Mechanical Products Catalog

tyco
Fire & Building Products

Grinnell®
MECHANICAL PRODUCTS
FOUNDED 1850®

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

GENERAL DATA

GENERAL DATA

GRINNELL MECHANICAL PRODUCTS - CONNECTING THE WORLD

3,500 employees

22 countries

Customer Service 1-800-558-5236
Technical Service 1-866-500-4768

NORTH AMERICA

CORPORATE OFFICE
Lansdale, Pennsylvania

Manufacturing Facilities
Anniston, Alabama
Huntsville, Alabama
Lubbock, Texas
Marinette, Wisconsin

Research & Development
Cranston, Rhode Island

STOCKING WAREHOUSES

Anniston, Alabama
Brea, California
Carol Stream, Illinois
Avon, Massachusetts
Norristown, Pennsylvania
Kent, WA (2009)

REGIONAL HEADQUARTERS

Asia
Singapore

Australia
Sunshine, Victoria

Europe and the Middle East
Enschede, The Netherlands

South America, Central America, and Caribbean
Pompano, Florida, USA

GENERAL DATA

WHY GROOVED?

Lower Overall Installation Cost

Faster to install than other methods, using grooved connections eliminates the need for expensive tools and reduces labor costs.

Flexible

A grooved piping system is more flexible than traditional pipe joining methods such as welded, threaded and flanged. A grooved piping system can be easily and quickly modified or retrofitted.

Eliminates Welding Fumes & Open Flame

With a grooved piping system there are no welding fumes or the dangers of open flame on the job site, helping you to reduce your healthcare costs.

Noise & Vibration

Grooved couplings incorporate elastomer gaskets that help provide excellent noise and vibration dampening.

Accomodates Misalignment

Flexible couplings can accommodate pipe misalignment on the jobsite reducing costly jobsite fixes. Flexible couplings are designed to allow for pipe deflection, expansion and contraction.

WHY GRINNELL®?

Backed by a Fortune 500 Company

With the financial strength and backing of Tyco, we are able to make the investment to design and manufacture the highest quality piping products to help you reduce your total system cost.

10 Year Limited Warranty

All Grinnell products are backed by the best warranty in the industry. For wholesalers this means selling a brand that stands behind its products. For contractors, it's the opportunity to be more competitive and enhance your reputation. For an owner, it means less worry about the costs of repair and replacement.

Standard Grooved Product

Grinnell grooved products are compatible with standard industry groove dimensions. This means NO special grooving tools are required, and Grinnell products can easily be installed or retrofitted on any existing system using standard groove dimensions. The simpler it is to install, the more money you'll save.

Green

Grinnell products cast in our Anniston, Alabama plant are manufactured with 90% recycled materials. Tyco is a member of the United States Green Building Council (USGBC).

Technical Support

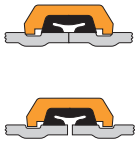
From "Design to Build," Grinnell Mechanical Services provides engineers and contractors with a complete piping solution, including the support and knowledge base of the staff who design and build our product.

Partner With a Friend

Grinnell is dedicated to partnering with our customers to give you the best solution to meet your needs. For contractors, we'll work with you to ensure that you're installing the best product, most efficiently and with the most competitive designs. For wholesalers, we believe in strategically growing the business – yours and ours. We want our partners to be successful, and whether a contractor or wholesaler, we work to help you differentiate your business.

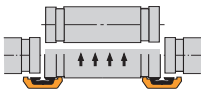
FEATURES & BENEFITS

• FLEXIBILITY



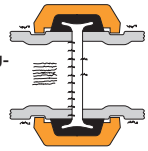
Grinnell® flexible couplings are able to absorb linear movement of the pipework due to temperature changes. This eliminates or minimizes the use of expansion joints.

• RETROFIT



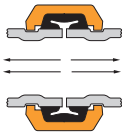
Grinnell Mechanical Piping Products allow for quick economical changes as necessary for field retrofit, with the ability to isolate equipment and piping systems for tenant changes and system repair.

• NOISE & VIBRATION



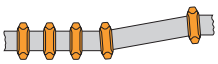
The resiliency of Grinnell Grooved Couplings with various elastomer gaskets provide excellent noise and vibration dampening. The engineering design of the couplings provide for pipe end gapping that helps to dissipate, isolate, and minimize noise and vibration transmission throughout the piping system.

• DEPENDABILITY



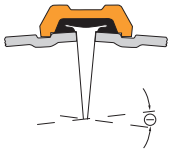
The coupling housings are designed to engage into the grooves and provide a secure joint. The pipe ends are sealed by a pressure responsive gasket which is encapsulated by the ductile iron housing.

• MISALIGNMENT



The Grinnell Flexible Couplings will accommodate misalignments. The maximum deflection information per coupling can be found in this catalogue.

• JOINT DEFLECTION



Grinnell Flexible Couplings are able to absorb pipe deflection to a given value. This feature is a great advantage in tunnel, bridge and mine applications.

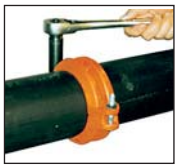
• SUPERIOR QUALITY

Grinnell Mechanical Piping Products are manufactured according to the ISO 9001:2000 Quality Assurance standard.

• QUICK

Grinnell Mechanical Piping Products will offer you time savings compared to welding, flanging or threading.

• EASY



Grinnell Mechanical Piping Products only require a wrench for installation. No special expensive equipment or skilled labor is required for installation as compared to welded or flanged systems.

• COST-SAVING

Total installed costs for Grinnell Mechanical Piping Products will be far below any other method currently used.

• SAFE

Due to the absence of flames from welding torches, Grinnell Mechanical Piping Products can be used in hazardous areas without special precautions.

• DEPENDABLE

Grinnell Mechanical Piping Products are designed to last the lifetime of the pipeline and have been tested and approved by major Approval Bodies. Since roll grooving does not remove metal from the pipe, the pipe integrity is fully maintained. The maximum working pressure of the system goes up to 1000 psi (69 Bar) depending on the coupling and pipe wall thickness used.

• COMPACT

Grinnell Mechanical Piping Products require far less space than traditional welded or flanged systems.

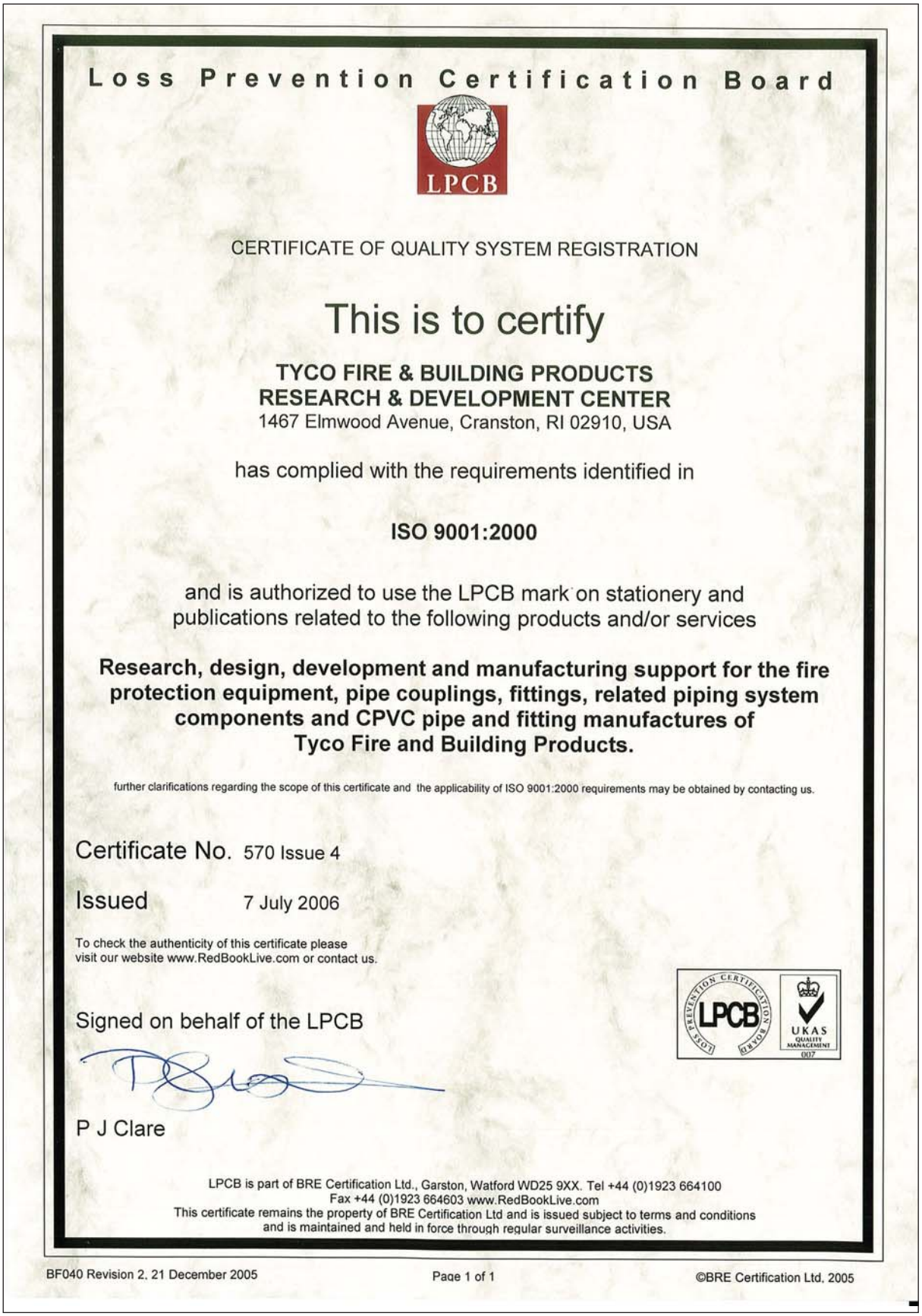
• CLEAN

Unlike welding, Grinnell Mechanical Piping Products do not lead to hazardous fumes or to the possible introduction of foreign material in the pipeline.

• WARRANTY

All Grinnell Mechanical Products have a 10 year limited warranty against defects and workmanship. For details, see page 167.

ISO 9001:2000 CERTIFIED



Loss Prevention Certification Board

LPCB

CERTIFICATE OF QUALITY SYSTEM REGISTRATION

This is to certify

TYCO FIRE & BUILDING PRODUCTS
RESEARCH & DEVELOPMENT CENTER
1467 Elmwood Avenue, Cranston, RI 02910, USA

has complied with the requirements identified in

ISO 9001:2000

and is authorized to use the LPCB mark on stationery and publications related to the following products and/or services

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.

further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2000 requirements may be obtained by contacting us.

Certificate No. 570 Issue 4

Issued 7 July 2006

To check the authenticity of this certificate please visit our website www.RedBookLive.com or contact us.

Signed on behalf of the LPCB

P J Clare

LPCB is part of BRE Certification Ltd., Garston, Watford WD25 9XX. Tel +44 (0)1923 664100
Fax +44 (0)1923 664603 www.RedBookLive.com
This certificate remains the property of BRE Certification Ltd and is issued subject to terms and conditions and is maintained and held in force through regular surveillance activities.

BF040 Revision 2, 21 December 2005 Page 1 of 1 ©BRE Certification Ltd, 2005

AGENCY APPROVALS

GOVERNMENT AGENCIES

COAST GUARD
Approved each vessel individually

CORPS OF ENGINEERS (COE)
GEGS 15000

FEDERAL AVIATION ADMINISTRATION (FAA)
HVAC, Plumbing and Fire Protection

FEDERAL HOUSING ADMINISTRATION (FHA)

GENERAL SERVICES ADMINISTRATION (GSA)
15000 Series

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

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION NASA)

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)
NFGS 15000 Series

NATIONAL INSTITUTE OF HEALTH (NIH)
Dept. of Health – 15000 Series

VETERANS AFFAIRS (VA)
15000 Series

GENERAL CODE GROUPS, ASSOCIATIONS, LABORATORIES & APPROVAL BODIES

AMERICAN BUREAU OF SHIPPING (ABS)

AMERICAN NATIONAL STANDARDS INSTITUTE/ AMERICAN WATER WORKS ASSOCIATION (ANSI/AWWA)

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, B-31.1
- Chemical Plant and Petroleum Refinery Piping, B-31.3;
- Refrigeration Piping, B-31.5
- Building Services Piping, B31.9

BUILDING OFFICIALS AND CODE ADMINISTRATORS (BOCA)

BUREAU VERITAS (BV)

FACTORY MUTUAL ENGINEERING CORP. (FM)
Approved for Fire Protection Services

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)

LOSS PREVENTION CERTIFICATION BOARD (LPCB)
Approved for Fire Protection Services

MATERIAL EQUIPMENT AND ACCEPTANCE (MEA)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NATIONAL SANITATION FOUNDATION (NSF)
The Public Health and Safety Company

SOUTHERN BUILDING CODE CONGRESS INTERNATIONAL (SBCCI)
Standard Plumbing

UNDERWRITERS LABORATORIES, INC. (UL)
Listed for Fire Protection Services

UNDERWRITERS LABORATORIES OF CANADA (ULC)
Listed for Fire Protection Services

UNIFORM PLUMBING CODE (UPC)

VERBAND DER SACHVERSICHERE e.V. (VDS)
Approved for Fire Protective Service

MANUFACTURING PROCESS

PRE-MANUFACTURED/PRODUCT DESIGN

All Grinnell products are designed and tested at our state-of-the-art Research & Development Technology Center in Cranston, Rhode Island.

FOUNDRY AND ASSEMBLY

1 Casting

Grinnell castings poured at our Anniston, Alabama foundry are made of Ductile Iron ASTM A-536m Grade 65-45-12. A rigorous Quality Control program monitors all steps of the manufacturing process. Samples are continuously tested chemically and physically to ensure all products meet our high material specifications.

2 Rubber Injection

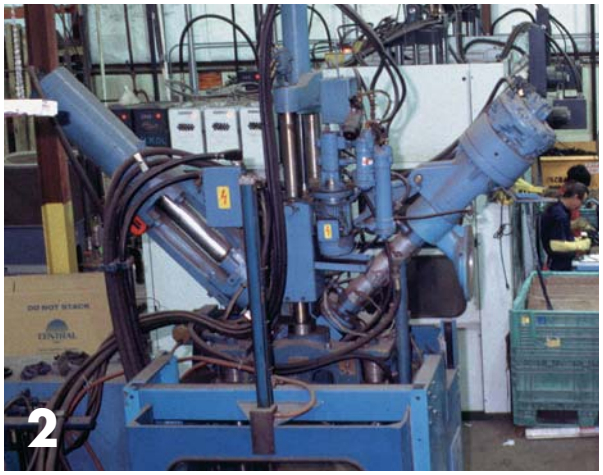
In our assembly plant in Anniston, we manufacture our gaskets using rubber injection presses and tooling to mold different types of rubber compounds specifically designed for the many applications required by our customers. Physical tests are performed on finished gasket samples to verify compliance with specifications including ASTM D-2000.

3 Paint Process

Using a computer controlled process, each product is spray washed, dried, pre-heated, dipped, and fully cured prior to assembly or packaging. Parts are inspected to maintain consistent paint coverage and surface condition.

4 Tooling

Using product designs from our Research & Development Department, our pattern center and contracted pattern makers then design and build patterns and molds that will produce products to the highest tolerances. Tooling is continually inspected by our in-house tooling specialists to ensure finished products meet our specifications.



GROOVED COUPLINGS & FITTINGS

GROOVED COUPLINGS & FITTINGS

Grinnell® Couplings are designed for grooved end pipe and are available in nominal sizes of 1" (DN 25) to 24" (DN 600).

The Grinnell Coupling design provides economical advantages when compared to welded or flanged systems. They also provide a universal means for the connection of pipe, fittings and pipe system components.

Grinnell Couplings and Gaskets permit a wide selection of combinations for specific applications.

Field modifications are easily accommodated with Grinnell Mechanical Piping Products as the couplings can be easily rotated, eliminated and/or added to facilitate the necessary modification.

Rigid Coupling

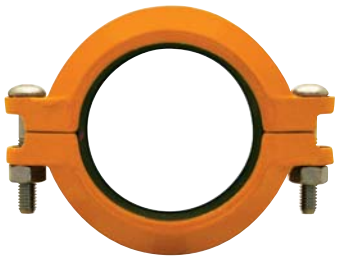


Figure 772 Rigid Coupling – Patented
Page 17

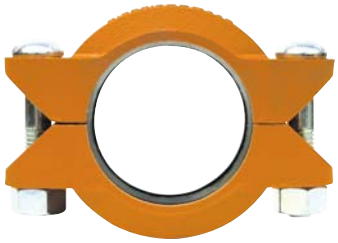


Figure 770 High Pressure Rigid Coupling
Page 19

Flexible Coupling

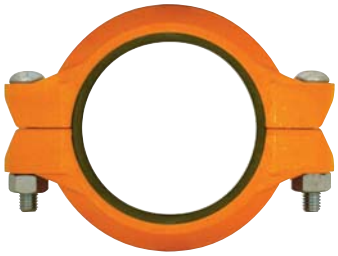


Figure 705 Flexible Coupling
Page 20

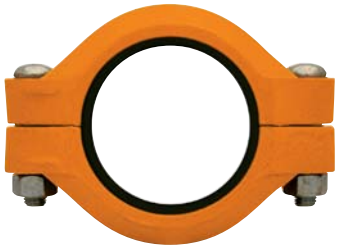


Figure 707 Heavy Duty Flexible Coupling
Page 21

Reducing Coupling

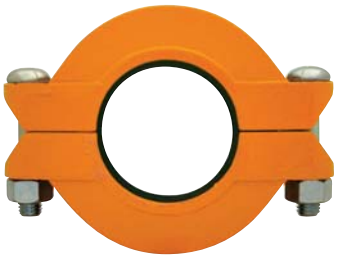


Figure 716 Flexible Reducing Coupling
Page 22

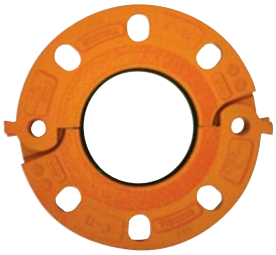
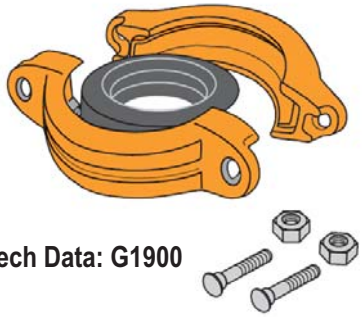


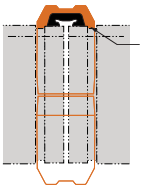
Figure 71 Flange Adapter (ANSI Class 125/150)
Page 23



Tech Data: G1900

Rigid Connection

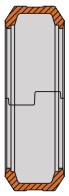
The Figure 772 Coupling has a patented design that grips the full 360° of circumference of the pipe groove. This means a more rigid and stronger connection through a range of pipe tolerances. The coupling design eliminates distortion of the gasket as the housing sections come together.



Full contact between Fig. 772 coupling key and groove diameter

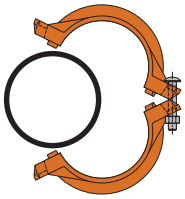
Trouble Free Design

The patented universal tongue and groove design of the coupling housings assures trouble free installation. Misalignment of the coupling housings that could lead to a joint failure is a thing of the past.



Quick Installation

The Grinnell Figure 772 and 705 Coupling in sizes up to 6" feature a clamshell design that allows for an easy one bolt installation, thus saving time in the field.



MATERIAL SPECIFICATIONS

Ductile Iron Housing Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings Grade 65-45-12
- Tensile Strength, minimum psi – 65,000 (MPa-448)
- Yield Strength, minimum psi – 45,000 (MPa-310)
- Elongation in 2" (50mm), minimum 12%
- ASTM A-153 – Standard Specification for Hot Dip Galvanizing

Bolt/Nut Specifications

- Carbon steel oval neck bolts and nuts are heat treated and conform to the physical properties of ASTM A-183 with a minimum tensile strength of 110,000 psi (758,422 kPa). Bolts and nuts are zinc electroplated to ASTM B633.
- Gold color coded metric bolts conforming to the physical properties of ASTM F568M are available upon request. Contact Tyco Fire & Building Products.

Gasket Specifications

- **Grade "E" EPDM** gaskets have a green color code identification and conform to ASTM D-2000 for service temperatures from -30°F (-34°C) to 230°F (110°C). They are recommended for hot water not to exceed 230°F (110°C), plus a variety of dilute acids, oil free air and many chemical services. They are not recommended for petroleum services. For low temperature and vacuum systems, a Tri-Seal Grade "E" EPDM gasket with rigid coupling is recommended.
- **Grade "T" Nitrile** gaskets have an orange color code identification and conform to ASTM D-2000 for service temperatures from -20°F (-29°C) to 180°F (82°C). They are recommended for petroleum products, vegetable oils, mineral oils, and air with oil vapors.
- **Grade "L" Silicone** gaskets are red and conform to ASTM D-2000 for service -30°F (-34°C) to 350°F (+177°C). They are recommended for air without hydrocarbons, dry heat.
- **Grade "O" Fluoroelastomer** gaskets have a blue color code and conform to ASTM D-2000 for service +20°F (-7°C) to +300°F (+149°C). They are recommended for oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hyrdrocarbons.
- **Grade "EN" NSF 61 approved** gaskets have a copper color code and are for potable water systems up to +180°F (+82°C). Not recommended for petroleum service.

Coatings

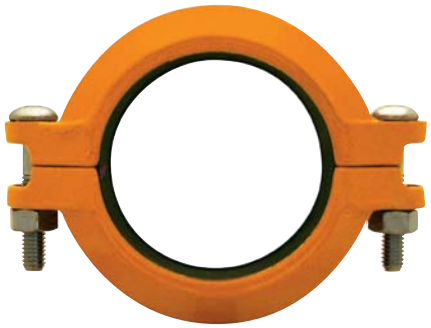
- Orange – Non-Lead (Standard)
- RAL Red – Non-Lead (Optional)
- Hot Dipped Zinc Galvanized (Optional)
- Copper Acrylic Enamel

COUPLINGS

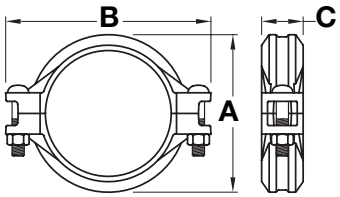
Figure 772 Rigid Coupling – Patented

The Figure 772 Rigid Coupling is capable of pressures up to 750 psi (51.7 bar) and provides a rigid joint by firmly gripping along the full 360° circumference of the pipe grooves.

The Figure 772 Rigid Coupling in sizes 1¼" (DN 32) to 4" (DN 100) has an Anti-Rotational Feature of "gripping teeth" along the coupling keys that makes it suited for installations where the likelihood of rotation is greatest. Sizes 1¼" (DN 32) to 6" (DN 150) feature a clamshell design that makes installation easier and faster.



Tech Data: G140



Sizes 1¼" (DN32) – 14" (DN350)

For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.

Nominal Size Inches *DN*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End*‡ Load lbs *kN*	Max. End*‡ Gap lbs *mm*	Nominal Dimensions			Coupling Bolts		Approx. Weight lbs *kg*
					A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size** Inches *mm*	
1¼	1.660	750	1,623.2	0.06	2.75	4.38	1.81	2	⅜ x 2¼	1.0
DN32	*42.4*	*51.7*	*7.22*	*1.5*	*69.9*	*111.3*	*46.0*		*M10 x 57*	*0.5*
1½	1.900	750	2,126.5	0.08	3.00	4.62	1.81	2	⅜ x 2¼	1.0
DN40	*48.3*	*51.7*	*9.46*	*2.0*	*76.2*	*117.3*	*46.0*		*M10 x 57*	*0.5*
2	2.375	750	3,322.6	0.13	3.41	5.12	1.88	2	⅜ x 2¼	1.5
DN50	*60.3*	*51.7*	*14.78*	*3.3*	*86.6*	*130.0*	*47.8*		*M10 x 57*	*0.7*
2½	2.875	750	4,868.9	0.13	3.91	5.63	1.88	2	⅜ x 2¼	2.5
DN65	*73.0*	*51.7*	*21.66*	*3.3*	*99.3*	*143.0*	*47.8*		*M10 x 57*	*1.1*
	3.000	750	5,301.4	0.13	4.19	5.72	2.00	2	M10 x 57	2.6
	76.1	*51.7*	*23.58*	*3.3*	*106.4*	*145.3*	*50.8*			*1.2*
3	3.500	750	7,215.8	0.13	4.63	6.25	1.88	2	⅜ x 2¼	2.6
DN80	*88.9*	*51.7*	*32.10*	*3.3*	*117.6*	*158.8*	*47.8*		*M10 x 57*	*1.2*
4	4.500	750	11,928.2	0.19	5.81	7.50	1.97	2	⅜ x 2¼	3.5
DN100	*114.3*	*51.7*	*53.06*	*4.8*	*147.6*	*190.5*	*50.0*		*M10 x 57*	*1.6*
	5.500	750	17,818.7	0.19	7.02	9.72	2.06	2	M16 x 83	7.5
	139.7	*51.7*	*79.26*	*4.8*	*178.3*	*246.9*	*52.3*			*3.4*
5	5.563	750	18,229.3	0.19	7.09	9.71	2.04	2	⅝ x 3¼	7.5
DN125	*141.3*	*51.7*	*81.09*	*4.8*	*180.1*	*246.6*	*51.8*		*M16 x 83*	*3.4*
	6.500	700	23,228.2	0.19	8.09	10.53	2.13	2	M16 x 83	7.6
	165.1	*48.2*	*103.18*	*4.8*	*205.5*	*267.5*	*54.1*			*3.4*
6	6.625	700	24,130.1	0.19	8.09	10.53	2.13	2	⅝ x 3¼	7.6
DN150	*168.3*	*48.2*	*107.34*	*4.8*	*205.5*	*267.5*	*54.1*		*M16 x 83*	*3.4*
8	8.625	600	35,055.8	0.19	10.56	13.56	2.62	2	¾ x 4¾	18.0
DN200	*219.1*	*41.4*	*155.94*	*4.8*	*268.2*	*344.4*	*66.5*		*M20 x 121*	*8.2*
10	10.750	500	45,381.3	0.13	12.84	16.41	2.62	2	1 x 6½	24.6
DN250	*273.0*	*34.5*	*201.87*	*3.3*	*326.1*	*416.8*	*66.5*		*M24 x 165*	*11.2*
12	12.750	400	51,070.5	0.13	15.41	18.84	2.62	2	1 x 6½	42.0
DN300	*323.9*	*27.6*	*227.17*	*3.3*	*391.4*	*478.5*	*66.5*		*M24 x 165*	*19.1*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

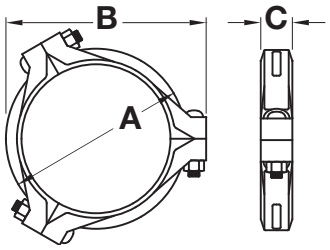
** Gold color coded metric bolt sizes for DN32 - DN300 couplings available upon request.

‡ Maximum end gap is for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

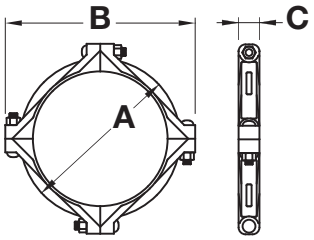
General Notes: Additional information is included in our data sheets and is available upon request. It is the Designer's responsibility to select products suitable for the intended service and to ensure that pressure ratings and performance data is not exceeded. Always read and understand the installation instructions (IH-1000M). Never remove any piping components or correct or modify any piping deficiencies without first depressurizing and draining the system. Material and gasket selection should be verified to be compatible for the specific application.

COUPLINGS

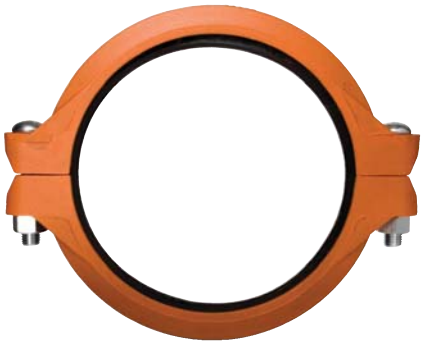
Figure 772 Rigid Coupling – Patented



Sizes 16" (DN400) – 18" (DN450)



Sizes 20" (DN500) – 24" (DN600)



Tech Data: G140

Nominal Size Inches *DN*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Max. End*‡ Gap lbs *mm*	Nominal Dimensions			Coupling Bolts		Approx. Weight lbs *kg*
					A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size Inches *mm*	
14	14.000	300	46,181.4	0.13	16.68	20.38	2.93	2	1 x 5½•	48.0
DN350	*355,6*	*20,7*	*205,43*	*3,3*	*423,7*	*517,6*	*74,4*			*21,7*
16	16.000	300	60,318.6	0.13	18.50	22.64	2.93	3	1 x 5½•	52.1
DN400	*406,4*	*20,7*	*268,31*	*3,3*	*469,9*	*545,1*	*74,4*			*23,6*
18	18.000	300	76,340.7	0.25	21,31	25.12	3.06	3	1 x 5½•	52.1
DN450	*457,2*	*20,7*	*339,58*	*6,4*	*541,3*	*638,0*	*77,7*			*30,8*
20	20.000	300	94,247.8	0.25	23.50	27.88	3.06	4	1⅛ x 5¾•	89.0
DN500	*508,0*	*20,7*	*419,23*	*6,4*	*596,9*	*708,2*	*77,7*			*40,4*
24	3.000	250	113,097.3	0.25	27.63	32.00	3.19	4	1⅛ x 5¾•	96.0
DN600	*609,6*	*17,2*	*503,08*	*6,4*	*701,8*	*812,8*	*81,0*			*43,5*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

** Gold color coded metric bolt sizes for DN32 - DN300 couplings available upon request.

‡ Maximum end gap is for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

• Only available in ANSI bolt sizes.

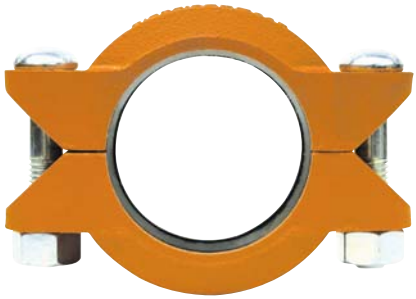
Please refer to General Notes on page 17.

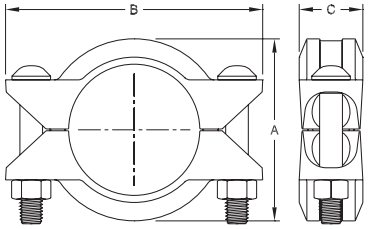
COUPLINGS

Figure 770 High Pressure Rigid Coupling

The Figure 770 High Pressure Rigid Coupling provides a rigid joint by firmly gripping along the full 360° circumference of the pipe grooves. The Figure 770 Rigid Coupling is a proven, dependable method of joining pipe, and is an economical alternative to welding, threading or using flanges. It is capable of pressures up to 1000 psi (69,0 bar) depending on pipe size and wall thickness.

Rigid couplings are recommended for low temperature and vacuum applications.





Tech Data: G138

Nominal Size Inches *DN*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Max. End*‡ Gap Inches *mm*	Nominal Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	Coupling Bolts Qty.	Size** Inches *mm*	Approx. Weight lbs *kg*
2	2.375	1000	4,430.1	0.14	3.53	5.72	1.88	2	⅝ x 2 ¾	4.3
DN50	*60,3*	*69,0*	*19,71*	*3,5*	*89,7*	*145,3*	*47,8*		*M16 x 70*	*2,0*
2½	2.875	1000	6,497.8	0.14	4.06	6.00	1.88	2	⅝ x 3½	5.0
DN65	*73,0*	*69,0*	*28,88*	*3,5*	*103,1*	*152,4*	*47,8*		*M16 x 89*	*2,3*
3	3.500	1000	9,621.1	0.14	4.78	6.76	1.88	2	⅝ x 3½	5.3
DN80	*88,9*	*69,0*	*42,79*	*3,5*	*121,4*	*171,7*	*47,8*		*M16 x 89*	*2,4*
4	4.500	1000	15,904.3	0.25	6.01	8.50	2.10	2	¾ x 4¼	7.7
DN100	*114,3*	*69,0*	*70,74*	*6,4*	*152,7*	*215,9*	*53,3*		*M20 x 108*	*3,5*
6	6.625	1000	34,471.6	0.25	8.51	11.25	2.10	2	⅞ x 5½	16.2
DN150	*168,3*	*69,0*	*153,33*	*6,4*	*216,2*	*285,8*	*53,3*		*M22 x 140*	*7,3*
8	8.625	800	46,741.0	0.25	10.93	13.75	2.60	2	1 x 5½	24.0
DN200	*219,1*	*55,1*	*207,90*	*6,4*	*277,6*	*349,3*	*66,0*		*M22 x 140*	*10,9*
10	10.750	800	72,610.1	0.25	13.46	16.00	2.60	2	1 x 6½	32.0
DN250	*273,0*	*55,1*	*322,97*	*6,4*	*341,9*	*406,4*	*66,0*		*M24 x 165*	*14,5*
12	12.750	800	102,141.0	0.25	15.52	18.00	2.60	2	1 x 6½	40.0
DN300	*323,9*	*55,1*	*454,32*	*6,4*	*394,2*	*457,2*	*66,0*		*M24 x 165*	*18,1*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

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

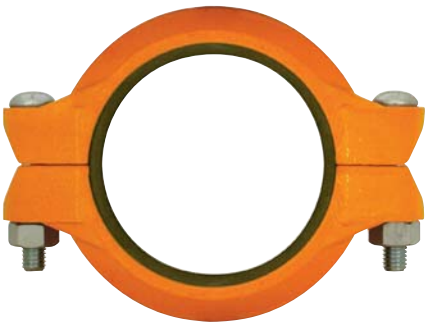
‡ Maximum end gap is for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

Please refer to General Notes on page 17.

