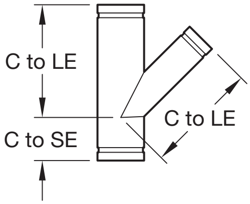


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
216,3mm x 216,3mm x 165,1mm *200 x 200 x 150*	8.516 x 8.516 x 6.500 *216,3 x 216,3 x 165,1*	18.00 *457,2*	6.00 *152,4*	50.6 *22,9*
216,3mm x 216,3mm x 6 *200 x 200 x 150*	8.516 x 8.516 x 6.625 *216,3 x 216,3 x 168,3*	18.00 *457,2*	6.00 *152,4*	56.8 *25,7*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	18.00 *457,2*	6.00 *152,4*	65.1 *29,5*
8 x 8 x 139,7mm *200 x 200 x 125*	8.625 x 8.625 x 5.500 *219,1 x 219,1 x 139,7*	18.00 *457,2*	6.00 *152,4*	64.6 *29,3*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 141,3*	18.00 *457,2*	6.00 *152,4*	68.3 *30,9*
8 x 8 x 165,1mm *200 x 200 x 150*	8.625 x 8.625 x 6.500 *219,1 x 219,1 x 165,1*	18.00 *457,2*	6.00 *152,4*	65.8 *29,8*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	18.00 *457,2*	6.00 *152,4*	72.0 *32,6*
267,4mm x 267,4mm x 4 *250 x 250 x 100*	10.528 x 10.528 x 4.500 *267,4 x 267,4 x 114,3*	20.50 *520,7*	6.50 *165,1*	73.3 *33,2*
267,4mm x 267,4mm x 139,7mm *250 x 250 x 125*	10.528 x 10.528 x 5.500 *267,4 x 267,4 x 139,7*	20.50 *520,7*	6.50 *165,1*	73.0 *33,1*
267,4mm x 267,4mm x 5 *250 x 250 x 125*	10.528 x 10.528 x 5.563 *267,4 x 267,4 x 141,3*	20.50 *520,7*	6.50 *165,1*	77.0 *34,9*
267,4mm x 267,4mm x 165,1mm *250 x 250 x 150*	10.528 x 10.528 x 6.500 *267,4 x 267,4 x 165,1*	20.50 *520,7*	6.50 *165,1*	74.6 *33,8*
267,4mm x 267,4mm x 6 *250 x 250 x 150*	10.528 x 10.528 x 6.625 *267,4 x 267,4 x 168,3*	20.50 *520,7*	6.50 *165,1*	81.2 *36,8*
267,4mm x 267,4mm x 216,3mm *250 x 250 x 200*	10.528 x 10.528 x 8.516 *267,4 x 267,4 x 216,3*	20.50 *520,7*	6.50 *165,1*	80.8 *36,6*
267,4mm x 267,4mm x 8 *250 x 250 x 200*	10.528 x 10.528 x 8.625 *267,4 x 267,4 x 219,1*	20.50 *520,7*	6.50 *165,1*	91.0 *41,3*
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	20.50 *520,7*	6.50 *165,1*	99.2 *45,0*
10 x 10 x 139,7mm *250 x 250 x 125*	10.750 x 10.750 x 5.500 *273,0 x 273,0 x 139,7*	20.50 *520,7*	6.50 *165,1*	98.5 *44,7*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

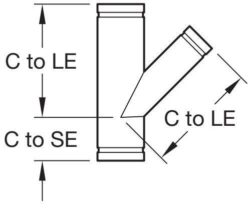


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
10 x 10 x 5 *250 x 250 x 125*	10.750 x 10.750 x 5.563 *273,0 x 273,0 x 141,3*	20.50 *520,7*	6.50 *165,1*	102.4 *46,4*
10 x 10 x 165,1mm *250 x 250 x 150*	10.750 x 10.750 x 6.500 *273,0 x 273,0 x 165,1*	20.50 *520,7*	6.50 *165,1*	99.7 *45,2*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	20.50 *520,7*	6.50 *165,1*	106.2 *48,2*
10 x 10 x 216,3mm *250 x 250 x 200*	10.750 x 10.750 x 8.516 *273,0 x 273,0 x 216,3*	20.50 *520,7*	6.50 *165,1*	104.7 *47,5*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	20.50 *520,7*	6.50 *165,1*	114.7 *52,0*
318,5mm x 318,5mm x 4 *300 x 300 x 100*	12.539 x 12.539 x 4.500 *318,5 x 318,5 x 114,3*	23.00 *584,2*	7.00 *177,8*	98.7 *44,8*
318,5mm x 318,5mm x 165,1mm *300 x 300 x 150*	12.539 x 12.539 x 6.500 *318,5 x 318,5 x 165,1*	23.00 *584,2*	7.00 *177,8*	100.1 *45,4*
318,5mm x 318,5mm x 6 *300 x 300 x 150*	12.539 x 12.539 x 6.625 *318,5 x 318,5 x 168,3*	23.00 *584,2*	7.00 *177,8*	107.3 *48,7*
318,5mm x 318,5mm x 216,3mm *300 x 300 x 200*	12.539 x 12.539 x 8.516 *318,5 x 318,5 x 216,3*	23.00 *584,2*	7.00 *177,8*	106.6 *48,4*
318,5mm x 318,5mm x 8 *300 x 300 x 200*	12.539 x 12.539 x 8.625 *318,5 x 318,5 x 219,1*	23.00 *584,2*	7.00 *177,8*	117.3 *53,2*
318,5mm x 318,5mm x 267,4mm *300 x 300 x 250*	12.539 x 12.539 x 10.528 *318,5 x 318,5 x 267,4*	23.00 *584,2*	7.00 *177,8*	115.0 *52,2*
318,5mm x 318,5mm x 10 *300 x 300 x 250*	12.539 x 12.539 x 10.750 *318,5 x 318,5 x 273,0*	23.00 *584,2*	7.00 *177,8*	131.0 *59,4*
12 x 12 x 4 *300 x 300 x 100*	12.750 x 12.750 x 4.500 *323,9 x 323,9 x 114,3*	23.00 *584,2*	7.00 *177,8*	132.4 *60,1*
12 x 12 x 165,1mm *300 x 300 x 150*	12.750 x 12.750 x 6.500 *323,9 x 323,9 x 165,1*	23.00 *584,2*	7.00 *177,8*	133.0 *60,3*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 *323,9 x 323,9 x 168,3*	23.00 *584,2*	7.00 *177,8*	140.0 *63,5*
12 x 12 x 216,3mm *300 x 300 x 200*	12.750 x 12.750 x 8.516 *323,9 x 323,9 x 216,3*	23.00 *584,2*	7.00 *177,8*	138.0 *62,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

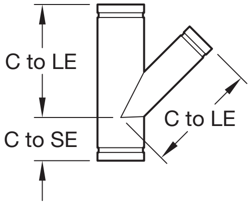


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*	C to LE Inches *mm*	C to SE Inches *mm*	
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	23.00 *584,2*	7.00 *177,8*	150.0 *68,0*
12 x 12 x 267,4mm *300 x 300 x 250*	12.750 x 12.750 x 10.528 *323,9 x 323,9 x 267,4*	23.00 *584,2*	7.00 *177,8*	145.3 *65,9*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	23.00 *584,2*	7.00 *177,8*	161.0 *73,0*
14 x 14 x 4 *350 x 350 x 100*	14.000 x 14.000 x 4.500 *355,6 x 355,6 x 114,3*	26.50 *673,1*	7.50 *190,5*	165.0 *74,8*
14 x 14 x 6 *350 x 350 x 150*	14.000 x 14.000 x 6.625 *355,6 x 355,6 x 168,3*	26.50 *673,1*	7.50 *190,5*	174.5 *79,2*
14 x 14 x 8 *350 x 350 x 200*	14.000 x 14.000 x 8.625 *355,6 x 355,6 x 219,1*	26.50 *673,1*	7.50 *190,5*	185.6 84,2
14 x 14 x 267,4mm *350 x 350 x 250*	14.000 x 14.000 x 10.528 *355,6 x 355,6 x 267,4*	26.50 *673,1*	7.50 *190,5*	182.0 *82,5*
14 x 14 x 10 *350 x 350 x 250*	14.000 x 14.000 x 10.750 *355,6 x 355,6 x 273,0*	26.50 *673,1*	7.50 *190,5*	200.0 *90,7*
14 x 14 x 318,5mm *350 x 350 x 300*	14.000 x 14.000 x 12.539 *355,6 x 355,6 x 318,5*	26.50 *673,1*	7.50 *190,5*	188.0 *85,3*
14 x 14 x 12 *350 x 350 x 300*	14.000 x 14.000 x 12.750 *355,6 x 355,6 x 323,9*	26.50 *673,1*	7.50 *190,5*	210.0 *95,3*
16 x 16 x 6 *400 x 400 x 150*	16.000 x 16.000 x 6.625 *406,4 x 406,4 x 168,3*	29.00 *736,6*	8.00 *203,0*	214.1 *97,1*
16 x 16 x 8 *400 x 400 x 200*	16.000 x 16.000 x 8.625 *406,4 x 406,4 x 219,1*	29.00 *736,6*	8.00 *203,0*	225.9 *102,5*
16 x 16 x 10 *400 x 400 x 250*	16.000 x 16.000 x 10.750 *406,4 x 406,4 x 273,0*	29.00 *736,6*	8.00 *203,0*	241.0 *109,3*
16 x 16 x 12 *400 x 400 x 300*	16.000 x 16.000 x 12.750 *406,4 x 406,4 x 323,9*	29.00 *736,6*	8.00 *203,0*	251.8 *114,2*
16 x 16 x 14 *400 x 400 x 350*	16.000 x 16.000 x 14.000 *406,4 x 406,4 x 355,6*	29.00 *736,6*	8.00 *203,0*	257.5 *116,8*
18 x 18 x 6 *450 x 450 x 150*	18.000 x 18.000 x 6.625 *457,2 x 457,2 x 168,3*	32.00 *812,8*	8.50 *215,9*	261.4 *118,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 325 Reducing Lateral, 45°

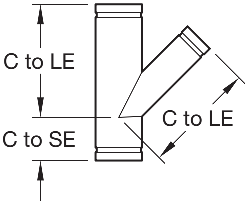


FIGURE 325
45° REDUCING LATERAL FABRICATED

Nominal Pipe Size		Nominal Dimensions		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**Pipe O.D. Inches *mm***	**C to LE Inches *mm***	**C to SE Inches *mm***	
18 x 18 x 8 *450 x 450 x 200*	18.000 x 18.000 x 8.625 *457,2 x 457,2 x 219,1*	32.00 *812,8*	8.50 *215,9*	274.4 *124,5*
18 x 18 x 10 *450 x 450 x 250*	18.000 x 18.000 x 10.750 *457,2 x 457,2 x 273,0*	32.00 *812,8*	8.50 *215,9*	290.8 *131,9*
18 x 18 x 12 *450 x 450 x 300*	18.000 x 18.000 x 12.750 *457,2 x 457,2 x 323,9*	32.00 *812,8*	8.50 *215,9*	302.5 *137,2*
18 x 18 x 14 *450 x 450 x 350*	18.000 x 18.000 x 14.000 *457,2 x 457,2 x 355,6*	32.00 *812,8*	8.50 *215,9*	308.6 *140,0*
18 x 18 x 16 *450 x 450 x 400*	18.000 x 18.000 x 16.000 *457,2 x 457,2 x 406,4*	32.00 *812,8*	8.50 *215,9*	318.5 *114,4*
20 x 20 x 12 *500 x 500 x 300*	20.000 x 20.000 x 12.750 *508,0 x 508,0 x 323,9*	35.00 *889,0*	9.00 *228,6*	358.0 *162,3*
20 x 20 x 14 *500 x 500 x 350*	20.000 x 20.000 x 14.000 *508,0 x 508,0 x 355,6*	35.00 *889,0*	9.00 *228,6*	364.6 *165,4*
20 x 20 x 16 *500 x 500 x 400*	20.000 x 20.000 x 16.000 *508,0 x 508,0 x 406,4*	35.00 *889,0*	9.00 *228,6*	375.1 *170,1*
24 x 24 x 16 *600 x 600 x 400*	24.000 x 24.000 x 16.000 *609,6 x 609,6 x 406,4*	40.00 *1016,0*	10.00 *254,0*	489.0 *221,8*
24 x 24 x 20 *600 x 600 x 500*	24.000 x 24.000 x 20.000 *609,6 x 609,6 x 508,0*	40.00 *1016,0*	10.00 *254,0*	511.5 *232,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 227 Cast Cross

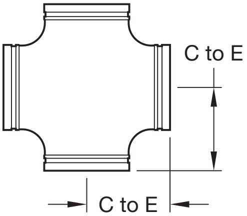


FIGURE 227
CAST CROSS GR x GR x MALE THREAD
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches** *mm*		
1 *25*	1.315 *33,4*	2.25 *57,2*	1.9 *0,9*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	2.2 *1,0*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	2.5 *1,1*
2 *50*	2.375 *60,3*	3.25 *82,6*	3.7 *1,7*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	5.8 *2,6*
76,1mm *65*	3.000 *76,1*	3.75 *95,3*	6.0 *2,7*
3 *80*	3.500 *88,9*	4.25 108,0	8.6 *3,9*
4 *100*	4.500 *114,3*	5.00 *127,0*	20.7 *9,4*
5 *125*	5.563 *141,3*	5.50 *139,7*	18.5 *8,4*
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	18.5 *8,4*
6 *150*	6.625 *168,3*	6.50 165,1	27.3 *12,4*
8 *200*	8.625 *219,1*	7.75 *196,9*	48.0 *21,7*
10 *250*	10.750 *273,0*	9.00 *228,6*	75.0 *34,0*
12 *300*	12.750 323,9	10.00 254,0	95.8 43,4

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 327 Fabricated Cross

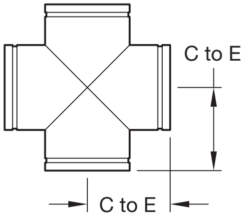


FIGURE 327
FABRICATED CROSS
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
1 *25*	1.315 *33,4*	2.25 *57,2*	1.9 *0,9*
1-1/4 *32*	1.660 *42,4*	2.75 *69,9*	2.2 *1,0*
1-1/2 *40*	1.900 *48,3*	2.75 *69,9*	2.5 *1,1*
2 *50*	2.375 *60,3*	3.25 *82,6*	3.7 *1,7*
2-1/2 *65*	2.874 *73,0*	3.75 *95,3*	5.8 *2,6*
76,1mm *65*	3.000 *76,1*	3.75 *95,3*	6.0 *2,7*
3 *80*	3.500 *88,9*	4.25 *108,0*	8.6 *3,9*
108,0mm *100*	4.252 *108,0*	5.00 *127,0*	
4 *100*	4.500 *114,3*	5.00 *127,0*	20.7 *9,4*
133,0mm *125*	5.250 *133,0*	5.50 *139,7*	18.2 *8,3*
139,7mm *125*	5.500 *139,7*	5.50 *139,7*	18.4 *8,3*
5 *125*	5.563 *141,3*	5.50 *139,7*	18.5 *8,4*
159,0mm *150*	6.250 *159,0*	6.50 *165,1*	
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	18.5 *8,4*
6 *150*	6.625 *168,3*	6.50 *165,1*	27.3 *12,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 327 Fabricated Cross

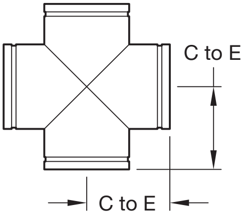
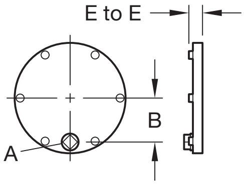


FIGURE 327
FABRICATED CROSS
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
216,3mm *200*	8.516 *216,3*	7.75 *196,9*	47.6 *21,6*
8 *200*	8.625 *219,1*	7.75 *196,9*	48.0 *21,7*
267,4mm *250*	10.528 *267,4*	9.00 *228,6*	74.1 *33,6*
10 *250*	10.750 *273,0*	9.00 *228,6*	75.0 *34,0*
318,5mm *300*	12.539 *318,5*	10.00 *254,0*	94.8 *43,0*
12 *300*	12.750 *323,9*	10.00 *254,0*	95.8 *43,4*
14 *350*	14.000 *355,6*	11.00 *279,4*	136.8 *62,0*
16 *400*	16.000 *406,4*	12.00 *304,8*	167.3 *75,9*
18 *450*	18.000 *457,2*	15.50 *393,7*	259.5 *117,7*
20 *500*	20.000 *508,0*	17.25 *438,2*	321.7 *145,9*
24 *600*	24.000 *609,6*	20.00 *508,0*	442.7 *200,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

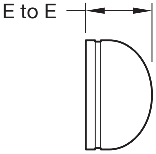
Figure 260 Cast End Cap



Nominal Pipe Size		Nominal E to E Inches *mm*	A Available NPT Sizes	Dim B Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	O.D. Inches *mm*				
1 *25*	1.315 *33,4*	0.83 *21,1*	—	—	0.2 *0,1*
1-1/4 *32*	1.660 *42,4*	0.83 *21,1*	1/2"	On C to E	0.3 *0,1*
1-1/2 *40*	1.900 *48,3*	0.83 *21,1*	1/2"	On C to E	0.4 *0,2*
2 *50*	2.375 *60,3*	0.92 *23,4*	1/2", 3/4"	0.50 *12,7*	0.7 *0,3*
2-1/2 *65*	2.874 *73,0*	0.92 *23,4*	1/2", 3/4"	0.69 *17,5*	1.0 *0,5*
76,1mm *65*	3.000 *76,1*	0.86 *21,8*	1/2", 3/4"	0.69 *17,5*	1.3 *0,6*
3 *80*	3.500 *88,9*	0.92 *23,4*	1/2", 3/4", 1"	0.94 *23,9*	1.4 *0,6*
4 *100*	4.500 *114,3*	1.00 *25,4*	1/2", 3/4", 1"	1.44 *36,6*	2.6 *1,2*
139,7mm *125*	5.500 *139,7*	0.92 *23,4*	1/2", 3/4", 1"	1.44 *36,6*	4.7 *2,1*
5 *125*	5.563 *141,3*	1.00 *25,4*	1/2", 3/4", 1"	1.94 *49,3*	5.0 *2,3*
165,1mm *150*	6.500 *165,1*	0.92 *23,4*	1/2", 3/4", 1"	1.94 *49,3*	6.4 *2,9*
6 *150*	6.625 *168,3*	1.00 *25,4*	1/2", 3/4", 1"	2.50 *63,5*	6.2 *2,8*
8 *200*	8.625 *219,1*	1.06 *27,0*	1/2", 3/4", 1"	3.44 *87,4*	7.1 *3,2*
10 *250*	10.750 *273,0*	1.02 *25,8*	1/2", 3/4", 1"	4.50 *114,3*	24.5 *11,1*
12 *300*	12.750 *323,9*	1.02 *25,8*	1/2", 3/4", 1"	5.44 *138,2*	31.0 *14,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

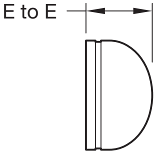
Figure 360 Fabricated End Cap



Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
1 *25*	1.315 *33,4*	0.83 *21,1*	—
1-1/4 *32*	1.660 *42,4*	1.57 *40,0*	0.3 *0,1*
1-1/2 *40*	1.900 *48,3*	1.57 *40,0*	0.3 *0,1*
2 *50*	2.375 *60,3*	1.57 *40,0*	0.5 *0,2*
2-1/2 *65*	2.874 *73,0*	1.57 *40,0*	0.8 *0,4*
76,1mm *65*	3.000 *76,1*	1.57 *40,0*	0.6 *0,3*
3 *80*	3.500 *88,9*	1.97 *50,0*	1.3 *0,6*
4 *100*	4.500 *114,3*	2.56 *65,0*	2.3 *1,0*
108,0mm *100*	4.252 *108,0*	2.56 *65,0*	1.2 *0,5*
5 *125*	5.563 *141,3*	3.15 *80,0*	3.7 *1,7*
133,0mm *125*	5.250 *133,0*	3.15 *80,0*	2.2 *0,9*
139,7mm *125*	5.500 *139,7*	3.15 *80,0*	2.9 *1,3*
6 *150*	6.625 *168,3*	3.50 *89,0*	5.4 *2,4*
159,0mm *150*	6.250 *159,0*	3.50 *89,0*	3.2 *1,5*
165,1mm *150*	6.500 *165,1*	3.50 *89,0*	3.8 *1,7*
8 *200*	8.625 *219,1*	3.94 *100,0*	9.3 *4,2*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 360 Fabricated End Cap



Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
216,3mm *200*	8.516 *216,3*	3.94 *100,0*	6.6 *3,0*
10 *250*	10.750 *273,0*	4.92 *125,0*	16.2 *7,3*
267,4mm *250*	10.528 *267,4*	4.92 *125,0*	14.9 *6,8*
12 *300*	12.750 *323,9*	5.90 *150,0*	–
318,5mm *300*	12.539 *318,5*	5.90 *150,0*	–
14 *350*	14.000 *355,6*	8.50 *215,9*	36.5 *16,6*
16 *400*	16.000 *406,4*	9.00 *228,6*	43.5 *19,7*
18 *450*	18.000 *457,2*	10.00 *254,0*	57.0 *25,6*
20 *500*	20.000 *508,0*	11,00 *279,4*	75.7 *34,3*
24 *600*	24.000 *609,6*	12.50 *317,5*	101.0 *45,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 341 and Figure 342 Flange Adapters

FIGURE 341
FABRICATED
FLANGE ADAPTER
ANSI CLASS 150 LBS.

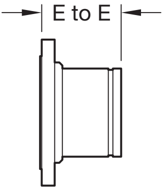


FIGURE 342
FABRICATED
FLANGE ADAPTER
ANSI CLASS 300 LBS.

Nominal Pipe Size		Figure 341		Nominal E to E Inches *mm*	Figure 342	
ANSI Inches *DN*	**O.D. Inches *mm***	**Mating Flange Bolt Qty.**	**Approx. Weight Lbs. *kg***		**Mating Flange Bolt Qty.**	**Approx. Weigh Lbs. *kg***
1 *25*	1.315 *33,4*	4	3.5 *1,6*	3.00 *76,2*	—	—
1-1/4 *32*	1.660 *42,4*	4	3.7 *1,7*	4.00 *101,6*	4	4.6 *2,1*
1-1/2 *40*	1.900 *48,3*	4	3.9 *1,8*	4.00 *101,6*	4	7.1 *3,2*
2 *50*	2.375 *60,3*	4	6.4 *2,8*	4.00 *101,6*	8	8.2 *3,7*
2-1/2 *65*	2.874 *73,0*	4	8.8 *4,0*	4.00 *101,6*	8	11.9 *5,4*
76,1mm *65*	3.000 *76,1*	4	10.0 *4,5*	4.00 *101,6*	8	12.5 *5,7*
3 *80*	3.500 *88,9*	4	10.4 *4,7*	4.00 *101,6*	8	15.5 *7,0*
108,0mm *100*	4.252 *108,0*	8	18.0 *8,2*	6.00 *152,4*	8	27.2 *12,3*
4 *100*	4.500 *114,3*	8	18.2 *8,3*	6.00 *152,4*	8	28.0 *12,7*
133,0mm *125*	5.250 *133,0*	8	21.5 *9,8*	6.00 *152,4*	8	35.0 *15,9*
139,7mm *125*	5.500 *139,7*	8	21.8 9,9	6.00 *152,4*	8	36.0 *16,3*
5 *125*	5.563 *141,3*	8	22.0 *10,0*	6.00 *152,4*	8	37.0 *16,8*
159,0mm *150*	6.250 *159,0*	8	27.5 *12,5*	6.00 *152,4*	12	46.0 *20,9*
165,1mm *150*	6.500 *165,1*	8	27.8 *12,6*	6.00 *152,4*	12	47.0 *21,3*
6 *150*	6.625 *168,3*	8	28.1 *12,7*	6.00 *152,4*	12	48.0 *21,8*
216,3mm *200*	8.516 *216,3*	8	43.2 *19,6*	6.00 *152,4*	12	77.0 *34,9*
8 *200*	8.625 *219,1*	8	43.7 *19,8*	6.00 *152,4*	12	79.0 *35,8*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 341 and Figure 342 Flange Adapters

FIGURE 341
FABRICATED
FLANGE ADAPTER
ANSI CLASS 150 LBS.

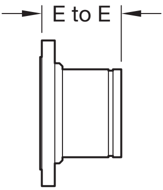


FIGURE 342
FABRICATED
FLANGE ADAPTER
ANSI CLASS 300 LBS.

Nominal Pipe Size		Figure 341		Nominal E to E Inches *mm*	Figure 342	
ANSI Inches *DN*	**O.D. Inches *mm***	**Mating Flange Bolt Qty.**	**Approx. Weight Lbs. *kg***		**Mating Flange Bolt Qty.**	**Approx. Weigh Lbs. *kg***
267,4mm *250*	10.528 *267,4*	12	68.2 *30,9*	8.00 *203,2*	16	86.0 *39.0*
10 *250*	10.750 *273,0*	12	68.2 *30,9*	8.00 *203,2*	16	122.0 *55,3*
318,5mm *300*	12.539 *318,5*	12	88.0 *39,9*	8.00 *203,2*	16	175.0 *79,4*
12 *300*	12.750 *323,9*	12	96.1 *43,6*	8.00 *203,2*	16	183.0 *83,0*
14 *350*	14.000 *355,6*	12	123.0 *55,8*	8.00 *203,2*	20	199.0 *90,3*
16 *400*	16.000 *406,4*	16	151.0 *68,5*	8.00 *203,2*	20	255.0 *155,7*
18 *450*	18.000 *457,2*	16	165.0 *74,8*	8.00 *203,2*	24	303.0 *137,4*
20 *500*	20.000 *508,0*	20	205.0 *93,0*	8.00 *203,2*	24	365.0 *165,6*
24 *600*	24.000 *609,6*	20	265.0 *120,2*	8.00 *203,2*	24	550.0 *249,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 343 and Figure 344 Flange Adapters

FIGURE 343
PN16
FABRICATED
FLANGE ADAPTER

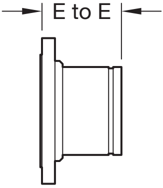


FIGURE 344
PN10 BS 4504
FABRICATED
FLANGE ADAPTER

Nominal Pipe Size		Figure 343		Nominal E to E Inches *mm*	Figure 344	
ANSI Inches *DN*	O.D. Inches *mm*	Mating Flange Bolt Qty.	Approx. Weight Lbs. *kg*		Mating Flange Bolt Qty.	Approx. Weight Lbs. *kg*
2 *50*	2.37 *60,3*	4	6.4 *2,9*	3.74 *95,0*	—	—
2-1/2 *65*	2.874 *73,0*	4	8.8 *4,0*	3.74 *95,0*	—	—
76mm *65*	3.000 *76,1*	4	10.0 *4,5*	3.74 *95,0*	—	—
3 *80*	3.500 *88,9*	8	10.4 *4,7*	3.94 *100,0*	—	—
108,0mm *100*	4.252 *108,0*	8	18.0 *8,2*	4.02 *102,0*	—	—
4 *100*	4.500 *114,3*	8	18.2 *8,3*	4.02 *102,0*	—	—
133,0mm *125*	5.250 *133,0*	8	21.5 *9,8*	4.13 *105,0*	—	—
139,7mm *125*	5.500 *139,7*	8	21.8 *9,9*	4.13 *105,0*	—	—
5 *125*	5.563 *141,3*	8	22.0 *10,0*	4.13 *105,0*	—	—
159,0mm *150*	6.250 *159,0*	8	27.5 *12,5*	4.13 *105,0*	—	—
165,1mm *150*	6.500 *165,1*	8	27.8 *12,6*	4.13 *105,0*	—	—
6 *150*	6.625 *168,3*	8	28.1 *12,7*	4.13 *105,0*	—	—
216mm *200*	8.516 *216,3*	12	43.2 *19,6*	4.40 *112,0*	8	42.6 *19,3*
8 *200*	8.625 *219,1*	12	43.7 *19,8*	4.40 *112,0*	8	43.1 *19,5*
267mm *250*	10.528 *267,4*	12	68.2 *30,9*	5.43 *138,0*	12	67.1 *30,4*
10 *250*	10.750 *273,0*	12	68.5 *31,1*	5.43 *138,0*	12	67.4 *30,6*
318mm *300*	12.539 *318,5*	12	94.5 *29,3*	5.43 *138,0*	12	93.1 *42,2*
12 *300*	12.750 *323,9*	12	96.1 *43,6*	5.43 *138,0*	12	94.0 *42,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

E to E

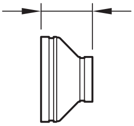


FIGURE 250
CAST
CONCENTRIC REDUCER

E to E

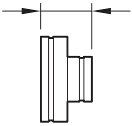


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1-1/4 x 1 *32 x 25*	1.660 x 1.315 *42,4 x 33,4*	2.50 *63,5*	0.7 *0,3*	2.50 *63,5*	0.4 *0,2*
1-1/2 x 1 *40 x 25*	1.900 x 1.315 *48,3 x 33,4*	—	—	2.50 *63,5*	0.5 *0,2*
1-1/2 x 1-1/4 *40 x 32*	1.900 x 1.660 *48,3 x 42,4*	2.50 *63,5*	0.8 *0,3*	2.50 *63,5*	0.5 *0,2*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,4*	—	—	2.50 *63,5*	0.6 *0,4*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	—	—	2.50 *63,5*	0.6 *0,4*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	—	—	2.50 *63,5*	0.6 *0,4*
2-1/2 x 1 *65 x 25*	2.874 x 1.315 *73,0 x 33,4*	—	—	2.50 *63,5*	0.6 *0,4*
2-1/2 x 1-1/4 *65 x 32*	2.874 x 1.660 *73,0 x 42,4*	2.50 *63,5*	1.4 *0,6*	2.50 *63,5*	0.7 *0,3*
2-1/2 x 1-1/2 *65 x 40*	2.874 x 1.900 *73,0 x 48,3*	2.50 *63,5*	1.4 *0,6*	2.50 *63,5*	0.7 *0,3*
2-1/2 x 2 *65 x 50*	2.874 x 2.375 *73,0 x 60,3*	2.50 *63,5*	1.3 *0,6*	2.50 *63,5*	0.8 *0,4*
76,1mm x 1 *65 x 25*	3.000 x 1.315 *76,1 x 33,4*	—	—	2.50 *63,5*	0.9 *0,4*
76,1mm x 1-1/4 *65 x 32*	3.000 x 1.660 *76,1 x 42,4*	2.50 *63,5*	1.4 *0,6*	2.50 *63,5*	0.9 *0,4*
76,1mm x 1-1/2 *65 x 40*	3.000 x 1.900 *76,1 x 48,3*	2.50 *63,5*	1.4 *0,6*	2.50 *63,5*	1.0 *0,5*
76,1mm x 2 *65 x 50*	3.000 x 2.375 *76,1 x 60,3*	2.50 *63,5*	1.5 *0,7*	2.50 *63,5*	1.0 *0,5*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	—	—	2.50 *63,5*	1.3 *0,6*
3 x 1-1/4 *80 x 32*	3.500 x 1.660 *88,9 x 42,4*	—	—	2.50 *63,5*	1.3 *0,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

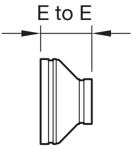


FIGURE 250
CAST
CONCENTRIC REDUCER

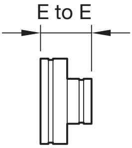


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches *mm***	**Nominal E to E Inches *mm***	**Approx. Weight Lbs. *kg***	**Nominal E to E Inches *mm***	**Approx. Weight Lbs. *kg***
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	2.50 *63,5*	1.8 *0,8*	2.50 *63,5*	1.3 *0,6*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	2.50 *63,5*	1.7 *0,8*	2.50 *63,5*	1.3 *0,6*
3 x 2-1/2 *80 x 65*	3.500 x 2.874 *88,9 x 73,0*	2.50 *63,5*	1.7 *0,8*	2.50 *63,5*	1.3 *0,6*
3-1/2 x 76,1mm *80 x 65*	3.500 x 3.000 *88,9 x 76,1*	2.50 63,5	2.0 *0,9*	2.50 *63,5*	1.4 *0,6*
108,0mm x 1 *100 x 25*	4.252 x 1.615 *108,0 x 33,4*	—	—	3.00 *76,2*	1.3 *0,6*
108,0mm x 1-1/4 *100 x 32*	4.252 x 1.660 *108,0 x 42,4*	—	—	3.00 *76,2*	1.4 *0,6*
108,0mm x 1-1/2 *100 x 40*	4.252 x 1.900 *108,0 x 48,3*	—	—	3.00 *76,2*	1.4 *0,6*
108,0mm x 2 *100 x 50*	4.252 x 2.375 *108,0 x 60,3*	—	—	3.00 *76,2*	1.4 *0,6*
108,0mm x 2-1/2 *100 x 65*	4.252 x 2.874 108,0 x 73,0	—	—	3.00 *76,2*	1.4 *0,6*
108,0mm x 76,1mm *100 x 65*	4.252 x 3.000 *108,0 x 76,1*	—	—	3.00 *76,2*	1.6 *0,7*
108,0mm x 3 *100 x 80*	4.252 x 3.500 *108,0 x 88,9*	—	—	3.00 *76,2*	1.7 *0,8*
108,0mm x 4 *100 x 100*	4.252 x 4.500 *108,0 x 114,3*	—	—	3.00 *76,2*	2.3 *1,0*
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	—	—	3.00 *76,2*	2.2 *0,9*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,4*	—	—	3.00 *76,2*	2.2 *0,9*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	—	—	3.00 *76,2*	2.2 *0,9*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	3.00 *76,2*	2.4 *1,1*	3.00 *76,2*	2.3 *1,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

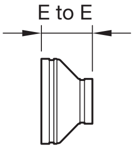


FIGURE 250
CAST
CONCENTRIC REDUCER

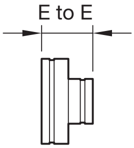


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
4 x 2-1/2 *100 x 65*	4.500 x 2.874 *114,3 x 73,0*	3.00 *76,2*	2.7 *1,2*	3.00 *76,2*	2.2 *0,9*
4 x 76,1mm *100 x 65*	4.500 x 3.000 *114,3 x 76,1*	3.00 *76,2*	3.2 *1,5*	3.00 *76,2*	2.4 *1,0*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	3.00 *76,2*	2.8 *1,3*	3.00 *76,2*	2.5 *1,1*
133,0mm x 2 *125 x 50*	5.250 x 2.375 *133,0 x 60,3*	—	—	3.50 *88,9*	2.3 *1,0*
133,0mm x 2-1/2 *125 x 65*	5.250 x 2.874 *133,0 x 73,0*	—	—	3.50 *88,9*	2.3 *1,0*
133,0mm x 76,1mm *125 x 65*	5.250 x 3.000 *133,0 x 76,1*	—	—	3.50 *88,9*	2.5 *1,1*
133,0mm x 3 *125 x 80*	5.250 x 3.500 *133,0 x 88,9*	—	—	3.50 *88,9*	2.7 *1,2*
133,0mm x 108,0mm *125 x 100*	5.250 x 4.252 *133,0 x 108,0*	—	—	3.50 *88,9*	2.2 *0,9*
133,0mm x 4 *125 x 100*	5.250 x 4.500 *133,0 x 114,3*	—	—	3.50 *88,9*	2.9 *1,3*
139,7mm x 2 *125 x 50*	5.500 x 2.375 *139,7 x 60,3*	—	—	3.50 *88,9*	2.7 *1,2*
139,7mm x 2-1/2 *125 x 65*	5.500 x 2.874 *139,7 x 73,0*	—	—	3.50 *88,9*	2.7 *1,2*
139,7mm x 76,1mm *125 x 65*	5.500 x 3.000 *139,7 x 76,1*	—	—	3.50 *88,9*	2.9 *1,3*
139,7mm x 3 *125 x 80*	5.500 x 3.500 *139,7 x 88,9*	3.50 *88,9*	4.2 *1,9*	3.50 *88,9*	3.0 *1,3*
139,7mm x 4 *125 x 100*	5.500 x 4.500 *139,7 x 114,3*	3.50 *88,9*	4.4 *2,0*	3.50 *88,9*	3.2 *1,5*
5 x 2 *125 x 50*	5.563 x 2.375 *141,3 x 60,3*	—	—	3.50 *88,9*	3.7 *1,7*
5 x 2-1/2 *125 x 65*	5.563 x 2.874 *141,3 x 73,0*	—	—	3.50 *88,9*	3.6 *1,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

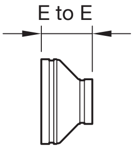


FIGURE 250
CAST
CONCENTRIC REDUCER

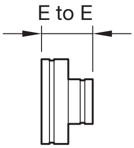


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
5 x 76,1mm *125 x 65*	5.563 x 3.000 *141,3 x 76,1*	—	—	3.50 *88,9*	3.8 *1,7*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	3.50 *88,9*	4.2 *1,9*	3.50 *88,9*	3.9 *1,8*
5 x 108,0mm *125 x 100*	5.563 x 4.252 *141,3 x 108,0*	—	—	3.50 *88,9*	3.3 *1,5*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	3.50 *88,9*	4.4 *2,0*	3.50 *88,9*	4.0 *1,8*
5 x 139,7mm *125 x 125*	5.563 x 5.500 *141,3 x 139,7*	—	—	3.50 *88,9*	3.4 *1,5*
159,0mm x 3 *150 x 80*	6.250 x 3.500 *159,0 x 88,9*	—	—	4.00 *101,6*	3.9 *1,8*
159,0mm x 108,0mm *150 x 100*	6.250 x 4.252 *159,0 x 108,0*	—	—	4.00 *101,6*	3.4 *1,5*
159,0mm x 4 *150 x 100*	6.250 x 4.500 *159,0 x 114,3*	—	—	4.00 *101,6*	4.1 *1,9*
159,0mm x 133,0mm *150 x 125*	6.250 x 5.250 159,0 x 133,0	—	—	4.00 *101,6*	3.4 *1,5*
159,0mm x 139,7mm *150 x 125*	6.250 x 5.500 159,0 x 139,7	—	—	4.00 *101,6*	3.8 *1,7*
165,1mm x 3 *150 x 80*	6.500 x 3.500 *165,1 x 88,9*	4.00 *101,6*	5.5 *2,5*	4.00 *101,6*	4.4 *1,9*
165,1mm x 4 *150 x 100*	6.500 x 4.500 *165,1 x 114,3*	4.00 *101,6*	6.0 *2,7*	4.00 *101,6*	4.6 *2,0*
165,1mm x 139,7mm *150 x 125*	6.500 x 5.500 *165,1 x 139,7*	4.00 *101,6*	5.6 *2,5*	4.00 *101,6*	4.2 *1,9*
165,1mm x 5 *150 x 125*	6.500 x 5.563 *165,1 x 141,3*	—	—	4.00 *101,6*	4.8 *2,2*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	4.00 *101,6*	5.3 *2,4*	4.00 *101,6*	5.6 *2,5*
6 x 2-1/2 *150 x 65*	6.625 x 2.874 *168,3 x 73,0*	4.00 *101,6*	5.7 *2,6*	4.00 *101,6*	5.5 *2,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

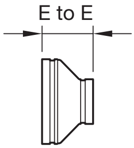


FIGURE 250
CAST
CONCENTRIC REDUCER

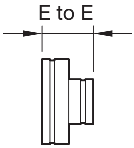


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
6 x 76,1mm *150 x 65*	6.625 x 3.000 *168,3 x 76,1*	4.00 *101,6*	6.1 *2,7*	4.00 *101,6*	5.7 *2,6*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	4.00 *101,6*	5.8 *2,6*	4.00 *101,6*	5.9 *2,7*
6 x 108,0mm *150 x 100*	6.625 x 4.252 *168,3 x 108,0*	—	—	4.00 *101,6*	5.2 *2,4*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	4.00 *101,6*	6.0 *2,7*	4.00 *101,6*	5.9 *2,7*
6 x 133,0mm *150 x 125*	6.625 x 5.250 *168,3 x 133,0*	—	—	4.00 *101,6*	5.0 *2,3*
6 x 139,7mm *150 x 100*	6.625 x 5.500 *168,3 x 139,7*	4.00 *101,6*	6.3 *2,3*	4.00 *101,6*	5.3 *2,4*
6 x 5 *150 x 125*	6.625 x 5.563 *168,3 x 141,3*	4.00 *101,6*	6.2 *2,8*	4.00 *101,6*	6.0 *2,7*
216,3mm x 2-1/2 *200 x 65*	8.516 x 2.874 *216,3 x 73,0*	—	—	5.00 *127,0*	7.7 *3,5*
216,3mm x 3 *200 x 80*	8.516 x 3.500 *216,3 x 88,9*	—	—	5.00 *127,0*	8.2 *3,7*
216,3mm x 4 *200 x 100*	8.516 x 4.500 *216,3 x 114,3*	—	—	5.00 *127,0*	8.5 *3,9*
216,3mm x 139,7mm *200 x 125*	8.516 x 5.500 *216,3 x 139,7*	—	—	5.00 *127,0*	8.0 *3,6*
216,3mm x 5 *200 x 125*	8.516 x 5.563 *216,3 x 141,3*	—	—	5.00 *127,0*	8.8 *3,9*
216,3mm x 165,1mm *200 x 165*	8.516 x 6.500 *216,3 x 165,1*	—	—	5.00 *127,0*	7.9 *3,6*
216,3mm x 6 *200 x 150*	8.516 x 6.625 *216,3 x 168,3*	—	—	5.00 *127,0*	9.1 *4,1*
8 x 2-1/2 *200 x 65*	8.625 x 2.874 *219,1 x 73,0*	—	—	5.00 *127,0*	10.6 *4,8*
8 x 3 *200 x 80*	8.625 x 3.500 *219,1 x 88,9*	5.00 *127,0*	11.5 *5,2*	5.00 *127,0*	11.0 *4,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

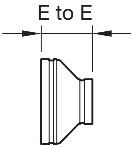


FIGURE 250
CAST
CONCENTRIC REDUCER

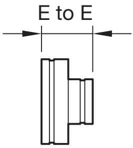


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
8 x 4 *200 x 100*	8.625 x 4.500 *219,1 x 114,3*	5.00 *127,0*	10.7 *4,9*	5.00 *127,0*	11.2 *5,1*
8 x 133,0mm *200 x 125*	8.625 x 5.250 *219,1 x 133,0*	—	—	5.00 *127,0*	10.1 *4,6*
8 x 139,7mm *200 x 125*	8.625 x 5.500 *219,1 x 139,7*	5.00 *127,0*	10.0 *4,5*	5.00 *127,0*	10.5 *4,8*
8 x 5 *200 x 125*	8.625 x 5.563 *219,1 x 141,3*	5.00 *127,0*	10.8 *4,9*	5.00 *127,0*	11.3 *5,1*
8 x 159,0mm *200 x 150*	8.625 x 6.250 *219,1 x 159,0*	—	—	5.00 *127,0*	9.9 *4,5*
8 x 165,1mm *200 x 150*	8.625 x 6.500 *219,1 x 165,1*	5.00 *127,0*	11.0 *5,0*	5.00 *127,0*	10.1 *4,6*
8 x 6 *200 x 150*	8.625 x 6.625 219,1 x 168,3	5.00 *127,0*	11.3 *5,1*	5.00 *127,0*	11.3 *5,1*
267,4mm x 4 *250 x 100*	10.528 x 4.500 *267,4 x 114,3*	—	—	6.00 *152,4*	14.1 *6,4*
267,4mm x 5 *250 x 125*	10.528 x 5.563 *267,4 x 141,3*	—	—	6.00 *152,4*	14.5 *6,6*
267,4mm x 165,1mm 250 x 125	10.528 x 6.500 *267,4 x 165,1*	—	—	6.00 *152,4*	13.4 *6,1*
267,4mm x 6 *250 x 150*	10.528 x 6.625 *267,4 x 168,3*	—	—	6.00 *152,4*	14.9 *6,8*
267,4mm x 216,3mm *250 x 216*	10.528 x 8.516 *267,4 x 216,3*	—	—	6.00 *152,4*	13.5 *6,1*
267,4mm x 8 *250 x 200*	10.528 x 8.625 *267,4 x 219,1*	—	—	6.00 *152,4*	15.6 *7,1*
10 x 4 *250 x 100*	10.750 X 4.500 *273,0 X 114,3*	—	—	6.00 *152,4*	19.1 *8,7*
10 x 5 *250 x 125*	10.750 x 5.563 *273,0 x 141,3*	—	—	6.00 *152,4*	19.2 *8,7*
10 x 159,0mm *250 x 125*	10.750 x 6.250 *273,0 x 159,0*	—	—	6.00 *152,4*	17.7 *8,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

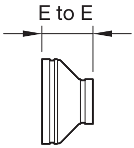


FIGURE 250
CAST
CONCENTRIC REDUCER

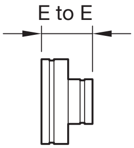


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
10 x 165,1mm *250 x 150*	10.750 x 6.500 *273,0 x 165,1*	6.00 *152,4*	17.8 *8,0*	6.00 *152,4*	17.9 *8,1*
10 x 6 *250 x 150*	10.750 x 6.625 *273,0 x 168,3*	6.00 *152,4*	16.3 *7,4*	6.00 *152,4*	19.4 *8,8*
10 x 216,3mm *250 x 200*	10.750 x 8.516 *273,0 x 216,3*	—	—	6.00 *152,4*	17.3 *7,8*
10 x 8 *250 x 200*	10.750 x 8.625 *273,0 x 219,1*	6.00 *152,4*	18.3 *8,3*	6.00 *152,4*	19.5 *8,8*
318,5mm x 4 *300 x 100*	12.539 x 4.500 *318,5 x 114,3*	—	—	7.00 *177,8*	20.5 *9,3*
318,5mm x 6 *300 x 150*	12.539 x 6.625 *318,5 x 168,3*	—	—	7.00 *177,8*	21.6 *9,8*
318,5mm x 216,3mm *300 x 200*	12.539 x 8.516 *318,5 x 216,3*	—	—	7.00 *177,8*	20.1 *9,1*
318,5mm x 8 *300 x 200*	12.539 x 8.625 *318,5 x 219,1*	—	—	7.00 *177,8*	22.6 *10,3*
318,5mm x 267,4mm *300 x 250*	12.539 x 10.528 *318,5 x 267,4*	—	—	7.00 *177,8*	20.3 *9,2*
318,5mm x 10 *300 x 250*	12.539 x 10.750 *318,5 x 273,0*	—	—	7.00 *177,8*	23.8 *10,8*
12 x 4 *300 x 100*	12.750 x 4.500 *323,9 x 114,3*	7.00 *177,8*	22.7 *10,3*	7.00 *177,8*	27.5 *12,5*
12 x 6 *300 x 150*	12.750 x 6.625 *323,9 x 168,3*	7.00 *177,8*	24.2 *11,0*	7.00 *177,8*	28.1 *12,7*
12 x 216,3mm *300 x 200*	12.750 x 8.516 *323,9 x 216,3*	—	—	7.00 *177,8*	26.0 *11,8*
12 x 8 *300 x 200*	12.750 x 8.625 *323,9 x 219,1*	7.00 *177,8*	25.8 *11,7*	7.00 *177,8*	28.5 *12,9*
12 x 267,4mm *300 x 250*	12.750 x 10.528 *323,9 x 267,4*	—	—	7.00 *177,8*	25.4 *11,5*
12 x 10 *300 x 250*	12.750 x 10.750 *323,9 x 273,0*	7.00 *177,8*	28.2 (12,8)	7.00 *177,8*	28.8 *13,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

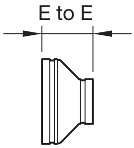


FIGURE 250
CAST
CONCENTRIC REDUCER

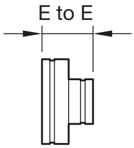


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
14 x 6 *350 x 150*	14.000 x 6.625 *355,6 x 168,3*	—	—	13.00 *330,2*	50.5 *23,0*
14 x 8 *350 x 200*	14.000 x 8.625 *355,6 x 219,1*	—	—	13.00 *330,2*	53.3 *24,2*
14 x 267,4mm *350 x 250*	14.000 x 10.528 *355,6 x 267,4*	—	—	13.00 *330,2*	50.1 *22,7*
14 x 10 *350 x 250*	14.000 x 10.750 *355,6 x 273,0*	—	—	13.00 *330,2*	56.6 *25,7*
14 x 318,5mm *350 x 300*	14.000 x 12.539 *355,6 x 318,5*	—	—	13.00 *330,2*	50.3 *22,8*
14 x 12 *350 x 300*	14.000 x 12.750 *355,6 x 323,9*	—	—	13.00 *330,2*	57.8 *26,2*
377,0mm x 6 *350 x 150*	14.842 x 6.625 *377,0 x 168,3*	—	—	13.50 *342,9*	48.7 *22,1*
377,0mm x 8 *350 x 200*	14.842 x 8.625 *377,0 x 219,1*	—	—	13.50 *342,9*	52.1 *23,6*
377,0mm x 216,3mm *350 x 250*	14.842 x 10.528 *377,0 x 267,4*	—	—	13.50 *342,9*	47.3 *21,4*
377,0mm x 267,4mm *350 x 250*	14.842 x 10.528 *377,0 x 267,4*	—	—	13.50 *342,9*	49.4 *22,4*
377,0mm x 10 *350 x 250*	14.842 x 10.750 *377,0 x 273,0*	—	—	13.50 *342,9*	56.1 *25,4*
377,0mm x 318,5mm *350 x 300*	14.842 x 12.539 *377,0 x 318,5*	—	—	13.50 *342,9*	50.3 *22,8*
377,0mm x 12 *350 x 300*	14.842 x 12.750 *377,0 x 323,9*	—	—	13.50 *342,9*	58.1 *26,4*
16 x 8 *400 x 200*	16.000 x 8.625 *406,4 x 219,1*	—	—	14.00 *355,6*	66.0 *29,9*
16 x 267,4mm *400 x 250*	16.000 x 10.528 *406,4 x 267,4*	—	—	14.00 *355,6*	62.9 *28,5*
16 x 10 *400 x 250*	16.000 x 10.750 *406,4 x 273,0*	—	—	14.00 *355,6*	69.8 *31,7*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 250 and Figure 350 Concentric Reducers

(9 of 9)

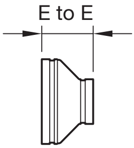


FIGURE 250
CAST
CONCENTRIC REDUCER

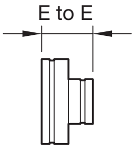


FIGURE 350
FABRICATED
CONCENTRIC REDUCER

Nominal Pipe Size		Figure 250		Figure 350	
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
16 x 318,5mm *400 x 300*	16.000 x 12.539 *406,4 x 318,5*	—	—	14.00 *355,6*	63.3 *28,7*
16 x 12 *400 x 300*	16.000 x 12.750 *406,4 x 323,9*	—	—	14.00 *355,6*	71.4 31,4
16 x 14 *400 x 350*	16.000 x 14.000 *406,4 x 355,6*	—	—	14.00 *355,6*	71.7 *32,5*
18 x 12 *450 x 300*	18.000 x 12.750 *457,2 x 323,9*	—	—	15.00 *381,0*	86.4 *39,2*
18 x 14 *450 x 350*	18.000 x 14.000 *457,2 x 355,6*	—	—	15.00 *381,0*	86.8 39,2
18 x 16 *450 x 400*	18.000 x 16.000 *457,2 x 406,4*	—	—	15.00 *381,0*	87.0 *39,5*
20 x 10 *500 x 250*	20.000 x 10.750 *508,0 x 273,0*	—	—	20.00 *508,0*	120.2 *54,5*
20 x 12 *500 x 300*	20.000 x 12.750 *508,0 x 323,9*	—	—	20.00 *508,0*	124.0 *56,2*
20 x 14 *500 x 350*	20.000 x 14.000 *508,0 x 355,6*	—	—	20.00 *508,0*	125.5 *56,9*
20 x 16 *500 x 400*	20.000 x 16.000 *508,0 x 406,4*	—	—	20.00 *508,0*	127.4 *57,8*
20 x 18 *500 x 450*	20.000 x 18.000 *508,0 x 457,2*	—	—	20.00 *508,0*	128.5 *58,3*
24 x 10 *600 x 250*	24.000 x 10.750 *609,6 x 273,0*	—	—	20.00 *508,0*	146.8 *66,6*
24 x 12 *600 x 300*	24.000 x 12.750 *609,6 x 323,9*	—	—	20.00 *508,0*	150.7 *68,4*
24 x 14 *600 x 350*	24.000 x 14.000 *609,6 x 355,6*	—	—	20.00 *508,0*	152.1 69,0
24 x 16 *600 x 400*	24.000 x 16.000 *609,6 x 406,4*	—	—	20.00 *508,0*	154.0 *69,9*
24 x 18 *600 x 450*	24.000 x 18.000 *609,6 x 457,2*	—	—	20.00 *508,0*	155.2 *70,4*
24 x 20 *600 x 500*	24.000 x 20.000 *609,6 x 508,0*	—	—	20.00 *508,0*	*155.4* 70,5

• Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 372 Concentric Reducer, Fabricated

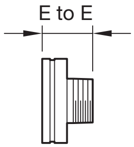


FIGURE 372
FABRICATED CONCENTRIC REDUCER
GROOVE X MALE THREAD

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***		
1-1/2 x 1 *40 x 25*	1.900 x 1.315 *48,3 x 33,7*	2.50 *63,5*	0.6 *0,3*
2 x 3/4 *50 x 20*	2.375 x 1.050 *60,3 x 26,7*	2.50 *63,5*	1.0 *0,5*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,7*	2.50 *63,5*	0.8 *0,4*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	2.50 *63,5*	0.8 *0,4*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	2.50 *63,5*	0.8 *0,4*
2-1/2 x 1-1/4 *65 x 32*	2.874 x 1.660 *73,0 x 42,4*	2.50 *63,5*	1.0 *0,5*
2-1/2 x 1-1/2 *65 x 40*	2.874 x 1.900 *73,0 x 48,3*	2.50 *63,5*	1.3 *0,6*
2-1/2 x 2 *65 x 50*	2.874 x 2.375 *73,0 x 60,3*	2.50 *63,5*	1.4 *0,6*
76,1mm x 1-1/4 *65 x 32*	3.000 x 1.660 *76,1 x 42,4*	2.50 *63,5*	1.0 *0,5*
76,1mm x 1-1/2 *65 x 40*	3.000 x 1.900 *76,1 x 48,3*	2.50 *63,5*	1.3 *0,6*
76,1mm x 2 *65 x 50*	3.000 x 2.375 *76,1 x 60,3*	2.50 *63,5*	1.4 *0,6*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	2.50 *63,5*	1.8 *0,8*
3 x 1-1/4 *80 x 32*	3.500 x 1.600 *88,9 x 42,4*	2.50 *63,5*	1.8 *0,8*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	2.50 *63.5*	1.9 *0,9*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	2.50 *63.5*	1.9 *0,9*
3 x 2-1/2 *80 x 65*	3.500 x 2.874 *88,9 x 73,0*	2.50 *63.5*	2.2 *1,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 372 Concentric Reducer, Fabricated

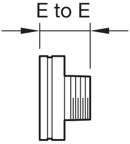


FIGURE 372
FABRICATED CONCENTRIC REDUCER
GROOVE X MALE THREAD

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*		
3 x 76,1mm *80 x 65*	3.500 x 3.000 *88,9 x 76,1*	2.50 *63.5*	2.2 *1,0*
108,0mm x 1 *100 x 25*	4.252 x 1.315 *108,0 x 33,4*	3.00 *76,2*	2.6 *1,2*
108,0mm x 1-1/4 *100 x 32*	4.252 x 1.660 *108,0 x 42,4*	3.00 *76,2*	2.6 *1,2*
108,0mm x 1-1/2 *100 x 40*	4.252 x 1.900 *108,0 x 48,3*	3.00 *76,2*	2.6 *1,2*
108,0mm x 2 *100 x 50*	4.252 x 2.375 *108,0 x 60,3*	3.00 *76,2*	2.7 *1,2*
108,0mm x 2-1/2 *100 x 65*	4.252 x 2.874 *108,0 x 73,0*	3.00 *76,2*	2.7 *1,2*
108,0mm x 76,1mm *100 x 65*	4.252 x 3.000 *108,0 x 76,1*	3.00 *76,2*	2.7 *1,2*
108,0mm x 3 *100 x 80*	4.252 x 3.500 *108,0 x 88,9*	3.00 *76,2*	2.8 *1,3*
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	3.00 *76,2*	2.9 *1,3*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,4*	3.00 *76,2*	2.9 *1,3*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	3.00 *76,2*	2.9 *1,3*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	3.00 *76,2*	2.9 *1,3*
4 x 2-1/2 *100 x 65*	4.500 x 2.874 *114,3 x 73,0*	3.00 *76,2*	3.0 *1,4*
4 x 76,1mm *100 x 65*	4.500 x 3.000 *114,3 x 76,1*	3.00 *76,2*	3.0 *1,4*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	3.00 *76,2*	3.2 *1,5*
133,0mm x 76,1mm *125 x 65*	5.250 x 3.000 *133,0 x 76,1*	3.50 *88,9*	4.3 *1,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 372 Concentric Reducer, Fabricated

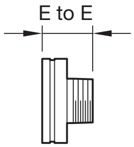


FIGURE 372
FABRICATED CONCENTRIC REDUCER
GROOVE X MALE THREAD

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*		
133,0mm x 3 *125 x 80*	5.250 x 3.500 *133,0 x 88,9*	3.50 *88,9*	4.3 *1,9*
133,0mm x 4 *125 x 100*	5.250 x 4.500 *133,0 x 114,3*	3.50 *88,9*	4.4 *2,0*
139,7mm x 76,1mm *125 x 65*	5.500 x 3.000 *139,7 x 76,1*	3.50 *88,9*	4.4 *2,0*
139,7mm x 3 *125 x 80*	5.500 x 3.500 *139,7 x 88,9*	3.50 *88,9*	4.4 *2,0*
139,7mm x *125 x 100*	5.500 x 4.500 *139,7 x 114,3*	3.50 *88,9*	4.5 *2,0*
5 x 76,1mm 125 x 65	5.563 x 3.000 *141,3 x 76,1*	3.50 *88,9*	4.3 *1,9*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	3.50 *88,9*	4.4 *2,0*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	3.50 *88,9*	4.5 *2,0*
159,0mm x 1 *125 x 25*	6.250 x 1.315 *159,0 x 33,4*	4.00 *101,6*	5.2 *2,4*
159,0mm x 2 *125 x 50*	6.250 x 2.375 *159,0 x 60,3*	4.00 *101,6*	5.6 *2,5*
159,0mm x 76,1mm *125 x 65*	6.250 x 3.000 *159,0 x 76,1*	4.00 *101,6*	5.6 *2,5*
159,0mm x 3 *125 x 80*	6.250 x 3.500 *159,0 x 88,9*	4.00 *101,6*	5.8 *2,6*
159,0mm x 4 *125 x 100*	6.250 x 4.500 *159,0 x 114,3*	4.00 *101,6*	6.0 *2,7*
159,0mm x 5 *125 x 125*	6.250 x 5.563 *159,0 x 141,3*	4.00 *101,6*	6.2 *2,8*
165,1mm x 1 *150 x 25*	6.500 x 1.315 *165,1 x 33,4*	4.00 *101,6*	5.6 *2,5*
165,1mm x 2 *150 x 50*	6.500 x 2.375 *165,1 x 60,3*	4.00 *101,6*	5.8 *2,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 372 Concentric Reducer, Fabricated

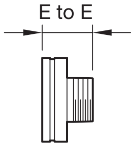


FIGURE 372
FABRICATED CONCENTRIC REDUCER
GROOVE X MALE THREAD

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***		
165,1mm x 76,1mm *150 x 65*	6.500 x 3.000 *165,1 x 76,1*	4.00 *101,6*	6.0 *2,7*
165,1mm x 3 *150 x 80*	6.500 x 3.500 *165,1 x 88,9*	4.00 *101,6*	6.0 *2,7*
165,1mm x 4 *150 x 100*	6.500 x 4.500 *165,1 x 114,3*	4.00 *101,6*	6.3 *2,8*
165,1mm x 5 *150 x 125*	6.500 x 5.563 *165,1 x 141,3*	4.00 *101,6*	6.5 *2,9*
6 x 1 *150 x 25*	6.625 x 1.315 *168,3 x 33,4*	4.00 *101,6*	5.2 *2,4*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	4.00 *101,6*	6.0 *2,7*
6 x 76,1mm *150 x 65*	6.625 x 3.000 *168,3 x 76,1*	4.00 *101,6*	6.0 *2,7*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	4.00 *101,6*	6.0 *2,7*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	4.00 *101,6*	6.3 *2,8*
6 x 5 *150 x 125*	6.625 x 5.563 *168,3 x 141,3*	4.00 *101,6*	6.5 *2,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

(1 of 9)

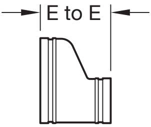


FIGURE 251
CAST
ECCENTRIC REDUCER

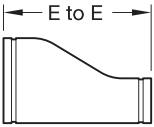


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1-1/4 x 1 *32 x 25*	1.660 x 1.315 *42,4 x 33,7*	—	—	8.50 *215,9*	1.7 *0,8*
1-1/2 x 3/4 *40 x 20*	1.900 x 1.050 *48,3 x 26,7*	—	—	8.50 *215,9*	1.8 *0,8*
1-1/2 x 1 *40 x 25*	1.900 x 1.315 *48,3 x 33,4*	—	—	8.50 *215,9*	1.9 *0,9*
1-1/2 x 1-1/4 *40 x 32*	1.900 x 1.660 *48,3 x 42,4*	—	—	8.50 *215,9*	2.2 *1,0*
2 x 3/4 *50 x 20*	2.375 x 1.050 *60,3 x 26,7*	—	—	9.00 *228,6*	2.1 *0,9*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,4*	—	—	9.00 *228,6*	2.2 *1,0*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	—	—	9.00 *228,6*	2.4 *1,1*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	—	—	9.00 *228,6*	2.5 *1,1*
2-1/2 x 1 65 x 25	2.874 x 1.315 73,0 x 33,4	—	—	9.50 *241,3*	3.2 *1,5*
2-1/2 x 1-1/4 *65 x 32*	2.874 x 1.660 *73,0 x 42,4*	—	—	9.50 *241,3*	3.4 *1,5*
2-1/2 x 1-1/2 *65 x 40*	2.874 x 1.900 *73,0 x 48,3*	—	—	9.50 *241,3*	3.6 *1,6*
2-1/2 x 2 65 x 50	2.874 x 2.375 73,0 x 60,3	—	—	9.50 *241,3*	4.0 *1,8*
76,1mm x 1 *65 x 25*	3.000 x 1.315 *73,0 x 33,4*	—	—	9.50 *241,3*	3.7 *1,7*
76,1mm x 1-1/4 *65 x 32*	3.000 x 1.660 *73,0 x 42,4*	—	—	9.50 *241,3*	3.9 *1,8*
76,1mm x 1-1/2 *65 x 40*	3.000 x 1.900 *73,0 x 48,3*	—	—	9.50 *241,3*	4.2 *1,9*
76,1mm x 2 *65 x 50*	3.000 x 2.375 *73,0 x 60,3*	—	—	9.50 *241,3*	4.5 *2,0*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