COUPLINGS

Figure 705 Flexible Coupling

The Figure 705 Flexible Coupling is capable of pressures up to 500 psi (34.5 bar) depending on pipe size and wall thickness. It provides a dependable method of joining pipe and is suitable for use in a variety of applications. Figure 705 Flexible Couplings in sizes 1¼" (DN 32) to 6" (DN 150) feature a clamshell design that makes installation easier and faster.



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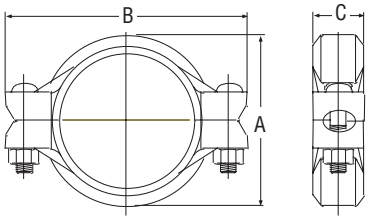


For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Max. End*‡ Gap Inches *mm*	Deflection ‡		Nominal Dimensions			Coupling Bolts		Approx. Weight lbs kg
					Degrees Per Coupling	Inches/ Foot *mm/m*	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size Inches *mm*	
1¼	1.660	500	1,082.1	0.13	4°19'	0.90	2.56	4.19	1.81	2	⅜ x 2¼	1.5
32	*42.4*	*34.5*	*4.81*	*3.3*		*75.0*	*65.0*	*106.4*	*46.0*		*M10 x 57*	*0.7*
1½	1.900	500	1,417.6	0.13	3°46'	0.79	2.75	4.44	1.81	2	⅜ x 2¼	1.6
40	*48.3*	*34.5*	*6.30*	*3.3*		*65.8*	*69.9*	*112.8*	*46.0*		*M10 x 57*	*0.7*
2	2.375	500	2,215.1	0.13	3°1'	0.63	3.25	4.88	1.88	2	⅜ x 2¼	1.7
50	*60.3*	*34.5*	*9.85*	*3.3*		*52.5*	*82.6*	*124.0*	*47.8*		*M10 x 57*	*0.8*
2½	2.875	500	3,245.9	0.13	2°29'	0.52	3.69	5.50	1.88	2	⅜ x 2¼	2.0
65	*73.0*	*34.5*	*14.43*	*3.3*		*43.3*	*93.7*	*139.7*	*47.8*		*M10 x 57*	*0.9*
	3.000	500	3,534.3	0.13	2°23'	0.50	4.00	5.75	1.88	2	M12 x 76	3.1
	76.1	*34.5*	*15.72*	*3.3*		*41.7*	*101.6*	*146.1*	*47.8*			*1.4*
3	3.500	500	4,810.6	0.13	2°3'	0.43	4.38	6.50	1.88	2	½ x 3	3.1
80	*88.9*	*34.5*	*21.39*	*3.3*		*35.8*	*111.3*	*165.1*	*47.8*		*M12 x 76*	*1.4*
	4.250	500	7,093.1	0.25	3°22'	0.70	5.50	7.50	2.06	2	M12 x 76	4.2
	108.0	*34.5*	*31.55*	*6.4*		*58.3*	*139.7*	*190.5*	*52.3*			*1.9*
4	4.500	500	7,952.2	0.25	3°11'	0.67	5.69	7.75	2.06	2	½ x 3	4.0
100	*114.3*	*34.5*	*35.35*	*6.4*		*55.8*	*144.5*	*196.9*	*52.3*		*M12 x 76*	*1.8*
	5.250	450	9,741.4	0.25	2°44'	0.56	6.56	9.50	2.06	2	M16 x 83	7.2
	133.0	*31.0*	*43.33*	*6.4*		*46.7*	*166.6*	*241.3*	*52.3*			*3.3*
	5.500	450	10,691.2	0.25	2°36'	0.55	6.81	9.75	2.06	2	M16 x 83	7.2
	139.7	*31.0*	*47.56*	*6.4*		*45.5*	*173.0*	*247.7*	*52.3*			*3.3*
5	5.563	450	10,937.6	0.25	2°35'	0.54	6.88	9.75	2.06	2	⅝ x 3¼	7.1
125	*141.3*	*31.0*	*48.63*	*6.4*		*45.0*	*174.8*	*247.7*	*52.3*		*M16 x 83*	*3.2*
	6.250	450	13,805.8	0.25	2°17'	0.48	7.56	10.31	2.06	2	M16 x 83	7.4
	159.0	*31.0*	*61.41*	*6.4*		*40.0*	*192.0*	*261.9*	*52.3*			*3.4*
	6.500	450	14,932.4	0.25	2°12'	0.46	7.75	10.69	2.06	2	M16 x 83	7.1
	165.1	*31.0*	*66.36*	*6.4*		*38.3*	*196.9*	*271.5*	*52.3*			*3.2*
6	6.625	450	15,512.2	0.25	2°10'	0.45	7.94	10.69	2.06	2	⅝ x 3¼	7.1
150	*168.3*	*31.0*	*68.97*	*6.4*		*37.5*	*201.7*	*271.5*	*52.3*		*M16 x 83*	*3.2*
	8.500	450	25,535.3	0.25	1°40'	0.35	10.07	13.50	2.31	2	M20 x 121	12.4
	216.3	*31.0*	*113.59*	*6.4*		*29.2*	*255.8*	*342.9*	*58.7*			*5.6*
8	8.625	450	26,291.8	0.25	1°40'	0.35	10.19	13.56	2.50	2	¾ x 4¾	14.5
200	*219.1*	*31.0*	*116.89*	*6.4*		*29.2*	*258.8*	*344.4*	*63.5*		*M20 x 121*	*6.6*
10	10.750	350	31,766.9	0.25	1°20'	0.28	12.69	16.38	2.63	2	1 x 6½	28.0
250	*273.0*	*24.1*	*141.31*	*6.4*		*23.3*	*322.3*	*416.1*	*66.8*		*M24 x 165*	*12.7*
12	12.750	350	44,686.7	0.25	1°7'	0.23	14.94	18.88	2.63	2	1 x 6½	36.5
300	*323.9*	*24.1*	*198.78*	*6.4*		*19.2*	*379.5*	*479.6*	*66.8*		*M24 x 165*	*16.6*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

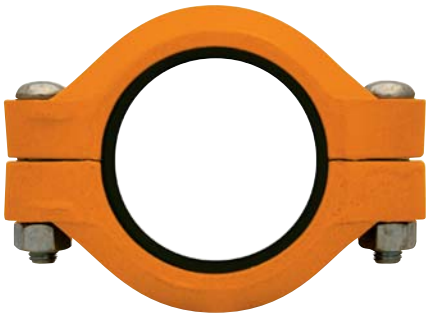
‡ Maximum end gap and deflection are for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

Please refer to General Notes on page 17.

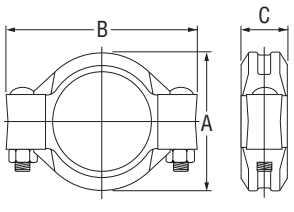
COUPLINGS

Figure 707 Heavy Duty Flexible Coupling

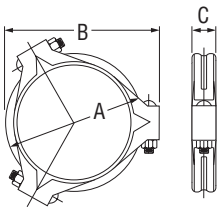
The Figure 707 Heavy Duty Flexible Coupling is capable of pressures up to 1000 psi (69 bar) depending on pipe size and wall thickness. It provides a dependable method of joining pipe and is suitable for use in a variety of applications. Flexible couplings can act as an "expansion joint", allowing linear and angular movement of the pipes when properly installed.



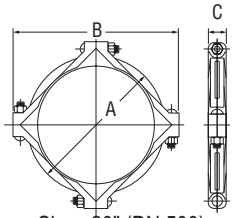
Tech Data: G130



Sizes 1" (DN 25) – 14" (DN 350)



Sizes 16" (DN 400) – 18" (DN 450)



Sizes 20" (DN 500) – 24" (DN 600)

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Max. End*‡ Gap Inches *mm*	Deflection ‡ Degrees Per Coupling	Deflection ‡ Inches/ Foot *mm/m*	Nominal Dimensions A Inches *mm*	Nominal Dimensions B Inches *mm*	Nominal Dimensions C Inches *mm*	Coupling Bolts Qty.	Coupling Bolts Size Inches *mm*	Approx. Weight lbs kg
1	1.315	1000	1,360.0	0.13	5°26'	1.14	2.38	4.00	1.81	2	½ x 3	2.0
25	*33.7*	*69.0*	*6.10*	*3.3*		*98.4*	*60.5*	*101.6*	*46.0*		*M12 x 76*	*0.9*
1½	1.900	1000	2,835.3	0.13	3°46'	0.79	2.97	4.63	1.81	2	½ x 3	2.5
40	*48.3*	*69.0*	*12.61*	*3.3*		*65.8*	*75.4*	*117.6*	*46.0*		*M12 x 76*	*1.1*
2	2.375	1000	4,430.1	0.13	3°1'	0.63	3.54	5.25	1.88	2	½ x 3	3.0
50	*60.3*	*69.0*	*19.71*	*3.3*		*52.5*	*89.9*	*133.4*	*47.8*		*M12 x 76*	*1.4*
2½	2.875	1000	6,491.8	0.13	2°29'	0.52	4.06	5.75	1.88	2	½ x 3	3.5
65	*73.0*	*69.0*	*28.88*	*3.3*		*43.3*	*103.1*	*146.1*	*47.8*		*M12 x 76*	*1.6*
	3.000	1000	7,068.6	0.13	2°23'	0.50	4.19	5.75	1.88	2	M12 x 76	3.7
	76.1	*69.0*	*31.44*	*3.3*		*41.7*	*106.4*	*146.1*	*47.8*			*1.7*
3	3.500	1000	9,621.1	0.13	2°3'	0.43	4.69	6.38	1.88	2	½ x 3	4.0
80	*88.9*	*69.0*	*42.80*	*3.3*		*35.8*	*119.1*	*162.1*	*47.8*		*M12 x 76*	*1.8*
4	4.500	1000	15,904.3	0.25	3°11'	0.67	5.95	8.25	2.06	2	⅝ x 3¼	7.0
100	*114.3*	*69.0*	*70.75*	*6.4*		*55.8*	*151.1*	*209.6*	*52.3*		*M16 x 83*	*3.2*
5	5.563	1000	24,305.7	0.25	2°35'	0.54	7.08	10.00	2.06	2	¾ x 4¾	10.5
125	*141.3*	*69.0*	*108.12*	*6.4*		*45.0*	*179.8*	*254.0*	*52.3*		*M20 x 121*	*4.8*
	6.500	1000	33,183.1	0.25	2°12'	0.46	8.19	11.25	2.06	2	M20 x 121	12.5
	165.1	*69.0*	*147.61*	*6.4*		*38.3*	*208.0*	*285.8*	*52.3*			*5.7*
6	6.625	1000	34,471.6	0.25	2°10'	0.45	8.30	11.25	2.06	2	¾ x 4¾	12.5
150	*168.3*	*69.0*	*153.34*	*6.4*		*37.5*	*210.8*	*285.8*	*52.3*		*M20 x 121*	*5.7*
8	8.625	800	46,741.0	0.25	1°40'	0.35	10.68	14.00	2.47	2	⅞ x 6½	23.5
200	*219.1*	*55.1*	*207.91*	*6.4*		*29.2*	*271.3*	*355.6*	*62.7*		*M22 x 165*	*10.7*
10	10.750	800	72,610.1	0.25	1°20'	0.28	13.06	16.44	2.63	2	1 x 6½	33.0
250	*273.0*	*55.1*	*322.99*	*6.4*		*23.3*	*331.7*	*417.6*	*66.8*		*M24 x 165*	*15.0*
12	12.750	800	102,141.0	0.25	1°7'	0.23	15.39	18.84	2.63	2	1 x 6½	37.0
300	*323.9*	*55.1*	*454.35*	*6.4*		*19.2*	*390.9*	*478.5*	*66.8*		*M24 x165*	*16.8*
14	14.000	300	46,181.4	0.25	1°2'	0.22	16.67	20.38	2.94	2	1 x 5½**	44.0
350	*355.6*	*20.7*	*205.43*	*6.4*		*18.3*	*423.4*	*517.7*	*74.7*			*20.0*
16	16.000	300	60,318.6	0.25	0°54'	0.19	18.83	22.64	2.94	2	1 x 5½**	52.1
400	*406.4*	*20.7*	*268.31*	*6.4*		*15.8*	*478.3*	*575.1*	*74.7*			*23.6*
18	18.000	300	76,340.7	0.25	0°48'	0.17	21.31	25.12	3.06	2	1 x 5½**	68.0
450	*457.2*	*20.7*	*339.58*	*6.4*		*14.2*	*541.3*	*638.0*	*77.7*			*30.8*
20	20.000	300	94,247.8	0.25	0°43'	0.15	23.47	27.88	3.06	2	1⅛ x 5¾**	89.0
500	*508.0*	*20.7*	*419.23*	*6.4*		*12.5*	*596.1*	*708.2*	*77.7*			*40.4*
24	24.000	250	113,097.3	0.25	0°36'	0.13	27.58	32.00	3.19	2	1⅛ x 5¾**	96.0
600	*609.6*	*17.2*	*503.08*	*6.4*		*10.8*	*700.5*	*812.8*	*81.0*			*43.5*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

‡ Maximum end gap and deflection are for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

** Only available in ANSI bolt sizes.

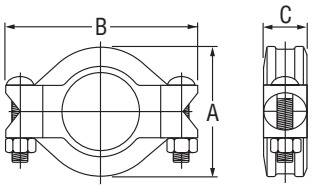
Please refer to General Notes on page 17.

For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.

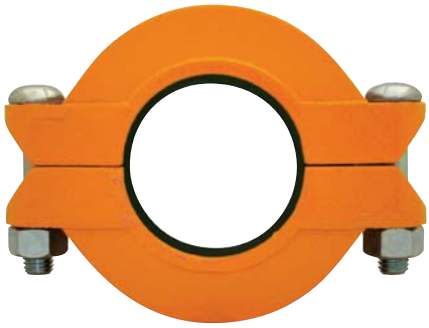
COUPLINGS

Figure 716 Flexible Reducing Coupling

The Figure 716 Reducing Coupling is capable of pressures up to 500 psi (34.5 bar) depending on pipe size and wall thickness. It provides a direct transition between two different pipe sizes, replacing two couplings and a reducing fitting.



For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.



Tech Data: G120

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Max. End*‡ Gap Inches *mm*	Deflection ‡		Nominal Dimensions			Coupling Bolts		Approx. Weight lbs kg
					Degrees Per Coupling	Inches/ Foot *mm/m*	A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size Inches *mm*	
2 x 1½	2.375 x 1.900	500	1,417.6	0.13	1°53'	0.39	3.50	5.06	1.88	2	⅜ x 2¼	2.0
50 x 40	*60.3 x 48.3*	*34.5*	*6.31*	*3.3*		*32.5*	*88.9*	*128.5*	*47.8*		*M10 x 57*	*0.9*
2½ x 2	2.875 x 2.375	500	2,215.1	0.13	1°33'	0.32	4.00	5.50	1.88	2	⅜ x 2¼	2.5
65 x 50	*73.0 x 60.3*	*34.5*	*9.85*	*3.3*		*26.7*	*101.6*	*139.7*	*47.8*		*M10 x 57*	*1.1*
	3.000 x 2.375	500	2,215.1	0.13	1°34'	0.32	4.19	5.88	1.88	2	M12 x 76	3.1
	76.1 x 60.3	*34.5*	*9.85*	*3.3*		*26.7*	*106.4*	*149.4*	*47.8*			*1.4*
3 x 2	3.500 x 2.375	500	2,215.1	0.13	1°17'	0.27	4.69	6.50	1.88	2	½ x 3	4.5
80 x 50	*88.9 x 60.3*	*34.5*	*9.85*	*3.3*		*22.5*	*119.1*	*165.1*	*47.8*		*M12 x 76*	*2.0*
3 x 2½	3.500 x 2.875	500	3,245.9	0.13	1°17'	0.27	4.69	6.50	1.88	2	½ x 3	4.6
80 x 65	*88.9 x 73.0*	*34.5*	*14.44*	*3.3*		*22.5*	*119.1*	*165.1*	*47.8*		*M12 x 76*	*2.1*
	3.500 x 3.000	500	3,534.3	0.13	1°17'	0.27	4.69	6.50	1.88	2	M12 x 76	4.5
	88.9 x 76.1	*34.5*	*15.72*	*3.3*		*22.5*	*119.1*	*165.1*	*47.8*			*2.0*
4 x 2	4.500 x 2.375	500	2,215.1	0.19	2°38'	0.55	6.00	8.13	2.00	2	⅝ x 3¼	7.0
100 x 60	*114.3 x 60.3*	*34.5*	*9.85*	*4.8*		*45.8*	*152.4*	*206.5*	*50.8*		*M16 x 83*	*3.2*
4 x 2½	4.500 x 2.875	500	3,245.9	0.19	2°38'	0.55	6.00	8.13	2.00	2	⅝ x 3¼	6.1
100 x 65	*114.3 x 73.0*	*34.5*	*14.44*	*4.8*		*45.8*	*152.4*	*206.5*	*50.8*		*M16 x 83*	*2.8*
	4.500 x 3.000	500	3,534.3	0.19	2°38'	0.55	6.00	8.13	2.00	2	M16 x 83	6.2
	114.3 x 76.1	*34.5*	*15.72*	*4.8*		*45.8*	*152.4*	*206.5*	*50.8*			*2.8*
4 x 3	4.500 x 3.500	500	4,810.6	0.19	2°38'	0.55	6.00	8.13	2.00	2	⅝ x 3¼	6.2
100 x 80	*114.3 x 88.9*	*34.5*	*21.40*	*4.8*		*45.8*	*152.4*	*206.5*	*50.8*		*M16 x 83*	*2.8*
	5.500 x 4.500	500	7,952.2	0.25	2°38'	0.55	7.06	9.50	2.06	2	M20 x 121	11.0
	139.7 x 114.3	*34.5*	*35.37*	*6.4*		*45.8*	*179.3*	*241.3*	*52.3*			*5.0*
5 x 4	5.563 x 4.500	500	7,952.2	0.25	2°5'	0.44	7.13	9.56	2.06	2	¾ x 4¾	10.1
125 x 100	*141.3 x 114.3*	*34.5*	*35.37*	*6.4*		*36.7*	*181.1*	*242.8*	*52.3*		*M20 x 121*	*4.6*
	6.500 x 4.500	400	6,361.7	0.25	1°50'	0.38	8.18	10.81	2.06	2	M20 x 121	12.5
	165.1 x 114.3	*27.6*	*28.30*	*6.4*		*31.7*	*207.8*	*274.6*	*52.3*			*5.7*
6 x 4	6.625 x 4.500	400	6,361.7	0.25	1°44'	0.36	8.38	10.88	2.06	2	¾ x 4¾	12.5
150 x 100	*168.3 x 114.3*	*27.6*	*28.30*	*6.4*		*30.0*	*212.9*	*276.4*	*52.3*		*M20 x 121*	*5.7*
6 x 5	6.625 x 5.563	400	9,722.3	0.25	1°44'	0.36	8.38	10.88	2.06	2	¾ x 4¾	11.7
150 x 125	*168.3 x 141.3*	*27.6*	*43.25*	*6.4*		*30.0*	*212.9*	*276.4*	*52.3*		*M20 x 121*	*5.3*
8 x 6	8.625 x 6.625	400	13,788.6	0.25	1°15'	0.26	10.69	13.75	2.25	2	⅞ x 6½	23.5
200 x 150	*219.1 x 168.3*	*27.6*	*61.33*	*6.4*		*21.7*	*271.5*	*349.3*	*57.2*		*M22 x 165*	*10.7*

† 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 Tyco Fire & Building Products for details.

* Maximum available gap between pipe ends, minimum gap = 0.

‡ Maximum end gap and deflection are for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

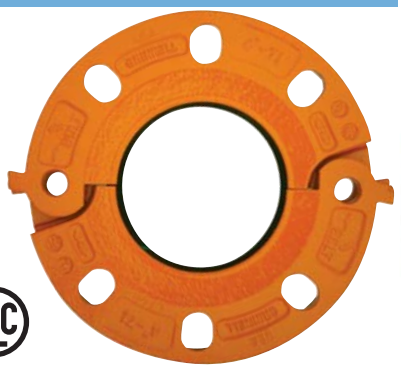
Please refer to General Notes on page 17.

FLANGES

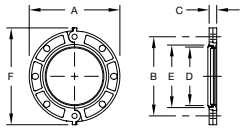
Figure 71 Flange Adapter (ANSI Class 125/150)

The Figure 71 Flange Adapter is capable of pressures up to 300 psi (20.7 bar) depending on pipe size and wall thickness. It provides a direct transition from flanged components to a grooved piping system. I.P.S. size flange bolt patterns conform to ANSI Class 125 and 150.

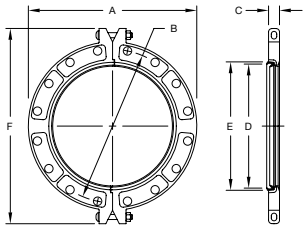
The gasket seal is designed with optimum amount of rubber to provide a dependable seal and also avoid the overfilling of the gasket pocket which may cause assembly difficulties.



Tech Data: G150



Sizes 2" (DN 50) – 12" (DN 300)



Sizes 14" (DN 350) – 24" (DN 600)

For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max.† Pressures psi *bar*	Max. End† Load lbs *kN*	Nominal Dimensions						Bolts**		Approx. Weight lbs *kg*
				A Inches *mm*	B Inches *mm*	C Inches *mm*	D* Inches *mm*	E* Inches *mm*	F Inches *mm*	Qty.	Size Inches *mm*	
2	2.375	300	1,329.0	6.38	4.75	0.75	2.38	3.41	7.25	4	⅝ x 3	3.0
50	*60.3*	*20.7*	*5.91*	*162.1*	*120.7*	*19.1*	*60.5*	*86.6*	*184.2*			*1.4*
2½	2.875	300	1,947.5	7.00	5.50	0.88	2.88	3.91	7.88	4	⅝ x 3	5.0
65	*73.0*	*20.7*	*8.66*	*178.0*	*140.0*	*22.0*	*73.0*	*99.0*	*200.0*			*2.3*
3	3.500	300	2,886.3	7.50	6.00	0.94	3.50	4.53	9.88	4	⅝ x 3	5.6
80	*88.9*	*20.7*	*12.84*	*190.5*	*152.4*	*23.9*	*88.9*	*115.1*	*251.0*			*2.5*
4	4.500	300	4,771.3	9.00	7.50	0.94	4.50	5.53	9.90	8	⅝ x 3	7.0
100	*114.3*	*20.7*	*21.22*	*228.6*	*190.5*	*23.9*	*114.3*	*140.5*	*251.5*			*3.2*
5	5.563	300	7,291.7	10.00	8.50	1.00	5.56	6.72	11.38	8	¾ x 3½	9.2
125	*141.3*	*20.7*	*32.44*	*254.0*	*215.9*	*25.4*	*141.2*	*170.7*	*289.1*			*4.2*
6	6.625	300	10,341.5	11.00	9.50	1.00	6.62	7.78	11.88	8	¾ x 3½	10.0
150	*168.3*	*20.7*	*46.02*	*279.4*	*241.3*	*25.4*	*168.1*	*197.6*	*301.8*			*4.5*
8	8.625	300	17,527.9	13.50	11.75	1.13	8.62	9.94	14.36	8	¾ x 3½	16.6
200	*219.1*	*20.7*	*77.99*	*342.9*	*298.5*	*28.7*	*218.9*	*252.5*	*365.3*			*7.5*
10	10.750	300	27,228.8	16.00	14.25	1.19	10.75	12.31	16.88	12	⅞ x 4	21.8
250	*273.0*	*20.7*	*121.08*	*406.4*	*362.0*	*30.2*	*273.1*	*312.7*	*428.8*			*9.9*
12	12.750	300	38,302.9	19.00	17.00	1.25	12.75	14.31	20.00	12	⅞ x 4	24.2
300	*323.9*	*20.7*	*170.44*	*482.6*	*431.8*	*31.8*	*323.9*	*363.9*	*508.0*			*11.0*
14	14.000	300	46,180.0	21.00	18.76	1.44	14.00	15.03	24.00	12	1⅛ x N	25.0
DN350	*(355.6)*	*20.7*	*205.41*	*(533,4)*	*(476.5)*	*(36,5)*	*(355,6)*	*(381,8)*	*(609,6)*			*(11.3)*
16	16.000	300	60,315.0	23,50	21.26	1.50	16.00	17.00	26.50	16	1⅛ x N	31.0
DN400	*(406.4)*	*20.7*	*268.28*	*(596.9)*	*(540.0)*	*(38.10)*	*(406.4)*	*(431.7)*	*(673.1)*			*(14.0)*
18	18.000	300	76,455.0	25.00	22.76	1.63	18.00	19.01	29.00	16	1¼ x N	35.0
DN450	*(457.2)*	*20.7*	*340.07*	*(635.0)*	*(578.1)*	*(41.3)*	*(457.2)*	*(482.8)*	*(736.6)*			*(15.8)*
20	20.000	300	94,245.0	27.50	25.00	1.75	20.00	21.03	31.50	20	1¼ x N	45.0
DN500	*(508.0)*	*20.7*	*419.20*	*(698.5)*	*(635.0)*	*(44.5)*	*(508.0)*	*(534.2)*	*(800.1)*			*(20.4)*
24	24.000	300	135,720.0	32.00	29.50	1.93	24.00	25.05	36.00	20	1⅜ x N	59.0
DN600	*(609.6)*	*2.7*	*603.68*	*(812.8)*	*(749.3)*	*(49.0)*	*(609.6)*	*(636.3)*	*(914.4)*			*(26.8)*

† 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 Tyco Fire & Building Products for details.

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

** Bolts are not supplied. Bolt lengths shown are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

Note: Metal flange washer adapters 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
- Serrated flange surfaces

Metal Flange Washer Adapter available in stainless steel ASTM.ALLL type 304-2B. Contact Tyco Fire & Building Products for prices and availability.
Figure 71 Flange Adapters are not recommended for applications which incorporate tie rods for anchoring or on a standard fitting within 90° of each other. Contact Tyco Fire & Building Products for recommendations prior to using with plastic pipe.

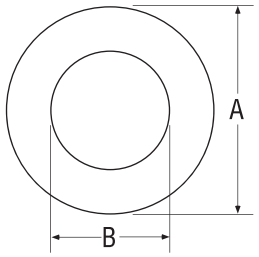
Please refer to General Notes on page 17.

FLANGES

Flange Washer Adapter

MATERIAL: CARBON STEEL

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Nominal Dimensions A Inches *mm*	Nominal Dimensions B Inches *mm*
†2	2.375	3.94	2.75
50	*60.3*	*100.0*	*57.2*
‡2½	2.875	4.69	2.75
65	*73.0*	*119.1*	*69.9*
*	3.000	4.89	2.88
	76.1	*124.2*	*73.2*
‡	3.500	5.19	3.38
	88.9	*131.8*	*85.9*
*3	3.500	5.48	3.38
80	*88.9*	*139.2*	*85.9*
‡4	4.500	6.69	4.38
100	*114.3*	*169.9*	*111.3*
*4	4.500	6.27	4.38
100	*114.3*	*159.3*	*111.3*
‡5	5.563	7.56	5.38
125	*141.3*	*192.0*	*136.7*
*	5.500	7.45	5.32
	139.7	*189.2*	*135.1*
*	6.500	8.47	6.32
	165.1	*215.1*	*160.5*
†6	6.625	8.56	6.44
150	*168.3*	*217.4*	*163.6*
‡8	8.625	10.81	8.44
200	*219.1*	*274.6*	*214.4*
*8	8.625	10.64	8.44
200	*219.1*	*270.3*	*214.4*
‡10	10.750	13.19	10.50
250	*273.0*	*335.0*	*266.7*
*10	10.750	12.85	10.50
250	*273.0*	*326.4*	*266.7*
‡12	12.750	15.94	12.50
300	*323.9*	*404.9*	*317.5*
*12	12.750	15.01	12.50
300	*323.9*	*381.3*	*317.5*



* DIN

† DIN and ANSI

‡ ANSI

Note: Metal flange washer adapters 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
- Serrated flange surfaces

Available in stainless steel ASTMA666 Type 304-2B. Contact Tyco Fire & Building Products for price and availability.

Please refer to General Notes on page 17.

FITTINGS

GROOVED COUPLINGS & FITTINGS

Grinnell® Grooved Fittings provide an economical and efficient method of changing direction, adding an outlet, reducing, or capping grooved piping systems.

Grinnell Grooved Fittings are rated at the pressure rating of the coupling being used.

Elbows

Pages 29-35

Tee

Pages 30, 37-41

Reducers

Pages 42-44

Adaptors and Nipples

Pages 45-46

Crosses & Laterals

Pages 47-51

Flange Adaptors

Page 52

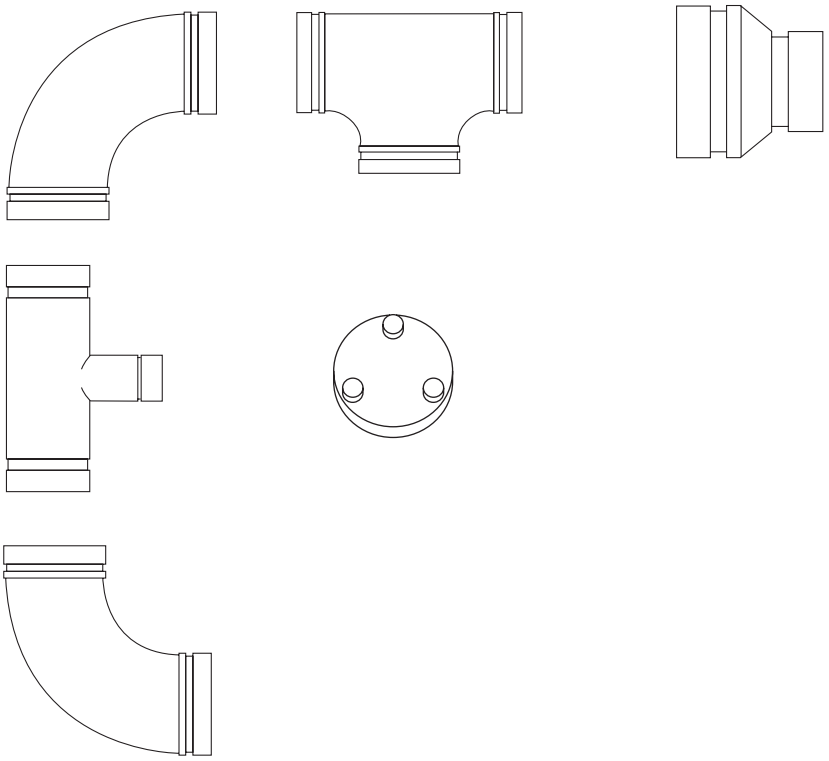
Caps

Page 36

Diaelectric Fittings

Page 53

Tech Data: G180



MATERIAL SPECIFICATIONS

Ductile Iron Fitting Specifications

- ASTM A-536 - Standard Specification for Ductile Iron Castings Grade 65-45-12
- Tensile Strength, Minimum PSI - 65,000 MPa-448)
- Yield Strength, Minimum PSI - 45,000 (MPa-310)
- Elongation in 2" (50mm), Minimum 12%
- ASTM A-153 - Standard Specification for Hot Dip Galvanizing

Fabricated Steel Fitting Specifications

- Carbon Steel: According to ASTM A-53 Grade B
- Tensile Strength, Minimum PSI - 60,000 (MPa-415)
- Yield Strength, Minimum PSI - 35,000 (MPa-240)
- Sizes 1¼" – 10" Schedule 40
- Sizes 12" – 24" STD (.375)

Coatings

- Orange - Non-Lead (Standard)
- RAL Red - Non-Lead (Optional)
- Hot Dipped Zinc Galvanized (Optiional)

FITTINGS

Flow Data

Friction Resistance (Expressed as Equivalent Straight Pipe)					
Nominal Size Inches *mm*	Pipe OD Inches *mm*	Elbows 90° Feet *Meters*	Elbows 45° Feet *Meters*	Tee Branch Feet *Meters*	Tee Run Feet *Meters*
1¼	1.660	1.9	1.0	4.8	1.9
32	*42.4*	*0.6*	*0.3*	*1.5*	*0.6*
1½	1.900	2.3	1.2	5.8	2.3
40	*48.3*	*0.7*	*0.4*	*1.8*	*0.7*
2	2.375	3.2	1.6	8.0	3.2
50	*60.3*	*1.0*	*0.5*	*2.5*	*1.0*
2½	2.875	3.9	2.0	9.8	3.9
65	*73.0*	*1.2*	*0.6*	*3.0*	*1.2*
	3.000	4.1	2.1	10.3	4.1
	76.1	*1.2*	*0.6*	*3.1*	*1.2*
3	3.500	4.9	2.4	12.2	4.9
80	*88.9*	*1.5*	*0.7*	*3.7*	*1.5*
	4.250	6.5	3.3	16.3	6.5
	108.0	*2.0*	*1.0*	*5.0*	*2.0*
4	4.500	6.5	3.3	16.3	6.5
100	*114.3*	*2.0*	*1.0*	*5.0*	*2.0*
	5.250	8.0	4.0	20.0	8.0
	133.0	*2.4*	*1.2*	*6.1*	*2.4*
	5.500	8.0	4.1	20.0	8.0
	139.7	*2.4*	*1.3*	*6.1*	*2.4*
5	5.563	8.2	4.1	20.5	8.2
125	*141.3*	*2.5*	*1.3*	*6.3*	*2.5*
	6.250	9.5	4.8	23.8	9.5
	159.0	*2.9*	*1.4*	*7.2*	*2.9*
	6.500	9.5	4.8	23.8	9.5
	165.1	*2.9*	*1.4*	*7.2*	*2.9*
6	6.625	9.9	5.0	24.8	9.9
150	*168.3*	*3.0*	*1.5*	*7.6*	*3.0*
	8.500	13.1	6.6	32.8	13.1
	216.3	*4.0*	*2.0*	*10.0*	*4.0*
8	8.625	13.1	6.6	32.8	13.1
200	*219.1*	*4.0*	*2.0*	*10.0*	*4.0*
10	10.750	16.5	8.3	41.3	16.5
250	*273.0*	*5.0*	*2.5*	*12.6*	*5.0*
12	12.750	19.9	9.9	49.7	19.9
300	*323.9*	*6.1*	*3.0*	*15.1*	*6.1*
14	14.000	23.0	18.0	67.9	23.0
350	*355.6*	*7.0*	*5.5*	*20.7*	*7.0*
16	16.000	25.9	20.0	78.1	25.9
400	*406.4*	*7.9*	*6.1*	*23.8*	*7.9*
18	18.000	28.9	23.0	85.0	28.9
450	*457.2*	*8.8*	*7.0*	*25.9*	*8.8*
20	20.000	33.1	25.9	100.1	33.1
500	*508.0*	*10.1*	*7.9*	*30.5*	*10.1*
24	24.000	40.0	29.9	115.2	40.0
600	*609.6*	*12.2*	*9.1*	*35.1*	*12.2*

Notes: For the reducing tee branches, use the value that is corresponding to the branch size. *Example:* For 8" x 8" x 2" (200mm x 200mm x 50mm) tee, the branch value of 2" (50mm) is 8.0 feet (2.5 meters). For sizes not listed, interpolate from the values shown.

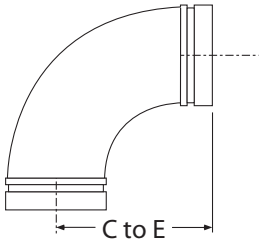
Please refer to General Notes on page 17.

FITTINGS

Figure 210 & 310 90° Elbow

Nominal Size Inches *mm*	Pipe OD Inches *mm*	210 Cast		210LR Long Radius Cast		310 Fabricated Long Radius	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	2.75	1.0			3.88	1.4
32	*42.4*	*69.9*	*0.5*			*98.6*	*0.6*
1½	1.900	2.75	1.2			4.25	1.8
40	*48.3*	*69.9*	*0.6*			*108.0*	*0.8*
2	2.375	3.25	2.0	4.38	2.6	4.38	2.5
50	*60.3*	*82.6*	*0.9*	*111.3*	*1.2*	*111.3*	*1.1*
2½	2.875	3.75	3.0	5.00	4.2	5.75	5.0
65	*73.0*	*95.3*	*1.4*	*127.0*	*1.9*	*146.1*	*2.3*
	3.000	3.75	3.0	5.00	4.3	–	–
	76.1	*95.3*	*1.4*	*127.0*	*2.0*	–	–
3	3.500	4.25	4.5	5.88	6.5	5.88	6.5
80	*88.9*	*108.0*	*2.0*	*149.4*	*2.9*	*149.4*	*2.9*
	4.250	4.75	8.5			–	–
	108.0	*120.7*	*3.9*			–	–
4	4.500	5.00	8.5	7.50	11.4	7.50	11.7
100	*114.3*	*127.0*	*3.9*	*190.5*	*5.2*	*190.5*	*5.3*
	5.250	5.25	11.3			–	–
	133.0	*133.4*	*5.1*			–	–
	5.500	5.50	11.3	9.50	19.0	–	–
	139.7	*139.7*	*5.1*	*241.3*	*8.6*	–	–
5	5.563	5.50	13.5	9.50	18.2	9.50	21.0
125	*141.3*	*139.7*	*6.1*	*241.3*	*8.3*	*241.3*	*9.5*
	6.250	6.00	14.6			–	–
	159.0	*152.4*	*6.6*			–	–
	6.500	6.50	18.5	10.75	26.4	–	–
	165.1	*165.1*	*8.4*	*273.1*	*12.0*	–	–
6	6.625	6.50	18.5	10.75	27.8	10.75	30.0
150	*168.3*	*165.1*	*8.4*	*273*	*12.6*	*273.1*	*13.6*
	8.500	7.75	36.5			–	–
	216.3	*196.9*	*16.6*			–	–
8	8.625	7.75	36.5	14.25	54.5	15.00	60.0
200	*219.1*	*196.9*	*16.6*	*362.0*	*24.7*	*381.0*	*27.2*
10	10.750	9.00	60.0	15.00	80.4	18.00	100.0
250	*273.0*	*228.6*	*27.2*	*381.0*	*36.5*	*457.2*	*45.4*
12	12.750	10.00	67.0	18.00	115.50	21.00	140.0
300	*323.9*	*254.0*	*30.4*	*457.2*	*52.4*	*533.4*	*63.5*
14	14.000	–	–			21.00	180.0
350	*355.6*					*533.4*	*81.6*
16	16.000	–	–			24.00	220.0
400	*406.4*					*609.6*	*99.8*
18	18.000	–	–			27.00	280.0
450	*457.2*					*685.8*	*127.0*
20	20.000	–	–			32.00	350.0
500	*508.0*					*838.2*	*158.8*
24	24.000	–	–			36.00	480.0
600	*609.6*					*914.4*	*217.7*

FIGURE 210
90° ELBOW CAST



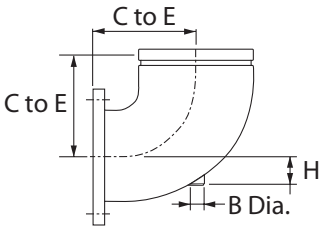
Please refer to General Notes on page 17.

FITTINGS

Figure 316 Reducing Base Support Elbow
Figure 315 Groove x Male Thread 90° Elbow
Figure 320 Groove x Groove x Male Thread Tee

316 Fabricated					
Nominal Size Inches *mm*	Grooved End OD Inches *mm*	Center to End Inches *mm*	H Inches *mm*	B Dia. Threaded *NPSC*	Approx. Wt. Ea. Lbs *Kg*
6 x 4	6.625	12.00	2.50	1.50	38.5
150 x 100	*168.3*	*304.8*	*63.5*	*38.1*	*17.5*
6 x 5	6.625	12.50	2.50	1.50	45.4
150 x 125	*168.3*	*317.5*	*63.5*	*38.1*	*20.6*
8 x 5	8.625	16.00	3.00	1.50	65.5
200 x 125	*219.1*	*406.4*	*76.2*	*38.1*	*29.7*
8 x 6	8.625	16.00	3.00	1.50	73.0
200 x 150	*219.1*	*406.4*	*76.2*	*38.1*	*33.1*
10 x 6	10.750	19.00	3.50	1.50	100.0
250 x 150	*273.1*	*482.6*	*88.9*	*38.1*	*45.4*
10 x 8	10.750	19.00	3.50	1.50	127.0
250 x 200	*273.1*	*482.6*	*88.9*	*38.1*	*57.6*
12 x 8	12.750	22.00	4.00	1.50	155.0
300 x 200	*323.9*	*558.8*	*101.6*	*38.1*	*70.3*
12 x 10	12.750	22.00	4.00	1.50	186.0
300 x 250	*323.9*	*558.8*	*101.6*	*38.1*	*84.4*

FIGURE 316 REDUCING BASE SUPPORT ELBOW GROOVED X FLANGED FABRICATED



Nominal Size Inches *mm*	Pipe OD Inches *mm*	315 Fabricated			320 Fabricated		
		Nominal C to GE Inches *mm*	Nominal C to TE Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to GE Inches *mm*	Nominal C to TE Inches *mm*	Approx Weight Lbs. *Kg*
1 1/4	1.660	2.75	2.75	1.0	2.75	2.75	1.5
32	*42.4*	*69.9*	*69.9*	*0.5*	*69.9*	*69.9*	*0.7*
1 1/2	1.900	2.75	2.75	1.2	2.75	2.75	1.9
40	*48.3*	*69.9*	*69.9*	*0.5*	*69.9*	*69.9*	*0.9*
2	2.375	3.25	4.25	2.3	3.25	4.25	3.2
50	*60.3*	*82.6*	*108.0*	*1.0*	*82.6*	*108.0*	*1.5*
2 1/2	2.875	3.75	3.75	3.7	3.75	3.75	4.0
65	*73.0*	*95.3*	*95.3*	*1.7*	*95.3*	*95.3*	*1.8*
3	3.500	4.25	6.00	6.5	4.25	6.00	6.0
80	*88.9*	*108.0*	*152.4*	*2.9*	*108.0*	*152.4*	*2.7*
4	4.500	5.00	7.25	11.0	5.00	7.25	11.0
100	*114.3*	*127.0*	*184.2*	*5.0*	*127.0*	*184.2*	*5.0*
5	5.563	–	–	–	5.50	5.50	23.0
125	*141.3*	–	–	–	*139.7*	*139.7*	*10.5*
6	6.625	6.50	6.50	19.8	6.50	6.50	23.0
150	*168.3*	*165.1*	*165.1*	*9.0*	*165.1*	*165.1*	*10.5*
8	8.625	–	–	–	7.75	7.75	38.7
200	*219.1*	–	–	–	*196.9*	*196.9*	*17.6*
10	10.750	–	–	–	9.00	9.00	72.1
250	*273.0*	–	–	–	*228.6*	*228.6*	*32.8*
12	12.750	–	–	–	10.00	10.00	92.5
300	*323.9*	–	–	–	*254.0*	*254.0*	*42.0*

FIGURE 320 GROOVE X MALE THREAD TEE FABRICATED

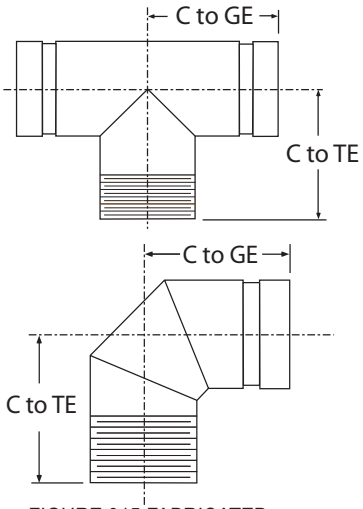


FIGURE 315 FABRICATED

Please refer to General Notes on page 17.

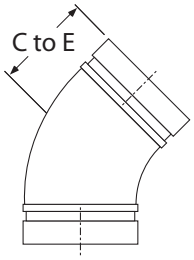
FITTINGS

Figure 201 & 301 45° Elbow

Nominal Size Inches *mm*	Pipe OD Inches *mm*	201 Cast		301 Fabricated Long Radius	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	1.75	0.9	2.50	1.1
32	*42.4*	*44.5*	*0.4*	*63.5*	*0.5*
1½	1.900	1.75	1.1	2.50	1.3
40	*48.3*	*44.5*	*0.5*	*63.5*	*0.6*
2	2.375	2.00	1.8	2.75	1.8
50	*60.3*	*50.8*	*0.8*	*69.9*	*0.8*
2½	2.875	2.25	2.2	3.00	2.9
65	*73.0*	*57.2*	*1.0*	*76.2*	*1.3*
	3.000	2.25	2.2	–	–
	76.1	*57.2*	*1.0*	–	–
3	3.500	2.50	3.5	3.38	4.6
80	*88.9*	*63.5*	*1.6*	*85.9*	*2.1*
	4.250	2.88	5.5	–	–
	108.0	*73.0*	*2.5*	–	–
4	4.500	3.00	5.2	4.00	7.5
100	*114.3*	*76.2*	*2.4*	*101.6*	*3.4*
	5.250	3.25	7.7	–	–
	133.0	*82.6*	*3.5*	–	–
	5.500	3.25	7.7	–	–
	139.7	*82.6*	*3.5*	–	–
5	5.563	3.25	8.5	5.00	12.5
125	*141.3*	*82.6*	*3.9*	*127.0*	*5.7*
	6.250	3.50	12.0	–	–
	159.0	*88.9*	*5.4*	–	–
	6.500	3.50	12.0	–	–
	165.1	*88.9*	*5.4*	–	–
6	6.625	3.50	12.0	5.50	12.0
150	*168.3*	*88.9*	*5.4*	*139.7*	*5.4*
	8.500	4.25	23.0	–	–
	216.3	*108.0*	*10.4*	–	–
8	8.625	4.25	23.0	7.25	34.0
200	*219.1*	*108.0*	*10.4*	*184.2*	*15.4*
10	10.750	4.75	31.0	8.50	56.0
250	*273.0*	*120.7*	*14.1*	*215.9*	*25.4*
12	12.750	5.25	40.0	10.00	98.0
300	*323.9*	*133.4*	*18.1*	*254.0*	*44.5*
14	14.000	–	–	8.75	105.0
350	*355.6*	–	–	*228.3*	*47.6*
16	16.000	–	–	10.00	115.0
400	*406.4*	–	–	*254.0*	*52.2*
18	18.000	–	–	11.25	145.0
450	*457.2*	–	–	*285.8*	*65.8*
20	20.000	–	–	12.50	180.0
500	*508.0*	–	–	*317.5*	*81.6*
24	24.000	–	–	15.00	250.0
600	*609.6*	–	–	*381.0*	*113.4*

Please refer to General Notes on page 17.

FIGURE 201
45° ELBOW CAST



FITTINGS

Figure 212 & 312 22½° Elbow
Figure 211 & 311 11¼° Elbow

Nominal Size Inches *mm*	Pipe OD Inches *mm*	212 Cast		312 Fabricated		211 Cast		311 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight *Kg*
1¼	1.660	1.75	0.8	1.75	0.4	1.38	0.73	1.38	0.4
32	*42.4*	*44.5*	*0.4*	*44.5*	*0.2*	*35.1*	*0.30*	*35.1*	*0.2*
1½	1.900	1.75	1.0	1.75	0.5	1.38	0.89	1.38	0.5
40	*48.3*	*44.5*	*0.5*	*44.5*	*0.2*	*35.1*	*0.40*	*35.1*	*0.2*
2	2.375	1.88	1.4	1.88	0.6	1.38	1.10	1.38	0.6
50	*60.3*	*47.8*	*0.6*	*47.8*	*0.3*	*35.1*	*0.50*	*35.1*	*0.3*
2½	2.875	2.00	2.1	2.00	0.7	1.50	1.60	1.50	1.1
65	*73.0*	*50.8*	*0.9*	*50.8*	*0.3*	*38.1*	*0.70*	*38.1*	*0.5*
	3.000	2.00	2.2			1.50	1.7		
	76.1	*50.8*	*1.0*			*38.1*	*0.80*		
3	3.500	2.25	3.1	2.25	1.4	1.50	1.70	1.50	1.2
80	*88.9*	*57.2*	*1.4*	*57.2*	*0.6*	*38.1*	*0.80*	*38.1*	*0.5*
4	4.500	2.63	5.1	2.63	2.4	1.75	2.30	1.75	2.2
100	*114.3*	*66.8*	*2.3*	*66.8*	*1.1*	*44.5*	*1.00*	*44.5*	*1.0*
	5.500	2.88	7.1			2.00	5.0		
	139.7	*73.2*	*3.2*			*50.8*	*2.3*		
5	5.563	2.88	7.5	2.88	4.1	2.00	3.50	2.00	3.3
125	*141.3*	*73.2*	*3.4*	*73.2*	*1.9*	*50.8*	*1.60*	*50.8*	*1.5*
	6.500	3.13	9.7			2.00	6.5		
	165.1	*79.5*	*4.4*			*50.8*	*2.9*		
6	6.625	3.13	10.4	3.13	5.6	2.00	5.00	2.00	4.6
150	*168.3*	*79.5*	*4.7*	*79.5*	*2.5*	*50.8*	*2.30*	*50.8*	*2.1*
8	8.625	3.88	18.8	3.88	11.1	2.00	6.50	2.00	8.7
200	*219.1*	*98.6*	*8.5*	*98.6*	*5.0*	*50.8*	*2.90*	*50.8*	*3.9*
10	10.750	4.38	28.2	4.38	14.0	2.13	5.30	2.13	9.1
250	*273.0*	*111.3*	*12.8*	*111.3*	*6.4*	*54.1*	*2.40*	*54.1*	*4.1*
12	12.750	4.88	35.1	4.88	22.0	2.25	6.80	2.25	16.7
300	*323.9*	*124.0*	*15.9*	*124.0*	*10.0*	*57.2*	*3.10*	*57.2*	*7.6*
14	14.000			5.00	46.0	2.00	10.10	3.50	32.1
350	*355.6*			*127.0*	*20.9*	*50.80*	*4.60*	*88.9*	*14.6*
16	16.000			5.00	52.2	2.13	15.00	4.00	42.0
400	*406.4*			*127.0*	*23.7*	*54.10*	*6.80*	*101.6*	*19.1*
18	18.000			5.50	65.0	2.25	19.25	4.50	53.2
450	*457.2*			*139.7*	*29.5*	*57.20*	*8.70*	*114.3*	*24.2*
20	20.000			6.00	80.0			5.00	65.7
500	*508.0*			*152.4*	*36.3*			*127.0*	*29.8*
24	24.000			7.00	112.0			6.00	96.0
600	*609.6*			*177.8*	*50.8*			*152.4*	*43.5*

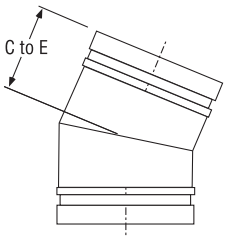


FIGURE 312 22½° ELBOW FABRICATED

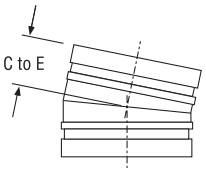
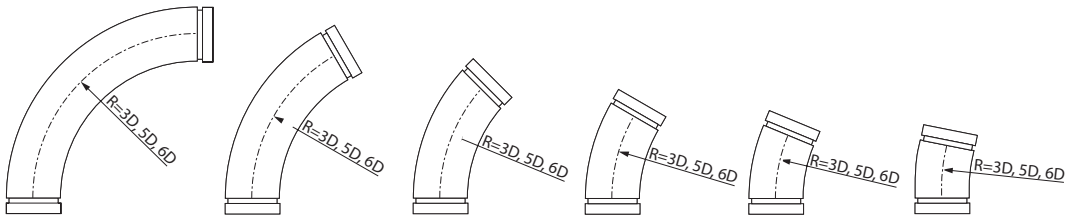


FIGURE 311 11¼° ELBOW FABRICATED

Please refer to General Notes on page 17.

FITTINGS

Long Radius Elbows 3D



Nominal Size Inches *mm*	Pipe OD Inches *mm*	310-3D 90° Elbow		306-3D 60° Elbow		301-3D 45° Elbow		303-3D 30° Elbow		312-3D 22½° Elbow		313-3D 11¼° Elbow	
		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*	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	2.375	10	5.3	7½	4.3	6½	3.9	5¾	3.4	5¼	3.2	4½	2.8
50	*60.3*	*254*	*2.4*	*191*	*2*	*165*	*1.8*	*146*	*1.5*	*133*	*1.5*	*114*	*1.3*
2½	2.875	11½	9.5	8¼	7.7	7¼	6.7	6	5.8	5½	5.3	4¾	4.6
65	*73.0*	*292*	*4.3*	*210*	*3.5*	*184*	*3*	*152*	*2.6*	*140*	*2.4*	*121*	*2.1*
3	3.500	13	14	9¼	11	7¾	9.5	6½	8	5¾	7.3	5	6.2
80	*88.9*	*330*	*6.4*	*235*	*5*	*197*	*4.3*	*165*	*3.6*	*146*	*3.3*	*127*	*2.8*
3½	4.000	14½	18.6	10	14.4	8½	12.3	6¾	10.2	6	9.2	5	7.6
90	*101.6*	*368*	*8.4*	*254*	*6.5*	*216*	*5.6*	*171*	*4.6*	*152*	*4.2*	*127*	*3.4*
4	4.500	16	24.1	11	18.5	9	15.7	7¼	12.8	6½	11.4	5¼	9.3
100	*114.3*	*406*	*10.9*	*279*	*8.4*	*229*	*7.1*	*184*	*5.8*	*165*	*5.2*	*133*	*4.2*
5	5.563	20	40.9	13¾	31.3	11¼	26.5	9	21.8	8	19.4	6½	15.8
125	*141.3*	*508*	*18.6*	*349*	*14.2*	*286*	*12*	*229*	*9.9*	*203*	*8.8*	*165*	*7.2*
6	6.625	24	63.7	16½	48.8	13½	41.3	10¾	33.9	9½	30.1	7¾	24.6
150	*168.3*	*610*	*28.9*	*419*	*22.1*	*343*	*18.7*	*273*	*15.4*	*241*	*13.7*	*197*	*11.2*
8	8.625	32	127.8	22	97.9	18	82.9	14½	68	12¾	60.5	10½	49.3
200	*219.1*	*813*	*58*	*559*	*44.4*	*457*	*37.6*	*368*	*30.8*	*324*	*27.4*	*267*	*22.4*
10	10.750	40	226.4	27¼	173.4	22½	146.9	18	120.5	16	107.2	13	87.3
250	*273.1*	*1016*	*102.7*	*692*	*78.7*	*572*	*66.6*	*457*	*54.7*	*406*	*48.6*	*330*	*39.6*
12	12.750	48	332.7	32¾	254.8	27	215.9	21¾	177	19¼	157.5	15½	128.3
300	*323.9*	*1219*	*150.9*	*832*	*115.6*	*686*	*97.9*	*552*	*80.3*	*489*	*71.4*	*394*	*58.2*
14	14.000	56	427.3	38¼	327.3	31½	227.3	25¼	227.3	22½	202.3	18¼	164.8
350	*355.6*	*1422*	*193.8*	*972*	*148.5*	*800*	*103.1*	*641*	*103.1*	*572*	*91.8*	*464*	*74.8*
16	16.000	64	560.1	43¾	429	36	363.5	29	297.9	25½	265.2	20¾	216
400	*406.4*	*1626*	*254.1*	*1111*	*194.6*	*914*	*164.9*	*737*	*135.1*	*648*	*120.3*	*527*	*98*
18	18.000	72	710.7	49¼	544.4	40½	461.3	32½	378.1	28¾	336.5	23.35	274.1
450	*457.2*	*1829*	*322.4*	*1251*	*246.9*	*1029*	*209.2*	*826*	*171.5*	*730*	*152.6*	*593*	*124.3*
20	20.000	80	879.3	54¾	673.5	45	540.7	36	467.8	32	416.3	26	339.2
500	*508.0*	*2032*	*398.8*	*1391*	*305.5*	*1143*	*245.3*	*914*	*212.2*	*813*	*188.8*	*660*	*153.9*
24	24.000	96	1270.3	65½	973	53¾	824.4	43¼	675.7	38¼	601.4	31	490
600	*609.6*	*2438*	*576.2*	*1664*	*441.3*	*1365*	*373.9*	*1099*	*306.5*	*972*	*272.8*	*787*	*222.3*

Notes: Long radius elbows 3D, 5D and 6D in 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.

Grooved or plain-end available – specify choice on order.

Material: standard wall steel pipe to ASTM A53, Grade B. (Other materials available on request).

Bends to conform to above radii.

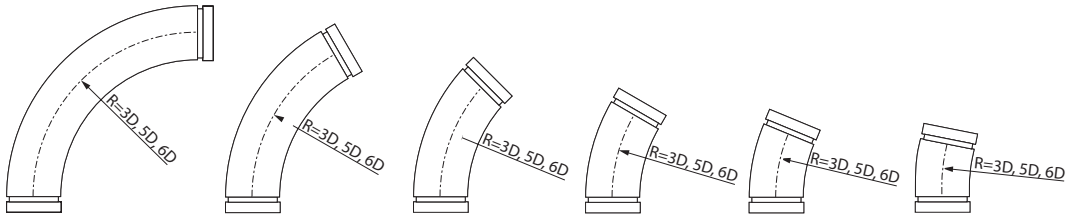
C to E tolerances: 2" through 6" ± ⅛" (3.2 mm); 8" through 16 ± ¼" (6.4 mm); 18" through 24" + ⅜" (9.5mm).

All weights are approximate, based on calculated weight of pipe.

Please refer to General Notes on page 17.

FITTINGS

Long Radius Elbows 5D



Nominal Size Inches *mm*	Pipe OD Inches *mm*	310-5D 90° Elbow		306-5D 60° Elbow		301-5D 45° Elbow		303-5D 30° Elbow		312-5D 22½° Elbow		313-5D 11¼° Elbow	
		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*	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	2.375	14	7.2	9¾	5.6	8¼	4.8	6¾	4	6	3.6	5	3
50	*60.3*	*356*	*3.3*	*248*	*2.5*	*210*	*2.2*	*171*	*1.8*	*152*	*1.6*	*127*	*1.4*
2½	2.875	16½	13.3	11¼	10.2	9¼	8.6	7½	7	6½	6.2	5¼	5
65	*73.0*	*419*	*6*	*286*	*4.6*	*235*	*3.9*	*191*	*3.2*	*165*	*2.8*	*133*	*2.3*
3	3.500	19	19.9	12¾	15	10¼	12.5	8	10	7	8.8	5½	6.9
80	*88.9*	*483*	*9*	*324*	*6.8*	*260*	*5.7*	*203*	*4.5*	*178*	*4*	*140*	*3.1*
3½	4.000	21½	26.9	12¼	20	11¼	16.5	8¾	13	7½	11.3	5¾	8.7
90	*101.6*	*546*	*12.2*	*311*	*9.1*	*286*	*7.5*	*222*	*5.9*	*191*	*5.1*	*146*	*3.9*
4	4.500	24	35.4	15½	26	12½	21.3	9½	16.6	8	14.3	6	10.7
100	*114.3*	*610*	*16.1*	*394*	*11.8*	*318*	*9.7*	*241*	*7.5*	*203*	*6.5*	*152*	*4.9*
5	5.563	30	60	19½	44.1	15½	36.1	11¾	28.1	10	24.1	½	18.2
125	*141.3*	*762*	*27.2*	*495*	*20*	*394*	*16.4*	*298*	*12.7*	*254*	*10.9*	*191*	*8.3*
6	6.625	36	93.5	23¼	68.6	18½	56.2	14	43.8	12	37.6	9	28.3
150	*168.3*	*914*	*42.4*	*591*	*31.1*	*470*	*25.5*	*356*	*19.9*	*305*	*17.1*	*229*	*12.8*
8	8.625	48	187.6	31	137.7	24½	112.8	18¾	87.9	16	75.4	12	56.8
200	*219.1*	*1219*	*85.1*	*787*	*62.5*	*622*	*51.2*	*476*	*39.9*	*406*	*34.2*	*305*	*25.8*
10	10.750	60	332.4	39	244.1	30¾	199.9	23½	155.8	20	133.7	15	100.6
250	*273.1*	*1524*	*150.8*	*991*	*110.7*	*781*	*90.7*	*597*	*70.7*	*508*	*60.6*	*381*	*45.6*
12	12.750	72	488.4	46¾	358.6	37	293.7	28	228.9	24	196.4	18	147.8
300	*323.9*	*1829*	*221.5*	*1187*	*162.7*	*940*	*133.2*	*711*	*103.8*	*610*	*89.1*	*457*	*67*
14	14.000	84	627.4	54½	460.7	43	377.3	32¾	294	28	252.3	21	189.8
350	*355.6*	*2134*	*284.6*	*1384*	*209*	*1092*	*171.1*	*832*	*133.4*	*711*	*114.4*	*533*	*86.1*
16	16.000	96	822.2	62¼	603.8	49¼	494.5	37½	385.3	32	330.7	24	248.8
400	*406.4*	*2438*	*372.9*	*1581*	*273.9*	*1251*	*224.3*	*953*	*174.8*	*813*	*150*	*610*	*112.9*
18	18.000	108	1,043.40	70	766.2	55¼	627.6	42¼	489	36	419.7	27	315.7
450	*457.2*	*2743*	*473.3*	*1778*	*347.5*	*1403*	*284.7*	*1073*	*221.8*	*914*	*190.4*	*686*	*143.2*
20	20.000	120	1,290.90	77¾	947.90	61½	776.4	46¾	605	40	519.2	30	390.6
500	*508.0*	*3048*	*585.5*	*1975*	*430*	*1562*	*352.2*	*1187*	*274.4*	*1016*	*235.5*	*762*	*177.2*
24	24.0000	144	1,864.80	93¼	1,369.30	73¾	1,121.60	56¼	873.9	48	750.1	35¾	564.3
600	*609.6*	*3658*	*845.9*	*2369*	*621.1*	*1873*	*508.7*	*1429*	*396.4*	*1219*	*340.2*	*908*	*256*

Notes: Long radius elbows 3D, 5D and 6D in 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.

Grooved or plain-end available – specify choice on order.

Material: standard wall steel pipe to ASTM A53, Grade B. (Other materials available on request).

Bends to conform to above radii.

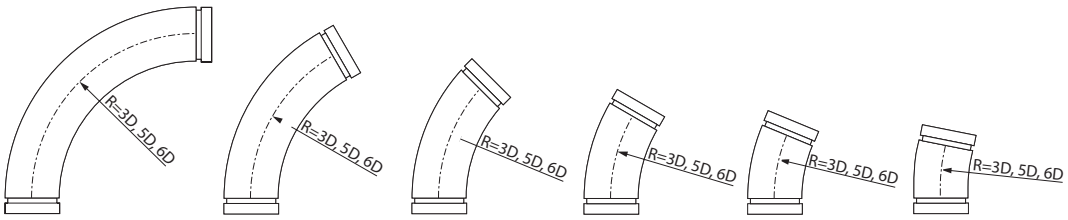
C to E tolerances: 2" through 6" ± ⅛" (3.2 mm); 8" through 16 ± ¼" (6.4 mm); 18" through 24" + ⅜" (9.5mm).

All weights are approximate, based on calculated weight of pipe.

Please refer to General Notes on page 17.

FITTINGS

Long Radius Elbows 6D



Nominal Size Inches *mm*	Pipe OD Inches *mm*	310-6D 90° Elbow		306-6D 60° Elbow		301-6D 45° Elbow		303-6D 30° Elbow		312-6D 22½° Elbow		313-6D 11¼° Elbow	
		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*	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	2.375	16	8.2	11	6.3	9	5.3	7¼	4.3	6½	3.9	5¼	3.2
50	*60.3*	*406*	*3.7*	*279*	*2.9*	*229*	*2.4*	*184*	*2*	*165*	*1.8*	*133*	*1.5*
2½	2.875	19	15.2	12¾	11.4	10¼	9.5	8	7.7	7	6.7	5½	5.3
65	*73.0*	*483*	*6.9*	*324*	*5.2*	*260*	*4.3*	*203*	*3.5*	*178*	*3*	*140*	*2.4*
3	3.500	22	22.9	14½	17	11½	14	8¾	11	7½	9.5	5¾	7.3
80	*88.9*	*559*	*10.4*	*368*	*7.7*	*292*	*6.4*	*222*	*5*	*191*	*4.3*	*146*	*3.3*
3½	4.000	25	31.1	16¼	22.8	12¾	18.6	9¾	14.4	8¼	12.3	6	9.2
90	*101.6*	*635*	*14.1*	*413*	*10.3*	*324*	*8.4*	*248*	*6.5*	*210*	*5.6*	*152*	*4.2*
4	4.500	28	41.1	18	29.8	14	24.1	10½	18.5	8¾	15.7	6½	11.4
100	*114.3*	*711*	*18.6*	*457*	*13.5*	*356*	*10.9*	*267*	*8.4*	*222*	*7.1*	*165*	*5.2*
5	5.563	35	69.6	22¼	50.5	17½	40.9	13	31.3	11	26.5	8	19.4
125	*141.3*	*889*	*31.6*	*565*	*22.9*	*445*	*18.6*	*330*	*14.2*	*279*	*12*	*203*	*8.8*
6	6.625	42	108.4	26¾	78.6	21	63.7	15¾	48.8	13¼	41.3	9½	30.1
150	*168.3*	*1067*	*49.2*	*679*	*35.7*	*533*	*28.9*	*400*	*22.1*	*337*	*18.7*	*241*	*13.7*
8	8.625	56	217.5	35¾	157.7	28	127.8	21	97.9	17½	82.9	12¾	60.5
200	*219.1*	*1422*	*98.7*	*908*	*71.5*	*711*	*58*	*533*	*44.4*	*445*	*37.6*	*324*	*27.4*
10	10.750	70	385.4	44¾	279.4	35	226.4	26	173.4	22	146.9	16	107.2
250	*273.1*	*1778*	*174.8*	*1137*	*126.7*	*889*	*102.7*	*660*	*78.7*	*559*	*66.6*	*406*	*48.6*
12	12.750	84	566.2	53½	410.5	41¾	332.7	31¼	254.8	26¼	215.9	19	157.5
300	*323.9*	*2134*	*256.8*	*1359*	*186.2*	*1060*	*150.9*	*794*	*115.6*	*667*	*97.9*	*483*	*71.4*
14	14.000	98	727.4	62½	527.3	48¾	427.3	36½	327.3	30¾	277.3	22¼	202.3
350	*355.6*	*2489*	*329.9*	*1588*	*239.2*	*1238*	*193.8*	*927*	*148.5*	*781*	*125.8*	*565*	*91.8*
16	16.000	112	953.3	71½	691.1	55¾	560.1	41¾	429	35¼	363.5	25½	265.2
400	*406.4*	*2845*	*432.4*	*1816*	*313.5*	*1416*	*254.1*	*1060*	*194.6*	*895*	*164.9*	*648*	*120.3*
18	18.000	126	1,209.70	80½	877.1	62¾	710.7	47	544.4	39½	461.3	28¾	336.5
450	*457.2*	*3200*	*548.7*	*2045*	*397.8*	*1594*	*322.4*	*1194*	*246.9*	*1003*	*209.2*	*730*	*152.6*
20	20.000	140	1,496.60	89¼	1,085.10	69¾	879.3	52¼	673.5	44	570.7	31¾	416.3
500	*508.0*	*3556*	*678.8*	*2267*	*492.2*	*1772*	*398.8*	*1327*	*305.5*	*1118*	*258.9*	*806*	*188.8*
24	24.000	168	2,162.00	107¼	1,567.50	83¾	1,270.30	62½	973	52.34	824.4	38¼	601.4
600	*609.6*	*4267*	*980.7*	*2724*	*711*	*2127*	*576.2*	*1588*	*441.3*	*1329*	*373.9*	*972*	*272.8*

Notes: Long radius elbows 3D, 5D and 6D in 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.