(2 of 9)

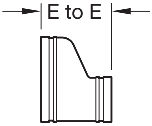


FIGURE 251
CAST
ECCENTRIC REDUCER

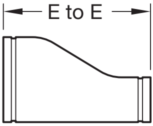


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	—	—	9.50 *241,3*	4.0 *1,8*
3 x 1-1/4 *80 x 32*	3.500 x 1.660 *88,9 x 42,4*	—	—	9.50 *241,3*	4.3 *2,0*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	—	—	9.50 *241,3*	4.5 *2,0*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	3.50 *88,9*	2.0 *0,9*	9.50 *241,3*	4.8 *2,1*
3 x 2-1/2 *80 x 65*	3.500 x 2.874 *88,9 x 73,0*	3.50 *88,9*	2.2 *1,0*	9.50 *241,3*	5.5 *2,5*
3 x 76,1mm *80 x 65*	3.500 x 3.000 *88,9 x 76,1*	—	—	9.50 *241,3*	5.8 *2,6*
108,0mm x 1 *100 x 25*	4.252 x 1.315 *108,0 x 33,4*	—	—	10.00 *254,0*	5.9 *2,7*
108,0mm x 1-1/4 *100 x 32*	4.252 x 1.660 *108,0 x 42,4*	—	—	10.00 *254,0*	6.2 *2,8*
108,0mm x 1-1/2 *100 x 40*	4.252 x 1.900 *108,0 x 48,3*	—	—	10.00 *254,0*	6.5 *2,9*
108,0mm x 2 *100 x 50*	4.252 x 2.375 *108,0 x 60,3*	—	—	10.00 *254,0*	6.7 *3,0*
108,0mm x 2-1/2 *100 x 65*	4.252 x 2.874 *108,0 x 73,0*	—	—	10.00 *254,0*	7.4 *3,4*
108,0mm x 76,1mm *100 x 65*	4.252 x 3.000 *100 x 65*	—	—	10.00 *254,0*	7.8 *3,5*
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	—	—	10.00 *254,0*	5.9 *2,7*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,4*	—	—	10.00 *254,0*	6.3 *2,9*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	—	—	10.00 *254,0*	6.4 *2,9*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	4.00 *101,6*	3.0 *1,4*	10.00 *254,0*	6.9 *3,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

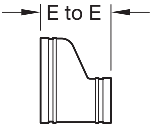


FIGURE 251
CAST
ECCENTRIC REDUCER

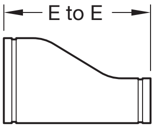


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
4 x 2-1/2 *100 x 65*	4.500 x 2.874 *114,3 x 73,0*	4.00 *101,6*	3.0 *1,4*	10.00 *254,0*	7.5 *3,4*
4 x 76,1mm *100 x 65*	4.500 x 3.000 *114,3 x 76,1*	—	—	10.00 *254,0*	7.7 *3,5*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	4.00 *101,6*	3.3 *1,5*	10.00 *254,0*	7.9 *3,6*
133,0mm x 2 *125 x 50*	5.250 x 2.375 *133,0 x 60,3*	—	—	11.00 *279,4*	8.5 *3,9*
133,0mm x 2-1/2 *125 x 65*	5.250 x 2.874 *133,0 x 73,0*	—	—	11.00 *279,4*	9.0 *4,1*
133,0mm x 76,1mm *125 x 65*	5.250 x 3.000 *133,0 x 76,1*	—	—	11.00 *279,4*	9.3 *4,2*
133,0mm x 3 *125 x 80*	5.250 x 3.500 *133,0 x 88,9*	—	—	11.00 *279,4*	10.4 *4,7*
133,0mm x 108,0mm *125 x 100*	5.250 x 4.252 *133,0 x 108,0*	—	—	11.00 *279,4*	11.0 *5,0*
139,7mm x 2 *125 x 50*	5.500 x 2.375 *139,7 x 60,3*	—	—	11.00 *279,4*	9.0 *4,1*
139,7mm x 2-1/2 *125 x 65*	5.500 x 2.874 *139,7 x 73,0*	—	—	11.00 *279,4*	9.5 *4,3*
139,7mm x 76,1mm *125 x 65*	5.500 x 3.000 *139,7 x 76,1*	—	—	11.00 *279,4*	9.8 *4,4*
139,7mm x 3 *125 x 80*	5.500 x 3.500 *139,7 x 88,9*	—	—	11.00 *279,4*	10.8 *4,9*
139,7mm x 108,0mm *125 x 100*	5.500 x 4.252 *139,7 x 108,0*	—	—	11.00 *279,4*	10.6 *4,8*
5 x 2 *125 x 50*	5.563 x 2.375 *141,3 x 60,3*	—	—	11.00 *279,4*	9.3 *4,2*
5 x 2-1/2 *125 x 65*	5.563 x 2.874 *141,3 x 73,0*	—	—	11.00 *279,4*	9.9 *4,5*
5 x 76,1mm *125 x 65*	5.563 x 3.000 *141,3 x 76,1*	—	—	11.00 *279,4*	10.2 *4,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

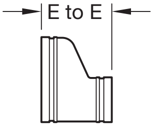


FIGURE 251
CAST
ECCENTRIC REDUCER

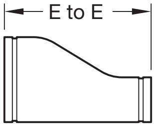


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	—	—	11.00 *279,4*	10.7 *4,9*
5 x 108,0mm *125 x 100*	5.563 x 4.252 *141,3 x 108,0*	—	—	11.00 *279,4*	11.5 *5,2*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	5.00 *127,5*	5.7 *2,6*	11.00 *279,4*	11.9 *5,4*
159,0mm x 2 *150 x 50*	6.250 x 2.375 *159,0 x 60,3*	—	—	11.50 *292,1*	11.5 *5,2*
159,0mm x 2-1/2 *150 x 65*	6.250 x 2.874 *159,0 x 73,0*	—	—	11.50 *292,1*	12.0 *5,4*
159,0mm x 76,1mm *150 x 65*	6.250 x 3.000 *159,0 x 76,1*	—	—	11.50 *292,1*	12.3 *5,6*
159,0mm x 3 *150 x 80*	6.250 x 3.500 *159,0 x 88,9*	—	—	11.50 *292,1*	13.0 *5,9*
159,0mm x 108,0mm *150 x 100*	6.250 x 4.252 *159,0 x 108,0*	—	—	11.50 *292,1*	13.5 *6,1*
159,0mm x 4 *150 x 100*	6.250 x 4.500 *159,0 x 114,3*	—	—	11.50 *292,1*	13.8 *6,3*
159,0mm x 133,0mm *150 x 125*	6.250 x 5.250 *159,0 x 133,0*	—	—	11.50 *292,1*	14.2 *6,4*
159,0mm x 139,7mm *150 x 125*	6.250 x 5.500 *159,0 x 139,7*	—	—	11.50 *292,1*	14.8 *6,7*
165,1mm x 2 *150 x 50*	6.500 x 2.375 *165,1 x 60,3*	—	—	11.50 *292,1*	11.8 *5,4*
165,1mm x 2-1/2 *150 x 65*	6.500 x 2.874 *165,1 x 73,0*	—	—	11.50 *292,1*	12.4 *5,6*
165,1mm x 76,1mm *150 x 65*	6.500 x 3.000 *165,1 x 76,1*	—	—	11.50 *292,1*	12.7 *5,8*
165,1mm x 3 *150 x 80*	6.500 x 3.500 *165,1 x 88,9*	—	—	11.50 *292,1*	13.3 6,0
165,1mm x 108,0mm *150 x 100*	6.500 x 4.252 *165,1 x 108,0*	—	—	11.50 *292,1*	13.8 *6,3*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

FIGURE 251
CAST
ECCENTRIC REDUCER

FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
165,1mm x 4 *150 x 100*	6.500 x 4.500 *165,1 x 114,3*	—	—	11.50 *292,1*	14.1 *6,4*
165,1mm x 133,0mm *150 x 125*	6.500 x 5.250 *165,1 x 133,0*	—	—	11.50 *292,1*	14.6 *6,6*
165,1mm x 139,7mm *150 x 125*	6.500 x 5.500 *165,1 x 139,7*	—	—	11.50 *292,1*	15.0 *6,8*
165,1mm x 5 *150 x 125*	6.500 x 5.563 *165,1 x 141,3*	—	—	11.50 *292,1*	15.8 *7,2*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	—	—	11.50 *292,1*	12.2 *5,5*
6 x 2-1/2 *150 x 65*	6.625 x 2.874 *168,3 x 73,0*	—	—	11.50 *292,1*	12.8 *5,8*
6 x 76,1mm *150 x 65*	6.625 x 3.000 *168,3 x 76,1*	—	—	11.50 *292,1*	13.0 *5,9*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	5.50 *139,7*	7.4 *3,4*	11.50 *292,1*	13.5 *6,1*
6 x 108,0mm *150 x 100*	6.625 x 4.252 *168,3 x 108,0*	—	—	11.50 *292,1*	14.1 *6,4*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	5.50 *139,7*	7.4 *3,4*	11.50 *292,1*	14.8 *6,7*
6 x 133,0mm *150 x 125*	6.625 x 5.250 *168,3 x 133,0*	—	—	11.50 *292,1*	15.2 *6,9*
6 x 139,7mm *150 x 125*	6.625 x 5.500 *168,3 x 139,7*	—	—	11.50 *292,1*	15.7 *7,1*
6 x 5 *150 x 125*	6.625 x 5.563 *168,3 x 141,3*	5.50 *139,7*	8.1 *3,7*	11.50 *292,1*	16.0 *7,3*
216,3mm x 3 *200 x 80*	8.516 x 3.500 *216,3 x 88,9*	—	—	12.00 *304,8*	17.2 *7,8*
216,3mm x 108,0mm *200 x 100*	8.516 x 4.252 *216,3 x 108,0*	—	—	12.00 *304,8*	18.0 *8,2*
216,4mm x 4 *200 x 100*	8.516 x 4.500 *216,3 x 114,3*	—	—	12.00 *304,8*	18.7 *8,5*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

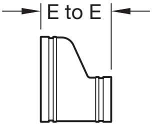


FIGURE 251
CAST
ECCENTRIC REDUCER

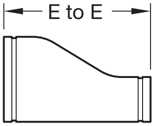


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
216,3mm x 133,0mm *200 x 125*	8.516 x 5.250 *216,3 x 133,0*	—	—	12.00 *304,8*	19.2 *8,7*
216,3mm x 139,7mm *200 x 125*	8.516 x 5.500 *216,3 x 139,7*	—	—	12.00 *304,8*	20.1 *9,1*
216,3mm x 5 *200 x 125*	8.516 x 5.563 *216,3 x 141,3*	—	—	12.00 *304,8*	20.8 *9,4*
216,3mm x 159,0mm *200 x 150*	8.516 x 6.250 *216,3 x 159,0*	—	—	12.00 *304,8*	21.2 *9,6*
216,3mm x 165,1mm *200 x 150*	8.516 x 6.500 *216,3 x 165,1*	—	—	12.00 *304,8*	22.6 *10,3*
216,3mm x 6 *200 x 150*	8.516 x 6.625 *216,3 x 168,3*	—	—	12.00 *304,8*	23.0 *10,4*
8 x 3 *200 x 80*	8.625 x 3.500 *219,1 x 88,9*	—	—	12.00 *304,8*	17.9 *8,1*
8 x 108,0mm *200 x 100*	8.625 x 4.252 *219,1 x 108,0*	—	—	12.00 *304,8*	18.7 *8,5*
8 x 4 *200 x 100*	8.625 x 4.500 *219,1 x 114,3*	—	—	12.00 *304,8*	19.4 *8,8*
8 x 133,0mm *200 x 125*	8.625 x 5.250 *219,1 x 133,0*	—	—	12.00 *304,8*	19.8 *8,9*
8 x 139,7mm *200 x 125*	8.625 x 5.500 *219,1 x 139,7*	—	—	12.00 *304,8*	21.0 *9,5*
8 x 5 *200 x 125*	8.625 x 5.563 *219,1 x 141,3*	—	—	12.00 *304,8*	21.4 *9,7*
8 x 159,0mm *200 x 150*	8.625 x 6.250 *219,1 x 159,0*	—	—	12.00 *304,8*	21.8 *9,8*
8 x 165,1mm *200 x 150*	8.625 x 6.500 *219,1 x 165,1*	—	—	12.00 *304,8*	22.8 *10,3*
8 x 6 *200 x 150*	8.625 x 6.625 *219,1 x 168,3*	—	—	12.00 *304,8*	23.2 *10,5*
267,4mm x 4 *250 x 100*	10.528 x 4.500 *267,4 x 114,3*	—	—	13.00 *330.2*	27.4 *12,4*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

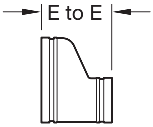


FIGURE 251
CAST
ECCENTRIC REDUCER

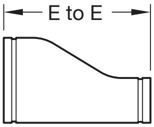


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
267,4mm x 133,0mm *205 x 125*	10.528 x 5.250 *267,4 x 133,0*	—	—	13.00 *330.2*	28.6 *12,9*
267,4mm x 139,7mm *250 x 125*	10.528 x 5.500 *267,4 x 139,7*	—	—	13.00 *330.2*	30.2 *13,7*
267,4mm x 5 *250 x 125*	10.528 x 5.563 *267,4 x 141,3*	—	—	13.00 *330.2*	31.0 *14,1*
267,4mm x 159,0mm *250 x 150*	10.528 x 6.250 *267,4 x 159,0*	—	—	13.00 *330.2*	32.1 *14,6*
267,4mm x 165,1mm *250 x 150*	10.528 x 6.500 *267,4 x 165,1*	—	—	13.00 *330.2*	33.0 *14,9*
267,4mm x 6 *250 x 150*	10.528 x 6.625 *267,4 x 168,3*	—	—	13.00 *330.2*	33.5 *15,2*
267,4mm x 8 *250 x 200*	10.528 x 8.625 *267,4 x 219,1*	—	—	13.00 *330.2*	34.0 *15,4*
10 x 4 *250 x 100*	10.750 x 4.500 *273,0 x 114,3*	—	—	13.00 *330.2*	29.7 *13,5*
10 x 133,0mm *250 x 125*	10.750 x 5.250 *273,0 x 133,0*	—	—	13.00 *330.2*	30.0 *13,6*
10 x 139,7mm *250 x 125*	10.750 x 5.500 *273,0 x 139,7*	—	—	13.00 *330.2*	30.8 *13,9*
10 x 5 *250 x 125*	10.750 x 5.563 *273,0 x 141,3*	—	—	13.00 *330.2*	31.7 *14,4*
10 x 159,0mm *250 x 150*	10.750 x 6.250 *273,0 x 159,0*	—	—	13.00 *330.2*	32.7 *14,8*
10 x 165,1mm *250 x 150*	10.750 x 6.500 *273,0 x 165,1*	—	—	13.00 *330.2*	33.3 *15,1*
10 x 6 *250 x 150*	10.750 x 6.625 *273,0 x 168,3*	—	—	13.00 *330.2*	34.0 15,4
10 x 216,3mm *250 x 200*	10.750 x 8.516 *273,0 x 216,3*	—	—	13.00 *330.2*	34.2 *15,5*
10 x 8 *250 x 200*	10.750 x 8.625 *273,0 x 219,1*	—	—	13.00 *330.2*	34.4 *15,6*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

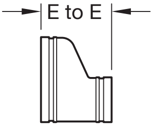


FIGURE 251
CAST
ECCENTRIC REDUCER

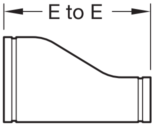


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
318,5mm x 4 *300 x 100*	12.539 x 4.500 *318,5 x 114,3*	—	—	14.00 *355,6*	40.1 *18,2*
318,5mm x 133,0mm *300 x 125*	12.539 x 5.250 *318,5 x 133,0*	—	—	14.00 *355,6*	41.7 *18,9*
318,5mm x 139,7mm *300 x 125*	12.539 x 5.500 *318,5 x 139,7*	—	—	14.00 *355,6*	42.0 *19,1*
318,5mm x 5 *300 x 125*	12.539 x 5.563 *318,5 x 141,3*	—	—	14.00 *355,6*	42.7 *19,3.*
318,5mm x 159,0mm *300 x 150*	12.539 x 6.250 *318,5 x 159,0*	—	—	14.00 *355,6*	43.4 *19,6*
318,5mm x 165,1mm *300 x 150*	12.539 x 6.500 *318,5 x 165,1*	—	—	14.00 *355,6*	44.6 *20,2*
318,5mm x 6 *300 x 150*	12.539 x 6.625 *318,5 x 168,3*	—	—	14.00 *355,6*	45.0 *20,4*
318,5mm x 216,3mm *300 x 200*	12.539 x 8.516 *318,5 x 216,3*	—	—	14.00 *355,6*	47.6 *21,6*
318,5mm x 8 *300 x 200*	12.539 x 8.625 *318,5 x 219,1*	—	—	14.00 *355,6*	48.0 *21,7*
318,5mm x 267,4mm *300 x 250*	12.539 x 10.528 *318,5 x 267,4*	—	—	14.00 *355,6*	49.1 *22,2*
318,5mm x 10 *300 x 250*	12.539 x 10.750 *318,5 x 273,0*	—	—	14.00 *355,6*	50.8 *23,0*
12 x 4 *300 x 100*	12.750 x 4.500 *323,9 x 114,3*	—	—	14.00 *355,6*	41.9 *19,0*
12 x 133,0mm *300 x 125*	12.750 x 5.250 *323,9 x 133,0*	—	—	14.00 *355,6*	42.2 *19,1*
12 x 139,7mm *300 x 125*	12.750 x 5.500 *323,9 x 139,7*	—	—	14.00 *355,6*	43.4 *19,7*
12 x 5 *300 x 125*	12.750 x 5.563 *323,9 x 141,3*	—	—	14.00 *355,6*	44.0 *20,0*
12 x 159,0mm *300 x 150*	12.750 x 6.250 *323,9 x 159,0*	—	—	14.00 *355,6*	44.3 *20,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 251 and Figure 351 Eccentric Reducers

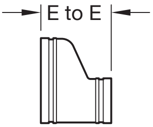


FIGURE 251
CAST
ECCENTRIC REDUCER

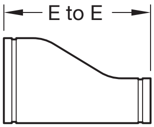


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Figure 251		Figure 351	
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
12 x 165,1mm *300 x 150*	12.750 x 6.500 *323,9 x 165,1*	—	—	14.00 *355,6*	44.7 *20,3*
12 x 6 *300 x 150*	12.750 x 6.625 *323,9 x 168,3*	—	—	14.00 *355,6*	45.2 *20,5*
12 x 216,3mm *300 x 200*	12.750 x 8.516 *323,9 x 216,3*	—	—	14.00 *355,6*	46.3 *21,0*
12 x 8 *300 x 200*	12.750 x 8.625 *323,9 x 219,1*	—	—	14.00 *355,6*	47.7 *21,6*
12 x 267,4mm *300 x 250*	12.750 x 10.528 *323,9 x 267,4*	—	—	14.00 *355,6*	48.9 *22,2*
12 x 10 *300 x 250*	12.750 x 10.750 *323,9 x 273,0*	—	—	14.00 *355,6*	52.0 *23,6*
14 x 6 *350 x 150*	14.000 x 6.625 *355,6 x 168,3*	—	—	19.00 *482,6*	78.0 *35,4*
14 x 216,3mm *350 x 200*	14.000 x 8.516 *355,6 x 216,3*	—	—	19.00 *482,6*	79.1 *35,9*
14 x 8 *350 x 200*	14.000 x 8.625 *355,6 x 219,1*	—	—	19.00 *482,6*	80.0 *36,3*
14 x 267,4mm *350 x 250*	14.000 x 10.528 *355,6 x 267,4*	—	—	19.00 *482,6*	82.5 *37,4*
14 x 10 *350 x 250*	14.000 x 10.750 *355,6 x 273,0*	—	—	19.00 *482,6*	84.0 *38,1*
14 x 318,5mm *350 x 300*	14.000 x 12.539 *355,6 x 318,5*	—	—	19.00 *482,6*	86.3 *39,1*
14 x 12 *350 x 300*	14.000 x 12.750 *355,6 x 323,9*	—	—	19.00 *482,6*	88.0 *39,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 351 Eccentric Reducer, Large Diameter

(1 of 2)

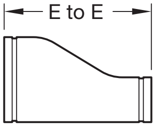


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size ANSI Inches *DN*	Nominal Pipe Size Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
16 x 8 *400 x 200*	16.000 x 8.625 *406,4 x 219,1*	20.00 *508,0*	91.0 *41,3*
16 x 267,4mm *400 x 250*	16.000 x 10.528 *406,4 x 267,4*	20.00 *508,0*	94.5 *42,9*
16 x 10 *400 x 250*	16.000 x 10.750 *406,4 x 273,0*	20.00 *508,0*	96.0 *43,5*
16 x 318,5mm *400 x 300*	16.000 x 12.539 *406,4 x 318,5*	20.00 *508,0*	98.1 *44,5*
16 x 12 *400 x 300*	16.000 x 12.750 *406,4 x 323,9*	20.00 *508,0*	99.0 *44,9*
16 x 14 *400 x 350*	16.000 x 14.000 *406,4 x 355,6*	20.00 *508,0*	104.0 *47,2*
18 x 318,5mm *450 x 300*	18.000 x 12.539 *457,2 x 318,5*	21.00 *533,0*	110.6 *50,2*
18 x 12 *450 x 300*	18.000 x 12.750 *457,2 x 323,9*	21.00 *533,0*	113.0 *51,3*
18 x 14 *450 x 350*	18.000 x 14.000 *457,2 x 355,6*	21.00 *533,0*	117.0 *53,1*
18 x 16 *450 x 400*	18.000 x 16.000 *457,2 x 406,4*	21.00 *533,0*	121.0 *54,9*
20 x 10 *500 x 250*	20.000 x 10.750 *508,0 x 273,0*	26.00 *660,4*	146.2 *66,3*
20 x 12 *500 x 300*	20.000 x 12.750 *508,0 x 323,9*	26.00 *660,4*	149.0 *67,6*
20 x 14 *500 x 350*	20.000 x 14.000 *508,0 x 355,6*	26.00 *660,4*	152.0 *68,9*
20 x 16 *500 x 400*	20.000 x 16.000 *508,0 x 406,4*	26.00 *660,4*	156.0 *70,8*
20 x 18 *500 x 450*	20.000 x 18.000 *508,0 x 457,2*	26.00 *660,4*	160.0 *72,6*
24 x 10 *600 x 250*	24.000 x 10.750 *609,6 x 273,0*	26.00 *660,4*	147.0 *78,9*
24 x 12 *600 x 300*	24.000 x 12.750 *609,6 x 323,9*	26.00 *660,4*	179.0 *81,2*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 351 Eccentric Reducer, Large Diameter

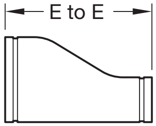


FIGURE 351
FABRICATED
ECCENTRIC REDUCER

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*		
24 x 14 *600 x 350*	24.000 x 14.000 *609,6 x 355,6*	26.00 *660,4*	184.0 *83,5*
24 x 16 *600 x 400*	24.000 x 16.000 *609,6 x 406,4*	26.00 *660,4*	189.0 *85,7*
24 x 18 *600 x 450*	24.000 x 18.000 *609,6 x 457,2*	26.00 *660,4*	194.0 *88,0*
24 x 20 *600 x 500*	24.000 x 20.000 *609,6 x 508,0*	26.00 *660,4*	199.0 *90,3*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 391, 392, and 393 Adapter Nipples

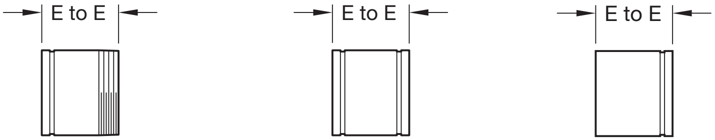


FIGURE 391
ADAPTER NIPPLE
GROOVE X MALE THREAD
FABRICATED

FIGURE 392
ADAPTER NIPPLE
GROOVE X GROOVE
FABRICATED

FIGURE 393
ADAPTER NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Pipe O.D. Inches *mm*		
1 *25*	1.315 *33,4*	3.00 *76,2*	0.6 *0,3*
1-1/4 *32*	1.660 *42,4*	4.00 *101,6*	0.8 *0,4*
1-1/2 *40*	1.900 *48,3*	4.00 *101,6*	0.9 *0,4*
2 *50*	2.375 *60,3*	4.00 *101,6*	1.2 *0,5*
2-1/2 *65*	2.874 *73,0*	4.00 *101,6*	1.9 *0,9*
76,1mm *65*	3.000 *76,1*	4.00 *101,6*	1.9 *0,9*
3 *80*	3.500 *88,9*	4.00 *101,6*	2.5 *1,1*
108,0mm[a] *100*	4.252 *108,0*	6.00 *154,4*	5.0 *2,3*
4 *100*	4.500 *114,3*	6.00 *154,4*	5.4 *2,5*
133,0mm[a] *125*	5.250 *133,0*	6.00 *154,4*	6.9 *3,1*
139,7mm *125*	5.500 *139,7*	6.00 *154,4*	7.1 *3,2*
5 *125*	5.563 *141,3*	6.00 *154,4*	7.3 *3,4*
159,0mm[a] *150*	6.250 *159,0*	6.00 *154,4*	8.7 *3,9*
165,1mm *150*	6.500 *165,1*	6.00 *154,4*	9.1 *4,1*
6 *150*	6.625 *168,3*	6.00 *154,4*	9.4 *4,3*
216,3mm[a] *200*	8.516 *216,3*	6.00 *154,4*	13.8 *6,3*

a. This size is not available for Figure 391 Adapter Nipple Groove x Male Thread Fabricated.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 391, 392, and 393 Adapter Nipples

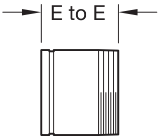


FIGURE 391
ADAPTER NIPPLE
GROOVE X MALE THREAD
FABRICATED

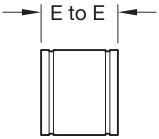


FIGURE 392
ADAPTER NIPPLE
GROOVE X GROOVE
FABRICATED

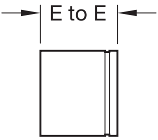


FIGURE 393
ADAPTER NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**Pipe O.D. Inches *mm***		
8 *200*	8.625 *219,1*	6.00 *154,4*	14.2 *6,4*
267,4mm[a] *250*	10.528 *267,4*	8.00 *203,2*	25.0 *11,3*
10 *250*	10.750 *273,0*	8.00 *203,2*	27.0 *12,2*
318,5mm[a] *300*	12.539 *318,5*	8.00 *203,2*	33.0 *15,0*
12 *300*	12.750 *323,9*	8.00 *203,2*	33.0 *15,0*

a. This size is not available for Figure 391 Adapter Nipple Groove x Male Thread Fabricated.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

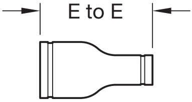


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

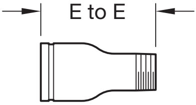


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

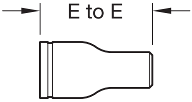


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,4*	6.50 *165,1*	2.0 *0,9*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	6.50 *165,1*	2.0 *0,9*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	6.50 *165,1*	2.0 *0,9*
2-1/2 x 1 *65 x 25*	2.874 x 1.315 *73,0 x 33,4*	7.00 *177,8*	3.5 *1,6*
2-1/2 x 1-1/4 *65 x 32*	2.874 x 1.660 *73,0 x 42,4*	7.00 *177,8*	3.5 *1,6*
2-1/2 x 1-1/2 *65 x 40*	2.874 x 1.900 73,0 x 48,3	7.00 *177,8*	3.5 *1,6*
2-1/2 x 2 *65 x 50*	2.874 x 2.375 *73,0 x 60,3*	7.00 *177,8*	3.5 *1,6*
76,1mm x 1 *65 x 25*	3.000 x 1.315 *76,1 x 33,4*	7.00 *177,8*	3.6 *1,6*
76,1mm x 1-1/4 *65 x 32*	3.000 x 1.660 *76,1 x 42,4*	7.00 *177,8*	3.6 *1,6*
76,1mm x 1-1/2 *65 x 40*	3.000 x 1.900 *76,1 x 48,3*	7.00 *177,8*	3.7 *1,7*
76,1mm x 2 *65 x 50*	3.000 x 2.375 *76,1 x 60,3*	7.00 *177,8*	3.7 *1,7*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	8.00 *203,2*	5.0 *2,3*
3 x 1-1/4 *80 x 32*	3.500 x 1.600 *88,9 x 42,4*	8.00 *203,2*	5.0 *2,3*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	8.00 *203,2*	5.0 *2,3*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	8.00 *203,2*	5.0 *2,3*
3 x 2-1/2 *80 x 65*	3.500 x 2.874 *88,9 x 73,0*	8.00 *203,2*	5.0 *2,3*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

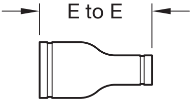


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

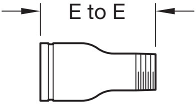


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

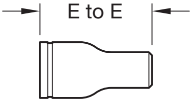


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		**Nominal E to E Inches *mm***	**Approx. Weight Lbs. *kg***
ANSI Inches *DN*	**O.D. Inches *mm***		
3 x 76,1mm *80 x 65*	3.500 x 3.000 *88,9 x 73,0*	8.00 *203,2*	5.2 *2,4*
108,0mm x 1 *100 x 25*	4.252 x 1.315 *108,0 x 33,4*	9.00 *228,6*	5.2 *2,4*
108,0mm x 1-1/4 *100 x 32*	4.252 x 1.660 *108,0 x 42,4*	9.00 *228,6*	5.2 *2,4*
108,0mm x 1-1/2 *100 x 40*	4.252 x 1.900 *108,0 x 48,3*	9.00 *228,6*	5.6 *2,5*
108,0mm x 2 *100 x 50*	4.252 x 2.375 *108,0 x 60,3*	9.00 *228,6*	5.6 *2,5*
108,0mm x 2-1/2 *100 x 65*	4.252 x 2.874 *108,0 x 73,0*	9.00 *228,6*	6.7 *3,0*
108,0mm x 76,1mm *100 x 65*	4.252 x 3.000 *108,0 x 76,1*	9.00 *228,6*	6.7 *3,0*
108,0mm x 3 *100 x 80*	4.252 x 3.500 *108,0 x 88,9*	9.00 *228,6*	6.7 *3,0*
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	9.00 *228,6*	8.0 *3,6*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,4*	9.00 *228,6*	8.0 *3,6*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	9.00 *228,6*	8.0 *3,6*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	9.00 *228,6*	8.0 *3,6*
4 x 2-1/2 *100 x 65*	4.500 x 2.874 *114,3 x 73,0*	9.00 *228,6*	8.0 *3,6*
4 x 76,1mm *100 x 65*	4.500 x 3.000 *114,3 x 76,1*	9.00 *228,6*	8.0 *3,6*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	9.00 *228,6*	8.0 *3,6*
133,0mm x 1-1/2[a] *125 x 40*	5.250 x 1.900 *133,0 x 48,3*	11.00 *279,4*	8.4 *3,8*

a. This size is not available for Figure 399 Fabricated Swagged Nipple.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

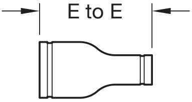


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

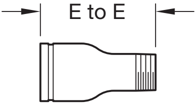


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

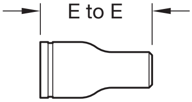


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
133,0mm x 2 *125 x 50*	5.250 x 2.375 *133,0 x 60,3*	11.00 *279,4*	8.4 *3,8*
133,0mm x 2-1/2 *125 x 65*	5.250 x 2.874 *133,0 x 73,0*	11.00 *279,4*	8.4 *3,8*
133,0mm x 76,1mm *125 x 65*	5.250 x 3.000 *133,0 x 76,1*	11.00 *279,4*	8.4 *3,8*
133,0mm x 3 *125 x 80*	5.250 x 3.500 *133,0 x 88,9*	11.00 *279,4*	8.4 *3,8*
133,0mm x 108,0mm[b] *125 x 100*	5.250 x 4.252 *133,0 x 108,0*	11.00 *279,4*	9.1 *4,1*
133,0mm x 4 *125 x 100*	5.250 x 4.500 *133,0 x 114,3*	11.00 *279,4*	9.1 *4,1*
139,7mm x 1-1/2 *125 x 40*	5.500 x 1.900 *139,7 x 48,3*	11.00 *279,4*	9.1 *4,1*
139,7mm x 2 *125 x 50*	5.500 x 2.375 *139,7 x 60,3*	11.00 *279,4*	9.1 *4,1*
139,7mm x 2-1/2 *125 x 65*	5.500 x 2.874 *139,7 x 73,0*	11.00 *279,4*	9.1 *4,1*
139,7mm x 76,1mm *125 x 65*	5.500 x 3.000 *139,7 x 76,1*	11.00 *279,4*	9.1 *4,1*
139,7mm x 3 *125 x 80*	5.500 x 3.500 *139,7 x 88,9*	11.00 *279,4*	11.2 *5,1*
139,7mm x 108,0mm[b] *125 x 100*	5.500 x 4.252 *139,7 x 108,0*	11.00 *279,4*	11.2 *5,1*
139,7mm x 4 *125 x 100*	5.500 x 4.500 *139,7 x 114,3*	11.00 *279,4*	11.2 *5,1*
5 x 1-1/2 *125 x 40*	5.563 x 1.900 141,3 x 48,3	11.00 *279,4*	11.2 *5,1*
5 x 2 *125 x 50*	5.563 x 2.375 141,3 x 60,3	11.00 *279,4*	12.0 *5,4*
5 x 2-1/2 *125 x 65*	5.563 x 2.874 141,3 x 73,0	11.00 *279,4*	12.0 *5,4*

b. This size is not available for Figure 398 Fabricated Swagged Nipple.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

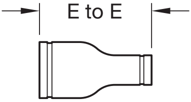


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

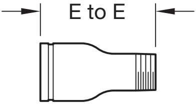


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

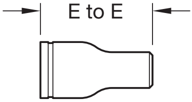


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
5 x 76,1mm *125 x 65*	5.563 x 3.000 141,3 x 76,1	11.00 *279,4*	12.0 *5,4*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	11.00 *279,4*	12.0 *5,4*
5 x 108,0mm[b] *125 x 100*	5.563 x 4.252 *141,3 x 108,0*	11.00 *279,4*	12.0 *5,4*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	11.00 *279,4*	12.0 *5,4*
159,0mm x 1 *150 x 25*	6.250 x 1.315 *159,0 x 33,4*	12.00 *304,8*	12.2 *5,5*
159,0mm x 1-1/4 *150 x 32*	6.250 x 1.660 *159,0 x 42,4*	12.00 *304,8*	12.2 *5,5*
159,0mm x 1-1/2 *150 x 40*	6.250 x 1.900 *159,0 x 48,3*	12.00 *304,8*	12.2 *5,5*
159,0mm x 2 *150 x 50*	6.250 x 2.375 *159,0 x 60,3*	12.00 *304,8*	12.4 *5,6*
159,0mm x 2-1/2 *150 x 65*	6.250 x 2.874 *159,0 x 73,0*	12.00 *304,8*	12.4 *5,6*
159,0mm x 76,1mm *150 x 65*	6.250 x 3.000 *159,0 x 76,1*	12.00 *304,8*	12.4 *5,6*
159,0mm x 3 *150 x 80*	6.250 x 3.500 *159,0 x 88,9*	12.00 *304,8*	12.4 *5,6*
159,0mm x 108,0mm[b] *150 x 100*	6.250 x 4.252 *159,0 x 108,0*	12.00 *304,8*	12.4 *5,6*
159,0mm x 4 *150 x 100*	6.250 x 4.500 *159,0 x 114,3*	12.00 *304,8*	12.9 *5,9*
159,0mm x 133,0mm[b] *150 x 125*	6.250 x 5.250 *159,0 x 133,0*	12.00 *304,8*	12.9 *5,9*
159,0mm x 139,7mm[c] *150 x 125*	6.250 x 5.500 *159,0 x 139,7*	12.00 *304,8*	
159,0mm x 5 *150 x 125*	6.250 x 5.563 *159,0 x 141,3*	12.00 *304,8*	13.0 *5,9*

b. This size is not available for Figure 398 Fabricated Swagged Nipple.
c. This size is not available for Figure 397 Fabricated Swagged Nipple and Figure 399 Fabricated Swagged Nipple

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

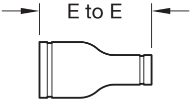


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

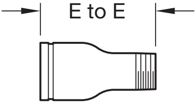


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

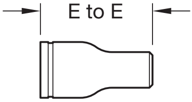


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***		
165,1mm x 1 *150 x 25*	6.500 x 1.315 *165,1 x 33,4*	12.00 *304,8*	15.8 *7,2*
165,1mm x 1-1/4 *150 x 32*	6.500 x 1.660 *165,1 x 42,4*	12.00 *304,8*	15.8 *7,2*
165,1mm x 1-1/2 *150 x 40*	6.500 x 1.900 *165,1 x 48,3*	12.00 *304,8*	15.8 *7,2*
165,1mm x 2 *150 x 50*	6.500 x 2.375 *165,1 x 60,3*	12.00 *304,8*	15.8 *7,2*
165,1mm x 2-1/2 *150 x 65*	6.500 x 2.874 *165,1 x 73,0*	12.00 *304,8*	16.4 *7,4*
165,1mm x 76,1mm *150 x 65*	6.500 x 3.000 *165,1 x 76,1*	12.00 *304,8*	16.4 *7,4*
165,1mm x 3 *150 x 80*	6.500 x 3.500 *165,1 x 88,9*	12.00 *304,8*	16.4 *7,4*
165,1mm x 108,0mm[b] *150 x 100*	6.500 x 4.252 *165,1 x 108,0*	12.00 *304,8*	16.4 *7,4*
165,1mm x 4 *150 x 100*	6.500 x 4.500 *165,1 x 114,3*	12.00 *304,8*	18.0 *8,2*
165,1mm x 133,0mm[b] *150 x 125*	6.500 x 5.250 *165,1 x 133,0*	12.00 *304,8*	18.0 *8,2*
165,1mm x 139,7mm[b] *150 x 125*	6.500 x 5.500 *165,1 x 139,7*	12.00 *304,8*	18.0 *8,2*
165,1mm x 5 *150 x 125*	6.500 x 5.563 *165,1 x 141,3*	12.00 *304,8*	18.0 *8,2*
6 x 1 *150 x 25*	6.625 x 1.315 *168,3 x 33,4*	12.00 *304,8*	19.0 *8,6*
6 x 1-1/4 *150 x 32*	6.625 x 1.660 *168,3 x 42,4*	12.00 *304,8*	19.0 *8,6*
6 x 1-1/2 *150 x 40*	6.625 x 1.900 *168,3 x 48,3*	12.00 *304,8*	19.0 *8,6*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	12.00 *304,8*	19.0 *8,6*

b. This size is not available for Figure 398 Fabricated Swagged Nipple.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 397, 398, and 399 Adapter Nipples

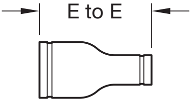


FIGURE 397
SWAGED NIPPLE
GROOVE X GROOVE
FABRICATED

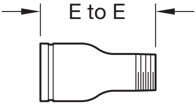


FIGURE 398
SWAGED NIPPLE
GROOVE X MALE THREAD
FABRICATED

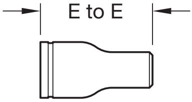


FIGURE 399
SWAGED NIPPLE
GROOVE X PLAIN
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***		
6 x 2-1/2 *150 x 65*	6.625 x 2.874 *168,3 x 73,0*	12.00 *304,8*	19.0 *8,6*
6 x 76,1mm *150 x 65*	6.625 x 3.000 *168,3 x 76,1*	12.00 *304,8*	19.0 *8,6*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	12.00 *304,8*	19.0 *8,6*
6 x 108,0mm[b] *150 x 100*	6.625 x 4.252 *168,3 x 108,0*	12.00 *304,8*	19.0 *8,6*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	12.00 *304,8*	19.0 *8,6*
6 x 133,0mm[b] *150 x 125*	6.625 x 5.250 *168,3 x 133,0*	12.00 *304,8*	19.0 *8,6*
6 x 139,7mm *150 x 125*	6.625 x 5.500 *168,3 x 139,7*	12.00 *304,8*	19.0 *8,6*
6 x 5 *150 x 125*	6.625 x 5.563 *168,3 x 141,3*	12.00 *304,8*	19.0 *8,6*
216,3mm x 165,1mm *200 x 150*	8.516 x 6.500 *216,3 x 165,1*	12.00 *304,8*	21.2 *9,6*
216,3mm x 6 *200 x 150*	8.516 x 6.625 *216,3 x 168,3*	12.00 *304,8*	21.2 *9,6*
8 x 165,1mm *200 x 150*	8.625 x 6.500 *219,1 x 165,1*	12.00 *304,8*	21.2 *9,6*
8 x 6 *200 x 150*	8.625 x 6.625 *219,1 x 168,3*	12.00 *304,8*	21.2 *9,6*

b. This size is not available for Figure 398 Fabricated Swagged Nipple.

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 380 and Figure 395 Adapter Nipples

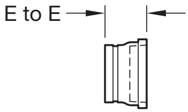


FIGURE 380
ADAPTER NIPPLE
GROOVE X FEMALE THREAD
FABRICATED

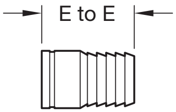


FIGURE 395
ADAPTER NIPPLE
GROOVE X HOSE
FABRICATED

Nominal Pipe Size		Figure 380		Figure 395	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1 *25*	1.315 *33,4*	2.06 *52,4*	0.7 *0,3*	3.00 *76,2*	0.4 *0,2*
1-1/4 *32*	1.600 *42,4*	2.31 *58,7*	1.4 *0,6*	3.63 *92,1*	0.7 *0,3*
1-1/2 *40*	1.900 *48,3*	2.31 *58,7*	1.5 *0,7*	4.00 *101,6*	0.8 *0,4*
2 *50*	2.375 *60,3*	2.50 *63,5*	1.6 *0,7*	4.63 *117,5*	1.3 *0,6*
2-1/2 *65*	2.874 *73,0*	2.75 *69,8*	1.9 *0,9*	5.50 *139,7*	2.1 *1,0*
76,1mm *65*	3.000 *76,1*	2.50 *63,5*	2.0 *0,9*	5.50 *139,7*	2.1 *1,0*
3 *80*	3.500 *88,9*	2.75 *69,9*	2.5 *1,1*	6.00 *152,4*	3.3 *1,5*
108,0mm *100*	4.252 *108,0*	3.25 *82,5*	4.2 *1,9*	7.25 *184,2*	5.0 *2,3*
4 *100*	4.500 *114,3*	3.25 *82,5*	4.5 *2,0*	7.25 *184,2*	5.5 *2,5*
133,0mm *125*	5.250 *133,0*	—	—	9.75 *247,7*	6.9 *3,1*
139,7mm *125*	5.500 *139,7*	—	—	9.75 *247,7*	7.1 *3,2*
5 *125*	5.563 *141,3*	—	—	9.75 *247,7*	8.1 *3,7*
159,0mm *150*	6.250 *159,0*	—	—	11.00 *279,4*	8.7 *3,9*
165,1mm *150*	6.500 *165,1*	—	—	11.00 *279,4*	9.1 *4,1*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Figure 380 and Figure 395 Adapter Nipples

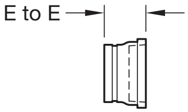


FIGURE 380
ADAPTER NIPPLE
GROOVE X FEMALE THREAD
FABRICATED

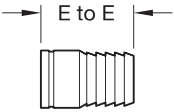


FIGURE 395
ADAPTER NIPPLE
GROOVE X HOSE
FABRICATED

Nominal Pipe Size		Figure 380		Figure 395	
ANSI Inches *DN*	**O.D. Inches *mm***	**Nominal E to E Inches *mm***	**Approx. Weight Lbs. *kg***	**Nominal E to E Inches *mm***	**Approx. Weight Lbs. *kg***
6 *150*	6.625 *168,3*	—	—	11.00 *279,4*	13.2 *6,0*
216,3mm *200*	8.516 *216,3*	—	—	12.50 *317,5*	21.0 *9,5*
8 *200*	8.625 *219,1*	—	—	12.50 *317,5*	24.0 *10,9*
267,4mm *250*	10.528 *267,4*	—	—	14.00 *355,6*	29.0 *13,2*
10 *250*	10.750 *273,0*	—	—	14.00 *355,6*	29.0 *13,2*
318,5mm *300*	12.539 *318,5*	—	—	16.00 *406,4*	46.0 *20,9*
12 *300*	12.750 *323,9*	—	—	16.00 *406,4*	46.0 *20,9*

- Refer to Technical Data Sheet G180 GRINNELL Grooved Fittings Ductile Iron and Fabricated Steel.

Mechanical Tees & Crosses

Figure 730 Threaded Tees and Crosses

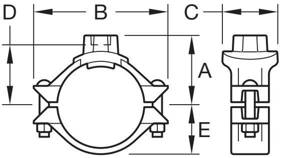


FIGURE 730
MECHANICAL TEE
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches (mm)				
		A	B	C	D Takeout	E
2 x 1/2 *50 x 15*	2.375 x 0.840 *60,3 x 21,3*	2.62 *66,5*	4.88 *124,0*	3.07 *78,0*	2.12 *53,8*	1.59 *40,4*
2 x 3/4 *50 x 20*	2.375 x 1.050 *60,3 x 26,7*	2.62 *66,5*	4.88 *124,0*	3.07 *78,0*	2.12 *53,8*	1.59 *40,4*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,4*	2.62 *66,5*	4.88 *124,0*	3.07 *78,0*	2.12 *53,8*	1.59 *40,4*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,2*	2.78 *70,6*	4.88 *124,0*	3.32 *84,3*	1.93 *49,0*	1.59 *40,4*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	2.75 *69,9*	4.88 *124,0*	3.32 *84,3*	1.93 *49,0*	1.59 *40,4*
2-1/2 x 1/2 *65 x 15*	2.875 x 0.840 *73,0 x 21,3*	2.88 *73,2*	5.25 *133,4*	3.07 *78,0*	2.38 *60,5*	1.81 *46,0*
2-1/2 x 3/4 *65 x 20*	2.875 x 0.840 *73,0 x 21,3*	2.88 *73,2*	5.25 *133,4*	3.07 *78,0*	2.38 *60,5*	1.81 *46,0*
2-1/2 x 1 *65 x 25*	2.875 x 1.315 *73,0 x 33,4*	2.88 *73,2*	5.25 *133,4*	3.07 *78,0*	2.38 *60,5*	1.81 *46,0*
2-1/2 x 1-1/4 *65 x 32*	2.875 x 1.660 *73,0 x 42,2*	3.00 *76,2*	5.25 *133,4*	3.56 *90,4*	2.19 *55,6*	1.81 *46,0*
2-1/2 x 1-1/2 *65 x 40*	2.875 x 1.900 *73,0 x 48,3*	3.07 *78,0*	5.25 *133,4*	3.59 *91,2*	2.17 *55,1*	1.81 *46,0*
2-1/2 x 2 65 x 50	2.875 x 2.375 *73,0 x 60,3*	3.19 *81,0*	5.25 *133,4*	4.00 *101,6*	2.44 *62,0*	1.81 *46,0*
76,1mm x 1/2 *65 x 15*	— *76,1 x 21,3*	2.94 *74,5*	5.62 *142,7*	3.07 *78,0*	2.44 *62,0*	1.87 *47,5*
76,1mm x 3/4 65 x 20	— *76,1 x 26,7*	2.94 *74,5*	5.62 *142,7*	3.07 *78,0*	2.44 *62,0*	1.87 *47,5*
76,1mm x 1 *65 x 25*	— *76,1 x 33,4*	2.94 *74,5*	5.62 *142,7*	3.07 *78,0*	2.44 *62,0*	1.87 *47,5*
76,1mm x 1-1/4 *65 x 32*	— *76,1 x 42,2*	3.06 *77,7*	5.62 *142,7*	3.56 *90,4*	2.25 *57,2*	1.87 *47,5*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded components other than steel pipe, such as dry type sprinklers, etc. may not be compatible with the female threaded outlets of Mechanical Tees and Crosses. Always confirm compatibility by contacting your Tyco Mechanical Products representative.

Figure 730 Threaded Tees and Crosses

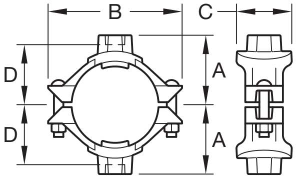


FIGURE 730
MECHANICAL CROSS
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
2 x 1/2 *50 x 15*	1.50 *38,1*	1.63 *41,3*	277.1 *1,2*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.4 *1,5*
2 x 3/4 *50 x 20*	1.50 *38,1*	1.63 *41,3*	433.0 *1,9*	3/8 x 2-1/4 *M10 x 57*	2.3 *1,0*	3.0 *1,4*
2 x 1 *50 x 25*	1.50 *38,1*	1.63 *41,3*	679.1 *3,0*	3/8 x 2-1/4 *M10 x 57*	2.2 *1,0*	3.2 *1,5*
2 x 1-1/4 *50 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.4 *1,5*
2 x 1-1/2 *50 x 40*	1.75 *44,5*	1.88 *47,6*	1418 *6,3*	3/8 x 2-1/4 *M10 x 57*	2.5 1,1	3.9 *1,8*
2-1/2 x 1/2 *65 x 15*	1.50 *38,1*	1.63 *41,3*	277.1 *1,2*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.4 *1,5*
2-1/2 x 3/4 *65 x 20*	1.50 *38,1*	1.63 *41,3*	433.0 *1,9*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.4 *1,5*
2-1/2 x 1 *65 x 25*	1.50 *38,1*	1.63 *41,3*	679.1 *3,0*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.4 *1,5*
2-1/2 x 1-1/4 *65 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.8 *1,7*
2-1/2 x 1-1/2 *65 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	3/8 x 2-1/4 *M10 x 57*	2.6 *1,2*	4.1 *1,9*
2-1/2 x 2 65 x 50	2.00 *50,8*	2.13 *54,0*	2215 *9,9*	3/8 x 2-1/4 *M10 x 57*	2.7 *1,2*	4.1 *1,9*
76,1mm x 1/2 *65 x 15*	1.50 *38,1*	1.63 *41,3*	277.1 *1,2*	– *M10 x 57*	2.5 *1,1*	3.5 *1,6*
76,1mm x 3/4 65 x 20	1.50 *38,1*	1.63 *41,3*	433.0 *1,9*	– *M10 x 57*	2.5 *1,1*	3.5 *1,6*
76,1mm x 1 *65 x 25*	1.50 *38,1*	1.63 *41,3*	679.1 *3,0*	– *M10 x 57*	2.5 *1,1*	3.5 *1,6*
76,1mm x 1-1/4 *65 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	– *M10 x 57*	3.3 *1,5*	5.1 *2,3*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Threaded Tees and Crosses

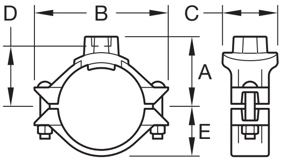


FIGURE 730
MECHANICAL TEE
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*				
		A	B	C	D Takeout	E
76,1mm x 1-1/2 *65 x 40*	— *76,1 x 48,3*	3.13 *79,5*	5.62 *142,7*	3.56 *90,4*	2.25 *57,2*	1.87 *47,5*
76,1mm x 2 *65 x 50*	— *76,1 x 60,3*	3.25 *82,6*	5.62 *142,7*	4.00 *101,6*	2.50 *63,5*	1.87 *47,5*
3 x 1/2 *80 x 15*	3.500 x 0.840 *88,9 x 21,3*	3.19 *81,0*	6.13 *155,7*	3.07 *78,0*	2.56 *65,0*	2.21 *56,1*
3 x 3/4 *80 x 20*	3.500 x 1.050 *88,9 x 26,7*	3.19 *81,0*	6.13 *155,7*	3.07 *78,0*	2.56 *65,0*	2.21 *56,1*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	3.19 *81,0*	6.13 *155,7*	3.07 *78,0*	2.56 *65,0*	2.21 *56,1*
3 x 1-1/4 *80 x 32*	3.500 x 1.660 *88,9 x 42,2*	3.34 *84,8*	6.13 *155,7*	3.32 *84,3*	2.50 *63,5*	2.21 *56,1*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	3.38 85,9	6.13 *155,7*	3.56 *90,4*	2.48 *63,0*	2.21 *56,1*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	3.50 *88,9*	6.13 *155,7*	4.09 *103,9*	2.75 *69,9*	2.21 *56,1*
4 x 1/2 *100 x 15*	4.500 x 0.840 *114,3 x 21,3*	3.69 *93,7*	7.13 *181,1*	3.07 *78,0*	3.06 *77,7*	2.78 *70,6*
4 x 3/4 100 x 20	4.500 x 1.050 *114,3 x 26,7*	3.69 *93,7*	7.13 *181,1*	3.07 *78,0*	3.06 *77,7*	2.78 *70,6*
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	3.69 *93,7*	7.13 *181,1*	3.07 *78,0*	3.06 *77,7*	2.78 *70,6*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,2*	3.92 *99,6*	7.13 *181,1*	3.32 *84,3*	3.00 *76,2*	2.78 *70,6*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	4.00 *101,6*	7.13 *181,1*	3.56 *90,4*	2.98 *75,7*	2.78 *70,6*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	4.00 *101,6*	7.13 *181,1*	4.06 *103,1*	3.25 *82,6*	2.78 *70,6*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	4.00 *101,6*	7.13 *181,1*	4.38 *111,3*	3.12 *79,2*	2.78 *70,6*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded components other than steel pipe, such as dry type sprinklers, etc. may not be compatible with the female threaded outlets of Mechanical Tees and Crosses. Always confirm compatibility by contacting your Tyco Mechanical Products representative.

Figure 730 Threaded Tees and Crosses

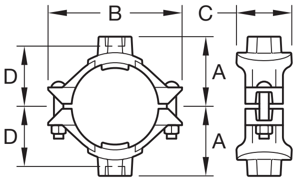


FIGURE 730
MECHANICAL CROSS
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
76,1mm x 1-1/2 *65 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	– *M10 x 57*	3.6 *1,6*	5.7 *2,6*
76,1mm x 2 *65 x 50*	2.00 *50,8*	2.13 *54,0*	2215 *9,9*	– *M10 x 57*	3.7 *1,7*	5.8 *2,6*
3 x 1/2 *80 x 15*	1.50 *38,1*	1.63 *41,3*	277.1 *1,2*	1/2 x 3 *M12 x 76*	3.7 *1,7*	5.2 *2,4*
3 x 3/4 *80 x 20*	1.50 *38,1*	1.63 *41,3*	433.0 *1,9*	1/2 x 3 *M12 x 76*	3.7 *1,7*	5.2 *2,4*
3 x 1 *80 x 25*	1.50 *38,1*	1.63 *41,3*	679.1 *3,0*	1/2 x 3 *M12 x 76*	3.7 *1,7*	5.2 *2,4*
3 x 1-1/4 *80 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	1/2 x 3 *M12 x 76*	3.5 *1,6*	4.6 *2,1*
3 x 1-1/2 *80 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	1/2 x 3 *M12 x 76*	3.7 *1,7*	5.2 *2,4*
3 x 2 *80 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	1/2 x 3 *M12 x 76*	4.7 *2,1*	6.8 *3,1*
4 x 1/2 *100 x 15*	1.50 *38,1*	1.63 *41,3*	277.1 *1,2*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 3/4 *100 x 20*	1.50 *38,1*	1.63 *41,3*	433.0 *1,9*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 1 *100 x 25*	1.50 *38,1*	1.63 *41,3*	679.1 *3,0*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 1-1/4 *100 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 1-1/2 *100 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	1/2 x 3 *M12 x 76*	5.1 *2,3*	6.4 *2,9*
4 x 2 *100 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	1/2 x 3 *M12 x 76*	5.5 *2,5*	7.3 *3,3*
4 x 2-1/2 *100 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	1/2 x 3 *M12 x 76*	6.2 *2,8*	8.7 *3,9*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Threaded Tees and Crosses

(1 of 2)

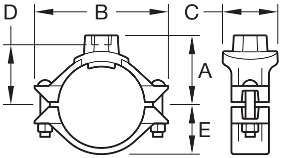


FIGURE 730
MECHANICAL TEE
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*				
		A	B	C	D Takeout	E
4 x 76,1mm *100 x 65*	– *114,3 x 76,1*	4.00 *101,6*	7.13 *181,1*	4.38 *111,3*	3.12 *79,2*	2.78 *70,6*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	4.13 *104,9*	7.13 *181,1*	5.13 *130,3*	3.31 *84,1*	2.78 *70,6*
5 x 1-1/2 *125 x 40*	5.563 x 1.900 *141,3 x 48,3*	4.63 *117,6*	8.13 *206,5*	3.56 *90,4*	4.00 *101,6*	3.37 *85,6*
5 x 2 *125 x 50*	5.563 x 2.375 *141,3 x 60,3*	4.63 *117,6*	8.13 *206,5*	4.06 *103,1*	3.88 *98,6*	3.37 *85,6*
5 x 2-1/2 *125 x 65*	5.563 x 2.875 *141,3 x 73,0*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.88 *98,6*	3.37 *85,6*
5 x 76,1mm *125 x 65*	— *139,7 x 76,1*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.88 *98,6*	3.37 *85,6*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	5.00 *127,0*	8.13 *206,5*	5.13 *130,3*	4.06 *103,1*	3.37 *85,6*
139,7mm x 1-1/2 *125 x 40*	— *139,7 x 48,3*	4.63 *117,6*	8.13 *206,5*	3.56 *90,4*	4.00 *101,6*	3.37 *85,6*
139,7mm x 2 *125 x 50*	— *139,7 x 60,3*	4.63 *117,6*	8.13 *206,5*	4.06 *103,1*	3.88 *98,6*	3.37 *85,6*
139,7mm x 2-1/2 *125 x 65*	— *139,7 x 73,0*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.88 *98,6*	3.37 *85,6*
139,7mm x 76,1mm *125 x 65*	— *139,7 x 76,1*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.88 *98,6*	3.37 *85,6*
139,7mm x 3 *125 x 80*	— *139,7 x 3.500*	5.00 *127,0*	8.13 *206,5*	5.13 *130,3*	4.06 *103,1*	3.37 *85,6*
6 x 1-1/4 *150 x 32*	6.625 x 1.660 *168,3 x 42,2*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	4.25 *108,0*	3.90 *99,1*
6 x 1-1/2 *150 x 40*	6.625 x 1.900 *168,3 x 48,3*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	4.04 *102,6*	3.90 *99,1*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	5.13 *130,3*	9.25 *235,0*	4.06 *103,1*	4.31 109,5	3.90 99,1

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded components other than steel pipe, such as dry type sprinklers, etc. may not be compatible with the female threaded outlets of Mechanical Tees and Crosses. Always confirm compatibility by contacting your Tyco Mechanical Products representative.

Figure 730 Threaded Tees and Crosses

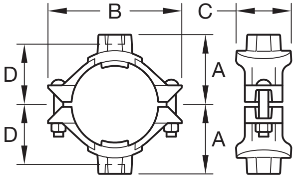


FIGURE 730
MECHANICAL CROSS
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
4 x 76,1mm *100 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M12 x 76*	6.2 *2,8*	8.7 *3,9*
4 x 3 *100 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	1/2 x 3 *M12 x 76*	7.8 *3,5*	11.9 *5,4*
5 x 1-1/2 *125 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	5/8 x 4-3/4 *M16 x 121*	7.8 *3,5*	9.4 *4,3*
5 x 2 *125 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	5/8 x 4-3/4 *M16 x 121*	7.8 *3,5*	9.4 *4,3*
5 x 2-1/2 *125 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	5/8 x 4-3/4 *M16 x 121*	8.9 *4,0*	11.5 *5,2*
5 x 76,1mm *125 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M16 x 121*	8.9 *4,0*	11.5 *5,2*
5 x 3 *125 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	5/8 x 4-3/4 *M16 x 121*	12.7 *5,8*	13.3 *6,0*
139,7mm x 1-1/2 *125 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	— *M16 x 121*	7.8 *3,5*	9.4 *4,3*
139,7mm x 2 *125 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	— *M16 x 121*	7.8 *3,5*	9.4 *4,3*
139,7mm x 2-1/2 *125 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	— *M16 x 121*	8.9 *4,0*	11.5 *5,2*
139,7mm x 76,1mm *125 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M16 x 121*	8.9 *4,0*	11.5 *5,2*
139,7mm x 3 *125 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	— *M16 x 121*	12.7 *5,8*	13.3 *6,0*
6 x 1-1/4 *150 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	5/8 x 4-3/4 *M16 x 121*	7.5 *3,4*	8.7 *3,9*
6 x 1-1/2 *150 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	5/8 x 4-3/4 *M16 x 121*	7.5 *3,4*	8.7 *3,9*
6 x 3 *150 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	5/8 x 4-3/4 *M16 x 121*	10.3 *4,7*	14.1 *6,4*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Threaded Tees and Crosses

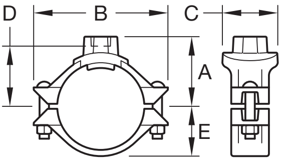


FIGURE 730
MECHANICAL TEE
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*				
		A	B	C	D Takeout	E
6 x 2-1/2 *150 x 65*	6.625 x 2.875 *168,3 x 73,0*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	4.18 *106,2*	3.90 99,1
6 x 76,1mm *150 x 65*	— *168,3 x 76,1*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	4.18 *106,2*	3.90 *99,1*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	5.50 *139,7*	9.25 *235,0*	5.13 *130,3*	4.37 *111,0*	3.90 *99,1*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	5.38 *136,7*	9.25 *235,0*	6.13 *155,7*	4.56 *115,8*	3.90 *99,1*
165,1mm x 1-1/4 *150 x 32*	— *165,1 x 42,2*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	4.25 *108,0*	3.90 *99,1*
165,1mm x 1-1/2 *150 x 40*	— *165,1 x 48,3*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	4.04 *102,6*	3.90 *99,1*
165,1mm x 2 *150 x 50*	— *165,1 x 60,3*	5.13 *130,3*	9.25 *235,0*	4.06 *103,1*	4.31 *109,5*	3.90 *99,1*
165,1mm x 2-1/2 *150 x 65*	— *165,1 x 73,0*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	4.18 *106,2*	3.90 *99,1*
165,1mm x 76,1mm 150 x 65	— *165,1 x 76,1*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	4.18 *106,2*	3.90 *99,1*
165,1mm x 3 *150 x 80*	— *165,1 x 88,9*	5.50 *139,7*	9.25 *235,0)*	5.13 *130,3*	4.37 *111,0*	3.90 *99,1*
165,1mm x 4 *150 x 100*	— *165,1 x 114,3*	5.38 *136,7*	9.25 *235,0*	6.13 *155,7*	4.56 *115,8*	3.90 *99,1*
8 x 2 *200 x 50*	8.625 x 2.375 *219,1 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.06 *103,1*	*5.50* *139,7*	4.90 *124,5*
8 x 2-1/2 *200 x 65*	8.625 x 2.875 *219,1 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	5.12 *130,0*	4.90 *124,5*
8 x 76,1mm *200 x 65*	— *216,3 x 76,1*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	5.12 *130,0*	4.90 *124,5*
8 x 3 *200 x 80*	8.625 x 3.500 *219,1 x 88,9*	6.25 *158,8*	12.50 *317,5*	5.13 *130,3*	5.37 *136,4*	4.90 *124,5*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded components other than steel pipe, such as dry type sprinklers, etc. may not be compatible with the female threaded outlets of Mechanical Tees and Crosses. Always confirm compatibility by contacting your Tyco Mechanical Products representative.