Grooved or plain-end available – specify choice on order.

Material: standard wall steel pipe to ASTM A53, Grade B. (Other materials available on request).

Bends to conform to above radii.

C to E tolerances: 2" through 6" ± ⅛" (3.2 mm); 8" through 16 ± ¼" (6.4 mm); 18" through 24" + ⅜" (9.5mm).

All weights are approximate, based on calculated weight of pipe.

Please refer to General Notes on page 17.

FITTINGS

Figure 260 & 360 End Cap

Nominal Size Inches *mm*	Pipe OD Inches *mm*	260 Cast		360 Fabricated	
		Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	0.88	0.4	–	–
32	*42.4*	*22.4*	*0.2*	–	–
1½	1.900	0.88	0.6	–	–
40	*48.3*	*22.4*	*0.3*	–	–
2	2.375	0.88	0.9	–	–
50	*60.3*	*22.4*	*0.4*	–	–
2½	2.875	0.88	0.9	–	–
65	*73.0*	*22.4*	*0.4*	–	–
	3.000	0.94	1.1	–	–
	76.1	*23.9*	*0.5*	–	–
3	3.500	0.88	1.1	–	–
80	*88.9*	*22.4*	*0.5*	–	–
4	4.500	1.00	2.6	–	–
100	*114.3*	*25.4*	*1.2*	–	–
	5.500	0.92	4.7	–	–
	139.7	*23.4*	*2.1*	–	–
5	5.563	1.00	5.0	–	–
125	*141.3*	*25.4*	*2.3*	–	–
	6.500	1.00	7.5	–	–
	165.1	*25.4*	*3.4*	–	–
6	6.625	1.00	7.5	–	–
150	*168.3*	*25.4*	*3.4*	–	–
8	8.625	1.19	12.8	–	–
200	*219.1*	*30.2*	*5.8*	–	–
10	10.750	1.25	20.0	–	–
250	*273.0*	*31.8*	*9.1*	–	–
12	12.750	1.25	36.0	–	–
300	*323.9*	*31.8*	*16.3*	–	–
14	14.000	–	–	8.50	45.0
350	*355.6*	–	–	*215.9*	*20.4*
16	16.000	–	–	9.00	50.3
400	*406.4*	–	–	*228.6*	*22.8*
18	18.000	–	–	10.00	66.0
450	*457.2*	–	–	*254.0*	*29.9*
20	20.000	–	–	11.00	88.00
500	*508.0*	–	–	*279.4*	*39.9*
24	24.000	–	–	12.50	11.90
600	*609.6*	–	–	*317.5*	*54.0*

Sizes 1¼" through 12" are available with ½", ¾" and 1" tap plug. Contact Tyco Fire & Building Products.

Please refer to General Notes on page 17.

FIGURE 260 CAP
CAST 1" - 12"

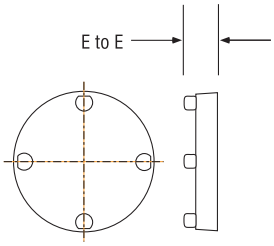


FIGURE 360 CAP
FABRICATED 14" - 24"

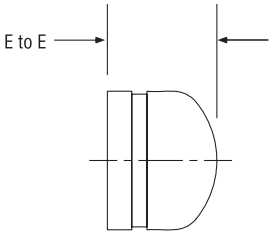


Figure 260 Cap with Tap			
	½" Tap	¾" Tap	1" Tap
1¼	•		
1½	•		
2	•		
2½	•	•	
3	•	•	•
4	•	•	•
5	•	•	•
6	•	•	•
8	•	•	•
10	•	•	•
12	•	•	•

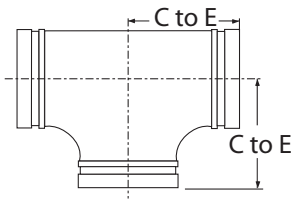
FITTINGS

Figure 219 & 319 Tee

Nominal Size Inches *mm*	Pipe OD Inches *mm*	219 Cast		319 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	2.75	1.4	–	–
32	*42.4*	*69.9*	*0.6*	–	–
1½	1.900	2.75	1.8	–	–
40	*48.3*	*69.9*	*0.8*	–	–
2	2.375	3.25	2.7	–	–
50	*60.3*	*82.6*	*1.2*	–	–
2½	2.875	3.75	5.8	–	–
65	*73.0*	*95.3*	*2.6*	–	–
	3.000	3.75	5.8	–	–
	76.1	*95.3*	*2.6*	–	–
3	3.500	4.25	7.0	–	–
80	*88.9*	*108.0*	*3.2*	–	–
	4.250	4.75	11.5	–	–
	108.0	*120.7*	*5.2*	–	–
4	4.500	5.00	11.8	–	–
100	*114.3*	*127.0*	*5.4*	–	–
	5.250	5.25	10.6	–	–
	133.0	*133.4*	*4.8*	–	–
	5.500	5.50	15.2	–	–
	139.7	*139.7*	*6.9*	–	–
5	5.563	5.50	17.0	–	–
125	*141.3*	*139.7*	*7.7*	–	–
	6.250	6.00	13.9	–	–
	159.0	*152.4*	*6.3*	–	–
	6.500	6.50	26.0	–	–
	165.1	*165.1*	*11.8*	–	–
6	6.625	6.50	26.0	–	–
150	*168.3*	*165.1*	*11.8*	–	–
	8.500	7.75	45.0	–	–
	216.3	*196.9*	*20.4*	–	–
8	8.625	7.75	45.0	–	–
200	*219.1*	*196.9*	*20.4*	–	–
10	10.750	9.00	72.1	–	–
250	*273.0*	*228.6*	*32.7*	–	–
12	12.750	10.00	92.5	–	–
300	*323.9*	*254.0*	*42.0*	–	–
14	14.000	–	–	11.00	48.0
350	*355.6*	–	–	*279.0*	*53.5*
16	16.000	–	–	12.00	146.0
400	*406.4*	–	–	*305.0*	*66.2*
18	18.000	–	–	15.50	218.0
450	*457.2*	–	–	*394.0*	*98.9*
20	20.000	–	–	17.25	275.0
500	*508.0*	–	–	*438.0*	*125.0*
24	24.000	–	–	20.00	379.0
600	*609.6*	–	–	*508.0*	*172.0*

Please refer to General Notes on page 17.

FIGURE 219
CAST TEE

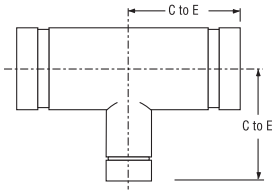


FITTINGS

Figure 221 & 321 Reducing Tee

Nominal Size Inches *mm*	Pipe OD Inches *mm*	221 Cast		321 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
1½ x 1½ x 1¼	1.900 x 1.900 x 1.660	–	–	2.75	1.5
40 x 40 x 32	*48.3 x 48.3 x 42.4*	–	–	*69.9*	*0.7*
2 x 2 x 1½	2.375 x 2.375 x 1.900	3.25	2.7	3.25	2.7
50 x 50 x 40	*60.3 x 60.6 x 48.3*	*82.6*	*1.2*	*82.6*	*1.2*
2½ x 2½ x1¼	2.875 x 2.875 x 1.660	–	–	3.75	4.2
65 x 65 x 32	*73.0 x 73.0 x 42.4*	–	–	*95.3*	*1.9*
2½ x 2½ x 1½	2.875 x 2.875 x 1.900	3.75	4.3	3.75	4.2
65 x 65 x 40	*73.0 x 73.0 x 48.3*	*95.3*	*1.9*	*95.3*	*1.9*
2½ x 2½ x 2	2.875 x 2.875 x 2.375	–	–	3.75	4.3
65 x 65 x 50	*73.0 x 73.0 x 60.3*	–	–	*95.3*	*2.0*
3 x 3 x 1	3.500 x 3.500 x 1.315	4.25	7.0	–	–
80 x 80 x 25	*88.9 x 88.9 x 33.7*	*108.0*	*3.2*	–	–
3 x 3 x 1½	3.500 x 3.500 x 1.900	4.25	6.2	4.25	5.3
80 x 80 x 40	*88.9 x 88.9 x 48.3*	*108.0*	*2.8*	*108.0*	*2.4*
3 x 3 x 2	3.500 x 3.500 x 2.375	4.25	5.5	4.25	5.5
80 x 80 x 50	*88.9 x 88.9 x 60.3*	*108.0*	*2.5*	*108.0*	*2.5*
3 x 3 x 2½	3.500 x 3.500 x 2.875	4.25	5.9	4.25	5.8
80 x 80 x 65	*88.9 x 88.9 x 73.0*	*108.0*	*2.6*	*108.0*	*2.6*
4 x 4 x 1¼	4.500 x 4.500 x 1.660	–	–	5.00	9.8
100 x 100 x 32	*114.3 x 114.3 x 42.4*	–	–	*127.0*	*4.4*
4 x 4 x 1½	4.500 x 4.500 x 1.900	–	–	5.00	9.9
100 x 100 x 40	*114.3 x 114.3 x 48.3*	–	–	*127.0*	*4.5*
4 x 4 x 2	4.500 x 4.500 x 2.375	5.00	10.2	5.00	10.1
100 x 100 x 50	*114.3 x 114.3 x 60.3*	*127.0*	*4.6*	*127.0*	*4.6*
4 x 4 x 2½	4.500 x 4.500 x 2.875	5.00	9.9	5.00	10.3
100 x 100 x 65	*114.3 x 114.3 x 73.0*	*127.0*	*4.4*	*127.0*	*4.7*
4 x 4 x 3	4.500 x 4.500 x 3.500	5.00	11.4	5.00	10.5
100 x 100 x 80	*114.3 x 114.3 x 88.9*	*127.0*	*5.2*	*127.0*	*4.8*
5 x 5 x 2	5.563 x 5.563 x 2.375	–	–	5.50	14.5
125 x 125 x 50	*141.3 x 141.3 x 60.3*	–	–	*139.7*	*6.6*
5 x 5 x 2½	5.563 x 5.563 x 2.875	5.50	14.3	5.50	14.8
125 x 125 x 65	*141.3 x 141.3 x 73.0*	*139.7*	*6.5*	*139.7*	*6.7*
5 x 5 x 3	5.563 x 5.563 x 3.500	5.50	15.0	5.50	15.2
125 x 125 x 80	*141.3 x 141.3 x 88.9*	*139.7*	*6.8*	*139.7*	*6.9*
5 x 5 x 4	5.563 x 5.563 x 4.500	5.50	15.5	5.50	15.8
125 x 125 x 100	*141.3 x 141.3 x 114.3*	*139.7*	*7.0*	*139.7*	*7.2*
6 x 6 x 2	6.625 x 6.625 x 2.375	6.50	26.4	6.50	26.3
150 x 150 x 50	*168.3 x 168.3 x 60.3*	*165.1*	*12.0*	*165.1*	*11.9*
6 x 6 x 2½	6.625 x 6.625 x 2.875	6.50	16.9	6.50	26.5
150 x 150 x 65	*168.3 x 168.3 x 73.0*	*165.1*	*7.6*	*165.1*	*12.0*
6 x 6 x 3	6.625 x 6.625 x 3.500	6.50	26.5	6.50	26.5
150 x 150 x 80	*168.3 x 168.3 x 88.9*	*165.1*	*12.0*	*165.1*	*12.0*
6 x 6 x 4	6.625 x 6.625 x 4.500	6.50	26.5	6.50	26.6
150 x 150 x 100	*168.3 x 168.3 x 114.3*	*165.1*	*12.0*	*165.1*	*12.1*
6 x 6 x 5	6.625 x 6.625 x 5.563	–	–	6.50	27.0
150 x 150 x 125	*168.3 x 168.3 x 141.3*	–	–	*165.1*	*12.2*
8 x 8 x 2	8.625 x 8.625 x 2.375	–	–	7.75	36.2
200 x 200 x 50	*219.1 x 219.1 x 60.3*	–	–	*196.9*	*16.4*
8 x 8 x 3	8.625 x 8.625 x 3.500	–	–	7.75	36.5
200 x 200 x 80	*219.1 x 219.1 x 88.9*	–	–	*196.9*	*16.6*
8 x 8 x 4	8.625 x 8.625 x 4.500	7.75	35.6	7.75	36.6
200 x 200 x 100	*219.1 x 219.1 x 114.3*	*196.9*	*16.1*	*196.9*	*16.6*
8 x 8 x 5	8.625 x 8.625 x 5.563	–	–	7.75	36.8
200 x 200 x 125	*219.1 x 219.1 x 141.3*	–	–	*196.9*	*16.7*
8 x 8 x 6	8.625 x 8.625 x 6.625	7.75	37.7	7.75	37.0
200 x 200 x 150	*219.1 x 219.1 x 168.3*	*196.9*	*17.1*	*196.9*	*16.8*
10 x 10 x 2	10.750 x 10.750 x 2.375	–	–	9.00	57.1
250 x 250 x 50	*273.0 x 273.0 x 60.3*	–	–	*228.6*	*25.9*

FIGURE 221 REDUCING TEE CAST (GALVANIZED)

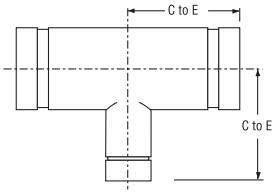


Please refer to General Notes on page 17.

FITTINGS

Figure 321 Reducing Tee

Nominal Size Inches *mm*	Pipe OD Inches *mm*	221 Cast		321 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
10 x 10 x 3	10.750 x 10.750 x 3.500			9.00	57.4
250 x 250 x 80	*273.0 x 273.0 x 88.9*			*228.6*	*26.0*
10 x 10 x 4	10.750 x 10.750 x 4.500	9.00	58.3	9.00	57.6
250 x 250 x 100	*273.0 x 273.0 x 114.3*	*228.6*	*26.3*	*228.6*	*26.1*
10 x 10 x 5	10.750 x 10.750 x 5.563			9.00	57.8
250 x 250 x 125	*273.0 x 273.0 x 141.3*			*228.6*	*26.2*
10 x 10 x 6	10.750 x 10.750 x 6.625	9.00	60.3	9.00	58.0
250 x 250 x 150	*273.0 x 273.0 x 168.3*	*228.6*	*27.2*	*228.6*	*26.3*
10 x 10 x 8	10.750 x 10.750 x 8.625	9.00	60.0	9.00	58.4
250 x 250 x 200	*273.0 x 273.0 x 219.1*	*228.6*	*27.2*	*228.6*	*26.5*
12 x 12 x 3	12.750 x 12.750 x 3.500			10.00	80.2
300 x 300 x 80	*323.9 x 323.9 x 88.9*			*254.0*	*36.4*
12 x 12 x 4	12.750 x 12.750 x 4.500			10.00	80.5
300 x 300 x 100	*323.9 x 323.9 x 114.3*			*254.0*	*36.5*
12 x 12 x 5	12.750 x 12.750 x 5.563			10.00	80.7
300 x 300 x 125	*323.9 x 323.9 x 141.3*			*254.0*	*36.6*
12 x 12 x 6	12.750 x 12.750 x 6.625			10.00	80.9
300 x 300 x 150	*323.9 x 323.9 x 168.3*			*254.0*	*36.7*
12 x 12 x 8	12.750 x 12.750 x 8.625			10.00	91.4
300 x 300 x 200	*323.9 x 323.9 x 219.1*			*254.0*	*41.5*
12 x 12 x 10	12.750 x 12.750 x 10.750			10.00	91.8
300 x 300 x 250	*323.9 x 323.9 x 273.0*			*254.0*	*41.6*
14 x 14 x 6	14.000 x 14.000 x 6.625			11.00	108.0
350 x 350 x 150	*355.6 x 355.6 x 168.3*			*279.4*	*49.0*
14 x 14 x 8	14.000 x 14.000 x 8.625			11.00	110.0
350 x 350 x 200	*355.6 x 355.6 x 219.1*			*279.4*	*49.9*
14 x 14 x 10	14.000 x 14.000 x 10.750			11.00	113.0
350 x 350 x 250	*355.6 x 355.6 x 273.0*			*279.4*	*51.3*
14 x 14 x 12	14.000 x 14.000 x 12.750			11.00	115.0
350 x 350 x 300	*355.6 x 355.6 x 323.9*			*279.4*	*52.2*
16 x 16 x 4	16.000 x 16.000 x 4.500			12.00	132.0
400 x 400 x 100	*406.4 x 406.4 x 114.3*			*304.8*	*59.9*
16 x 16 x 8	16.000 x 16.000 x 8.625			12.00	140.0
400 x 400 x 200	*406.4 x 406.4 x 219.1*			*304.8*	*63.5*
16 x 16 x 10	16.000 x 16.000 x 10.750			12.00	143.0
400 x 400 x 250	*406.4 x 406.4 x 273.0*			*304.8*	*64.9*
16 x 16 x 12	16.000 x 16.000 x 12.750			12.00	147.0
400 x 400 x 300	*406.4 x 406.4 x 323.9*			*304.8*	*66.7*
16 x 16 x 14	16.000 x 16.000 x 14.000			12.00	150.0
400 x 400 x 350	*406.4 x 406.4 x 355.6*			*304.8*	*68.0*
18 x 18 x 8	18.000 x 18.000 x 8.625			15.50	193.0
450 x 450 x 200	*457.2 x 457.2 x 219.1*			*393.7*	*87.5*
18 x 18 x 10	18.000 x 18.000 x 10.750			15.50	197.0
450 x 450 x 250	*457.2 x 457.2 x 273.0*			*393.7*	*89.4*
18 x 18 x 12	18.000 x 18.000 x 12.750			15.50	200.0
450 x 450 x 300	*457.2 x 457.2 x 323.9*			*393.7*	*90.7*



Nominal Size Inches *mm*	Pipe OD Inches *mm*	321 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
18 x 18 x 14	18.000 x 18.000 x 14.000	15.50	204.0
450 x 450 x 350	*457.2 x 457.2 x 355.6*	*393.7*	*92.5*
18 x 18 x 16	18.000 x 18.000 x 16.000	15.50	210.0
450 x 450 x 400	*457.2 x 457.2 x 406.4*	*393.7*	*95.3*
20 x 20 x 14	20.000 x 20.000 x 14.000	17.25	255.0
500 x 500 x 350	*508.0 x 508.0 x 355.6*	*450.9*	*115.7*
20 x 20 x 16	20.000 x 20.000 x 16.000	17.25	260.0
500 x 500 x 400	*508.0 x 508.0 x 406.4*	*450.9*	*117.9*
20 x 20 x 18	20.000 x 20.000 x 18.000	17.25	275.0
500 x 500 x 450	*508.0 x 508.0 x 457.2*	*450.9*	*124.7*
24 x 24 x 10	24.000 x 24.000 x 10.750	20.00	345.0
600 x 600 x 250	*609.6 x 609.6 x 273.0*	*508.0*	*156.5*
24 x 24 x 12	24.000 x 24.000 x 12.750	20.00	347.0
600 x 600 x 300	*609.6 x 609.6 x 323.9*	*508.0*	*157.4*
24 x 24 x 14	24.000 x 24.000 x 14.000	20.00	350.0
600 x 600 x 350	*609.6 x 609.6 x 355.6*	*508.0*	*158.8*
24 x 24 x 16	24.000 x 24.000 x 16.000	20.00	355.0
600 x 600 x 400	*609.6 x 609.6 x 406.4*	*508.0*	*161.0*
24 x 24 x 18	24.000 x 24.000 x 18.000	20.00	360.0
600 x 600 x 450	*609.6 x 609.6 x 457.2*	*508.0*	*163.3*
24 x 24 x 20	24.000 x 24.000 x 20.000	20.00	370.0
600 x 600 x 500	*609.6 x 609.6 x 508.0*	*508.0*	*167.8*

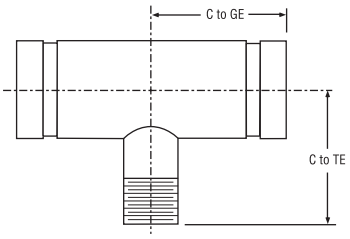
Please refer to General Notes on page 17.

FITTINGS

Figure 323 Groove x Groove x Male Thread Reducing Tee

Nominal Size Inches *mm*	Pipe OD Inches *mm*	323 Fabricated		
		Nominal C to GE Inches *mm*	Nominal C to TE Inches *mm*	Approx Weight Lbs. *Kg*
1½ x 1½ x 1¼	1.900 x 1.900 x 1.660	3.25	3.25	2.7
40 x 40 x 32	*48.3 x 48.3 x 42.4*	*82.6*	*82.6*	*1.2*
2 x 2 x 1½	2.375 x 2.375 x 1.900	3.25	3.25	2.7
50 x 50 x 40	*60.3 x 60.6 x 48.3*	*82.6*	*82.6*	*1.2*
2½ x 2½ x1¼	2.875 x 2.875 x 1.660	3.75	3.75	4.3
65 x 65 x 32	*73.0 x 73.0 x 42.4*	*95.3*	*95.3*	*2.0*
2½ x 2½ x 1½	2.875 x 2.875 x 1.900	3.75	3.75	4.2
65 x 65 x 40	*73.0 x 73.0 x 48.3*	*95.3*	*95.3*	*1.9*
2½ x 2½ x 2	2.875 x 2.875 x 2.375	3.75	3.75	4.3
65 x 65 x 50	*73.0 x 73.0 x 60.3*	*95.3*	*95.3*	*2.0*
3 x 3 x 1½	3.500 x 3.500 x 1.900	4.25	4.25	5.3
80 x 80 x 40	*88.9 x 88.9 x 48.3*	*108.0*	*108.0*	*2.4*
3 x 3 x 2	3.500 x 3.500 x 2.375	4.25	4.25	5.5
80 x 80 x 50	*88.9 x 88.9 x 60.3*	*108.0*	*108.0*	*2.5*
3 x 3 x 2½	3.500 x 3.500 x 2.875	4.25	4.25	5.8
80 x 80 x 65	*88.9 x 88.9 x 73.0*	*108.0*	*108.0*	*2.6*
4 x 4 x 1½	4.500 x 4.500 x 1.900	5.00	5.00	9.9
100 x 100 x 40	*114.3 x 114.3 x 48.3*	*127.0*	*127.0*	*4.5*
4 x 4 x 2	4.500 x 4.500 x 2.375	5.00	5.00	10.1
100 x 100 x 50	*114.3 x 114.3 x 60.3*	*127.0*	*127.0*	*4.6*
4 x 4 x 2½	4.500 x 4.500 x 2.875	5.00	5.00	10.3
100 x 100 x 65	*114.3 x 114.3 x 73.0*	*127.0*	*127.0*	*4.7*
4 x 4 x 3	4.500 x 4.500 x 3.500	5.00	5.00	10.5
100 x 100 x 80	*114.3 x 114.3 x 88.9*	*127.0*	*127.0*	*4.8*
5 x 5 x 2	5.563 x 5.563 x 2.375	5.50	5.50	14.5
125 x 125 x 50	*141.3 x 141.3 x 60.3*	*139.7*	*139.7*	*6.6*
5 x 5 x 3	5.563 x 5.563 x 3.500	5.50	5.50	15.2
125 x 125 x 80	*141.3 x 141.3 x 88.9*	*139.7*	*139.7*	*6.9*
5 x 5 x 4	5.563 x 5.563 x 4.500	5.50	5.50	15.8
125 x 125 x 100	*141.3 x 141.3 x 114.3*	*139.7*	*139.7*	*7.2*
6 x 6 x 2	6.625 x 6.625 x 2.375	6.50	6.50	26.3
150 x 150 x 50	*168.3 x 168.3 x 60.3*	*165.1*	*165.1*	*11.9*
6 x 6 x 2½	6.625 x 6.625 x 2.875	6.50	6.50	26.5
150 x 150 x 65	*168.3 x 168.3 x 73.0*	*165.1*	*165.1*	*12.0*
6 x 6 x 3	6.625 x 6.625 x 3.500	6.50	6.50	26.5
150 x 150 x 80	*168.3 x 168.3 x 88.9*	*165.1*	*165.1*	*12.0*
6 x 6 x 4	6.625 x 6.625 x 4.500	6.50	6.50	26.6
150 x 150 x 100	*168.3 x 168.3 x 114.3*	*165.1*	*165.1*	*12.1*
6 x 6 x 5	6.625 x 6.625 x 5.563	6.50	6.50	27.0
150 x 150 x 125	*168.3 x 168.3 x 141.3*	*165.1*	*165.1*	*12.2*
8 x 8 x 2	8.625 x 8.625 x 2.375	7.75	7.75	36.2
200 x 200 x 50	*219.1 x 219.1 x 60.3*	*196.9*	*196.9*	*16.4*
8 x 8 x 3	8.625 x 8.625 x 3.500	7.75	7.75	36.5
200 x 200 x 80	*219.1 x 219.1 x 88.9*	*196.9*	*196.9*	*16.6*
8 x 8 x 4	8.625 x 8.625 x 4.500	7.75	7.75	36.6
200 x 200 x 100	*219.1 x 219.1 x 114.1*	*196.9*	*196.9*	*16.6*
8 x 8 x 5	8.625 x 8.625 x 5.563	7.75	7.75	36.8
200 x 200 x 125	*219.1 x 219.1 x 141.3*	*196.9*	*196.9*	*16.7*
8 x 8 x 6	8.625 x 8.625 x 6.625	7.75	7.75	37.0
200 x 200 x 150	*219.1 x 219.1 x 168.3*	*196.9*	*196.9*	*16.8*

FIGURE 323
REDUCING TEE
(GALVANIZED)

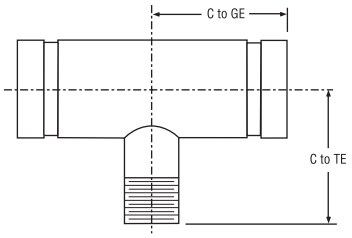


Please refer to General Notes on page 17.

Figure 323 Groove x Groove x Male Thread Reducing Tee

Nominal Size Inches *mm*	Pipe OD Inches *mm*	323 Fabricated		
		Nominal C to GE Inches *mm*	Nominal C to TE Inches *mm*	Approx Weight Lbs. *Kg*
10 x 10 x 2	10.750 x 10.750 x 2.375	9.00	9.00	57.1
250 x 250 x 50	*273.0 x 273.0 x 60.3*	*228.6*	*228.6*	*25.9*
10 x 10 x 3	10.750 x 10.750 x 3.500	9.00	9.00	57.4
250 x 250 x 80	*273.0 x 273.0 x 88.9*	*228.6*	*228.6*	*26.0*
10 x 10 x 4	10.750 x 10.750 x 4.500	9.00	9.00	57.6
250 x 250 x 100	*273.0 x 273.0 x 114.3*	*228.6*	*228.6*	*26.1*
10 x 10 x 5	10.750 x 10.750 x 5.563	9.00	9.00	57.8
250 x 250 x 125	*273.0 x 273.0 x 141.3*	*228.6*	*228.6*	*26.2*
10 x 10 x 6	10.750 x 10.750 x 6.625	9.00	9.00	58.0
250 x 250 x 150	*273.0 x 273.0 x 168.3*	*228.6*	*228.6*	*26.3*
10 x 10 x 8	10.750 x 10.750 x 8.625	9.00	9.00	58.4
250 x 250 x 200	*273.0 x 273.0 x 219.1*	*228.6*	*228.6*	*26.5*
12 x 12 x 3	12.750 x 12.750 x 3.500	10.00	10.00	80.2
300 x 300 x 80	*323.9 x 323.9 x 88.9*	*254.0*	*254.0*	*36.4*
12 x 12 x 4	12.750 x 12.750 x 4.500	10.00	10.00	80.5
300 x 300 x 100	*323.9 x 323.9 x 114.3*	*254.0*	*254.0*	*36.5*
12 x 12 x 5	12.750 x 12.750 x 5.563	10.00	10.00	80.7
300 x 300 x 125	*323.9 x 323.9 x 141.3*	*254.0*	*254.0*	*36.6*
12 x 12 x 6	12.750 x 12.750 x 6.625	10.00	10.00	80.9
300 x 300 x 150	*323.9 x 323.9 x 168.3*	*254.0*	*254.0*	*36.7*
12 x 12 x 8	12.750 x 12.750 x 8.625	10.00	10.00	91.4
300 x 300 x 200	*323.9 x 323.9 x 219.1*	*254.0*	*254.0*	*41.5*
12 x 12 x 10	12.750 x 12.750 x 10.750	10.00	10.00	91.8
300 x 300 x 250	*323.9 x 323.9 x 273.0*	*254.0*	*254.0*	*41.6*
14 x 14 x 6	14.000 x 14.000 x 6.625	11.00	11.00	109.6
350 x 350 x 150	*355.6 x 355.6 x 168.3*	*279.4*	*279.4*	*49.7*
14 x 14 x 8	14.000 x 14.000 x 8.625	11.00	11.00	110.0
350 x 350 x 200	*355.6 x 355.6 x 219.1*	*279.4*	*279.4*	*49.9*
14 x 14 x 10	14.000 x 14.000 x 10.750	11.00	11.00	113.0
350 x 350 x 250	*355.6 x 355.6 x 273.0*	*279.4*	*279.4*	*51.3*
14 x 14 x 12	14.000 x 14.000 x 12.750	11.00	11.00	115.0
350 x 350 x 300	*355.6 x 355.6 x 323.9*	*279.4*	*279.4*	*52.2*
16 x 16 x 8	16.000 x 16.000 x 8.625	12.00	12.00	140.0
400 x 400 x 200	*406.4 x 406.4 x 219.1*	*304.8*	*304.8*	*63.5*
16 x 16 x 10	16.000 x 16.000 x 10.750	12.00	12.00	143.0
400 x 400 x 250	*406.4 x 406.4 x 273.0*	*304.8*	*304.8*	*64.9*
16 x 16 x 12	16.000 x 16.000 x 12.750	12.00	12.00	147.0
400 x 400 x 300	*406.4 x 406.4 x 323.9*	*304.8*	*304.8*	*66.7*
18 x 18 x 8	18.000 x 18.000 x 8.625	15.50	15.50	193.0
450 x 450 x 200	*457.2 x 457.2 x 219.1*	*393.7*	*393.7*	*87.5*
18 x 18 x 10	18.000 x 18.000 x 10.750	15.50	15.50	197.0
450 x 450 x 250	*457.2 x 457.2 x 273.0*	*393.7*	*393.7*	*98.4*
18 x 18 x 12	18.000 x 18.000 x 12.750	15.50	15.50	200.0
450 x 450 x 300	*457.2 x 457.2 x 323.9*	*393.7*	*393.7*	*90.7*
18 x 18 x 14	18.000 x 18.000 x 14.000	15.50	15.50	211.0
450 x 450 x 350	*457.2 x 457.2 x 355.6*	*393.7*	*393.7*	*95.7*
18 x 18 x 16	18.000 x 18.000 x 16.000	15.50	15.50	216.0
450 x 450 x 400	*457.2 x 457.2 x 406.4*	*393.7*	*393.7*	*98.0*
24 x 24 x 8	24.000 x 24.000 x 8.625	20.00	20.00	334.0
600 x 600 x 200	*609.6 x 609.6 x 219.1*	*508.0*	*508.0*	*151.5*
24 x 24 x 10	24.000 x 24.000 x 10.750	20.00	20.00	345.0
600 x 600 x 250	*609.6 x 609.6 x 273.0*	*508.0*	*508.0*	*156.5*
24 x 24 x 12	24.000 x 24.000 x 12.750	20.00	20.00	347.0
600 x 600 x 300	*609.6 x 609.6 x 323.9*	*508.0*	*508.0*	*157.4*

FIGURE 323 REDUCING TEE
FABRICATED (GALVANIZED)



Please refer to General Notes on page 17.

FITTINGS

Figure 250, 350 & 372 Concentric Reducer

Nominal Size Inches *mm*	Pipe OD Inches *mm*	250 Cast		350 Fabricated		372 Fabricated Groove x Thread	
		Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼ x 1	1.660 x 1.315	2.50	0.6				
32 x 25	42.4 x 33.7	*63.5*	*0.3*				
1½ x 1	1.900 x 1.315	2.50	0.8	–	–	2.50	0.6
40 x 25	*48.3 x 33.7*	*63.5*	*0.4*	–	–	*63.5*	*0.3*
1½ x 1¼	1.900 x 1.660	–	–	2.50	0.6	–	–
40 x 32	*48.3 x 42.4*	–	–	*63.5*	*0.3*	–	–
2 x 1	2.375 x 1.315	–	–	–	–	2.50	0.8
50 x 25	*60.3 x 33.7*	–	–	–	–	*63.5*	*0.4*
2 x 1¼	2.375 x 1.660	–	–	2.50	0.8	2.50	0.8
50 x 32	*60.3 x 42.4*	–	–	*63.5*	*0.4*	*63.5*	*0.4*
2 x 1¼	2.375 x 1.900	–	–	2.50	0.8	2.50	0.8
50 x 40	*60.3 x 48.3*	–	–	*63.5*	*0.4*	*63.5*	*0.4*
2½ x 1¼	2.875 x 1.660	2.50	1.5	2.50	1.0	2.50	1.0
65 x 32	*73.0 x 42.4*	*63.5*	*0.7*	*63.5*	*0.5*	*63.5*	*0.5*
2½ x 1½	2.875 x 1.900	2.50	1.5	2.50	1.3	2.50	1.3
65 x 40	*73.0 x 48.3*	*63.5*	*0.7*	*63.5*	*0.6*	*63.5*	*0.6*
2½ x 2	2.875 x 2.375	2.50	1.2	2.50	1.2	2.50	1.2
65 x 50	*73.0 x 60.3*	*63.5*	*0.5*	*63.5*	*0.5*	*63.5*	*0.5*
	3.000 x 1.900	2.50	1.4				
	76.1 x 42.4	*63.5*	*0.6*				
3 x 1	3.500 x 1.315	–	–	–	–	2.50	1.3
80 x 25	*88.9 x 33.7*	–	–	–	–	*63.5*	*0.6*
3 x 1¼	3.500 x 1.660	–	–	2.50	1.3	–	–
80 x 32	*88.9 x 42.4*	–	–	*63.5*	*0.6*	–	–
3 x 1½	3.500 x 1.900	2.50	2.0	2.50	1.3	2.50	1.3
80 x 40	*88.9 x 48.3*	*63.5*	*0.9*	*63.5*	*0.6*	*63.5*	*0.6*
3 x 2	3.500 x 2.375	2.50	1.6	2.50	1.3	2.50	1.3
80 x 50	*88.9 x 60.3*	*63.5*	*0.7*	*63.5*	*0.6*	*63.5*	*0.6*
3 x 2½	3.500 x 2.875	2.50	1.8	2.50	1.5	2.50	1.5
80 x 65	*88.9 x 73.0*	*63.5*	*0.8*	*63.5*	*0.7*	*63.5*	*0.7*
	4.000 x 3.500	–	–	–	–	2.50	1.5
	101.6 x 88.9	–	–	–	–	*63.5*	*0.7*
4 x 1¼	4.500 x 1.660	–	–	3.00	2.2	–	–
100 x 32	*114.3 x 42.4*	–	–	*76.2*	*1.0*	–	–
4 x 1½	4.500 x 1.900	–	–	3.00	2.3	3.00	2.3
100 x 40	*114.3 x 48.3*	–	–	*76.2*	*1.0*	*76.2*	*1.0*
4 x 2	4.500 x 2.375	3.00	2.7	3.00	2.3	3.00	2.3
100 x 50	*114.3 x 60.3*	*76.2*	*1.2*	*76.2*	*1.0*	*76.2*	*1.0*
4 x 2½	4.500 x 2.875	3.00	2.8	3.00	2.3	3.00	2.3
100 x 65	*114.3 x 73.0*	*76.2*	*1.3*	*76.2*	*1.0*	*76.2*	*1.0*
4 x 3	4.500 x 3.500	3.00	3.0	3.00	2.6	3.00	2.6
100 x 80	*114.3 x 88.9*	*76.2*	*1.4*	*76.2*	*1.2*	*76.2*	*1.2*
5 x 1½	5.563 x 1.900	–	–	3.50	4.6	–	–
125 x 40	*141.3 x 48.3*	–	–	*88.9*	*2.1*	–	–
5 x 2	5.563 x 2.375	–	–	3.50	4.6	–	–
125 x 50	*141.3 x 60.3*	–	–	*88.9*	*2.1*	–	–
5 x 2½	5.563 x 2.875	–	–	3.50	4.5	–	–
125 x 65	*141.3 x 73.0*	–	–	*88.9*	*2.0*	–	–
5 x 3	5.563 x 3.500	3.5	4.4	3.50	4.4	–	–
125 x 80	*141.3 x 88.9*	*88.9*	*2.0*	*88.9*	*2.0*	–	–
5 x 4	5.563 x 4.500	3.50	4.6	3.50	4.5	3.50	4.5
125 x 100	*141.3 x 114.3*	*88.9*	*2.1*	*88.9*	*2.0*	*88.9*	*2.0*
6 x 2	6.625 x 2.375	4.00	5.4	4.00	6.0	4.00	6.0
150 x 50	*168.3 x 60.3*	*101.6*	*2.5*	*101.6*	*2.7*	*101.6*	*2.7*
6 X 2½	6.625 x 2.875	4.0	5.4	4.00	6.0	–	–
150 X 65	*168.3 x 73.0*	*101.6*	*2.5*	*101.6*	*2.7*	–	–
	6.625 x 2.875	–	–	–	–	–	–
	168.3 x 76.1	–	–	–	–	–	–
6 x 3	6.625 x 3.500	4.00	5.8	4.00	6.0	4.00	6.0
150 x 80	*168.3 x 88.9*	*101.6*	*2.6*	*101.6*	*2.7*	*101.6*	*2.7*
6 x 4	6.625 x 4.500	4.00	5.9	4.00	5.9	4.00	5.9
150 x 100	*168.3 x 114.3*	*101.6*	*2.7*	*101.6*	*2.7*	*101.6*	*2.7*
6 X 5	6.625 x 5.563	4.00	6.3	4.00	5.8	4.00	5.8
150 X 125	*168.3 x 141.3*	*101.6*	*2.9*	*101.6*	*2.6*	*101.6*	*2.6*

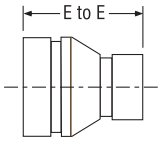


FIGURE 250
CAST

FIGURE 250
CONCENTRIC
REDUCER CAST

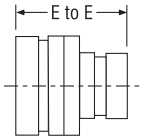


FIGURE 350
FABRICATED
SIZES 1$^{1}/_{2}$" - 6"

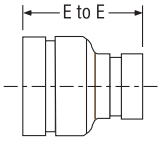


FIGURE 350
FABRICATED
SIZES 8" - 24"

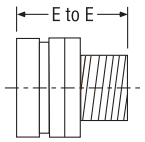


FIGURE 372
FABRICATED
Groove x Male Thread

Please refer to General Notes on page 17.

FITTINGS

Figure 250, 350 & 372 Concentric Reducer

Nominal Size Inches *mm*	Pipe OD Inches *mm*	250 Cast Nominal E to E Inches *mm*	250 Cast Approx Weight Lbs. *Kg*	350 Fabricated Nominal E to E Inches *mm*	350 Fabricated Approx Weight Lbs. *Kg*	372 Fabricated Groove x Thread Nominal E to E Inches *mm*	372 Fabricated Groove x Thread Approx Weight Lbs. *Kg*
8 x 2	8.625 x 2.375	–	–	5.00	12.2	–	–
200 x 50	*219.1 x 60.3*	–	–	*127.0*	*5.5*	–	–
8 x 2½	8.625 x 2.875	–	–	5.00	12.1	–	–
200 x 65	*219.1 x 73.0*	–	–	*127.0*	*5.5*	–	–
8 x 3	8.625 x 3.500	5.0	11.7	5.00	12.0	–	–
200 x 80	*219.1 x 88.9*	*127.0*	*5.3*	*127.0*	*5.5*	–	–
8 x 4	8.625 x 4.500	5.0	11.1	5.00	11.9	–	–
200 x 100	*219.1 x 114.3*	*127.0*	*5.0*	*127.0*	*5.4*	–	–
8 x 5	8.625 x 5.563	5.0	11.7	5.00	11.3	–	–
200 x 125	*219.1 x 141.3*	*127.0*	*5.3*	*127.0*	*5.1*	–	–
	8.625 x 5.500	5.0	10.0				
	219.1 x 139.7	*127.0*	*4.5*				
8 x 6	8.625 x 6.625	5.0	11.8	5.00	10.8	–	–
200 x 150	*219.1 x 168.3*	*127.0*	*5.4*	*127.0*	*4.9*	–	–
	8.625 x 6.500	5.0	11.0				
	219.1 x 165.1	*127.0*	*4.9*				
10 x 4	10.750 x 4.500	–	–	6.00	21.9	–	–
250 x 100	*273.0 x 114.3*	–	–	*152.4*	*10.0*	–	–
10 x 5	10.750 x 5.563	–	–	6.00	21.6	–	–
250 x 125	*273.0 x 141.3*	–	–	*152.4*	*9.8*	–	–
10 x 6	10.750 x 6.625	6.00	17.8	6.00	21.1	–	–
250 x 150	*273.0 x 168.3*	*152.4*	*8.0*	*152.4*	*9.6*	–	–
	10.750 x 6.500	6.00	17.8				
	273.0 x 165.1	*152.4*	*8.0*				
10 x 8	10.750 x 8.625	6.00	19.2	6.00	19.5	–	–
250 x 200	*273.0 x 219.1*	*152.4*	*8.7*	*152.4*	*8.9*	–	–
12 x 4	12.750 x 4.500	7.00	22.7	7.00	28.0	–	–
300 x 100	*323.9 x 114.3*	*177.8*	*10.0*	*177.8*	*12.7*	–	–
12 x 6	12.750 x 6.625	7.00	24.2	7.00	30.0	–	–
300 x 150	*323.9 x 168.3*	*177.8*	*11.0*	*177.8*	*13.6*	–	–
12 x 8	12.750 x 8.625	7.00	25.8	7.00	28.0	–	–
300 x 200	*323.9 x 219.1*	*177.8*	*11.7*	*177.8*	*12.7*	–	–
12 x 10	12.750 x 10.750	7.0	28.2	7.00	33.0	–	–
300 x 250	*323.9 x 273.0*	*177.8*	*12.8*	*177.8*	*15.0*	–	–
14 x 6	14.000 x 6.625	–	–	13.00	58.0	–	–
350 x 150	*355.6 x 168.3*	–	–	*330.2*	*26.4*	–	–
14 x 8	14.000 x 8.625	–	–	13.00	58.5	–	–
350 x 200	*355.6 x 219.1*	–	–	*330.2*	*26.6*	–	–
14 x 10	14.000 x 10.750	–	–	13.00	59.3	–	–
350 x 250	*355.6 x 273.0*	–	–	*330.2*	*27.0*	–	–
14 x 12	14.000 x 12.750	–	–	13.00	60.0	–	–
350 x 300	*355.6 x 323.9*	–	–	*330.2*	*27.3*	–	–
16 x 8	16.000 x 8.625	–	–	14.00	68.5	–	–
400 x 200	*406.4 x 219.1*	–	–	*355.6*	*31.1*	–	–
16 x 10	16.000 x 10.750	–	–	14.00	69.5	–	–
400 x 250	*406.4 x 273.0*	–	–	*355.6*	*31.6*	–	–
16 x 12	16.000 x 12.750	–	–	14.00	70.0	–	–
400 x 300	*406.4 x 323.9*	–	–	*355.6*	*31.8*	–	–
16 x 14	16.000 x 14.000	–	–	14.00	71.0	–	–
400 x 350	*406.4 x 355.6*	–	–	*355.6*	*32.3*	–	–
18 x 12	18.000 x 12.750	–	–	15.00	83.0	–	–
450 x 300	*457.2 x 323.9*	–	–	*381.0*	*37.7*	–	–
18 x 14	18.000 x 14.000	–	–	15.00	84.0	–	–
450 x 350	*457.2 x 355.6*	–	–	*381.0*	*38.2*	–	–
18 x 16	18.000 x 16.000	–	–	15.00	85.0	–	–
450 x 400	*457.2 x 406.4*	–	–	*381.0*	*38.6*	–	–
20 x 10	20.000 x 10.750	–	–	20.00	115.0	–	–
500 x 250	*508.0 x 273.0*	–	–	*508.0*	*52.3*	–	–
20 x 12	20.000 x 12.750	–	–	20.00	120.0	–	–
500 x 300	*508.0 x 323.9*	–	–	*508.0*	*54.5*	–	–
20 x 14	20.000 x 14.000	–	–	20.00	122.0	–	–
500 x 350	*508.0 x 355.6*	–	–	*508.0*	*55.5*	–	–
20 x 16	20.000 x 16.000	–	–	20.00	124.0	–	–
500 x 400	*508.0 x 406.4*	–	–	*508.0*	*56.4*	–	–
20 x 18	20.000 x 18.000	–	–	20.00	125.0	–	–
500 x 450	*508.0 x 457.2*	–	–	*508.0*	*56.8*	–	–
24 x 10	24.000 x 10.750	–	–	20.00	147.0	–	–
600 x 250	*609.6 x 273.0*	–	–	*508.0*	*66.8*	–	–
24 x 12	24.000 x 12.750			20.00	138.0		
600 x 300	*609.6 x 323.9*	–	–	*508.0*	*62.7*	–	
24 x 14	24.000 x 14.000	–	–	20.00	140.0	–	
600 x 350	*609.6 x 355.6*	–	–	*508.0*	*63.6*	–	
24 x 16	24.000 x 16.000	–	–	20.00	145.0	–	
600 x 400	*609.6 x 406.4*	–	–	*508.0*	*65.9*	–	
24 x 18	24.000 x 18.000	–	–	20.00	148.0	–	
600 x 450	*609.6 x 457.2*	–	–	*508.0*	*67.3*	–	
24 x 20	24.000 x 20.000	–	–	20.00	150.0	–	
600 x 500	*609.6 x 508.0*	–	–	*508.0*	*68.2*	–	

Please refer to General Notes on page 17.

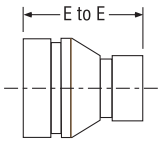


FIGURE 250
CAST

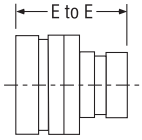


FIGURE 350
FABRICATED
SIZES 1$^{1}/_{2}$" - 6"

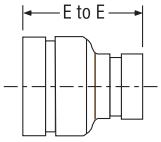


FIGURE 350
FABRICATED
SIZES 8" - 24"

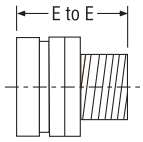


FIGURE 372
FABRICATED
Groove x Male Thread

FITTINGS

Figure 251 & 351 Eccentric Reducer

Nominal Size Inches *mm*	Pipe OD Inches *mm*	251 Cast Nominal E to E Inches *mm*	251 Cast Approx Weight Lbs. *Kg*	351 Fabricated Nominal E to E Inches *mm*	351 Fabricated Approx Weight Lbs. *Kg*
1½ x 1¼	1.900 x 1.660	–	–	8.50	4.5
40 x 32	*48.3 x 42.4*	–	–	*215.9*	*2.0*
2 x 1¼	2.375 x 1.660	–	–	9.00	2.4
50 x 32	*60.3 x 42.4*	–	–	*228.6*	*1.1*
2 x 1½	2.375 x 1.900	–	–	9.00	2.5
50 x 40	*60.3 x 48.3*	–	–	*228.6*	*1.1*
2½ x 1¼	2.875 x 1.660	–	–	9.50	3.4
65 x 32	*73.0 x 42.4*	–	–	*241.3*	*1.5*
2½ x 1½	2.875 x 1.900	–	–	9.50	3.6
65 x 40	*73.0 x 48.3*	–	–	*241.3*	*1.6*
2½ x 2	2.875 x 2.375	–	–	9.50	4.0
65 x 50	*73.0 x 60.3*	–	–	*241.3*	*1.8*
3 x 1¼	3.500 x 1.660	–	–	9.50	4.3
80 x 32	*88.9 x 42.4*	–	–	*241.3*	*2.0*
3 x 1½	3.500 x 1.900	–	–	9.50	4.5
80 x 40	*88.9 x 48.3*	–	–	*241.3*	*2.0*
3 x 2	3.500 x 2.375	3.50	1.8	9.50	4.8
80 x 50	*88.9 x 60.3*	*88.9*	*.8*	*241.3*	*2.2*
3 x 2½	3.500 x 2.875	3.50	2.0	9.50	5.6
80 x 65	*88.9 x 73.0*	*88.9*	*.9*	*241.3*	*2.5*
4 x 1¼	4.500 x 1.660	–	–	10.00	6.3
100 x 32	*114.3 x 42.4*	–	–	*254.0*	*2.9*
4 x 1½	4.500 x 1.900	–	–	10.00	6.4
100 x 40	*114.3 x 48.3*	–	–	*254.0*	*2.9*
4 x 2	4.500 x 2.375	4.0	2.8	10.00	6.7
100 x 50	*114.3 x 60.3*	*101.6*	*1.3*	*254.0*	*3.0*
4 x 2½	4.500 x 2.875	4.0	3.1	10.00	7.3
100 x 65	*114.3 x 73.0*	*101.6*	*1.4*	*254.0*	*3.3*
4 x 3	4.500 x 3.500	4.0	3.3	10.00	7.9
100 x 80	*114.3 x 88.9*	*101.6*	*1.5*	*254.0*	*3.6*
5 x 2	5.563 x 2.375	–	–	11.00	9.3
125 x 50	*141.3 x 60.3*	–	–	*279.4*	*4.2*
5 x 2½	5.563 x 2.875	–	–	11.00	9.9
125 x 65	*141.3 x 73.0*	–	–	*279.4*	*4.5*
5 x 3	5.563 x 3.500	–	–	11.00	10.7
125 x 80	*141.3 x 88.9*	–	–	*279.4*	*4.9*
5 x 4	5.563 x 4.500	5.0	5.7	11.00	11.9
125 x 100	*141.3 x 114.3*	*127.0*	*2.6*	*279.4*	*5.4*
6 x 2	6.625 x 2.375	–	–	11.50	12.2
150 x 50	*168.3 x 60.3*	–	–	*292.1*	*5.5*
6 x 2½	6.625 x 2.875	–	–	11.50	12.8
150 x 65	*168.3 x 73.0*	–	–	*292.1*	*5.8*
6 x 3	6.625 x 3.500	5.5	6.7	11.50	13.6
150 x 80	*168.3 x 88.9*	*139.7*	*3.0*	*292.1*	*6.2*
6 x 4	6.625 x 4.500	5.5	7.2	11.50	14.9
150 x 100	*168.3 x 114.3*	*139.7*	*3.3*	*292.1*	*6.8*
6 x 5	6.625 x 5.563	5.5	7.8	11.50	16.2
150 x 125	*168.3 x 141.3*	*139.7*	*3.5*	*292.1*	*7.3*
8 x 3	8.625 x 3.500	–	–	12.00	17.9
200 x 80	*219.1 x 88.9*	–	–	*304.8*	*8.1*
8 x 4	8.625 x 4.500	–	–	12.00	19.7
200 x 100	*219.1 x 114.3*	–	–	*304.8*	*8.9*
8 x 5	8.625 x 5.563	–	–	12.00	21.4
200 x 125	*219.1 x 141.3*	–	–	*304.8*	*9.7*
8 x 6	8.625 x 6.625	–	–	12.00	23.2
200 x 150	*219.1 x 168.3*	–	–	*304.8*	*10.5*
10 x 4	10.750 x 4.500	–	–	13.00	29.7
250 x 100	*273.0 x 114.3*	–	–	*330.2*	*13.5*
10 x 5	10.750 x 5.563	–	–	13.00	31.7
250 x 125	*273.0 x 141.3*	–	–	*330.2*	*14.4*
10 x 6	10.750 x 6.625	–	–	13.00	34.0
250 x 150	*273.0 x 168.3*	–	–	*330.2*	*15.4*

Please refer to General Notes on page 17.

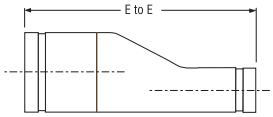


FIGURE 251 ECCENTRIC REDUCER CAST GROOVE X GROOVE

Nominal Size Inches *mm*	Pipe OD Inches *mm*	251 Cast Nominal E to E Inches *mm*	251 Cast Approx Weight Lbs. *Kg*	351 Fabricated Nominal E to E Inches *mm*	351 Fabricated Approx Weight Lbs. *Kg*
10 x 8	10.750 x 8.625	–	–	13.00	34.4
250 x 200	*273.0 x 219.1*	–	–	*330.2*	*15.6*
12 x 4	12.750 x 4.500	–	–	14.00	44.8
300 x 100	*323.9 x 114.3*	–	–	*355.6*	*20.3*
12 x 6	12.750 x 6.625	–	–	14.00	45.2
300 x 150	*323.9 x 168.3*	–	–	*355.6*	*20.5*
12 x 8	12.750 x 8.625	–	–	14.00	47.7
300 x 200	*323.9 x 219.1*	–	–	*355.6*	*21.6*
12 x 10	12.750 x 10.750	–	–	14.00	52.0
300 x 250	*323.9 x 273.0*	–	–	*355.6*	*23.6*
14 x 6	14.000 x 6.625	–	–	13.00	78.0
350 x 150	*355.6 x 168.3*	–	–	*330.2*	*35.4*
14 x 8	14.000 x 8.625	–	–	13.00	80.0
350 x 200	*355.6 x 219.1*	–	–	*330.2*	*36.3*
14 x 10	14.000 x 10.750	–	–	13.00	84.0
350 x 250	*355.6 x 273.0*	–	–	*330.2*	*38.1*
14 x 12	14.000 x 12.750	–	–	13.00	88.0
350 x 300	*355.6 x 323.9*	–	–	*330.2*	*39.9*
16 x 8	16.000 x 8.625	–	–	14.00	91.0
400 x 200	*406.4 x 219.1*	–	–	*355.6*	*41.3*
16 x 10	16.000 x 10.750	–	–	14.00	96.0
400 x 250	*406.4 x 273.0*	–	–	*355.6*	*43.5*
16 x 12	16.000 x 12.750	–	–	14.00	99.0
400 x 300	*406.4 x 323.9*	–	–	*355.6*	*44.9*
16 x 14	16.000 x 14.000	–	–	14.00	104.0
400 x 350	*406.4 x 355.6*	–	–	*355.6*	*47.2*
18 x 10	18.000 x 10.750	–	–	15.00	110.0
450 x 250	*457.2 x 273.0*	–	–	*381.0*	*49.9*
18 x 12	18.000 x 12.750	–	–	15.00	113.0
450 x 300	*457.2 x 323.9*	–	–	*381.0*	*51.3*
18 x 14	18.000 x 14.000	–	–	15.00	117.0
450 x 350	*457.2 x 355.6*	–	–	*381.0*	*53.1*
18 x 16	18.000 x 16.000	–	–	15.00	121.0
450 x 400	*457.2 x 406.4*	–	–	*381.0*	*54.9*
20 x 10	20.000 x 10.750	–	–	20.00	145.0
500 x 250	*508.0 x 273.0*	–	–	*508.0*	*65.8*
20 x 12	20.000 x 12.750	–	–	20.00	149.0
500 x 300	*508.0 x 323.9*	–	–	*508.0*	*67.6*
20 x 14	20.000 x 14.000	–	–	20.00	152.0
500 x 350	*508.0 x 355.6*	–	–	*508.0*	*68.9*
20 x 16	20.000 x 16.000	–	–	20.00	156.0
500 x 400	*508.0 x 406.4*	–	–	*508.0*	*70.8*
20 x 18	20.000 x 18.000	–	–	20.00	160.0
500 x 450	*508.0 x 457.2*	–	–	*508.0*	*72.6*
24 x 10	24.000 x 10.750	–	–	20.00	147.0
600 x 250	*609.6 x 273.0*	–	–	*508.0*	*78.9*
24 x 12	24.000 x 12.750	–	–	20.00	179.0
600 x 300	*609.6 x 323.9*	–	–	*508.0*	*81.2*
24 x 14	24.000 x 14.000	–	–	20.00	184.0
600 x 350	*609.6 x 355.6*	–	–	*508.0*	*83.5*
24 x 16	24.000 x 16.000	–	–	20.00	189.0
600 x 400	*609.6 x 406.4*	–	–	*508.0*	*85.7*
24 x 18	24.000 x 18.000	–	–	20.00	194.0
600 x 450	*609.6 x 457.2*	–	–	*508.0*	*88.0*
24 x 20	24.000 x 20.000	–	–	20.00	199.0
600 x 500	*609.6 x 508.0*	–	–	*508.0*	*90.3*

FITTINGS

Figure 397, 398 & 399 Swagged Nipples

Nominal Size Inches *mm*	Pipe OD Inches *mm*	397, 398 & 399 Fabricated	
		Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*
2 x 1¼	2.375 x 1.660	6.50	2.0
50 x 32	*60.3 x 42.4*	*165.1*	*0.9*
2 x 1½	2.375 x 1.900	6.50	2.0
50 x 40	*60.3 x 48.3*	*165.1*	*0.9*
2½ x 1¼	2.875 x 1.660	7.00	3.5
65 x 32	*73.0 x 42.4*	*177.8*	*1.6*
2½ x 1½	2.875 x 1.900	7.00	3.5
65 x 40	*73.0 x 48.3*	*177.8*	*1.6*
2½ x 2	2.875 x 2.375	7.00	3.5
65 x 50	*73.0 x 60.3*	*177.8*	*1.6*
3 x 1¼	3.500 x 1.660	8.00	5.0
80 x 32	*88.9 x 42.4*	*203.2*	*2.3*
3 x 1½	3.500 x 1.900	8.00	5.0
80 x 40	*88.9 x 48.3*	*203.2*	*2.3*
3 x 2	3.500 x 2.375	8.00	5.0
80 x 50	*88.9 x 60.3*	*203.2*	*2.3*
3 x 2½	3.500 x 2.875	8.00	5.0
80 x 65	*88.9 x 73.0*	*203.2*	*2.3*
4 x 1¼	4.500 x 1.660	9.00	8.0
100 x 32	*114.3 x 42.4*	*228.6*	*3.6*
4 x 1½	4.500 x 1.900	9.00	8.0
100 x 40	*114.3 x 48.3*	*228.6*	*3.6*
4 x 2	4.500 x 2.375	9.00	8.0
100 x 50	*114.3 x 60.3*	*228.6*	*3.6*
4 x 2½	4.500 x 2.875	9.00	8.0
100 x 65	*114.3 x 73.0*	*228.6*	*3.6*
4 x 3	4.500 x 3.500	9.00	8.0
100 x 80	*114.3 x 88.9*	*228.6*	*3.6*
5 x 1 1/2	5.563 x 1.900	11.00	12.0
125 x 40	*141.3 x 48.3*	*279.4*	*5.4*
5 x 2	5.563 x 2.375	11.00	12.0
125 x 50	*141.3 x 60.3*	*279.4*	*5.4*
5 x 2 1/2	5.563 x 2.875	11.00	12.0
125 x 65	*141.3 x 73.0*	*279.4*	*5.4*
5 x 3	5.563 x 3.500	11.00	12.0
125 x 80	*141.3 x 88.9*	*279.4*	*5.4*
5 x 4	5.563 x 4.500	11.00	12.0
125 x 100	*141.3 x 114.3*	*279.4*	*5.4*
6 x 2	6.625 x 2.375	12.00	19.0
150 x 50	*168.3 x 60.3*	*304.8*	*8.6*
6 x 2 1/2	6.625 x 2.875	12.00	19.0
150 x 65	*168.3 x 73.0*	*304.8*	*8.6*
6 x 3	6.625 x 3.500	12.00	19.0
150 x 80	*168.3 x 88.9*	*304.8*	*8.6*
6 x 4	6.625 x 4.500	12.00	19.0
150 x 100	*168.3 x 114.3*	*304.8*	*8.6*
6 x 5	6.625 x 5.563	12.00	19.0
150 x 125	*168.3 x 141.3*	*304.8*	*8.6*

FIGURE 397
SWAGGED NIPPLE
GROOVE x GROOVE
FABRICATED

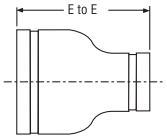


FIGURE 398
SWAGGED NIPPLE
GROOVE x MALE THREAD
FABRICATED

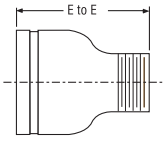
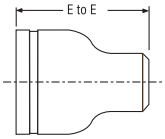


FIGURE 399
GROOVE x PLAIN END
FABRICATED



Please refer to General Notes on page 17.

FITTINGS

Figure 391, 392 & 393 Adapter Nipples

Nominal Size Inches *mm*	Pipe OD Inches *mm*	391, 392 & 393 Fabricated Nominal E to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	4.00	0.8
32	*42.4*	*101.6*	*0.4*
1½	1.900	4.00	0.9
40	*48.3*	*101.6*	*0.4*
2	2.375	4.00	1.2
50	*60.3*	*101.6*	*0.5*
2½	2.875	4.00	1.9
65	*73.0*	*101.6*	*0.9*
3	3.500	4.00	2.5
80	*88.9*	*101.6*	*1.1*
4	4.500	6.00	5.5
100	*114.3*	*152.4*	*2.5*
5	5.563	6.00	7.4
125	*141.3*	*152.4*	*3.4*
6	6.625	6.00	9.5
150	*168.3*	*152.4*	*4.3*
8	8.625	6.00	14.2
200	*219.1*	*152.4*	*6.4*
10	10.750	8.00	27.0
250	*273.0*	*203.2*	*12.2*
12	12.750	8.00	33.0
300	*323.9*	*203.2*	*15.0*

FIGURE 391
GROOVE x MALE THREAD

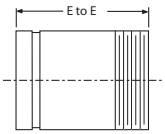


FIGURE 392
GROOVE x GROOVE

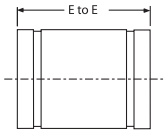


FIGURE 393
GROOVE x PLAIN END

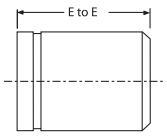


Figure 395 Hose Adapter Nipple

395 Fabricated Nominal Size Inches *mm*	End to End Inches *mm*	Approx Weight Lbs. *Kg*
1	3.25	0.4
25	*82.6*	*0.2*
1¼	3.63	0.7
32	*92.1*	*0.3*
1½	4.00	0.8
40	*101.6*	*0.4*
2	4.63	1.3
50	*117.5*	*0.6*
$2^{1}/_{5}$	5.50	2.1
65	*139.7*	*1.0*
3	6.00	3.3
80	*152.4*	*1.5*
4	7.25	5.5
100	*184.2*	*2.5*
5	9.75	8.1
125	*247.7*	*3.7*
6	11.00	13.2
150	*279.4*	*6.0*
8	12.50	24.0
200	*317.5*	*10.9*
10	14.00	29.0
250	*355.6*	*13.2*
12	16.00	46.0
300	*406.4*	*20.9*

FIGURE 395
HOSE ADAPTER NIPPLE

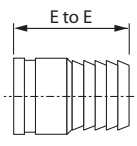
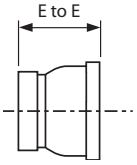


Figure 380 Female Thread Adapter

380 Fabricated Nominal Size Inches *mm*	Grooved End OD Inches *mm*	End to End Inches *mm*	Approx Weight Lbs. *Kg*
1	1.32	$2^{1}/_{16}$	0.7
25	*33.4*	*533*	*0.3*
$1^{1}/_{4}$	1.66	$2^{5}/_{16}$	1.4
32	*42.2*	*635*	*0.6*
$1^{1}/_{2}$	1.90	$2^{5}/_{16}$	1.5
40	*48.3*	*635*	*0.7*
2	2.38	2½	1.6
50	*60.3*	*64*	*0.7*
3	3.50	2¾	2.5
80	*88.9*	*70*	*1.1*
4	4.50	3¼	4.5
100	*114.3*	*83*	*2.0*

FIGURE 380 ADAPTER
GROOVE x FEMALE
THREAD ADAPTER



Please refer to General Notes on page 17.

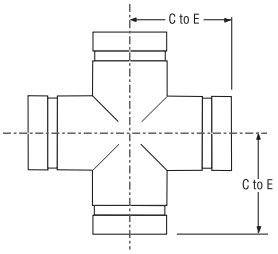
FITTINGS

Figure 227 Cast & 327 Cross

Nominal Size Inches *mm*	Pipe OD Inches *mm*	227 Cast		327 Fabricated	
		Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*	Nominal C to E Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	2.75	2.17	2.75	2.0
32	*42.4*	*69.90*	*0.98*	*69.9*	*0.9*
1½	1.900	2.75	2.50	2.75	2.2
40	*48.3*	*69.90*	*1.14*	*69.9*	*1.0*
2	2.375	3.25	3.70	3.25	2.7
50	*60.3*	*82.60*	*1.70*	*82.6*	*1.2*
2½	2.875	3.75	5.80	3.75	5.0
65	*73.0*	*95.30*	*2.60*	*95.3*	*2.3*
	3.000	3.75	6.03		
	76.1	*95.30*	*2.70*		
3	3.500	4.25	8.57	4.25	7.1
80	*88.9*	*108.00*	*3.89*	*108.0*	*3.2*
	4.250	5.00	13.20		
	108.0	*127.00*	*6.00*		
4	4.500	5.00	13.60	5.00	11.9
100	*114.3*	*127.00*	*6.17*	*127.0*	*5.4*
	5.250	5.50	17.70		
	133.0	*139.70*	*8.00*		
	5.500	5.50	18.50		
	139.7	*139.70*	*8.40*		
5	5.563	5.50	19.10	5.50	17.1
125	*141.3*	*139.70*	*8.70*	*139.7*	*7.8*
	6.500	6.50	27.30		
	165.1	*165.10*	*12.36*		
6	6.625	6.50	28.60	6.50	27.5
150	*168.3*	*165.10*	*12.90*	*165.1*	*12.5*
	8.500	7.75	47.50		
	216.3	*196.90*	*21.50*		
8	8.625	7.75	47.90	7.75	47.0
200	*219.1*	*196.90*	*21.70*	*196.9*	*21.3*
10	10.750	9.00	74.70	9.00	68.0
250	*273.0*	*228.60*	*33.90*	*278.6*	*30.8*
12	12.750	10.00	95.70	10.00	107.0
300	*323.9*	*254.00*	*43.40*	*254.0*	*48.5*
14	14.000			11.00	135.0
350	*355.6*			*279.4*	*61.8*
16	16.000			12.00	164.0
400	*406.4*			*304.8*	*74.4*
18	18.000			15.50	250.0
450	*457.2*			*393.7*	*113.4*
20	20.000			17.25	310.0
500	*508.0*			*438.2*	*140.6*
24	24.000			20.00	575.0
600	*609.6*			*508.0*	*260.8*

Please refer to General Notes on page 17.