Figure 730 Threaded Tees and Crosses

(2 of 2)

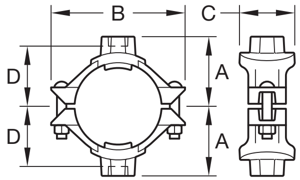


FIGURE 730
MECHANICAL CROSS
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
6 x 2 *150 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	5/8 x 4-3/4 *M16 x 121*	7.7 *3,5*	9.5 *4,3*
6 x 2-1/2 *150 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	5/8 x 4-3/4 *M16 x 121*	8.9 *4,0*	11.3 *5,1*
6 x 76,1mm *150 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	5/8 x 4-3/4 *M16 x 121*	8.9 *4,0*	11.3 *5,1*
6 x 4 *150 x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	5/8 x 4-3/4 *M16 x 121*	11.9 *5,4*	17.3 *7,8*
165,1mm x 1-1/4 *150 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	— *M16 x 121*	7.7 *3,5*	9.5 *4,3*
165,1mm x 1-1/2 *150 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	— *M16 x 121*	7.7 *3,5*	9.5 *4,3*
165,1mm x 2 150 x 50	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	— *M16 x 121*	8.2 *3,7*	9.5 *4,3*
165,1mm x 2-1/2 *150 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	— *M16 x 121*	9.0 *4,1*	11.3 *5,1*
165,1mm x 76,1mm *150 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M16 x 121*	9.0 *4,1*	11.3 *5,1*
165,1mm x 3 *150 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	— *M16 x 121*	10.5 *4,1*	14.1 *6,4*
165,1mm x 4 *150 x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	— *M16 x 121*	12.1 *5,5*	17.3 *7,8*
8 x 2 *200 x 65*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	3/4 x 4-3/4 *M20 x 121*	12.1 *5,5*	14.1 *6,4*
8 x 2-1/2 *200 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	3/4 x 4-3/4 *M20 x 121*	12.6 *5,7*	15.0 *6,8*
8 x 76,1mm *200 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M20 x 121*	12.6 *5,7*	15.0 *6,8*
8 x 3 *200 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	3/4 x 4-3/4 *M20 x 121*	13.6 *6,1*	16.9 *7,7*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Threaded Tees and Crosses

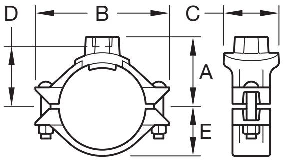


FIGURE 730
MECHANICAL TEE
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*				
		A	B	C	D Takeout	E
8 x 4 *200 x 100*	8.625 x 4.500 *219,1 x 114,3*	6.38 *162,1*	12.50 *317,5*	6.13 *155,7*	5.56 *141,2*	4.90 *124,5*
216,3mm x 2 *200 JIS x 50*	— *216,3 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.06 *103,1*	*5.50* *139,7*	4.90 *124,5*
216,3mm x 2-1/2 *200 JIS x 65*	— *216,3 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	5.12 *130,0*	4.90 *124,5*
216,3mm x 76,1mm *200 JIS x DN65*	— *216,3 x 76,1*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	5.12 *130,0*	4.90 *124,5*
216,3mm x 3 *200 JIS x 80*	— *216,3 x 88,9*	6.50 *165,1*	12.50 *317,5*	5.13 *130,3*	5.37 *136,4*	4.90 *124,5*
216,3mm x 4 *200 JIS x 100*	— *216,3 x 114,3*	6.38 *162,1*	12.50 *317,5*	6.13 *155,7*	5.56 *141,2*	4.90 *124,5*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8” (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded components other than steel pipe, such as dry type sprinklers, etc. may not be compatible with the female threaded outlets of Mechanical Tees and Crosses. Always confirm compatibility by contacting your Tyco Mechanical Products representative.

Figure 730 Threaded Tees and Crosses

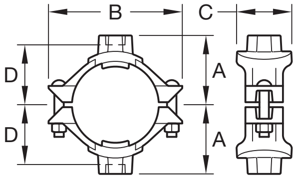


FIGURE 730
MECHANICAL CROSS
THREADED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
8 x 4 *200 x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	3/4 x 4-3/4 *M20 x 121*	15.2 *6,9*	20.0 *9,1*
216,3mm x 2 *200 JIS x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	3/4 x 4-3/4 *M20 x 121*	12.1 *5,5*	14.1 *6,4*
216,3mm x 2-1/2 *200 JIS x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	3/4 x 4-3/4 *M20 x 121*	12.6 *5,7*	15.0 *6,8*
216,3mm x 76,1mm *200 JIS x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M20 x 121*	12.6 *5,7*	15.0 *6,8*
216,3mm x 3 *200 JIS x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	3/4 x 4-3/4 *M20 x 121*	13.6 *6,1*	16.9 *7,7*
216,3mm x 4 *200 JIS x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	3/4 x 4-3/4 *M20 x 121*	15.2 *6,9*	20.0 *9,1*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Grooved Tees and Crosses

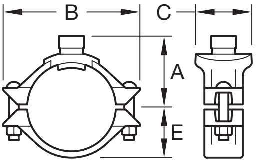


FIGURE 730
MECHANICAL TEE
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*			
		A	B	C	E
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,4*	2.62 *66,5*	4.88 *124,0*	3.07 *78,0*	1.59 *40,4*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,2*	2.78 *70,6*	4.88 *124,0*	3.32 *84,3*	1.59 *40,4*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	2.62 *66,5*	4.88 *124,0*	3.32 *84,3*	1.59 *40,4*
2-1/2 x 1 *65 x 25*	2.875 x 1.315 *73,0 x 33,4*	2.88 *73,2*	5.25 *133,4*	3.07 *78,0*	1.81 *46,0*
2-1/2 x 1-1/4 *65 x 32*	2.875 x 1.660 *73,0 x 42,2*	3.00 *76,2*	5.25 *133,4*	3.56 *90,4*	1.81 *46,0*
2-1/2 x 1-1/2 *65 x 40*	2.875 x 1.900 *73,0 x 48,3*	3.07 *78,0*	5.25 *133,4*	3.59 *91,2*	1.81 *46,0*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	3.19 *81,0*	5.25 *133,4*	4.00 *101,6*	1.81 *46,0*
76,1mm x 1 *65 x 25*	— *76,1 x 33,4*	2.94 *74,5*	5.62 *142,7*	3.07 *78,0*	1.87 *47,5*
76,1mm x 1-1/4 *65 x 32*	— *76,1 x 42,2*	3.06 *77,7*	5.62 *142,7*	3.56 *90,4*	1.87 *47,5*
76,1mm x 1-1/2 *65 x 40*	— *76,1 x 48,3*	3.13 *79,5*	5.62 *142,7*	3.56 *90,4*	1.87 *47,5*
76,1mm x 2 *65 x 50*	— *76,1 x 60,3*	3.25 *82,6*	5.62 *142,7*	4.00 *101,6*	1.87 *47,5*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	3.19 *81,0*	6.13 *155,7*	3.07 *78,0*	2.21 *56,1*
3 x 1-1/4 *80 x 32*	3.500 x 1.660 *88,9 x 42,2*	3.34 *84,8*	6.13 *155,7*	3.32 *84,3*	2.21 *56,1*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	3.38 *85,9*	6.13 *155,7*	3.56 *90,4*	2.21 *56,1*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	3.50 *88,9*	6.13 *155,7*	4.09 *103,9*	2.21 *56,1*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

Figure 730 Grooved Tees and Crosses

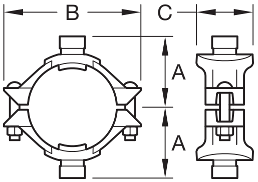


FIGURE 730
MECHANICAL CROSS
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs. / *kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
2 x 1 *50 x 25*	1.50 *38,1*	1.63 *41,3*	679 *3,0*	3/8 x 2-1/4 *M10 x 57*	2.2 *1,0*	3.2 *1,5*
2 x 1-1/4 *50 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.3 *1,5*
2 x 1-1/2 *50 x 40*	1.75 *44,5*	1.88 *47,6*	1418 *6,3*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.7 *1,7*
2-1/2 x 1 *65 x 25*	1.50 *38,1*	1.63 *41,3*	679 *3,0*	3/8 x 2-1/4 *M10 x 57*	2.4 *1,1*	3.4 *1,5*
2-1/2 x 1-1/4 *65 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.8 *1,7*
2-1/2 x 1-1/2 *65 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.9 *1,8*
2-1/2 x 2 *65 x 50*	2.00 *50,8*	2.13 *54,0*	2215 *9,9*	3/8 x 2-1/4 *M10 x 57*	2.5 *1,1*	3.8 *1,7*
76,1mm x 1 *65 x 25*	1.50 *38,1*	1.63 *41,3*	679 *3,0*	— *M10 x 57*	2.5 *1,1*	3.5 *1,6*
76,1mm x 1-1/4 *65 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	— *M10 x 57*	2.5 *1,1*	3.8 *1,7*
76,1mm x 1-1/2 *65 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	— *M10 x 57*	2.5 *1,1*	3.9 *1,8*
76,1mm x 2 *65 x 50*	2.00 *50,8*	2.13 *54,0*	2215 *9,9*	— *M10 x 57*	2.5 *1,1*	3.8 *1,7*
3 x 1 *80 x 25*	1.50 *38,1*	1.63 *41,3*	679 *3,0*	1/2 x 3 *M12 x 76*	3.7 *1,7*	5.2 *2,4*
3 x 1-1/4 *80 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	1/2 x 3 *M12 x 76*	3.5 *1,6*	4.6 *2,1*
3 x 1-1/2 *80 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	1/2 x 3 *M12 x 76*	3.6 *1,6*	5.0 *2,3*
3 x 2 *80 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	1/2 x 3 *M12 x 76*	4.5 *2,0*	6.4 *2,9*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Grooved Tees and Crosses

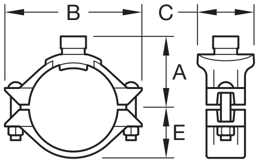


**FIGURE 730
MECHANICAL TEE
GROOVED OUTLET**

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*			
		A	B	C	E
4 x 1 *100 x 25*	4.500 x 1.315 *114,3 x 33,4*	3.69 *93,7*	7.13 *181,1*	3.07 *78,0*	2.78 *70,6*
4 x 1-1/4 *100 x 32*	4.500 x 1.660 *114,3 x 42,2*	3.92 *99,6*	7.13 *181,1*	3.32 *84,3*	2.78 *70,6*
4 x 1-1/2 *100 x 40*	4.500 x 1.900 *114,3 x 48,3*	4.00 *101,6*	7.13 *181,1*	3.56 *90,4*	2.78 *70,6*
4 x 2 *100 xN50*	4.500 x 2.375 *114,3 x 60,3*	4.00 *101,6*	7.13 *181,1*	4.06 *103,1*	2.78 *70,6*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	4.00 *101,6*	7.13 *181,1*	4.38 *111,3*	2.78 *70,6*
4 x 76,1mm *100 x 65*	— *114,3 x 76,1*	4.00 *101,6*	7.13 *181,1*	4.38 *111,3*	2.78 *70,6*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	4.13 *104,9*	7.13 *181,1*	5.13 *130,3*	2.78 *70,6*
5 x 1-1/2 *125 x 40*	5.563 x 1.900 *141,3 x 48,3*	4.63 *117,6*	8.13 *206,5*	3.56 *90,4*	3.37 *85,6*
5 x 2 *125 x 50*	5.563 x 2.375 *141,3 x 60,3*	4.63 *117,6*	8.13 *206,5*	4.06 *103,1*	3.37 *85,6*
5 x 2-1/2 *125 x 65*	5.563 x 2.875 *141,3 x 73,0*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.37 *85,6*
5 x 76,1mm *125 x 65*	— *139,7 x 76,1*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.37 *85,6*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	5.00 *127,0*	8.13 *206,5*	5.13 *130,3*	3.37 *85,6*
139,7mm x 1-1/2 *125 x 40*	— *139,7 x 48,3*	4.63 *117,6*	8.13 *206,5*	3.56 *90,4*	3.37 *85,6*
139,7mm x 2 *125 x 50*	— *139,7 x 60,3*	4.63 *117,6*	8.13 *206,5*	4.06 *103,1*	3.37 *85,6*
139,7mm x 2-1/2 *125 x 65*	— *139,7 x 73,0*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.37 *85,6*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

Figure 730 Grooved Tees and Crosses

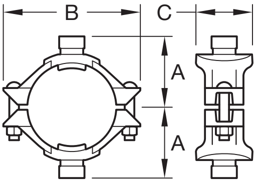


FIGURE 730
MECHANICAL CROSS
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs./*kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
4 x 1 *100 x 25*	1.50 *38,1*	1.63 *41,3*	679 *3,0*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 1-1/4 *100 x 32*	1.75 *44,5*	1.88 *47,6*	1082 *4,8*	1/2 x 3 *M12 x 76*	4.8 *2,2*	5.6 *2,5*
4 x 1-1/2 *100 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	1/2 x 3 *M12 x 76*	5.0 *2,3*	6.2 *2,8*
4 x 2 *100 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	1/2 x 3 *M12 x 89*	5.3 *2,4*	6.9 *3,1*
4 x 2-1/2 *100 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	1/2 x 3 *M12 x 89*	5.9 *2,7*	8.2 *3,7*
4 x 76,1mm *100 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M12 x 89*	5.9 *2,7*	8.2 *3,7*
4 x 3 *100 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	1/2 x 3 *M12 x 89*	7.4 *3,4*	11.1 *5,0*
5 x 1-1/2 *125 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	5/8 x 4-3/4 *M16 x 121*	7.7 *3,5*	9.2 *4,2*
5 x 2 *125 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	5/8 x 4-3/4 *M16 x 121*	7.6 *3,4*	9.0 *4,1*
5 x 2-1/2 *125 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	5/8 x 4-3/4 *M16 x 121*	8.6 *3,9*	11.0 *5,0*
5 x 76,1mm *125 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M16 x 121*	8.6 *3,9*	11.0 *5,0*
5 x 3 *125 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	5/8 x 4-3/4 *M16 x 121*	12.3 *5,6*	12.5 *5,7*
139,7mm x 1-1/2 *125 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	— *M16 x 121*	7.7 *3,5*	9.2 *4,2*
139,7mm x 2 *125 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	— *M16 x 121*	7.6 *3,4*	9.0 *4,1*
139,7mm x 2-1/2 *125 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	— *M16 x 121*	8.6 *3,9*	11.0 *5,0*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Grooved Tees and Crosses

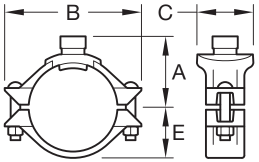


FIGURE 730
MECHANICAL TEE
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal Dimensions - Inches / *mm***			
		A	**B**	**C**	**E**
139,7mm x 76,1mm *125 x 65*	— *139,7 x 76,1*	4.75 *120,7*	8.13 *206,5*	4.38 *111,3*	3.37 *85,6*
139,7mm x 3 *125 x 80*	— *139,7 x 3.500*	5.00 *127,0*	8.13 *206,5*	5.13 *130,3*	3.37 *85,6*
6 x 1-1/4 *150 x 32*	6.625 x 1.660 *168,3 x 42,2*	5.13 *130,3*	9.25 *235,0*	3.56 *90.4*	3.90 *99,1*
6 x 1-1/2 *150 x 40*	6.625 x 1.900 *168,3 x 48,3*	5.13 *130,3*	9.25 *235,0*	3.56 *90.4*	3.90 *99,1*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	5.13 *130,3*	9.25 *235,0*	4.06 *103,1*	3.90 *99,1*
6 x 2-1/2 *150 x 65*	6.625 x 2.875 *168,3 x 73,0*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	3.90 *99,1*
6 x 76,1mm *150 x 65*	— *168,3 x 76,1*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	3.90 *99,1*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	5.50 *139,7*	9.25 *235,0*	5.13 *130,3*	3.90 *99,1*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	5.38 *136,7*	9.25 *235,0*	6.13 *155,7*	3.90 *99,1*
165,1mm x 1-1/4 *150 x 32*	— *165,1 x 42,2*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	3.90 *99,1*
165,1mm x 1-1/2 *150 x 40*	— *165,1 x 48,3*	5.13 *130,3*	9.25 *235,0*	3.56 *90,4*	3.90 *99,1*
165,1mm x 2 *150 x 50*	— *165,1 x 60,3*	5.13 *130,3*	9.25 *235,0*	4.06 *103,1*	3.90 *99,1*
165,1mm x 2-1/2 *150 x 65*	— *165,1 x 73,0*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	3.90 *99,1*
165,1mm x 76,1mm *150 x 65*	— *165,1 x 76,1*	5.13 *130,3*	9.25 *235,0*	4.38 *111,3*	3.90 *99,1*
165,1mm x 3 *150 x 80*	— *165,1 x 88,9*	5.50 *139,7*	9.25 *235,0*	5.13 *130,3*	3.90 *99,1*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8" (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

Figure 730 Grooved Tees and Crosses

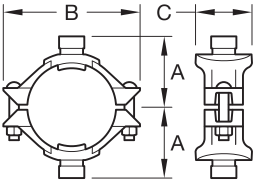


FIGURE 730
MECHANICAL CROSS
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs./*kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
139,7mm x 76,1mm *125 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M16 x 121*	8.6 *3,9*	11.0 *5,0*
139,7mm x 3 *125 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	— *M16 x 121*	12.3 *5,6*	12.5 *5,7*
6 x 1-1/4 *150 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	5/8 x 4-3/4 *M16 x 121*	7.7 *3,5*	9.5 *4,3*
6 x 1-1/2 *150 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	5/8 x 4-3/4 *M16 x 121*	7.6 *3,4*	9.3 *4,2*
6 x 2 *150 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	5/8 x 4-3/4 *M16 x 121*	8.0 *3,6*	9.1 *4,1*
6 x 2-1/2 *150 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	5/8 x 4-3/4 *M16 x 121*	8.8 *4,0*	10.8 *4,9*
6 x 76,1mm *150 x 65*	2.75 *69,9*	2.88 *73,0*	1418 *6,3*	5/8 x 4-3/4 *M16 x 121*	8.8 *4,0*	10.8 *4,9*
6 x 3 *150 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	5/8 x 4-3/4 *M16 x 121*	10.1 *4,6*	13.3 *6,0*
6 x 4 *150 x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	5/8 x 4-3/4 *M16 x 121*	11.6 *5,3*	16.3 *7,4*
165,1mm x 1-1/4 *150 x 32*	2.00 *50,8*	2.13 *54,0*	1082 *4,8*	— *M16 x 121*	7.7 *3,5*	9.5 *4,3*
165,1mm x 1-1/2 *150 x 40*	2.00 *50,8*	2.13 *54,0*	1418 *6,3*	— *M16 x 121*	7.6 *3,4*	9.3 *4,2*
165,1mm x 2 *150 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	— *M16 x 121*	8.0 *3,6*	9.1 *4,1*
165,1mm x 2-1/2 *150 x 65*	2.75 *69,9*	2.88 *73,0*	1082 *4,8*	— *M16 x 121*	8.8 *4,0*	10.8 *4,9*
165,1mm x 76,1mm *150 x 65*	2.75 *69,9*	2.88 *73,0*	1418 *6,3*	— *M16 x 121*	8.8 *4,0*	10.8 *4,9*
165,1mm x 3 *150 x 80*	3.50 *88,9*	3.63 *92,1*	2215 *9,9*	— *M16 x 121*	10.1 *4,6*	13.3 *6,0*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Grooved Tees and Crosses

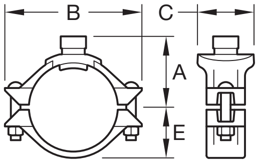


FIGURE 730
MECHANICAL TEE
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*			
		A	B	C	E
165,1mm x 4 *150 x 100*	— *165,1 x 114,3*	5.38 *136,7*	9.25 *235,0*	6.13 *155,7*	3.90 *99,1*
8 x 2 *200 x 50*	8.625 x 2.375 *219,1 x 60,3*	6.25 *158,8*	12.50 *317,5*	4.06 *103,1*	4.09 *124,5*
8 x 2-1/2 *200 x 65*	8.625 x 2.875 *219,1 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	4.09 *124,5*
8 x 76,1mm *200 x 65*	— *219,1 x 76,1*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	4.09 *124,5*
8 x 3 *200 x 80*	8.625 x 3.500 *219,1 x 88,9*	6.50 *165,1*	12.50 *317,5*	5.13 *130,3*	4.09 *124,5*
8 x 4 *200 x 100*	8.625 x 4.500 *219,1 x 114,3*	6.38 *162,1*	12.50 *317,5*	6.13 *155,7*	4.09 *124,5*
216,3mm x 2 *200 JIS x 50*	— *216,3 x 60,3*	6.25 *158,8*	12.50 *317,5*	4.06 *103,1*	4.90 *124,5*
216,3mm x 2-1/2 *200 JIS x 65*	— *216,3 x 73,0*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	4.90 *124,5*
216,3mm x 76,1mm *200 JIS x 65*	— *216,3 x 76,1*	6.25 *158,8*	12.50 *317,5*	4.38 *111,3*	4.90 *124,5*
216,3mm x 3 *200 JIS x 80*	— *216,3 x 88,9*	6.50 *165,1*	12.50 *317,5*	5.13 *130,3*	4.90 *124,5*
216,3mm x 4 *200 JIS x 100*	— *216,3 x 114,3*	6.38 *162,1*	12.50 *317,5*	6.13 *155,7*	4.90 *124,5*

a. Proper outlet hole preparation is required for effective sealing and performance. Inspect the pipe seal surface within 5/8” (15,9 mm) of the hole to ensure it is free from conditions that would adversely 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 Mechanical Crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

Figure 730 Grooved Tees and Crosses

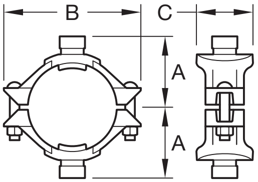


FIGURE 730
MECHANICAL CROSS
GROOVED OUTLET

Nominal Run x Branch ANSI Inches *DN*	Hole Dia.[a]		Max. Branch End Load Lbs. *kN*	Bolt[b] Size Inches *mm*	Approx. Weight Lbs./*kg*	
	Min. Inches *mm*	Max. Inches *mm*			Tee	Cross
165,1mm x 4 *150 x 100*	4.50 *114,3*	4.63 *117,5*	1082 *4,8*	— *M16 x 121*	11.6 *5,3*	16.3 *7,4*
8 x 2 *200 x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	3/4 x 4-3/4 *M20 x 121*	12.1 *5,5*	14.1 *6,4*
8 x 2-1/2 *200 x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	3/4 x 4-3/4 *M20 x 121*	12.3 *5,6*	14.5 *6,6*
8 x 76,1mm *200 x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M20 x 121*	12.3 *5,6*	14.5 *6,6*
8 x 3 *200 x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	3/4 x 4-3/4 *M20 x 121*	13.2 *6,0*	16.1 *7,3*
8 x 4 *200 x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	3/4 x 4-3/4 *M20 x 121*	14.7 *6,7*	19.0 *8,6*
216,3mm x 2 *200 JIS x 50*	2.50 *63,5*	2.63 *66,7*	2215 *9,9*	3/4 x 4-3/4 *M20 x 121*	12.1 *5,5*	14.1 *6,4*
216,3mm x 2-1/2 *200 JIS x 65*	2.75 *69,9*	2.88 *73,0*	3246 *14,4*	3/4 x 4-3/4 *M20 x 121*	12.3 *5,6*	14.5 *6,6*
216,3mm x 76,1mm *200 JIS x 65*	2.75 *69,9*	2.88 *73,0*	3534 *15,7*	— *M20 x 121*	12.3 *5,6*	14.5 *6,6*
216,3mm x 3 *200 JIS x 80*	3.50 *88,9*	3.63 *92,1*	4811 *21,4*	3/4 x 4-3/4 *M20 x 121*	13.2 *6,0*	16.1 *7,3*
216,3mm x 4 *200 JIS x 100*	4.50 *114,3*	4.63 *117,5*	7952 *35,4*	3/4 x 4-3/4 *M20 x 121*	14.7 *6,7*	19.0 *8,6*

b. Gold color coded metric bolt sizes are available upon request.

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved

Figure 730 Mechanical Outlet Loss as Equivalent Pipe Length

Nominal Size Run x Branch ANSI Inches (DN)	Equivalent Length of Schedule 40 Steel Pipe Feet (Meters)	
	Figure 730 Threaded	Figure 730 Grooved
2 x 1 (DN50 x DN25)	2 (0,60)	N/A
2 x 1-1/4 (DN50 x DN32)	4 (1,22)	
2 x 1-1/2 (DN50 x DN40)	13 (3,96)	
2-1/2 x 1 (DN65 x DN25)	2 (0,60)	N/A
2-1/2 x 1-1/4 (DN65 x DN32)	4 (1,22)	
2-1/2 x 1-1/2 (DN65 x DN40)	3 (0,91)	
2-1/2 x 2 (DN65 x DN50)	26 (7,92)	
76,1mm x 1 (DN65 x DN25)	2 (0,60)	N/A
76,1mm x 1-1/4 (DN65 x DN32)	4 (1,22)	
76,1mm x 1-1/2 (DN65 x DN40)	3 (0,91)	
76,1mm x 2 (DN65 x DN50)	26 (7,92)	
3 x 1 (DN80 x DN25)	2 (0,60)	
3 x 1-1/4 (DN80 x DN32)	4 (1,22)	
3 x 1-1/2 (DN80 x DN40)	3 (0,91)	
3 x 2 (DN80 x DN50)	5 (1,52)	
4 x 1 (DN100 x DN25)	2 (0,60)	N/A
4 x 1-1/4 (DN100 x DN32)	4 (1,22)	
4 x 1-1/2 (DN100 x DN40)	3 (0,91)	
4 x 2 (DN100 x DN50)	5 (1,52)	
4 x 2-1/2 (DN100 x DN65)	10 (3,05)	
4 x 76,1mm* (DN100 x DN65)	11 (3,35)	

Notes:
- * Equivalent Length of BS1387 Heavy Pipe
- *Hazen Williams Coefficient = 120*

Figure 730 Mechanical Outlet Loss as Equivalent Pipe Length

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Nominal Size Run x Branch ANSI Inches (DN)	Equivalent Length of Schedule 40 Steel Pipe Feet (Meters)	
	Figure 730 Threaded	Figure 730 Grooved
4 x 3 (DN100 x DN80)	13 (3,96)	
5 x 1-1/2 (DN125 x DN40)	3 (0,91)	
5 x 2 (DN125 x DN50)	5 (1,52)	
5 x 2-1/2 (DN125 x DN65)	10 (3,05)	
5 x 76,1mm* (DN125 x DN65)	11 (3,35)	
5 x 3 (DN125 x DN80)	13 (3,96)	
139,7mm x 1-1/2 (DN125 x DN40)	3 (0.91)	
139,7mm x 2 (DN125 x DN50)	5 (1,52)	
139,7mm x 2-1/2 (DN125 x DN65)	10 (3,05)	
139,7mm x 76,1mm* (DN125 x DN65)	11 (3,35)	
139,7mm x 3 (DN125 x DN80)	13 (3,96)	
6 x 1-1/4 (DN150 x DN32)	4 (1,22)	
6 x 1-1/2 (DN150 x DN40)	3 (0,91)	
6 x 2 (DN150 x DN50)	5 (1,52)	
6 x 2-1/2 (DN150 x DN65)	10 (3,05)	
6 x 76,1mm* (DN150 x DN65)	11 (3,35)	
6 x 3 (DN150 x DN80)	9 (2,74)	
6 x 4 (DN150 x DN100)	14 (4,27)	
165,1mm x 1-1/4 (DN150 x DN32)	4 (1,22)	
165,1mm x 1-1/2 (DN150 x DN40)	3 (0,91)	
165,1mm x 2 (DN150 x DN50)	5 (1,52)	

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved.

Figure 730 Mechanical Outlet Loss as Equivalent Pipe Length

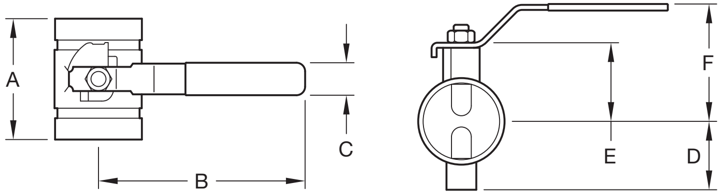
(3 of 3)

Nominal Size Run x Branch ANSI Inches / DN	Equivalent Length of Schedule 40 Steel Pipe Feet (Meters)	
	Figure 730 Threaded	Figure 730 Grooved
165,1mm x 2-1/2 (DN150 x DN65)	10 (3,05)	
165,1mm x 76,1mm* (DN150 x DN65)	11 (3,35)	
165,1mm x 3 (DN150 x DN80)	9 (2,74)	
165,1mm x 4 (DN150 x DN100)	14 (4,27)	
8 x 2 (DN200 x DN65)	5 (1,52)	
8 x 2-1/2 (DN200 x DN65)	10 (3,05)	
8 x 76,1mm* (DN200 x DN65)	11 (3,35)	
8 x 3 (DN200 x DN80)	N/A	9 (2,74)
8 x 4 (DN200 x DN100)	N/A	14 (4,27)
216,3mm X 2 (200 JIS x DN50)	5 (1,52)	
216,3mm X 2-1/2 (200 JIS x DN65)	10 (3,05)	
216,3mm X 76,1mm* (200 JIS x DN65)	11 (3,35)	
216,3mm X 3 (200 JIS x DN80)	N/A	9 (2,74)
216,3mm X 4 (200 JIS x DN100)	N/A	14 (4,27)

- Refer to Technical Data Sheet G210 Mechanical Outlet Tees and Crosses, Threaded/Grooved.

Valves

Model B8101 Low Profile Butterfly Valve

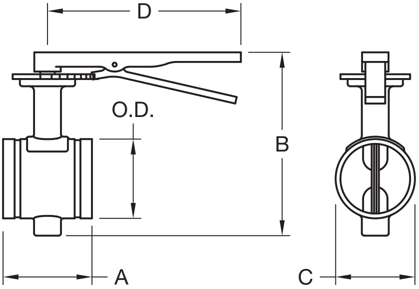


Nominal Pipe Size		Nominal Dimensions Inches *mm*						Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**	**E**	**F**	
2 *50*	2.375 *60,3*	3.39 *86,0*	5.98 *152,0*	0.98 *25,0*	1.81 46,0	1.97 50,0	3.15 80,0	4.2 1,9
2-1/2 *65*	2.875 *73,0*	3.78 *96,0*	5.98 *152,0*	0.98 *25,0*	2.05 52,0	2.40 61,0	3.58 91,0	6.4 2,9
3 *80*	3.500 *88,9*	3.78 *96,0*	8.27 *210,0*	0.98 *25,0*	2.56 65,0	2.64 67,0	4.21 107,0	7.5 3,4
4 *100*	4.500 *114,3*	4.53 *115,0*	8.27 *210,0*	0.98 *25,0*	3.27 83,0	3.27 83,0	4.84 123,0	11.7 5,3
5 *125*	5.563 *141,3*	5.50 *139,7*	12.25 *311,2*	1.26 *32,0*	4.00 101,6	4.00 101,6	6.75 171,5	12.7 5,8
6 *150*	6.625 *168,3*	5.20 *132,0*	12.01 *305,0*	1.26 *32,0*	4.29 109,0	4.29 109,0	6.85 174,0	26.6 12,1

Notes:
- Maximum Working Pressure: 200 psi (13,8 bar)
- For Fire Protection pressure rating, listing and approval information, contact GRINNELL Mechanical Products.
- Refer to Tech Data Sheet G330 for additional information.

Model 680 Butterfly Valve with Lever Handle

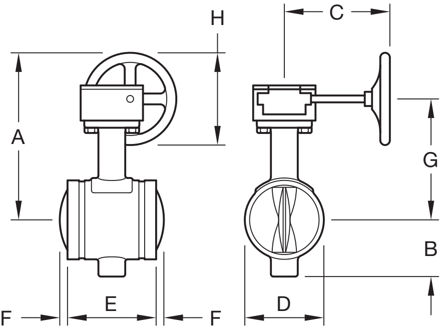
For Copper Tubing (CTS)



Nominal Valve Size ANSI Inches *DN*	Tube O.D. Inches *mm*	Nominal Dimensions Inches mm				Approx. Weight Lbs. *kg*
		A	B	C	D	
2 *50*	2.125 *54,0*	3.19 *81,0*	5.31 *135,0*	2.45 *57,0*	10.00 *254,0*	4.9 *2,2*
2-1/2 *65*	2.625 *66,7*	3.75 *96,0*	5.91 *150,0*	2.63 *67,0*	10.00 *254,0*	5.9 *2,7*
3 *80*	3.125 *79,4*	3.75 *96,0*	7.68 *195,0*	3.13 *79,0*	10.00 *254,0*	6.6 *3,0*
4 *100*	4.125 *104,8*	4.63 *118,0*	8.78 *223,0*	4.13 *105,0*	10.00 *254,0*	11.0 *5,0*
5 *125*	5.125 *130,2*	5.88 *149,0*	9.80 *249,0*	5.13 *130,0*	10.00 *254,0*	17.6 *8,0*
6 *150*	6.125 *155,6*	5.88 *149,0*	10.86 *276,0*	6.13 *156,0*	10.00 *254,0*	21.6 *9,8*

Notes:
- Maximum Working Pressure: 300psi (20,7 bar)
- For Fire Protection pressure rating, listing and approval information, contact GRINNELL Mechanical Products.
- Refer to Technical Data Sheet G530 for additional information.

Models B302 and BN302 Grooved End Butterfly Valve
with Gear Operator (1 of 2)

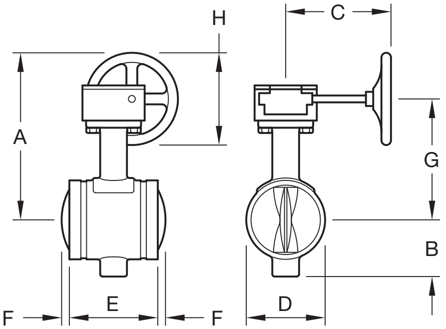


Nominal Pipe Size		Nominal Dimensions Inches *mm*			
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**
2 *50*	2.375 *60,3*	8.44 *214,4*	3.14 *79,8*	7.64 *194,1*	2.89 *73,4*
2-1/2 65	2.875 *73,0*	8.63 *219,2*	3.25 *82,6*	7.64 *194,1*	3.46 *87,9*
3 *80*	3.500 *88,9*	8.90 *226,0*	3.54 *89,9*	7.64 *194,1*	3.97 *100,8*
4 *100*	4.500 *114,3*	9.27 *235,5*	4.35 *110,5*	7.64 *194,1*	5.03 *127,8*
5 *125*	5.563 *141,3*	10.28 *261,1*	4.84 *122,9*	7.64 *194,1*	6.27 *159,3*
6 *150*	6.625 *168,3*	11.57 *293,9*	5.93 *150,6*	7.64 *194,1*	7.25 *184,2*
8 *200*	8.625 *219,1*	14.72 *373,9*	6.87 *174,5*	9.53 *242,1*	9.25 *235,0*
10 *250*	10.750 *273,1*	16.53 *418,9*	9.17 *232,9*	11.54 *293,1*	11.25 *285,8*
12 *300*	12.750 *323,9*	17.52 *445,0*	10.17 *258,3*	11.54 *293,1*	13.14 *333,8*

Notes:
- The Model BN302 Butterfly Valve with Grade "EN" EPDM Disc Seal is NSF 61 Approved to Annex G and NSF372 for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service.
- The Model B302 and the Model BN302 Butterfly Valves conform to MSS SP-67.
- Maximum Working Pressure: Sizes 2 to 10 Inch (DN50 to DN250) - 300 psi (20,7 bar)
  12 Inch (DN300) - 200 psi (13,8 bar)
- Refer to Technical Data Sheet G310 for additional information.

Models B302 and BN302 Grooved End Butterfly Valve

with Gear Operator **(2 of 2)**

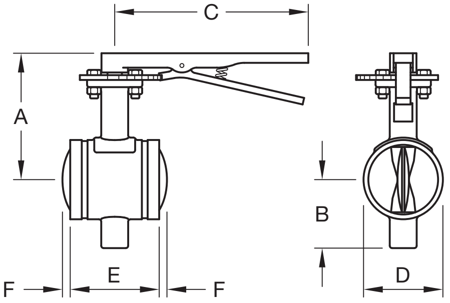


Nominal Pipe Size		Nominal Dimensions Inches *mm*				Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**E**	**F**	**G**	**H**	
2 *50*	2.375 *60,3*	3.33 *84,6*	N/A*	5.48 *139,2*	5.91 *150,1*	21.2 *9,6*
2-1/2 *65*	2.875 *73,0*	3.85 *97,8*	N/A*	5.67 *144,0*	5.91 *150,1*	22.0 *10,0*
3 *80*	3.500 *88,9*	3.85 *97,8*	N/A*	5.94 *150,9*	5.91 *150,1*	23.0 *10,4*
4 *100*	4.500 *114,3*	4.56 *115,8*	N/A*	6.31 *160,3*	5.91 *150,1*	28.0 *12,7*
5 *125*	5.563 *141,3*	5.86 *148,8*	N/A*	7.32 *185,9*	5.91 *150,1*	31.0 *14,1*
6 *150*	6.625 *168,3*	5.86 *148,8*	N/A*	8.61 *218,7*	5.91 *150,1*	41.0 *18,6*
8 *200*	8.625 *219,1*	5.26 *133,6*	1.30 *33,0*	9.80 *248,9*	9.84 *249,9*	53.0 *24,0*
10 *250*	10.750 *273,1*	6.29 *159,8*	1.65 *41,9*	11.61 *294,9*	9.84 *249,9*	88.0 *40,0*
12 *300*	12.750 *323,9*	6.52 *165,6*	2.56 *65,0*	12.60 *320,0*	9.84 *249,9*	106.4 *48,3*

*The end of the Disc does not extend beyond valve body.

Models B302 and BN302 Grooved End Butterfly Valve

with Lever-Lock Operator



Nominal Pipe Size		Nominal Dimensions Inches *mm*						
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**	**E**	**F**	**Approx. Weight Lbs. *kg***
2 *50*	2.375 *60,3*	5.31 *134,9*	3.14 *79,8*	10.50 *266,7*	2.89 *73,4*	3.33 *84,6*	N/A*	6.7 *3,0*
2-1/2 *65*	2.875 *73,0*	5.41 *137,4*	3.25 *82,6*	10.50 *266,7*	3.46 *87,9*	3.85 *97,8*	N/A*	7.5 *3,4*
3 *80*	3.500 *88,9*	5.62 *142,7*	3.54 *89,9*	10.50 *266,7*	3.97 *100,8*	3.85 *97,8*	N/A*	8.7 *4,0*
4 *100*	4.500 *114,3*	6.57 *166,9*	4.35 *110,5*	10.50 *266,7*	5.03 *127,8*	4.56 *115,8*	N/A*	12.2 *5,5*
5 *125*	5.563 *141,3*	7.07 *179,6*	4.84 *122,9*	10.50 *266,7*	6.27 *159,3*	5.86 *148,8*	N/A*	17.3 *7,9*
6 *150*	6.625 *168,3*	8.40 *213,4*	5.93 *150,6*	13.75 *349,3*	7.25 *184,2*	5.86 *148,8*	N/A*	27.4 *12,5*
8 *200*	8.625 *219,1*	9.37 *238,0*	6.87 *174,5*	13.75 *349,3*	9.25 *235,0*	5.26 *133,6*	1.30 *33,0*	37.5 *17,0*

Notes:

* The end of the Disc does not extend beyond valve Body.

- The Model BN302 Butterfly Valve with Grade "EN" EPDM Disc Seal is NSF 61 Approved to Annex G and NSF372 for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service.
- The Model B302 and the Model BN302 Butterfly Valves conform to MSS SP-67.
- Maximum Working Pressure:
  Sizes 2 to 10 Inch (DN50 to DN250) - 300 psi (20,7 bar)
  12 Inch (DN300) - 200 psi (13,8 bar)
- Refer to Technical Data Sheet G310 for additional information.

Models B302 and BN302 Grooved End Butterfly Valve

Operating Temperature Range

Model	Encapsulated Disc Material			
	Grade "E" EPDM[(a)]	Grade "EN" EPDM[(b)]	Grade "T" Nitrile[(c)]	Grade "O" Fluoroelastomer[(d)]
B302	-20°F to 200°F (-29°C to 93° C)	N/A	-20°F to 180°F (-29°C to 82° C)	-20°F to 200°F (-29°C to 93° C)
BN302	N/A	-20°F to 200°F (-29°C to 93° C)	N/A	N/A

a. Recommended for hot water, dilute acids, alkalis, oil free air, and many chemical services not involving petroleum products. Not recommended for hydrocarbons or steam service.
b. Recommended for NSF 61 Approved for potable water. Not recommended for use with hydrocarbons.
c. Recommended for petroleum products, vegetable oils, mineral oils, and air with oils. High-end oil vapor temperature decreases to 150°F (66°C). Not recommended for hot water or hot dry air systems.
d. Recommended for oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons. Not recommended for hot water.
N/A: Not Available

Models B302 and BN302 Grooved End Butterfly Valve

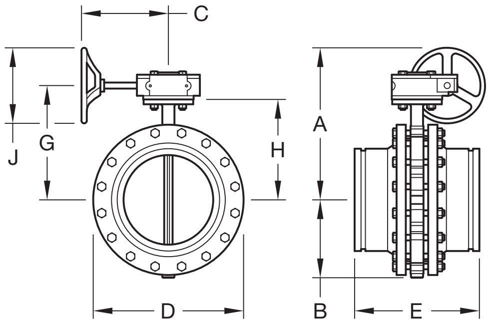
Butterfly Valve Torque

Sizes ANSI *DN*	**Torque Inch Lbs.** ***Nm***		
	100 psi ***6,9 bar***	**200 psi** ***13,8 bar***	**300 psi 20,7 bar**
2 *50*	48 *5*	67 *8*	83 *9*
2-1/2 *65*	48 *5*	67 *8*	83 *9*
3 *80*	100 *11*	134 *15*	168 *19*
4 *100*	185 *21*	251 *16*	317 *36*
5 *125*	294 *33*	410 *46*	499 *56*
6 *150*	520 *59*	705 *80*	890 *101*
8 *200*	1,070 *121*	1,495 *169*	1,798 *203*
10 *250*	1,550 *175*	2,214 *250*	2,654 *300*
12 *300*	2,150 *243*	3,024 *342*	—

Notes:

- The torque values provided in Table B apply to Grade "E" EPDM. When calculating torques for Nitrile or Fluoroelastomer, multiply listed torque by 1.25.
- Refer to Technical Data Sheet G310 for additional information.

Model 308 Grooved End Butterfly Valve

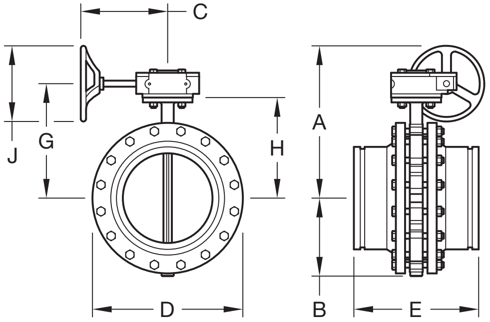


Nominal Pipe size		Nominal Dimensions Inches *mm*			
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**
14 *350*	14.000 *355,6*	22.13 *562,1*	10.50 *266,7*	8.94 *227,1*	21.00 *533,4*
16 *400*	16.000 *406,4*	23.97 *608,8*	12.22 *310,4*	11.82 *300,2*	23.50 *596,9*
18 *450*	18.000 *457,2*	24.87 *631,7*	12.93 *328,4*	11.82 *300,2*	25.00 *635,0*
20 *500*	20.000 *508,0*	27.17 *690,1*	14.22 *361,2*	11.82 *300,2*	27.50 *698,5*
24 *600*	24.000 *609,6*	31.23 *793,2*	15.34 *389,6*	13.78 *350,0*	32.00 *812,8*

Notes:

- Maximum Working Pressure:
  150 psi (10,3 bar) with 316 Stainless Steel Stem
  200 psi (13,8 bar) with 416 Stainless Steel Stem
- Temperature Rating:
  Grade EPDM seat material, -30°F to 230°F (-34°C to 110°C), recommended for water service, dilute acids, alkalies, oil-free air and many chemical services. NOT RECOMMENDED FOR USE IN PETROLEUM SERVICES.
  Grade "T" Nitrile seat material, -20°F to 180°F (-29°C to 82°C), recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils. NOT RECOMMENDED FOR USE IN HOT WATER SERVICES.
- Refer to Tech Data Sheet G610 for specific recommendations on seat material, or contact GRINNELL Mechanical Products.
- Refer to Technical Data Sheet G320 for additional information.

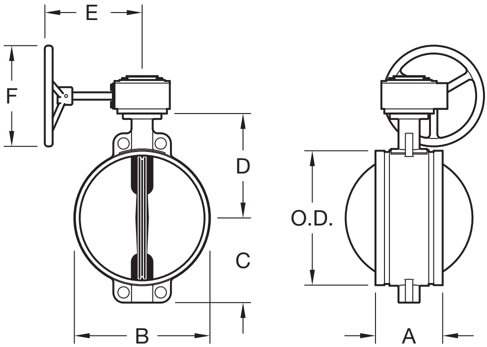
Model 308 Grooved End Butterfly Valve



Nominal Pipe Size		Nominal Dimensions Inches *mm*				Approx. Weight Lbs *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**E**	**G**	**H**	**J**	
14 *350*	14.000 *355,6*	19.13 *485,9*	16.13 *409,7*	14.50 *368,3*	11.81 *300,0*	414.0 *187,8*
16 *400*	16.000 *406,4*	19.54 *496,3*	17.97 *456,4*	15.70 *398,8*	11.81 *300,0*	603.0 *273,5*
18 *450*	18.000 *457,2*	20.29 *515,4*	18.87 *479,3*	16.60 *421,6*	15.75 *400,0*	678.0 *307,5*
20 *500*	20.000 *508,0*	21.31 *541,3*	21.17 *537,7*	18.90 *480,1*	11.81 *300,0*	948.0 *430,0*
24 *600*	24.000 *609,6*	22.14 *562,3*	25.23 *640,8*	22.10 *561,3*	11.81 *300,0*	1274.0 *577,9*

Model B333 Grooved End Butterfly Valve

Large Diameter with Gear Operator



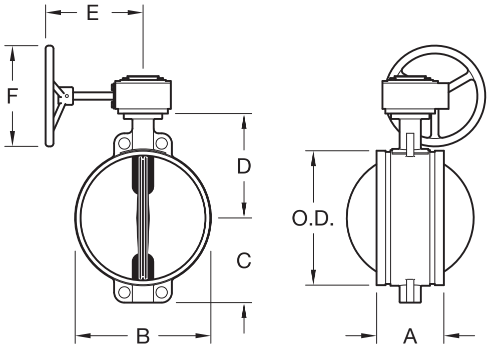
Nominal Pipe Size		Nominal Dimensions			
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A Inches** ***mm***	**B Inches** ***mm***	**C Inches** ***mm***	**D Inches** ***mm***
14 *350*	14.000 *355,6*	7.00 *178*	14.37 *365*	8.82 *224*	10.86 *276*
16 *400*	16.000 *406,4*	7.00 *178*	16.38 *416*	9.76 *248*	11.89 *302*
18 *450*	18.000 *457,2*	8.00 *203*	18.50 *470*	11.14 *283*	13.78 *350*
20 *500*	20.000 *508,0*	8.50 *216*	20.75 *527*	12.36 *314*	15.08 *383*
24 *600*	24.000 *609,6*	10.00 *254*	24.76 629	14.49 *368*	17.83 *463*

Notes:

- Maximum Working Pressure:
  300 psi (20 bar), non-shock cold water
- Operating Temperature Rating:
  Grade "E" EPDM seat material, -30°F (-34°C) to +200°F (93°C) for general service. Recommended for water service, dilute acids, alkalies, oil-free air and many chemical services. NOT RECOMMENDED FOR USE IN PETROLEUM SERVICES
- Grade "T" Nitrile seat material, -20°F (-29°C) to +180°F (+82°C), recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils. NOT RECOMMENDED FOR USE IN HOT WATER SERVICES.
- For specific recommendations on seat material, refer to Tech Data Sheet G610 or contact GRINNELL Mechanical Products.
- Refer to Technical Data Sheet G325 for additional information.

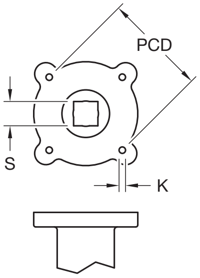
Model B333 Grooved End Butterfly Valve

Large Diameter with Gear Operator



Nominal Pipe Size		Nominal Dimensions		Operating Torque in-lbs *Nm*	Approx Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	E Inches *mm*	F Inches *mm*		
14 *350*	14.000 *355,6*	9.50 *242*	12.00 *305*	3000 *339*	130.0 *59*
16 *400*	16.000 *406,4*	9.50 *242*	12.00 *305*	4000 *452*	147.4 *67*
18 *450*	18.000 *457,2*	11.40 *290*	16.20 *412*	5500 *621,5*	223.5 *101,4*
20 *500*	20.000 *508,0*	11.40 *290*	16.20 *412*	8000 *904*	292.6 *133,0*
24 *600*	24.000 *609,6*	11.40 *290*	16.20 *412*	9500 *1073,5*	352.0 *160,0*

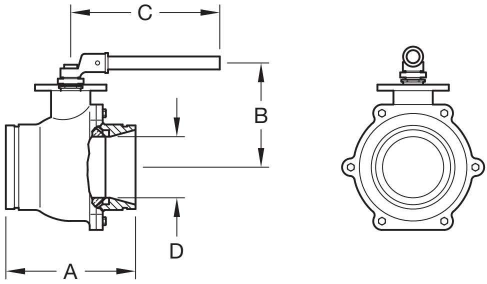
Worm Gear Operator



Nominal Size in *mm*	PCD (dia.) in *mm*	K mm	S Inches *mm*	Weight Lbs *kg*
14 *DN350*	4.90 *125*	M12	0.94 *24*	32.8 *14,9*
16 *DN400*	5.50 *140*	M16	1.44 *36,6*	32.8 *14,9*
18 *DN450*	5.50 *140*	M16	1.736 *44,1*	67.1 *30,5*
20 *DN500*	6.50 *165*	M20	2.04 *52*	67.1 *30,5*
24 *DN600*	6.50 *165*	M20	2.04 *52*	67.1 *30,5*

Model BV835 Ball Valve

with Lever Handle



Nominal Pipe Size		Operating Torque* In-Lbs. *Nm*	Nominal Dimensions Inches *mm*				Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		A	B	C	D	
2 *50*	2.375 *60,3*	150 *17*	5.50 *140,0*	3.75 *95,0*	7.00 *178,0*	1.50 *38,1*	6.4 *2,9*
2-1/2 *65*	2.875 *73,0*	186 *21*	6.25 *159,0*	5.20 *132,0*	10.43 *265,0*	2.00 *51,0*	10.6 *4,8*
3 *80*	3.500 *88,9*	248 *28*	6.56 *167,0*	5.63 *143,0*	10.43 *265,0*	2.50 *63,5*	13.4 *6,1*
4 *100*	4.500 *114,3*	398 *45*	9.45 *240,0*	5.35 *135,8*	23.60 *600,0*	3.50 *90,0*	60.0 *27,2*
6 *150*	6.625 *168,3*	531 *60*	10.15 *258,0*	8.68 *220,5*	23.60 *600,0*	4.92 *125,0*	79.2 *36,0*

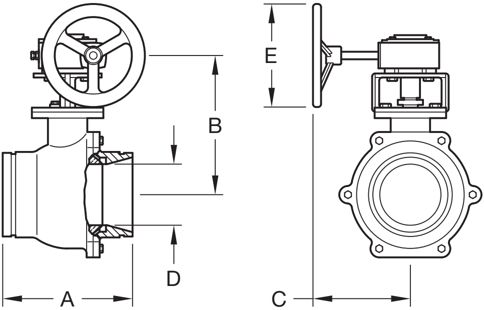
Notes:

* For the first opening or closing of the valve when the valve is not continuously operated, an additional torque of 2.0-2.5 times the listed operating torque is normally required.

- Maximum Working Pressure: 1000 psi (68,9 bar) for sizes 2-3 Inch (DN50-DN80)
  800 psi (55,2 bar) for sizes 4 and 6 Inch (DN100 and DN150)
- Refer to Technical Data Sheet G380 for additional information.

Model BV835 Ball Valve

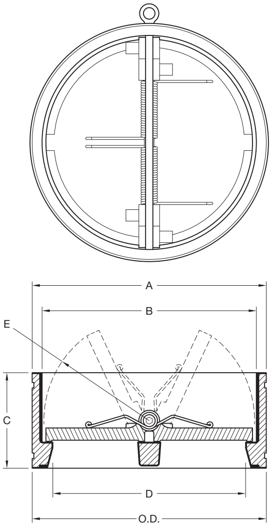
with Gear Operator

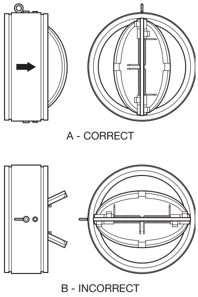


Nominal Pipe Size		Nominal Dimensions Inches *mm*					Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**	**E**	
2 *50*	2.375 *60,3*	5.50 *140,0*	5.38 *137,0*	8.00 *203,2*	1.50 *38,1*	6.00 *152,4*	18.0 *8,0*
2-1/2 *65*	2.875 *73,0*	6.25 *159,0*	5.68 *144,2*	8.00 *203,2*	2.00 *51,0*	6.00 *152,4*	22.0 *10,0*
3 *80*	3.500 *88,9*	6.56 *167,0*	7.16 *182,0*	8.00 *203,2*	2.50 *63,5*	6.00 *152,4*	31.0 *14,0*
4 *100*	4.500 *114,3*	9.45 *240,0*	8.00 *203,2*	8.00 *203,2*	3.50 *90,0*	6.00 *152,4*	73.0 *33,0*
6 *150*	6.625 *168,3*	10.15 *258,0*	10.89 *277,0*	14.00 *356,0*	4.92 *125,0*	12.00 *305,0*	123.4 *56,0*

- Refer to Technical Data Sheet G380 for additional information.

Figure CV890 Dual Disc Check Valve

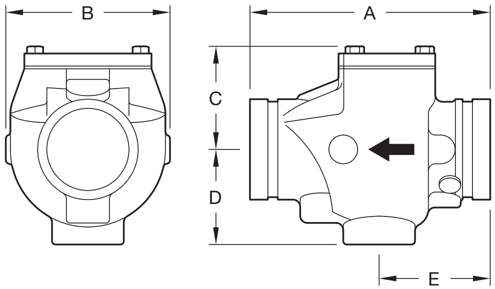


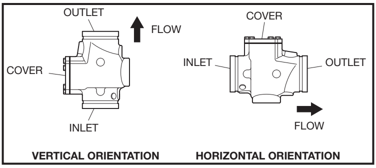


Nominal Pipe Size		Nominal Dimensions Inches *mm*					Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A**	**B**	**C**	**D**	**E**	
14 *350*	14.00 *355,6*	14.49 *368*	12.96 *329*	7.25 *184*	11.14 *283*	6.06 *154*	101 *46*
16 *400*	16.00 *406,4*	16.14 *410*	14.13 *359*	7.50 *191*	12.20 *310*	6.81 *173*	119 *54*
18 *450*	18.00 *457,2*	18.15 *461*	16.42 *417*	8.00 *203*	14.33 *364*	8.00 *203*	169 *77*
20 *200*	20.00 *508,0*	20.04 *509*	18.11 *460*	8.625 *219*	16.06 *408*	8.80 *226*	211 *96*
24 *600*	24.00 *609,6*	24.00 *610*	22.13 *562*	8.75 *222*	18.00 *457*	9.80 *249*	131 *288*

Notes:
- Maximum Working Pressure: 300 psi (20,7 bar)
- Refer to Technical Data Sheet G350 for additional information.

Model 590 Check Valve

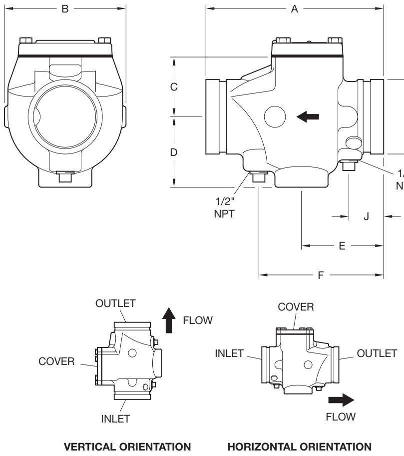




Nominal Pipe Size		Nominal Dimensions Inches *mm*					Cover Bolt Torque Lb.-ft. *Nm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A	B	C	D	E		
2 *50*	2.375 *60,3*	6.75 *171,5*	4.38 *111,3*	1.96 *49,8*	2.57 *65,3*	3.25 *82,3*	18 *25*	9.0 *4,5*
2-1/2 *65*	2.875 *73,0*	8.00 *203,2*	5.38 *136,7*	2.63 *66,7*	3.09 *78,5*	3.87 *98,3*	39 *54*	10.0 *4,5*
76,1 *65*	— *76,1*	8.00 *203,2*	5.38 *136,7*	2.63 *66,7*	3.09 *78,5*	3.87 *98,3*	39 *54*	10.0 *4,5*
3 *80*	3.500 *88,9*	8.37 *212,6*	5.72 *145,3*	2.81 *71,4*	3.31 *84,1*	3.87 *98,3*	39 *54*	11.0 *5,0*
4 *100*	4.500 *114,3*	9.63 *244,6*	6.68 *169,7*	3.80 *96,5*	3.63 *92,2*	4.53 *115,4*	50 *69*	25.0 *11,3*
5 *125*	5.563 *141,3*	10.50 *266,7*	7.40 *188,0*	4.46 *113,3*	4.13 *104,9*	4.90 *124,5*	39 *54*	29.0 *13,2*
139,7 *125*	— *139,7*	10.50 *266,7*	7.40 *188,0*	4.46 *113,3*	4.13 *104,9*	4.90 *124,5*	39 *54*	29.0 *13,2*
6 *150*	6.625 *168,3*	11.50 *292,1*	8.00 *203,2*	4.62 *117,3*	4.50 *114,3*	5.00 *127,0*	60 *82*	47.0 *21,3*
165,1 *150*	— *165,1*	11.50 *292,1*	8.00 *203,2*	4.62 *117,3*	4.50 *114,3*	5.00 *127,0*	60 *82*	47.0 *21,3*
8 *200*	8.625 *219,1*	14.00 *355,6*	10.14 *257,6*	6.67 *169,4*	5.52 *140,2*	5.46 *138,7*	120 *164*	66.0 *29,9*
10 *250*	10.750 *273,1*	18.00 *457,2*	12.38 *314,5*	8.62 *218,9*	6.41 *162,8*	7.50 *190,5*	130 *178*	109.7 *49,4*
12 *300*	12.750 *323,9*	21.00 *533,4*	14.28 *362,7*	9.93 *252,2*	7.27 *184,7*	7.62 *193,5*	130 *178*	151.0 *68,0*

Notes:
- Maximum Working Pressure: 300 psi (20,7 bar)
- Refer to Technical Data Sheet G350 for additional information.