FIGURE 327 CROSS
FABRICATED



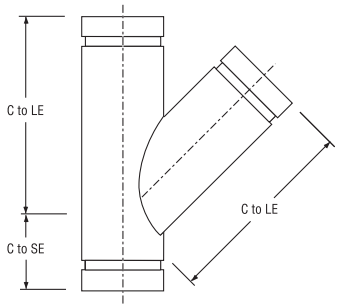
FITTINGS

Figure 314 45° Lateral

Nominal Size Inches *mm*	Pipe OD Inches *mm*	314 Fabricated		
		Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx Weight Lbs. *Kg*
2	2.375	7.00	2.75	4.5
50	*60.3*	*177.8*	*69.9*	*2.0*
2½	2.875	7.75	3.00	10.1
65	*73.0*	*196.9*	*76.2*	*4.6*
3	3.500	8.50	3.25	11.0
80	*88.9*	*215.9*	*82.6*	*5.0*
4	4.500	10.50	3.75	18.2
100	*114.3*	*266.7*	*95.3*	*8.3*
5	5.563	12.50	4.00	28.9
125	*141.3*	*317.5*	*101.6*	*13.1*
6	6.625	14.00	4.50	46.0
150	*168.3*	*355.6*	*114.3*	*20.9*
8	8.625	18.00	6.00	83.0
200	*219.1*	*457.2*	*152.4*	*37.6*
10	10.750	20.50	6.50	127.0
250	*273.0*	*520.7*	*165.1*	*57.6*
12	12.750	23.00	7.00	166.0
300	*323.9*	*584.2*	*177.8*	*75.3*
14	14.000	26.50	7.50	210.0
350	*355.6*	*673.1*	*190.5*	*95.3*
16	16.000	29.00	8.00	340.0
400	*406.4*	*736.6*	*203.2*	*154.2*
18	18.000	32.00	8.50	415.0
450	*457.2*	*812.8*	*215.9*	*188.2*
20	20.000	35.00	9.00	500.0
500	*508.0*	*889.0*	*238.6*	*226.8*
24	24.000	40.00	10.00	925.0
600	*609.6*	*1016.0*	*254.0*	*419.6*

Please refer to General Notes on page 17.

FIGURE 314 45° LATERAL
FABRICATED



FITTINGS

Figure 325 45° Reducing Lateral

Nominal Size Inches *mm*	Pipe OD Inches *mm*	325 Fabricated Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx Weight Lbs. *Kg*
3 x 3 x 2	3.500 x 3.500 x 2.375	8.50	3.25	9.9
80 x 80 x 50	*88.9 x 88.9 x 60.3*	*215.9*	*82.6*	*4.5*
3 x 3 x 2½	3.500 x 3.500 x 2.875	8.50	3.25	11.5
80 x 80 x 65	*88.9 x 88.9 x 73.0*	*215.9*	*82.6*	*5.2*
4 x 4 x 2	4.500 x 4.500 x 2.375	10.50	3.75	16.0
100 x 100 x 50	*114.3 x 114.3 x 60.3*	*266.7*	*95.3*	*7.3*
4 x 4 x 2½	4.500 x 4.500 x 2.875	10.50	3.75	17.0
100 x 100 x 65	*114.3 x 114.3 x 73.0*	*266.7*	*95.3*	*7.7*
4 x 4 x 3	4.500 x 4.500 x 3.500	10.50	3.75	18.6
100 x 100 x 80	*114.3 x 114.3 x 88.9*	*266.7*	*95.3*	*8.4*
5 x 5 x 2	5.563 x 5.563 x 2.375	12.50	4.00	23.0
125 x 125 x 50	*141.3 x 141.3 x 60.3*	*317.5*	*101.6*	*10.4*
5 x 5 x 2½	5.563 x 5.563 x 2.875	12.50	4.00	23.5
125 x 125 x 65	*141.3 x 141.3 x 73.0*	*317.5*	*101.6*	*10.7*
5 x 5 x 3	5.563 x 5.563 x 3.500	12.50	4.00	27.0
125 x 125 x 80	*141.3 x 141.3 x 88.9*	*317.5*	*101.6*	*12.2*
5 x 5 x 4	5.563 x 5.563 x 4.500	12.50	4.00	31.0
125 x 125 x 100	*141.3 x 141.3 x 114.3*	*317.5*	*101.6*	*14.1*
6 x 6 x 2	6.625 x 6.625 x 2.375	14.00	4.50	33.0
150 x 150 x 50	*168.3 x 168.3 x 60.3*	*355.6*	*114.3*	*15.0*
6 x 6 x 2½	6.625 x 6.625 x 2.875	14.00	4.50	34.0
150 x 150 x 65	*168.3 x 168.3 x 73.0*	*355.6*	*114.3*	*15.4*
6 x 6 x 3	6.625 x 6.625 x 3.500	14.00	4.50	37.1
150 x 150 x 80	*168.3 x 168.3 x 88.9*	*355.6*	*114.3*	*16.8*
6 x 6 x 4	6.625 x 6.625 x 4.500	14.00	4.50	40.1
150 x 150 x 100	*168.3 x 168.3 x 114.3*	*355.6*	*114.3*	*18.2*
6 x 6 x 5	6.625 x 6.625 x 5.563	14.00	4.50	45.1
150 x 150 x 125	*168.3 x 168.3 x 141.3*	*355.6*	*114.3*	*20.5*
8 x 8 x 4	8.625 x 8.625 x 4.500	18.00	6.00	60.0
200 x 200 x 100	*219.1 x 219.1 x 114.1*	*457.2*	*152.4*	*27.2*
8 x 8 x 5	8.625 x 8.625 x 5.563	18.00	6.00	68.1
200 x 200 x 125	*219.1 x 219.1 x 141.3*	*457.2*	*152.4*	*30.9*
8 x 8 x 6	8.625 x 8.625 x 6.625	18.00	6.00	76.0
200 x 200 x 150	*219.1 x 219.1 x 168.3*	*457.2*	*152.4*	*34.5*
10 x 10 x 4	10.750 x 10.750 x 4.500	20.50	6.50	83.1
250 x 250 x 100	*273.0 x 273.0 x 114.3*	*520.7*	*165.1*	*37.7*
10 x 10 x 5	10.750 x 10.750 x 5.563	20.50	6.50	100.2
250 x 250 x 125	*273.0 x 273.0 x 141.3*	*520.7*	*165.1*	*45.5*
10 x 10 x 6	10.750 x 10.750 x 6.625	20.50	6.50	106.0
250 x 250 x 150	*273.0 x 273.0 x 168.3*	*520.7*	*165.1*	*48.1*
10 x 10 x 8	10.750 x 10.750 x 8.625	20.50	6.50	117.0
250 x 250 x 200	*273.0 x 273.0 x 219.1*	*520.7*	*165.1*	*53.1*
12 x 12 x 4	12.750 x 12.750 x 4.500	23.00	7.00	138.0
300 x 300 x 100	*323.9 x 323.9 x 114.3*	*584.2*	*177.8*	*62.6*
12 x 12 x 6	12.750 x 12.750 x 6.625	23.00	7.00	139.9
300 x 300 x 150	*323.9 x 323.9 x 168.3*	*584.2*	*177.8*	*63.5*
12 x 12 x 8	12.750 x 12.750 x 8.625	23.00	7.00	148.0
300 x 300 x 200	*323.9 x 323.9 x 219.1*	*584.2*	*177.8*	*67.1*
12 x 12 x 10	12.750 x 12.750 x 10.750	23.00	7.00	166.0
300 x 300 x 250	*323.9 x 323.9 x 273.0*	*584.2*	*177.8*	*75.3*
14 x 14 x 4	14.000 x 14.000 x 4.500	26.50	7.50	167.9
350 x 350 x 100	*355.6 x 355.6 x 114.3*	*673.1*	*190.5*	*76.2*
14 x 14 x 6	14.000 x 14.000 x 6.625	26.50	7.50	177.2
350 x 350 x 150	*355.6 x 355.6 x 168.3*	*673.1*	*190.5*	*80.4*
14 x 14 x 8	14.000 x 14.000 x 8.625	26.50	7.50	182.5
350 x 350 x 200	*355.6 x 355.6 x 219.1*	*673.1*	*190.5*	*82.8*

Please refer to General Notes on page 17.

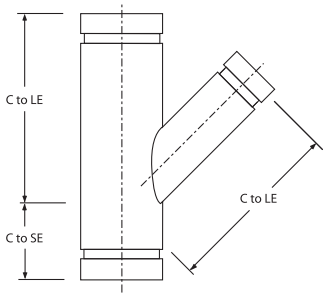


FIGURE 325 45° REDUCING LATERAL FABRICATED

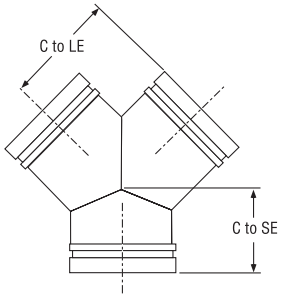
Nominal Size Inches *mm*	Pipe OD Inches *mm*	325 Fabricated Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx Weight Lbs. *Kg*
14 x 14 x 10	14.000 x 14.000 x 10.750	26.50	7.50	193.0
350 x 350 x 250	*355.6 x 355.6 x 273.0*	*673.1*	*190.5*	*87.5*
14 x 14 x 12	14.000 x 14.000 x 12.750	26.50	7.50	203.0
350 x 350 x 300	*355.6 x 355.6 x 323.9*	*673.1*	*190.5*	*92.1*
16 x 16 x 6	16.000 x 16.000 x 6.625	29.00	8.00	217.2
400 x 400 x 150	*406.4 x 406.4 x 168.3*	*736.6*	*203.0*	*98.5*
16 x 16 x 8	16.000 x 16.000 x 8.625	29.00	8.00	223.0
400 x 400 x 200	*406.4 x 406.4 x 219.1*	*736.6*	*203.0*	*101.2*
16 x 16 x 10	16.000 x 16.000 x 10.750	29.00	8.00	234.1
400 x 400 x 250	*406.4 x 406.4 x 273.0*	*736.6*	*203.0*	*106.2*
16 x 16 x 12	16.000 x 16.000 x 12.750	29.00	8.00	245.4
400 x 400 x 300	*406.4 x 406.4 x 323.9*	*736.6*	*203.0*	*111.3*
16 x 16 x 14	16.000 x 16.000 x 14.000	29.00	8.00	261.0
400 x 400 x 350	*406.4 x 406.4 x 355.6*	*736.6*	*203.0*	*118.4*
18 x 18 x 6	18.000 x 18.000 x 6.625	32.00	8.50	265.1
450 x 450 x 150	*457.2 x 457.2 x 168.3*	*812.8*	*215.9*	*120.2*
18 x 18 x 8	18.000 x 18.000 x 8.625	32.00	8.50	271.5
450 x 450 x 200	*457.2 x 457.2 x 219.1*	*812.8*	*215.9*	*123.2*
18 x 18 x 10	18.000 x 18.000 x 10.750	32.00	8.50	283.5
450 x 450 x 250	*457.2 x 457.2 x 273.0*	*812.8*	*215.9*	*128.6*
18 x 18 x 12	18.000 x 18.000 x 12.750	32.00	8.50	296.0
450 x 450 x 300	*457.2 x 457.2 x 323.9*	*812.8*	*215.9*	*134.3*
18 x 18 x 14	18.000 x 18.000 x 14.000	32.00	8.50	312.6
450 x 450 x 350	*457.2 x 457.2 x 355.6*	*812.8*	*215.9*	*141.8*
18 x 18 x 16	18.000 x 18.000 x 16.000	32.00	8.50	322.6
450 x 450 x 400	*457.2 x 457.2 x 406.4*	*812.8*	*215.9*	*146.3*
20 x 20 x 12	20.000 x 20.000 x 12.750	35.00	9.00	351.4
500 x 500 x 300	*508.0 x 508.0 x 323.9*	*889.0*	*228.6*	*159.4*
20 x 20 x 14	20.000 x 20.000 x 14.000	35.00	9.00	369.1
500 x 500 x 350	*508.0 x 508.0 x 355.6*	*889.0*	*228.6*	*167.4*
20 x 20 x 16	20.000 x 20.000 x 16.000	35.00	9.00	379.7
500 x 500 x 400	*508.0 x 508.0 x 406.4*	*889.0*	*228.6*	*172.2*
24 x 24 x 16	24.000 x 24.000 x 16.000	40.00	10.00	495.6
600 x 600 x 400	*609.6 x 609.6 x 406.4*	*1016.0*	*254.0*	*224.8*
24 x 24 x 20	24.000 x 24.000 x 20.000	40.00	10.00	518.4
600 x 600 x 500	*609.6 x 609.6 x 508.0*	*1016.0*	*254.0*	*235.1*

FITTINGS

Figure 324 90° True Y

Nominal Size Inches *mm*	Pipe OD Inches *mm*	324 Fabricated Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	2.75	2.50	1.5
32	*42.4*	*69.9*	*63.5*	*0.7*
1½	1.900	2.75	2.75	1.8
40	*48.3*	*69.9*	*69.9*	*0.8*
2	2.375	3.25	2.75	2.3
50	*60.3*	*82.6*	*69.9*	*1.0*
2½	2.875	3.75	3.00	4.8
65	*73.0*	*95.3*	*76.2*	*2.2*
3	3.500	4.25	3.25	6.0
80	*88.9*	*108.0*	*82.6*	*2.7*
4	4.500	5.00	3.75	10.5
100	*114.3*	*127.0*	*95.3*	*4.8*
5	5.563	5.50	4.00	15.0
125	*141.3*	*139.7*	*101.6*	*6.8*
6	6.625	6.50	4.50	21.0
150	*168.3*	*165.1*	*114.3*	*9.5*
8	8.625	7.75	6.00	35.0
200	*219.1*	*196.9*	*152.4*	*15.9*
10	10.750	9.00	6.50	50.0
250	*273.0*	*228.6*	*165.1*	*22.7*
12	12.750	10.00	7.00	87.7
300	*323.9*	*254.0*	*177.8*	*39.8*
14	14.000	11.00	7.50	105.3
350	*355.6*	*279.4*	*190.5*	*47.8*

FIGURE 324 90° TRUE Y FABRICATED

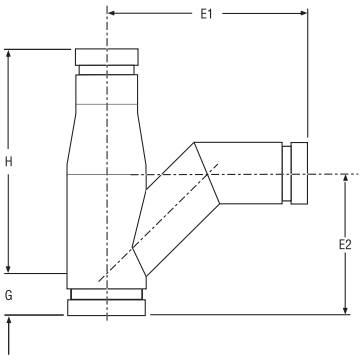


Nominal Size Inches *mm*	Pipe OD Inches *mm*	324 Fabricated Nominal C to LE Inches *mm*	Nominal C to SE Inches *mm*	Approx Weight Lbs. *Kg*
16	16.000	12.00	8.00	129.1
400	*406.4*	*304.8*	*203.2*	*58.6*
18	18.000	15.50	8.50	184.4
450	*457.2*	*393.7*	*215.9*	*83.6*
20	20.000	17.25	9.00	225.8
500	*508.0*	*438.2*	*228.6*	*102.4*
24	24.000	20.00	10.00	308.5
600	*609.6*	*508.0*	*254.0*	*139.9*

Figure 331 Reducing Tee Wye

Nominal Size Inches *mm*	Pipe OD Inches *mm*	331 Fabricated Nominal G Inches *mm*	Nominal H Inches *mm*	Nominal E1 Inches *mm*	Nominal E2 Inches *mm*	Approx Weight Lbs. *Kg*
4 x 3 x 3	4.500 x 3.500 x 3.500	1.63	7.38	10.75	5.63	15.9
100 x 80 x 80	*114.3 x 88.9 x 88.9*	*41.4*	*187.5*	*273.1*	*143.0*	*7.2*
4 x 3 x 4	4.500 x 3.500 x 4.500	3.75	10.50	13.63	8.13	26.8
100 x 80 x 100	*114.3 x 88.9 x 114.3*	*95.3*	*266.7*	*346.2*	*206.5*	*12.2*
5 x 3 x 3	5.563 x 3.500 x 3.500	1.25	9.75	11.50	6.50	24.8
125 x 80 x 80	*141.3 x 88.9 x 88.9*	*31.8*	*247.7*	*292.1*	*165.1*	*11.2*
5 x 3 x 5	5.563 x 3.500 x 5.563	4.00	12.50	16.13	10.00	44.1
125 x 80 x 100	*141.3 x 88.9 x 141.3*	*101.6*	*317.5*	*409.7*	*254.0*	*20.0*
5 x 4 x 3	5.563 x 4.500 x 3.500	1.88	9.13	11.88	6.88	21.1
125 x 100 x 80	*141.3 x 114.3 x 88.9*	*47.8*	*231.9*	*301.88*	*174.8*	*9.6*
5 x 4 x 4	5.563 x 4.500 x 4.500	1.88	9.13	12.75	7.25	25.6
125 x 100 x 100	*141.3 x 114.3 x 114.3*	*47.8*	*231.9*	*323.9*	*184.2*	*11.6*
6 x 4 x 6	6.625 x 4.500 x 6.625	4.50	14.00	18.25	11.50	62.0
150 x 100 x 150	*168.3 x 114.3 x 168.3*	*114.3*	*355.6*	*463.6*	*292.1*	*28.1*
6 x 5 x 3	6.625 x 5.563 x 3.500	1.25	10.75	13.00	8.00	26.7
150 x 125 x 80	*168.3 x 141.3 x 88.9*	*31.8*	*273.1*	*330.2*	*203.2*	*12.1*
6 x 5 x 4	6.625 x 5.563 x 4.500	1.25	10.75	13.88	8.38	32.0
150 x 125 x 100	*168.3 x 141.3 x 114.3*	*31.8*	*273.1*	*352.6*	*212.9*	*14.5*
8 x 6 x 4	8.625 x 6.625 x 4.500	1.00	12.00	14.75	9.25	46.0
200 x 150 x 100	*219.1 x 168.3 x 114.1*	*25.4*	*304.8*	*374.7*	*235.0*	*20.9*
8 x 6 x 8	8.625 x 6.625 x 8.625	6.00	18.00	23.25	15.25	93.0
200 x 150 x 200	*219.1 x 168.3 x 219.1*	*152.4*	*457.2*	*590.6*	*387.4*	*42.2*

FIGURE 331 REDUCING TEE WYE FABRICATED (GALVANIZED)



Please refer to General Notes on page 17.

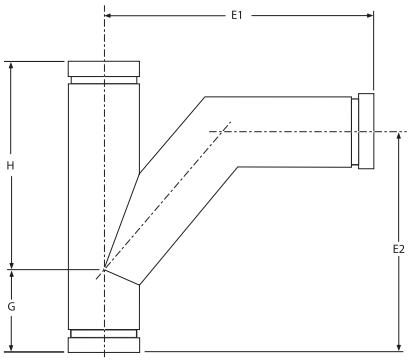
FITTINGS

Figure 330 Tee Wye

Nominal Size Inches *mm*	Pipe OD Inches *mm*	330 Fabricated				
		Nominal G Inches *mm*	Nominal H Inches *mm*	Nominal E1 Inches *mm*	Nominal E2 Inches *mm*	Approx Weight Lbs. *Kg*
2 x 2 x 2	2.375 x 2.375 x 2.375	2.75	7.00	9.00	4.63	6.5
50 x 50 x 50	*60.3 x 60.6 x 60.6*	*69.9*	*177.8*	*228.6*	*117.6*	*2.9*
2½ x 2½ x 2½	2.875 x 2.875 x 2.875	3.00	7.75	10.50	5.75	11.6
65 x 65 x 65	*73.0 x 73.0 x 73.0*	*76.2*	*196.9*	*266.7*	*146.1*	*5.3*
3 x 3 x 3	3.500 x 3.500 x 3.500	3.25	8.50	11.50	6.50	16.6
80 x 80 x 80	*88.9 x 88.9 x 88.9*	*82.6*	*215.9*	*292.1*	*165.1*	*7.5*
4 x 4 x 3	4.500 x 4.500 x 3.500	3.75	10.50	12.88	7.88	24.0
100 x 100 x 80	*114.3 x 114.3 x 88.9*	*95.3*	*266.7*	*327.2*	*200.2*	*10.9*
4 x 4 x 4	4.500 x 4.500 x 4.500	3.75	10.50	13.63	8.13	26.1
100 x 100 x 100	*114.3 x 114.3 x 114.3*	*95.3*	*266.7*	*346.2*	*206.5*	*11.8*
5 x 5 x 3	5.563 x 5.563 x 3.500	4.00	12.50	14.25	9.25	32.1
125 x 125 x 80	*141.3 x 141.3 x 88.9*	*101.6*	*317.5*	*362.0*	*235.0*	*14.6*
5 x 5 x 4	5.563 x 5.563 x 4.500	4.00	12.50	15.13	9.63	35.5
125 x 125 x 100	*141.3 x 141.3 x 114.3*	*101.6*	*317.5*	*384.3*	*244.6*	*16.1*
5 x 5 x 5	5.563 x 5.563 x 5.563	4.00	12.50	16.13	10.00	41.0
125 x 125 x 125	*141.3 x 141.3 x 141.3*	*101.6*	*317.5*	*409.7*	*254.0*	*18.6*
6 x 6 x 3	6.625 x 6.625 x 3.500	4.50	14.00	15.31	10.31	51.1
150 x 150 x 80	*168.3 x 168.3 x 88.9*	*114.3*	*355.6*	*388.9*	*261.9*	*23.2*
6 x 6 x 4	6.625 x 6.625 x 4.500	4.50	14.00	16.25	10.75	55.1
150 x 150 x 100	*168.3 x 168.3 x 114.3*	*114.3*	*355.6*	*412.8*	*273.1*	*25.0*
6 x 6 x 5	6.625 x 6.625 x 5.563	4.50	14.00	17.25	11.13	58.2
150 x 150 x 125	*168.3 x 168.3 x 141.3*	*114.3*	*355.6*	*438.2*	*282.7*	*26.4*
6 x 6 x 6	6.625 x 6.625 x 6.625	4.50	14.00	18.25	11.50	61.0
150 x 150 x 150	*168.3 x 168.3 x 168.3*	*114.3*	*355.6*	*463.6*	*292.1*	*27.7*
8 x 8 x 3	8.625 x 8.625 x 3.500	6.00	18.00	18.19	13.19	101.0
200 x 200 x 80	*219.1 x 219.1 x 88.9*	*152.4*	*457.2*	*462.0*	*355.0*	*45.8*
8 x 8 x 4	8.625 x 8.625 x 4.500	6.00	18.00	19.00	13.50	111.5
200 x 200 x 100	*219.1 x 219.1 x 114.1*	*152.4*	*457.2*	*482.6*	*342.9*	*50.6*
8 x 8 x 5	8.625 x 8.625 x 5.563	6.00	18.00	20.00	13.88	112.0
200 x 200 x 125	*219.1 x 219.1 x 141.3*	*152.4*	*457.2*	*508.0*	*352.6*	*50.8*
8 x 8 x 6	8.625 x 8.625 x 6.625	6.00	18.00	21.13	14.38	113.0
200 x 200 x 150	*219.1 x 219.1 x 168.3*	*152.4*	*457.2*	*536.7*	*365.3*	*51.3*
8 x 8 x 8	8.625 x 8.625 x 8.625	6.00	18.00	23.25	15.25	119.0
200 x 200 x 200	*219.1 x 219.1 x 219.1*	*152.4*	*457.2*	*590.6*	*387.4*	*54.0*
10 x 10 x 3	10.750 x 10.750 x 3.500	6.50	20.50	19.88	14.88	131.0
250 x 250 x 80	*273.0 x 273.0 x 88.9*	*165.1*	*520.7*	*505.0*	*378.0*	*59.4*
10 x 10 x 4	10.750 x 10.750 x 4.500	6.50	20.50	20.75	15.25	136.0
250 x 250 x 100	*273.0 x 273.0 x 114.3*	*165.1*	*520.7*	*527.1*	*387.4*	*61.7*
10 x 10 x 5	10.750 x 10.750 x 5.563	6.50	20.50	21.88	15.75	139.0
250 x 250 x 125	*273.0 x 273.0 x 141.3*	*165.1*	*520.7*	*555.8*	*400.1*	*63.1*
10 x 10 x 6	10.750 x 10.750 x 6.625	6.50	20.50	22.88	16.13	146.0
250 x 250 x 150	*273.0 x 273.0 x 168.3*	*165.1*	*520.7*	*581.2*	*409.7*	*66.2*
10 x 10 x 8	10.750 x 10.750 x 8.625	6.50	20.50	27.25	19.25	155.0
250 x 250 x 200	*273.0 x 273.0 x 219.1*	*165.1*	*520.7*	*692.2*	*489.0*	*70.3*
10 x 10 x 10	10.750 x 10.750 x 10.750	6.50	20.50	27.25	18.00	195.0
250 x 250 x 250	*273.0 x 273.0 x 273.0*	*165.1*	*520.7*	*692.2*	*457.2*	*88.5*
12 x 12 x 3	12.750 x 12.750 x 3.500	7.00	23.00	20.75	15.75	140.0
300 x 300 x 80	*323.9 x 323.9 x 88.9*	*177.8*	*584.2*	*527.1*	*400.1*	*63.5*
12 x 12 x 4	12.750 x 12.750 x 4.500	7.00	23.00	21.50	16.00	145.0
300 x 300 x 100	*323.9 x 323.9 x 114.3*	*177.8*	*584.2*	*546.1*	*406.4*	*65.8*
12 x 12 x 6	12.750 x 12.750 x 6.625	7.00	23.00	23.75	17.00	165.0
300 x 300 x 150	*323.9 x 323.9 x 168.3*	*177.8*	*584.2*	*603.3*	*431.8*	*74.8*
12 x 12 x 8	12.750 x 12.750 x 8.625	7.00	23.00	26.00	18.00	175.0
300 x 300 x 200	*323.9 x 323.9 x 219.1*	*177.8*	*584.2*	*660.4*	*457.2*	*79.4*
12 x 12 x 10	12.750 x 12.750 x 10.750	7.00	23.00	28.00	18.75	200.0
300 x 300 x 250	*323.9 x 323.9 x 273.0*	*177.8*	*584.2*	*711.2*	*476.3*	*90.7*
12 x 12 x 12	12.750 x 12.750 x 12.750	7.00	23.00	31.00	20.50	240.0
300 x 300 x 300	*323.9 x 323.9 x 323.9*	*177.8*	*584.2*	*787.4*	*520.7*	*108.9*

Please refer to General Notes on page 17.

FIGURE 330 TEE WYE
FABRICATED



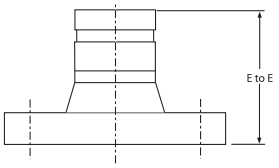
FITTINGS

Figure 341 Flange Adapter (ANSI Class 150 Lbs.)
Figure 342 Flange Adapter (ANSI Class 300 Lbs.)

Nominal Size Inches *mm*	Pipe OD Inches *mm*	Nominal E to E Inches *mm*	341 Fabricated		342 Fabricated	
			Mating Flange Bolt *Qty*	Approx Weight Lbs. *Kg*	Mating Flange Bolt *Qty*	Approx Weight Lbs. *Kg*
1¼	1.660	4.00	4	2.8	4	4.6
32	*42.4*	*101.6*		*1.3*		*2.1*
1½	1.900	4.00	4	3.2	4	7.1
40	*48.3*	*101.6*		*1.5*		*3.2*
2	2.375	4.00	4	5.2	8	8.2
50	*60.3*	*101.6*		*2.4*		*3.7*
2½	2.875	4.00	4	8.0	8	11.9
65	*73.0*	*101.6*		*3.6*		*5.4*
3	3.500	4.00	4	10.2	8	15.5
80	*88.9*	*101.6*		*4.6*		*7.0*
4	4.500	6.00	8	17.2	8	28.0
100	*114.3*	*152.4*		*7.8*		*12.7*
5	5.563	6.00	8	21.4	8	35.0
125	*141.3*	*152.4*		*9.7*		*15.9*
6	6.625	6.00	8	26.0	12	50.0
150	*168.3*	*152.4*		*11.8*		*22.7*
8	8.625	6.00	8	38.4	12	73.0
200	*219.1*	*152.4*		*17.4*		*32.7*
10	10.750	8.00	12	65.0	16	103.0
250	*273.0*	*203.2*		*29.5*		*46.7*
12	12.750	8.00	12	91.0	16	143.0
300	*323.9*	*203.2*		*41.3*		*64.9*
14	14.000	8.00	12	123.0	20	199.0
350	*355.6*	*203.2*		*55.8*		*90.3*
16	16.000	8.00	12	151.0	20	255.0
400	*406.4*	*203.2*		*68.5*		*155.7*
18	18.000	8.00	16	165.0	24	303.0
450	*457.2*	*203.2*		*74.8*		*137.4*
20	20.000	8.00	20	205.0	24	365.0
500	*508.0*	*203.2*		*93.0*		*165.6*
24	24.000	8.00	20	265.0	24	550.0
600	*609.6*	*203.2*		*120.2*		*249.5*

Please refer to General Notes on page 17.

FIGURE 341 FLANGE ADAPTER FABRICATED



FITTINGS

Figure 407GT & 407T Clearflow® Dielectric Waterway

Clearflow® fittings protect plumbing systems through an innovative steel-to-plastic design that establishes a dielectric waterway. The Clearflow line of dielectric fittings separates dissimilar metals in the electrolyte (waterway) eliminating the local galvanic cell.

Clearflow's metal-to-metal joint design maintains external electrical continuity, thereby preventing stray current corrosion. This feature is critical when stray current is present due to intentional or non-intentional grounding of direct current (DC) sources, such as phone systems and appliances.

Clearflow fittings meet the requirements of ASTM standard F-492 for continuous use at temperatures up to 230°F (110°C).

Test Data/Results and Listings:

Test data provided by Pittsburgh Testing Laboratory can be provided upon request.

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FIGURE 407GT

FIGURE 407T

Nominal Size Inches *mm*	Pipe OD Inches *mm*	407GT Grooved x Threaded	
		Nominal End to End Inches *mm*	Approx Weight Lbs. *Kg*
1¼	1.660	4.00	0.6
32	*42.4*	*101.6*	*0.3*
1½	1.900	4.00	0.8
40	*48.3*	*101.6*	*0.4*
2	2.375	4.00	1.0
50	*60.3*	*101.6*	*0.5*
2½	2.875	6.00	1.6
65	*73.0*	*152.4*	*0.7*
3	3.500	6.00	2.0
80	*88.9*	*152.4*	*0.9*
4	4.500	6.00	4.5
100	*114.3*	*152.4*	*2.0*

Please refer to General Notes on page 17.

Nominal Size Inches *mm*	Pipe OD Inches *mm*	407T Threaded x Threaded	
		Nominal End to End Inches *mm*	Approx Weight Lbs. *Kg*
½	0.840	3.00	0.2
15	*21.3*	*76.2*	*0.1*
¾	1.050	3.00	0.2
20	*26.7*	*76.2*	*0.1*
1	1.315	4.00	0.3
25	*33.7*	*101.6*	*0.1*
1¼	1.660	4.00	0.3
32	*42.4*	*101.6*	*0.1*
1½	1.900	4.00	0.8
40	*48.3*	*101.6*	*0.4*
2	2.375	4.00	0.8
50	*60.3*	*101.6*	*0.4*
2½	2.875	6.00	1.6
65	*73.0*	*152.4*	*0.7*
3	3.500	6.00	2.0
80	*88.9*	*152.4*	*0.9*
4	4.500	6.00	4.5
100	*114.3*	*152.4*	*2.0*

MECHANICAL TEES

MECHANICAL TEES

The Figure 730 Mechanical Tees are rated at 500 psi (34.5 Bar) on standard weight pipe and can be used in place of a tee, a cross connection, or a welded outlet where a threaded or grooved outlet is needed. The Mechanical Tee is ideal for use in retrofit or equipment hookup installations, as it can be positioned along the pipe at the proper location in the field, ensuring exact lineup of the branch outlet connection. All Figure 730 Mechanical Tees are provided with a ductile iron lower housing section for increased strength and dependability. This provides stability, rigidity, and inhibits damage to the pipe during tightening.

Mechanical Tees

Figure 730 Female Threaded Branch
Pages 58-59

Figure 730 Grooved Branch
Pages 60-61

Various end configurations are obtainable:

Mechanical Cross

Threaded x Threaded

Grooved x Grooved

Threaded x Grooved

MECHANICAL TEES

MATERIAL SPECIFICATIONS

Housing Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings Grade 65-45-12
- Tensile Strength, Minimum PSI – 65,000 (MPa-448)
- Yield Strength, Minimum PSI – 45,000 (MPa-310)
- Elongation in 2" (50mm), Minimum 12%
- ASTM A-153 – Standard Specification for Hot Dip Galvanizing

Bolt/Nut Specifications

- Carbon steel oval neck bolts and nuts are heat treated and conform to the physical properties of ASTM A-183 with a minimum tensile strength of 110,000 psi (758,422 kPa). Bolts and nuts are zinc electroplated to ASTM B633.
- Gold color coded metric bolts conforming to the physical properties of ASTM F568M are available upon request. Contact Tyco Fire & Building Products.

Gasket Specifications

- **Grade "E" EPDM** gaskets have a green color code identification and conform to ASTM D-2,000 for service temperatures from -30°F (-34°C) to 230°F (110°C). They are recommended for hot water not to exceed 230°F (110°C), plus a variety of dilute acids, oil free air and many chemical services. They are not recommended for petroleum services.
- **Grade "T" Nitrile** gaskets have an orange color code identification and conform to ASTM D-2000 for service temperatures from -20°F (-29°C) to 180°F (82°C). They are recommended for petroleum products, vegetable oils, mineral oils, and air with oil vapors.