Model CV-1 Grooved End Swing Check Valve

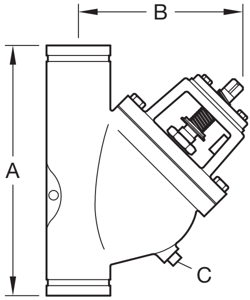


Nominal Pipe Size		Nominal Dimensions Inches *mm*							Cover Bolt Torque Lb.-ft. *Nm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A**	**B**	**C**	**D**	**E**	**F**	**J**		
2 *50*	2.375 *60,3*	6.75 *171,5*	4.38 *111,3*	1.96 *49,8*	2.57 *65,3*	3.25 *82,3*	4.75 *120,7*	1.62 *41,5*	18 *25*	9.0 *4,5*
2-1/2 *65*	2.875 *73,0*	8.00 *203,2*	5.38 *136,7*	2.63 *66,8*	3.40 *86,4*	3.87 *98,3*	5.87 *149,1*	1.64 *41,7*	39 *54*	10.0 *4,5*
76,1 *65*	— *76,1*	8.00 *203,2*	5.38 *136,7*	2.63 *66,8*	3.40 *86,4*	3.87 *98,3*	5.87 *149,1*	1.64 *41,7*	39 *54*	10.0 *4,5*
3 *80*	3.500 *88,9*	8.37 *212,6*	5.72 *145,3*	2.81 *71,4*	3.40 *86,4*	3.87 *98,3*	5.87 *149,1*	1.64 *41,7*	39 *54*	11.0 *5,0*
4 *100*	4.500 *114,3*	9.63 *244,6*	6.68 *169,7*	3.80 *96,5*	3.63 *92,2*	4.56 *115,4*	7.13 *181,1*	1.84 *46,7*	50 *69*	25.0 *11,3*
139,7 *125*	— *139,7*	10.50 *266,7*	7.40 *188,0*	4.46 *113,2*	4.20 *106,7*	4.90 *124,5*	7.50 *190,5*	1.75 *46,7*	39 *54*	29.0 *13,2*
5 *125*	5.563 *141,3*	10.50 *266,7*	7.40 *188,0*	4.46 *113,2*	4.20 *106,7*	4.90 *124,5*	7.50 *190,5*	1.75 *46,7*	39 *54*	29.0 *13,2*
165,1 *150*	— *165,1*	11.50 *292,1*	8.00 *203,2*	4.62 *117,3*	4.50 *114,3*	5.00 *127,0*	7.60 *193,0*	1.85 *47,0*	60 *82*	47.0 *21,3*
6 *150*	6.625 *168,3*	11.50 *292,1*	8.00 *203,2*	4.62 *117,3*	4.50 *114,3*	5.00 *127,0*	7.60 *193,0*	1.85 *47,0*	60 *82*	47.0 *21,3*
8 *200*	8.625 *219,1*	14.00 *355,6*	10.14 *257,6*	6.67 *169,4*	5.52 *140,2*	5.46 *138,7*	8.46 *214,9*	2.13 *54,1*	120 *164*	66.0 *29,9*
10 *250*	10.750 *273,1*	18.00 *457,2*	12.38 *314,5*	8.62 *218,9*	6.41 *162,8*	7.50 *190,5*	10.50 *266,7*	3.00 *76,2*	130 *178*	109.7 *49,4*
12 *300*	12.750 *323,9*	21.00 *533,4*	14.28 *362,7*	9.93 *252,2*	7.27 *184,7*	7.62 *193,5*	10.62 *269,7*	2.75 *69,9*	130 *178*	151.0 *68,0*

Notes:

- Maximum Working Pressure: 300 psi (20,7 bar)
- Refer to Technical Data Sheet G352 for additional information.

Model TD830 Triple Duty Valve



Nominal Pipe Size		Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B OPEN**	**C NPT**	
2 *50*	2.375 *60,3*	9.375 *238,1*	9.625 *244,5*	1/2 *15*	23.0 *10,0*
2-1/2 *65*	2.875 *73,0*	10.250 *260,4*	9.625 *244,5*	1/2 *15*	24.0 *10,9*
3 *80*	3.500 *88,9*	11.250 *285,8*	10.125 *257,2*	1/2 *15*	33.0 *15,0*
4 *100*	4.500 *114,3*	15.625 *397,9*	11.125 *282,6*	1/2 *15*	84.0 *38,0*
5 *125*	5.563 *141,3*	15.625 *397,9*	11.125 *282,6*	1/2 *15*	84.0 *38,0*
6 *150*	6.625 *168,3*	19.625 *498,5*	17.500 *444,5*	3/4 *20*	156.0 *70,0*
8 *200*	8.625 *219,1*	23.625 *600,0*	18.000 *457,2*	3/4 *20*	300.0 *136,0*
10 *250*	10.750 *273,1*	28.000 *711,2*	19.875 *504,8*	1 *25*	392.0 *178,0*
12 *300*	12.750 *323,9*	31.625 *803,3*	25.000 *635,0*	1 *25*	496.0 *225,0*
14 *350*	14.000 *355,6*	33.500 *851,0*	25.000 *635,0*	1 *25*	790.0 *358,3*

Notes:

- Maximum Working Pressure:
  Sizes 2-12 Inch (50mm-300mm)
  640 psi (44 bar) at 100°F (38°C) / 565 psi (39 bar) at 300°F (149°C)
- Size 14 Inch (350mm)
  500 psi (34 bar) at 100°F (38°C)
  400 psi (28 bar) at 300°F (149°C)
- Refer to Technical Data Sheet G390 for additional information.

Model TD830 Triple Duty Valve

Flow Rates

Various Flow Rates at Different Valve Openings							
Size ANSI Inches *DN*	% Valve is Open	Pressure Drop					
		0.5 psi *0.03 bar*	1.0 psi *0.07 bar* Cv	1.5 psi *0.09 bar*	2.0 psi *0.14 bar*	2.5 psi *0.17 bar*	3.0 psi *0.21 bar*
		Nominal Flow Rate gpm *lpm*					
2 *50* 2-1/2 *65*	25%	20 *75,7*	28 *106,0*	35 *132,5*	40 *151,4*	45 *170,3*	49 *185,5*
	50%	29 *109,8*	40 *151,4*	49 *185,5*	54 *204,4*	64 *242,3*	70 *264,0*
	75%	40 *151,4*	56 *211,0*	69 *261,2*	79 *299,1*	89 *336,9*	97 *367,2*
	100%	56 *211,0*	80 *302,8*	98 *371,0*	112 *424,0*	125 *473,2*	145 *548,9*
3 *80*	25%	33 *124,9*	46 *174,1*	57 *215,8*	66 *249,8*	74 *280,1*	81 *306,6*
	50%	48 *181,7*	66 *249,8*	71 *268,8*	95 *359,6*	105 *397,5*	115 *435,3*
	75%	65 *246,1*	90 *340,7*	110 *416,4*	130 *492,1*	142 *537,5*	156 *590,5*
	100%	91 *344,5*	125 *473,2*	155 *586,7*	180 *681,4*	200 *757,1*	220 *832,8*
4 *100* 5 *125*	25%	83 *314,2*	115 *435,3*	142 *537,5*	165 *624,6*	185 *700,3*	200 *757,1*
	50%	115 *435,3*	160 *605,7*	195 *738,2*	225 *851,7*	250 *946,4*	275 *1041,0*
	75%	157 *594,3*	215 *813,9*	265 *1003,1*	205 *776,0*	340 *1287,0*	370 *1400,6*
	100%	220 *832,8*	290 *1097,8*	360 *1362,7*	425 *1608,8*	465 *1760,2*	510 *1930,6*
6 *150*	25%	215 *813,9*	300 *1135,6*	370 *1400,6*	425 *1608,8*	480 *1817,0*	520 *1968,4*
	50%	290 *1097,8*	410 *1552,0*	500 *1892,7*	590 *2233,4*	650 *2465,5*	720 *2725,5*
	75%	380 *1438,5*	540 *2044,1*	660 *2498,4*	760 *2876,9*	850 *3217,6*	930 *3520,4*
	100%	500 *1892,7*	700 *2649,8*	870 *3293,3*	1000 *3785,4*	1120 *4239,7*	1230 *4656,1*

- Refer to Technical Data Sheet G390 for additional information.

Model TD830 Triple Duty Valve

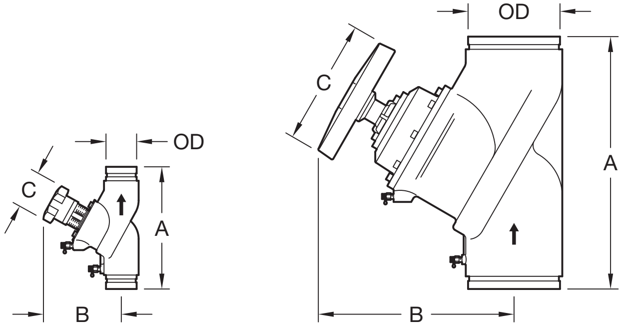
Flow Rates

Various Flow Rates at Different Valve Openings							
Size ANSI Inches *DN*	% Valve is Open	Pressure Drop					
		0.5 psi *0.03 bar*	1.0 psi *0.07 bar* Cv	1.5 psi *0.09 bar*	2.0 psi *0.14 bar*	2.5 psi *0.17 bar*	3.0 psi *0.21 bar*
		Nominal Flow Rate gpm *lpm*					
8 *200*	25%	450 *1703,4*	600 *2271,2*	750 *2839,1*	860 *3255,5*	960 *3634,0*	1050 *3974,7*
	50%	500 *1892,7*	800 *3028,3*	1000 *3785,4*	1150 *4353,2*	1270 *4807,5*	1400 *5299,6*
	75%	700 *2649,8*	1000 *3785,4*	1250 *4731,8*	1400 *5299,6*	1570 *5943,1*	1700 *6435,2*
	100%	880 *3331,2*	1260 *4769,6*	1550 *5867,4*	1800 *6813,7*	2050 *7760,1*	2200 *8327,9*
10 *250*	25%	790 *2990,5*	1100 *4164,0*	1350 *5110,3*	1570 *5943,1*	1750 *6624,5*	1950 *7381,6*
	50%	1000 *3785,4*	1400 *5299,6*	1750 *6624,5*	2050 *7760,1*	2250 *8517,2*	2450 *9274,3*
	75%	1250 *4731,8*	1750 *6624,5*	2150 *8138,6*	2500 *9463,5*	2750 *10410,0*	3000 *11356,0*
	100%	1550 *5867,4*	2150 *8138,6*	2650 *10031,0*	3050 *11546,0*	3400 *12870,0*	3750 *14195,0*
12 *300* **14** *350*	25%	1200 *4542,5*	1700 *6435,2*	2100 *7949,4*	2450 *9274,3*	2700 *10221,0*	3000 *11356,0*
	50%	1550 *5867,4*	2150 *8138,6*	2650 *10031,0*	3050 *11546,0*	3400 *12870,0*	3700 *14006,0*
	75%	1900 *7192,3*	2650 *10031,0*	3300 *12492,0*	3750 *14195,0*	4150 *15709,0*	4650 *17602,0*
	100%	2400 *9085,0*	3320 *12568,0*	4100 *15520,0*	4750 *17981,0*	5250 *19873,0*	5800 *21955,0*

- Refer to Technical Data Sheet G390 for additional information.

Model CB800 Circuit Balancing Valve

Grooved x Grooved Connection

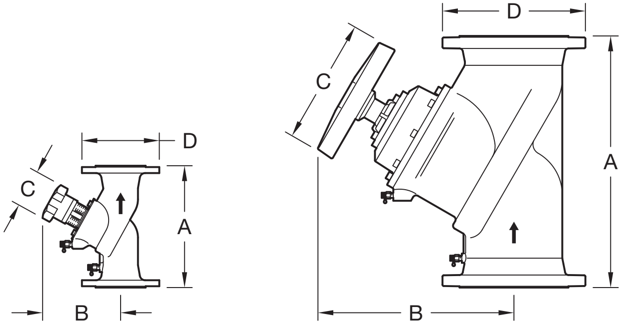


Nominal Pipe Size		Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*	Limits psi/°F *bar/°C*
ANSI Inches *DN*	O.D. Inches *mm*	A	B	C		
2-1/2 *65*	2.875 *73,0*	11.44 *290,6*	7.38 *187,5*	4.33 *110,0*	19.7 *8,9*	300/300 *20,7/150*
76,1 mm *65*	3.000 *76,1*	11.44 *290,6*	7.38 *187,5*	4.33 *110,0*	19.7 *8,9*	300/300 *20,7/150*
3 *80*	3.500 *88,9*	12.25 *311,2*	8.00 *203,2*	4.33 *110,0*	27.8 *12,6*	300/300 *20,7/150*
4 *100*	4.500 *114,3*	13.75 *349,3*	9.44 *239,8*	6.30 *160,0*	45.3 *20,6*	300/300 *20,7/150*
139,7 mm *125*	5.500 *139,7*	15.75 *400,0*	11.13 *282,7*	6.30 *160,0*	70.0 *31,8*	300/300 *20,7/150*
5 *125*	5.563 *141,3*	15.75 *400,0*	11.13 *282,7*	6.30 *160,0*	70.0 *31,8*	300/300 *20,7/150*
165,1 mm *150*	6.500 *165,3*	18.88 *479,6*	11.25 *285,8*	6.30 *160,0*	95.7 *43,5*	300/300 *20,7/150*
6 *150*	6.625 *168,3*	18.88 *479,6*	11.25 *285,8*	6.30 *160,0*	95.7 *43,5*	300/300 *20,7/150*
8 *200*	8.625 *219,1*	23.63 *600,2*	18.44 *468,4*	11.80 *300,0*	255.2 *116,0*	300/300 *20,7/150*
10 *250*	10.750 *273,1*	28.75 *730,3*	18.88 *479,6*	11.80 *300,0*	377.3 *171,5*	300/300 *20,7/150*
12 *300*	12.750 *323,9*	33.44 *849,4*	20.25 *514,4*	11.80 *300,0*	520.3 *236,5*	300/300 *20,7/150*

Notes:
- Maximum Working Pressure: 300 psi (20,7 bar)
- Refer to Technical Data Sheet G450 for additional information.

Model CB800 Circuit Balancing Valve

#125 Flange x #125 Flange Connection



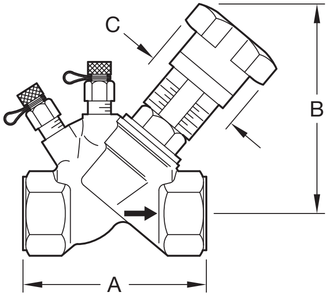
Nominal Pipe Size	Nominal Dimensions Inches *mm*				Approx. Weight Lbs. *kg*	Limits psi/°F *bar/°C*
ANSI Inches *DN*	**A**	**B**	**C**	**D**		
2-1/2 *65*	11.44 *290,6*	7.38 *187,5*	4.33 *110,0*	7.25 *184,2*	31.7 *14,4*	235/300 *16/150*
76,1 mm *65*	11.44 *290,6*	7.38 *187,5*	4.33 *110,0*	7.25 *184,2*	31.7 *14,4*	235/300 *16/150*
3 *80*	12.25 *311,2*	8.00 *203,2*	4.33 *110,0*	7.88 *200,2*	39.8 *18,0*	235/300 *16/150*
4 *100*	13.75 *349,3*	9.50 *241,3*	6.30 *160,0*	8.69 *220,7*	61.3 *27,8*	235/300 *16/150*
139,7 mm *125*	15.75 *400,1*	11.13 *282,7*	6.30 *160,0*	9.88 *250,9*	89.9 *40,9*	235/300 *16/150*
5 *125*	15.75 *400,1*	11.13 *282,7*	6.30 *160,0*	9.88 *250,9*	89.9 *40,9*	235/300 *16/150*
165,1 mm *150*	18.88 *479,6*	11.25 *285,8*	6.30 *160,0*	11.25 *285,8*	113.9 *51,8*	235/300 *16/150*
6 *150*	18.88 *479,6*	11.25 *285,8*	6.30 *160,0*	11.25 *285,8*	113.9 *51,8*	235/300 *16/150*
8 *200*	23.63 *600,2*	18.38 *466,9*	11.80 *300,0*	13.38 *339,9*	361.9 *164,5*	235/300 *16/150*
10 *250*	28.75 *730,3*	18.94 *481,1*	11.80 *300,0*	15.94 *404,9*	431.2 *196,0*	235/300 *16/150*
12 *300*	33.50 *850,9*	20.25 *514,4*	11.80 *300,0*	18.13 *460,5*	581.9 *264,5*	235/300 *16/150*

Notes:

- Flanges are available drilled for ANSI B16.1 (Class 125), B16.5 (Class 150), and B16.42 (Class 250) or PN10/16. Specify when ordering.
- For Flange Drilling Specifications, refer to the Grooved Couplings section, pages 84-85.
- Maximum Working Pressure: 235 psi (16,0 bar)
- Refer to Technical Data Sheet G450 for additional information.

Model CB800 Circuit Balancing Valve

Female NPT Connection (Th x Th)

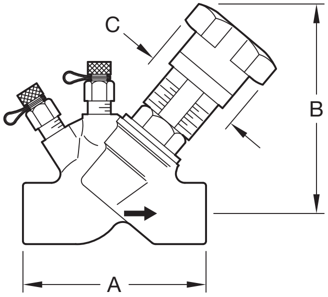


Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*	Limits psi/°F *bar/°C*
	A	B	C		
1/2 *15*	3.13 *79,5*	4.49 *114,0*	2.75 *70,0*	1.6 *0,7*	235/300 *16/150*
3/4 *20*	3.31 *84,1*	4.56 *115,8*	2.75 *70,0*	1.8 *0,8*	235/300 *16/150*
1 *25*	3.84 *97,5*	4.69 *119,1*	2.75 *70,0*	2.5 *1,1*	235/300 *16/150*
1-1/4 *32*	4.38 *111,3*	5.38 *136,7*	2.75 *70,0*	3.0 *1,4*	235/300 *16/150*
1-1/2 *40*	4.75 *120,7*	5.44 *138,2*	2.75 *70,0*	4.0 *1,8*	235/300 *16/150*
2 *50*	5.94 *150,9*	5.81 *147,6*	2.75 *70,0*	6.0 *2,7*	235/300 *16/150*

Notes:
- Maximum Working Pressure: 235 psi (16,0 bar)
- Available in BSP Thread
- Refer to Technical Data Sheet G450 for additional information.

Model CB800 Circuit Balancing Valve

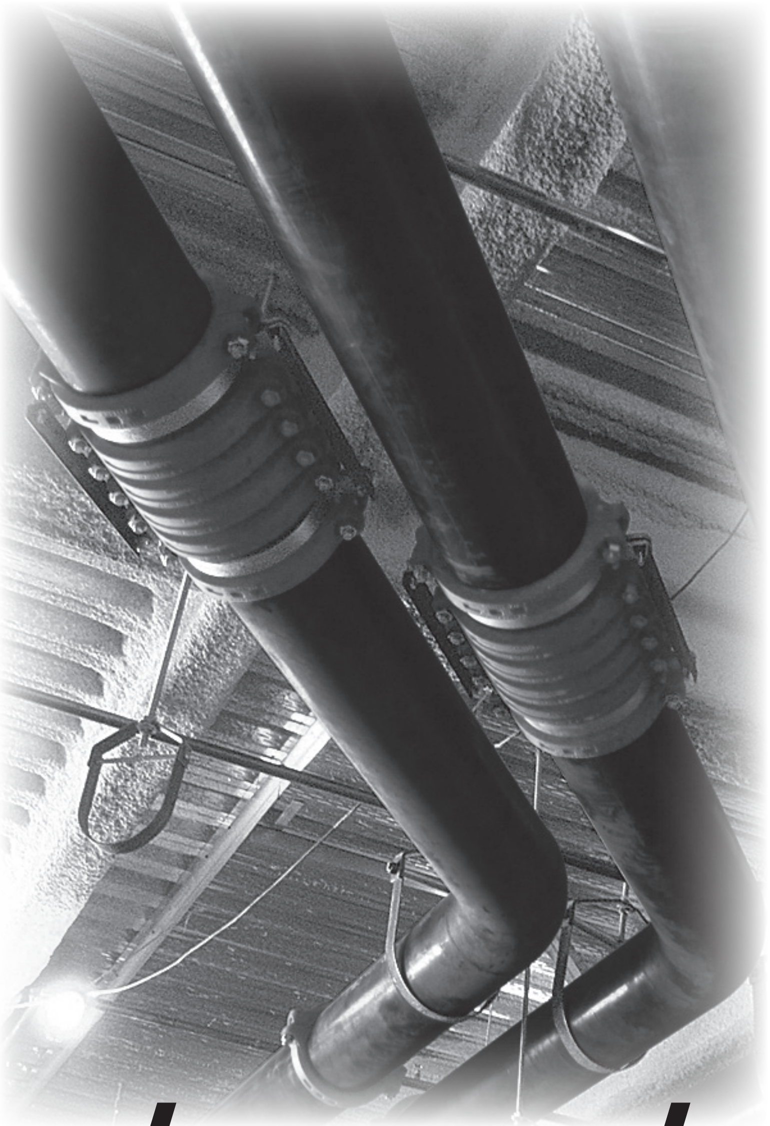
Female Solder Connection (Cup x Cup)



Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*	Limits psi/°F *bar/°C*
	A	B	C		
1/2 *15*	3.50 *88,9*	4.50 *114,3*	2.75 *70,0*	1.6 *0,7*	235/300 *16/150*
3/4 *20*	3.81 *96,8*	4.56 *115,8*	2.75 *70,0*	1.4 *0,6*	235/300 *16/150*
1 *25*	4.31 *109,5*	4.69 *119,1*	2.75 *70,0*	1.8 *0,8*	235/300 *16/150*
1-1/4 *32*	5.06 *128,5*	5.38 *136,7*	2.75 *70,0*	3.1 *1,4*	235/300 *16/150*
1-1/2 *40*	5.56 *141,2*	5.44 *138,2*	2.75 *70,0*	3.8 *1,7*	235/300 *16/150*
2 *50*	6.56 *166,6*	5.81 *147,6*	2.75 *70,0*	5.2 *2,4*	235/300 *16/150*

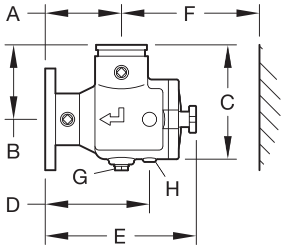
Notes:
- Maximum Working Pressure: 235 psi (16,0 bar)
- Refer to Technical Data Sheet G450 for additional information.

Notes



Accessories

Figure S810 Suction Diffuser

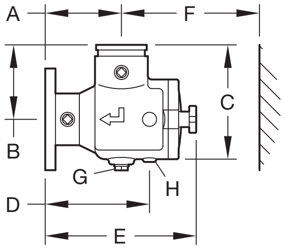


Nominal Pipe Size		Nominal Dimensions Inches *mm*				
ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**A**	**B**	**C**	**D**	**E**
2 x 2 *50 x 50*	2.375 x 2.375 *60,3 x 60,3*	4.50 *114,3*	4.50 *114,3*	6.69 *169,9*	6.13 *155,7*	10.19 *258,8*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	5.00 *127,0*	5.00 *127,0*	7.50 *190,5*	6.56 *166,6*	10.88 *276,4*
2-1/2 x 2-1/2 *65 x 65*	2.875 x 2.875 *73,0 x 73,0*	5.00 *127,0*	5.00 *127,0*	7.50 *190,5*	6.56 *166,6*	10.88 *276,4*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	5.50 *139,7*	5.50 *139,7*	8.48 *215,4*	7.38 *187,5*	11.56 *293,6*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	5.50 *139,7*	5.50 *139,7*	8.48 *215,4*	7.38 *187,5*	11.56 *293,6*
3 x 3 *80 x 80*	3.500 x 3.500 *88,9 x 88,9*	5.50 *139,7*	5.50 *139,7*	8.48 *215,4*	7.38 *187,5*	11.56 *293,6*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	5.75 *146,1*	5.75 *146,1*	9.13 *231,9*	7.63 *193,8*	11.81 *300,0*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	6.50 *165,1*	6.50 *165,1*	10.48 *266,2*	8.75 *222,3*	13.13 *333,5*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	6.50 *165,1*	6.50 *165,1*	10.48 *266,2*	8.75 *222,3*	13.13 *333,5*
4 x 4 *100 x 100*	4.500 x 4.500 *114,3 x 114,3*	6.50 *165,1*	6.50 *165,1*	10.48 *266,2*	8.75 *222,3*	13.13 *333,5*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	6.50 *165,1*	6.50 *165,1*	10.48 *266,2*	8.75 *222,3*	13.13 *333,5*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	6.50 *165,1*	6.50 *165,1*	11.94 *303,3*	10.00 *254,0*	15.75 *400,1*
5 x 5 *125 x 125*	5.563 x 5.563 *141,3 x 141,3*	7.50 *190,5*	7.50 *190,5*	11.94 *303,3*	10.00 *254,0*	15.75 *400,1*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	8.00 *203,2*	8.00 *203,2*	13.31 *338,1*	10.50 *266,7*	16.88 *428,8*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	8.00 *203,2*	8.00 *203,2*	13.31 *338,1*	10.50 *266,7*	16.88 *428,8*

Notes:

- Maximum Working Pressure: 300 psi (20,7 bar) at 100°F (38°C); 165 psi (11,4 bar) at 300°F (149°C)
- Figure S810 Suction Diffuser Screen has the following perforations:
  5/32" (4,0mm) 304 Stainless Steel for Sizes 3" x 2" - 6" x 6" (DN80 x DN50 to DN150 x DN150);
  1/8" Stainless Steel for Sizes 8" x 5" (DN200 x DN125) and Larger.
  Sleeve is 20 mesh 304 Stainless Steel.

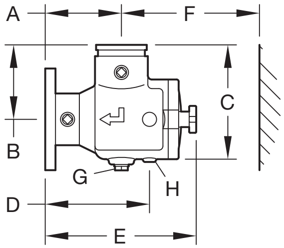
Figure S810 Suction Diffuser



Nominal Pipe Size		Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**Pipe O.D. Inches *mm***	**F Screen Removal**	**G Plug NPT**	**H Pipe Support ID**	
2 x 2 *50 x 50*	2.375 x 2.375 *60,3 x 60,3*	8.81 *223,8*	0.75	0.824 *20,9*	19 *8,6*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	9.13 *231,9*	0.75	1.38 *35,1*	20 *9,1*
2-1/2 x 2-1/2 *65 x 65*	2.875 x 2.875 *73,0 x 73,0*	9.13 *231,9*	0.75	1.38 *35,1*	22 *10,0*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	9.63 *244,6*	0.75	1.38 *35,1*	38.0 *17,2*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	9.63 *244,6*	0.75	1.38 *35,1*	39.0 *17,7*
3 x 3 *80 x 80*	3.500 x 3.500 *88,9 x 88,9*	9.63 *244,6*	0.75	1.38 *35,1*	40.0 *18,1*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	11.18 *284,0*	0.75	1.38 *35,1*	48.0 *21,8*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	9.63 *244,6*	1.00	1.38 *35,1*	49.0 *22,2*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	9.63 *244,6*	1.00	1.38 *35,1*	50.0 *22,7*
4 x 4 *100 x 100*	4.500 x 4.500 *114,3 x 114,3*	9.63 *244,6*	1.00	1.38 *35,1*	52.0 *23,6*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	11.50 *292,1*	1.00	1.38 *35,1*	94.0 *42,6*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	14.00 *355,6*	1.00	1.38 *35,1*	96.0 *43,5*
5 x 5 *125 x 125*	5.563 x 5.563 *141,3 x 141,3*	14.88 *378,0*	1.00	1.38 *35,1*	101.0 *45,8*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	16.56 *420,6*	1.00	1.38 *35,1*	103.0 *46,7*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	16.56 *420,6*	1.00	1.38 *35,1*	106.0 *48,1*

- Refer to Tech Data Sheet G410 for additional information.

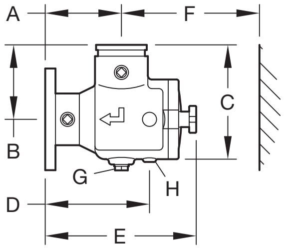
Figure S810 Suction Diffuser



Nominal Pipe Size		Nominal Dimensions Inches *mm*				
ANSI Inches ***DN***	**Pipe O.D. Inches mm**	**A**	**B**	**C**	**D**	**E**
6 x 5 150 x 125	6.625 x 5.563 *168,3 x 141,3*	8.00 *203,2*	8.00 *203,2*	13.31 *338,1*	10.50 *266,7*	16.88 *428,8*
6 x 6 150 x 150	6.625 x 6.625 *168,3 x 168,3*	8.00 *203,2*	8.00 *203,2*	13.31 *338,1*	10.50 *266,7*	16.88 *428,8*
8 x 5 200 x 125	8.625 x 5.563 *219,1 x 141,3*	9.00 *228,6*	9.00 *228,6*	14.38 *365,3*	11.50 *292,1*	17.88 *454,2*
8 x 6 200 x 150	8.625 x 6.625 *219,1 x 168,3*	9.00 *228,6*	9.00 *228,6*	15.31 *388,9*	11.50 *292,1*	17.88 *454,2*
8 x 8 200 x 200	8.625 x 8.625 *219,1 x 219,3*	9.00 *228,6*	9.00 *228,6*	16.75 *425,5*	11.75 *298,5*	20.75 *527,1*
10 x 6 250 x 150	10.750 x 6.625 *273,1 x 168,3*	9.48 *240,8*	9.48 *240,8*	15.50 *393,7*	11.94 *303,3*	18.31 *465,1*
10 x 8 250 x 200	10.750 x 8.625 *273,1 x 219,1*	9.00 *228,6*	9.00 *228,6*	18.44 *468,4*	11.75 *298,5*	20.75 *527,1*
10 x 10 250 x 250	10.750 x 10.750 *273,1 x 273,1*	11.00 *279,4*	11.00 *279,4*	20.00 *508,0*	14.00 *355,6*	26.38 *670,1*
12 x 8 300 x 200	12.750 x 8.625 *323,4 x 219,1*	9.00 *228,6*	9.00 *228,6*	19.63 *498,6*	11.75 298,5	20.75 *527,1*
12 x 10 300 x 250	12.750 x 10.750 *323,4 x 237,1*	11.00 *279,4*	12.75 *323,9*	21.00 *533,4*	14.00 *355,6*	26.38 *670,1*
12 x 12 300 x 300	12.750 x 12.750 *323,4 x 323,4*	12.00 *304,8*	12.00 *304,8*	22.06 *560,3*	15.25 *387,4*	26.18 *665,0*
14 x 10 350 x 250	14.000 x 10.750 *355,6 x 237,1*	11.00 *279,4*	11.00 *279,4*	22.50 *571,5*	14.00 *355,6*	26.38 *670,1*
14 x 12 350 x 300	14.000 x 12.750 *355,6 x 323,4*	12.00 *304,8*	12.00 *304,8*	22.38 *568,5*	15.25 *387,4*	26.18 *665,0*
14 x 14 350 x 350	14.000 x 14.000 *355,6 x 355,6*	14.00 *355,6*	14.00 *355,6*	25.00 *635,0*	17.50 *444,5*	27.75 *704,9*
16 x 14 400 x 350	16.000 x 14.000 *406,4 x 355,6*	14.00 *355,6*	14.00 *355,6*	26.00 *660,4*	17.50 *444,5*	27.88 *708,2*

Notes:
- Maximum Working Pressure: 300 psi (20,7 bar) at 100°F (38°C); 165 psi (11,4 bar) at 300°F (149°C)
- Figure S810 Suction Diffuser Screen has the following perforations:
  5/32" (4,0mm) 304 Stainless Steel for Sizes 3" x 2" - 6" x 6" (DN80 x DN50 to DN150 x DN150);
  1/8" Stainless Steel for Sizes 8" x 5" (DN200 x DN125) and Larger.
  Sleeve is 20 mesh 304 Stainless Steel.

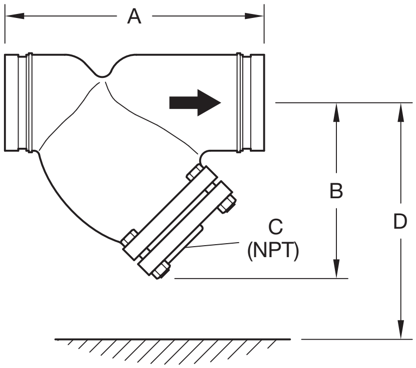
Figure S810 Suction Diffuser



Nominal Pipe Size		Nominal Dimensions Inches *mm*			Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***	**F Screen Removal**	**G Plug NPT**	**H Pipe Support ID**	
6 x 5 150 x 125	6.625 x 5.563 *168,3 x 141,3*	16.56 *420,6*	1.00	1.38 *35,1*	110.0 *49,9*
6 x 6 150 x 150	6.625 x 6.625 *168,3 x 168,3*	16.56 *420,6*	1.00	1.38 *35,1*	113.0 *51,2*
8 x 5 200 x 125	8.625 x 5.563 *219,1 x 141,3*	16.88 *428,8*	1.00	1.38 *35,1*	135.0 *61,2*
8 x 6 200 x 150	8.625 x 6.625 *219,1 x 168,3*	16.88 *428,8*	1.00	1.38 *35,1*	137.0 *62,1*
8 x 8 200 x 200	8.625 x 8.625 *219,1 x 219,3*	22.88 *581,2*	1.25	1.38 *35,1*	222.0 *100,7*
10 x 6 250 x 150	10.750 x 6.625 *273,1 x 168,3*	16.88 *428,8*	1.00	1.38 *35,1*	230.0 *104,3*
10 x 8 250 x 200	10.750 x 8.625 *273,1 x 219,1*	22.88 *581,2*	1.25	1.38 *35,1*	236.0 *107,0*
10 x 10 250 x 250	10.750 x 10.750 *273,1 x 273,1*	30.75 *781,1*	1.25	1.38 *35,1*	343.0 *155,6*
12 x 8 300 x 200	12.750 x 8.625 *323,4 x 219,1*	22.88 *581,2*	1.25	1.38 *35,1*	357.0 *161,9*
12 x 10 300 x 250	12.750 x 10.750 *323,4 x 237,1*	30.75 *781,1*	1.25	1.38 *35,1*	357.0 *161,9*
12 x 12 300 x 300	12.750 x 12.750 *323,4 x 323,4*	30.75 *781,1*	1.25	1.38 *35,1*	357.0 *161,9*
14 x 10 350 x 250	14.000 x 10.750 *355,6 x 237,1*	30.75 *781,1*	1.25	1.38 *35,1*	507.0 *229,9*
14 x 12 350 x 300	14.000 x 12.750 *355,6 x 323,4*	31.00 *787,4*	1.25	1.38 *35,1*	601.0 *272,6*
14 x 14 350 x 350	14.000 x 14.000 *355,6 x 355,6*	33.13 *841,5*	2.00	1.38 *35,1*	706.0 *320,2*
16 x 14 400 x 350	16.000 x 14.000 *406,4 x 355,6*	31.00 *787,4*	2.00	1.38 *35,1*	750.0 *340,1*

- Refer to Tech Data Sheet G410 for additional information.

Figure S853 "Y" Strainer

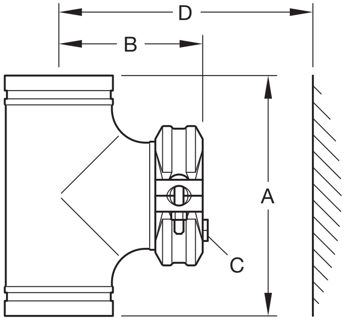


Nominal Pipe Size		Nominal Dimensions Inches *mm*				Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**A**	**B**	**C**	**D Screen Removal**	
2 *50*	2.375 *60,3*	7.88 *200,2*	5.25 *133,4*	0.50 *12,7*	7.00 *177,8*	12.0 *5,4*
2-1/2 *65*	2.875 *73,0*	10.00 *254,0*	6.50 *165,1*	1.00 *25,4*	9.75 *247,7*	18.0 *8,2*
3 *80*	3.500 *88,9*	10.13 *257,3*	7.00 *177,8*	1.00 *25,4*	10.00 *254,0*	23.0 *10,4*
4 *100*	4.500 *114,3*	12.13 *308,1*	8.25 *209,6*	1.50 *38,1*	12.00 *304,8*	42.0 *19,1*
5 *125*	5.563 *141,3*	15.63 *397,0*	11.25 *285,8*	2.00 *50,8*	17.00 *431,8*	80.0 *36,3*
6 *150*	6.625 *168,3*	18.50 *469,9*	13.50 *342,9*	2.00 *50,8*	20.00 *508,0*	112.0 *50,8*
8 *200*	8.625 *219,1*	21.63 *549,4*	15.50 *393,7*	2.00 *50,8*	22.75 *577,9*	205.0 *93,0*
10 *250*	10.750 *273,1*	29.13 *739,8*	21.00 *533,4*	2.00 *50,8*	30.50 *774,7*	277.0 *125,6*
12 *300*	12.750 *323,9*	33.75 *857,3*	25.00 *635,0*	2.00 *50,8*	35.50 *901,7*	470.0 *213,2*

Notes:

- Maximum Working Pressure: 640 psi (44,1 bar) at 100°F (38°C);
  150 psi (10,3 bar) at 565°F (296°C).
- Figure S853 "Y" Strainer perforated screen has the following standard perforations:
  Sizes 2-4 Inch (DN50 - DN100) = 1/16 Inch (1,6 mm)
  Sizes 5-12 Inch (DN125 - DN300) = 1/8 Inch (3,2 mm)
- All covers have an NPT blow-off outlet (pipe plugs not included)
- Refer to Tech Data Sheet G420 for additional information.

Figure S855 Tee Strainer



Nominal Pipe Size		Nominal Dimensions Inches *mm*				Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C Pipe Plug NPT *mm***	**D Screen Removal**	
2 *50*	2.375 *60,3*	6.50 *165,0*	4.25 *108,0*	1/2 *12,7*	7.50 *191,0*	6.0 *2,7*
2-1/2 *65*	2.875 *73,0*	7.50 *191,0*	4.75 *110,0*	1/2 *12,7*	8.75 *222,0*	11.0 *5,0*
3 *80*	3.500 *88,9*	8.50 *216,0*	5.25 *133,0*	1/2 *12,7*	10.00 *254,0*	12.0 *5,4*
4 *100*	4.500 *114,3*	10.00 *254,0*	6.13 *156,0*	1/2 *12,7*	12.00 *305,0*	20.0 *9,0*
5 *125*	5.563 *141,3*	11.00 *279,0*	6.63 *168,0*	3/4 *19,1*	13.50 *342,0*	30.0 *13,0*
6 *150*	6.625 *168,3*	13.00 *330,0*	7.63 *194,0*	3/4 *19,1*	16.00 *406,0*	40.0 *18,0*
8 *200*	8.625 *219,1*	15.50 *394,0*	9.13 *232,0*	3/4 *19,1*	19.44 *494,0*	81.0 *36,0*
10 *250*	10.750 *273,1*	18.00 *457,0*	10.38 *264,0*	1 *25,4*	22.94 *583,0*	126.0 *57,0*
12 *300*	12.750 *323,9*	20.00 *508,0*	11.38 *289,0*	1 *25,4*	25.94 *659,0*	174.0 *79,0*

Notes:
- Maximum Working Pressure:
  Sizes 2-5 Inch (DN50-DN125): 750 psi (51,7 bar) at 100°F (38°C)
  Size 6 Inch (DN150): 700 psi (48,3 bar) at 100°F (38°C)
  Size 8 Inch (DN200): 600 psi (41,7 bar) at 100°F (38°C)
  Size 10 Inch (DN250): 500 psi (34,5 bar) at 100°F (38°C)
  Size 12 Inch (DN300): 400 psi (27,6 bar) at 100°F (38°C)
- Figure S855 Tee Strainer perforated screen has the following perforations:
  Sizes 2-6 Inch (DN50 - DN150) = 1/8 Inch (3,2 mm)
  Sizes 8-12 Inch (DN200 - DN300) = 5/32 Inch (4,0 mm)
- Refer to Tech Data Sheet G430 for additional information.

Figure 7550 Expansion Joint

Grooved Expansion Joints are factory fabricated and calibrated to the specific thermal movement conditions of the piping runs. The joints are manufactured from precision machined grooved nipples with the following GRINNELL Flexible Couplings:

- Figure 705 Couplings are used for sizes 1-1/4 to 12 inch. Refer to Technical Data Sheet G110.
- Figure 707 Couplings are used for sizes 14 and 16 inch. Refer to Technical Data Sheet G130.
- Figure 405 Couplings are used for optional stainless steel assemblies in sizes 1-1/4 to 8 inch. Refer to Technical Data Sheet G565.

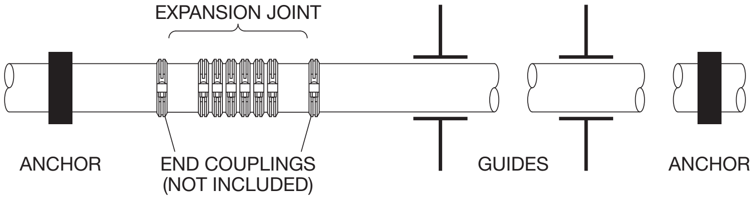


FIGURE 7550 EXPANSION JOINTS
TYPICAL INSTALLATION

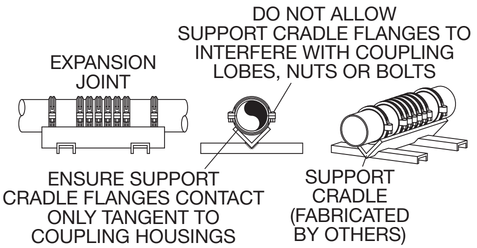


FIGURE 7550
EXPANSION JOINTS

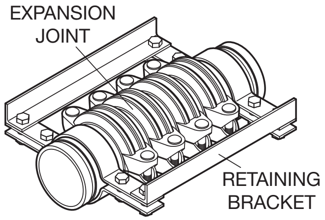
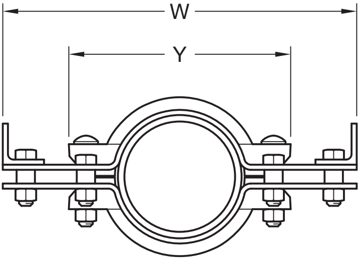


FIGURE 7550
EXPANSION JOINTS
RETAINING BRACKET
DETAIL

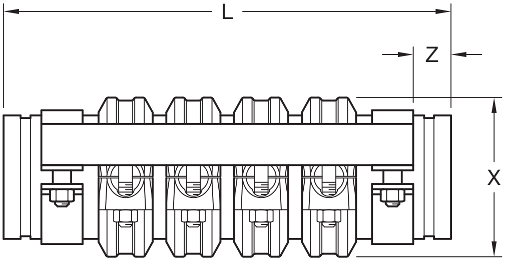
Figure 7550 Expansion Joint



Nominal Dimensions For End Elevation View				
Nominal Pipe Size		Y Coupling Length	W Overall Width	Coupling Movement Capability Inches *mm*
ANSI Inches ***DN***	**O.D. Inches** ***mm***			
1-1/4 *32*	1.660 *42,4*	4.190	9.750	0.125 *3,18*
1-1/2 *40*	1.900 *48,3*	4.440	9.625	0.125 *3,18*
2 *50*	2.375 *60,3*	4.880	10.875	0.125 *3,18*
2-1/2 *65*	2.875 *73,0*	5.500	10.750	0.125 *3,18*
3 *80*	3.500 *88,9*	6.500	11.750	0.125 *3,18*
4 *100*	4.500 *114,3*	7.750	12.937	0.250 *6,35*
5 *125*	5.563 *141,3*	9.750	14.250	0.250 *6,35*
6 *150*	6.625 *168,3*	10.690	15.500	0.250 *6,35*
8 *200*	8.625 *219,1*	13.560	18.250	0.250 *6,35*
10 *250*	10.750 *273,1*	16.380	20.125	0.250 *6,35*
12 *300*	12.750 *323,9*	18.880	22.375	0.250 *6,35*
14 *350*	14.000 *355,6*	20.380	24.125	0.250 *6,35*
16 *400*	16.000 *406,4*	22.640	27.870	0.250 *6,35*

- Refer to Tech Data Sheet G460 for additional information.

Figure 7550-1 Expansion Joint

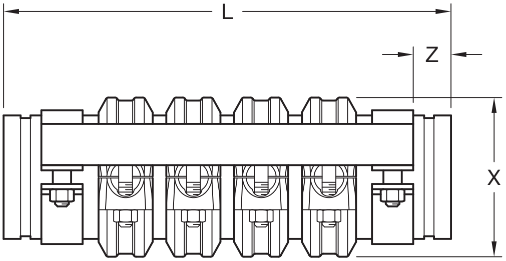


Nominal Dimensions for Side Elevation View Total Movement Length 1 Inch				
Nominal Pipe Size		Flexible[a] Coupling Figure and Quantity	X Coupling Height Inches *mm*	Z Tie Location Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	705 / 8	2.560 *65,02*	1.25 *31,75*
1-1/2 *40*	1.900 *48,3*	705 / 8	2.750 *69,85*	1.25 *31,75*
2 *50*	2.375 *60,3*	705 / 8	3.250 *82,55*	1.25 *31,75*
2-1/2 *65*	2.875 *73,0*	705 / 8	3.690 *93,73*	1.25 *31,75*
3 *80*	3.500 *88,9*	705 / 8	4.380 *111,25*	1.25 *31,75*
4 *100*	4.500 *114,3*	705 / 4	5.690 *144,53*	1.25 *31,75*
5 *125*	5.563 *141,3*	705 / 4	6.880 *174,75*	1.25 *31,75*
6 *150*	6.625 *168,3*	705 / 4	7.940 *201,68*	11.25 *31,75*
8 *200*	8.625 *219,1*	705 / 4	10.190 *258,83*	1.375 *34,93*
10 *250*	10.750 *273,1*	705 / 4	12.690 *322,33*	1.375 *34,93*
12 *300*	12.750 *323,9*	705 / 4	14.940 *379.48*	1.375 *34,93*
14 *350*	14.000 *355,6*	707 / 4	16.670 *423,42*	1.500 *38,10*
16 *400*	16.000 *406,4*	707 / 4	18.830 *478,28*	1.500 *38,10*

Notes:

a. 1-1/4 to 8 Inch Figure 405 Stainless Steel Couplings available upon request.

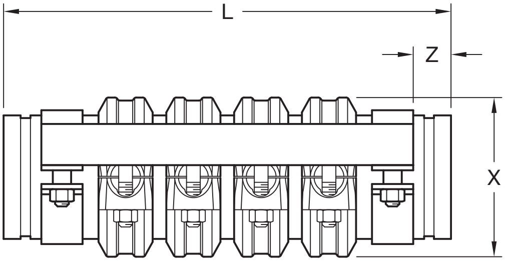
Figure 7550-1 Expansion Joint



Nominal Dimensions for Side Elevation View Total Movement Length 1 Inch					
Nominal Pipe Size		**L Compressed Length Inches** *mm*	**L Expanded Length Inches** *mm*	**Total Movement Capability Inches** *mm*	**Approx. Weight Lbs.** *kg*
ANSI Inches *DN*	**O.D. Inches** *mm*				
1-1/4 *32*	1.660 *42,4*	26.625 *676,27*	27.625 *701,67*	1.000 *25,40*	26 *11,8*
1-1/2 *40*	1.900 *48,3*	26.625 *676,27*	27.625 *701,67*	1.000 *25,40*	28 *12,7*
2 *50*	2.375 *60,3*	26.625 *676,27*	27.625 *701,67*	1.000 *25,40*	31 *14,1*
2-1/2 *65*	2.875 *73,0*	26.625 *676,27*	27.625 *701,67*	1.000 *25,40*	37 *16,8*
3 *80*	3.500 *88,9*	26.625 *676,27*	27.625 *701,67*	1.000 *25,40*	49 *22,2*
4 *100*	4.500 *114,3*	17.500 *444,50*	18.500 *469,90*	1.000 *25,40*	36 *16,3*
5 *125*	5.563 *141,3*	17.500 *444,50*	18.500 *469,90*	1.000 *25,40*	53 *24,0*
6 *150*	6.625 *168,3*	17.500 *444,50*	18.500 *469,90*	1.000 *25,40*	59 *26,8*
8 *200*	8.625 *219,1*	19.125 *488,95*	20.125 *511,17*	1.000 *25,40*	104 *47,2*
10 *250*	10.750 *273,1*	21.500 *546,10*	22.500 *571,50*	1.000 *25,40*	179 *81,2*
12 *300*	12.750 *323,9*	21.500 *546,10*	22.500 *571,50*	1.000 *25,40*	235 *106,6*
14 *350*	14.000 *355,6*	23.125 *587,40*	24.125 *612,77*	1.000 *25,40*	305 *138,4*
16 *400*	16.000 *406,4*	24.125 *612,77*	25.125 *638,17*	1.000 *25,40*	371 *168,2*

- Refer to Tech Data Sheet G460 for additional information.

Figure 7550-13 Expansion Joint

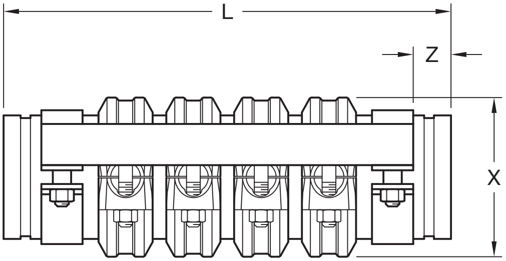


Nominal Dimensions for Side Elevation View Total Movement Length 1-1/4 Inch				
Nominal Pipe Size		Flexible[a] Coupling Figure and Quantity	X Coupling Height Inches *mm*	Z Tie Location Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	705 / 10	2.560 *65,02*	1.25 *31,75*
1-1/2 *40*	1.900 *48,3*	705 / 10	2.750 *69,85*	1.25 *31,75*
2 *50*	2.375 *60,3*	705 / 10	3.250 *82,55*	1.25 *31,75*
2-1/2 *65*	2.875 *73,0*	705 / 10	3.690 *93,73*	1.25 *31,75*
3 *80*	3.500 *88,9*	705 / 10	4.380 *111,25*	1.25 *31,75*
4 *100*	4.500 *114,3*	705 / 5	5.690 *144,53*	1.25 *31,75*
5 *125*	5.563 *141,3*	705 / 5	6.880 *174,75*	1.25 *31,75*
6 *150*	6.625 *168,3*	705 / 5	7.940 *201,68*	11.25 *31,75*
8 *200*	8.625 *219,1*	705 / 5	10.190 *258,83*	1.375 *34,93*
10 *250*	10.750 *273,1*	705 / 5	12.690 *322,33*	1.375 *34,93*
12 *300*	12.750 *323,9*	705 / 5	14.940 *379.48*	1.375 *34,93*
14 *350*	14.000 *355,6*	707 / 5	16.670 *423,42*	1.500 *38,10*
16 *400*	16.000 *406,4*	707 / 5	18.830 *478,28*	1.500 *38,10*

Notes:

a. 1-1/4 to 8 Inch Figure 405 Stainless Steel Couplings available upon request.

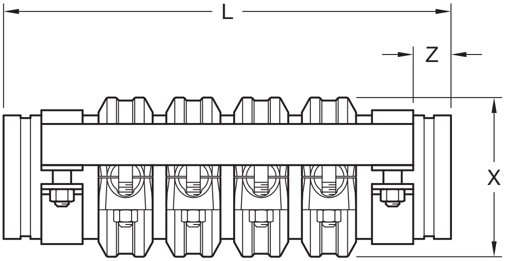
Figure 7550-13 Expansion Joint



Nominal Dimensions for Side Elevation View Total Movement Length 1-1/4 Inch					
Nominal Pipe Size		L Compressed Length Inches *mm*	L Expanded Length Inches *mm*	Total Movement Capability Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*				
1-1/4 *32*	1.660 *42,4*	31.375 *796,92*	32.625 *828,67*	1.250 *31,75*	31 *14,1*
1-1/2 *40*	1.900 *48,3*	31.375 *796,92*	32.625 *828,67*	1.250 *31,75*	33 *15,0*
2 *50*	2.375 *60,3*	31.375 *796,92*	32.625 *828,67*	1.250 *31,75*	37 *16,8*
2-1/2 *65*	2.875 *73,0*	31.375 *796,92*	32.625 *828,67*	1.250 *31,75*	45 *20,4*
3 *80*	3.500 *88,9*	31.375 *796,92*	32.625 *828,67*	1.250 *31,75*	59 *26,8*
4 *100*	4.500 *114,3*	20.000 *508,00*	21.250 *539,75*	1.250 *31,75*	43 *19,5*
5 *125*	5.563 *141,3*	20.000 *508,00*	21.250 *539,75*	1.250 *31,75*	64 *29,0*
6 *150*	6.625 *168,3*	20.000 *508,00*	21.250 *539,75*	1.250 *31,75*	70 *31,8*
8 *200*	8.625 *219,1*	22.000 *558,80*	23.250 *590,55*	1.250 *31,75*	125 *56,7*
10 *250*	10.750 *273,1*	24.500 *622,30*	25.750 *654,05*	1.250 *31,75*	215 *97,5*
12 *300*	12.750 *323,9*	24.500 *622,30*	25.750 *654,05*	1.250 *31,75*	281 *127,5*
14 *350*	14.000 *355,6*	26.500 *673,10*	27.750 *704,85*	1.250 *31,75*	365 *138,4*
16 *400*	16.000 *406,4*	27.500 *698,50*	28.750 *730,25*	1.250 *31,75*	441 *168,2*

- Refer to Tech Data Sheet G460 for additional information.

Figure 7550-15 Expansion Joint

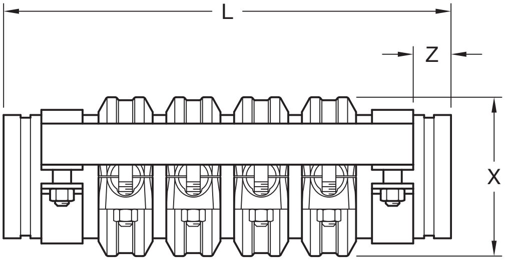


Nominal Dimensions for Side Elevation View Total Movement Length 1-1/2 Inch				
Nominal Pipe Size		Flexible[a] Coupling Figure and Quantity	X Coupling Height Inches *mm*	Z Tie Location Inches *mm*
ANSI Inches ***DN***	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	705 / 12	2.560 *65,02*	1.25 *31,75*
1-1/2 *40*	1.900 *48,3*	705 / 12	2.750 *69,85*	1.25 *31,75*
2 *50*	2.375 *60,3*	705 / 12	3.250 *82,55*	1.25 *31,75*
2-1/2 *65*	2.875 *73,0*	705 / 12	3.690 *93,73*	1.25 *31,75*
3 *80*	3.500 *88,9*	705 / 12	4.380 *111,25*	1.25 *31,75*
4 *100*	4.500 *114,3*	705 / 6	5.690 *144,53*	1.25 *31,75*
5 *125*	5.563 *141,3*	705 / 6	6.880 *174,75*	1.25 *31,75*
6 *150*	6.625 *168,3*	705 / 6	7.940 *201,68*	11.25 *31,75*
8 *200*	8.625 *219,1*	705 / 6	10.190 *258,83*	1.375 *34,93*
10 *250*	10.750 *273,1*	705 / 6	12.690 *322,33*	1.375 *34,93*
12 *300*	12.750 *323,9*	705 / 6	14.940 *379.48*	1.375 *34,93*
14 *350*	14.000 *355,6*	707 / 6	16.670 *423,42*	1.500 *38,10*
16 *400*	16.000 *406,4*	707 / 6	18.830 *478,28*	1.500 *38,10*

Notes:

a. 1-1/4 to 8 Inch Figure 405 Stainless Steel Couplings available upon request.

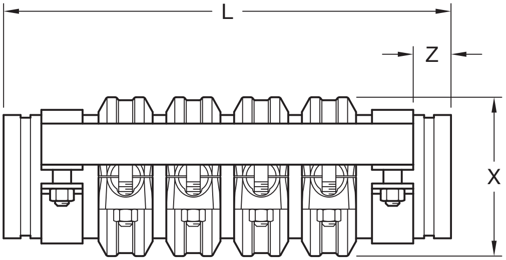
Figure 7550-15 Expansion Joint



Nominal Dimensions for Side Elevation View Total Movement Length 1-1/2 Inch					
Nominal Pipe Size		L Compressed Length Inches *mm*	L Expanded Length Inches *mm*	Total Movement Capability Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*				
1-1/4 *32*	1.660 *42,4*	36.125 *917,57*	37.625 *955,68*	1.500 *38,10*	37 *16,8*
1-1/2 *40*	1.900 *48,3*	36.125 *917,57*	37.625 *955,68*	1.500 *38,10*	39 *17,7*
2 *50*	2.375 *60,3*	36.125 *917,57*	37.625 *955,68*	1.500 *38,10*	43 *19,5*
2-1/2 *65*	2.875 *73,0*	36.125 *917,57*	37.625 *955,68*	1.500 *38,10*	52 *23,6*
3 *80*	3.500 *88,9*	36.125 *917,57*	37.625 *955,68*	1.500 *38,10*	69 *31,3*
4 *100*	4.500 *114,3*	22.500 *571,50*	24.000 *609,60*	1.500 *38,10*	50 *22,7*
5 *125*	5.563 *141,3*	22.500 *571,50*	24.000 *609,60*	1.500 *38,10*	74 *33,6*
6 *150*	6.625 *168,3*	22.500 *571,50*	24.000 *609,60*	1.500 *38,10*	81 *36,7*
8 *200*	8.625 *219,1*	24.875 *631,82*	26.375 *669,93*	1.500 *38,10*	145 *65,8*
10 *250*	10.750 *273,1*	27.500 *698,50*	29.000 *736,60*	1.500 *38,10*	251 *113,8*
12 *300*	12.750 *323,9*	27.500 *698,50*	29.000 *736,60*	1.500 *38,10*	328 *148,8*
14 *350*	14.000 *355,6*	29.875 *758,82*	31.375 *796,93*	1.500 *38,10*	425 *192,8*
16 *400*	16.000 *406,4*	30.875 *784,22*	32.375 *822,32*	1.500 *38,10*	512 *232,2*

- Refer to Tech Data Sheet G460 for additional information.

Figure 7550-75 Expansion Joint

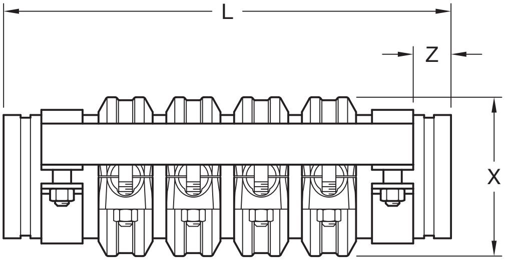


Nominal Dimensions for Side Elevation View Total Movement Length 1-3/4 Inch				
Nominal Pipe Size		Flexible[a] Coupling Figure and Quantity	X Coupling Height Inches *mm*	Z Tie Location Inches *mm*
ANSI Inches *DN*	O.D. Inches *mm*			
1-1/4 *32*	1.660 *42,4*	705 / 14	2.560 *65,02*	1.25 *31,75*
1-1/2 *40*	1.900 *48,3*	705 / 14	2.750 *69,85*	1.25 *31,75*
2 *50*	2.375 *60,3*	705 / 14	3.250 *82,55*	1.25 *31,75*
2-1/2 *65*	2.875 *73,0*	705 / 14	3.690 *93,73*	1.25 *31,75*
3 *80*	3.500 *88,9*	705 / 14	4.380 *111,25*	1.25 *31,75*
4 *100*	4.500 *114,3*	705 / 7	5.690 *144,53*	1.25 *31,75*
5 *125*	5.563 *141,3*	705 / 7	6.880 *174,75*	1.25 *31,75*
6 *150*	6.625 *168,3*	705 / 7	7.940 *201,68*	11.25 *31,75*
8 *200*	8.625 *219,1*	705 / 7	10.190 *258,83*	1.375 *34,93*
10 *250*	10.750 *273,1*	705 / 7	12.690 *322,33*	1.375 *34,93*
12 *300*	12.750 *323,9*	705 / 7	14.940 *379.48*	1.375 *34,93*
14 *350*	14.000 *355,6*	707 / 7	16.670 *423,42*	1.500 *38,10*
16 *400*	16.000 *406,4*	707 / 7	18.830 *478,28*	1.500 *38,10*

Notes:

a. 1-1/4 to 8 Inch Figure 405 Stainless Steel Couplings available upon request.

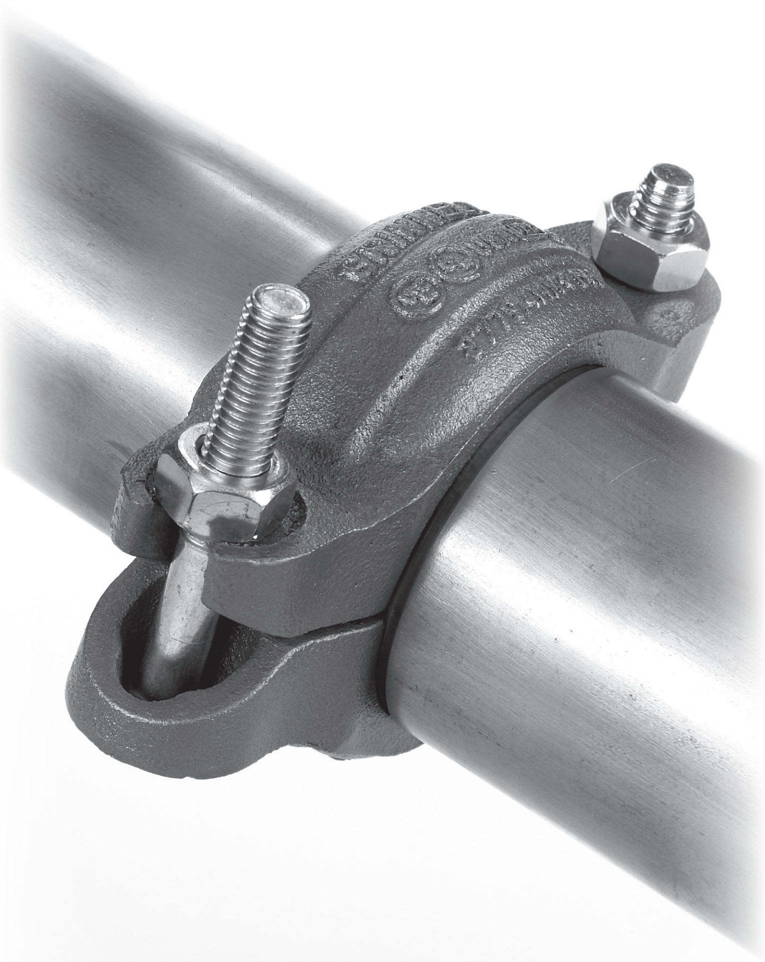
Figure 7550-75 Expansion Joint



Nominal Dimensions for Side Elevation View Total Movement Length 1-3/4 Inch					
Nominal Pipe Size		L Compressed Length Inches *mm*	L Expanded Length Inches *mm*	Total Movement Capability Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*				
1-1/4 *32*	1.660 *42,4*	40.875 *1038,22*	42.625 *1082,67*	1.750 *44,45*	42 *19,0*
1-1/2 *40*	1.900 *48,3*	40.875 *1038,22*	42.625 *1082,67*	1.750 *44,45*	45 *20,4*
2 *50*	2.375 *60,3*	40.875 *1038,22*	42.625 *1082,67*	1.750 *44,45*	49 *22,2*
2-1/2 *65*	2.875 *73,0*	40.875 *1038,22*	42.625 *1082,67*	1.750 *44,45*	60 *27,2*
3 *80*	3.500 *88,9*	40.875 *1038,22*	42.625 *1082,67*	1.750 *44,45*	79 *35,8*
4 *100*	4.500 *114,3*	25.000 *635,00*	26.750 *679,45*	1.750 *44,45*	57 *25,9*
5 *125*	5.563 *141,3*	25.000 *635,00*	26.750 *679,45*	1.750 *44,45*	84 *38,1*
6 *150*	6.625 *168,3*	25.000 *635,00*	26.750 *679,45*	1.750 *44,45*	92 *41,7*
8 *200*	8.625 *219,1*	27.750 *704,85*	29.500 *749,30*	1.750 *44,45*	166 *75,3*
10 *250*	10.750 *273,1*	30.500 *774,70*	32.250 *819,15*	1.750 *44,45*	287 *130,2*
12 *300*	12.750 *323,9*	30.500 *774,70*	32.250 *819,15*	1.750 *44,45*	375 *170,1*
14 *350*	14.000 *355,6*	33.250 *844,55*	35.000 *889,00*	1.750 *44,45*	486 *220,5*
16 *400*	16.000 *406,4*	34.250 *869,95*	36.000 *914,40*	1.750 *44,45*	583 *264,4*

- Refer to Tech Data Sheet G460 for additional information.