Coatings

- Orange – Non-Lead (Standard)
- RAL Red – Non-Lead (Optional)
- Hot Dipped Zinc Galvanized (Optional)

MECHANICAL TEES

Figure 730 Mechanical Tee – Threaded

Nominal Size Run x Branch Inches *mm*	Hole Dia.† Hole Inches *mm*	Hole Dia.† Max. Inches *mm*	Max.‡ End Load (Branch) lbs *kN*	Nominal Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	Bolt Size Inches *mm*	Tee Approx. Weight lbs *kg*	Cross Approx. Weight lbs *kg*
2 x ½	1.50	1.63	277.1	2.62	4.88	3.07	2.12	1.59	⅜ x 2¼	2.2	2.6
50 x 15	*38.1*	*41.3*	*1.2*	*66.5*	*124.0*	*78.0*	*53.8*	*40.4*	*M10 x 57*	*1.0*	*1.2*
2 x ¾	1.50	1.63	433.0	2.62	4.88	3.07	2.12	1.59	⅜ x 2¼	2.2	2.6
50 x 20	*38.1*	*41.3*	*1.9*	*66.5*	*124.0*	*78.0*	*53.8*	*40.4*	*M10 x 57*	*1.0*	*1.2*
2 x 1	1.50	1.63	679.1	2.62	4.88	3.07	2.12	1.59	⅜ x 2¼	2.2	2.6
50 x 25	*38.1*	*41.3*	*3.0*	*66.5*	*124.0*	*78.0*	*53.8*	*40.4*	*M10 x 57*	*1.0*	*1.2*
2 x 1¼	1.75	1.88	1082.1	2.78	4.88	3.32	1.93	1.59	⅜ x 2¼	2.5	3.3
50 x 32	*44.5*	*47.6*	*4.8*	*70.6*	*124.0*	*84.3*	*49.0*	*40.4*	*M10 x 57*	*1.1*	*1.5*
2 x 1½	1.75	1.88	1417.6	2.75	4.88	3.32	1.93	1.59	⅜ x 2¼	2.5	3.7
50 x 40	*44.5*	*47.6*	*6.3*	*69.9*	*124.0*	*84.3*	*49.0*	*40.4*	*M10 x 57*	*1.1*	*1.7*
2½ x ½	1.50	1.63	277.1	2.88	5.25	3.07	2.38	1.81	⅜ x 2¼	2.7	3.1
65 x 15	*38.1*	*41.3*	*1.2*	*73.2*	*133.4*	*78.0*	*60.5*	*46.0*	*M10 x 57*	*1.2*	*1.4*
2½ x ¾	1.50	1.63	433.0	2.88	5.25	3.07	2.38	1.81	⅜ x 2¼	2.7	3.1
65 x 20	*38.1*	*41.3*	*1.9*	*73.2*	*133.4*	*78.0*	*60.5*	*46.0*	*M10 x 57*	*1.2*	*1.4*
2½ x 1	1.50	1.63	679.1	2.88	5.25	3.07	2.38	1.81	⅜ x 2¼	2.7	3.1
65 x 25	*38.1*	*41.3*	*3.0*	*73.2*	*133.4*	*78.0*	*60.5*	*46.0*	*M10 x 57*	*1.2*	*1.4*
2½ x 1¼	2.00	2.13	1082.1	3.00	5.25	3.56	2.19	1.81	⅜ x 2¼	3.1	3.9
65 x 32	*50.8*	*54.0*	*4.8*	*76.2*	*133.4*	*90.4*	*55.6*	*46.0*	*M10 x 57*	*1.4*	*1.8*
2½ x 1½	2.00	2.13	1417.6	3.07	5.25	3.59	2.17	1.81	⅜ x 2¼	3.3	4.3
65 x 40	*50.8*	*54.0*	*6.3*	*78.0*	*133.4*	*91.2*	*55.1*	*46.0*	*M10 x 57*	*1.5*	*1.9*
2½ x 2	2.00	2.13	2215.1	3.19	5.25	4.00	2.44	1.81	⅜ x 2¼	3.5	4.4
65 x 50	*50.8*	*54.0*	*9.9*	*81.0*	*133.4*	*101.6*	*62.0*	*46.0*	*M10 x 57*	*1.6*	*2.0*
76.1mm x ½	1.50	1.63	277.1	2.94	5.62	3.07	2.44	1.87	M10 x 57	2.7	3.1
65 x 15	*38.1*	*41.3*	*1.2*	*74.5*	*142.7*	*78.0*	*62.0*	*47.5*		*1.2*	*1.4*
76.1mm x ¾	1.50	1.63	433.0	2.94	5.62	3.07	2.44	1.87	M10 x 57	2.7	3.1
65 x 20	*38.1*	*41.3*	*1.9*	*74.5*	*142.7*	*78.0*	*62.0*	*47.5*		*1.2*	*1.4*
76.1mm x 1	1.50	1.63	679.1	2.94	5.62	3.07	2.44	1.87	M10 x 57	2.7	3.1
65 x 25	*38.1*	*41.3*	*3.0*	*74.5*	*142.7*	*78.0*	*62.0*	*47.5*		*1.2*	*1.4*
76.1mm x 1¼	2.00	2.13	1082.1	3.06	5.62	3.56	2.25	1.87	M10 x 57	3.1	3.9
65 x 32	*50.8*	*54.0*	*4.8*	*77.7*	*142.7*	*90.4*	*57.2*	*47.5*		*1.4*	*1.8*
76.1mm x 1½	2.00	2.13	1417.6	3.13	5.62	3.56	2.25	1.87	M10 x 57	3.3	5.1
65 x 40	*50.8*	*54.0*	*6.3*	*79.5*	*142.7*	*90.4*	*57.2*	*47.5*		*1.5*	*2.3*
76.1mm x 2	2.50	2.63	2215.1	3.25	5.62	4.00	2.50	1.87	M10 x 57	4.1	5.9
65 x 50	*63.5*	*66.7*	*9.9*	*82.6*	*142.7*	*101.6*	*63.5*	*47.5*		*1.9*	*2.7*
3 x ½	1.50	1.63	277.1	3.19	6.13	3.07	2.56	2.21	½ x 3	3.7	4.5
80 x 15	*38.1*	*41.3*	*1.2*	*81.0*	*155.7*	*78.0*	*65.0*	*56.1*	*M12 x 76*	*1.7*	*2.0*
3 x ¾	1.50	1.63	433.0	3.19	6.13	3.07	2.56	2.21	½ x 3	3.7	4.5
80 x 20	*38.1*	*41.3*	*1.9*	*81.0*	*155.7*	*78.0*	*65.0*	*56.1*	*M12 x 76*	*1.7*	*2.0*
3 x 1	1.50	1.63	679.1	3.19	6.13	3.07	2.56	2.21	½ x 3	3.7	4.5
80 x 25	*38.1*	*41.3*	*3.0*	*81.0*	*155.7*	*78.0*	*65.0*	*56.1*	*M12 x 76*	*1.7*	*2.0*
3 x 1¼	1.75	1.88	1082.1	3.34	6.13	3.32	2.50	2.21	½ x 3	3.9	4.9
80 x 32	*44.5*	*47.6*	*4.8*	*84.8*	*155.7*	*84.3*	*63.5*	*56.1*	*M12 x 76*	*1.8*	*2.2*
3 x 1½	2.00	2.13	1417.6	3.38	6.13	3.56	2.48	2.21	½ x 3	4.2	5.5
80 x 40	*50.8*	*54.0*	*6.3*	*85.9*	*155.7*	*90.4*	*63.0*	*56.1*	*M12 x 76*	*1.9*	*2.5*
3 x 2	2.50	2.63	2215.1	3.50	6.13	4.09	2.75	2.21	½ x 3	4.7	6.5
80 x 50	*63.5*	*66.7*	*9.9*	*88.9*	*155.7*	*103.9*	*69.9*	*56.1*	*M12 x 76*	*2.1*	*2.9*
4 x ½	1.50	1.63	277.1	3.69	7.13	3.07	3.06	2.78	½ x 3	5.5	7.1
100 x 15	*38.1*	*41.3*	*1.2*	*93.7*	*181.1*	*78.0*	*77.7*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x ¾	1.50	1.63	433.0	3.69	7.13	3.07	3.06	2.78	½ x 3	5.5	7.1
100 x 20	*38.1*	*41.3*	*1.9*	*93.7*	*181.1*	*78.0*	*77.7*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x 1	1.50	1.63	679.1	3.69	7.13	3.07	3.06	2.78	½ x 3	5.5	7.1
100 x 25	*38.1*	*41.3*	*3.0*	*93.7*	*181.1*	*78.0*	*77.7*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x 1¼	1.75	1.88	1082.1	3.92	7.13	3.32	3.00	2.78	½ x 3	5.5	7.1
100 x 32	*44.5*	*47.6*	*4.8*	*99.6*	*181.1*	*84.3*	*76.2*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x 1½	2.00	2.13	1417.6	4.00	7.13	3.56	2.98	2.78	½ x 3	5.5	7.1
100 x 40	*50.8*	*54.0*	*6.3*	*101.6*	*181.1*	*90.4*	*75.7*	*70.6*	*M12 x 76*	*2.5*	*3.2*

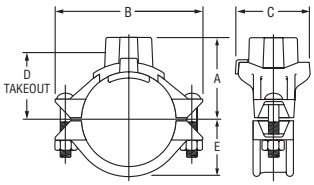


Figure 730 Mechanical Tee with Female NPT/ISO 7-1 Threaded Branch (Tee Configuration)

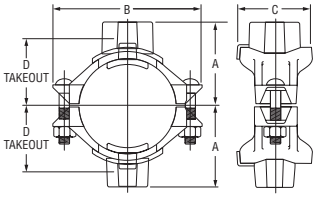


Figure 730 Mechanical Tee with Female NPT/ISO 7-1 Threaded Branch (Cross Configuration)

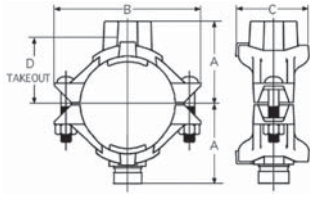


Figure 730 Mechanical Tee with One Female NPT/ISO 7-1 Threaded Branch & One Grooved Branch (Cross Configuration*)

* see pages XX for dimensions

† Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within ⅝" (15.9mm) of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area, that might affect assembly, proper seating of the locating collar or flow from the outlet. For crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded products other than steel pipe, such as dry pendents, etc. may not be compatible with the female threaded outlet on the Mechanical Tee. Always confirm compatibility by contacting Tyco Fire & Building Products.

‡ 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 Tyco Fire & Building Products for details.

Note: Outlet Threads conforming to ISO 7-1 are available, contact Tyco Fire & Building Products.

Please refer to General Notes on page 17.

MECHANICAL TEES

Figure 730 Mechanical Tee – Threaded

Nominal Size Run x Branch Inches *mm*	Hole Dia.†		Max.‡ End Load (Branch) lbs *kN*	Nominal Dimensions					Bolt Size Inches *mm*	Tee Approx. Weight lbs *kg*	Cross Approx. Weight lbs *kg*
	Hole Inches *mm*	Max. Inches *mm*		A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*			
4 x 2	2.50	2.63	2215.1	4.00	7.13	4.06	3.25	2.78	½ x 3	6.0	8.1
100 x 50	*63.5*	*66.7*	*9.9*	*101.6*	*181.1*	*103.1*	*82.6*	*70.6*	*M12 x 76*	*2.7*	*3.7*
4 x 2½	2.75	2.88	3245.9	4.00	7.13	4.38	3.12	2.78	½ x 3	6.0	8.1
100 x 65	*69.9*	*73.0*	*14.4*	*101.6*	*181.1*	*111.3*	*79.2*	*70.6*	*M12 x 76*	*2.7*	*3.7*
4 x 76.1mm	2.75	2.88	3534.3	4.00	7.13	4.38	3.12	2.78	M12 x 76	6.0	8.1
100 x 65	*69.9*	*73.0*	*15.7*	*101.6*	*181.1*	*111.3*	*79.2*	*70.6*		*2.7*	*3.7*
4 x 3	3.50	3.63	4810.6	4.13	7.13	5.13	3.31	2.78	½ x 3	7.0	13.5
100 x 80	*88.9*	*92.1*	*21.4*	*104.9*	*181.1*	*130.3*	*84.1*	*70.6*	*M12 x 76*	*3.2*	*6.1*
5 x 1½	2.00	2.13	1417.6	4.63	8.13	3.56	4.00	3.37	⅝ x 4¾	6.5	7.7
125 x 40	*50.8*	*54.0*	*6.3*	*117.6*	*206.5*	*90.4*	*101.6*	*85.6*	*M16 x 121*	*2.9*	*3.5*
5 x 2	2.50	2.63	2215.1	4.63	8.13	4.06	3.88	3.37	⅝ x 4¾	7.1	8.1
125 x 50	*63.5*	*66.7*	*9.9*	*117.6*	*206.5*	*103.1*	*98.6*	*85.6*	*M16 x 121*	*3.2*	*3.7*
5 x 2½	2.75	2.88	3245.9	4.75	8.13	4.38	3.88	3.37	⅝ x 4¾	7.3	8.7
125 x 65	*69.9*	*73.0*	*14.4*	*120.7*	*206.5*	*111.3*	*98.6*	*85.6*	*M16 x 121*	*3.3*	*3.9*
5 x 76.1mm	2.75	2.88	3534.3	4.75	8.13	4.38	3.88	3.37	M16 x 121	7.3	8.7
125 x 65	*69.9*	*73.0*	*15.7*	*120.7*	*206.5*	*111.3*	*98.6*	*85.6*		*3.3*	*3.9*
5 x 3	3.50	3.63	4810.6	5.00	8.13	5.13	4.06	3.37	⅝ x 4¾	7.6	14.7
125 x 80	*88.9*	*92.1*	*21.4*	*127.0*	*206.5*	*130.3*	*103.1*	*85.6*	*M16 x 121*	*3.4*	*6.7*
165.1mm x 1¼	2.00	2.13	1082.1	5.13	9.25	3.56	4.25	3.90	M16 x 121	6.9	7.9
150 x 32	*50.8*	*54.0*	*4.8*	*130.3*	*235.0*	*90.4*	*108.0*	*99.1*		*3.1*	*3.6*
165.1mm x 1½	2.00	2.13	1417.6	5.13	9.25	3.56	4.04	3.90	M16 x 121	7.4	8.9
150 x 40	*50.8*	*54.0*	*6.3*	*130.3*	*235.0*	*90.4*	*102.6*	*99.1*		*3.4*	*4.0*
165.1mm x 2	2.50	2.63	2215.1	5.13	9.25	4.06	4.31	3.90	M16 x 121	7.5	8.9
150 x 50	*63.5*	*66.7*	*9.9*	*130.3*	*235.0*	*103.1*	*109.5*	*99.1*		*3.4*	*4.0*
165.1mm x 2½	2.75	2.88	3245.9	5.13	9.25	4.38	4.18	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*14.4*	*130.3*	*235.0*	*111.3*	*106.2*	*99.1*		*3.4*	*5.0*
165.1mm x 76.1mm	2.75	2.88	3584.3	5.13	9.25	4.38	4.18	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*15.7*	*130.3*	*235.0*	*111.3*	*106.2*	*99.1*		*3.4*	*5.0*
165.1mm x 3	3.50	3.63	4810.6	5.50	9.25	5.13	4.37	3.90	M16 x 121	9.5	14.1
150 x 80	*88.9*	*92.1*	*21.4*	*139.7*	*235.0*	*130.3*	*111.0*	*99.1*		*4.3*	*6.4*
165.1mm x 4	4.50	4.63	7952.2	5.38	9.25	6.13	4.56	3.90	M16 x 121	10.0	20.1
150 x 100	*114.3*	*117.5*	*35.4*	*136.7*	*235.0*	*155.7*	*115.8*	*99.1*		*4.5*	*9.1*
6 x 1¼	2.00	2.13	1082.1	5.13	9.25	3.56	4.25	3.90	⅝ x 4¾	6.9	7.9
150 x 32	*50.8*	*54.0*	*4.8*	*130.3*	*235.0*	*90.4*	*108.0*	*99.1*	*M16 x 121*	*3.1*	*3.6*
6 x 1½	2.00	2.13	1417.6	5.13	9.25	3.56	4.04	3.90	⅝ x 4¾	7.4	8.9
150 x 40	*50.8*	*54.0*	*6.3*	*130.3*	*235.0*	*90.4*	*102.6*	*99.1*	*M16 x 121*	*3.4*	*4.0*
6 x 2	2.50	2.63	2215.1	5.13	9.25	4.06	4.31	3.90	⅝ x 4¾	7.5	8.9
150 x 50	*63.5*	*66.7*	*9.9*	*130.3*	*235.0*	*103.1*	*109.5*	*99.1*	*M16 x 121*	*3.4*	*4.0*
6 x 2½	2.75	2.88	3245.9	5.13	9.25	4.38	4.18	3.90	⅝ x 4¾	7.5	11.1
150 x 65	*69.9*	*73.0*	*14.4*	*130.3*	*235.0*	*111.3*	*106.2*	*99.1*	*M16 x 121*	*3.4*	*5.0*
6 x 76.1mm	2.75	2.88	3534.3	5.13	9.25	4.38	4.18	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*15.7*	*130.3*	*235.0*	*111.3*	*106.2*	*99.1*		*3.4*	*5.0*
6 x 3	3.50	3.63	4810.6	5.50	9.25	5.13	4.37	3.90	⅝ x 4¾	9.5	14.1
150 x 80	*88.9*	*92.1*	*21.4*	*139.7*	*235.0*	*130.3*	*111.0*	*99.1*	*M16 x 121*	*4.3*	*6.4*
6 x 4	4.50	4.63	7952.2	5.38	9.25	6.13	4.56	3.90	⅝ x 4¾	10.0	20.1
150 x 100	*114.3*	*117.5*	*35.4*	*136.7*	*235.0*	*155.7*	*115.8*	*99.1*	*M16 x 121*	*4.5*	*9.1*
8 x 2½	2.75	2.88	3245.9	6.25	12.50	4.38	5.12	4.90	¾ x 4¾	10.2	12.1
200 x 65	*69.9*	*73.0*	*14.4*	*158.8*	*317.5*	*111.3*	*130.0*	*124.5*	*M20 x 121*	*4.6*	*5.5*
8 x 76.1mm	2.75	2.88	3534.3	6.25	12.50	4.38	5.12	4.90	M20 x 121	10.2	12.1
200 x 65	*69.9*	*73.0*	*15.7*	*158.8*	*317.5*	*111.3*	*130.0*	*124.5*		*4.6*	*5.5*
8 x 3	3.50	3.63	4810.6	6.50	12.50	5.13	5.37	4.90	¾ x 4¾	12.5	15.1
200 x 80	*88.9*	*92.1*	*21.4*	*165.1*	*317.5*	*130.3*	*136.4*	*124.5*	*M20 x 121*	*5.7*	*6.8*
8 x 4	4.50	4.63	7952.2	6.38	12.50	6.13	5.56	4.90	¾ x 4¾	12.5	21.1
200 x 100	*114.3*	*117.5*	*35.4*	*162.1*	*317.5*	*155.7*	*141.2*	*124.5*	*M20 x 121*	*5.7*	*9.6*

† Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within ⅝" (15.9mm) of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area, that might affect assembly, proper seating of the locating collar or flow from the outlet. For crosses, ensure double outlet holes are aligned on opposite sides of the pipe. The use of threaded products other than steel pipe, such as dry pendents, etc. may not be compatible with the female threaded outlet on the Mechanical Tee. Always confirm compatibility by contacting Tyco Fire & Building Products.

‡ 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 Tyco Fire & Building Products for details.

Note: Outlet Threads conforming to ISO 7-1 are available, contact Tyco Fire & Building Products.

Please refer to General Notes on page 17.

MECHANICAL TEES

Figure 730 Mechanical Tee – Grooved

Nominal Size Run x Branch Inches *mm*	Hole Dia. †		Max.‡ End Load (Branch) lbs *kN*	Nominal Dimensions				Bolt Approx. Size Inches *mm*	Tee Approx. Weight lbs *kg*	Cross Approx. Weight lbs *kg*
	Hole Inches *mm*	Max. Inches *mm*		A Inches *mm*	B Inches *mm*	C Inches *mm*	E Inches *mm*			
2 x 1¼	1.75	1.88	1082.1	2.78	4.88	3.32	1.59	⅜ x 2¼	2.5	3.3
50 x 32	*44.5*	*47.6*	*4.8*	*70.6*	*124.0*	*84.3*	*40.4*	*M10 x 57*	*1.1*	*1.5*
2 x 1½	1.75	1.88	1417.6	2.62	4.88	3.32	1.59	⅜ x 2¼	2.5	3.7
50 x 40	*44.5*	*47.6*	*6.3*	*66.5*	*124.0*	*84.3*	*40.4*	*M10 x 57*	*1.1*	*1.7*
2½ x 1¼	2.00	2.13	1082.1	3.00	5.25	3.56	1.81	⅜ x 2¼	3.1	3.9
65 x 32	*50.8*	*54.0*	*4.8*	*76.2*	*133.4*	*90.4*	*46.0*	*M10 x 57*	*1.4*	*1.8*
2½ x 1½	2.00	2.13	1417.6	3.07	5.25	3.59	1.81	⅜ x 2¼	3.3	4.3
65 x 40	*50.8*	*54.0*	*6.3*	*78.0*	*133.4*	*91.2*	*46.0*	*M10 x 57*	*1.5*	*1.9*
2½ x 2	2.00	2.13	2215.1	3.19	5.25	4.00	1.81	⅜ x 2¼	3.5	4.4
65 x 50	*50.8*	*54.0*	*9.9*	*81.0*	*133.4*	*101.6*	*46.0*	*M10 x 57*	*1.6*	*2.0*
76.1mm x 1¼	2.00	2.13	1082.1	3.06	5.62	3.56	1.87	M10 x 57	3.1	3.9
65 x 32	*50.8*	*54.0*	*4.8*	*77.7*	*142.7*	*90.4*	*47.5*		*1.4*	*1.8*
76.1mm x 1½	2.00	2.13	1417.6	3.13	5.62	3.56	1.87	M10 x 57	3.3	5.1
65 x 40	*50.8*	*54.0*	*6.3*	*79.5*	*142.7*	*90.4*	*47.5*		*1.5*	*2.3*
76.1mm x 2	2.50	2.63	2215.1	3.25	5.62	4.00	1.87	M10 x 57	4.1	5.9
65 x 50	*63.5*	*66.7*	*9.9*	*82.6*	*142.7*	*101.6*	*47.5*		*1.9*	*2.7*
3 x 1¼	1.75	1.88	1082.1	3.34	6.13	3.32	2.21	½ x 3	3.9	4.9
80 x 32	*44.5*	*47.6*	*4.8*	*84.8*	*155.7*	*84.3*	*56.1*	*M12 x 76*	*1.8*	*2.2*
3 x 1½	2.00	2.13	1417.6	3.38	6.13	3.56	2.21	½ x 3	4.2	5.5
80 x 40	*50.8*	*54.0*	*6.3*	*85.9*	*155.7*	*90.4*	*56.1*	*M12 x 76*	*1.9*	*2.5*
3 x 2	2.50	2.63	2215.1	3.50	6.13	4.09	2.21	½ x 3	4.7	6.5
80 x 50	*63.5*	*66.7*	*9.9*	*88.9*	*155.7*	*103.9*	*56.1*	*M12 x 76*	*2.1*	*2.9*
4 x 1¼	1.75	1.88	1082.1	3.92	7.13	3.32	2.78	½ x 3	5.5	7.1
100 x 32	*44.5*	*47.6*	*4.8*	*99.6*	*181.1*	*84.3*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x 1½	2.00	2.13	1417.6	4.00	7.13	3.56	2.78	½ x 3	5.5	7.1
100 x 40	*50.8*	*54.0*	*6.3*	*101.6*	*181.1*	*90.4*	*70.6*	*M12 x 76*	*2.5*	*3.2*
4 x 2	2.50	2.63	2215.1	4.00	7.13	4.06	2.78	½ x 3	6.0	8.1
100 x 50	*63.5*	*66.7*	*9.9*	*101.6*	*181.1*	*103.1*	*70.6*	*M12 x 76*	*2.7*	*3.7*
4 x 2½	2.75	2.88	3245.9	4.00	7.13	4.38	2.78	½ x 3	6.0	8.1
100 x 65	*69.9*	*73.0*	*14.4*	*101.6*	*181.1*	*111.3*	*70.6*	*M12 x 76*	*2.7*	*3.7*
4 x 76.1mm	2.75	2.88	3534.3	4.00	7.13	4.38	2.78	M12 x 76	6.0	8.1
100 x 65	*69.9*	*73.0*	*15.7*	*101.6*	*181.1*	*111.3*	*70.6*		*2.7*	*3.7*
4 x 3	3.50	3.63	4810.6	4.13	7.13	5.13	2.78	½ x 3	7.0	13.5
100 x 80	*88.9*	*92.1*	*21.4*	*104.9*	*181.1*	*130.3*	*70.6*	*M12 x 76*	*3.2*	*6.1*
5 x 1½	2.00	2.13	1417.6	4.63	8.13	3.56	3.37	⅝ x 4¾	6.5	7.7
125 x 40	*50.8*	*54.0*	*6.3*	*117.6*	*206.5*	*90.4*	*85.6*	*M16 x 121*	*2.9*	*3.5*
5 x 2	2.50	2.63	2215.1	4.63	8.13	4.06	3.37	⅝ x 4¾	7.1	8.1
125 x 50	*63.5*	*66.7*	*9.9*	*117.6*	*206.5*	*103.1*	*85.6*	*M16 x 121*	*3.2*	*3.7*
5 x 2½	2.75	2.88	3245.9	4.75	8.13	4.38	3.37	⅝ x 4¾	7.3	8.7
125 x 65	*69.9*	*73.0*	*14.4*	*120.7*	*206.5*	*111.3*	*85.6*	*M16 x 121*	*3.3*	*3.9*

† Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within ⅝" (15.9mm) of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area, that might affect assembly, proper seating of the locating collar or flow from the outlet. For crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

‡ 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 Tyco Fire & Building Products for details.

Please refer to General Notes on page 17.

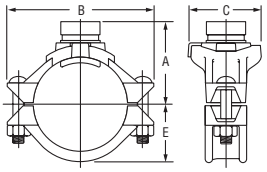


Figure 730 Mechanical Tee with Grooved Branch (Tee Configuration)

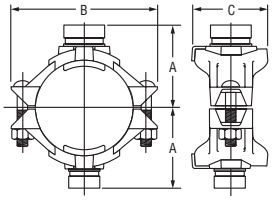


Figure 730 Mechanical Tee with Grooved Branch (Cross Configuration)

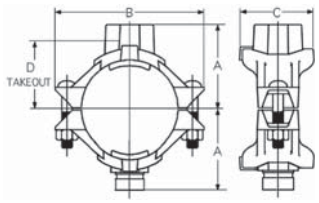


Figure 730 Mechanical Tee with One Female NPT/ISO 7-1 Threaded Branch & One Grooved Branch (Cross Configuration*)

* see pages XX for dimensions

MECHANICAL TEES

Figure 730 Mechanical Tee – Grooved

Nominal Size Run x Branch Inches *mm*	Hole Dia. †		Max.‡ End Load (Branch) lbs *kN*	Nominal Dimensions				Bolt Size Inches *mm*	Tee Approx. Weight lbs *kg*	Cross Approx. Weight lbs *kg*
	Hole Inches *mm*	Max. Inches *mm*		A Inches *mm*	B Inches *mm*	C Inches *mm*	E Inches *mm*			
5 x 76.1mm	2.75	2.88	3534.3	4.75	8.13	4.38	3.37	M16 x 121	7.3	8.7
125 x 65	*69.9*	*73.0*	*15.7*	*120.7*	*206.5*	*111.3*	*85.6*		*3.3*	*3.9*
5 x 3	3.50	3.63	4810.6	5.00	8.13	5.13	3.37	⅝ x 4¾	7.6	14.7
125 x 80	*88.9*	*92.1*	*21.4*	*127.0*	*206.5*	*130.3*	*85.6*	*M16 x 121*	*3.4*	*6.7*
165.1mm x 1¼	2.00	2.13	1082.1	5.13	9.25	3.56	3.90	M16 x 121	6.9	7.9
150 x 32	*50.8*	*54.0*	*4.8*	*130.3*	*235.0*	*90.4*	*99.1*		*3.1*	*3.6*
165.1mm x 1½	2.00	2.13	1417.6	5.13	9.25	3.56	3.90	M16 x 121	7.4	8.9
150 x 40	*50.8*	*54.0*	*6.3*	*130.3*	*235.0*	*90.4*	*99.1*		*3.4*	*4.0*
165.1mm x 2	2.50	2.63	2215.1	5.13	9.25	4.06	3.90	M16 x 121	7.5	8.9
150 x 50	*63.5*	*66.7*	*9.9*	*130.3*	*235.0*	*103.1*	*99.1*		*3.4*	*4.0*
165.1mm x 2½	2.75	2.88	3245.9	5.13	9.25	4.38	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*14.4*	*130.3*	*235.0*	*111.3*	*99.1*		*3.4*	*5.0*
165.1mm x 76.1mm	2.75	2.88	3534.3	5.13	9.25	4.38	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*15.7*	*130.3*	*235.0*	*111.3*	*99.1*		*3.4*	*5.0*
165.1mm x 3	3.50	3.63	4810.6	5.50	9.25	5.13	3.90	M16 x 121	9.5	14.1
150 x 80	*88.9*	*92.1*	*21.4*	*139.7*	*235.0*	*130.3*	*99.1*		*4.3*	*6.4*
165.1mm x 4	4.50	4.63	7952.2	5.38	9.25	6.13	3.90	M16 x 121	10.0	20.1
150 x 100	*114.3*	*117.5*	*35.4*	*136.7*	*235.0*	*155.7*	*99.1*		*4.5*	*9.1*
6 x 1¼	2.00	2.13	1082.1	5.13	9.25	3.56	3.90	⅝ x 4¾	6.9	7.9
150 x 32	*50.8*	*54.0*	*4.8*	*130.3*	*235.0*	*90.4*	*99.1*	*M16 x 121*	*3.1*	*3.6*
6 x 1½	2.00	2.13	1417.6	5.13	9.25	3.56	3.90	⅝ x 4¾	7.4	8.9
150 x 40	*50.8*	*54.0*	*6.3*	*130.3*	*235.0*	*90.4*	*99.1*	*M16 x 121*	*3.4*	*4.0*
6 x 2	2.50	2.63	2215.1	5.13	9.25	4.06	3.90	⅝ x 4¾	7.5	8.9
150 x 50	*63.5*	*66.7*	*9.9*	*130.3*	*235.0*	*103.1*	*99.1*	*M16 x 121*	*3.4*	*4.0*
6 x 2½	2.75	2.88	3245.9	5.13	9.25	4.38	3.90	⅝ x 4¾	7.5	11.1
150 x 65	*69.9*	*73.0*	*14.4*	*130.3*	*235.0*	*111.3*	*99.1*	*M16 x 121*	*3.4*	*5.0*
6 x 76.1mm	2.75	2.88	3534.3	5.13	9.25	4.38	3.90	M16 x 121	7.5	11.1
150 x 65	*69.9*	*73.0*	*15.7*	*130.3*	*235.0*	*111.3*	*99.1*		*3.4*	*5.0*
6 x 3	3.50	3.63	4810.6	5.50	9.25	5.13	3.90	⅝ x 4¾	9.5	14.1
150 x 80	*88.9*	*92.1*	*21.4*	*139.7*	*235.0*	*130.3*	*99.1*	*M16 x 121*	*4.3*	*6.4*
6 x 4	4.50	4.63	7952.2	5.38	9.25	6.13	3.90	⅝ x 4¾	10.0	20.1
150 x 100	*114.3*	*117.5*	*35.4*	*136.7*	*235.0*	*155.7*	*99.1*	*M16 x 121*	*4.5*	*9.1*
8 x 2½	2.75	2.88	3245.9	6.25	12.50	4.38	4.90	¾ x 4¾	10.2	12.1
200 x 65	*69.9*	*73.0*	*14.4*	*158.8*	*317.5*	*111.3*	*124.5*	*M20 x 121*	*4.6*	*5.5*
8 x 76.1mm	2.75	2.88	3534.3	6.25	12.50	4.38	4.90	M20 x 121	10.2	12.1
200 x 65	*69.9*	*73.0*	*15.7*	*158.8*	*317.5*	*111.3*	*124.5*		*4.6*	*5.5*
8 x 3	3.50	3.63	4810.6	6.50	12.50	5.13	4.90	¾ x 4¾	12.5	15.1
200 x 80	*88.9*	*92.1*	*21.4*	*165.1*	*317.5*	*130.3*	*124.5*	*M20 x 121*	*5.7*	*6.8*
8 x 4	4.50	4.63	7952.2	6.38	12.50	6.13	4.90	¾ x 4¾	12.5	21.1
200 x 100	*114.3*	*117.5*	*35.4*	*162.1*	*317.5*	*155.7*	*124.5*	*M20 x 121*	*5.7*	*9.6*

† Proper hole preparation is required for effective sealing and performance. Check the pipe seal surface within ⅝" (15.9mm) of the hole to be certain it is free from conditions that would affect proper gasket sealing. Remove any sharp or rough edges from the hole or upper housing contact area, that might affect assembly, proper seating of the locating collar or flow from the outlet. For crosses, ensure double outlet holes are aligned on opposite sides of the pipe.

‡ 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 Tyco Fire & Building Products for details.

Please refer to General Notes on page 17.

VALVES

VALVES

The Grinnell® line of grooved end valves offers a wide range of butterfly, check, ball and triple duty valves with a variety of wear resistant materials.