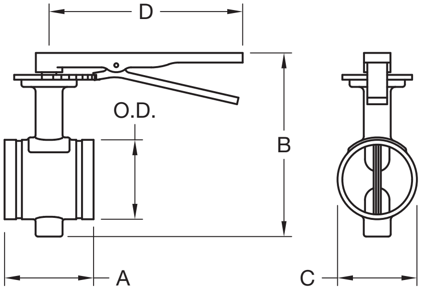
Notes



Copper Systems

Model 680 Butterfly Valve with Lever Handle

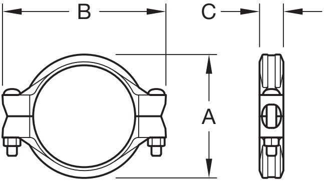
For Copper Tubing (CTS)



Nominal Valve Size ANSI Inches	Tube O.D. Inches *mm*	Nominal Dimensions - Inches / *mm*				Approx. Weight Lbs. *kg*
		A	B	C	D	
2	2.125 *54,0*	3.19 *81,0*	5.31 *135,0*	2.45 *57,0*	10.00 *254,0*	4.9 *2,2*
2-1/2	2.625 *66,7*	3.75 *96,0*	5.91 *150,0*	2.63 *67,0*	10.00 *254,0*	5.9 *2,7*
3	3.125 *79,4*	3.75 *96,0*	7.68 *195,0*	3.13 *79,0*	10.00 *254,0*	6.6 *3,0*
4	4.125 *104,8*	4.63 *118,0*	8.78 *223,0*	4.13 *105,0*	10.00 *254,0*	11.0 *5,0*
5	5.125 *130,2*	5.88 *149,0*	9.80 *249,0*	5.13 *130,0*	10.00 *254,0*	17.6 *8,0*
6	6.125 *155,6*	5.88 *149,0*	10.86 *276,0*	6.13 *156,0*	10.00 *254,0*	21.6 *9,8*

Notes:
- Pressure ratings listed are CWP (cold water pressure) or maximum working pressure within the service temperature range of the gasket used in the coupling.
- Maximum Working Pressures and End Loads listed are total of internal and external pressures and loads based on roll-grooved Type K - ASTM B 88 copper tubing.
- Maximum Working Pressure: 300psi (20,7 bar)
- Maximum Use Temperature: 180°F (82°C)
- Refer to Tech Data Sheet G530 Model 680 Butterfly Valve.

Figure 672 Rigid Coupling



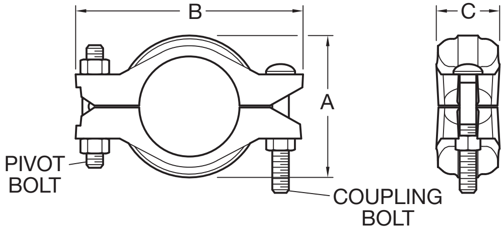
Copper Tube Size		Max.[a] Gap Inches *mm*	Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
Nominal ANSI Inches	O.D. Inches *mm*		A Inches *mm*	B Inches *mm*	C Inches *mm*	Bolt Size[b] Dia. x Lg.	Qty.	
2	2.125 *54,0*	0.06 *1,5*	3.09 *78,6*	4.65 *118,1*	1.76 *44,7*	3/8 x 2-1/4 —	2	2.1 *0,9*
2-1/2	2.625 *66,7*	0.06 *1,5*	3.59 *91,3*	5.56 *141,2*	1.76 *44,7*	3/8 x 2-1/4 —	2	2.3 *1,1*
3	3.125 *79,4*	0.06 *1,5*	4.12 *104,7*	6.25 *158,8*	1.76 *44,7*	1/2 x 3 —	2	2.9 *1,3*
4	4.125 *104,8*	0.09 *2,3*	5.33 *135,3*	7.75 *196,9*	1.86 *47,2*	1/2 x 3 —	2	3.9 *1,8*
5	5.125 *130,7*	0.09 *2,3*	6.48 *164,6*	9.25 *235,0*	1.86 *47,2*	5/8 x 3-1/4 —	2	6.0 *2,7*
6	6.125 *155,6*	0.09 *2,3*	7.48 *190,0*	10.25 *260,4*	1.86 *47,2*	5/8 x 3-1/4 —	2	6.7 *3,0*
8	8.125 *206,4*	0.09 *2,3*	9.64 *244,8*	12.75 *323,9*	1.86 *47,2*	3/4 x 4-3/4 —	2	10.5 *4,8*

Notes:

a. Maximum Gap available between pipe ends, Minimum Gap = 0.
b. Gold color coded metric bolts sizes available upon request.

- Refer to page 378 of the Pressure & Design section for further information on performance pressure.
- Refer to G610 Tech Data Sheet for gasket information.
- Refer to G520 Tech Data Sheet for fitting specifications.
- Refer to Tech Data Sheet G510 Figure 672 Rigid Coupling.

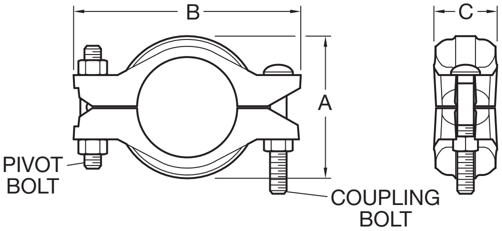
Figure 640 Pivot-Bolt Rigid Coupling



Copper Tube Size		Dimensions		
Nominal ANSI Inches	**O.D. Inches *mm***	**A Inches *mm***	**B Inches *mm***	**C Inches *mm***
2	2.125 *54,0*	3.34 *84,9*	5.86 *148,8*	1.90 *48,3*
2-1/2	2.625 *66,7*	3.85 *97,8*	6.36 *161,5*	1.90 *48,3*
3	3.125 *79,4*	4.35 *110,5*	6.86 *174,2*	1.91 *48,5*
4	4.125 *104,8*	5.48 *139,2*	7.99 *202,9*	1.93 *49,0*
5	5.125 *130,2*	6.57 *166,9*	9.73 *247,1*	2.00 *50,8*
6	6.125 *155,6*	7.57 *192,3*	10.73 *272,5*	2.02 *51,3*
8	8.125 *206,4*	9.57 *243,1*	12.73 *323,3*	2.04 *51,8*

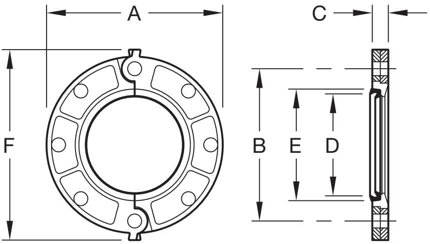
Notes:
- Figure 640 Coupling requires deep sockets.
- Refer to the manufacturer's instructions when setting the torque on power impact wrenches.
- Refer to page 379 of the Pressure & Design section for further information on performance pressure.
- Refer to G610 Tech Data Sheet for gasket information.
- Refer to G520 Tech Data Sheet for fitting specifications.
- Refer to Tech Data Sheet G512 Figure 640 Pivot-Bolt Rigid Coupling.

Figure 640 Pivot-Bolt Rigid Coupling



Copper Tube Size		Pivot Bolt Size Dia. x Lg.	Coupling Bolt Size Dia. x Lg.	Net Weight Lbs. *kg*
Nominal ANSI Inches	O.D. Inches *mm*			
2	2.125 *54,0*	1/2 x 3-3/4	1/2 x 3-5/8	3.1 *1,4*
2-1/2	2.625 *66,7*	1/2 x 3-3/4	1/2 x 3-5/8	3.2 *1,5*
3	3.125 *79,4*	1/2 x 3-3/4	1/2 x 3-5/8	3.6 *1,6*
4	4.125 *104,8*	1/2 x 3-3/4	1/2 x 3-5/8	4.2 *1,9*
5	5.125 *130,2*	5/8 x 4-1/2	5/8 x 4-1/2	6.9 *3,1*
6	6.125 *155,6*	5/8 x 4-1/2	5/8 x 4-1/2	7.5 *3,4*
8	8.125 *206,4*	5/8 x 4-1/2	5/8 x 4-1/2	8.8 *4,0*

Figure 61 Flange Adapter



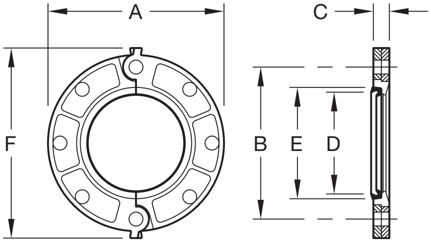
Nominal Tube Size		Nominal Dimensions					
ANSI Inches *DN*	Copper Tube O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	D[a] Inches *mm*	E[a] Inches *mm*	F Inches *mm*
2	2.125 *54,0*	6.38 *162,1*	4.75 *120,7*	0.75 *19,1*	2.3 *58,4*	2.83 *71,9*	7.25 *184,2*
2-1/2	2.625 *66,7*	7.00 *178,0*	5.50 *140,0*	0.88 *22,0*	2.79 *70,9*	3.33 *84,6*	7.88 *200,0*
3	3.125 *79,4*	7.50 *190,5*	6.00 *152,4*	0.94 *23,9*	3.28 *83,3*	3.85 *97,8*	8.38 *212,9*
4	4.125 *104,8*	9.00 *228,6*	7.50 *190,5*	0.94 *23,9*	4.28 *108,7*	4.85 *123,2*	9.90 *251,5*
5	5.125 *130,7*	10.00 *254,0*	8.50 *215,9*	1.00 *25,4*	5.25 *133,3*	5.84 *148,3*	10.88 *276,4*
6	6.125 *155,6*	11.00 *279,4*	9.50 *241,3*	1.00 *25,4*	6.20 *157,5*	6.96 *176,8*	11.88 *301,8*

Notes:

a. Dimensions D and E represent minimum and maximum sealing surfaces.
b. Bolts and nuts are not supplied. Flange mating bolts must have mechanical properties equal to or greater than SAEJ429 Grade 5. Bolt lengths shown are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

- Figure 61 Flange Adapters are not recommended for applications that incorporate tie rods for anchoring or on a standard fitting within 90° of each other.
- Phenolic Type “F” flange adapter washers are required when the Figure 61 Flange Adapter is used against surfaces such as: rubber surfaces, adapting to AWWA cast flanges, rubber faced wafer valves, and serrated flange surfaces.
- For additional information on Flange Adapter Washers, refer to pages 86-87 of the Grooved Couplings section.

Figure 61 Flange Adapter



Nominal Tube Size		Recommended Flange Mating Bolts[b]			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	Copper Tube O.D. Inches *mm*	Size Dia. x Lg. Inches	Torque Range Ft. - Lbs. *Nm*	Qty.	
2	2.125 *54,0*	5/8 x 3 —	110-140 *150-190*	4	3.7 *1,7*
2-1/2	2.625 *66,7*	5/8 x 3 —	110-140 *150-190*	4	5.4 *2,4*
3	3.125 *79,4*	5/8 x 3 —	110-140 *150-190*	4	6.1 *2,8*
4	4.125 *104,8*	5/8 x 3 —	110-140 *150-190*	8	7.6 *3,4*
5	5.125 *130,7*	3/4 x 3-1/2 —	220-250 *300-340*	8	9.5 *4,3*
6	6.125 *155,6*	3/4 x 3-1/2 —	220-250 *300-340*	8	10.9 *4,9*

- Refer to Tech Data Sheet G515 Figure 61 Flange Adapter - CTS.

Figure 610 90° Elbow and Figure 601 45° Elbow

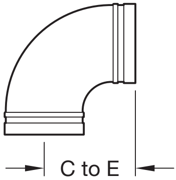


FIGURE 610
CAST
90° ELBOW

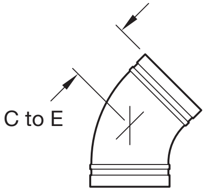


FIGURE 601
CAST
45° ELBOW

Nominal Tube Size		Figure 610		Figure 601	
ANSI Inches	**Copper Tube O.D. Inches** ***mm***	**Nominal C to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal C to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
2	2.125 *54,0*	2.91 *73,9*	1.9 *0,9*	2.19 *55,6*	1.6 *0,7*
2-1/2	2.625 *66,7*	3.31 *84,1*	2.7 *1,2*	2.31 *58,7*	2.1 *1,0*
3	3.125 *79,4*	3.81 *96,8*	3.6 *1,6*	2.59 *65,8*	2.7 *1,2*
4	4.125 *104,8*	4.75 *120,7*	7.1 *3,2*	3.19 *81,0*	5.5 *2,5*
5	5.125 *130,2*	5.94 *150,9*	11.9 *5,4*	3.25 *82,6*	7.7 *3,5*
6	6.125 *155,6*	6.94 *176,7*	16.7 *7,6*	3.50 *88,9*	10.1 *4,6*
8	8.125 *206,4*	7.75 *196,9*	25.3 *11,5*	4.25 *108,0*	16.6 *7,5*

Notes:
- Dimensional information in this chart is for cast fittings.
- Refer to G520 Tech Data Sheet for further information on fitting specifications.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figure 618 Cast Reducing Tee

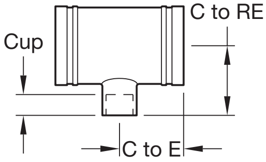


FIGURE 618
CAST REDUCING TEE
GROOVE X GROOVE X
CUP

Nominal Size ANSI Inches	Nominal C to E Inches *mm*	Nominal C to RE Inches* *mm*	Cup Inches *mm*	Approx. Weight Lbs. *kg.*
2 x 2 x 3/4	2.20 *55,9*	2.04 *51,8*	0.75 *19,0*	1.6 *0,7*
2 x 2 x 1	2.33 *59,1*	2.26 *57,4*	0.91 *23,1*	1.8 *0,8*
2 x 2 x 1-1/4	2.48 *63,0*	2.41 *61,2*	0.97 *24,6*	2.0 *0,9*
2 x 2 x 1-1/2	2.55 *64,7*	2.34 *59,4*	1.09 *27,7*	2.0 *0,9*
2-1/2 x 2-1/2 x 3/4	2.27 *57,7*	2.24 *57,0*	0.75 *19,0*	2.2 *1,0*
2-1/2 x 2-1/2 x 1	2.40 *61,0*	2.46 *62,5*	0.91 *23,1*	2.3 *1,0*
2-1/2 x 2-1/2 x 1-1/4	2.52 *64,0*	2.63 *66,8*	0.97 *24,6*	2.5 *1,1*
2-1/2 x 2-1/2 x 1-1/2	2.70 *68,6*	2.74 *69,6*	1.09 *27,7*	2.7 *1,2*
3 x 3 x 3/4	2.45 *62,2*	2.64 *67,1*	0.75 *19,0*	2.9 *1,3*
3 x 3 x 1	2.54 *64,5*	2.85 *72,4*	0.91 *23,1*	3.0 *1,4*
3 x 3 x 1-1/4	2.63 *66,8*	2.95 *74,9*	0.97 *24,6*	3.1 *1,4*
3 x 3 x 1-1/2	2.85 *72,4*	3.06 *77,7*	1.09 *27,7*	3.4 *1,5*
4 x 4 x 3/4	2.95 *74,9*	3.06 *77,7*	0.75 *19,0*	5.2 *2,4*
4 x 4 x 1	3.10 *78,7*	3.28 *83,3*	0.91 *23,1*	5.5 *2,6*
4 x 4 x 1-1/4	3.25 *82,5*	3.53 *89,7*	0.97 *24,6*	5.7 *2,6*
4 x 4 x 1-1/2	3.35 *85,1*	3.71 *94,2*	1.09 *27,7*	6.1 *2,8*

Notes:
- Dimensional information in this chart is for cast fittings.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figure 621 Cast Reducing Tee

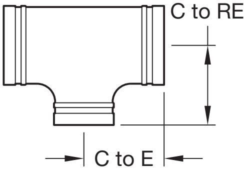


FIGURE 621
CAST REDUCING TEE
GROOVE X GROOVE X GROOVE

Nominal Size ANSI Inches	Copper Tube O.D. Inches *mm*	Nominal C to E Inches *mm*	Nominal C to RE Inches *mm*	Approx. Weight Lbs. *kg*
2-1/2 x 2-1/2 x 2	2.625 x 2.625 x 2.125 *66,7 x 66,7 x 54,0*	3.28 *83,3*	3.38 *85,9*	3.5 *1,6*
3 x 3 x 2	3.125 x 3.125 x 2.125 *79,4 x 79,4 x 54,0*	3.00 *76,2*	3.38 *85,9*	3.8 *1,7*
3 x 3 x 2-1/2	3.125 x 3.125 x 2.625 *79,4 x 79,4 x 66,7*	3.25 *82,6*	3.50 *88,9*	4.3 *2,0*
4 x 4 x 2	4.125 x 4.125 x 2.125 *104,8 x 104,8 x 54,0*	3.66 *93,0*	4.13 *104,9*	6.9 *3,2*
4 x 4 x 2-1/2	4.125 x 4.125 x 2.625 *104,8 x 104,8 x 66,7*	3.94 *100,1*	4.06 *103,1*	7.5 *3,4*
4 x 4 x 3	4.125 x 4.125 x 3.125 *104,8 x 104,8 x 79,4*	4.19 *106,4*	4.16 *105,7*	8.7 *4,0*
5 x 5 x 3	5.125 x 5.125 x 3.125 *130,2 x 130,2 x 79,4*	3.75 *95,3*	4.63 *117,6*	10.0 *4,5*
5 x 5 x 4	5.125 x 5.125 x 4.125 *130,2 x 130,2 x 104,8*	4.25 *108,0*	4.56 *115,8*	11.4 *5,2*
6 x 6 x 2-1/2	6.125 x 6.125 x 2.625 *155,6 x 155,6 x 66,7*	3.63 *92,2*	5.13 *130,3*	11.5 *5,2*
6 x 6 x 3	6.125 x 6.125 x 3.125 *155,6 x 155,6 x 79,4*	3.69 *93,7*	5.19 *131,8*	11.9 *5,4*
6 x 6 x 4	6.125 x 6.125 x 4.125 *155,6 x 155,6 x 104,8*	4.19 *106,4*	5.13 *130,3*	13.7 *6,2*
6 x 6 x 5	6.125 x 6.125 x 5.125 *155,6 x 155,6 x 130,2*	4.69 *119,1*	5.20 *131,8*	15.9 *7,2*

Notes:
- Dimensional information in this chart is for cast fittings.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figure 619 Tee and Figure 660 End Cap

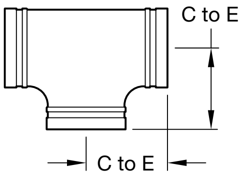


FIGURE 619
CAST TEE

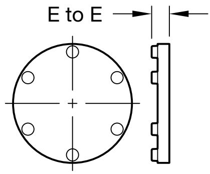
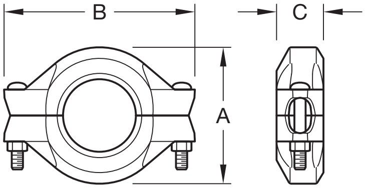


FIGURE 660
CAST END CAP

Nominal Tube Size		Figure 619		Figure 660	
ANSI Inches	Copper Tube O.D. Inches *mm*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
2	2.125 *54,0*	2.69 *68,3*	2.5 *1,1*	0.92 *23,4*	0.6 *0,3*
2-1/2	2.625 *66,7*	3.20 *81,3*	3.8 *1,7*	0.92 *23,4*	1.0 *0,4*
3	3.125 *79,4*	3.52 *89,4*	4.7 *2,1*	0.92 *23,4*	1.3 *0,6*
4	4.125 *104,8*	4.25 *108,0*	9.0 *4,1*	0.92 *23,4*	2.2 *1,0*
5	5.125 *130,2*	5.94 *150,9*	17.7 *8,0*	0.92 *23,4*	5.8 *2,6*
6	6.125 *155,6*	6.94 *176,3*	24.8 *11,3*	0.92 *23,4*	8.1 *3,7*
8	8.125 *206,4*	7.75 *196,9*	46.2 *21,0*	1.03 *26,2*	14.1 *6,4*

Notes:
- Dimensional information in this chart is for cast fittings.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figure 616 Reducing Coupling



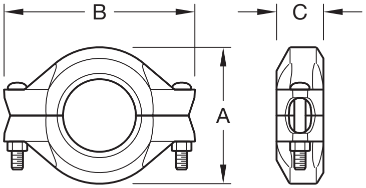
Nominal Pipe Size		Max. Working Pressure (CWP)[a] psi *bar*	End Pipe Separation	Deflection	
ANSI Inches *DN*	O.D. Inches *mm*			Degree Per Cou-pling	Pipe in/ft *mm/m*
2-1/2 x 2 *65 x 50*	2.625 x 2.215 *66,7 x 54,0*	300 *20*	0.06 *1,6*	1° - 20'	0.29 *24,0*
3 x 2 *80 x 50*	3.125 x 2.125 *79,4 x 54,0*	300 *20*	0.06 *1,6*	1° - 09'	0.24 *20,0*
3 x 2-1/2 *80 x 65*	3.125 x 2.625 *79,4 x 66,7*	300 *20*	0.06 *1,6*	1° - 09'	0.24 *20,0*
4 x 2-1/2 *100 x 65*	4.125 x 2.625 *104,8 x 66,7*	300 *20*	0.06 *1,6*	0° - 53'	0.18 *15,0*
4 x 3 *100 x 80*	4.125 x 3.125 *104,8 x 79,4*	300 *20*	0.06 *1,6*	0° - 53'	0.18 *15,0*
5 x 4 *125 x 100*	5.125 x 4.125 *130,2 x 104,8*	200 *14*	0.06 *1,6*	0° - 42'	0.15 *12,0*
6 x 4 *150 x 100*	6.125 x 4.125 *155,6 x 104,8*	200 *14*	0.06 *1,6*	0° - 36'	0.13 *10,3*

Notes:

a. The maximum cold water pressure for general piping services tested to ASTM F1476 and/or AWWA C606 methods. Figures listed are based on roll-grooved Type K-ASTM B-88 copper Tubing. For more information on other types, contact GRINNELL Technical Services.

- Couplings with rubber gaskets are likely to function as an insulator. Where electrical continuity is required, GRINNELL Continuity Clip will restore electrical continuity to the system. The continuity clip satisfies IEE Wiring Regulations.
- Refer to Tech Data Sheet G511 Figure 616 Reducing Coupling for Joining Copper Tubing Systems.

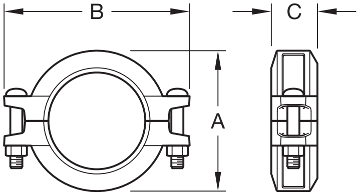
Figure 616 Reducing Coupling



Nominal Pipe Size		Nominal Dimensions			Bolt Size	Approx Weight Lbs. kg
ANSI Inches *DN*	O.D. Inches *mm*	A Inches mm	B Inches mm	C Inches mm		
2-1/2 x 2 *65 x 50*	2.625 x 2.215 *66,7 x 54,0*	3.70 *94*	5.55 *141*	1.77 *45*	1/2 x 3	2.9 *1,3*
3 x 2 *80 x 50*	3.125 x 2.125 *79,4 x 54,0*	4.21 *107*	5.98 *152*	1.77 *45*	1/2 x 3	3.3 *1,5*
3 x 2-1/2 *80 x 65*	3.125 x 2.625 *79,4 x 66,7*	4.21 *107*	5.98 *152*	1.77 *45*	1/2 x 3	3.0 *1,4*
4 x 2-1/2 *100 x 65*	4.125 x 2.625 *104,8 x 66,7*	5.20 *132*	7.20 *183*	1.77 *45*	1/2 x 3	4.2 *1,9*
4 x 3 *100 x 80*	4.125 x 3.125 *104,8 x 79,4*	5.20 *132*	7.20 *183*	1.77 *45*	1/2 x 3	4.0 *1,8*
5 x 4 *125 x 100*	5.125 x 4.125 *130,2 x 104,8*	6.30 *160*	8.82 *224*	1.77 *45*	5/8 x 3-1/2	5.5 *2,5*
6 x 4 *150 x 100*	6.125 x 4.125 *155,6 x 104,8*	7.28 *185*	9.88 *251*	1.77 *45*	5/8 x 3-1/2	7.3 *3,3*

Notes:
- Couplings with rubber gaskets are likely to function as an insulator. Where electrical continuity is required, GRINNELL Continuity Clip will restore electrical continuity to the system. The continuity clip satisfies IEE Wiring Regulations.
- Refer to Tech Data Sheet G511 Figure 616 Reducing Coupling for Joining Copper Tubing Systems.

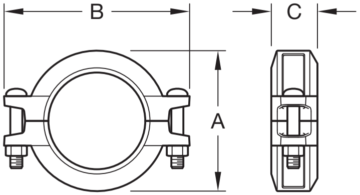
Figure 617 Transition Coupling Joining IPS to Copper Tubing Systems



Nominal Pipe Size		Max. Working Pressure (CWP)* psi *bar*	Axial Displacement Inches *mm*	Deflection
ANSI Inches *DN*	**O.D. IPS x CTS Inches *mm***			**Degree Per Coupling**
2 *50*	2.375 x 2.215 *60,3 x 54,0*	300 *20*	0 - 0.06 *0 -1,6*	1° - 31'
2-1/2 *65*	2.875 x 2.625 *73,0 x 66,7*	300 *20*	0 - 0.06 *0 -1,6*	1° - 15'
3 *80*	3.500 x 3.125 *88,9 x 79,4*	300 *20*	0 - 0.06 *0 -1,6*	1° - 02'
4 *100*	4.500 x 4.125 *114,3 x 104,8*	300 *20*	0 - 0.06 *0 -1,6*	1° - 36'

- Refer to Tech Data Sheet G513 Figure 617 Transition Coupling for Joining IPS to Copper Tubing Systems.

Figure 617 Transition Coupling Joining IPS to Copper Tubing Systems



Nominal Pipe Size		Nominal Dimensions			Bolt Size	Approx Weight Lbs. kg
ANSI Inches ***DN***	**O.D. IPS x CTS Inches** ***mm***	**A Inches mm**	**B Inches mm**	**C Inches mm**		
2 *50*	2.375 x 2.215 *60,3 x 54,0*	3.31 *84*	5.08 *129*	1.89 *48*	1/2 x 2-1/8	2.0 *0,9*
2-1/2 *65*	2.875 x 2.625 *73,0 x 66,7*	3.90 *99*	5.59 *142*	1.89 *48*	3/8 x 2-1/8	2.2 *1,0*
3 *80*	3.500 x 3.125 *88,9 x 79,4*	4.57 *116*	6.65 *169*	1.89 *48*	1/2 x 3	3.0 *1,4*
4 *100*	4.500 x 4.125 *114,3 x 104,8*	7.76 *197*	7.76 *197*	2.05 *52*	1/2 x 3	4.2 *1,9*

- Refer to Tech Data Sheet G513 Figure 617 Transition Coupling for Joining IPS to Copper Tubing Systems.

Figure 650 Cast Concentric Reducer

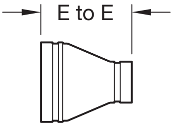


FIGURE 650
CAST CONCENTRIC REDUCER
GROOVE x GROOVE

Nominal Tube Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches	**Tube O.D. Inches** ***mm***		
2-1/2 x 2	2.625 x 2.125 *66,7 x 54,0*	3.29 *83,6*	1.4 *0,6*
3 x 2	3.125 x 2.125 *79,4 x 54,0*	2.50 *63,5*	1.4 *0,6*
3 x 2-1/2	3.500 x 2.625 *79,4 x 73,0*	2.50 *63,5*	1.4 *0,6*
4 x 2	4.125 x 2.125 *104,8 x 54,0*	4.75 *120,7*	3.0 *1,4*
4 x 2-1/2	4.125 x 2.625 *104,8 x 66,7*	3.00 *76,2*	2.3 *1,0*
4 x 3	4.125 x 3.125 *104,8 x 79,4*	3.00 *76,2*	2.3 *1,0*
5 x 3	5.125 x 3.125 *130,7 x 79,4*	3.88 *98,6*	3.7 *1,7*
5 x 4	5.125 x 4.125 *130,7 x 104,8*	3.38 *85,9*	3.7 *1,7*
6 x 3	6.125 x 3.125 *155,6 x 79,4*	4.38 *111,3*	5.1 *2,3*
6 x 4	6.125 x 4.125 *155,6 x 104,8*	3.88 *98,6*	5.2 *2,4*
6 x 5	6.125 x 5.125 *155,6 x 130,7*	3.38 *85,9*	4.8 *2,2*
8 x 6	8.125 x 6.125 *206,4 x 155,6*	5.00 *127,0*	9.7 *4,4*

Notes:
- Dimensional information in this chart is for cast fittings.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figure 652 Concentric Reducer

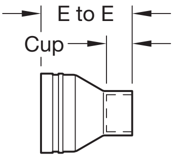


**FIGURE 652
CONCENTRIC REDUCER
WROT COPPER
GROOVE x CUP**

Nominal Tube Size		Nominal E to E Inches *mm*	Cup Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches	**Tube O.D. Inches *mm***			
2 x 1	2.125 x 1.315 *54,0 x 33,4*	2.70 *68,6*	0.91 *23,1*	0.5 *0,2*
2 x 1-1/4	2.125 x 1.660 *54,0 x 42,2*	3.00 *76,2*	0.97 *24,6*	0.4 *0,2*
2 x 1-1/2	2.125 x 1.900 *54,0 x 48,3*	2.94 *74,7*	1.09 *27,7*	0.4 *0,2*
2-1/2 x 1	2.625 x 1.315 *66,7 x 33,4*	3.25 *82,6*	0.91 *23,1*	0.5 *0,2*
2-1/2 x 1-1/4	2.625 x 1.660 *66,7 x 42,2*	3.52 *89,4*	0.97 *24,6*	0.6 *0,3*
2-1/2 x 1-1/2	2.625 x 1.900 *66,7 x 48,3*	3.45 *87,6*	1.09 *27,7*	0.6 *0,3*
2-1/2 x 2	2.625 x 2.125 *66,7 x 54,0*	3.38 *85,9*	1.34 *34,0*	0.6 *0,3*
3 x 1-1/2	3.125 x 1.900 *79,4 x 48,3*	3.68 *93,5*	1.09 *27,7*	0.7 *0,3*
3 x 2	3.125 x 2.125 *79,4 x 54,0*	4.10 *104,1*	1.34 *34,0*	1.0 *0,5*
4 x 2	4.125 x 2.125 *104,8 x 54,0*	4.75 *120,7*	1.34 *34,0*	1.4 *0,6*

Notes:
- Dimensional information in this chart is for wrought copper.
- Refer to Tech Data Sheet G520 Grooved Fittings - CTS.

Figures 407GT and 407T Dielectric Waterways

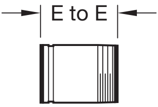


FIGURE 407GT
GROOVED x MALE THREAD

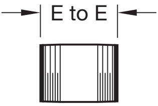


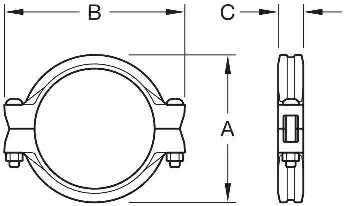
FIGURE 407T
MALE THREAD x MALE THREAD

Nominal Tube Size		407GT		407T	
ANSI Inches	O.D. Inches *mm*	Nominal End to End Inches *mm*	Approx. Weight Lbs. *kg*	Nominal End to End Inches *mm*	Approx. Weight Lbs. *kg*
1/2	0.625 *15,9*	—	—	3.0 *76,2*	0.2 *0,1*
3/4	0.875 *22,2*	—	—	3.0 *76,2*	0.2 *0,1*
1	1.125 *28,6*	4.0 *101,6*	0.3 *0,1*	4.0 *101,6*	0.3 *0,1*
1-1/4	1.375 *34,9*	4.0 *101,6*	0.6 *0,3*	4.0 *101,6*	0.6 *0,3*
1-1/2	1.625 *41,3*	4.0 *101,6*	0.8 *0,4*	4.0 *101,6*	0.8 *0,4*
2	2.125 *54,0*	4.0 *101,6*	1.0 *0,5*	4.0 *101,6*	1.0 *0,5*
2-1/2	2.625 *66,7*	6.0 *152,4*	1.6 *0,7*	6.0 *152,4*	1.6 *0,7*
3	3.125 *79,4*	6.0 *152,4*	2.0 *0,9*	6.0 *152,4*	2.0 *0,9*
4	4.125 *104,8*	6.0 *152,4*	4.5 *2,0*	6.0 *152,4*	4.5 *2,0*

Notes:
- Clearflow* is a registered trademark of Perfection Corporation.
- Refer to Tech Data Sheet G465 CLEARFLOW* Dielectric Waterway Fittings.

Stainless Steel Systems

Figure 472 Rigid Coupling



Nominal Pipe Size		Max.[a] Pressures psi *bar*	Max.[a] End Load Lbs. *kN*	Max.[b] Gap Inches *mm*	Coupling Bolts	
ANSI Inches *DN*	O.D. Inches *mm*				Qty.	Size[c] Inches *mm*
1-1/4 *32*	1.660 *42,4*	600 *41,4*	1,298.5 *5,78*	0.06 *1,5*	2	3/8 x 2-1/4 *M10 x 57*
1-1/2 *40*	1.900 *48,3*	600 *41,4*	1,701.1 *7,57*	0.08 *2,0*	2	3/8 x 2-1/4 *M10 x 57*
2 *50*	2.375 *60,3*	600 *41,4*	2,658.0 *11,82*	0.13 *3,3*	2	3/8 x 2-1/4 *M10 x 57*
2-1/2 *65*	2.875 *73,0*	600 *41,4*	3,895.0 *17,32*	0.13 *3,3*	2	3/8 x 2-1/4 *M10 x 57*
76,1mm *65*	3.000 *76,1*	600 *41,4*	4,241.0 *18,86*	0.13 *3,3*	2	— *M10 x 57*
3 *80*	3.500 *88,9*	600 *41,4*	5,772.5 *25,68*	0.13 *3,3*	2	1/2 x 3 *M12 x 76*
4 *100*	4.500 *114,3*	600 *41,4*	9,542.3 *42,44*	0.19 *4,8*	2	1/2 x 3 *M12 x 76*
139,7mm *125*	5.500 *139,7*	600 *41,4*	14,254.6 *63,40*	0.19 *4,8*	2	— *M16 x 83*
5 *125*	5.563 *141,3*	600 *41,4*	14,583.0 *64,87*	0.19 *4,8*	2	5/8 x 3-1/4 *M16 x 83*
6 *150*	6.625 *168,3*	600 41,4	20,682.4 *92,00*	0.19 *4,8*	2	5/8 x 3-1/4 *M16 x 83*
8 *200*[d]	8.625 *219,1*	600 *41,4*	35,054.7 *155,92*	0.19 *4,8*	2	3/4 x 4-3/4 *M20 x 121*
10 *250*[d]	10.750 *273,0*	600 *41,4*	54,455.9 *242,22*	0.13 *3,3*	2	1 x 6-1/2 *M24 x 165*
12 *300*[d]	12.750 *323,9*	600 *41,4*	76,603.5 *340,73*	0.13 *3,3*	2	1 x 6-1/2 *M24 x 165*

Notes:

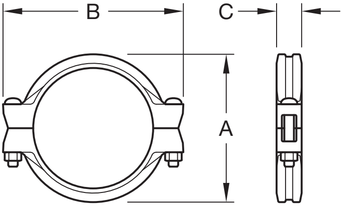
a. Maximum Pressure and end load are total from all loads based on standard weight stainless steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

b. Maximum available gap between pipe ends. Minimum gap = 0.

c. For availability of inch bolt sizes vs. metric bolt sizes, contact GRINNELL Mechanical Products.

d. Sizes are available to JIS standards. Contact GRINNELL Mechanical Products.

Figure 472 Rigid Coupling

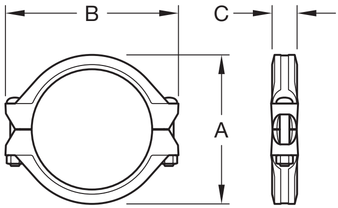


Nominal Pipe Size		Nominal Dimensions Inches (*mm*)			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches** *mm*	**A**	**B**	**C**	
1-1/4 *32*	1.660 *42,4*	2.76 *69,9*	4.37 *111,3*	1.81 *46,0*	2.0 *0,9*
1-1/2 *40*	1.900 *48,3*	3.00 *76,2*	4.61 *117,3*	1.81 *46,0*	2.1 *1,0*
2 *50*	2.375 *60,3*	3.43 *86,6*	5.12 *130,0*	1.89 *47,8*	1.9 *0,9*
2-1/2 *65*	2.875 *73,0*	3.91 *99,3*	5.63 *143,0*	1.89 *47,8*	3.2 *1,5*
76,1mm *65*	3.000 *76,1*	4.19 *106,4*	5.72 *145,3*	2.00 *50,8*	3.5 *1,6*
3 *80*	3.500 *88,9*	4.65 *117,6*	6.26 *158,8*	1.89 *47,8*	3.5 *1,6*
4 *100*	4.500 *114,3*	5.83 *147,6*	7.52 *190,5*	1.97 *50,0*	5.6 *2,5*
139,7mm *125*	5.500 *139,7*	7.02 *178,3*	9.72 *246,9*	2.06 *52,3*	8.5 *3,9*
5 *125*	5.563 *141,3*	7.09 *180,1*	9.72 *246,6*	2.05 *51,8*	8.5 *3,9*
6 *150*	6.625 *168,3*	8.11 *205,5*	10.55 *267,5*	2.13 *54,1*	9.4 *4,3*
8 *200* [d]	8.625 *219,1*	10.56 *268,2*	13.56 *344,4*	2.62 *66,5*	19.4 *8,8*
10 *250* [d]	10.750 *273,0*	12.84 *326,1*	16.41 *416,8*	2.62 *66,5*	32.0 *14,5*
12 *300* [d]	12.750 *323,9*	15.41 *391,4*	18.84 *478,5*	2.62 *66,5*	43.0 *19,5*

Notes:

- Figure 472 Rigid Couplings have an Anti-Rotation Feature of “gripping teeth” along the coupling keys in sizes 1-1/4˝ - 4˝ (DN32 - DN100), making the Figure 472 perfectly suited for installations where the likelihood of rotation is greatest.
- Refer to Tech Data Sheet G560 for additional information.

Figure 770 Rigid Coupling



Nominal Pipe Size		Maximum[a,c] End Gap Inches *mm*	Maximum[b] End Load Lbs. *kN*	Maximum[b] Pressure psi *bar*
ANSI Inches *DN*	O.D. Inches *mm*			
2 50	2.375 *60,3*	0.14 *3,6*	4,430.1 *19,71*	1000 *69,0*
2-1/2 65	2.875 *73,0*	0.14 *3,6*	6,491.8 *28,88*	1000 *69,0*
3 80	3.500 *88,9*	0.14 *3,6*	9,621.1 *42,79*	1000 *69,0*
4 100	4.500 *114,3*	0.25 *6,4*	15,904.3 *70,74*	1000 *69,0*
6 150	6.625 *168,3*	0.25 *6,4*	34,471.6 *153,33*	1000 *69,0*
8 200	8.625 *219,1*	0.25 *6,4*	46,741.0 *207,90*	800 *55,2*
10 250	10.750 *273,0*	0.25 *6,4*	72,610.1 *322,97*	800 *55,2*
12 300	12.750 *323,9*	0.25 *6,4*	102,141.0 *454,32*	800 *55,2*

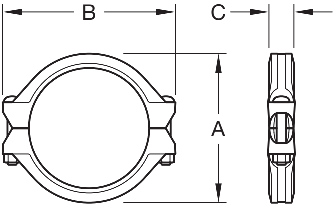
Notes:

a. Maximum available gap between pipe ends. Minimum gap = 0.

b. Maximum Pressure and End Load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

c. Maximum End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe will be 1⁄2 that of cut grooved.

Figure 770 Rigid Coupling



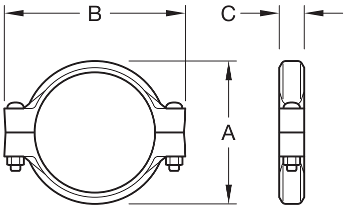
Nominal Pipe Size ANSI Inches *DN*	Nominal Dimensions			Coupling Bolts		Approx. Weight Lbs. *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size[d] Inches *mm*	
2 50	3.53 *89,7*	5.72 *145,3*	1.88 *47,8*	2	5/8 x 2-3/4 *M16 x 70*	4.3 *2,0*
2-1/2 65	4.06 *103,1*	6.00 *152,4*	1.88 *47,8*	2	5/8 x 3-1/2 *M16 x 89*	5.0 *2,3*
3 80	4.78 *121,4*	6.76 *171,7*	1.88 *47.8*	2	5/8 x 3-1/2 *M16 x 89*	5.3 *2,4*
4 100	6.01 *152,7*	8.50 *215,9*	2.10 *53,3*	2	3/4 x 4-1/4 *M20 x 108*	7.7 *3,5*
6 150	8.51 *216,2*	11.25 *285,8*	2.10 *53,3*	2	7/8 x 5-1/2 *M22 x 140*	16.2 *7,3*
8 200	10.93 *277,6*	13.75 *349,3*	2.60 *66,0*	2	1 x 5-1/2 *M24 x 140*	24.0 *10,9*
10 250	13.46 *341,9*	16.00 *406,4*	2.60 *66,0*	2	1 x 6-1/2 *M24 x165*	32.0 *14,5*
12 300	15.52 *394,2*	18.00 *457,2*	2.60 *66,0*	2	1 x 6-1/2 *M24 x165*	40.0 *18,1*

Notes:

d. Gold color-coded metric bolt sizes for DN50 - DN300 couplings are available upon request.

- Refer to Tech Data Sheet G138 for additional information.

Figure 405 Flexible Coupling



Nominal Pipe Size		Max.[a] Pressures psi *bar*	Max.[b, c] End Gap Inches *mm*	Nominal Dimensions Inches (*mm*)		
ANSI Inches *DN*	O.D. Inches *mm*			A	B	C
1-1/4 *32*	1.660 *42,4*	750 *51,7*	0.13 *3,3*	2.56 *65,0*	4.17 *106,0*	1.81 *46,0*
1-1/2 *40*	1.900 *48,3*	750 *51,7*	0.13 *3,3*	2.76 *70,1*	4.45 *113,0*	1.81 *46,0*
2 *50*	2.375 *60,3*	500 *34,5*	0.13 *3,3*	3.26 *82,8*	4.88 *124,0*	1.89 *48,0*
2-1/2 *65*	2.875 *73,0*	500 *34,5*	0.13 *3,3*	3.70 *94,0*	5.51 *139,7*	1.89 *48,0*
3 *80*	3.500 *88,9*	500 *34,5*	0.13 *3,3*	4.37 *111,0*	6.50 *165,1*	1.89 *48,0*
4 *100*	4.500 *114,3*	325 *22,4*	0.25 *6,4*	5.71 *145,0*	7.76 *197,1*	2.05 *52,0*
5 *125*	5.563 *141,3*	200 *13,8*	0.25 *6,4*	6.89 *175,0*	9.76 *247,9*	2.05 *52,0*
6 *150*	6.625 *168,3*	200 *13,8*	0.25 *6,4*	7.95 *201,9*	10.67 *271,0*	2.05 *52,0*
8 *200*	8.625 *219,1*	200 *13,8*	0.25 *6,4*	10.20 *259,0*	13.54 *344,0*	2.52 *63,0*

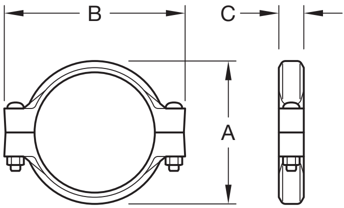
Notes:

a. Maximum Pressure and end load are total from all loads based on standard weight stainless steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

b. Maximum available gap between pipe ends. Minimum gap = 0.

c. Max End Gap and Deflection is for cut grooved standard weight stainless steel pipe. Values for roll grooved pipe will be 1⁄2 that of cut grooved.

Figure 405 Flexible Coupling



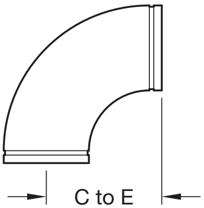
Nominal Pipe Size		Deflection[d]		Coupling Bolts		Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Degrees per coupling**	**Inches/ Foot** ***mm/m***	**Qty.**	**Size Inches** ***mm***	
1-1/4 *32*	1.660 *42,4*	4°19’	0.90 *75,0*	2	3/8 x 2-1/4 *M10 x 57*	1.5 *0,7*
1-1/2 *40*	1.900 *48,3*	3°46’	0.79 *65,8*	2	3/8 x 2-1/4 *M10 x 57*	1.5 *0,7*
2 *50*	2.375 *60,3*	3°1’	0.63 *52,5*	2	3/8 x 2-1/4 *M10 x 57*	1.8 *0,8*
2-1/2 *65*	2.875 *73,0*	2°29’	0.52 *43,3*	2	3/8 x 2-1/4 *M10 x 57*	2.0 *0,9*
3 *80*	3.500 *88,9*	2°3’	0.43 *35,8*	2	1/2 x 3 *M12 x 76*	3.1 *1,4*
4 *100*	4.500 *114,3*	3°11’	0.67 *55,8*	2	1/2 x 3 *M12 x 76*	4.0 *1,8*
5 *125*	5.563 *141,3*	2°35’	0.54 *45,0*	2	5/8 x 3-1/4 *M16 x 83*	7.1 *3,2*
6 *150*	6.625 *168,3*	2°10’	0.45 *37,5*	2	5/8 x 3-1/4 *M16 x 83*	7.1 *3,2*
8 *200*	8.625 *219,1*	1°40’	0.35 *29,2*	2	3/4 x 4-3/4 *M20 x 121*	14.6 *6,6*

Note:

d. For availability of inch bolt sizes vs. metric bolt sizes, contact GRINNELL Mechanical Products.

- Refer to Tech Data Sheet G565 for additional information.

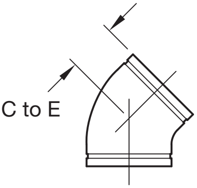
Figure 410 Full-Flow 90° Elbow



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
1 *25*	1.315 *33,4*	2.88 *73,2*	1.0 *0,45*
1-1/4 *32*	1.660 *42,4*	3.13 *79,5*	1.0 *0,45*
1-1/2 *40*	1.900 *48,3*	3.50 *88,9*	1.0 *0,45*
2 *50*	2.375 *60,3*	4.50 *114,3*	1.1 *0,50*
2-1/2 *65*	2.875 *73,0*	5.00 *127,0*	1.7 *0,77*
76,1 mm *65*	3.000 *76,1*	5.12 *130,0*	3.1 *1,41*
3 *80*	3.500 *88,9*	4.50 *114,3*	2.6 *1,18*
4 *100*	4.500 *114,3*	6.00 *152,4*	4.7 *2,13*
5 *125*	*5.563* *141,3*	7.50 *190,5*	8.4 *3,81*
6 *150*	6.625 *168,3*	9.00 *228,6*	10.3 *4,67*
8 *200*	8.625 *219,1*	12.00 *304,8*	17.6 *7,98*
10 *250*	10.750 *273,0*	15.00 *381,0*	49.2 *22,32*
12 *300*	12.750 *323,9*	18.00 *457,2*	78.4 *35,56*

Notes:
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

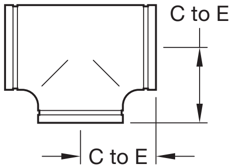
Figure 401 Full-Flow 45° Elbow



Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***		
1 *25*	1.315 *33,4*	2.00 *50,8*	0.6 *0,27*
1-1/4 *32*	1.660 *42,4*	2.00 *50,8*	0.8 *0,36*
1-1/2 *40*	1.900 *48,3*	3.50 *88,9*	1.0 *0,45*
2 *50*	2.375 *60,3*	2.75 *69,9*	1.2 *0,54*
2-1/2 *65*	2.875 *73,0*	2.81 *71,4*	1.7 *0,77*
76,1 mm *65*	3.000 *76,1*	2.87 *73,0*	3.1 *1,41*
3 *80*	3.500 *88,9*	2.00 *50,8*	1.3 *0,59*
4 *100*	4.500 *114,3*	2.50 *63,5*	2.3 *1,04*
5 *125*	*5.563* *141,3*	3.13 *79,4*	4.2 *1,90*
6 *150*	6.625 *168,3*	3.75 *95,3*	5.1 *2,31*
8 *200*	8.625 *219,1*	5.00 *127,0*	13.8 *6,26*
10 *250*	10.750 *273,0*	6.25 *158,8*	24.6 *11,16*
12 *300*	12.750 *323,9*	7.50 *190,5*	39.2 *17,78*

Notes:
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 419 Full-Flow Tee



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal C to E Inches *mm*		Approx. Weight Lbs. *kg*
1 *25*	1.315 *33,4*	2.88 *73,2*		1.0 *0,45*
1-1/4 *32*	1.660 *42,4*	3.38 *85,9*		1.5 *0,68*
1-1/2 *40*	1.900 *48,3*	3.38 *85,9*		1.6 *0,73*
2 *50*	2.375 *60,3*	**Non-US**	2.75 *69,9*	2.3 *1,04*
		US	4.00 *101,6*	1.8 *0,82*
2-1/2 *65*	2.875 *73,0*	**Non-US**	3.07 *78,0*	2.2 *1,00*
		US	4.63 *117,6*	3.6 *1,63*
76,1 mm *65*	3.000 *76,1*	2.99 *76,0*		3.1 *1,41*
3 *80*	3.500 *88,9*	3.77 *95,8*		3.1 *1,41*
4 *100*	4.500 *114,3*	4.47 *113,5*		4.9 *2,22*
5 *125*	5.563 *141,3*	5.91 *150,1*		7.1 *3,49*
6 *150*	6.625 *168,3*	5.91 *150,1*		11.7 *5,31*
8 *200*	8.625 *219,1*	7.79 *197,9*		20.0 *9,07*
10 *250*	10.750 *273,0*	8.89 *225,8*		34.4 *15,60*
12 *300*	12.750 *323,9*	10.39 *263,9*		52.5 *23,81*

Notes:
- Dimensions for U.S. and Non-U.S. sourced products are identical unless indicated.
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 460 End Caps

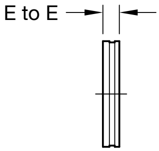


FIGURE 460
END CAP

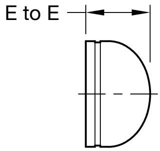
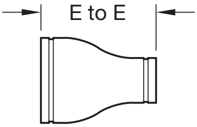


FIGURE 460
DISHED END CAP

Nominal Size ANSI Inches ***DN***	**Pipe O.D. Inches** ***mm***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
Figure 460 End Cap			
1 *25*	1.315 *33,4*	1.08 *27,5*	0.2 *0,09*
1-1/4 *32*	1.660 *42,4*	1.08 *27,5*	0.4 *0,09*
1-1/2 *40*	1.900 *48,3*	1.08 *27,5*	0.5 *0,09*
2 *50*	2.375 *60,3*	1.08 *27,5*	0.7 *0,09*
2-1/2 *65*	2.875 *73,0*	1.08 *27,5*	1.0 *0,45*
76,1 mm *65*	3.000 *76,1*	2.36 *60,0*	3.1 *1,41*
3 *80*	3.500 *88,9*	1.08 *27,5*	2.0 *0,91*
4 *100*	4.500 *114,3*	1.13 *28,7*	3.1 *1,41*
Figure 460 Dished End Cap			
5 *125*	*5.563* *141,3*	3.00 *76,2*	1.5 *0,68*
6 *150*	6.625 *168,3*	3.50 *88,9*	1.5 *0,68*
8 *200*	8.625 *219,1*	4.00 *101,6*	3.1 *1,41*
10 *250*	10.750 *273,0*	5.00 *127,0*	6.0 *2,72*
12 *300*	12.750 *323,9*	6.00 *152,4*	7.8 *3,54*

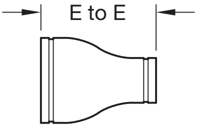
Notes:
- Dimensions for U.S. and Non-U.S. sourced products are identical unless indicated.
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 450 Concentric Reducer



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
1-1/2 x 1 *40 x 25*	1.900 x 1.315 *48,3 x 33,7*	3.75 *95,3*	1.4 *0,64*
1-1/2 x 1-1/4 *40 x 32*	1.900 x 1.660 *48,3 x 42,4*	3.75 *95,3*	1.4 *0,64*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,7*	3.75 *95,3*	1.5 *0,68*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	3.75 *95,3*	2.5 *1,13*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	5.00 *127,0*	2.5 *1,13*
2-1/2 x 1-1/2 *65 x 40*	2.875 x 1.900 *73,0 x 48,3*	5.00 *127,0*	3.5 *1,59*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	5.00 *127,0*	3.5 *1,59*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,7*	5.00 *127,0*	4.0 *1,81*
3 x 1-1/4 *80 x 32*	3.500 x 1.660 *88,9 x 42,4*	5.00 *127,0*	4.3 *1,95*
3 x 1-1/2 *80 x 40*	3.500 x 1.900 *88,9 x 48,3*	5.00 *127,0*	4.4 *2,00*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	5.00 *127,0*	4.8 *2,17*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	5.00 *127,0*	4.8 *2,17*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	5.00 *127,0*	4.8 *2,17*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	5.00 *127,0*	4.8 *2,17*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	5.00 *127,0*	5.0 *2,27*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	9.00 *228,6*	7.0 *3,18*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	9.00 *228,6*	7.0 *3,18*

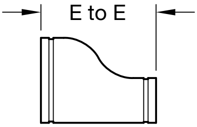
Figure 450 Concentric Reducer



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*		Approx. Weight Lbs. *kg*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	9.00 *228,6*		7.0 *3,18*
6 x 2-1/2 *150 x 65*	6.625 x 2.875 *168,3 x 73,0*	15.00 *381,0*		7.0 *3,18*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	**Non-US**	5.50 *139,7*	6.9 *3,13*
		US	9.00 *228,6*	7.4 *3,36*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	5.50 *139,7*		7.0 *3,18*
8 x 4 *200 x 00*	8.625 x 4.500 *219,1 x 114,3*	**Non-US**	6.00 *152,4*	9.6 *4,35*
		US	9.00 *228,6*	7.1 *3,22*
8 x 6 *200 x 150*	8.625 x 6.625 *219,1 x 168,3*	6.00 *152,4*		9.6 *4,35*
10 x 4 *250 x 100*	10.750 x 4.500 *273,0 x 114,3*	10.00 *254,0*		12.4 *5,62*
10 x 6 *250 x 150*	10.750 x 6.625 *273,0 x 168,3*	**Non-US**	7.00 *177,8*	12.4 *5,62*
		US	10.00 *254,0*	21.0 *9,53*
10 x 8 *250 x 200*	10.750 x 8.625 *273,0 x 219,1*	7.00 *177,8*		14.9 *6,76*
12 x 6 *300 x 150*	12.750 x 6.625 *323,9 x 168,3*	14.00 *355,6*		22.0 *9,98*
12 x 8 *300 x 200*	12.750 x 8.625 *323,9 x 219,1*	14.00 *355,6*		22.0 *9,98*
12 x 10 *300 x 250*	12.750 x 10.750 *323,9 x 273,0*	14.00 *355,6*		26.0 *11,79*

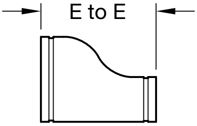
Notes:
- Dimensions for U.S. and Non-U.S. sourced products are identical unless indicated.
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 451 Eccentric Reducer



Nominal Size ANSI Inches *DN*	**Pipe O.D. Inches** *mm*	**Nominal E to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
1-1/2 x 1 *40 x 25*	1.900 x 1.315 *48,3 x 33,7*	3.75 *95,3*	1.4 *0,64*
1-1/2 x 1-1/4 *40 x 32*	1.900 x 1.660 *48,3 x 42,4*	3.75 *95,3*	1.4 *0,64*
2 x 1 *50 x 25*	2.375 x 1.315 *60,3 x 33,7*	3.75 *95,3*	1.5 *0,68*
2 x 1-1/4 *50 x 32*	2.375 x 1.660 *60,3 x 42,4*	3.75 *95,3*	2.5 *1,13*
2 x 1-1/2 *50 x 40*	2.375 x 1.900 *60,3 x 48,3*	5.00 *127,0*	2.5 *1,13*
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	5.00 *127,0*	3.5 *1,59*
3 x 1 *80 x 25*	3.500 x 1.315 *88,9 x 33,4*	5.00 *127,0*	4.3 *1,95*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	5.00 *127,0*	4.3 *1,95*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	5.00 *127,0*	4.5 *1,95*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	5.00 *127,0*	4.8 *2,18*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	5.00 *127,0*	5.8 *2,63*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	5.00 *127,0*	5.9 *2,68*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	9.00 *228,6*	5.9 *2,68*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	9.00 *228,6*	7.0 *3,18*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	9.00 *228,6*	7.0 *3,17*
6 x 2-1/2 *150 x 65*	6.625 x 2.875 *168,3 x 73,0*	9.00 *228,6*	7.0 *3,17*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	9.00 *228,6*	7.0 *3,18*

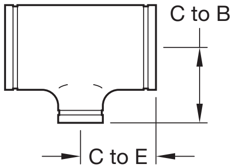
Figure 451 Eccentric Reducer



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal E to E Inches *mm*		Approx. Weight Lbs. *kg*
6 x 4 *150 x 100*	6.625 x 4.500 *168,3 x 114,3*	**Non-US**	5.00 *127,0*	7.0 *3,18*
		US	9.00 *228,6*	8.2 *3,72*
8 x 3 *200 x 80*	8.625 x 3.500 *219,1 x 88,9*	10.00 *254,0*		9.3 *4,22*
8 x 4 *200 x 100*	8.625 x 4.500 *219,1 x 114,3*	12.00 *304,8*		9.3 *4,22*
8 x 6 *200 x 150*	8.625 x 6.625 *219,1 x 168,3*	8.00 *203,2*		7.0 *3,18*
10 x 6 *250 x 150*	10.750 x 6.625 *273,0 x 168,3*	13.00 *330,2*		12.4 *5,62*
10 x 8 *250 x 200*	10.750 x 8.625 *273,0 x 219,1*	13.00 *330,2*		11.5 *5,22*
12 x 6 *300 x 150*	12.750 x 6.625 *323,9 x 168,3*	14.00 *355,6*		21.1 *9,57*
12 x 8 *300 x 200*	12.750 x 8.625 *323,9 x 219,1*	14.00 *355,6*		21.1 *9,57*
12 x 10 *300 x 250*	12.750 x 10.750 *323,9 x 273,0*	14.00 *355,6*		21.1 *9,57*

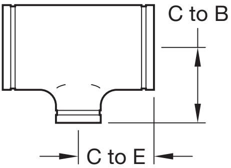
Notes:
- Dimensions for U.S. and Non-U.S. sourced products are identical unless indicated.
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 421 Full-Flow Reducing Tee



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal C to E Inches *mm*	Nominal C to B Inches *mm*	Approx. Weight Lbs. *kg*
1-1/2 x 1-1/2 x 1 *40 x 40 x 25*	1.900 x 1.900 x 1.315 *48,3 x 48,3 x 33,4*	3.38 *85,9*	3.38 *85,9*	1.6 *0,73*
1-1/2 x 1-1/2 x 1-1/4 *40 x 40 x 32*	1.900 x 1.900 x 1.660 *48,3 x 48,3 x 42,4*	3.38 *85,9*	3.38 *85,9*	1.6 *0,73*
2 x 2 x 1 *50 x 50 x 25*	2.375 x 2.375 x 1.315 *60,3 x 60,3 x 33,4*	3.25 *82,6*	3.38 *69,9*	2.2 *1,00*
2 x 2 x 1-1/4 *50 x 50 x 32*	2.375 x 2.375 x 1.660 *60,3 x 60,3 x 42,4*	3.25 *82,6*	3.25 *82,6*	2.4 *1,09*
2 x 2 x 1-1/2 *50 x 50 x 40*	2.375 x 2.375 x 1.900 *60,3 x 60,3 x 48,3*	2.75 *69,9*	2.75 *69,9*	2.4 *1,09*
2-1/2 x 2-1/2 x 1 *50 x 50 x 40*	2.375 x 2.375 x 1.315 *60,3 x 60,3 x 33,4*	3.75 *95,3*	3.75 *95,3*	3.1 *1,41*
2-1/2 x 2-1/2 x 1-1/2 *50 x 50 x 40*	2.375 x 2.375 x 1.900 *60,3 x 60,3 x 48,3*	3.75 *95,3*	3.75 *95,3*	3.4 *1,54*
2-1/2 x 2-1/2 x 2 *50 x 0 x 40*	2.375 x 2.375 x 2.375 *60,3 x 60,3 x 60,3*	3.07 *78,0*	3.07 *78,0*	3.6 *1,63*
3 x 3 x 1 *80 x 80 x 25*	3.500 x 3.500 x 1.315 *88,9 x 88,9 x 33,4*	4.25 *108,0*	4.25 *108,0*	4.3 *1,95*
3 x 3 x 1-1/4 *80 x 80 x 32*	3.500 x 3.500 x 1.660 *88,9 x 88,9 x 42,2*	4.25 *108,0*	4.25 *108,0*	4.3 *1,95*
3 x 3 x 1-1/2 *80 x 80 x 40*	3.500 x 3.500 x 1.900 *88,9 x 88,9 x 48,3*	4.25 *108,0*	4.25 *108,0*	4.4 *2,00*
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	3.77 *95,8*	3.23 *82,0*	4.4 *2,00*
3 x 3 x 2-1/2 *80 x 80 x 65*	3.500 x 3.500 x 2.875 *88,9 x 88,9 x 73,0*	3.77 *95,8*	3.23 *82,0*	4.4 *2,00*
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	4.47 *113,5*	3.82 *97,0*	4.4 *2,00*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.875 *114,3 x 114,3 x 73,0*	5.00 *113,5*	5.00 *113,5*	4.4 *2,00*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	4.47 *113,5*	3.38 *69,9*	4.9 *2,22*

Figure 421 Full-Flow Reducing Tee



Nominal Size ANSI Inches *DN*	Pipe O.D. Inches *mm*	Nominal C to E Inches *mm*	Nominal C to B Inches *mm*	Approx. Weight Lbs. *kg*
6 x 6 x 1-1/2 *150 x 150 x 40*	6.625 x 6.625 x 1.900 *168,3 x 168,3 x 48,3*	5.91 *150,1*	5.91 *150,1*	9.3 *4,22*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 88,9*	5.91 *150,1*	5.91 *150,1*	9.3 *4,22*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 60,3*	5.91 *150,1*	4.88 *124,0*	9.3 *4,22*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	5.91 *150,1*	5.12 *130,0*	9.3 *4,22*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	7.79 *197,9*	6.31 *160,3*	18.1 *8,21*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	7.79 *197,9*	6.62 *168,1*	18.1 *8,21*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	8.89 *225,8*	7.70 *195,6*	29.3 *13,29*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	8.89 *225,8*	8.59 *218,2*	31.7 *14,38*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	10.39 *263,9*	9.51 *242,0*	44 *19,96*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	10.39 *263,9*	9.89 *251,2*	44 *19,96*

Notes:
- Dimensions for U.S. and Non-U.S. sourced products are identical unless indicated.
- Schedule 40 fittings available upon request.
- Refer to Tech Data Sheet G570 for additional information.

Figure 441 Flange Adapter

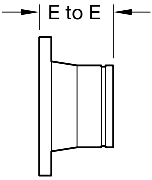
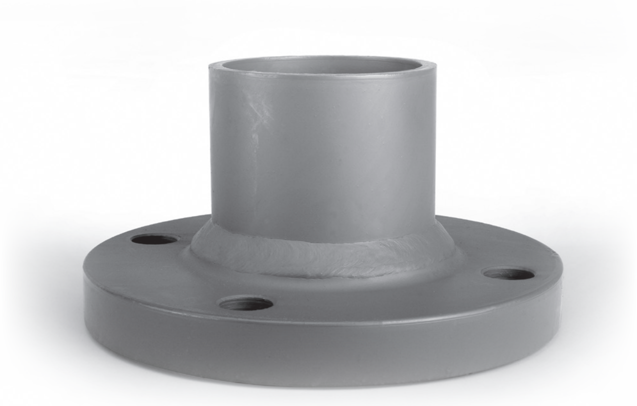


FIGURE 441
FLANGE ADAPTER
GROOVED x CLASS 150 FLANGE

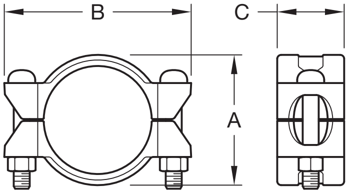
Nominal Pipe Size		Nominal E to E Inches *mm*	Mating Flange Bolt Qty.	Approx. Weight Lbs. *kg*
ANSI Inches ***DN***	**O.D. Inches** ***mm***			
1 *25*	1.315 *33,4*	3.00 *76,2*		2.3 *1,0*
1-1/4 *32*	1.660 *42,2*	4.00 *101,6*		2.9 *1,3*
1-1/2 *40*	1.900 *48,3*	*4.00* *101,6*		3.8 *1,7*
2 *50*	2.375 *60,3*	4.00 *101,6*	4	6.4 *2,8*
2-1/2 *65*	2.875 *73,0*	4.00 *101,6*	4	8.8 *4,0*
3 *80*	3.500 *88,9*	4.00 *101,6*	4	10.4 *4,7*
4 *100*	4.500 *114,3*	6.00 *152,4*	8	18.2 *8,3*
5 *125*	5.563 *141,3*	6.00 *152,4*	8	22.0 *10,0*
6 *150*	6.625 *168,3*	6.00 *152,4*	8	28.1 *12,7*
8 *200*	8.625 *219,1*	6.00 *152,4*	8	43.7 *19,8*
10 *250*	10.750 *273,1*	8.00 *203,2*		68.2 *30,9*
12 *300*	12.750 *323,9*	8.00 *203,2*		96.1 *43,6*

- Refer to Tech Data Sheet G568 for additional information.



Plain End Systems

Figure 909 Plain End Coupling



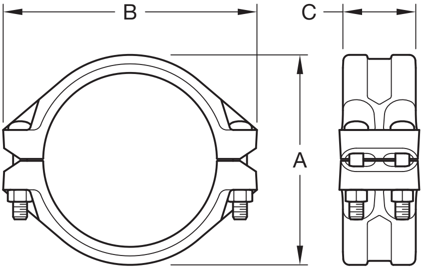
Size 2" - 6" (DN50 - DN150)

Nominal Pipe Size		Max.[a] Pressures psi *bar*	Max.[a] End Load Lbs. *kN*	Nominal Dimensions		
ANSI Inches *DN*	O.D. Inches *mm*			A Inches *mm*	B Inches *mm*	C Inches *mm*
2 *50*	2.375 *60,3*	750 *51,7*	3,323 *14,78*	3.69 *93,7*	5.75 *146,1*	3.31 *84,1*
2-1/2 *65*	2.875 *73,0*	600 *41,4*	3,895 *17,33*	4.17 *105,9*	6.25 *158,8*	3.31 *84,1*
76,1mm *65*	3.000 *76,1*	600 *41,4*	4,230 *18,82*	4.40 *111,8*	7.13 *181,1*	3.88 *96,6*
3 *80*	3.500 *88,9*	600 *41,4*	5,773 *25,68*	4.81 *122,2*	7.56 *192,0*	3.31 *84,1*
4 *100*	4.500 *114,3*	450 *31,0*	7,157 *31,83*	5.93 *150,6*	8.63 *219,2*	3.88 *98,6*
5 *125*	5.563 *141,3*	350 *24,1*	8,504 *37,83*	7.08 *179,8*	10.62 *269,7*	4.20 *106,7*
165,1mm *150*	6.500 *165,1*	200 *13,8*	6,637 *29,52*	8.02 *203,7*	11.56 *293,6*	4.20 *106,7*
6 *150*	6.625 *168,3*	300 *20,7*	10,341 *46,00*	8.19 *208,0*	11.68 *296,7*	4.25 *108,0*
8 *200*	8.625 *219,1*	250 *17,2*	14,607 *64,98*	10.69 *271,5*	13.63 *346,2*	4.91 *124,7*
10 *250*	10.750 *273,0*	250 *17,2*	22,691 *100,94*	13.13 *333,5*	15.88 *403,4*	4.91 *124,7*
12 *300*	12.750 *323,9*	250 *17,2*	31,919 *141,99*	15.44 *392,2*	16.00 *406,4*	4.76 *120,9*

Notes:

a. Maximum pressure and end load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

Figure 909 Plain End Coupling



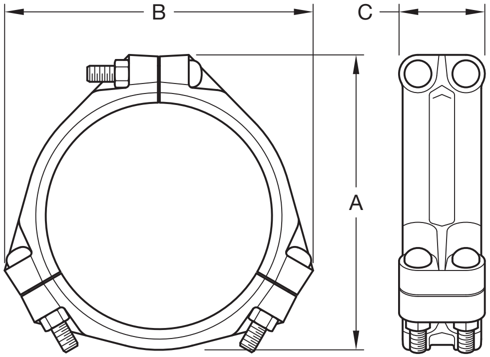
Size 8" - 12" (DN200 - DN300)

Nominal Pipe Size		Coupling Bolts			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	Qty.	Size[b] Inches *mm*	Bolt Torque Lbs.-ft *Nm*	
2 *50*	2.375 *60,3*	2	5/8 x 3-1/2 *M16 x 90*	150 *203*	5.4 *2,4*
2-1/2 *65*	2.875 *73,0*	2	5/8 x 3-1/2 *M16 x 90*	150 *203*	5.9 *2,7*
76,1mm *65*	3.000 *76,1*	2	3/4 x 4-3/4 *M20 x 121*	150 *203*	4.6 *2,1*
3 *80*	3.500 *88,9*	2	3/4 x 4-3/4 *M20 x 121*	200 *271*	9.0 *4,1*
4 *100*	4.500 *114,3*	2	3/4 x 4-3/4 *M20 x 121*	200 *271*	13.5 *6,1*
5 *125*	5.563 *141,3*	2	1 x 6-1/2 *M24 x 165*	250 *339*	7.8 *3,5*
165,1mm *150*	6.500 *165,1*	2	1 x 6-1/2 *M24 x 165*	250 *339*	8.5 *3,9*
6 *150*	6.625 *168,3*	2	1 x 6-1/2 *M24 x 165*	250 *339*	23.5 *10,7*
8 *200*	8.625 *219,1*	4	7/8 x 5-1/2 *M22 x 140*	250 *339*	35.1 *15,9*
10 *250*	10.750 *273,0*	4	7/8 x 5-1/2 *M22 x 140*	300 *407*	48.5 *22,0*
12 *300*	12.750 *323,9*	4	1 x 6 *M24 x 152*	350 *475*	62.6 *28,4*

b. Gold color coded metric bolt sizes are available upon request

- Refer to Tech Data Sheet G190 Figure 909 Plain End Coupling.

Figure 909 Plain End Coupling



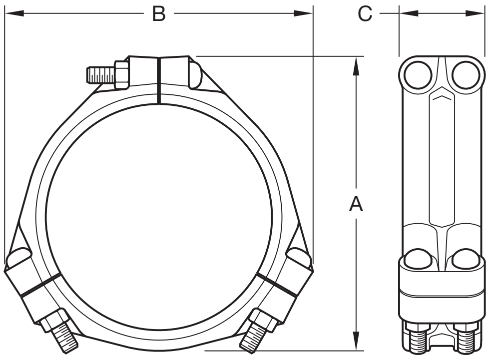
Size 14" - 18" (DN350 - DN450)

Nominal Pipe Size		Max.[a] Pressures psi *bar*	Max.[a] End Load Lbs. *kN*	Nominal Dimensions		
ANSI Inches *DN*	O.D. Inches *mm*			A Inches *mm*	B Inches *mm*	C Inches *mm*
14 *350*	14.000 *355,6*	200 *13,8*	30,788 *136,96*	16.74 *425,2*	17.06 *433,3*	4.76 *120,9*
16 *400*	16.000 *406,4*	150 *10,3*	30,159 *134,16*	18.74 *476,0*	18.75 *476,3*	4.76 *120,9*
18 *450*	18.000 *457,2*	150 *10,3*	38,170 *169,80*	20.74 *526,8*	19.63 *498,6*	4.76 *120,9*

Notes:

a. Maximum pressure and end load are total from all loads based on standard weight steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact GRINNELL Mechanical Products for details.

Figure 909 Plain End Coupling



Size 14" - 18" (DN350 - DN450)

Nominal Pipe Size		Coupling Bolts			Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**Qty.**	**Size[b] Inches *mm***	**Bolt Torque Lbs.-ft *Nm***	
14 *350*	14.000 *355,6*	6	1 x 6 *M24 x 152*	350 *475*	90.2 *40,9*
16 *400*	16.000 *406,4*	6	1 x 6 *M24 x 152*	350 *475*	105.6 *47,9*
18 *450*	18.000 *457,2*	6	1 x 6 *M24 x 152*	350 *475*	127.2 *57,7*

b. Gold color coded metric bolt sizes are available upon request

- Refer to Tech Data Sheet G190 Figure 909 Plain End Coupling.

Friction Resistance Table

Expressed as Equivalent Straight Pipe

Nominal Pipe Size ANSI Inches *DN*	Nominal Pipe Size O.D. Inches *mm*	Elbows 90° Feet *m*	Elbows 45° Feet *m*	Tee Branch Feet *m*	Tee Run Feet *m*
2 *50*	2.375 *60,3*	3.2 *1,0*	1.6 *0,5*	8.0 *2,5*	3.2 *1,0*
2-1/2 *65*	2.875 *73,0*	3.9 *1,2*	2.0 *0,6*	9.8 *3,0*	3.9 *1,2*
3 *80*	3.500 *88,9*	4.9 *1,5*	2.4 *0,7*	12.2 *3,7*	4.9 *1,5*
3-1/2 *90*	4.000 *101,6*	6.5 *2,0*	3.3 *1,0*	16.3 *5,0*	6.5 *2,0*
4 *100*	4.500 *114,3*	6.5 *2,0*	3.3 *1,0*	16.3 *5,0*	6.5 *2,0*
5 *125*	5.563 *141,3*	8.2 *2,5*	4.1 *1,3*	20.5 *6,3*	8.2 *2,5*
6 *150*	6.625 *168,3*	9.9 *3,0*	5.0 *1,5*	24.8 *7,6*	9.9 *3,0*
8 *200*	8.625 *219,1*	13.1 *4,0*	6.6 *2,0*	32.8 *10,0*	13.1 *4,0*

Notes:

- For the reducing tee branches, use the value that is corresponding to the branch size.
  Example: For 8” x 8” x 2” tee, the branch value of 2” is 8.0 feet.
- For sizes not listed interpolate from the values shown.
- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 910 90° and Figure 45° 901 Elbows

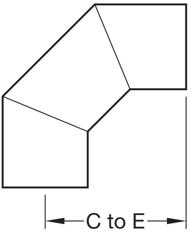


FIGURE 910
90° ELBOW
FABRICATED
(SEGMENT WELDED)

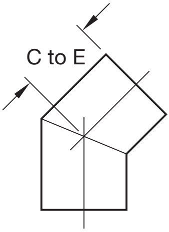


FIGURE 901
45° ELBOW
FABRICATED
(SEGMENT WELDED)

Nominal Pipe Size		Figure 910		Figure 901	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
2 *50*	2.375 *60,3*	4.75 *120,7*	1.8 *0,8*	3.13 *79,5*	1.3 *0,6*
2-1/2 *65*	2.875 *73,0*	5.50 *139,7*	3.1 *1,4*	3.50 *89,9*	2.1 *1,0*
76,1mm *65*	3.000 *76,1*	5.50 *139,7*	3.2 *1,5*	3.50 *89,9*	2.2 *1,0*
3 *80*	3.500 *88,9*	6.25 *158,8*	4.8 *2,2*	3.75 *95,3*	3.5 *1,6*
4 *100*	4.500 *114,3*	7.75 *196,9*	7.5 *3,4*	4.25 *108,0*	5.5 *2,5*
139,7mm *125*	5.500 *139,7*	9.75 *248,0*	11.3 *5,1*	5.00 *127,0*	7.7 *3,5*
5 *125*	5.563 *141,3*	9.75 *248,0*	11.6 *5,3*	5.00 *127,0*	8.1 *3,7*
165,1mm *150*	6.500 *165,1*	10.00 *254,0*	16.9 *7,7*	5.75 *146,1*	11.0 *5,0*
6 *150*	6.625 *168,3*	10.00 *254,0*	16.6 *7,5*	5.75 *146,1*	11.2 *5,1*
8 *200*	8.625 *219,1*	11.00 *279,4*	29.6 *13,4*	6.00 *152,4*	19.0 *8,6*
10 *250*	10.750 *273,0*	11.50 *292,1*	48.5 *22,0*	6.50 *165,1*	28.0 *12,7*
12 *300*	12.750 *323,9*	13.50 342,9	66.4 *30,1*	7.00 *177,8*	48.0 *22,0*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 910LR 90° and Figure 901LR 45° Long Radius Elbows

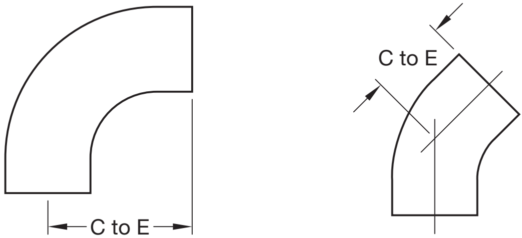


FIGURE 910LR
90° LONG RADIUS ELBOW

FIGURE 901LR
45° LONG RADIUS ELBOW

Nominal Pipe Size		Figure 910LR		Figure 901LR	
ANSI Inches *DN*	O.D. Inches *mm*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*	Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
2 *50*	2.375 *60,3*	4.25 *108,0*	2.7 *1,2*	3.13 *79,5*	1.8 *0,8*
2-1/2 *65*	2.875 *73,0*	5.50 *139,7*	4.2 *1,9*	3.50 *89,9*	2.9 *1,3*
76,1mm *65*	3.000 *76,1*	5.50 *139,7*	4.4 *2,0*	3.50 *89,9*	3.1 *1,4*
3 *80*	3.500 *88,9*	6.25 *158,8*	6.5 *2,9*	3.75 *95,3*	4.6 *2,1*
4 *100*	4.500 *114,3*	8.00 *203,3*	11.5 *5,2*	4.50 *114,3*	7.5 *3,4*
139,7mm *125*	5.500 *139,7*	9.75 *248,0*	19.0 *8,6*	5.00 *127,0*	12.5 *5,7*
5 *125*	5.563 *141,3*	9.75 *248,0*	19.4 *8,8*	5.00 *127,0*	12.5 *5,7*
165,1mm *150*	6.500 *165,1*	11.13 *282,7*	26.4 *12,0*	5.88 *149,4*	12.0 *5,4*
6 *150*	6.625 *168,3*	11.13 *282,7*	27.9 *12,6*	5.88 *149,4*	12.0 *5,4*
8 *200*	8.625 *219,1*	14.13 *358,9*	54.5 *24,7*	7.13 *181,1*	34.0 *15,4*
10 *250*	10.750 *273,0*	17.13 *435,1*	103.7 *47,0*	8.38 *212,9*	56.0 *25,4*
12 *300*	12.750 *323,9*	20.13 *511,3*	147.8 *67,0*	9.36 *244,6*	98.0 *44,5*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 919 Tee and Figure 927 Cross

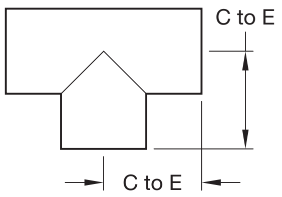


FIGURE 919 TEE
CAST

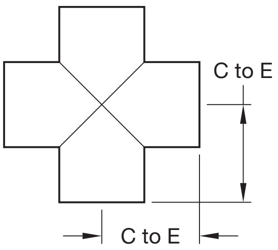


FIGURE 927 CROSS
FABRICATED

Nominal Pipe Size		Figure 919 Tee		Figure 927 Cross	
ANSI Inches *DN*	**O.D. Inches** *mm*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*	**Nominal C to E Inches** *mm*	**Approx. Weight Lbs.** *kg*
2 *50*	2.375 *60,3*	3.25 *82,6*	2.7 *1,2*	4.25 *108,0*	3.7 *1,7*
2-1/2 *65*	2.875 *73,0*	3.75 *95,3*	4.4 *2,0*	4.75 *120,7*	5.8 *2,6*
76,1mm *65*	3.000 *76,1*	3.75 *95,3*	6.5 *2,9*	4.75 *120,7*	6.0 *2,7*
3 *80*	3.500 *88,9*	4.25 *108,0*	6.5 *2,9*	5.13 *130,3*	8.6 *3,9*
4 *100*	4.500 *114,3*	5.00 *127,0*	10.7 *4,8*	5.88 *149,4*	20.7 *9,4*
139,7mm *125*	5.500 *139,7*	5.50 *139,7*	15.2 *6,9*	—	—
5 *125*	5.563 *141,3*	5.50 *139,7*	15.5 *7,0*	6.88 *175,0*	18.5 *8,4*
165,1mm *150*	6.500 *165,1*	6.50 *165,1*	24.2 *11,0*	7.63 *193,8*	27.3 *12,4*
6 *150*	6.625 *168,3*	6.50 *165,1*	23.0 *10,4*	7.63 *193,8*	28.6 *13,0*
8 *200*	8.625 *219,1*	10.00 *254,0*	43.7 *19,8*	10.00 *254,0*	48.0 *21,7*
10 *250*	10.750 *273,0*	11.50 *292,1*	57.0 *25,9*	11.50 *292,1*	75.0 *34,0*
12 *300*	12.750 *323,9*	13.50 *342,9*	110.0 *49,9*	13.50 *342,9*	95.8 *43,4*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 921 Reducing Tee

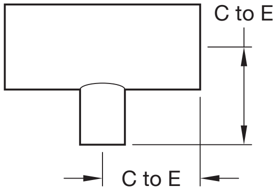


FIGURE 921
FABRICATED REDUCING TEE
(SEGMENT WELDED)

Nominal Pipe Size		Nominal C to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches** *mm*		
3 x 3 x 2 *80 x 80 x 50*	3.500 x 3.500 x 2.375 *88,9 x 88,9 x 60,3*	5.13 *130,3*	7.1 *3,2*
4 x 4 x 2 *100 x 100 x 50*	4.500 x 4.500 x 2.375 *114,3 x 114,3 x 60,3*	5.88 *149,4*	9.1 *4,1*
4 x 4 x 2-1/2 *100 x 100 x 65*	4.500 x 4.500 x 2.875 *114,3 x 114,3 x 73,0*	5.88 *149,4*	9.5 *4,3*
4 x 4 x 3 *100 x 100 x 80*	4.500 x 4.500 x 3.500 *114,3 x 114,3 x 88,9*	5.88 *149,4*	9.7 *4,4*
6 x 6 x 2 *150 x 150 x 50*	6.625 x 6.625 x 2.375 *168,3 x 168,3 x 60,3*	7.63 *193,8*	19.4 *8,8*
6 x 6 x 3 *150 x 150 x 80*	6.625 x 6.625 x 3.500 *168,3 x 168,3 x 88,9*	7.63 *193,8*	21.0 *9,5*
6 x 6 x 4 *150 x 150 x 100*	6.625 x 6.625 x 4.500 *168,3 x 168,3 x 114,3*	7.63 *193,8*	21.8 *9,9*
8 x 8 x 2 *200 x 200 x 50*	8.625 x 8.625 x 2.375 *219,1 x 219,1 x 60,3*	10.00 *254,0*	36.2 *16,4*
8 x 8 x 3 *200 x 200 x 80*	8.625 x 8.625 x 3.500 *219,1 x 219,1 x 88,9*	10.00 *254,0*	36.5 *16,6*
8 x 8 x 4 *200 x 200 x 100*	8.625 x 8.625 x 4.500 *219,1 x 219,1 x 114,1*	10.00 *254,0*	37.2 *16,9*
8 x 8 x 5 *200 x 200 x 125*	8.625 x 8.625 x 5.563 *219,1 x 219,1 x 141,3*	10.00 *254,0*	36.8 *16,7*
8 x 8 x 6 *200 x 200 x 150*	8.625 x 8.625 x 6.625 *219,1 x 219,1 x 168,3*	10.00 *254,0*	37.4 *17,0*
10 x 10 x 4 *250 x 250 x 100*	10.750 x 10.750 x 4.500 *273,0 x 273,0 x 114,3*	11.50 *292,1*	58.0 *26,3*
10 x 10 x 6 *250 x 250 x 150*	10.750 x 10.750 x 6.625 *273,0 x 273,0 x 168,3*	11.50 *292,1*	66.0 *27,2*
10 x 10 x 8 *250 x 250 x 200*	10.750 x 10.750 x 8.625 *273,0 x 273,0 x 219,1*	11.50 *292,1*	62.0 *28,1*
12 x 12 x 6 *300 x 300 x 150*	12.750 x 12.750 x 6.625 *323,9 x 323,9 x 168,3*	13.50 *342,9*	80.9 *36,7*
12 x 12 x 8 *300 x 300 x 200*	12.750 x 12.750 x 8.625 *323,9 x 323,9 x 219,1*	13.50 *342,9*	76.3 *34,6*
12 x 12 x 10 *300 x 300 x 250*	12.750 x 12.750 x 10.750 *323,9 x 323,9 x 273,0*	13.50 *342,9*	77.6 *35,2*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 914 45° Lateral and Figure 924 90° True Wye

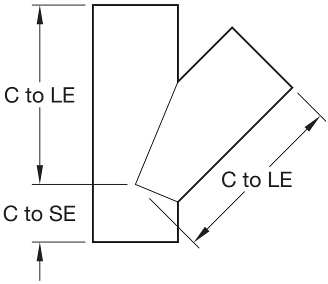


FIGURE 914
FABRICATED 45° LATERAL
(SEGMENT WELDED)

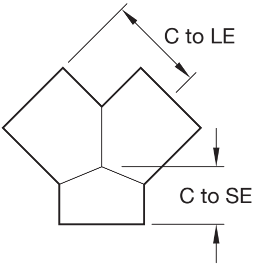


FIGURE 924
FABRICATED 90° TRUE WYE
(SEGMENT WELDED)

Nominal Pipe Size		Figure 914 45° Lateral			Figure 924 90° True Wye		
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Nominal C to LE Inches** ***mm***	**Nominal C to SE Inches** ***mm***	**Approx. Weight Lbs.** ***kg***	**Nominal C to LE Inches** ***mm***	**Nominal C to SE Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
2 *50*	2.375 *60,3*	7.25 *184,2*	2.75 *70,0*	4.5 *2,0*	4.25 *108,0*	2.75 *69,9*	2.5 *1,1*
2-1/2 *65*	2.875 *73,0*	7.75 *197,0*	3.00 *76,2*	7.7 *3,5*	4.75 *120,7*	3.00 *76,2*	4.4 *2,0*
3 *80*	3.500 *88,9*	8.75 *222,3*	3.25 *83,5*	11.0 *5,0*	5.13 *130,3*	3.25 *82,6*	6.4 *2,9*
4 *100*	4.500 *114,3*	10.75 *273,1*	3.75 *95,2*	18.7 *8,5*	5.88 *149,4*	3.75 *95,3*	10.5 *4,8*
5 *125*	5.563 *141,3*	12.75 *324,0*	4.00 *102,0*	29.4 *13,3*	6.88 *175,0*	4.00 *101,6*	15.2 *6,9*
6 *150*	6.625 *168,3*	14.00 *356,0*	4.50 *114,3*	42.2 *19,1*	7.63 *193,8*	4.50 *114,3*	22.9 *10,4*
8 *200*	8.625 *219,1*	18.00 *457,0*	6.00 *152,4*	70.9 *32,2*	10.00 *254,0*	6.00 *152,4*	41.9 *19,0*
10 *250*	10.750 *273,0*	20.75 *527,1*	6.50 *165,1*	66.2 *30,0*	11.50 *292,1*	6.50 *165,1*	66.2 *30,0*
12 *300*	12.750 *323,9*	24.50 *622,3*	7.00 *177,8*	87.7 *39,8*	13.50 *342,9*	7.00 *177,8*	87.7 *39,8*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 999 Swaged Nipple

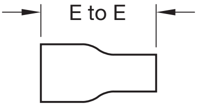


FIGURE 999
SWAGED NIPPLE
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
2-1/2 x 2 *65 x 50*	2.875 x 2.375 *73,0 x 60,3*	7.00 *177,8*	3.0 *1,6*
3 x 2 *80 x 50*	3.500 x 2.375 *88,9 x 60,3*	8.00 *203,2*	5.0 *2,3*
3 x 2-1/2 *80 x 65*	3.500 x 2.875 *88,9 x 73,0*	8.00 *203,2*	5.0 *2,3*
4 x 2 *100 x 50*	4.500 x 2.375 *114,3 x 60,3*	9.00 *228,6*	7.5 *3,4*
4 x 2-1/2 *100 x 65*	4.500 x 2.875 *114,3 x 73,0*	9.00 *228,6*	7.5 *3,4*
4 x 3 *100 x 80*	4.500 x 3.500 *114,3 x 88,9*	9.00 *228,6*	7.5 *3,4*
5 x 2 *125 x 50*	5.563 x 2.375 *141,3 x 60,3*	11.00 *279,4*	11.5 *5,2*
5 x 3 *125 x 80*	5.563 x 3.500 *141,3 x 88,9*	11.00 *279,4*	11.5 *5,2*
5 x 4 *125 x 100*	5.563 x 4.500 *141,3 x 114,3*	11.00 *279,4*	11.5 *5,2*
6 x 2 *150 x 50*	6.625 x 2.375 *168,3 x 60,3*	12.00 *304,8*	19.0 *8,6*
6 x 2-1/2 *150 x 65*	6.625 x 2.875 *168,3 x 73,0*	12.00 *304,8*	19.0 *8,6*
6 x 3 *150 x 80*	6.625 x 3.500 *168,3 x 88,9*	12.00 *304,8*	19.0 *8,6*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 999 Swaged Nipple

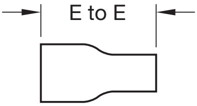


FIGURE 999
SWAGED NIPPLE
FABRICATED

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
6 x 4 150 x 100	6.625 x 4.500 *168,3 x 114,3*	12.00 *304,8*	19.0 *8,6*
6 x 5 150 x 125	6.625 x 5.563 *168,3 x 141,3*	12.00 *304,8*	19.0 *8,6*
8 x 3 200 x 80	8.625 x 3.500 *219,1 x 88,9*	13.00 *330,2*	–
8 x 4 200 x 100	8.625 x 4.500 *219,1 x 114,3*	13.00 *330,2*	–
8 x 6 200 x 150	8.625 x 6.625 *219,1 x 168,3*	13.00 *330,2*	–
10 x 3 250 x 80	10.750 x 3.500 *273,0 x 88,9*	15.00 *381,0*	–
10 x 4 250 x 100	10.750 x 4.500 *273,0 x 114,3*	15.00 *381,0*	–
10 x 6 250 x 150	10.750 x 6.625 *273,0 x 168,3*	15.00 *381,0*	–
10 x 8 250 x 200	10.750 x 8.625 *273,0 x 219,1*	15.00 *381,0*	–
12 x 6 300 x 150	12.750 x 6.625 *323,9 x 168,3*	16.00 *406,4*	–
12 x 8 300 x 200	12.750 x 8.625 *323,9 x 219,1*	16.00 *406,4*	–
12 x 10 300 x 250	12.750 x 10.750 *323,9 x 273,0*	16.00 *406,4*	–

Figures 991, 992, and 993 Adapter Nipples

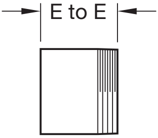


FIGURE 991
ADAPTER NIPPLE
FABRICATED
PLAIN x MALE THREAD

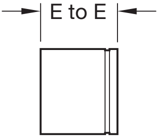


FIGURE 992
ADAPTER NIPPLE
FABRICATED
PLAIN x GROOVE

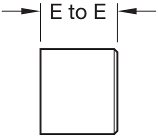


FIGURE 993
ADAPTER NIPPLE
FABRICATED
PLAIN x BEVEL

Nominal Pipe Size		Figures 991, 992, and 993	
ANSI Inches ***DN***	**O.D. Inches** ***mm***	**Nominal E to E Inches** ***mm***	**Approx. Weight Lbs.** ***kg***
2 *50*	2.375 *60,3*	4.00 *101,6*	1.2 *0,5*
2-1/2 *65*	2.875 *73,0*	4.00 *101,6*	1.9 *0,9*
3 *80*	3.500 *88,9*	4.00 *101,6*	2.5 *1,1*
4 *100*	4.500 *114,3*	6.00 *154,4*	5.4 *2,4*
5 *125*	5.563 *141,3*	6.00 *154,4*	7.3 *3,3*
6 *150*	6.625 *168,3*	6.00 *154,4*	9.4 *4,3*
8 *200*	8.625 *219,1*	6.00 *154,4*	14.2 *6,4*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figures 941 and 942 Flange Adapters

FIGURE 941
FABRICATED FLANGE ADAPTER
ANSI CLASS 150 LBS.

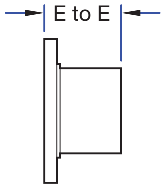


FIGURE 942
FABRICATED FLANGE ADAPTER
ANSI CLASS 300 LBS.

Nominal Pipe Size		Figure 941			Figure 942		
ANSI Inches *DN*	O.D. Inches *mm*	Nominal E to E Inches *mm*	Mating Flange Bolt Qty	Approx. Weight Lbs. *kg*	Nominal E to E Inches *mm*	Mating Flange Bolt Qty	Approx. Weight Lbs. *kg*
2 *50*	2.375 *60,3*	4 *102,0*	4	6.0 *2,7*	4 *102,0*	8	8.2 *3,7*
2-1/2 *65*	2.875 *73,0*	4 *102,0*	4	9.2 *4,2*	4 *102,0*	8	11.9 *5,4*
3 *80*	3.500 *88,9*	4 *102,0*	4	10.4 *4,7*	4 *102,0*	8	15.5 *7,0*
4 *100*	4.500 *114,3*	6 *152,4*	8	19.1 *8,7*	6 *152,4*	8	28.0 *12,7*
5 *125*	5.563 *141,3*	6 *152,4*	8	23.0 *10,4*	6 *152,4*	8	35.0 *15,9*
6 *150*	6.625 *168,3*	6 *152,4*	8	29.5 *13,4*	6 *152,4*	12	50.0 *22,7*
8 *200*	8.625 *219,1*	6 *152,4*	8	43.5 *19,7*	6 *152,4*	12	72.0 *32,7*

- Refer to Tech Data Sheet G192 Plain End Fittings.

Figure 960 End Cap

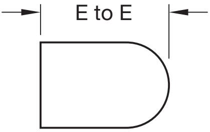
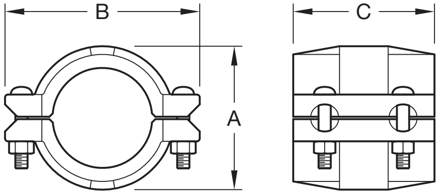


FIGURE 960
FABRICATED END CAP

Nominal Pipe Size		Nominal E to E Inches *mm*	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*		
2 *50*	2.375 *60,3*	4.00 *102,0*	2.3 *1,0*
2-1/2 *65*	2.875 *73,0*	5.00 *127,0*	3.0 *1,4*
3 *80*	3.500 *88,9*	6.00 *152,4*	4.5 *2,0*
4 *100*	4.500 *114,3*	7.00 *178,0*	7.5 *3,4*
5 *125*	5.563 *141,3*	8.50 *216,0*	12.5 *5,7*
6 *150*	6.625 *168,3*	10.00 *254,0*	17.0 *7,7*
8 *200*	8.625 *219,1*	11.00 *279,4*	29.0 *13,2*
10 *250*	10.750 *273,0*	13.00 *330,2*	24.5 *11,1*
12 *300*	12.750 *323,9*	14.00 *355,6*	31.0 *14,1*

- Refer to Tech Data Sheet G192 Plain End Fittings.

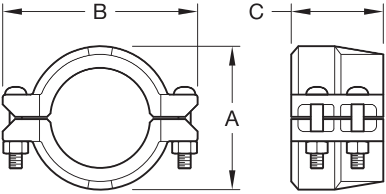
Figure 9095 HDPE Coupling



Nominal Pipe Size		Nominal Dimensions			Coupling Bolt Size Inches	Approx. Weight Lbs kg
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*		
2 *50*	2.375 *60,3*	3.39 *86,0*	5.24 *133,0*	4.61 *117,0*	1/2 x 2-3/8	5.7 *2,6*
3 *80*	3.500 *88,9*	4.61 *117,0*	6.50 *165,0*	4.02 *102,0*	1/2 x 2-3/4	7.9 *3,6*
4 *100*	4.500 *114,3*	5.75 *146,0*	7.99 *203,0*	5.75 *146,0*	1/2 x 3	11.4 *5,2*
6 *150*	6.625 *168,3*	7.87 *200,0*	10.75 *273,0*	5.87 *149,0*	5/8 x 3-1/2	18.0 *8,2*
8 *200*	8.625 *219,1*	10.39 *264,0*	13.11 *333,0*	5.98 *152,0*	5/8 x 3-1/2	27.5 *12,5*
10 *250*	10.750 *273,1*	12.52 *318,0*	15.63 *397,0*	6.50 *165,0*	3/4 x 4-3/4	44.0 *20,0*
12 *300*	12.750 *323,9*	14.37 *365,0*	17.64 *448,0*	7.87 *200,0*	3/4 x 4-3/4	56.1 *25,5*
14 *350*	14.000 *355,6*	16.26 *413,0*	19.37 *492,0*	10.12 *257,0*	1 x 6 —	90.6 *41,2*
16 *400*	16.000 *406,4*	18.39 *467,0*	21.38 *543,0*	10.12 *257,0*	1 x 6 —	97.2 *44,2*
18 *450*	18.000 *457,2*	20.28 *515,0*	23.43 *595,0*	10.24 *260,0*	1 x 6 —	111.1 *50,5*
20 *500*	20.000 *508,0*	22.36 *568,0*	25.63 *651,0*	10.24 *260,0*	1 x 6 —	136.0 *61,8*

- Refer to Tech Data Sheet G580 Figure 9095 HDPE Coupling

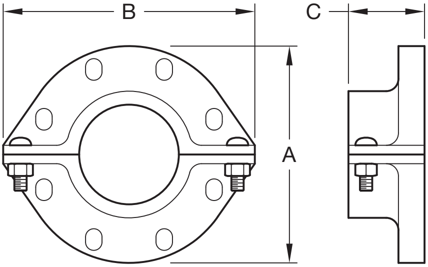
Figure 9097 HDPE Transition Coupling



Nominal Pipe Size		Nominal Dimensions			Coupling Bolt Size Inches	Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A Inches *mm***	**B Inches *mm***	**C Inches *mm***		
2 *50*	2.375 *60,3*	3.39 *86,0*	5.99 *152,0*	3.11 *79,0*	1/2 x 2-3/8	4.4 *2,0*
3 *80*	3.500 *88,9*	4.49 *114,0*	7.13 *181,0*	3.11 *79,0*	1/2 x 3	5.9 *2,7*
4 *100*	4.500 *114,3*	5.75 *146,0*	8.50 *216,0*	3.74 *95,0*	1/2 x 3	8.4 *3,8*
6 *150*	6.625 *168,3*	8.00 *203,0*	11.26 *286,0*	3.74 *95,0*	5/8 x 3-1/2	12.5 *5,7*
8 *200*	8.625 *219,1*	10.51 *267,0*	13.63 *346,0*	4.25 *108,0*	5/8 x 3-1/2	21.3 *9,7*
10 *250*	10.750 *273,1*	12.64 *321,0*	17.00 *432,0*	5.00 *127,0*	3/4 x 4-3/4	35.2 *16,0*
12 *300*	12.750 *323,9*	14.76 *375,0*	19.49 *495,0*	5.00 *127,0*	3/4 x 4-3/4	43.1 *19,6*

- Refer to Tech Data Sheet G582 Figure 9097 HDPE Transition Coupling.

Figure 9094 HDPE Flange Coupling



Nominal Pipe Size		Nominal Dimensions			Coupling Bolts [a]		Approx. Weight Lbs. *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Bolt Size Inches / Torque Range Ft. - Lbs. *Nm*	
4 *100*	4.500 114,3	9.00 229,0	10.25 260,0	3.10 79,0	8	5/8 x 3-1/4 / 110 - 140 *149 - 190*	15.0 *6,8*
6 *150*	6.625 168,3	11.00 279,0	12.25 311,0	3.75 95,0	8	3/4 x 3-1/2 / 220 - 230 *298 - 312*	21.5 *9,8*
8 *200*	8.625 219,1	13.50 343,0	14.75 375,0	3.42 87,0	8	3/4 x 3-3/4 / 220 - 250 *298 - 339*	28.8 *13,1*

Notes:

a. Mating Bolts and Nuts are not supplied. Flange Mating Bolts must be at least SAE J429 Grade 5 or stronger. It is the responsibility of the purchaser to verify correct length for the intended application.

- Refer to Tech Data Sheet G584 Figure 9094 HDPE Flange Coupling.

HDPE Pipe Dimensional Specifications

Nominal Pipe Size				Pipe Wall Thickness and Standard Dimension Ratio						
ANSI Inches *DN*	O.D.	Tol. +/-	Max. Pipe Ovaity +/-	SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
	Inches *mm*									
2 *50*	2.375 *60,3*	0.006 *0,15*	0.035 *0,89*	0.325 *8,3*	0.264 *6,7*	0.216 *5,5*	0.153 *3,9*	0.140 *3,6*	0.113 *2,9*	—
3 *80*	3.500 *88,9*	0.016 *0,41*	0.040 *1,02*	0.479 *12,2*	0.389 *9,9*	0.318 *8,1*	0.226 *5,7*	0.206 *5,2*	0.167 *4,2*	0.108 *2,7*
4 *100*	4.500 *114,3*	0.020 *0,51*	0.040 *1,02*	0.616 *15,6*	0.500 *12,7*	0.409 *10,4*	0.290 *7,4*	0.265 *6,7*	0.214 *5,4*	0.138 *3,5*
6 *150*	6.625 *168,3*	0.030 *0,76*	0.050 *1,27*	0.908 *23,1*	0.736 *18,7*	0.602 *15,3*	0.427 *10,8*	0.327 *8,3*	0.265 *6,7*	0.204 *5,2*
8 *200*	8.625 *219,1*	0.039 *0,99*	0.075 *1,91*	1.182 *30,0*	0.958 *24,3*	0.784 *19,9*	0.556 *14,1*	0.507 *12,9*	0.340 *8,6*	0.265 *6,7*
10 *250*	10.750 *273,0*	0.048 *1,22*	0.075 *1,91*	1.473 *37,4*	1.194 *30,3*	0.977 *24,8*	0.694 *17,6*	0.632 *16,1*	0.512 *13,0*	0.331 *8,4*
12 *300*	12.750 *323,9*	0.057 *1,45*	0.075 *1,91*	1.747 *44,4*	1.417 *36,0*	1.159 *29,4*	0.823 *20,9*	0.750 *19,1*	0.607 *15,4*	0.392 *10,0*

Note:
Per Specification for Polyethylene (P.E.) Plastic Pipe ASTM F714, D2447, D3035
- Refer to Tech Data Sheets G580, G582 G584

Gasket Types

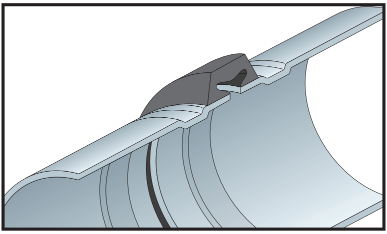
Pressure responsive gaskets are offered in a variety of types. Although they each serve a specific function they all utilize the same sealing design.

The GRINNELL gasket is designed to provide a three-way sealing action.

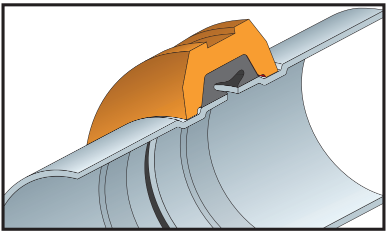
(1) Installation of the gasket over the outside sealing surface of the pipe compresses the lip seal and forms the initial seal.

(2) The installation of the housing segments around the gasket and into the pipe groove properly positions the gasket. Tightening of the housing segments forms the gasket to the inside of the housing and compresses it around the pipe-sealing surface thus increasing the gasket's sealing against the pipe.

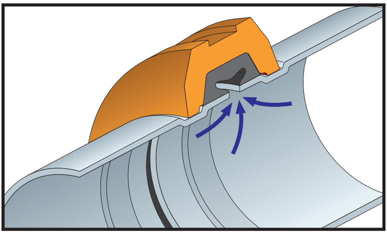
(3) The introduction of the system pressure energizes the pressure responsive seal of the gasket and further enhances the sealing action.



First Seal
C-shaped rubber gasket seals on pipe ends.



Second Seal
The housings compress the gasket to increase the sealing capacity.

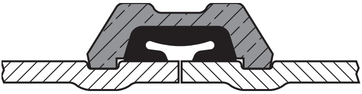


Third Seal
The system pressure or vacuum will then maximize the leak-tight seal.

- Refer to Technical Data Sheet G610 Gaskets.

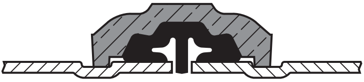
For additional listing or approvals, visit our website at www.grinnell.com

Gasket Styles



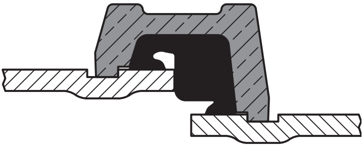
Standard Gasket

The standard style gasket, with a "C" shape configuration, is the most commonly used.



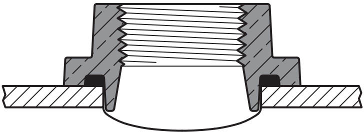
Center-Stop, Push-On Gasket

This gasket is specifically designed for use with the GRINNELL Figure 640 Pivot-Bolt Coupling.



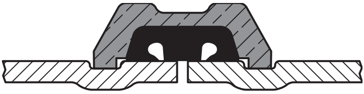
Reducing Coupling Gasket

This gasket is provided with ribs used to position the larger pipe so that the sealing lip is located on the sealing surface of the pipe. This gasket is used only with the GRINNELL Figure 716 Reducing Coupling.



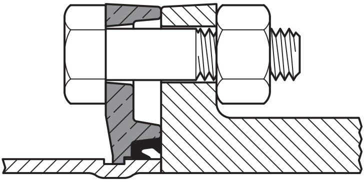
Mechanical Tee Gasket

This gasket provides a compression-type seal, which is designed to conform to the exterior curve (OD) of the pipe.



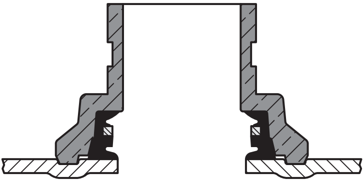
Tri-Seal Gasket

This gasket is designed to close off the gap or gasket cavity. This is accomplished by positioning the center "rib" of the gasket over the gap between the pipes. The tri-seal gasket has two tapered sealing edges in addition to the center rib for additional strength and sealing.



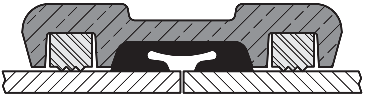
Flange Adapter Gasket

This gasket is specifically designed for use with GRINNELL Flange Adapters. The gasket has an optimal amount of rubber to provide a dependable seal between both the pipe and mating surface.



Outlet Coupling Gasket

This gasket is specifically designed for use with the GRINNELL Figure 702 Outlet Coupling.



Plain End Coupling Gasket

This gasket is designed for use with the GRINNELL Figure 909 Plain End Couplings.

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Descriptions

Gaskets are provided in Grade “E”, “EN” and “EHT” EPDM, Grade “T” Nitrile, Grade “O” Fluoroelastomer, and Grade “L” Silicone.

The gasket recommendation tables have been developed to assure maximum service life. These tables have been developed from information supplied by the material manufacturers of the elastomer, technical reference literature and testing conducted by GRINNELL Mechanical Products.

In evaluating the gasket grade for intended service applications, the following considerations must be reviewed:

- System operating temperature
- Fluid or solution type and concentration
- Duration of service

Technical and engineering services should be consulted if combinations of service solutions are being considered. Contact GRINNELL Mechanical Products for recommendations for services not listed.

NOTICE

Rigid couplings are recommended for vacuum and low temperature applications. All gasket recommendations are based on a temperature of 70°F (21°C) unless otherwise noted.

To prevent deterioration of the gasket material a petroleum lubricant should never be used on Grade “E” “EPDM”, Grade “EHT” “EPDM” or Grade “L” Silicone gaskets. For applications, below 40°F (4°C) Tri-Seal gaskets are recommended with a petroleum-free silicone lubricant.

Proper pipe end preparation and grooving is mandatory to prevent leakage (See specifications for cut and roll grooving). The gasket seal surface must be free from score marks, ridges, indentations, projections, loose paint, flaking galvanizing, scale, dirt chips, grease, or rust that would prevent a positive seal.

Gasket recommendations apply to GRINNELL gaskets and valves only.

- Specify gasket grade when ordering.
- For vacuum or low temperature systems, use Tri-Seal gaskets. Use a petroleum-free silicone lubricant.
- Check gasket color code to be certain it is recommended for the service intended.
- Unless otherwise noted, all gasket listings are based upon a temperature of 70°F (21°C).
- Where more than one gasket is shown, the preferred gasket grade is listed first.
- For services not listed, contact GRINNELL Mechanical Products for recommendation.
- Gaskets for fire protection services are provided in Pre-lubricated Grade “A” EPDM, Grade “E” EPDM, or Tri-Seal Grade “E” EPDM.

- Refer to Technical Data Sheet G610 Gaskets.

NSF-61 Certification

In order to retain the NSF-61 Certification, an NSF 61 Certified lubricant must be used for the intended service; for example, LA-CO Industries Lubri-Joint or Dow Corning* No. 7, both offered through GRINNELL Mechanical Products.

- Grade “EN” EPDM Tri-Seal Gaskets, NSF-61 Approved Compound, are designed for use with potable water systems.
- Grade “EHT” EPDM Gaskets, NSF-61 Approved Compound, are designed for use with copper tubing systems.

Gasket Lubricants

To prevent gasket deterioration, use a petroleum-free lubricant for all EPDM and Grade “L” Silicone gaskets. A petroleum-free silicone lubricant should be used for HDPE applications and for low-temperature environments to prevent lubricant freezing.

WARNING

Never use silicone lubricants with Grade “L” silicone gaskets. Failure to select the proper compound could result in product failure, property damage, or serious injury.

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Grade & Service Recommendations

Grade	Temperature Range	Compound & Color Code	General Service Application
"E"	-30°F to 230°F (-34°C to 110°C)	EPDM Green	Hot water, dilute acids, alkalis, oil free air, and many chemical services not involving petroleum products Excellent oxidation resistance Not for use with hydrocarbons Not recommended for steam service
"E" Tri- Seal	-30°F to 230°F (-34°C to 110°C)	EPDM Green	Hot water, dilute acids, alkalis, and many chemical services not involving petroleum products Excellent oxidation resistance Not for use with hydrocarbons Recommended for use in low-temperature and vacuum systems
"EHT" Center-Stop Push-On	-30°F to 250°F (-34°C to 121°C) Potable Water up to 180°F (82°C)	EPDM Red and Copper, and Red and Green Striped	Closed-loop heating systems up to 250°F (121°C) NSF-61 Approved for Potable Water up to 180°F (82°C) Recommended for use in low-temperature and vacuum systems Not for use with hydrocarbons Designed for use with GRINNELL Figure 640 and 740 Pivot-Bolt Couplings
"EN" Tri-Seal for Copper Tubing	Potable Water up to 180°F (82°C)	EPDM Copper	CTS sizes only NSF 61 Approved for Potable Water Not for use with hydrocarbons
"EN" and "EN" Tri-Seal for IPS Pipe	Potable Water up to 180°F (82°C)	EPDM Green / Yellow	IPS Pipe sizes NSF 61 Approved for Potable Water Not for use with hydrocarbons
"T" and "T" Tri-Seal	-20°F to 180°F (-29°C to 82°C)	Nitrile Orange	Petroleum products, vegetable oils, mineral oils, air with oils High-end oil vapor temperature decreases to 150°F (66°C) Not recommended for hot water or hot dry air systems
"O" and "O" Tri-Seal	20°F to 300°F (-7°C to 149°C)	Fluoroelastomer Blue	Oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons
"L"	-30°F to 350°F (-34°C to 177°C)	Silicone[a] Red Gasket	Air without hydrocarbons, dry heat

Note:

a. To prevent gasket deterioration, never use silicone-based lubricants with Grade "L" silicone gaskets.

- Refer to Technical Data Sheet G610 Gaskets

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Acetaldehyde	E
Acetamide	T
Acetic Acid up to 10% 100°C (38°C)	E/L
Acetic Acid up to 10-50% 100°C (38°C)	L
Acetic Acid, Glacial 100°C (38°C)	L
Acetic Anhydride	E
Acetone	E
Acetonitrile	T
Acetophenone	E
Acetylene	E/T
Adipic Acid	T
Air, oil free	E
Air with vapored oil	T
Alkalis	E
Allyl Alcohol to 96%	E
Alum Sulfuric Acid	O
Aluminum Chloride	E/T
Aluminum Fluoride	E/T/O
Aluminum Hydroxide	E /O
Aluminum Nitrate	E/T
Aluminum Oxychloride	T
Aluminum Phosphate	E
Aluminum Salts	E/T
Aluminum Sulfate	E/T
Alums	E/T
Ammonia Gas, Cold	E

Chemical Composition	Gasket Grade
Ammonia, Aqua, 10-25%	E
Ammonia, Liquid	E
Ammonium Bifluoride	T
Ammonium Carbonate	E
Ammonium Chloride	E/T
Ammonium Fluoride	E
Ammonium Hydroxide	E
Ammonium Metaphosphate	E
Ammonium Nitrate	E/T
Ammonium Nitrite	E
Ammonium Persulfate, to 10%	E
Ammonium Phosphate	T
Ammonium Sulfamate	T
Ammonium Sulfate	E/T
Ammonium Sulfide	E
Ammonium Thiocyanate	E
Amyl Acetate	E
Amyl Alcohol	E
Amyl Chloronaphthalene	T
Anderol	O
Aniline	E
Aniline Dyes	E
Aniline Hydrochloride	E
Aniline Oil	E
Antimony Chloride	E
Antimony Trichloride	E

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Argon Gas	E/O
Aroclor(S)	O
Arsenic Acid, to 75%	E/T/O
ASTM #1, 2 & 3 Oil	T
Barium Carbonate	E
Barium Chloride	E/T
Barium Hydroxide	E/T
Barium Sulfide	T
Benzaldehyde	E
Benzene	O
Benzine (see Petroleum Ether)	O
Benzoic Acid	E
Benzol	O
Benzyl Alcohol	E
Benzyl Benzoate	E
Benzyl Chloride	E
Black Sulfate Liquor	T
Blast Furnace Gas	T
Bleach,12% Active	E
Borax Solutions	E
Bordeaux Mixture	E
Boric Acid	E/T
Bromine	O
Butane Gas	T
Butanol (see Butyl Alcohol)	E/T
Butyl Acetate Ricinoleate	E/T

Chemical Composition	Gasket Grade
Butyl Alcohol	E/T
Butyl "Cellosolve Adipate"	E/T
Butyl Phenol	E
Butyl Stearate	T/O
Butylene	T/O
Butylene Glycol	E
Calcium Acetate	T
Calcium Bisulfate	T/O
Calcium Bisulfide	T/O
Calcium Bisulphite	T/O
Calcium Carbonate	E/T
Calcium Chlorate	E/T
Calcium Chloride	E/T
Calcium Hydroxide (Lime)	E/T
Calcium Hypochlorite	E
Calcium Hypochloride	E
Calcium Nitrate	E/T
Calcium Sulfate	E/T
Calcium Sulfide	E/T
Caliche Liquors	T
Carbitol	E/T
Carbonic Acid, Phenol	O
Carbon Bisulphide	O
Carbon Dioxide, Dry	E/T
Carbon Dioxide, Wet	E/T
Carbon Disulphide	O

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Carbon Monoxide	E
Carbon Tetrachloride	O
Carbonic Acid, Dry	O
Caster Oil	T
Caustic Potash	E/T
Cellosolve	E
Cellosolve Acetate	E
Cellosolve (Alcohol Ether)	E
Cellulose Acetate	E
Cellulube 220 (Tri-Aryl-Phosphate)	E
Cellulube Hydraulic Fluids	E
China Wood Oil, Tung Oil	T
Chloric Acid to 20%	E
Chlorine, Dry	O
Chlorine, Water 4000 PPM (max.)	E
Chlorinated Paraffin (Chlorocosane)	T
Chloroacetic Acid	E
Chloroacetone	E
Chlorobenzene	O
Chloroform	O
Chrome Alum	T
Chromic Acid, to 10%	O
Chromic Acid, to 25%	O
Chrome Plating Solutions	O
Citric Acid, Saturated	E
Citric Acid	E/T

Chemical Composition	Gasket Grade
Coke Oven Gas	T/O
Copper Carbonate	E/T
Copper Chloride	E/T
Copper Cyanide	E/T
Copper Fluoride	E
Copper Nitrate	E/T
Copper Sulfate	E/T
Creosol, Cresylic Acid	O
Creosote, Coal Tar	O
Creosote, Wood	T/O
Cupric Fluoride	E/T
Cupric Sulfate	E/T
Cyclohexane (Alicyclic Hydrocarbon)	O
Cyclohexanol	O
Cyclohexanone	E
Deionized Water	E
Dextrim	T
Dibutyl Phthalate	E
Dichloro Difloro Methane	T
Dicyclohexylamine	T
Diesel Oil	T
Diethyl Ether	T
Diethyl Sebacate	E
Diethylamine	T
Diethylene Glycol	E/T
Digester Gas	T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Dimethylamine	T
Dioctyl Phthalate	E
Dioxane	E
Dipentene (Terpene-Hydrocarbon)	T
Dipropylene Glycol	T
Dowtherm A	O
Dowtherm E	O
Dowtherm SR-1	T/E
Ethane	E
Ethanolamine	E
Ethyl Acetoacetate	E
Ethyl Acrylate	L
Ethyl Alcohol (Ethanol)	E
Ethyl Cellulose	E
Ethyl “Cellusolve”	E
Ethyl Chloride	E/T
Ethyl Ether	T
Ethyl Oxalate	E
Ethyl Silicate	T
Ethylene Chlorohydrin	E
Ethylene Diamine	E/T
Ethylene Dichloride (Dichloroethane)	O
Ethylene Glycol	E/T
Ferric Chloride, to 35%	E/T/O
Ferric Chloride, Saturated	E
Ferric Hydroxide	E

Chemical Composition	Gasket Grade
Ferric Sulfate	T
Fire Fighting Foam Concentrate	E/O
Fluboric Acid	E/T
Fly Ash	E
FM200 HFC-227ea	E
Foam	E
Fog Oil	T
Formaldehyde	E/T
Formamide	E/T
Formic Acid , to 25%	E
Freon 11, 130°F (54°C)	T
Freon 12, 130°F (54°C)	T
Freon 113 130°F (54°C)	T
Freon 114, 130°F (54°C)	T
Freon F-12	T
Freon 134a,176°F (80°C)	E/T
Fructose	E/T
Fuel Oil	T
Fumaric Acid	E
Furfuryl Alcohol	E
Gasoline, Refined	T
Gasoline, Refined, Unleaded	O
Glue	E/T
Glycerin	E/T
Glycerol	E/T
Glycol	E/T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Glycolic Acid	E
Grease	T/O
Green Sulfate Liquor	T
Halon 1301	E
Heptane	T
Hexaldehyde	E
Hexane	T
Hexanol	T
Hexanol Tertiary	T
Hexyl Alcohol	T
Hexylene Glycol	T
Hydrobromic Acid, to 40%	E
Hydrochloric Acid, to 36%, 75°F (24°C)	E
Hydrochloric Acid, to 36%, 158°F (70°C)	O
Hydrocyanic Acid	E
Hydrofluoric Acid, to 75%, 75°F (24°C)	O
Hydrofluosilicic Acid	E
Hydrocyanic Acid, to 10%	E
Hydrofluoric Acid, tp 30%	O
Hydrofluosilicic Acid, to 50%	T
Hydrogen Gas, Cold	E/T
Hydrogen Gas, Hot	E
Hydrogen Peroxide, to 50%	L
Hydrogen Peroxide, to 90%	O
Hydrogen Sulfide	E
Hydroquinone	T/O

Chemical Composition	Gasket Grade
Hydroxylamine Sulfate	E
Hypochlorous Acid, Dilute	E
Iso Octane, 100°F (38°C)	T
Isobutyl Alcohol	E
Isopropyl Acetate	E
Isopropyl Alcohol	E
Isopropyl Ether	T
JP-3	T
JP-4	T
JP-5, 6, 7, 8	T
Kerosene	T
Ketones	E
Latex (1% Styrene & Butadiene)	O
Lauric Acid	T
Lavender Oil	T
Lead Acetate	E/T
Lead Chloride	E
Lead Sulfate	T
Lime and H2O	E/T
Lime Sulfur	O
Linoleic Acid	O
Lithium Bromide	T
Lithium Chloride	T
Lithium Bromide (Brine)	T/O
Lubricating Oil, Refined	T
Lubricating Oil, Sour	T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Lubricating Oil, to 150°F (66°C)	T
Lubricating Oil, to 150°F (66°C) to 180°F (82°C)	T
Magnesium Chloride	E/T
Magnesium Hydroxide	E/T
Magnesium Nitrate	E
Magnesium Sulfate	E/T
Maleic Acid, Saturate	T
Malic Acid	T
Mercuric Chloride	E/T
Mercuric Cyanide	T
Mercurous Nitrate	E/T
Mercury	E/T
Methane	T
Methyl Alcohol, Methanol	E/T
Methyl Chloride	O
Methyl Ethyl Ketone	E
Methyl Isobutyl Carbinol	E
Methylene Chloride	O
Methylene Dichloride 100°F (38°C)	O
MIL-L7808	O
MIL-05606	O
MIL-08515	O
Mineral Oils	T
Naptha	O
Naptha, 160°F (71°C)	O
Napthenic Acid	T

Chemical Composition	Gasket Grade
Natural Gas	T
Nevoil	E
Nickel Chloride	E/T
Nickel Plating Solution 125°F (52°C) - Max.	E/T
Nickel Sulfate	E/T
Nitric Acid to 10%, 75°F (24°C) - Max.	E
Nitric Acid, 10-50%, 75°F (24°C) - Max.	O
Nitric Acid, 50-86%, 75°F (24°C)	O
Nitric Acid, Red Fuming	O
Nitrogen	E
Nitromethane	E
Nitrous Oxide	E
NOVEC 1230 FK-5-1-12	E
Ogisogiric Acid, to 75%, 150°F (66°C)	O
Oil, Crude Sour	T
Oil, Motor	T
Oleic Acid	T
Olive Oil	T
Oronite 8200 Silicate Ester Fluid	O
Orthodichlorobenzene	O
OS-45 Silicate Ester Fluid	O
OS-45-1	O
Oxalic Acid	E
Oxygen, Cold	E
Ozone (100 ppm)	E
Palm Oil	T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Palmitic Acid	T
Pentane	T
Perchloroethylene	O
Petroleum Ether (see Benzene)	O
Petroleum Oils	T
Phenol (Carbolic Acid)	O
Phenylhydrazine	E
Phenylhydrazine Hydrochloride	E
Phosphate Ester	E
Phosphoric Acid, to 50%	E
Phosphoric Acid, to 75% and 70°F	E/T
Phosphoric Acid, to 85% and 200°F (93°C)	O
Photographic Solutions	T
Phthalic Anhydride	E
Polybutene	T
Polyvinyl Acetate, Solid (In Liquid State is 50% solution of Methanol or 60% solution of H_2O)	E
Potash	E
Potassium Alum	E/T
Potassium Aluminum Sulfate	E/T
Potassium Bicarbonate	E/T
Potassium Bichromate	E/T
Potassium Borate	E
Potassium Bromate	E
Potassium Bromide	E/T
Potassium Carbonate	E/T
Potassium Chlorate	E

Chemical Composition	Gasket Grade
Potassium Chloride	E/T
Potassium Chromate	T
Potassium Cyanide	E/T
Potassium Dichromate	E
Potassium Ferricyanide	E
Potassium Ferrocyanide	E
Potassium Fluoride	E
Potassium Hydroxide	T
Potassium Nitrate	T
Potassium Perborate	E
Potassium Perchlorate	T
Potassium Permanganate, Saturated to 10%	E
Potassium Permaganate Saturate 10-25%	E
Potassium Persulfate	T
Potassium Silicate	E/T
Potassium Sulfate	T
Prestone	T
Propane Gas	T
Propanol	E
Propargyl Alcohol	E
Propyl Alcohol	T
Propylene Dichloride	L
Propylene Glycol	E
Pyranol 1467	T
Pyranol 1476	T
Pyroguard "C"	T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

(8 of 10)

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Pyroguard "D"	T
Pyroguard 55	E
Pyrrole	E
Ref. Fuel (70 ISO Octane, 30 Toluene)	T
Rosin Oil	T
Salicylic Acid	E
Secondary Butyl Alcohol	T
Sewage	E/T
Silver Nitrate	E
Silver Sulfate	E
Skydrol, 200°F (93°C) - Max.	L
Skydrol 500 Phosphate Ester	E
Soap Solutions	E/T
Soda Ash, Sodium Carbonate	E/T
Sodium Acetate	E
Sodium Alum	T
Sodium Benzoate	E/T
Sodium Bicarbonate	E/T
Sodium Bisulfate	E/T
Sodium Bisulfite (Black Liquor)	E/T
Sodium Bromide	E/T
Sodium Carbonate	E/T
Sodium Chlorate	E
Sodium Chloride	E/T
Sodium Cyanide	E/T
Sodium Dichromate, to 20%	E/T

Chemical Composition	Gasket Grade
Sodium Ferricyanide	E/T
Sodium Ferrocyanide	E/T
Sodium Fluoride	E/T
Sodium Hydroxide, to 15%	E
Sodium Hydro Sulfide	T
Sodium Hydroxide to 50%	E
Sodium Hypochlorite, to 20%	E
Sodium Metaphosphate	T
Sodium Nitrate	E
Sodium Nitrite	E/T
Sodium Perborate	E
Sodium Peroxide	E
Sodium Phosphate	T
Sodium Phosphate, Dibasic	T
Sodium Phosphate, Monobasic	T
Sodium Phosphate, Tribasic	T
Sodium Silicate	T
Sodium Sulfate	E/T
Sodium Sulfide	E/T
Sodium Sulfite Solution, to 20%	T
Sodium Thiosulfate, "Hypo"	T
Sohovis 47	T
Sohovis 78	T
Solvasol #1	T
Solvasol #2	T
Solvasol #3	T

- Refer to Technical Data Sheet G610 Gaskets.

Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Solvasol #73	T
Spindle Oil	T
Stannic Chloride	T
Stannous Chloride, to 15%	T
Starch	E/T
Stearic Acid	T
Stoddard Solvent	T
Styrene	O
Sulfonic Acid	E
Sulphite Acid Liquor	E
Sulfur	E
Sulfur Chloride	O
Sulfur Dioxide, Dry	E/T
Sulfur Dioxide, Liquid	E
Sulfur Trioxide, Dry	O
Sulfuric Acid, to 25%, 150°F (66°C)	E
Sulfuric Acid, 25-50%, 200°F (93°C)	O
Sulfuric Acid, 50-95%, 150°F (66°C)	O
Sulfuric Acid, Fuming	O
Sulfuric Acid, Oleum	O
Sulfurous Acid	O
Tall Oil	T
Tanning Liquors (50g. alum. solution, 50g. dichromate solution)	T
Tartaric Acid	E
Tertiary Butyl Alcohol	E/T
Tetrabutyl Titanate	E

Chemical Composition	Gasket Grade
Tetrachloroethylene	O
Thionyl Chloride	T
Terpineol	T
Tertiary Butyl Alcohol	E/T
Tetrachloroethylene	O
Titanium Tetrachloride	O
Toluene, to 30%	T
Transmission Fluid, Type A	O
Triacetin	T
Trichloroethane	O
Trichloroethylene	O
Trichloroethylene, to 200°F (93°C)	O
Tricresyl Phosphate	E
Triethanolamine	E/T
Trisodium Phosphate	E
Tung Oil	T
Turbo Oil #15 Diester Lubricant	O
Turpentine	T
Urea	E/T
Vegetable Oils	T
Vinyl Acetate	E
Vinyl Chloride	O
Vi-Pex	T
Water, to 150°F (66°C)	E/EHT/T
Water, to 200°F (93°C)	E/EHT
Water, to 230°F (110°C)	E/EHT

- Refer to Technical Data Sheet G610 Gaskets.

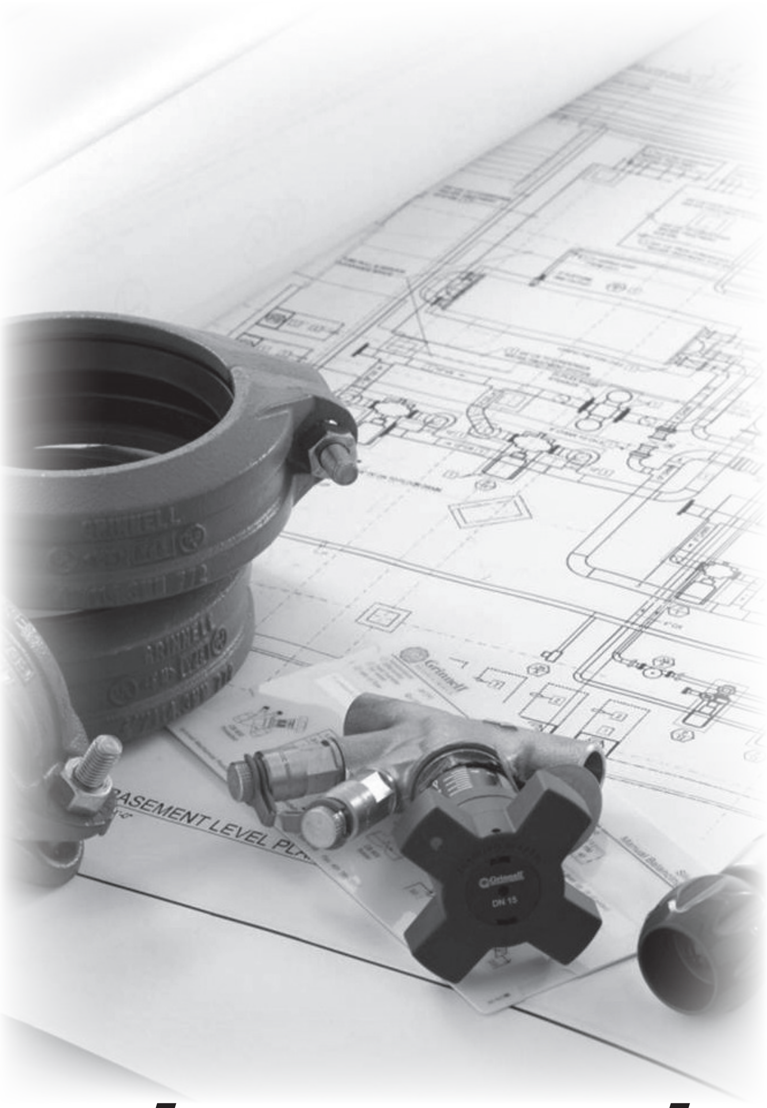
Gasket Recommendations

For Air, Water, and Chemical Use

Chemical Composition	Gasket Grade
Water, to 250°F (121°C)	EHT
Water, Acid Mine	E/T
Water, Bromine	O
Water, Chlorinated, to 3500 ppm	E
Water, Chlorine	E
Water, Deionized	E
Water, Potable	EN/EHT
Water, Seawater	E
Water, Waste	E/T
White Liquor	E
Wood Oil	T
Xylene	O
Zinc Chloride, to 50%	E
Zinc Nitrate	E
Zinc Sulfate	E/T

Notes:
- Specify gasket grade when ordering.
- For vacuum or low-temperature systems, use Tri-Seal Gaskets. Use a petroleum-free silicone lubricant.
- Check gasket color code to ensure it is recommended for the intended service.
- Unless otherwise specified, note all gasket listings are based upon a temperature of 70°F (21°C).
- Where more than one gasket is shown, the preferred gasket grade is listed first.
- For services not listed, contact GRINNELL Mechanical Products for recommendations.
- Refer to Technical Data Sheet G610 Gaskets.

Notes



Engineering Reference

Global Pipe Size Designations

(1 of 4)

GRINNELL Mechanical Products product data is utilized worldwide and all technical data is shown in both metric and imperial terms. The following chart shows a comparison between typical metric and IPS pipe sizes.

Nominal Size (DN)		Outside Diameter (OD)			
Inches (Imperial)	mm (Metric)	mm (Specification Reference)	DIN mm	BS mm	ISO mm
1/2	15	21,3mm	DN 15	DN 15	DN 15
3/4	20	26,7mm	26,9mm	DN 20	DN 20
1	25	33,4mm	33,7mm	DN 25	DN 25
1-1/4	32	42,2mm	42,4mm	DN 32	DN 32
1-1/2	40	48,3mm	DN 40	DN 40	DN 40
2	50	60,3mm	DN 50	DN 50	DN 50
2-1/2	65	73,1mm	–	–	–
		76,1mm BS/ISO	76,1mm	76,1mm	76,1mm
3	80	88,9mm	DN 80	DN 80	DN 80
3-1/2	90	101,6mm	–	–	–
4	100	108mm China (& old DIN)	DIN 133mm	–	–
		114,3mm	DN 100	DN 100	DN 101
–	127mm	127mm	–	–	–
5	125	133mm China	–	–	–
		139,7mm BS/ISO	DN 125	139,7mm	139,7mm
		141,3mm	–	–	–
–	152,4mm	152,4mm	–	–	–
6	150	159mm China	–	–	–
		165,1mm JIS/BS	–	165,1mm	–
		168,3mm	DN 150	–	DN 150
–	175	193,7mm	–	–	–
–	203,2mm	203,2mm	–	–	–
8	200	216,3mm JIS	–	–	–
		219,1mm	DN 200	DN 200	DN 200
–	254mm	254mm	–	–	–
10	250	267,4mm JIS	–	–	–
		273mm	DN 250	DN 250	DN 250
–	304,8mm	304,8mm	–	–	–
12	300	318,5mm JIS	–	–	–
		323,9mm	DN 300	DN 300	DN 300

Global Pipe Size Designations

Outside Diameter (OD)				
JIS mm	ANSI Inches	GB China mm	India IS 1239	India IS3589
21,7mm	1/2	DN 15	DN 15	–
27,2mm	3/4	DN 20	DN 20	–
34mm	1	DN 25	DN 25	–
42,7mm	1-1/4	DN 32	DN 32	–
48,6mm	1-1/2	DN 40	DN 40	–
60,5mm	2	DN 50	DN 50	–
–	2-1/2	–	–	–
76,3mm	–	76,1mm **	76,1mm	–
DN 80	3	DN 80	DN 80	–
–	–	–	–	–
–	–	108mm **	–	–
DN 100	4	DN 100	DN 100	–
–	–	–	–	–
–	–	133mm **	–	–
139,8mm	–	139,7mm	139,7mm	–
–	5	–	–	–
–	–	–	–	–
–	–	159mm	–	
165,2mm	–	–	165,1mm	–
–	6	DN 150	–	DN 150
–	–	–	–	193,7mm
–	–	–	–	–
216,3mm	–	–	–	–
–	8	DN 200	DN 200	DN 200
–	–	–	–	–
267,4mm	–	–	–	–
–	10	DN 250	DN 250	DN 250
–	–	–	–	–
318,5mm	–	–	–	–
–	12	–	–	–

IMPORTANT NOTE: Nominal designations are used where the actual OD of the pipe matches the ANSI size. Otherwise both the nominal and actual OD are listed.

China sizes are listed as actual OD in mm.
** China sizes are tubing sizes.

Global Pipe Size Designations

Nominal Size (DN)		Outside Diameter (OD)			
Inches (Imperial)	mm (Metric)	mm (Specification Reference)	DIN mm	BS mm	ISO mm
14	350	355,6mm	DN 350	DN 350	DN 350
		377mm China	–	–	–
16	400	406,4mm	DN 400	DN 400	DN 400
		426mm China	–	–	–
18	450	457,2mm	DN 450	DN 450	DN 450
		480mm China	–	–	–
20	500	508mm	DN 500	DN 500	DN 500
		530mm China	–	–	–
22	550	558,8mm	–	–	–
		580mm China	–	–	–
24	600	610mm	DN 600	DN 600	DN 600
		630mm China	–	–	–

Global Pipe Size Designations

Outside Diameter (OD)				
JIS mm	ANSI Inches	GB China mm	India	
			IS 1239	IS3589
DN 350	14	DN 350	–	–
–	–	377mm	–	–
DN 400	16	DN 400	–	–
–	–	426mm	–	–
DN 450	18	DN 450	–	–
–	–	480mm	–	–
DN 500	20	DN 500	–	–
–	–	530mm	–	–
DN 550	22	559mm	–	–
–	–	580mm	–	–
DN 600	24	DN 600	–	–
–	–	630mm	–	–

IMPORTANT NOTE: Nominal designations are used where the actual OD of the pipe matches the ANSI size. Otherwise both the nominal and actual OD are listed.

China sizes are listed as actual OD in mm. ** China sizes are tubing sizes.

Decimal Equivalents of Fractions

1/64	0.015625	33/64	0.515625
1/32	0.03125	17/32	0.53125
3/64	0.046875	35/64	0.546875
1/16	0.0625	9/16	0.5625
5/64	0.078125	37/64	0.578125
3/32	0.09375	19/32	0.59375
7/64	0.109375	39/64	0.609375
1/8	0.125	5/8	0.625
9/64	0.140625	41/64	0.640625
5/32	0.15625	21/32	0.65625
11/64	0.171875	43/64	0.671875
3/16	0.1875	11/16	0.6875
13/64	0.203125	45/64	0.703125
7/32	0.21875	23/32	0.71875
15/64	0.234375	47/64	0.734375
1/4	0.25	3/4	0.75
17/64	0.265265	49/64	0.765625
9/32	0.28125	25/32	0.78125
19/64	0.296875	51/64	0.796875
5/16	0.3125	13/16	0.8125
21/64	0.328125	53/64	0.828125
11/32	0.34375	27/32	0.84375
22/64	0.359375	55/64	0.859375
3/8	0.375	7/8	0.875
25/64	0.390625	57/64	0.890625
13/32	0.40625	29/32	0.90625
27/64	0.421875	59/64	0.92875
7/16	0.4375	15/16	0.9375
29/64	0.453125	61/64	0.953125
15/32	0.46875	31/32	0.96875
31/64	0.484375	63/64	0.984375
1/2	0.5	1	1.0

Standard Conversion Factors

TO CHANGE	TO	MULTIPLY BY
Inches	Feet	0.0833
Inches	Millimeters	25.4
Feet	Inches	12
Feet	Yards	0.3333
Yards	Feet	3
Square Inches	Square Feet	0.00694
Square Feet	Square Inches	144
Square Feet	Square Yards	0.11111
Square Yards	Square Feet	9
Cubic Inches	Cubic Feet	0.00058
Cubic Feet	Cubic Inches	1728
Cubic Feet	Cubic Yards	0.03703
Cubic Yards	Cubic Feet	27
Cubic Inches	Gallons	0.00433
Cubic Feet	Gallons	7.48
Gallons	Cubic Inches	231
Gallons	Cubic Feet	0.1337
Gallons	Pounds Of Water	8.33
Pounds Of Water	Gallons	0.12004
Ounces	Pounds	0.0625
Pounds	Ounces	16
Inches Of Water	Pounds Per Square Inch	0.0361
Inches Of Water	Inches Of Mercury	0.0735
Inches Of Water	Ounces Per Square Inch	0.578
Inches Of Water	Pounds Per Square Foot	5.2
Inches Of Mercury	Inches Of Water	13.6
Inches Of Mercury	Feet Of Water	1.1333
Inches Of Mercury	Pounds Per Square Inch	0.4914
Ounces Per Square Inch	Inches Of Mercury	0.127
Ounces Per Square Inch	Inches Of Water	1.733
Pounds Per Square Inch	Inches Of Water	27.72
Pounds Per Square Inch	Feet Of Water	2.31
Pounds Per Square Inch	Inches Of Mercury	2.04
Pounds Per Square Inch	Atmospheres	0.0681
Feet Of Water	Pounds Per Square Inch	0.434
Feet Of Water	Pounds Per Square Foot	62.5
Feet Of Water	Inches Of Mercury	0.8824
Atmospheres	Pounds Per Square Inch	14.696
Atmospheres	Inches Of Mercury	29.92
Atmospheres	Feet Of Water	34
Long Tons	Pounds	2240
Short Tons	Pounds	2000
Short Tons	Long Tons	0.89285

Minutes Converted to Decimals of a Degree

1	0.0166	31	0.5166
2	0.0333	32	0.5333
3	0.0500	33	0.5500
4	0.0666	34	0.5666
5	0.0833	35	0.5833
6	0.1000	36	0.6000
7	0.1166	37	0.6166
8	0.1333	38	0.6333
9	0.1500	39	0.6500
10	0.1666	40	0.6666
11	0.1833	41	0.6833
12	0.2000	42	0.7000
13	0.2166	43	0.7166
14	0.2333	44	0.7333
15	0.2500	45	0.7500
16	0.2666	46	0.7666
17	0.2833	47	0.7833
18	0.3000	48	0.8000
19	0.3166	49	0.8166
20	0.3333	50	0.8333
21	0.3500	51	0.8500
22	0.3666	52	0.8666
23	0.3833	53	0.8833
24	0.4000	54	0.9000
25	0.4166	55	0.9166
26	0.4333	56	0.9333
27	0.4500	57	0.9500
28	0.4666	58	0.9666
29	0.4833	59	0.9833
30	0.5000	60	1.0000

Water Feet Head Conversion

Water Pressure to Feet Head			
Pounds Per Square Inch	Feet Head	Pounds Per Square Inch	Feet Head
1	2.31	100	230.90
2	4.62	110	253.93
3	6.93	120	277.07
4	9.24	130	300.16
5	11.54	140	323.25
6	13.85	150	346.34
7	16.16	160	369.43
8	18.47	170	392.52
9	20.78	180	415.61
10	23.09	200	461.78
15	34.63	250	577.24
20	46.18	300	692.69
25	57.72	350	808.13
30	69.27	400	922.58
40	92.36	500	1154.48
50	115.45	600	1385.39
60	138.54	700	1616.30
70	161.63	800	1847.20
80	184.72	900	2078.10
90	207.81	1000	2309.00

Notes:
- The requirements of ANSI, ASME or other code groups may require additional supports. One pound of pressure per square inch of water equals 2.309 feet of water at 62°F.
- To find the Feet Head of Water for any pressure not given in the table above, multiply the PSI by 2.309.

Feet Head of Water to PSI			
Feet Head	Pounds Per Square Inch	Feet Head	Pounds Per Square Inch
1	0.43	100	43.31
2	0.87	110	47.64
3	1.30	120	51.97
4	1.73	130	56.30
5	2.17	140	60.63
6	2.60	150	64.96
7	3.03	160	69.29
8	3.46	170	73.63
9	3.90	180	77.96
10	4.33	200	86.62
15	6.50	250	108.27
20	8.66	300	129.93
25	10.83	350	151.58
30	12.99	400	173.24
40	17.32	500	216.55
50	21.65	600	259.85
60	25.99	700	303.16
70	30.32	800	346.47
80	34.65	900	389.78
90	38.98	1000	433.00

Notes:
- One foot of water at 62°F equals 0.433 PSI.
- To find the PSI for any Feet Head not given in the table above,
  multiply the Feet Head by 0.433.

Pipe and Water Weight Per Line Foot

Nominal Pipe Size ANSI *DN*	Weight Lbs. *kg*		Weight Lbs. *kg*	
	STD. Pipe	STD. Pipe & Water	XS Pipe	XS Pipe & Water
1/2 *15*	0.851 *0,386*	0.132 *0,600*	1.088 *0,500*	0.101 *0,045*
3/4 *20*	1.131 *0,513*	0.231 *0,105*	1.474 *0,668*	0.187 *0,085*
1 *25*	1.679 *0,761*	0.374 *0,170*	2.172 *0,985*	0.311 *0,141*
1-1/4 *32*	2.273 *1,031*	0.648 *0,293*	2.997 *1,360*	0.555 *0,251*
1-1/2 *40*	2.718 *1,232*	0.882 *0,400*	3.632 *1,647*	0.765 *0,346*
2 *50*	3.653 *1,656*	1.453 *0,660*	5.022 *2,278*	1.278 *0,580*
2-1/2 *65*	5.794 *2,628*	2.073 *0,940*	7.662 *3,475*	1.835 *0,832*
3 *80*	7.580 *3,440*	3.200 *1,451*	10.250 *4,650*	2.860 *1,300*
3-1/2 *90*	9.110 *4,132*	4.280 *1,941*	12.510 *5,674*	3.850 *1,746*
4 *100*	10.790 *4,900*	5.510 *2,500*	14.990 *6,800*	4.980 *2,258*
5 *125*	14.620 *6,631*	8.660 *3,928*	20.780 *9,425*	7.880 *3,574*
6 *150*	18.980 *8,609*	12.510 *7,035*	28.580 *12,963*	11.290 *5,121*
8 *200*	28.560 *12,954*	21.680 *9,833*	43.400 *19,685*	19.800 *8,981*
10 *250*	40.500 *18,370*	34.100 *15,467*	54.700 *24,811*	32.300 *14,651*
12 *300*	49.600 *22,500*	49.000 *22,226*	65.400 *29,664*	47.000 *21,318*
14 *350*	54.600 *25,673*	59.700 *27,080*	72.100 *32,704*	57.500 *26,081*
16 *400*	62.600 *28,394*	79.100 *35,880*	82.800 *37,557*	76.500 *34,700*
18 *450*	70.600 *32,023*	101.200 *45,903*	93.500 *42,410*	98.300 *44,588*
20 *500*	78.600 *35,652*	126.000 *57,152*	104.100 *47,218*	122.800 *55,701*
24 *600*	94.600 *42,909*	183.800 *83,370*	125.500 *56,925*	179.900 *81,601*
30 *800*	118.700 *53,841*	291.000 *132,000*	157.600 *71,486*	286.000 *129,727*

Standard Pipe Data

Based on Schedule 40 Pipe Dimensions

Nominal Pipe Size ANSI *DN*	**Inside Diameter Inches** *mm*	**Outside Diameter Inches** *mm*	**Wall Thickness Inches** *mm*	**Weight Per Foot Pounds**	**Gallons In One Lineal Foot**
1/8 *6*	0.269 *6,8*	0.405 *10,3*	0.068 *1,72*	0.244	0.0030
1/4 *8*	0.364 *9,2*	0.540 *13,7*	0.088 *2,24*	0424	0.0054
3/8 *10*	0.493 *12,5*	0.675 *17,1*	0.091 *2,31*	0.567	0.0099
1/2 *15*	0.622 *15,8*	0.840 *21,3*	0.109 *2,77*	0.850	0.0158
3/4 *20*	0.824 *21,0*	1.050 *26,7*	0.113 *2,87*	1.130	0.0277
1 *25*	1.049 *26,6*	1.315 *33,4*	0.133 *3,38*	1.678	0.0449
1-1/4 *32*	1.380 *35,0*	1.660 *42,2*	0.140 *3,56*	2.272	0.0777
1-1/2 *40*	1.610 *40,9*	1.900 *48,2*	0.145 *3,68*	2.717	0.1058
2 *50*	2.067 *52,5*	2.375 *60,3*	0.154 *3,91*	3.652	0.1743
2-1/2 *65*	2.469 *62,7*	2.875 *73,0*	0.203 *5,16*	5.793	0.2487
3 *80*	3.068 *78,0*	3.500 *89,0*	0.216 *5,49*	7.575	0.3840
3-1/2 *90*	3.548 *90,1*	4.000 *101,6*	0.226 *5,74*	9.109	0.5136
4 *100*	4.026 *102,2*	4.500 *114,3*	0.237 *6,02*	10.790	0.6613
4-1/2 *115*	4.560 *116,0*	5.000 *127,0*	0.248 *6,30*	12.538	0.8284
5 *125*	5.047 *128,1*	5.563 *141,3*	0.258 *6,55*	14.617	1.0393
6 *150*	6.065 *154,0*	6.625 *168,3*	0.280 *7,11*	18.974	1.5008
8 *200*	7.981 *203,0*	8.625 *219,0*	0.322 *8,18*	28.554	2.5988
10 *250*	10.020 *255,0*	10.750 *273,0*	0.365 *9,27*	40.483	4.0963
12 *300*	11.937 *303,0*	12.750 *323,8*	0.406 *10,3*	53.530	5.8153

Steel Pipe Sizes and Wall Thicknesses

(1 of 4)

Nominal Pipe Size		Nominal Wall Thickness Inches *mm*						
ANSI Inches *DN*	O.D. Inches *mm*	SCH. 5S	SCH. 10S	SCH. 10	SCH. 20	SCH. 30	STND.	SCH. 40
1/8 *6*	0.405 *10,3*	–	0.049 *1,2*	–	–	–	0.068 *1,7*	0.068 *1,7*
1/4 *8*	0.540 *13,7*	–	0.065 *1,6*	–	–	–	0.088 *2,2*	0.088 *2,2*
3/8 *10*	0.675 *17,1*	–	0.065 *1,6*	–	–	–	0.091 *2,3*	0.091 *2,3*
1/2 *15*	0.840 *21,3*	0.065 *1,6*	0.083 *2,1*	–	–	–	0.109 *2,8*	0.109 *2,8*
3/4 *20*	1.050 *26,7*	0.065 *1,6*	0.109 *2,8*	–	–	–	0.113 *2,9*	0.113 *2,9*
1 *25*	1.315 *33,4*	0.065 *1,6*	0.109 *2,8*	–	–	–	0.133 *3,4*	0.133 *3,4*
1-1/4 *32*	1.660 *42,2*	0.065 *1,6*	0.109 *2,8*	–	–	–	0.140 *3,5*	0.140 *3,5*
1-1/2 *40*	1.900 *48,2*	0.065 *1,6*	0.109 *2,8*	–	–	–	0.145 *3,7*	0.145 *3,7*
2 *50*	2.375 *60,3*	0.065 *1,6*	0.109 *2,8*	–	–	–	0.154 *3,9*	0.154 *3,9*
2-1/2 *65*	2.875 *73,0*	0.083 *2,1*	0.120 *3,0*	–	–	–	0.203 *5,1*	0.203 *5,1*
3 *80*	3.500 *89,0*	0.083 *2,1*	0.120 *3,0*	-	–	–	0.216 *5,5*	0.216 *5,5*
3-1/2 *90*	4.000 *101,6*	0.083 *2,1*	0.120 *3,0*	–	–	–	0.226 *5,7*	0.226 *5,7*
4 *100*	4.500 *114,3*	0.083 *2,1*	0.120 *3,0*	–	–	–	0.237 *6,0*	0.237 *6,0*
5 *125*	5.563 *141,3*	0.109 *2,8*	0.134 *3,4*	–	–	–	0.258 *6,5*	0.258 *6,5*
6 *150*	6.625 *168,3*	0.109 *2,8*	0.134 *3,4*	–	–	–	0.280 *7,1*	0.280 *7,1*
8 *200*	8.625 *219,0*	0.109 *2,8*	0.148 *3,8*	–	0.250 *6,4*	0.277 *7,0*	0.322 *8,2*	0.322 *8,2*
10 *250*	10.750 *273,0*	0.134 *3,4*	0.165 *4,2*	–	0.250 *6,4*	0.307 *7,8*	0.365 *9,3*	0.365 *9,3*
12 *300*	12.750 *323,8*	0.156 *4,0*	0.180 *4,6*	–	0.250 *6,4*	0.330 *8,4*	0.375 *9,5*	0.406 *10,3*

Notes:

- The traditional standard weight, extra strong, and double extra strong pipe
- The pipe wall thickness schedules listed in American Standard B36.10, which are applicable to carbon steel.
- The pipe wall thickness schedules listed in American Standard B36.19, and ASTM Specification A409, which are applicable only to corrosion-resistant materials.

Steel Pipe Sizes and Wall Thicknesses

Nominal Pipe Size		Nominal Wall Thickness Inches *mm*							
ANSI Inches *DN*	**O.D. Inches *mm***	**SCH. 60**	**Extra Strong**	**SCH. 80**	**SCH. 100**	**SCH. 120**	**SCH. 140**	**SCH. 160.**	**XX Strong**
1/8 *6*	0.405 *10,3*	–	0.095 *2,4*	0.095 *2,4*	–	–	–	–	–
1/4 *8*	0.540 *13,7*	–	0.119 *3,0*	0.119 *3,0*	–	–	–	–	–
3/8 *10*	0.675 *17,1*	–	0.126 *3,2*	0.126 *3,2*	–	–	–	–	–
1/2 *15*	0.840 *21,3*	–	0.147 *3,7*	0.147 *3,7*	–	–	–	0.188 *4,8*	0.294 *7,5*
3/4 *20*	1.050 *26,7*	–	0.154 *3,9*	0.154 *3,9*	–	–	–	0.219 *5,6*	0.308 *7,8*
1 *25*	1.315 *33,4*	–	0.179 *4,5*	0.179 *4,5*	–	–	–	0.250 *6,3*	0.358 *9,1*
1-1/4 *32*	1.660 *42,2*	–	0.191 *4,9*	0.191 *4,9*	–	–	–	0.250 *6,3*	0.382 *9,7*
1-1/2 *40*	1.900 *48,2*	–	0.200 *5,1*	0.200 *5,1*	–		–	0.281 *7,1*	0.400 *10,2*
2 *50*	2.375 *60,3*	–	0.218 *5,5*	0.218 *5,5*	–	–	–	0.344 *8,7*	0.436 *11,1*
2-1/2 *65*	2.875 *73,0*	–	0.276 *7,0*	0.276 *7,0*	–	–	–	0.375 *9,5*	0.552 *14,0*
3 *80*	3.500 *89,0*	–	0.300 *7,6*	0.300 *7,6*	–	–	–	0.438 *11,1*	0.600 *15,2*
3-1/2 *90*	4.000 *101,6*	–	0.318 *8,0*	0.318 *8,0*	–	–	–	–	–
4 *100*	4.500 *114,3*	–	0.337 *8,6*	0.337 *8,6*	–	0.438 *11,1*	–	0.531 *13,5*	0.674 *17,1*
5 *125*	5.563 *141,3*	–	0.375 *9,5*	0.375 *9,5*	–	0.500 *12,7*	–	0.625 *15,9*	0.750 *19,1*
6 *150*	6.625 *168,3*	–	0.432 *10,1*	0.432 *10,1*	–	0.562 *14,3*	–	0.719 *18,3*	0.864 *21,9*
8 *200*	8.625 *219,0*	0.406 *10,3*	0.500 *12,7*	0.500 *12,7*	0.594 *15,0*	0.719 *18,3*	0.812 *20,6*	0.906 *23,0*	0.875 *22,2*
10 *250*	10.750 *273,0*	0.500 *12,7*	0.500 *12,7*	0.594 *15,1*	0.718 *18,2*	0.844 *21,4*	1.000 *25,4*	1.125 *28,6*	1.000 *25,4*
12 *300*	12.750 *323,8*	0.562 *14,3*	0.500 *12,7*	0.688 *17,5*	0.844 *21,4*	1.000 *25,4*	1.125 *28,6*	1.312 *33,5*	1.000 *25,4*

Steel Pipe Sizes and Wall Thicknesses

Nominal Pipe Size		Nominal Wall Thickness Inches *mm*						
ANSI Inches *DN*	**O.D. Inches *mm***	**SCH. 5S**	**SCH. 10S**	**SCH. 10**	**SCH. 20**	**SCH. 30**	**STND.**	**SCH. 40**
14 *350*	14.000 *355,6*	0.156 *4,0*	0.188 *4,8*	0.250 *6,4*	0.312 *7,9*	0.375 *9,5*	0.375 *9,5*	0.438 *11,1*
16 *400*	16.000 *406,4*	0.165 *4,2*	0.188 *4,8*	0.250 *6,4*	0.312 *7,9*	0.375 *9,5*	0.375 *9,5*	0.500 *12,7*
18 *450*	18.000 *457,2*	0.165 *4,2*	0.188 *4,8*	0.250 *6,4*	0.312 *7,9*	0.438 *11,1*	0.375 *9,5*	0.562 *14,3*
20 *500*	20.000 *508,0*	0.188 *4,8*	0.218 *5,5*	0.250 *6,4*	0.375 *9,5*	0.500 *12,7*	0.375 *9,5*	0.594 *15,0*
22 *500*	22.000 *559,0*	0.188 *4,8*	0.218 *5,5*	0.250 *6,4*	0.375 *9,5*	0.500 *12,7*	0.375 *9,5*	0.594 *15,0*
24 *600*	24.000 *610,0*	0.218 *5,5*	–	0.250 *6,4*	0.375 *9,5*	0.562 *14,3*	0.375 *9,5*	0.688 *17,5*
26 *650*	26.000 *660,4*	–	–	0.312 *7,9*	0.500 *12,7*	–	0.375 *9,5*	–
28 *700*	28.000 *711,2*	–	–	–	0.500 *12,7*	0.625 *16,0*	0.375 *9,5*	–
30 *750*	30.000 *762,0*	0.250 *6,3*	0.312 *7,9*	0.312 *7,9*	0.500 *12,7*	0.625 *16,0*	0.375 *9,5*	–
32 *800*	32.000 *813,0*	–	–	0.312 *7,9*	0.500 *12,7*	0.625 *16,0*	0.375 *9,5*	0.688 *17,5*
34 *850*	34.000 *864,0*	–	–	0.312 *7,9*	0.500 *12,7*	0.625 *16,0*	0.375 *9,5*	0.688 *17,5*
36 *900*	36.000 *914,4*	–	–	0.312 *7,9*	0.500 *12,7*	0.625 *16,0*	0.375 *9,5*	0.750 *19,0*
42 *1000*	42.000 *1067,0*	–	–	–	0.375 *9,5*	–	–	–

Notes:

- The traditional standard weight, extra strong, and double extra strong pipe
- The pipe wall thickness schedules listed in American Standard B36.10, which are applicable to carbon steel.
- The pipe wall thickness schedules listed in American Standard B36.19, and ASTM Specification A409, which are applicable only to corrosion-resistant materials.

Steel Pipe Sizes and Wall Thicknesses

Nominal Pipe Size		Nominal Wall Thickness Inches *mm*							
ANSI Inches *DN*	**O.D. Inches *mm***	**SCH. 60**	**Extra Strong**	**SCH. 80**	**SCH. 100**	**SCH. 120**	**SCH. 140**	**SCH. 160.**	**XX Strong**
14 *350*	14.000 *355,6*	0.594 *15,1*	0.500 *12,7*	0.750 *19,1*	0.938 *23,8*	1.094 *27,8*	1.250 *31,8*	1.406 *35,7*	–
16 *400*	16.000 *406,4*	0.656 *16,7*	0.500 *12,7*	0.844 *21,4*	1.031 *26,2*	1.219 *31,0*	1.438 *36,5*	1.594 *40,5*	–
18 *450*	18.000 *457,2*	0.750 *19,1*	0.500 *12,7*	0.938 *23,8*	1.156 *29,4*	1.375 *34,9*	1.562 *39,7*	1.781 *45,2*	–
20 *500*	20.000 *508,0*	0.812 *20,6*	0.500 *12,7*	1.031 *26,2*	1.281 *32,5*	1.500 *38,1*	1.750 *44,5*	1.969 *50,0*	–
22 *500*	22.000 *559,0*	0.875 *22,2*	0.500 *12,7*	1.125 *28,6*	1.375 *34,9*	1.625 *41,3*	1.875 *47,6*	2.125 *54,0*	–
24 *600*	24.000 *610,0*	0.969 *24,6*	0.500 *12,7*	1.218 *30,9*	1.531 *38,9*	1.812 *46,0*	2.062 *52,4*	2.344 *59,5*	–
26 *650*	26.000 *660,4*	–	0.500 *12,7*	–	–	–	–	–	–
28 *700*	28.000 *711,2*	–	0.500 *12,7*	–	–	–	–	–	–
30 *750*	30.000 *762,0*	–	0.500 *12,7*	–	–	–	–	–	–
32 *800*	32.000 *813,0*	–	0.500 *12,7*	–	–	–	–	–	–
34 *850*	34.000 *864,0*	–	0.500 *12,7*	–	–	–	–	–	–
36 *900*	36.000 *914,4*	–	0.500 *12,7*	–	–	–	–	–	–
42 *1000*	42.000 *1067,0*	–	0.500 *12,7*	–	–	–	–	–	–

Copper Tubing Sizes and Wall Thicknesses

TYPE M

Nominal Tube Size	Nominal Tube Dimensions			Calculated Values		
ANSI Inches *DN*	**Outside Dia. Inches *mm***	**Inside Dia. Inches *mm***	**Wall Thickness Inches mm**	**Tube Weight Lbs. / ft.**	**Tube Weight w/water Lbs. / ft.**	**Tube Volume gal. / ft.**
3/4 *20*	0.875 *22,2*	0.811 *20,6*	0.032 *0,812*	0.33	0.55	0.03
1 *25*	1.125 *29,0*	1.055 *26,8*	0.035 *0,889*	0.46	0.84	0.04
1-1/4 *32*	1.375 *35,0*	1.291 *33,0*	0.042 *1,06*	0.68	1.25	0.07
1-1/2 *40*	1.625 *41,3*	1.527 *39,0*	0.049 *1,24*	0.94	1.73	0.09
2 *50*	2.125 *54,0*	2.009 *51,0*	0.058 *1,47*	1.46	2.83	0.16
2-1/2 *65*	2.625 *66,7*	2.495 *63,4*	0.065 *1,65*	2.03	4.14	0.25
3 *80*	3.125 *39,4*	2.981 *76,0*	0.072 *1,83*	2.68	5.70	0.36
3-1/2 *90*	3.625 *92,1*	3.459 *88,0*	0.083 *2,11*	3.58	7.64	0.49
4 *100*	4.125 *105,0*	3.935 *100,0*	0.095 *2,41*	4.66	9.83	0.63
5 *125*	5.125 *130,2*	4.907 *124,6*	0.109 *2,77*	6.66	14.80	0.98
6 *150*	6.125 *155,6*	5.881 *149,4*	0.122 *3,10*	8.92	20.70	1.41
8 *200*	8.125 *206,4*	7.785 *197,7*	0.170 *4,31*	16.50	37.10	2.47

Copper Tubing Sizes and Wall Thicknesses

TYPE K

Nominal Tube Size	Nominal Tube Dimensions			Calculated Values		
ANSI Inches *DN*	**Outside Dia. Inches** *mm*	**Inside Dia. Inches** *mm*	**Wall Thickness Inches mm**	**Tube Weight Lbs. / ft.**	**Tube Weight w/water Lbs. / ft.**	**Tube Volume gal. / ft.**
3/4 *20*	0.875 *22,2*	0.745 *18,9*	0.065 *1,65*	0.64	0.83	0.02
1 *25*	1.125 *29,0*	0.995 *25,3*	0.065 *1,65*	0.84	1.18	0.04
1-1/4 *32*	1.375 *35,0*	1.245 *31,6*	0.065 *1,65*	1.04	1.57	0.06
1-1/2 *40*	1.625 *41,3*	1.481 *37,6*	0.072 *1,83*	1.36	2.10	0.09
2 *50*	2.125 *54,0*	1.959 *49,8*	0.083 *2,11*	2.06	3.36	0.16
2-1/2 *65*	2.625 *66,7*	2.435 *61,8*	0.095 *2,41*	2.93	4.94	0.24
3 *80*	3.125 *39,4*	2.907 *73,8*	0.109 *2,77*	4.00	6.87	0.34
3-1/2 *90*	3.625 *92,1*	3.385 *86,0*	0.120 *3,05*	5.12	9.01	0.47
4 *100*	4.125 *105,0*	3.857 *98,0*	0.134 *3,40*	6.51	11.60	0.61
5 *125*	5.125 *130,2*	4.805 *122,0*	0.160 *4,06*	9.67	17.50	0.94
6 *150*	6.125 *155,6*	5.741 *142,8*	0.192 *4,88*	13.90	25.10	1.35
8 *200*	8.125 *206,4*	7.583 *192,6*	0.271 *6,88*	25.90	45.40	2.35

Copper Tubing Sizes and Wall Thicknesses

TYPE L

Nominal Tube Size	Nominal Tube Dimensions			Calculated Values		
ANSI Inches *DN*	**Outside Dia. Inches *mm***	**Inside Dia. Inches *mm***	**Wall Thickness Inches mm**	**Tube Weight Lbs. / ft.**	**Tube Weight w/water Lbs. / ft.**	**Tube Volume gal. / ft.**
3/4 *20*	0.875 *22,2*	0.785 *19,9*	0.045 *1,14*	0.45	0.66	0.02
1 *25*	1.125 *29,0*	1.025 *26,0*	0.050 *1,27*	0.65	1.01	0.04
1-1/4 *32*	1.375 *35,0*	1.265 *32,1*	0.055 *1,40*	0.88	1.43	0.06
1-1/2 *40*	1.625 *41,3*	1.505 *38,2*	0.060 *1,52*	1.14	1.91	0.09
2 *50*	2.125 *54,0*	1.985 *50,4*	0.070 *1,78*	1.75	3.09	0.16
2-1/2 *65*	2.625 *66,7*	2.465 *62,6*	0.080 *2,03*	2.48	4.54	0.25
3 *80*	3.125 *39,4*	2.945 *74,8*	0.090 *2,29*	3.33	6.27	0.35
3-1/2 *90*	3.625 *92,1*	3.425 *87,0*	0.100 *2,54*	4.29	8.27	0.48
4 *100*	4.125 *105,0*	3.905 *99,1*	0.110 *2,79*	5.38	10.10	0.57
5 *125*	5.125 *130,2*	4.875 *123,8*	0.125 *3,18*	7.61	15.70	0.97
6 *150*	6.125 *155,6*	5.845 *148,5*	0.140 *3,56*	10.20	21.80	1.39
8 *200*	8.125 *206,4*	7.725 *196,2*	0.200 *5,08*	19.30	39.60	2.44

Copper Tubing Sizes and Wall Thicknesses

DWV

Nominal Tube Size	Nominal Tube Dimensions			Calculated Values		
ANSI Inches *DN*	**Outside Dia. Inches *mm***	**Inside Dia. Inches *mm***	**Wall Thickness Inches mm**	**Tube Weight Lbs. / ft.**	**Tube Weight w/water Lbs. / ft.**	**Tube Volume gal. / ft.**
1-1/4 *32*	1.375 *35,0*	1.295 *32,9*	0.040 *1,02*	0.65	1.22	0.07
1-1/2 *40*	1.625 *41,3*	1.541 *39,1*	0.042 *1,07*	0.81	1.62	0.10
2 *50*	2.125 *54,0*	2.041 *51,8*	0.042 *1,07*	1.07	2.48	0.17
3 *80*	3.125 *39,4*	3.030 *77,0*	0.045 *1,14*	1.69	4.81	0.37
4 *100*	4.125 *105,0*	4.009 *101,8*	.058 *1,47*	2.87	7.88	0.60
5 *125*	5.125 *130,2*	4.981 *126,5*	0.072 *1,83*	4.43	12.90	1.01
6 *150*	6.125 *155,6*	5.959 *151,3*	0.083 *2,11*	6.10	18.20	1.45
8 *200*	8.125 *206,4*	7.907 *200,8*	0.109 *2,77*	10.6	31.80	2.55

Pressure Performance for Steel Pipe

Figure 707, Figure 772, Figure 71 Couplings

(1 of 3)

Nominal Pipe Size		Pipe[a] Sch.	Nominal Wall Inches *mm*	Maximum Pressure psi *bar*		
ANSI Inches *DN*	O.D. Inches *mm*			Figure 707	Figure 772	Figure 71
1-1/4 *32*	1.660 *42,4*	5	0.065 *1,6*	500 *34,5*	750 *51,7*	–
		10	0.109 *2,8*	750 *51,7*	750 *51,7*	–
		40	0.140 *3,6*	1000 *69,0*	750 *51,7*	–
1-1/2 *40*	1.900 *48,3*	5	0.065 *1,6*	500 *34,5*	500 *34,5*	–
		10	0.109 *2,8*	750 *51,7*	750 *51,7*	–
		40	0.145 *3,7*	1000 *69,0*	750 *51,7*	–
2 *50*	2.375 *60,3*	5	0.065 *1,6*	500 *34,5*	500 *34,5*	200 *13,8*
		10	0.109 *2,8*	750 *51,7*	750 *51,7*	250 *17,2*
		40	0.154 *3,9*	1000 *69,0*	750 *51,7*	300 *20,7*
2-1/2 *65*	2.875 *73,0*	5	0.083 *2,1*	500 *34,5*	500 *34,5*	200 *13,8*
		10	0.120 *3,0*	600 *41,3*	600 *41,3*	250 *17,2*
		40	0.203 *5,2*	1000 *69,0*	750 *51,7*	300 *20,7*
3 *80*	3.500 *88,9*	5	0.083 *2,1*	500 *34,5*	500 *34,5*	200 *13,8*
		10	0.120 *3,0*	600 *41,3*	600 *41,3*	250 *17,2*
		40	0.216 *5,5*	1000 *69,0*	750 *51,7*	300 *20,7*

Note:

a. Data based on carbon steel pipe.

- For a one-time field-test only, the Maximum Joint Working Pressure may be increased to 1-1/2 times the Maximum Pressure column shown in the dimensional tables. For any parts installed in accordance with Bureau Veritas rules and regulations, this test is required.

Pressure Performance for Steel Pipe

Figure 707, Figure 772, Figure 71 Couplings

(2 of 3)

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure psi *bar*		
ANSI Inches *DN*	O.D. Inches *mm*			Figure 707	Figure 772	Figure 71
4 *100*	4.500 *114,3*	5	0.083 *2,1*	400 *27,6*	400 *27,6*	200 *13,8*
		10	0.120 *3,0*	600 *41,3*	600 *41,3*	250 *17,2*
		40	0.273 *6,9*	1000 *69,0*	750 *51,7*	300 *20,7*
5 *125*	5.563 *141,3*	5	0.109 *2,8*	350 *24,1*	350 *24,1*	200 *13,8*
		10	0.134 *3,4*	500 *34,5*	450 *31,0*	250 *17,2*
		40	0.258 *6,6*	1000 *69,0*	750 *51,7*	300 *20,7*
6 *150*	6.625 *168,3*	5	0.109 *2,8*	350 *24,1*	350 *24,1*	200 *13,8*
		10	0.134 *3,4*	450 *31,0*	500 *34,5*	250 *17,2*
		40	0.280 *7,1*	1000 *69,0*	700 *48,2*	300 *20,7*
8 *200*	8.625 *219,1*	5	0.109 *2,8*	250 *17,2*	250 *17,2*	200 *13,8*
		10	0.148 *3,8*	300 *20,7*	300 *20,7*	200 *13,8*
		40	0.322 *8,2*	800 *55,1*	600 *41,3*	300 *20,7*
10 *250*	10.750 *273,0*	5	0.134 *3,4*	250 *17,2*	250 *17,2*	200 *13,8*
		10	0.165 *4,2*	300 *20,7*	300 *20,7*	200 *13,8*
		40	0.365 *9,3*	800 *55,1*	500 *34,5*	300 *20,7*
12 *300*	12.750 *323,9*	5	0.156 *4,0*	200 *13,8*	200 *13,8*	200 *13,8*
		10	0.180 *4,6*	300 *20,7*	200 *13,8*	200 *13,8*
		40	0.375 *9,5*	800 *55,1*	400 *27,6*	300 *20,7*

* Data based on carbon steel pipe.

Pressure Performance for Steel Pipe

Figure 707, Figure 772, Figure 71 Couplings

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure psi *bar*		
ANSI Inches *DN*	O.D. Inches *mm*			Figure 707	Figure 772	Figure 71
14 *350*	14.000 *355,6*	5	0.156 *4,0*	125 (8,6)	125 (8,6)	125 (8,6)
		10	0.250 *4,6*	250 (17,2)	250 (17,2)	250 (17,2)
		20	0.312 *7,9*	275 (18,9)	275 (18,9)	275 (18,9)
		30 (STD)	0.375 *9,5*	300 (20,7)	300 (20,7)	300 (20,7)
16 *400*	16.000 *406,4*	5	0.156 *4,0*	100 (6,9)	100 (6,9)	100 (6,9)
		10	0.250 *4,6*	175 (12,1)	175 (12,1)	175 (12,1)
		20	0.312 *7,9*	275 (18,9)	275 (18,9)	275 (18,9)
		30 (STD)	0.375 *9,5*	300 (20,7)	300 (20,7)	300 (20,7)
18 *450*	18.000 *457,2*	10	0.250 *4,6*	100 (6,9)	100 (6,9)	100 (6,9)
		20	0.312 *7,9*	175 (12,1)	175 (12,1)	175 (12,1)
		STD	0.375 *9,5*	300 (20,7)	300 (20,7)	300 (20,7)
20 *500*	20.000 *508,0*	10	0.250 *4,6*	100 (6,9)	100 (6,9)	100 (6,9)
		20 (STD)	0.375 *9,5*	300 (20,7)	300 (20,7)	300 (20,7)
24 *600*	24.000 *609,6*	10	0.250 *4,6*	75 (5,2)	75 (5,2)	75 (5,2)
		20 (STD)	0.375 *9,5*	250 (17,2)	250 (17,2)	300 (20,7)

* Data based on carbon steel pipe.

Pressure Performance for Steel Pipe

Figure 705 and Figure 770 Couplings

(1 of 2)

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure psi *bar*	
ANSI Inches *DN*	O.D. Inches *mm*			Figure 705	Figure 770
1-1/4 *32*	1.660 *42,4*	5	0.065 *1,6*	300 *20,7*	–
		10	0.109 *2,8*	500 *34,5*	–
		40	0.140 *3,6*	500 *34,5*	–
1-1/2 *40*	1.900 *48,3*	5	0.065 *1,6*	500 *34,5*	–
		10	0.109 *2,8*	500 *34,5*	–
		40	0.145 *3,7*	500 *34,5*	–
2 *50*	2.375 *60,3*	5	0.065 *1,6*	500 *34,5*	500 *34,5*
		10	0.109 *2,8*	500 *34,5*	750 *51,7*
		40	0.154 *3,9*	500 *34,5*	1000 *69,0*
2-1/2 *65*	2.875 *73,0*	5	0.083 *2,1*	500 *34,5*	500 *34,5*
		10	0.120 *3,0*	500 *34,5*	600 *41,3*
		40	0.203 *5,2*	500 *34,5*	1000 *69,0*
3 *80*	3.500 *88,9*	5	0.083 *2,1*	500 *34,5*	500 *34,5*
		10	0.120 *3,0*	500 *34,5*	600 *41,3*
		40	0.216 *5,5*	500 *34,5*	1000 *69,0*

* Data based on carbon steel pipe.

Pressure Performance for Steel Pipe

Figure 705 and Figure 770 Couplings

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure psi *bar*	
ANSI Inches *DN*	**O.D. Inches *mm***			**Figure 705**	**Figure 770**
4 *100*	4.500 *114,3*	5	0.083 *2,1*	400 *27,6*	400 *27,6*
		10	0.120 *3,0*	500 *34,5*	600 *41,3*
		40	0.273 *6,9*	500 *34,5*	1000 *69,0*
5 *125*	5.563 *141,3*	5	0.109 *2,8*	350 *24,1*	350 *24,1*
		10	0.134 *3,4*	450 *31,0*	500 *34,5*
		40	0.258 *6,6*	450 *31,0*	1000 *69,0*
6 *150*	6.625 *168,3*	5	0.109 *2,8*	350 *24,1*	350 *24,1*
		10	0.134 *3,4*	450 *31,0*	450 *31,0*
		40	0.280 *7,1*	450 *31,0*	1000 *69,0*
8 *200*	8.625 *219,1*	5	0.109 *2,8*	250 *17,2*	250 *17,2*
		10	0.148 *3,8*	300 *20,7*	300 *20,7*
		40	0.322 *8,2*	450 *31,0*	800 *55,1*
10 *250*	10.750 *73,0*	5	0.134 *3,4*	300 *20,7*	250 *17,2*
		10	0.165 *4,2*	350 *24,1*	300 *20,7*
		40	0.3650 *9,3*	350 *24,1*	800 *55,1*
12 *300*	12.750 *323,9*	5	0.156 *4,0*	300 *20,7*	200 *13,8*
		10	0.180 *4,6*	350 *24,1*	300 *20,7*
		40	0.375 *9,5*	350 *24,1*	800 *55,1*

* Data based on carbon steel pipe.

Pressure Performance for Stainless Steel Pipe

ANSI 304/316 Stainless Steel Pipe (1 of 4)

Nominal Pipe Size ANSI Inches *DN*	Nominal Pipe Size O.D. Inches *mm*	Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar* Figure 405	Figure 472	Figure 705	Figure 707	Figure 772
1 *25*	1.315 *33,4*	5	0.065 *1,7*	350 *24,0*	—	350 *24,0*	400 *28,0*	—
		10	0.109 *2,8*	500 *34,0*	—	500 *34,0*	500 *34,0*	—
		40	0.134 *3,4*	750 *52,0*	—	750 *52,0*	750 *52,0*	—
1-1/4 *32*	1.660 *42,4*	5	0.065 *1,7*	350 *24,0*	350 *24,0*	325 *22,0*	400 *28,0*	400 *28,0*
		10	0.109 *2,8*	500 *34,0*	500 *34,0*	500 *34,0*	500 *34,0*	750 *52,0*
		40	0.140 *3,6*	750 *52,0*	750 *52,0*	750 *52,0*	750 *52,0*	750 *52,0*
1-1/2 *40*	1.900 *48,3*	5	0.065 *1,7*	350 *24,0*	350 *24,0*	325 *22,0*	400 *28,0*	400 *28,0*
		10	0.109 *2,8*	500 *34,0*	500 *34,0*	500 *34,0*	500 *34,0*	750 *52,0*
		40	0.145 *3,7*	750 *52,0*	750 *52,0*	6500 *45,0*	750 *52,0*	750 *52,0*
2 *50*	2.375 *60,3*	5	0.065 *1,7*	350 *24,0*	350 *24,0*	250 *17,0*	350 *24,0*	350 *24,0*
		10	0.109 *2,8*	500 *34,0*	500 *34,0*	500 *34,0*	500 *34,0*	700 *48,0*
		40	0.154 *3,9*	500 *34,0*	600 *41,0*	500 *34,0*	750 *52,0*	750 *52,0*
2-1/2 *65*	2.875 *73,0*	5	0.083 *2,1*	350 *24,0*	350 *24,0*	250 *17,0*	325 *22,0*	350 *24,0*
		10	0.120 *3,0*	500 *34,0*	500 *34,0*	500 *34,0*	500 *34,0*	700 *48,0*
		40	0.203 *5,2*	500 *34,0*	600 *41,0*	500 *34,0*	750 *52,0*	750 *52,0*
76,1mm *65*	3.000 *76,1*	5	0.079 *2,0*	350 *24,0*	350 *24,0*	250 *17,0*	325 *22,0*	350 *24,0*
		10	0.118 *3,0*	500 *34,0*	500 *34,0*	400 *28,0*	500 *34,0*	500 *34,0*
		40	0.205 *5,2*	500 *34,0*	600 *41,0*	500 *34,0*	500 *34,0*	750 *52,0*

Pressure Performance for Stainless Steel Pipe

ANSI 304/316 Stainless Steel Pipe **(2 of 4)**

Nominal Pipe Size ANSI Inches *DN*	Nominal Pipe Size O.D. Inches *mm*	Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar* Figure 405	Figure 472	Figure 705	Figure 707	Figure 772
3 *80*	3.500 *88,9*	5	0.083 *2,1*	350 *24,0*	350 *24,0*	250 *17,0*	325 *22,0*	350 *24,0*
		10	0.120 *3,0*	500 *34,0*	500 *34,0*	400 *28,0*	500 *34,0*	500 *34,0*
		40	0.216 *5,5*	500 *34,0*	600 *41,0*	500 *34,0*	750 *52,0*	750 *52,0*
4 *100*	4.500 *114,3*	5	0.083 *2,1*	300 *21,0*	300 *21,0*	200 *14,0*	250 *17,0*	300 *21,0*
		10	0.120 *3,0*	400 *28,0*	400 *28,0*	400 *28,0*	500 *34,0*	500 *34,0*
		40	0.237 *6,0*	500 *34,0*	600 *41,0*	500 *34,0*	750 *52,0*	750 *52,0*
139,7mm *125*	5.500 *139,7*	5	0.109 *2,8*	250 *17,0*	250 *17,0*	125 *9*	200 *14,0*	250 *17,0*
		10	0.134 *3,4*	350 *24,0*	350 *24,0*	350 *24,0*	500 *34,0*	500 *34,0*
		40	0.258 *6,6*	450 *31,0*	600 *41,0*	450 *31*	650 *45*	650 *45*
5 *125*	5.563 *141,3*	5	0.118 *3,0*	250 *17,0*	250 *17,0*	125 *9,0*	200 *14,0*	250 *17,0*
		10	0.201 *5,1*	350 *24,0*	350 *24,0*	350 *24,0*	500 *34,0*	500 *34,0*
		40	0.252 *6,4*	450 *31,0*	600 *41,0*	450 *31*	650 *45*	650 *45*
165,1mm *150*	6.500 *165,1*	5	0.109 *2,8*	250 *17,0*	250 *17,0*	*75* *5,0*	125 *9,0*	250 *17,0*
		10	0.134 *3,4*	250 *17,0*	300 *21,0*	200 *14,0*	300 *21,0*	300 *21,0*
		40	0.280 *7,1*	450 *31,0*	600 *41,0*	300 *21,0*	500 *34,0*	500 *34,0*
6 *150*	6.625 *168,3*	5	0.118 *3,0*	250 *17,0*	250 *17,0*	*75* *5,0*	125 *9,0*	250 *17,0*
		10	0.201 *5,1*	250 *17,0*	300 *21,0*	200 *14,0*	300 *21,0*	300 *21,0*
		40	0.252 *6,4*	450 *31,0*	600 *41,0*	300 *21,0*	500 *34,0*	450 *31,0*

Note:

- Pressure performance values shown for GRINNELL couplings on light-wall (Sch. 5 & Sch. 10) stainless pipe are dependent on the use of the required special rolls for roll grooving light-wall stainless pipe.

Pressure Performance for Stainless Steel Pipe

ANSI 304/316 Stainless Steel Pipe **(3 of 4)**

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar*				
ANSI Inches *DN*	**O.D. Inches *mm***			**Figure 405**	**Figure 472**	**Figure 705**	**Figure 707**	**Figure 772**
8 *200*	8.625 *219,1*	5	0.109 *2,8*	100 *7,0*	100 *7,0*	50 *3,0*	75 *5,0*	100 *7,0*
		10	0.148 *3,8*	200 *14,0*	300 *21,0*	200 *14,0*	300 *21,0*	300 *21,0*
		40	0.322 *8,2*	450 *31,0*	600 *41,0*	300 *21,0*	400 *28,0*	450 *31,0*
10 *250*	10.750 *273,0*	5	0.134 *3,4*	—	—	—	—	—
		10	0.165 *4,2*	—	300 *21,0*	75 *5,0*	125 *9,0*	300 *21,0*
		40	0.365 *9,3*	—	600 *41,0*	75 *5,0*	325 *22,0*	450 *31,0*
12 *300*	12.750 *323,9*	5	0.156 *4,0*	—	150 *10,3*	—	—	150 *10,3*
		10	0.180 *4,6*	—	150 *10,3*	50 *3,0*	125 *9,0*	150 *10,3*
		40	0.375 *9,5*	—	600 *41,0*	50 *3,0*	250 *17,0*	250 *17,0*
14 *350*	14.000 *355,6*	5	0.156 *3,96*	—	—	—	—	—
		10	0.188 *4,78*	—	—	—	150 *10,3*	300 *20,7*
		40	0.375 *9,53*	—	—	—	—	—
16 *400*	16.000 *406,4*	5	0.165 *4,19*	—	—	—	—	—
		10	0.188 *4,78*	—	—	—	100 *6,9*	200 *13,8*
		40	0.375 *9,53*	—	—	—	—	—
18 *450*	18.000 *457,2*	5	0.165 *4,19*	—	—	—	—	—
		10	0.188 *4,78*	—	—	—	45 *3,1*	100 *6,9*
		40	0.375 *9,53*	—	—	—	—	—

Pressure Performance for Stainless Steel Pipe

ANSI 304/316 Stainless Steel Pipe

(4 of 4)

Nominal Pipe Size		Pipe* Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar*				
ANSI Inches *DN*	O.D. Inches *mm*			Figure 405	Figure 472	Figure 705	Figure 707	Figure 772
20 *500*	20.000 *508,0*	5	0.188 *4,78*	—	—	—	—	—
		10	0.218 *5,54*	—	—	—	35 *2,4*	150 *10,3*
		40	0.375 *9,53*	—	—	—	—	—
24 *600*	24.000 *609,6*	5	0.218 *5,54*	—	—	—	—	—
		10	0.250 *6,35*	—	—	—	200 *13,8*	200 *13,8*
		40	0.375 *9,53*	—	—	—	—	—

Notes:

- For parts installed in accordance with Bureau Veritas rules and regulations, a one-time only field-test is required to a maximum joint working pressure to 1-1/2 times the rated pressure shown in the Max. Pressure column of the dimensional tables for the following Figures: 71, 201, 210, 219, 260, 301, 303, 311, 312, 321,327, 341, 350, 522, 705, 707, 716, 730, 772, and 774. This test is in accordance with BV NR 467, Pt. C, Ch. 1, Sec. 10, [20.4.2.], where applicable. Tests are to be attended by a local BV Surveyor.
- Pressure performance values shown for GRINNELL couplings on light-wall (Sch. 5 & Sch. 10) stainless pipe are dependent on the use of the required special rolls for roll grooving light-wall stainless pipe.
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pressure Performance for Stainless Steel Pipe

For ANSI 304/316 Stainless Steel Pipe **(1 of 3)**

Nominal Pipe Size		Pipe[a] Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar*			
ANSI Inches *DN*	O.D. Inches *mm*			Figure 740	Figure 770	Figure 71	Figure 71H
1 *25*	1.315 *33,4*	5	0.065 *1,7*	—	—	—	—
		10	0.109 *2,8*	—	—	—	—
		40	0.134 *3,4*	—	—	—	—
1-1/4 *32*	1.660 *42,4*	5	0.0625 *2,0*	—	—	—	—
		10	0.109 *2,8*	—	—	—	—
		40	0.140 *3,6*	—	—	—	—
1-1/2 *40*	1.900 *48,3*	5	0.065 *1,7*	—	—	—	—
		10	0.109 *2,8*	—	—	—	—
		40	0.145 *3,7*	—	—	—	—
2 *50*	2.375 *60,3*	5	0.065 *1,7*	350 *24,0*	350 *24,0*	175 *12,0*	250 *17,0*
		10	0.109 *2,8*	700 *48,0*	750 *52,0*	275 *19,0*	500 *34,0*
		40	0.154 *3,9*	750 *52,0*	750 *52,0*	275 *19,0*	500 *34,0*
2-1/2 *65*	2.875 *73,0*	5	0.083 *2,1*	350 *24,0*	350 *24,0*	175 *12,0*	250 *17,0*
		10	0.120 *3,0*	700 *48,0*	750 *52,0*	275 *19,0*	500 *34,0*
		40	0.203 *5,2*	750 *52,0*	750 *52,0*	275 *19,0*	500 *34,0*
76,1mm *65*	3.000 *76,1*	5	0.079 *2,0*	350 *24,0*	—	175 *12,0*	—
		10	0.118 *3,0*	350 *24,0*	—	275 *19,0*	—
		40	0.205 *5,2*	750 *52,0*	—	275 *19,0*	—

Note:

a. Data based on carbon steel pipe.

- Pressure performance values shown for GRINNELL couplings on light-wall (Sch. 5 & Sch. 10) stainless pipe are dependent on the use of the required special rolls for roll grooving light-wall stainless pipe.
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pressure Performance for Stainless Steel Pipe

For ANSI 304/316 Stainless Steel Pipe **(2 of 3)**

Nominal Pipe Size		Pipe[a] Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar*			
ANSI Inches *DN*	O.D. Inches *mm*			Figure 740	Figure 770	Figure 71	Figure 71H
3 *80*	3.500 *88,9*	5	0.083 *2,1*	350 *24,0*	350 *24,0*	175 *12,0*	250 *17,0*
		10	0.120 *3,0*	500 *34,0*	750 *52,0*	275 *19,0*	400 *28,0*
		40	0.216 *5,5*	750 *52,0*	750 *52,0*	275 *19,0*	500 *34,0*
4 *100*	4.500 *114,3*	5	0.083 *2,1*	300 *21,0*	300 *21,0*	175 *12,0*	200 *14,0*
		10	0.120 *3,0*	500 *34,0*	750 *52,0*	275 *19,0*	400 *28,0*
		40	0.237 *6,0*	750 *52,0*	750 *52,0*	275 *19,0*	500 *34,0*
139,7mm *125*	5.500 *139,7*	5	0.109 *2,8*	250 *17,0*	—	125 *9,0*	—
		10	0.134 *3,4*	500 *34,0*	—	200 *14,0*	—
		40	0.258 *6,6*	650 *45,0*	—	250 *17,0*	—
5 *125*	5.563 *141,3*	5	0.118 *3,0*	250 *17,0*	250 *17,0*	125 *9,0*	125 *9,0*
		10	0.201 *5,1*	500 *34,0*	350 *24,0*	200 *14,0*	350 *24,0*
		40	0.252 *6,4*	650 *45,0*	750 *52,0*	250 *17,0*	500 *34,0*
165,1mm *150*	6.500 *165,1*	5	0.109 *2,8*	125 *9,0*	—	75 *5,0*	—
		10	0.134 *3,4*	300 *21,0*	—	125 *9,0*	—
		40	0.280 *7,1*	450 *31,0*	—	150 *10,0*	—
6 *150*	6.625 *168,3*	5	0.118 *3,0*	250 *17,0*	250 *17,0*	75 *5,0*	50 *3,0*
		10	0.201 *5,1*	300 *21,0*	350 *24,0*	125 *9,0*	75 *5,0*
		40	0.252 *6,4*	450 *31,0*	750 *52,0*	150 *10,0*	500 *34,0*

Note:

a. Data based on carbon steel pipe.

- Pressure performance values shown for GRINNELL couplings on light-wall (Sch. 5 & Sch. 10) stainless pipe are dependent on the use of the required special rolls for roll grooving light-wall stainless pipe.
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pressure Performance for Stainless Steel Pipe

For ANSI 304/316 Stainless Steel Pipe **(3 of 3)**

Nominal Pipe Size		Pipe[a] Sch.	Nominal Wall Inches *mm*	Maximum Pressure Rating psi *bar*			
ANSI Inches *DN*	O.D. Inches *mm*			Figure 740	Figure 770	Figure 71	Figure 71H
8 *200*	8.625 *219,1*	5	0.109 *2,8*	100 *7,0*	100 *7,0*	50 *3,0*	50 *3,0*
		10	0.148 *3,8*	300 *21,0*	350 *24,0*	75 *5,0*	75 *5,0*
		40	0.322 *8,2*	450 *31,0*	650 *45,0*	125 *9,0*	400 *28,0*
10 *250*	10.750 *273,0*	5	0.134 *3,4*	—	—	—	—
		10	0.165 *4,2*	—	300 *21,0*	75 *5,0*	75 *5,0*
		40	0.365 *9,3*	—	600 *41,0*	125 *9,0*	400 *28,0*
12 *300*	12.750 *323,9*	5	0.156 *4,0*	—	150 *10,0*	—	—
		10	0.180 *4,6*	—	150 *10,0*	50 *3,0*	50 *3,0*
		40	0.375 *9,5*	—	600 *41,0*	125 *9,0*	400 *28,0*

Note:

a. Data based on carbon steel pipe.

- Pressure performance values shown for GRINNELL couplings on light-wall (Sch. 5 & Sch. 10) stainless pipe are dependent on the use of the required special rolls for roll grooving light-wall stainless pipe.
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pressure Performance for Copper Tubing

Figure 672 Rigid Coupling

Nominal ANSI Inches *DN*	Type "K" - ASTM B 88			Type "L" - ASTM B 88		
	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*
2 *50*	0.083 *2,1*	300 *20,7*	1,065 *4,74*	0.070 *1,8*	300 *20,7*	1,065 *4,74*
2-1/2 *65*	0.095 *2,4*	300 *20,7*	1,625 *7,23*	0.080 *2,0*	300 *20,7*	1,625 *7,23*
3 *80*	0.109 *2,8*	300 *20,7*	2,300 *10,23*	0.090 *2,3*	300 *20,7*	2,300 *10,23*
4 *100*	0.134 *3,4*	300 *20,7*	4,005 *17,82*	0.110 *2,8*	300 *20,7*	4,005 *17,82*
5 *125*	0.160 *4,1*	300 *20,7*	6,190 *27,55*	0.125 *3,2*	300 *20,7*	6,190 *27,55*
6 *150*	0.192 *4,9*	300 *20,7*	8,840 *39,34*	0.140 *3,6*	300 *20,7*	8,840 *39,34*
8 *200*	0.271 *6,9*	300 *20,7*	15,550 *69,2*	0.200 *5,1*	300 *20,7*	15,550 *69,2*

Nominal ANSI Inches *DN*	Type "M" - ASTM B 88			DWV - ASTM B 306		
	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*
2 *50*	0.058 *1,5*	250 *17,2*	890 *3.96*	–	–	–
2-1/2 *65*	0.065 *1,7*	250 *17,2*	1,350 *6.01*	–	–	–
3 *80*	0.072 *1,8*	250 *17,2*	1,415 *6.30*	0.045 *1.1*	100 *6,9*	765 *3.40*
4 *100*	0.095 *2,4*	250 *17,2*	3,340 *14.86*	0.058 *1.5*	100 *6,9*	1,335 *5.94*
5 *125*	0.109 *2,8*	200 *13,8*	4,125 *18.36*	0.072 *1.8*	100 *6,9*	2,060 *9.17*
6 *150*	0.122 *3,1*	200 *13,8*	5,890 *26.21*	0.083 *2.1*	100 *6,9*	2,945 *13.10*
8 *200*	0.170 *4,3*	200 *13,8*	10,370 *46.10*	0.109 *2.8*	100 *6,9*	5,180 *23.0*

Notes:
- For a one-time field-test only, the Maximum Joint Working Pressure may be increased to 1-1/2 times the Maximum Pressure column shown in the dimensional tables. For any parts installed in accordance with Bureau Veritas rules and regulations, this test is required.
- Pressure performance values shown for GRINNELL couplings on copper tubing are dependent on the use of the required copper roll sets for roll grooved copper tubing.
- Refer to Technical Data Sheet G510 Figure 672 Rigid Coupling - CTS.

Pressure Performance for Copper Tubing (2 of 2)

Figure 640 Rigid Coupling

Nominal ANSI Inches *DN*	Type "K" - ASTM B 88			Type "L" - ASTM B 88		
	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*
2 *50*	0.083 *2,1*	300 *20,7*	1,065 *4,74*	0.070 *1,8*	300 *20,7*	1,065 *4,74*
2-1/2 *65*	0.095 *2,4*	300 *20,7*	1,625 *7,23*	0.080 *2,0*	300 *20,7*	1,625 *7,23*
3 *80*	0.109 *2,8*	300 *20,7*	2,300 *10,23*	0.090 *2,3*	300 *20,7*	2,300 *10,23*
4 *100*	0.134 *3,4*	300 *20,7*	4,005 *17,82*	0.110 *2,8*	300 *20,7*	4,005 *17,82*
5 *125*	0.160 *4,1*	300 *20,7*	6,190 *27,55*	0.125 *3,2*	300 *20,7*	6,190 *27,55*
6 *150*	0.192 *4,9*	300 *20,7*	8,840 *39,34*	0.140 *3,6*	300 *20,7*	8,840 *39,34*
8 *200*	0.271 *6,9*	300 *20,7*	15,550 *69,2*	0.200 *5,1*	300 *20,7*	15,550 *69,2*

Nominal ANSI Inches *DN*	Type "M" - ASTM B 88			DWV - ASTM B 306		
	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*	Wall Thickness Inches *mm*	Maximum Working Pressure psi *bars*	Maximum End Load Lbs. *kN*
2 *50*	0.058 *1,5*	250 *17,2*	890 *3,96*	–	–	–
2-1/2 *65*	0.065 *1,7*	250 *17,2*	1,350 *6,01*	–	–	–
3 *80*	0.072 *1,8*	250 *17,2*	1,415 *6,30*	0.045 *1,1*	100 *6,9*	765 *3,40*
4 *100*	0.095 *2,4*	250 *17,2*	3,340 *14,86*	0.058 *1,5*	100 *6,9*	1,335 *5,94*
5 *125*	0.109 *2,8*	200 13,8	4,125 *18,36*	0.072 *1,8*	100 *6,9*	2,060 *9,17*
6 *150*	0.122 *3,1*	200 *13,8*	5,890 *26,21*	0.083 *2,1*	100 *6,9*	2,945 *13,10*
8 *200*	0.170 *4,3*	200 *13,8*	10,370 *46,10*	0.109 *2,8*	100 *6,9*	5,180 *23,0*

Notes:
- For a one-time field-test only, the Maximum Joint Working Pressure may be increased to 1-1/2 times the Maximum Pressure column shown in the dimensional tables. For any parts installed in accordance with Bureau Veritas rules and regulations, this test is required.
- Pressure performance values shown for GRINNELL couplings on copper tubing are dependent on the use of the required copper roll sets for roll grooved copper tubing.
- Refer to Technical Data Sheet G512 Figure 640 Pivot-Bolt Rigid Coupling - CTS.

Pipe Support

All piping systems require that the support system accommodate the weight of the pipe, joint connections, fluid and other system components. In addition, consideration may be necessary in reducing stresses, accommodating thermal expansion or contraction, building settlement, seismic movement, etc. The following tables provide guidelines for grooved steel piping products without concentrated loads between supports.

Flexible Joints

For pipe runs when linear movement is accommodated by the flexible coupling:

Number of Hangers Per Pipe Length								
Nominal Size ANSI Inches *DN*	**Pipe Length in Feet *Meters***							
	10 *3,3*	12 *3,7*	15 *4,6*	22 *6,7*	25 *7,6*	30 *9,1*	35 *10,7*	40 *12,2*
	Average Hangers Per Pipe Length							
1-1/4 - 2 *32 - 50*	2	2	2	3	4	4	5	6
2-1/2 - 4 *65 - 100*	1	2	2	2	2	3	4	4
5 - 24 *125 - 600*	1	1	2	2	2	3	3	3

For pipe when linear movement is not required:

Distance Between Supports	
Nominal Size ANSI Inches *DN*	**Maximum Distance Between Supports Feet *Meters***
1-1/4 - 1-1/2 *32 - 40*	12 *3,7*
2 - 8 *50 - 200*	15 *4,6*
10 - 12 *250 - 300*	16 *4,9*
14 - 16 *350 - 400*	18 *5,5*
18 - 24 *450 - 600*	20 *6,1*

Note:
- The requirements of ANSI, ASME or other code groups may require additional supports.

- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pipe Support

Rigid Joints

For Pipe Runs with Rigid Couplings

Nominal Size ANSI Inches *DN*	**Suggested Maximum Span Between Supports Feet** *Meters*			
	Water Service		**Air Service**	
	I	**II**	**I**	**II**
1-1/4 *32*	7 *2,1*	11 *3,4*	9 *2,7*	11 *3,4*
1-1/2 *40*	7 *2,1*	12 *3,7*	9 *2,7*	13 *4,0*
2 *50*	10 *3,0*	13 *4,0*	13 *4,0*	15 *4,6*
2-1/2 *65*	11 *3,4*	14 *4,3*	14 *4,3*	16 *4,9*
— *65*	11 *3,4*	14 *4,3*	14 *4,3*	16 *4,9*
3 *80*	12 *3,7*	15 *4,6*	15 *4,6*	17 *5,2*
4 *100*	14 *4,3*	17 *5,2*	17 *5,2*	21 *6,4*
5 *125*	16 *4,9*	19 *5,8*	20 *6,1*	24 *7,3*
— *150*	17 *5,2*	20 *6,1*	21 *6,4*	25 *7,6*
6 *150*	17 *5,2*	20 *6,1*	21 *6,4*	25 *7,6*
8 *200*	19 *5,8*	21 *6,4*	24 *7,3*	28 *8,5*
10 *250*	19 *5,8*	21 *6,4*	24 *7,3*	31 *9,4*
12 *300*	23 *7,0*	21 *6,4*	30 *9,1*	33 *10,1*
14 *350*	23 *7,0*	21 *6,4*	30 *9,1*	33 *10,1*
16 *400*	27 *8,2*	21 *6,4*	35 *10,7*	33 *10,1*
18 *450*	27 *8,2*	21 *6,4*	35 *10,7*	33 *10,1*
20 *500*	30 *9,1*	21 *6,4*	39 *11,9*	33 *10,1*
24 *600*	32 *9,8*	21 *6,4*	42 *12,8*	33 *10,1*

Notes:

- I - Spacing by ANSI B31.1 Power Piping Code
- II - Spacing by ANSI B31.9 Building Piping Code
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

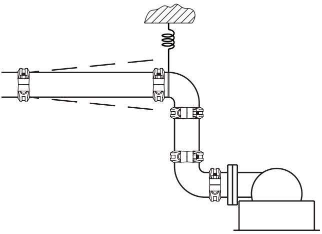
Pipe Support

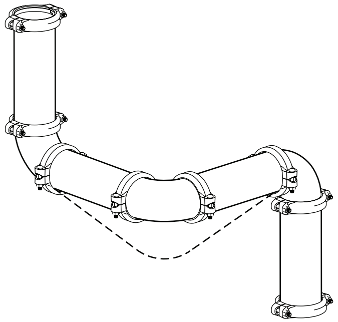
Pipe Hanger Positioning

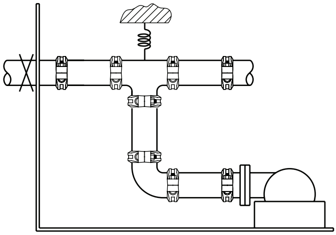
Pipe hanger positioning is important to prevent pipe “sagging” due to the flexible nature of the piping system. Proper positioning of hangers near the elbow, for example, should be considered.

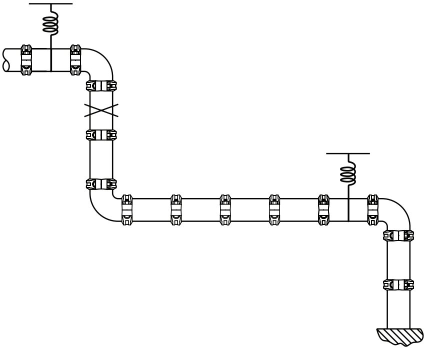
The use of spring hangers or other methods can be employed to accommodate vibrations. Base supports, pressure thrust anchors and pipe offsets can be used to direct pipe movement.

The use of rigid couplings may be used to reduce the movement available with flexible couplings. Consideration to other methods to accommodate pipe movements may be required.









- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Pipe Support

Vertical Piping

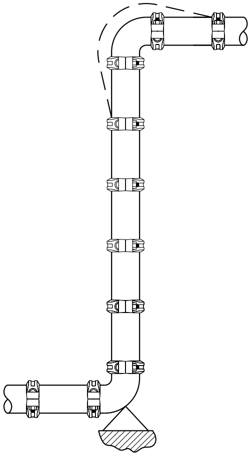
Risers comprised of rigid couplings are similar to welded or flanged systems. Where thermal movement exists, expansion joints and/or flexible couplings with offsets may be required.

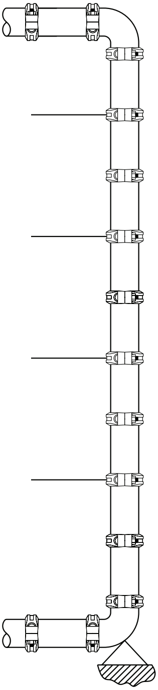
When using flexible couplings, the movement that occurs in long lengths of piping needs to be considered. Each joint can move up to the maximum pipe end separation published. This movement can accumulate and result in the growth of the piping system. Offsets may be necessary.

Should the riser contain branch connections, the movement that occurs at these locations with flexible couplings, will need to be considered.

One solution would be to anchor the vertical piping at appropriate locations to prevent movement that can cause stresses at the branches or equipment.

As always, good piping practice should prevail. It is the Designer's responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data is not exceeded. Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Material and gasket selection should be verified to be compatible for the specific application.



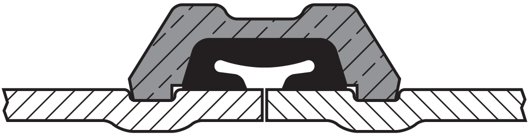


- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Design Data

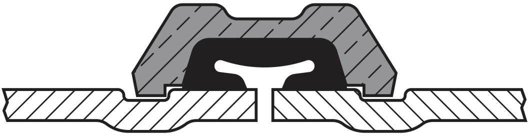
GRINNELL Grooved Piping Products provide the versatility required in piping systems through the use of rigid and flexible piping products. Figure 772 Couplings incorporate rotation resistant gripping teeth that provide the installer and designer with increased benefits.

Rigid Couplings



Rigid Couplings provide rigid gripping of the pipe. They are designed to bring the pipe ends closely together and the coupling clamps firmly onto the pipe O.D. and also into the bottom of the grooves. Because Rigid Couplings clamp around the entire pipe surface, they provide resistance to flexural loads and therefore permit longer spacing to ASME/ANSI B31.1 (Power Piping) and ASME/ANSI B39.1 (Building Services) requirements.

Flexible Couplings



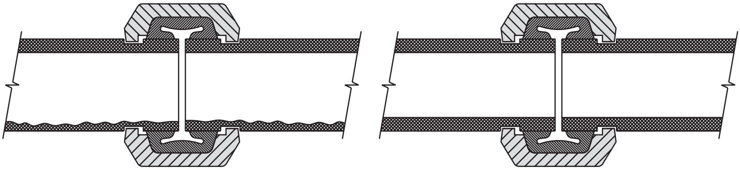
Flexible Couplings act as an “expansion joint”, allowing linear and angular movement of the pipe. They are designed with the coupling keys engaging the pipe without gripping on the bottom of the grooves, while still providing for a restrained mechanical joint. This is particularly useful to allow for pipe expansion or contraction and piping misalignment.

- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Rotational Movement

GRINNELL Flexible Couplings are suitable for use in seismic as well as other applications. The inherent capability of the flexible coupling to allow for linear movement, angular deflection, and rotational movement, make it an excellent choice for reducing stresses in a piping system.

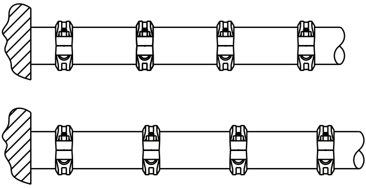
For mining applications where pipe needs to be rotated, the system should be de-pressurized. The pipe couplings bolts/nuts can be loosened, pipe rotated and the bolts/nuts re-tightened and the system restored to service.



Even distribution of pipe wear can be achieved with this method on inner surface of the pipe.

Linear Movement

The inherent flexibility of the coupling must be considered when deciding on support arrangements for the pipe system as movement can occur in more than one plane (linear movement, angular deflection, and rotational movement).



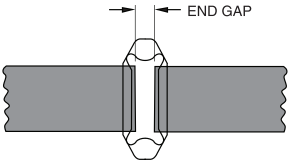
Upon system pressurization, each pipe end within the flexible couplings will expand to the maximum published value. The coupling keys make contact with the face of the groove and restrain the joint. In piping systems, this movement will be accumulative.

• Refer to Technical Data Sheets G810, G820, and G830 for more information.

Linear Movement

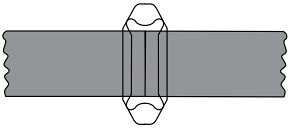
Flexible Couplings

For thermal expansion with flexible couplings, the pipe ends at each joint should be fully gapped to the maximum end gap. This can be accomplished by pressurizing the system and then anchoring the system.



Pipe Ends Gapped for Expansion

For thermal contraction with flexible couplings, the pipe ends at each joint should be fully butted. The system can then be anchored in place to prevent the pipe ends from opening up to the maximum end gap when pressurized.



Pipe Ends Butted for Contraction

For design purposes, the maximum pipe end gap should be reduced to account for field practices.

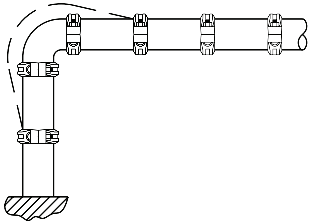
End Gap Reduction	
Nominal Pipe Size ANSI Inches ***DN***	**Maximum Pipe End Gap Reduction**
1-1/4 - 3 *32 - 80*	50%
4 - 24 *100 - 600*	25%

Therefore the following values should be used as available pipe end movements for GRINNELL Figure 705, 707 and 716 Flexible Couplings:

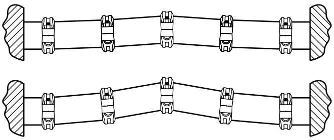
Pipe End Movements		
Nominal Pipe Size ANSI Inches ***DN***	**Cut Grooved Inches** ***mm***	**Roll Grooved[a] Inches** ***mm***
1-1/4 - 3 *32 - 80*	0 - 0.063 *0 - 1,6*	0 - 0.031 *0 - 0,8*
4 - 24 *100 - 600*	0 - 0.188 *0 - 4,8*	0 - 0.094 *0 - 2,4*
a. Roll grooved joints provide 1/2 the available movement of cut grooved joints.		

• Refer to Technical Data Sheets G810, G820, and G830 for more information.

Angular Movement



System movement can be accommodated by providing for sufficient offset lengths. Temperature increases/decreases can further increase this movement.



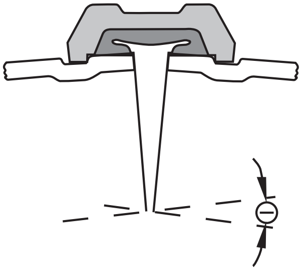
When systems are anchored with partially deflected joints, the system can move to the fully deflected condition upon pressurization resulting in the "snaking" of the piping system. Light weight hangers may not be suitable to prevent the lateral motion.

Angular Deflection

GRINNELL Flexible Couplings are capable of accommodating angular deflection.

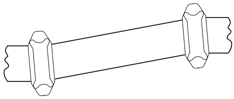
Deflection	
Nominal Pipe Size ANSI Inches ***DN***	**Maximum Pipe Deflection Reduction**
1-1/4 - 3 *32 - 80*	50%
4 - 24 *100 - 600*	25%

The deflection published is a maximum value. For design purposes the maximum deflection should be reduced to account for field practices as shown.

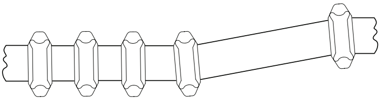


Expansion / Contraction

GRINNELL Flexible Couplings are capable of accommodating pipe movements provided they are properly gapped and a sufficient quantity of flexible couplings are used. However, flexible couplings will not accommodate both full maximum linear movement and the maximum available angular deflection concurrently at the same joint.



If it is desired to have both deflection and linear movement available, then the system should have sufficient flexible joints to accommodate the requirement.



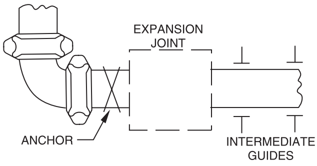
Thermal Movement

The following guidelines are similar to any expansion joint: It is recommended that anchors be installed at changes of direction on the pipelines to control the pipe movement. The thermal expansion / contraction in the piping system can be accommodated utilizing GRINNELL Flexible Couplings. In designing anchoring systems, it is suggested that the following be taken into consideration as a minimum:

- Pressure thrusts
- Frictional resistance of any guides or supports
- Centrifugal thrust due to velocity at changes of direction
- Activation force required to compress or expand a flexible coupling

Three methods are available as examples to accommodate thermal expansion/contraction:

1. Design the system with rigid couplings and place expansion joints at the proper locations. Expansion joints may be a series of flexible grooved couplings of a sufficient quantity to accommodate the movement.



a. Refer to Technical Data Sheets G810, G820, and G830 for more information.

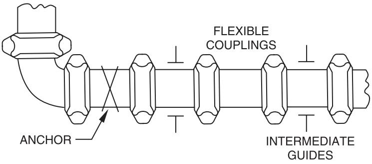
Thermal Movement

Nominal Pipe Size ANSI Inches *DN*	Activation Force Lbs. *N*
1-1/4 *32*	35 *156*
1-1/2 *50*	45 *200*
2 *50*	70 *311*
2-1/2 *65*	100 *645*
— *65*	110 *489*
3 *80*	145 *645*
4 *100*	240 *1068*

Nominal Pipe Size ANSI Inches *DN*	Activation Force Lbs. *N*
5 *125*	375 *1668*
— *150*	500 *2224*
6 *150*	520 *2313*
8 *200*	880 *3914*
10 *250*	1365 *6072*
12 *300*	1915 *8518*

2. Design the system with flexible and/or rigid couplings and allow the pipe to move in directions desired, with the use of anchors and guides if so required. With this method, it is important to ensure that movement at branch connections, changes of direction, equipment hookup, for example, will not cause damage or harmful stresses.
3. Design the system with flexible couplings utilizing the expansion/contraction capabilities of these products. The following example illustrates this method:

- 6-Inch, Schedule 40 Steel Pipe, Roll Grooved, 150 foot long, anchored at each end.
- Maximum Temperature = 200°F
- Minimum Temperature = 40°F
- Install Temperature = 80°F



a. Refer to Technical Data Sheets G810, G820, and G830 for more information.

Thermal Movement

Directions to calculate the number of couplings required to compensate for the Thermal Expansion and Contraction of the pipe (by example):

1. Thermal Contraction: Utilize the Thermal Expansion Table. Allowance for installation temperature to the minimum temperature, in this case 80°F to 40°F is calculated as:

   80°F = 0.61 inches per 100 feet
   40°F = 0.30 inches per 100 feet
   Difference = 0.31 inch per 100 feet

   For 150 feet of pipe = 0.31 inch x 1.5 = 0.47 inch per 150 feet)

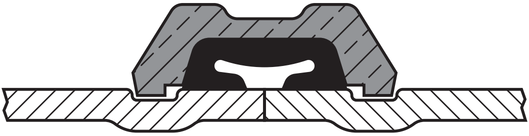
2. Thermal Expansion: Utilize the Thermal Expansion Table. Allowance for installation temperature to the minimum temperature, in this case 80°F to 200°F is calculated as:

   200°F = 1.52 inches per 100 feet
   80°F = 0.61 inch per 100 feet
   Difference = 0.91 inch per 100 feet

   For 150 feet of pipe = 0.91 inch x 1.5 = 1.36 inches per 150 feet)

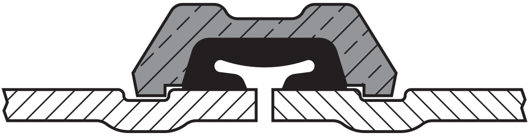
3. Couplings Required:
   Available linear movement for a 6 inch Figure 707 Flexible Coupling on roll grooved pipe = 0.094 inch per coupling.

   a) Fully butted together for contraction only.
   Therefore the number of Figure 707 Flexible Couplings required: 0.47 inch / 0.094 inch per coupling = 5.0



   Use 5 Figure 707 Flexible Couplings for pipe contraction.

   b) Fully Gapped Apart for Expansion Only.
   Therefore the number of Figure 707 Flexible Couplings required: 1.36 inches / 0.094 inch per coupling = 14.47



   Use 15 Figure 707 Flexible Couplings for pipe expansion.

Refer to Technical Data Sheets G810, G820, and G830 for more information.

Thermal Movement

Thermal Expansion of Carbon Steel
In Inches/100 Feet (Millimeters/30.5 Meters)
Between 0°F (-18°C) & Indicated Temperature

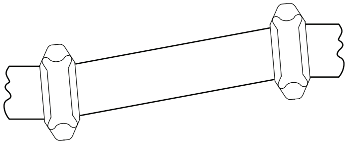
Temperature F° (C°)	Inches/100 ft. (mm/30.5 m)	Temperature F° (C°)	Inches/100 ft. (mm/30.5 m)
-40 (-40)	-0.30 (-7.62)	100 (37.8)	0.76 (19.30)
-30 (-34.4)	-0.23 (-5.84)	110 (43.3)	0.84 (21.34)
-20 (-28.9)	-0.15 (-3.81)	120 (48.9)	0.91 (23.11)
-10 (-23.3)	-0.08 (-2.03)	130 (54.4)	0.99 (25.15)
0 (-17.8)	0.00 (0.00)	40 (60.0)	1.06 (26.92)
10 (-12.2)	0.08 (2.03)	150 (65.6)	1.14 (28.96)
20 (-6.7)	0.15 (3.81)	160 (71.1)	1.22 (30.99)
30 (-1.1)	0.23 (5.84)	170 (76.7)	1.29 (32.77)
40 (4.4)	0.30 (7.62)	180 (82.2)	1.37 (34.80)
50 (10.0)	0.38 (9.65)	190 (87.8)	1.44 (36.58)
60 (15.6)	0.46 (11.68)	200 (93.3)	1.52 (38.61)
70 (21.1)	0.53 (13.46)	210 (98.9)	1.60 (40.64)
80 (26.7)	0.61 (15.50)	220 (104.4)	1.67 (42.42)
90 (32.2)	0.68 (17.27)	230 (110.0)	1.75 (44.45)

Notes:
- Mean Coefficient of Thermal Expansion = 0.00000633 in/in/°F
- Source: ASME B31.9
- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Misalignment and Deflection

GRINNELL Flexible Couplings provide for restrained joints and allow for deflection to aid where the pipe or equipment is misaligned.

Note that flexible couplings will not accommodate both full maximum linear movement and the maximum available angular deflection concurrently at the same joint.

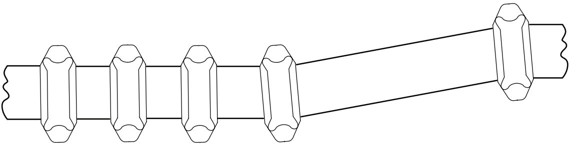


Design Deflection for Roll Grooved Pipe			
Nominal Pipe Size			Figures 705 & 707
ANSI Inches	**DN**	**O.D. Inches** ***mm***	
1-1/4	32	1.600 *42,2*	1.08°
1-1/2	40	1.900 *48,3*	0.94°
2	50	2.375 *60,3*	0.75°
2-1/2	65	2.875 *73,0*	0.62°
–	65	3.000 *76,1*	0.60°
3	80	3.500 *88,9*	0.51°
4	100	4.500 *114,3*	1.19°
5	125	5.563 *141,3*	0.97°
–	150	6.500 *165,1*	0.83°
6	150	6.625 *168,3*	0.81°
8	200	8.625 *219,1*	0.63°
10	250	10.750 *273,1*	0.50°
12	300	12.750 *323,4*	0.42°

- Refer to Technical Data Sheets G810, G820, and G830 for more information.

Misalignment and Deflection

If it is desired to have both deflection and linear movement available, then the system should have sufficient flexible joints to accommodate the requirement.

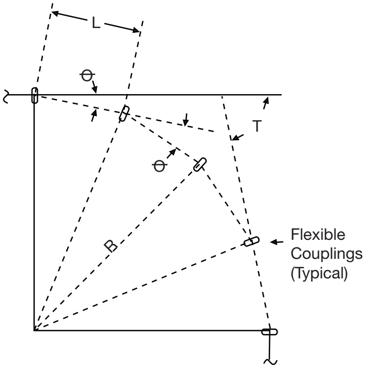


Flexible couplings are also useful in laying out curved piping systems.

$$R = \frac{L}{(2)\left(\sin\frac{\theta}{2}\right)}$$

$$L = (2)(R)\left(\sin\frac{\theta}{2}\right)$$

$$N = \frac{T}{\theta}$$



R = Radius of curve

L = Pipe length

θ = Deflection from centerline, in degrees, for each coupling (see table)

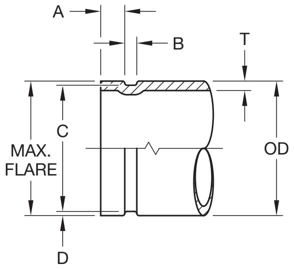
N = Number of flexible couplings needed

T = Total deflection, in degrees, required

a. Refer to Technical Data Sheets G810, G820, and G830 for more information.

Rolled Groove Standard Specifications

For Steel and Other IPS Pipe



1. The maximum allowable tolerances for IPS pipe from square cut ends is 0.030″ (0.76 mm) for sizes 1.25″ to 3″ (DN32 to DN80); 0.045″ (1.14 mm) for sizes 4″ to 6″ (DN100 to DN150); and 0.060″ (1.52 mm) for sizes 8″ (DN200) to 24″ (DN600).
2. 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.
3. Groove diameter "C" must be of uniform depth around the circumference of the pipe.
4. Groove Depth "D" is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension "C" must be maintained.
5. Minimum Wall Thickness "T" is the minimum wall thickness that should be roll grooved.
6. Maximum allowable pipe end flare diameter is measured at the pipe end diameter.

Nominal Pipe Size ANSI Inches *DN*	Pipe O.D. Inches mm		
	O.D.	Tolerance	
		+	-
1 *25*	1.315 *33,7*	0.028 *0,41*	0.015 *0,68*
1-1/4 *32*	1.660 *42,4*	0.029 *0,50*	0.016 *0,64*
1-1/2 *40*	1.900 *48,3*	0.019 *0,48*	0.019 *0,48*
2 *50*	2.375 *60,3*	0.024 *0,61*	0.024 *0,61*
2-1/2 *65*	2.875 *73,0*	0.029 *0,74*	0.029 *0,74*
76,1mm *65*	3.000 *76,1*	0.030 *0,76*	0.030 *0,76*
3 *80*	3.500 *88,9*	0.035 *0,89*	0.031 *0,79*
108,0mm *100*	4.250 *108,0*	0.043 *1,09*	0.031 *0,79*
4 *100*	4.500 *14,3*	0.045 *1,14*	0.031 *0,79*
133,4mm *125*	5.250 *133,4*	0.053 *1,35*	0.031 *0,79*
139,1mm *125*	5.500 *139,7*	0.056 *1,42*	0.031 *0,79*
5 *125*	5.563 *141,3*	0.056 *1,42*	0.031 *0,79*
159,0mm *150*	6.250 *159,0*	0.063 *1,60*	0.031 *0,79*
165,1mm *150*	6.500 *165,1*	0.063 *1,60*	0.031 *0,79*
6 *150*	6.625 *168,3*	0.063 *1,60*	0.031 *0,79*
216,3mm *200*	8.516 *216,3*	0.063 *1,60*	0.031 *0,79*
8 *200*	8.625 *219,1*	0.063 *1,60*	0.031 *0,79*
10 *250*	10.750 *273,1*	0.063 *1,60*	0.031 *0,79*
12 *300*	12.750 *323,9*	0.063 *1,60*	0.031 *0,79*
14 *350*	14.000 *355,6*	0.063 *1,60*	0.031 *0,79*

Refer to Tech Data Sheet G710 Groove Specifications for Steel Pipe.

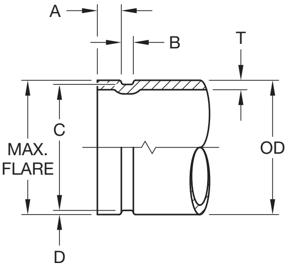
Rolled Groove Standard Specifications (2 of 2)
For Steel and Other IPS Pipe

Nominal Size ANSI Inches *DN*	A ±0.030″ ±0,76 mm Inches *mm*	B ±0.030″ ±0,76 mm Inches *mm*	C Groove Dia. Inches *mm*		D Groove Depth Inches *mm*	T Min. Wall Inches *mm*	Max. Allow. Flare Diameter Inches *mm*
			Actual	Tol.+0			
1 *25*	0.625 *15,88*	0.281 *7,14*	1.190 *30,23*	-0.015 *-0,38*	0.063 *1,60*	0.065 *1,65*	1.43 *36,3*
1-1/4 *32*	0.625 *15,88*	0.281 *7,14*	1.535 *38,99*	-0.015 *-0,38*	0.063 *1,60*	0.065 *1,65*	1.77 *44,96*
1-1/2 *40*	0.625 *15,88*	0.281 *7,14*	1.775 *45,09*	-0.015 *-0,38*	0.063 *1,60*	0.065 *1,65*	2.01 *51,05*
2 *50*	0.625 *15,88*	0.344 *8,74*	2.250 *57,15*	-0.015 *-0,38*	0.063 *1,60*	0.065 *1,65*	2.48 *62,99*
2-1/2 *65*	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*
76,1mm *65*	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 *80*	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*
108,0mm *100*	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 *100*	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*
133,4mm *125*	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*
139,1mm *125*	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 *125*	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*
159,0mm *150*	0.625 *15,88*	0.344 *8,74*	6.084 *154,53*	-0.030 *-0.76*	0.084 *2,13*	0.109 *2,77*	6.35 *161,29*
165,1mm *150*	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 *150*	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*
216,3mm *200*	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 *200*	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 *250*	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 *300*	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 *350*	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*

Rolled Groove Standard Specifications

(1 of 2)

For Steel and Other IPS Pipe



1. The maximum allowable tolerances for IPS pipe from square cut ends is 0.030˝ (0.76 mm) for sizes 1.25˝ to 3˝ (DN32 to DN80); 0.045˝ (1.14 mm) for sizes 4˝ to 6˝ (DN100 to DN150); and 0.060˝ (1.52 mm) for sizes 8˝ (DN200) to 24˝ (DN600).
2. 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.
3. Groove diameter "C" must be of uniform depth around the circumference of the pipe.
4. Groove Depth "D" is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension "C" must be maintained.
5. Minimum Wall Thickness "T" is the minimum wall thickness that should be roll grooved.
6. Maximum allowable pipe end flare diameter is measured at the pipe end diameter.

Nominal Pipe Size ANSI Inches *DN*	Pipe O.D. Inches mm		
	O.D.	Tolerance	
		+	-
16 *400*	16.000 *406,4*	0.063 *1,60*	0.031 *0,79*
18 *450*	18.000 *457,2*	0.063 *1,60*	0.031 *0,79*
20 *500*	20.000 *508,0*	0.063 *1,60*	0.031 *0,79*
24 *600*	24.000 *609,6*	0.063 *1,60*	0.031 *0,79*

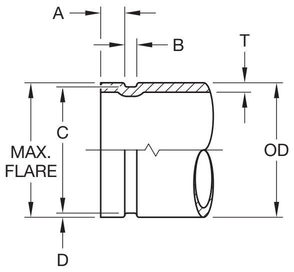
Refer to Tech Data Sheet G710 Groove Specifications for Steel Pipe.

Rolled Groove Standard Specifications (2 of 2)
For Steel and Other IPS Pipe

Nominal Size ANSI Inches *DN*	A ±0.030˝ ±0,76 mm Inches *mm*	B ±0.030˝ ±0,76 mm Inches *mm*	C Groove Dia. Inches *mm*		D Groove Depth Inches *mm*	T Min. Wall Inches *mm*	Max. Allow. Flare Diameter Inches *mm*
			Actual	Tol.+0			
16 *400*	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 *450*	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 *500*	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 *600*	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*

Rolled Groove Standard Specifications

Large Diameter IPS Pipe



1. The maximum allowable tolerances for IPS pipe from square cut ends is 0.125˝ (3,18 mm) for sizes 26˝ (DN650) to 42˝ (DN1050).
2. 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.
3. Groove diameter “C” must be of uniform depth around the circumference of the pipe.
4. Groove Depth “D” is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension “C” must be maintained.
5. Minimum Wall Thickness “T” is the minimum wall thickness that should be roll grooved.
6. Maximum allowable pipe end flare diameter is measured at the pipe end diameter.

Nominal Pipe Size ANSI Inches *DN*	O.D. Inches mm		
	O.D.	Tolerance	
		+	-
26 *650*	26.0 *660,4*	0.093 *2,36*	0.031 *0,79*
28 *700*	28.0 *711,2*	0.093 *2,36*	0.031 *0,79*
30 *750*	30.0 *762,0*	0.093 *2,36*	0.031 *0,79*
32 *800*	32.0 *812,8*	0.093 *2,36*	0.031 *0,79*
36 *900*	36.0 *914,4*	0.093 *2,36*	0.031 *0,79*
40 *1000*	40.0 1016,0	0.093 *2,36*	0.031 *0,79*
42 *1050*	42.0 *1066,8*	0.093 *2,36*	0.031 *0,79*

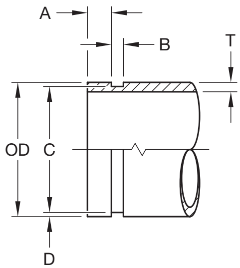
Rolled Groove Standard Specifications

Large Diameter IPS Pipe

Nominal Size ANSI Inches *DN*	A ±0.030˝ ±0,8 mm Inches *mm*	B ±0.030˝ ±0,8 mm Inches *mm*	C +0, -0.063 +0, -1.6mm *Inches* *mm*	D Groove Depth Inches *mm*	T Pipe Wall Roll Grooved Inches *mm*	T Min. Wall Cut Grooved Inches *mm*	Max. Allow. Flare Dia. Inches *mm*
26 *650*	1.75 *44,5*	0.625 *15,9*	25.500 *647,7*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	26.2 *665,5*
28 *700*	1.75 *44,5*	0.625 *15,9*	27.500 *698,5*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	28.2 *716,3*
30 *750*	1.75 *44,5*	0.625 *15,9*	29.500 *749,3*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	30.2 *767,1*
32 *800*	1.75 *44,5*	0.625 *15,9*	31.500 *800,1*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	32.2 *817,9*
36 *900*	1.75 *44,5*	0.625 *15,9*	35.500 *901,7*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	36.2 *919.5*
40 *1000*	1.75 *44,5*	0.625 *15,9*	39.500 *1003,3*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	40.4 *1026,2*
42 *1050*	2.00 *50,8*	0.625 *15,9*	41.500 *1054,1*	0.250 *6,4*	0.375 *9,5*	0.625 *15,9*	42.2 *1071,9*

Cut Groove Standard Specifications

For Steel and Other IPS Pipe



1. The maximum allowable tolerances for IPS pipe from square cut ends is 0.030″ (0.76 mm) for sizes 1.25″ to 3″ (DN32 to DN80); 0.045″(1.14 mm) for sizes 4″ to 6″ (DN100 to DN150); and 0.060″ (1.52 mm) for sizes 8″ (DN200) and above.
2. 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.
3. Groove diameter "C" must be of uniform depth around the circumference of the pipe.
4. Groove Depth "D" is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension "C" must be maintained.
5. Minimum Wall Thickness "T" is the minimum wall thickness that should be roll grooved.
6. Maximum allowable pipe end flare diameter is measured at the pipe end diameter.

Nominal Pipe Size ANSI Inches *DN*	Pipe O.D. Inches mm		
	O.D.	Tolerance	
		+	-
1 *25*	1.315 *33,7*	0.028 *0,41*	0.015 *0,68*
1-1/4 *32*	1.660 *42,4*	0.029 *0,50*	0.016 *0,64*
1-1/2 *40*	1.900 *48,3*	0.019 *0,48*	0.019 *0,48*
2 *50*	2.375 *60,3*	0.024 *0,61*	0.024 *0,61*
2-1/2 *65*	2.875 *73,0*	0.029 *0,74*	0.029 *0,74*
76,1mm *65*	3.000 *76,1*	0.030 *0,76*	0.030 *0,76*
3 *80*	3.500 *88,9*	0.035 *0,89*	0.031 *0,79*
108,0mm *100*	4.250 *108,0*	0.042 *1,07*	0.031 *0,79*
4 *100*	4.500 *14,3*	0.045 *1,14*	0.031 *0,79*
133,4mm *125*	5.250 *133,4*	0.052 *1,35*	0.031 *0,79*
139,1mm *125*	5.500 *139,7*	0.056 *1,42*	0.031 *0,79*
5 *125*	5.563 *141,3*	0.056 *1,42*	0.031 *0,79*
159,0mm *150*	6.250 *159,0*	0.063 *1,60*	0.031 *0,79*
165,1mm *150*	6.500 *165,1*	0.063 *1,60*	0.031 *0,79*
6 *150*	6.625 *168,3*	0.063 *1,60*	0.031 *0,79*
216,3mm *200*	8.516 *216,3*	0.063 *1,60*	0.031 *0,79*
8 *200*	8.625 *219,1*	0.063 *1,60*	0.031 *0,79*
10 *250*	10.750 *273,1*	0.063 *1,60*	0.031 *0,79*
12 *300*	12.750 *323,9*	0.063 *1,60*	0.031 *0,79*
14 *350*	14.000 *355,6*	0.063 *1,60*	0.031 *0,79*

Refer to Tech Data Sheet G710 Groove Specifications for Steel Pipe.

Cut Groove Standard Specifications

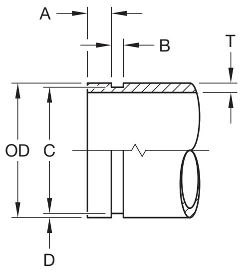
For Steel and Other IPS Pipe

Nominal Size ANSI Inches *DN*	A ±0.030˝ ±0,76 mm Inches *mm*	B 0.030˝ ±0,76 mm Inches *mm*	C Groove Dia. Inches *mm*		D Groove Depth Inches *mm*	T Min. Wall Inches *mm*
			Actual	Tol.+0		
1 DN25	0.625 *15,88*	0.313 *7,95*	1.190 *30,23*	-0.015 *-0,38*	0.063 *1,60*	0.133 *3,38*
1-1/4 DN32	0.625 *15,88*	0.313 *7,95*	1.535 *38,99*	-0.015 *-0,38*	0.063 *1,60*	0.065 *1,65*
1-1/2 DN40	0.625 *15,88*	0.313 *7,95*	1.775 *45,09*	-0.015 *-0,38*	0.063 *1,60*	0.145 *3,68*
2 DN50	0.625 *15,88*	0.313 *7,95*	2.250 *57,15*	-0.015 *-0,38*	0.063 *1,60*	0.154 *3,91*
2-1/2 DN65	0.625 *15,88*	0.313 *7,95*	2.720 *69,09*	-0.018 *-0,46*	0.078 *1,98*	0.188 *4,78*
76,1mm DN65	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	0.625 *15,88*	0.313 *7,95*	3.344 *84,94*	-0.018 *-0,46*	0.078 *1,98*	0.188 *4,78*
108,0mm *100*	0.625 *15,88*	0.375 *9,53*	1.084 *103,73*	-0.020 *-0.51*	0.083 *2,11*	0.203 *5,16*
4 DN100	0.625 *15,88*	0.375 *9,53*	4.334 *110,08*	-0.020 *-0,51*	0.083 *2,11*	0.203 *5,16*
133,4mm *125*	0.625 *15,88*	0.375 *9,53*	5.084 *129,13*	-0.020 *-0,51*	0.083 *2,11*	0.203 *5,16*
139,1mm DN125	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	0.625 *15,88*	0.375 *9,53*	5.395 *137,03*	-0.022 *-0,56*	0.084 *2,13*	0.203 *5,16*
159,0mm *150*	0.625 *15,88*	0.375 *9,53*	6.084 *154,53*	-0.022 *-0.56*	0.083 *2,11*	0.219 *5,56*
165,1mm DN150	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	0.625 *15,88*	0.375 *9,53*	6.455 *163,96*	-0.022 *-0,56*	0.085 *2,16*	0.219 *5,56*
216,3mm *200*	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	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	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	0.750 *19,05*	0.500 *12,70*	12.531 *318,29*	-0.030 *-0,76*	0.109 *2,77*	0.279 *7,09*
14 DN350	0.938 *23,83*	0.500 *12,70*	13.781 *350,04*	-0.030 *-0,76*	0.109 *2,77*	0.281 *7,14*

Cut Groove Standard Specifications

(1 of 2)

For Steel and Other IPS Pipe



1. The maximum allowable tolerances for IPS pipe from square cut ends is 0.030″ (0.76 mm) for sizes 1.25″ to 3″ (DN32 to DN80); 0.045″(1.14 mm) for sizes 4″ to 6″ (DN100 to DN150); and 0.060″ (1.52 mm) for sizes 8″ (DN200) and above.
2. 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.
3. Groove diameter “C” must be of uniform depth around the circumference of the pipe.
4. Groove Depth “D” is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension “C” must be maintained.
5. Minimum Wall Thickness “T” is the minimum wall thickness that should be roll grooved.
6. Maximum allowable pipe end flare diameter is measured at the pipe end diameter.

Nominal Pipe Size ANSI Inches *DN*	Pipe O.D. Inches mm		
	O.D.	Tolerance	
		+	-
16 *400*	16.000 *406,4*	0.063 *1,60*	0.031 *0,79*
18 *450*	18.000 *457,2*	0.063 *1,60*	0.031 *0,79*
20 *500*	20.000 *508,0*	0.063 *1,60*	0.031 *0,79*
24 *600*	24.000 *609,6*	0.063 *1,60*	0.031 *0,79*

Refer to Tech Data Sheet G710 Groove Specifications for Steel Pipe.

Cut Groove Standard Specifications

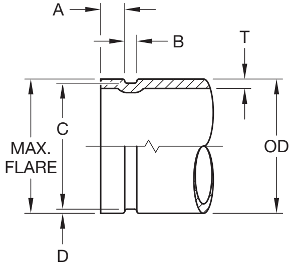
(2 of 2)

For Steel and Other IPS Pipe

Nominal Size ANSI Inches *DN*	A ±0.030″ ±0,76 mm Inches *mm*	B 0.030″ ±0,76 mm Inches *mm*	C Groove Dia. Inches *mm*		D Groove Depth Inches *mm*	T Min. Wall Inches *mm*
			Actual	Tol.+0		
16 DN400	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	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	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	1.000 *25,40*	0.562 *14,27*	23.656 *600,86*	-0.030 *-0,76*	0.172 *4,37*	0.375 *9,53*

Rolled Groove Standard Specifications

For Copper Tubing



1. Nominal Tubing, ASTM B-88 drawn copper tubing size.
2. Outside Diameter "O.D.", of roll grooved tubing shall not vary more than the tolerance listed. The maximum tolerance from square cut ends is: 0.030˝ (0.76 mm) for sizes 2˝ to 3˝ (DN50 to DN80); 0.045˝ (1.14 mm) for sizes 4˝ to 8˝ (DN100 to DN200); measured from true square line.
3. Gasket Seating Surface "A", must be free from roll marks, indentations, projections, loose scale, dirt, chips, grease, etc. that would prevent a positive seal.
4. Groove must be free of loose dirt, chips and scale that may interfere with proper coupling assembly.
5. The Groove Diameter "C", must be uniform in depth for the entire circumference of the tubing. Groove must be maintained within the tolerance listed.

Nominal Tube Size ANSI Inches	Tubing O.D. Inches mm		
	O.D.	Tolerance	
		+	-
2	2.125 *54,0*	0.002 *0,05*	0.002 *0,05*
2-1/2	2.625 *66,7*	0.002 *0,05*	0.002 *0,05*
3	3.125 *79,4*	0.002 *0,05*	0.002 *0,05*
4	4.125 *104,8*	0.002 *0,05*	0.002 *0,05*
5	5.125 *130,2*	0.002 *0,05*	0.002 *0,05*
6	6.125 *155,6*	0.002 *0,05*	0.002 *0,05*
8	8.125 *206,4*	0.002 *0,05*	0.004 *0,10*

6. Groove Depth "D" is a reference dimension of the distance from the pipe outer surface to the groove bottom, with regards to groove concentricity about the pipe. This dimension is a reference only. The actual dimension "C" must be maintained.
7. Minimum Wall Thickness "T", per ASTM B-306 drain waste and vent (DWV), is minimum wall thickness copper tubing which may be roll grooved.
8. Maximum flare diameter is the O.D. at the most extreme tubing diameter.

Refer to Tech Data Sheet G720 Groove Specifications for Copper Tubing.

Rolled Groove Standard Specifications

For Copper Tubing

Nominal Tube Size ANSI Inches	A ±0.030˝ ±0,76 mm Inches *mm*	B ±0.030˝ ±0,76 mm Inches *mm*	C Groove Dia. Inches *mm*		D Nominal Groove Depth Inches *mm*	T Min. Wall Inches *mm*	Max. Allow. Flare Diameter Inches *mm*
			Actual	Tol.+0			
2	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	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	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	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	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	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	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*

Note:

Special roll sets must be used when roll grooving copper tubing. Refer to Roll Selection Chart on pages 400-401 for the required roll sets for Pace / GRINNELL roll grooving tools. If other manufactures roll grooving tools are used, the proper roll sets for roll grooving copper tubing must be used.

Roll Selection Chart

Machine Number	Pipe	Size (Inches)	Top Roll Part Number
1021 1023 2021	Schd. 40	1-1/4 - 1-1/2	41262
	-	2 - 3-1/2	41263
	-	4 - 6	41264
	-	8 - 12	41265
	Std. Wall	14 - 16	41266
	-	18 - 24	41267
	Copper Tube	2 - 8	41268
1010 2010	Schd. 10 & 40	1-1/2 - 6	41269
	-	-	-
	-	-	-
	Schd. 10	8 - 12	41270
2040	Schd. 40	1 - 1-1/2	41271
	-	1 - 6	41272
	-	2 - 6	41273
	Schd. 10	8 - 12	41274
	Copper Tube	2 - 8	41275
1012 1112 2112	Schd. 40	1 - 1-1/2	41276
	-	2 - 6	41277
	-	8 - 12	41278
	Copper Tube	2 - 8	41506
1021 1022 1023 2021	Stainless Steel 10 Ga.	2 - 3-1/2	–
		4 - 6	–
		8 - 12	–
		14 - 16	–
		18 - 24	–
1041, 1112, 2112	Stainless Steel 10 Ga.	-	-
		-	-
1034, 1039	Schd. 40	1-1/4 - 6	41279
1039-66	Copper Tube	2 - 8	41280
	-	-	4798
1066	Copper Tube	2 - 8	4798
	-	-	-

Notes:

- Groove tool data is specific to the Americas region only, for local availability contact your Sales Representative.
- Special roll sets designed for roll grooving light-wall stainless steel pipe must be used. If other manufacturers' roll grooving tools are used, proper roll sets for roll grooving light-wall stainless must be used.

Roll Selection Chart

(2 of 2)

Machine Number	Size (Inches)	Bottom Roll Part Number	Additional Parts	Part Number
1021 1023 2021	1-1/4 - 1-1/2	41281	-	-
	2 - 3-1/2	41282	-	-
	4 - 6	41283	-	-
	8 - 12	41284	-	-
	14 - 16	41285	-	-
	18 - 24	41286	-	-
	2 - 8	41287	Depth Gauge 4043	41509
1010 2010	1-1/2	41288	-	-
	2 - 3-1/2	41289	-	-
	4 - 6	41290	-	-
	8 - 12	41291	-	-
2040	1 - 1-1/2	41292	-	-
	2 - 6	41293	-	-
	-	-	-	-
	8 - 12	41294	-	-
	2 - 8	41295	Depth Gauge 4021	41510
1012 1112 2112	1 - 1-1/2	41296	-	-
	2 - 6	41297	-	-
	8 - 12	41298	-	-
	2 - 8	41507	Depth Gauge 4021	41510
1021 1022 1023 2021	2 - 3-1/2	4802	-	-
	4 - 6	4803	-	-
	8 - 12	4804	-	-
	14 - 16	4805	-	-
	18 - 24	4808	-	-
1041, 1112, 2112	2 - 6	41502	-	-
	8 - 12	41503	-	-
1034, 1039	-	-	Drive Shaft 1-1/4 - 6	41511
1039-66	-	-	Drive Shaft 2 - 8	41513
	-	-	Depth Gauge 4021	41510
1066	-	-	Depth Gauge 4021	41510
	-	-	Drive Shaft 2 - 8	41514

Grooving Machines

Portable Roll Groovers with Electric Motor

Pace Model	Size Range Inches *mm*			
	Schedule 40	Schedule 10	Standard Wall	Copper
1112 (1-1/2 HP, 110 v)	1 - 12 *25mm - 300mm*	*1-1/4 - 12* *32mm - 300mm*	-	*2 - 8* *50mm - 200mm*
1023 (1-1/2 HP, 110 v)	1-1/4 - 12 *32mm - 300mm*	*1-1/4 - 24* *32mm - 600mm*	*12 - 24* *300mm - 600mm*	*2 - 8* *50mm - 200mm*

For Ridgid® 300 Pipe Threader[a] Pace Model	Size Range Inches *mm*			
	Schedule 40	Schedule 10	Standard Wall	Copper
1012	1 - 12 *25mm - 300mm*	-	-	2 - 8 *50mm - 200mm*
1022	1-1/4 - 12 *32mm - 300mm*	-	12 - 16 *300mm - 400mm*	2 - 8 *50mm - 200mm*
1041	1 - 6 *25mm - 150mm*	1 - 12 *25mm - 300mm*	-	2 - 8 *50mm - 200mm*

a. Ridgid is a registered trademark of Ridgid Tool Company.

MINI-MITES Field Portable Groovers

Pace Model	Size Range - Inches (mm)			
	Schedule 40	Schedule 10	Standard Wall	Copper
1039-66 Ridgid* Model 300, hand crank	-	-	-	2 - 8 *50mm - 200mm*
1039 Ridgid* Model 300, hand crank	1-1/4 - 6 *32mm - 150mm*	-	-	-
1034 Ridgid* Model 300	1-1/4 - 6 32mm - 150mm	-	-	-
1066 Ridgid* Model 300	-	-	-	2 - 8 *50mm - 200mm*

Notes:

- Roll Grooving Machines are available for rent. Specify power outlet when ordering. Contact GRINNELL Mechanical Products for details and availability.
- Groove tool data is specific to the Americas region only, for local availability contact your Sales Representative.

Grooving Machines

Automated Roll Groovers

Pace Model	Size Range Inches *mm*			
	Schedule 40	Schedule 10	Standard Wall	Copper
2021 (3 HP, 220 v)	1-1/4 - 12 *32mm - 300mm*	-	12 - 24 *300mm - 600mm*	2 - 8 *50mm - 200mm*
2050 (5 HP, 220 v)	4 - 12 *100mm - 200mm*	4 - 30 *100mm - 800mm*	-	-
2112 (1-1/2 HP, 110 v)	1 - 12 *25mm - 300mm*	-	-	2 - 8 *50mm - 200mm*

Model 1000 Portable Cut Groover

Pace Model	Size Range Inches *mm*			
	Schedule 40	Schedule 10	Schedule 80	Standard Wall
1000 (1 HP, 115-230 v)	2 - 12[a] *50mm - 300mm*	-	2-1/2 - 8 *65mm - 200mm*	-

Notes:

a. With optional collet chucks for pipe sizes 10” - 12” (250mm - 300mm). Contact GRINNELL Mechanical Products for details and availability.

- Groove tool data is specific to the Americas region only, for local availability contact your Sales Representative.

Grooving Machine Accessories

Pipe Support Stands Model	Size Range Inches *mm*	Max. Capacity Lbs. *kg*	Part Number
4031	1 - 4 *25mm - 100mm*	600 Lbs. *272,2*	41037
4000	2 - 8 *50mm - 200mm*	900 Lbs. *408,2*	41038
4033	2 - 14 *50mm - 350mm*	1,200 Lbs. *544,3*	41039
4040	12 - 24 *300mm - 600mm*	4,000 Lbs. *1814,4*	41040

Porta-Bore Model 3013 (110 v, 4-speed)	1-1/4 - 12 *32mm - 300mm*	-	41049
Roll Groover Nipple Bracket Model 4037	8 - 24 *200mm - 600mm* Fits Models 1020, 1021, 1023, 2020, 2021, 2050	-	41035

Notes

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