Butterfly Valves

Model B302
Pages 65-67

Model B8101
Low Profile Butterfly Valve
Page 70

Ball Valves

Model BV835
Pages 71-72

Check Valves

Model 590
Pages 73-74

Triple Duty Valves

Model TD 830
Page 75

BUTTERFLY VALVES

Model B302 Grooved End Butterfly Valve

Grinnell® Model B302 Butterfly Valves are capable of pressures of 300 psi (20.7 Bar) for sizes 2" – 8" (DN 50 – DN 200) and 200 psi for sizes 10" and 12" (DN 250 – DN 300). The valves are designed for efficient control of: on/off or throttling/balancing service, fluid flow and "bubble tight" shut-off in piping systems. Flow may be from either direction and the valve may be positioned in any orientation. The valves are available with either a Gear Operator, for sizes 2" – 12" (DN 50 – DN 300) or Lever-Lock Operator, for sizes 2" – 8" (DN 50 – DN 200). The valves are furnished with grooved ends for use with grooved couplings and can be easily adapted to flanged components utilizing Grinnell Figure 71 Class 150 Flange Adapters.

The body and disc construction provides for increased strength and durability. The disc seal and body coatings are compatible with a variety of chemicals and temperature ranges (Contact Tyco Fire & Building Products for specific recommendations on seal and coating selections).

The Model B302 Butterfly Valve with Gear Operator is a self-locking worm gear type. It is equipped with adjustable stops at the open and shut positions.

The Model B302 Butterfly Valve with Lever-Lock Operator has a throttling plate which provides throttling notches every 10° for manual control in balancing up to 90° or shut off service. The lever may be padlocked in any one of the positions including opened or closed by virtue of a locking hole located in the handle and lever.

Model B302
with Gear Operator

Model B302
with Lever-Lock Operator

MATERIAL SPECIFICATIONS

Ductile Iron Body and Disc Specifications

- ASTM A-395 – Standard Specification for Ductile Iron Castings
- Grade 60-40-18
- Tensile Strength, Minimum PSI – 60,000 (MPa-414)
- Yield Strength, Minimum PSI – 40,000 (MPa-276)
- Elongation in 2" (50mm), Minimum 18%

Body Coating

- Black Polymid Coated

Upper and Lower Stem

- Type 416 Stainless Steel

Gear Operator

- Cast Iron Housing

Lever-Lock Operator

- Handle – Iron Polymer Coated
- Lever-Lock – Steel Zinc Plated
- Throttling Plate – Steel Zinc Plated

Disc Seal Specifications Encapsulated Rubber

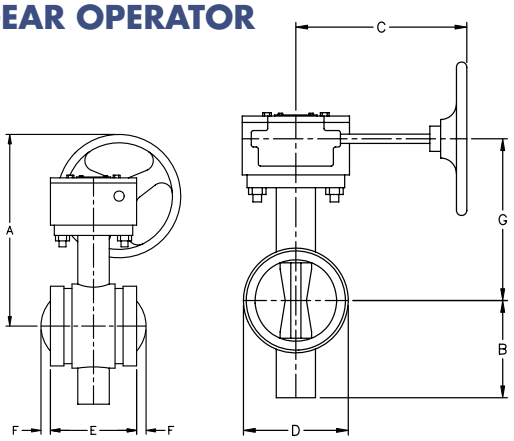
- **EPDM** – for service temperatures from -20°F (-29°C) to 250°F (121°C), intermittent service at 250°F (121°C) and continuous service at 225°F (107°C). Recommended for hot water not to exceed the temperature ratings above, plus a variety of dilute acids, alkalines and many chemical services. They are not recommended for petroleum oil, strong acid, strong alkaline or compressed air services.
- **Nitrile** – for service temperatures from -20°F (-29°C) to 180°F (82°C). Recommended for solvents, oils, water and hydraulic fluid resistance. They are not recommended for highly polar solvents such as acetone and methyl ethyl ketone, cholrinated hydrocarbons, ozone or nitro hydrocarbons and some aviation fuels.
- **Fluoroelastomer** – For service temperatures +20° F (-7°C) to +300°F (+149°C). Recommended for oxidizing acids, petroleum products, hydraulic fluids, lubricants, and halogenated hydrocarbons.

Tech Data: G310

BUTTERFLY VALVES

Model B302 Grooved End Butterfly Valve

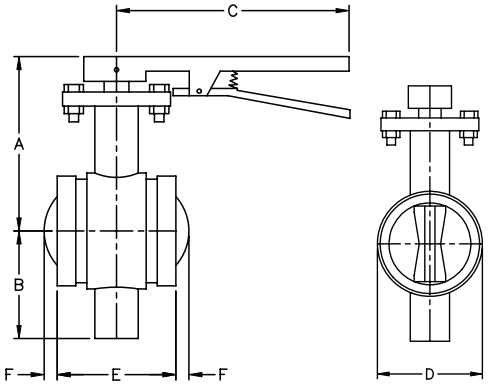
GEAR OPERATOR



Side view with valve open

Front view with valve open

LEVER LOCK OPERATOR



Side view with valve open

Front view with valve open

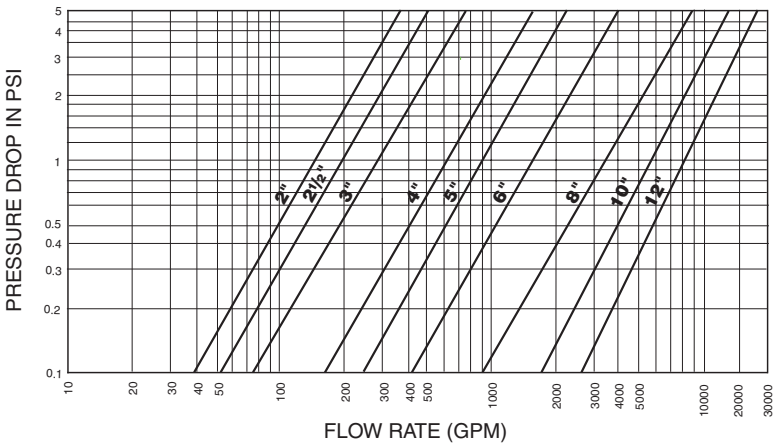
Nominal Size Inches *mm*	Nominal Dimensions							Approx. Weight lbs *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Inches *mm*	G Inches *mm*	
2	8.46	3.14	7.64	2.89	3.33	N/A*	5.50	14.5
50	*214.9*	*79.8*	*194.1*	*73.4*	*84.6*		*139.7*	*6.6*
2½	8.65	3.25	7.64	3.46	3.85	N/A*	5.69	15.5
65	*219.7*	*82.6*	*194.1*	*87.9*	*97.8*		*144.5*	*7.0*
3	8.99	3.54	7.64	3.97	3.85	N/A*	5.94	17.0
80	*226.1*	*89.9*	*194.1*	*100.8*	*97.8*		*150.9*	*7.7*
4	9.79	4.35	7.64	5.03	4.56	N/A*	8.00	20.5
100	*248.7*	*110.5*	*194.1*	*127.8*	*115.8*		*203.2*	*9.3*
5	9.30	4.84	7.64	6.28	5.86	N/A*	7.33	25.0
125	*236.2*	*122.9*	*194.1*	*159.3*	*148.8*		*186.2*	*11.3*
6	13.53	5.93	9.53	7.25	5.86	N/A*	8.61	33.0
150	*343.7*	*150.6*	*242.1*	*184.2*	*148.8*		*218.7*	*15.0*
8	14.47	6.87	9.53	9.25	5.26	1.30	9.55	45.0
200	*367.5*	*174.5*	*242.1*	*235.0*	*133.6*	*33.0*	*242.6*	*20.4*
10	16.53	9.17	11.54	11.25	6.29	1.65	11.61	83.0
250	*418.9*	*232.9*	*293.1*	*285.8*	*159.8*	*41.9*	*294.9*	*37.6*
12	17.52	10.17	11.54	13.14	6.52	2.56	12.60	100.0
300	*445.0*	*258.3*	*293.1*	*333.8*	*165.6*	*65.0*	*320.0*	*45.4*

* End of disc does not extend beyond valve body.
Please refer to General Notes on page 17.

Nominal Size Inches *mm*	Nominal Dimensions						Approx. Weight lbs *kg*
	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Inches *mm*	
2	5.00	3.14	10.50	2.89	3.33	N/A*	6.5
50	*127.0*	*79.8*	*266.7*	*73.4*	*84.6*		*2.9*
2½	5.19	3.25	10.50	3.46	3.85	N/A*	7.0
65	*131.8*	*82.6*	*266.7*	*87.9*	*97.8*		*3.2*
3	5.44	3.54	10.50	3.97	3.85	N/A*	8.5
80	*138.2*	*89.9*	*266.7*	*100.8*	*97.8*		*3.9*
4	6.33	4.35	13.75	5.03	4.56	N/A*	13.0
100	*160.8*	*110.5*	*349.3*	*127.8*	*115.8*		*5.9*
5	6.83	4.84	13.75	6.27	5.86	N/A*	18.0
125	*173.5*	*122.9*	*349.3*	*159.3*	*148.8*		*8.2*
6	8.11	5.93	13.75	7.25	5.86	N/A*	25.0
150	*206.0*	*150.6*	*349.3*	*184.2*	*148.8*		*11.3*
8	9.05	6.87	13.75	9.25	5.26	1.30	33.0
200	*229.9*	*174.5*	*349.3*	*235.0*	*133.6*	*33.0*	*15.0*

* End of disc does not extend beyond valve body.
Please refer to General Notes on page 17.

Performance



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table.

BUTTERFLY VALVE

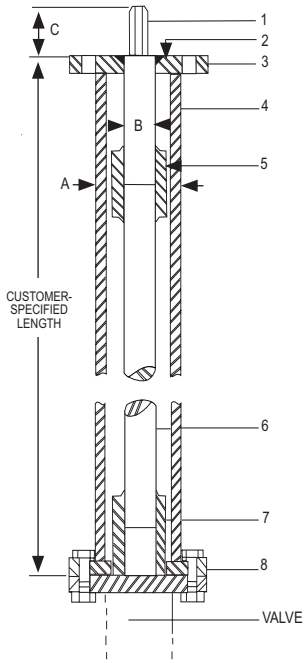
Model B302 Butterfly Valve Options

Stem Extensions

Stem extensions can be provided to permit remote operation of the valve in any required length. Stem extensions are available in lengths up to 10 feet. The top flange of the extension stem, plug shaft diameter, and distance across the flats on the plug shaft are the same size as the valve selected. This allows interchangeability of gear operators, actuators, and adapter bushings from the valve mounting flange to the extension stem top flange.

Adjustable Sprocket Rim

The Babbitt Adjustable Sprocket Rim will provide for remote operation of the butterfly valves in high, out-of-reach locations. Specify the sprocket number and size. The chain length must also be specified. (Chain length = Height x 2 + 2 ft.).



MATERIAL LIST	
Part	**Specification**
1. Plug	Steel
2. Top Flange Bushing	Bronze
3. Top Flange	Steel
4. Housing (Steel Pipe)	Steel
5. Plug and Rod Coupling	Steel
6. Rod	Steel
7. Rod and Stem Coupling	Steel
8. Bottom Flange	Steel

DIMENSIONS			
SIZE	A	B	C
2" – 12"	2.88	1.125	1.12

Adjustable Sprocket Rim Dimensions						
Size No.	**Dia. of Sprocket Wheel Inches**	**Weight lbs**	**Dia. Of HDWL Rim will Fit**	**Chain Size**	**Chain Weight per 100' in lbs**	**Butterfly Valve Size**
1	5⅞	4	4⅛ to 5⅞	1/0	17½	
1½	7½	5	6 to 7½	1/0	17½	2" – 6"
2	9	8	7¾ to 9	1/0	17½	
2½	12½	15	9¼ to 12½	4/0	30	8" – 16", 20", 24"
3	15½	21	12¾ to 15½	4/0	30	
3½	19	25	15¾ to 19	4/0	30	18", 30" – 48"
4	22	34	19¼ to 22	5/0	35	

BUTTERFLY VALVES

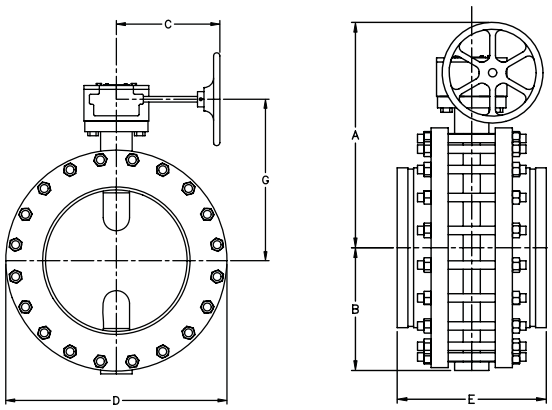
Model 308 14" - 24" Butterfly Valve

The Model 308 Butterfly Valve provides dependable, long-term service and superior control of fluid flow in piping systems. Flow may be from either direction and the valve may be positioned in any orientation. The valve is furnished with grooved ends for use with grooved couplings. The body and disc design provides exceptional flow characteristics and low operating torque. The disc has a streamline profile that optimizes flow. The body is lined with an elastomer seat that is reinforced with a phenolic backing ring, reducing seat distortion, and wear.

The Model 308 Butterfly Valve is provided with a gear operator with adjustable stops at the open and shut positions.

Maximum Working Pressure is 150 psi (10.3 Bar) with 316 S.S. Stem and 200 psi (13.8 Bar) with 416 S.S. Stem. Special order is available upon request: Vacuum Service to 29.5" (750mm) Hg.

Temperature rating for Grade E EPDM seat material is -40°F (-40°C) to +230°F (+110°C), recommended for water service, dilute acids, alkalies, oil-free air and many chemical services. NOT RECOMMENDED FOR USE IN PETROLEUM SERVICES. The temperature rating for Grade T (Nitrile) seat material is -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. (Contact Tyco Fire & Building Products for specific recommendations on seat material.)



Tech Data: G320

BUTTERFLY VALVES

Model 308 14" – 24" Butterfly Valve

MATERIAL SPECIFICATIONS

Body
- Cast Iron conforming to ASTM A-126, Class B

Body Seat (Liner)
- Grade E EPDM, Grade T Nitrile or Fluoroelastomer

Body Coating
- Epoxy Coated

Disc
- Stainless Steel Conforming to ASTM A-351, Grade CF8M
- Aluminum Bronze Conforming to ASTM B-148, C95400
- Ductile Iron Conforming to ASTM A-536, Grade 65-45-12

Drive and Bottom Shaft
- Stainless Steel Conforming to ASTM A-582, Type 416 or Stainless Steel Conforming to ASTM A-276, Type 316

Gear Operator
- Cast Iron Housing

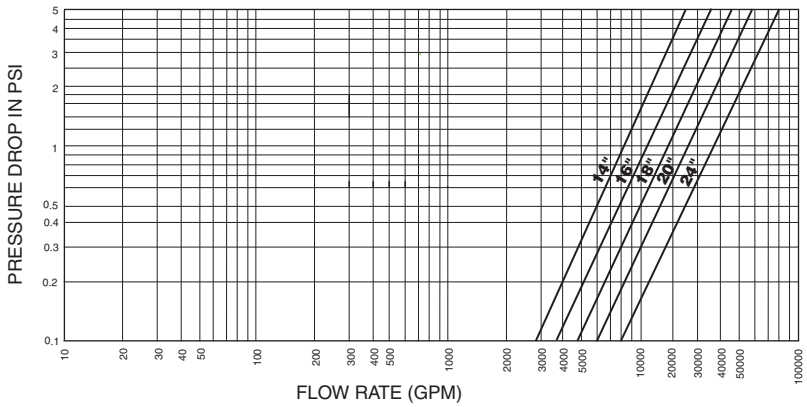
Upper and Lower Bearings
- Reinforced Teflon®*

Plug
- Cast Iron ASTM A-126

* Teflon® is an E.I. Dupont trademark

Nominal Size Inches *mm*	Nominal Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Inches *mm*	Approx. Weight lbs *kg*
14	23.25	10.75	10.00	21.00	13.06	15.25	378.0
350	*590.6*	*273.1*	*254.0*	*533.4*	*331.7*	*387.4*	*171.8*
16	24.75	12.50	10.00	23.50	14.33	16.75	452.0
400	*628.7*	*317.5*	*254.0*	*596.9*	*364.0*	*425.5*	*205.5*
18	25.75	14.00	10.00	25.00	15.40	17.75	548.0
450	*654.1*	*355.6*	*254.0*	*635.0*	*391.2*	*450.9*	*249.1*
20	27.25	15.00	10.00	27.50	16.38	18.25	728.0
500	*692.2*	*381.0*	*254.0*	*698.5*	*416.1*	*463.6*	*330.9*
24	30.12	16.75	10.25	32.00	18.26	21.12	1097.0
600	*765.0*	*425.5*	*260.4*	*812.8*	*463.8*	*536.4*	*498.6*

Performance



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table for design purposes.

BUTTERFLY VALVES

Model B8101 Low Profile Butterfly Valve

The Model B8101 Low Profile Butterfly Valve has a rated working pressure of 200 psi and provides efficient control of fluid in piping systems. Flow may be from either direction, and the valve may be positioned in any orientation. The ductile iron body is epoxy coated to resist atmospheric corrosion and the disc is EPDM encapsulated ductile iron to be compatible with a variety of chemicals and temperature ranges.

Tech Data: G330

MATERIAL SPECIFICATIONS

Body
- Ductile Iron

Body Coating
- Black Epoxy Coated

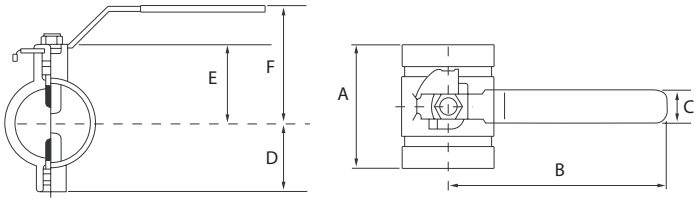
Disc
- Ductile Iron

Disc Seal
- EPDM Encapsulated Rubber
- Optional: Nitrile

Stem
- Two-piece Stainless Steel, Splined

Stem Seal
- O-rings, Upper and Lower Stem

Handle
- Carbon Steel Zinc Plated



Nominal Size Inches	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Inches *mm*	Approx Weight Lbs Kg
2	3.39	5.98	0.98	1.81	1.97	3.15	4.2
50	*86.0*	*152.0*	*25.0*	*46.0*	*50.0*	*80.0*	*1.9*
2½	3.78	5.98	0.98	2.05	2.40	3.58	6.4
65	*96.0*	*152.0*	*25.0*	*52.0*	*61.0*	*91.0*	*2.9*
3	3.78	8.27	0.98	2.56	2.64	4.21	7.5
80	*96.0*	*210.0*	*25.0*	*65.0*	*67.0*	*107.0*	*3.4*
4	4.53	8.27	0.98	3.27	3.27	4.84	11.7
100	*115.0*	*210.0*	*25.0*	*83.0*	*83.0*	*123.0*	*5.3*
6	5.20	12.01	1.26	4.29	4.29	6.85	26.6
150	*132.0*	*305.0*	*32.0*	*109.0*	*109.0*	*174.0*	*12.1*

Please refer to General Notes on page 17.

BALL VALVES

Model BV835 Ball Valve

The Model BV835 Ball Valve is capable of a working pressure of 1,000 psi. Available in sizes 2" (DN 50) to 6" (DN 150). Flow may be from either direction and the valves may be positioned in any orientation. The Model BV835 is furnished with grooved ends and features a handle that accepts a padlock device for locking in either the open or closed position.

Max. Working Pressure
1,000 psi (68,9 bars) 2 – 3 inches
800 psi (55,1 bars) 4 inches
600 psi (41,4 bars) 6 inches

MATERIAL SPECIFICATIONS

Body
- Ductile Iron Conforming to ASTM A-536, Grade 65-45-12

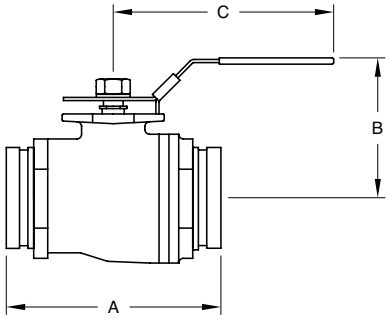
Body Coating
- Black Enamel

Ball
- Carbon Steel, Chrome Plated 304SS Available

Ball Seal
- Teflon®*

Upper Stem
- Carbon Steel Nickel Plated

Operator
- Lever With Locking Device



* Teflon® is an E.I. Dupont trademark

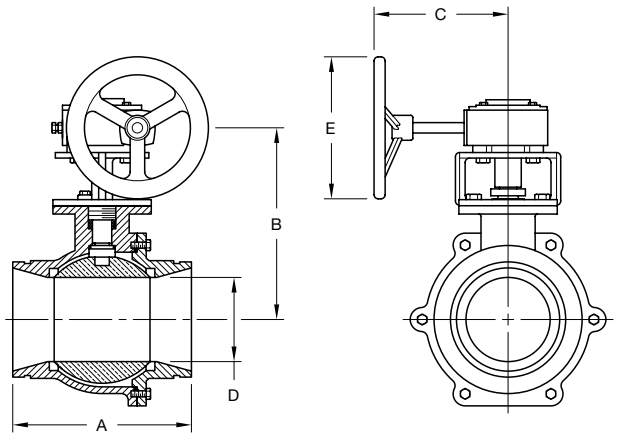
Nominal Pipe Size		Nominal Dimensions Inches *mm*				Approx. Weight lbs *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	
2	2.375	5.50	3.75	7.0	1.50	6.4
DN50	*60,3*	*140,0*	*95,0*	*178,0*	*38,1*	*2,9*
2½	2.875	6.25	5.20	10.43	2.00	10.6
DN65	*73,0*	*159,0*	*132,0*	*265,0*	*51,0*	*4,8*
3	3.500	6.56	5.63	10.43	2.50	13.4
DN80	*88,9*	*167,0*	*143,0*	*265,0*	*63,5*	*6,1*
4	4.500	9.45	3.70	10.43	3.50	55.0
DN100	*114,3*	*240,0*	*94,0*	*265,0*	*90,0*	*25,0*
6	6.625	10.15	8.68	23.60	4.92	79.2
DN150	*168,3*	*258,0*	*220,5*	*600,0*	*125,0*	*36,0*

Please refer to General Notes on page 17.

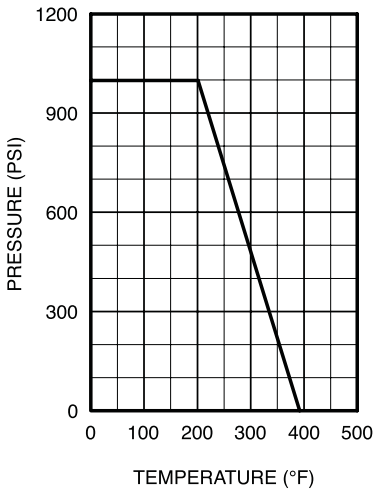
BALL VALVES

Model BV835 Ball Valve

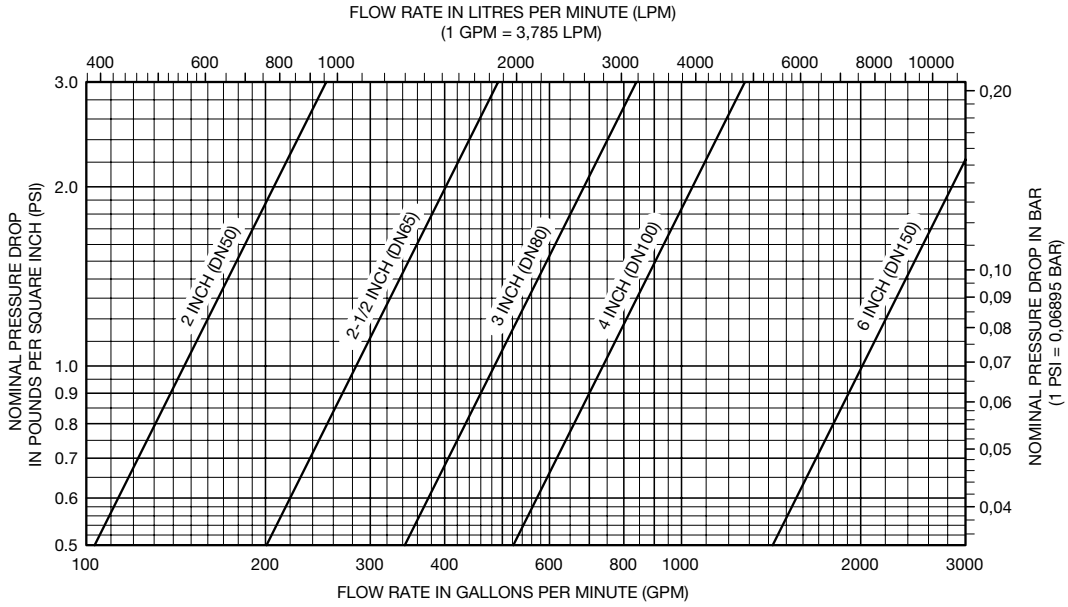
OPTIONAL WITH GEAR OPERATOR



Pressure Performance



Nominal Pipe Size		Nominal Dimensions Inches *mm*					Approx. Weight lbs *kg*
ANSI Inches *DN*	O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	
2	2.375	5.50	5.38	8.00	1.50	6.00	18.0
DN50	*60,3*	*140,0*	*137,0*	*203,2*	*38,1*	*152,4*	*8,0*
2½	2.875	6.25	5.68	8.00	2.00	6.00	22.0
DN65	*73,0*	*159,0*	*144,2*	*203,2*	*51,0*	*152,4*	*10,0*
3	3.500	6.56	7.16	8.00	2.50	6.00	31.0
DN80	*88,9*	*167,0*	*182,0*	*203,2*	*63,5*	*152,4*	*14,0*
4	4.500	9.45	8.00	8.00	3.50	6.00	73.0
DN100	*114,3*	*240,0*	*203,2*	*203,2*	*90,0*	*152,4*	*33,0*
6	6.625	10.15	10.89	14.00	4.92	12.00	123.4
DN150	*168,3*	*258,0*	*277,0*	*356,0*	*125,0*	*305,0*	*56,0*



CHECK VALVES

Model 590 Grooved End Check Valve

Grinnell® Model 590 Check Valves are capable of pressures up to 300 psi (20.7 Bar) and are designed as compact and rugged swing-type units that allow water flow in one direction and prevent flow in the opposite direction. They are manufactured with a ductile iron body, nickel seat and a stainless steel clapper assembly for sizes 2" – 8" (DN 50 – DN 200), and a ductile iron clapper assembly for sizes 10" – 12" (DN 250 – DN 300). A resilient elastomer seal facing on the spring loaded clapper ensures a leak tight seal and a non-sticking operation. All Model 590 Check Valves are designed to minimize water hammer caused by flow reversal.

The valves are furnished with grooved ends and can be installed using Grinnell Couplings. The Model 590 can be installed with our Figure 71 Flange Adapters and also ANSI class 300 Flange Adapters. All Model 590 Check Valves have been designed with a removable cover for ease of field maintenance. They may be installed in either horizontal or vertical piping systems with the flow in the upward or downward direction.

Tech Data: G350

MATERIAL SPECIFICATIONS

Ductile Iron Body & Cap Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings Grade 65-45-12
- Tensile Strength, Minimum PSI – 65,000 (MPa-448)
- Yield Strength, Minimum PSI – 45,000 (MPa-310)
- Elongation in 2" (50mm), minimum 12%

Seat

- Nickel

Coating

- Non-Lead Paint

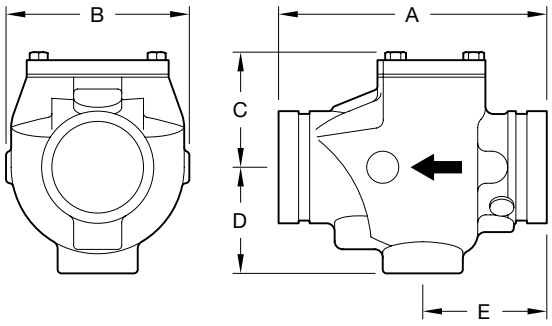
Seal Specifications

- **Grade "E" EPDM** seals have a green color code identification and conform to ASTM D-2000 for service temperatures from -30°F (-34°C) to 230°F (110°C). They are recommended for hot water not to exceed 230°F (110°C), plus a variety of dilute acids, oil free air and many chemical services. They are not recommended for petroleum services.
- **Grade "T" Nitrile** seals have an orange color code identification and conform to ASTM D-2000 for service temperatures from -20°F (-29°C) to 180°F (82°C). They are recommended for petroleum products, vegetable oils, mineral oils, and air with oil vapors.

CHECK VALVES

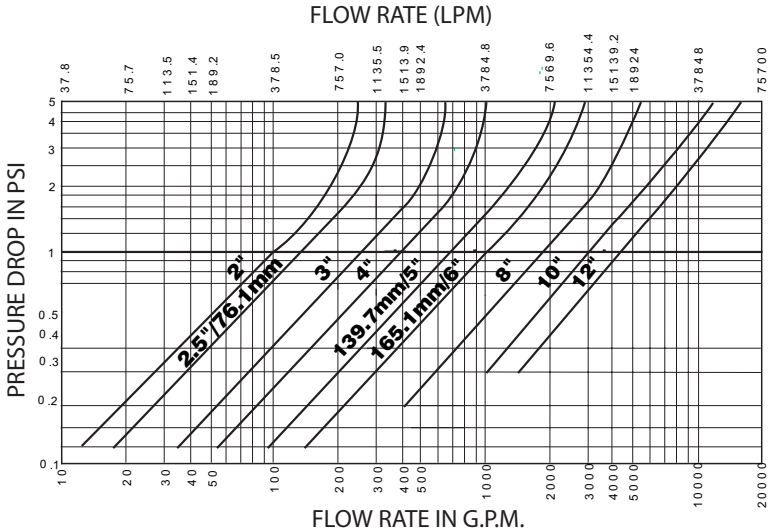
Model 590 Grooved End Check Valve

Nominal Size Inches *mm*	Nominal Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	Cover Bolt Torque *lb-ft/mm*	Approx. Weight lbs *kg*
2	6.75	4.38	2.55	2.57	3.25	15	9.0
50	*171.5*	*111.3*	*64.8*	*65.3*	*82.3*	*21*	*4.5*
2½	8.00	5.42	3.41	3.09	3.88	39	10.0
65	*203.2*	*136.7*	*86.6*	*78.5*	*98.6*	*54*	*4.5*
76.1mm	8.00	5.42	3.41	3.09	3.88	39	10.0
	203.2	*136.7*	*86.6*	*78.5*	*98.6*	*54*	*4.5*
3	8.38	5.76	3.60	3.31	3.88	39	11.0
80	*212.9*	*146.3*	*91.4*	*84.1*	*98.6*	*54*	*5.0*
4	9.63	6.74	4.61	3.63	4.53	39	25.0
100	*245.6*	*171.2*	*117.1*	*92.2*	*115.4*	*54*	*11.3*
139.7mm	10.50	7.50	5.29	4.13	4.90	39	29.0
	266.7	*190.5*	*134.4*	*104.9*	*124.5*	*54*	*13.2*
5	10.50	7.50	5.29	4.13	4.90	39	29.0
125	*266.7*	*190.5*	*134.4*	*104.9*	*124.5*	*54*	*13.2*
165.1mm	11.50	80.5	5.75	4.50	5.00	60	47.0
	292.1	*204.4*	*146.1*	*114.3*	*127.0*	*82*	*21.3*
6	11.50	8.05	5.75	4.50	5.00	60	47.0
150	*292.1*	*204.4*	*146.1*	*114.3*	*127.0*	*82*	*21.3*
8	14.00	10.25	7.75	5.62	5.45	120	66.0
200	*355.6*	*260.4*	*196.9*	*142.7*	*138.4*	*164*	*30.0*
10	18.00	13.00	10.21	6.38	7.50	120	109.7
250	*457.2*	*330.2*	*259.3*	*162.1*	*190.5*	*164*	*49.4*
12	21.0	14.28	11.31	7.26	7.62	120	151.0
300	*533.4*	*362.7*	*287.2*	*184.4*	*193.5*	*164*	*68.0*



Please refer to General Notes on page 17.

Performance



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table.

TRIPLE DUTY VALVES

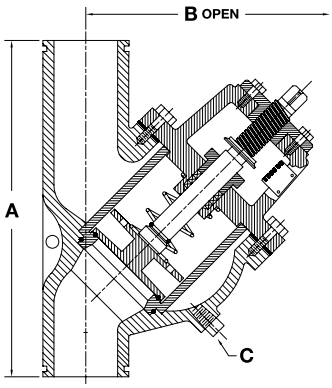
Model TD830 Triple Duty Valve

The Model TD830 Triple Duty Valve is designed for installation in pump discharge piping where it functions as a spring loaded silent check valve, flow control valve and shut-off valve.

The Model TD830 Triple Duty Valve operates automatically and silently. Line pressure of approximately ¼ psi will open the disc. The spring closes the disc as the line flow approaches zero in order to prevent flow reversal and water hammer. The flow through the valve can be adjusted from bubble tight shut-off to full flow by the acme threaded rising stem.

The Model TD830 Triple Duty Valve can be installed quickly into grooved end piping systems with two Grinnell Couplings. The externally guided disc has a soft seat to ensure a leak-tight seal. It lifts ⅓ inch for each inch of pipe diameter. The rising stem design incorporates a graduated position indicator to ensure accurate disc positioning for throttling service. The yoke and valve stem are unwetted external parts so they cannot be corroded or eroded by the line fluid. All mating threaded parts are made of dissimilar, non-galling metals. An NPT drain plug is provided, as well as bosses for gauge taps at the inlet and outlet.

Tech Data: G390



MATERIAL SPECIFICATIONS

Body & Yoke Specifications
• Ductile Iron Conforming to ASTM A-536 or A-395

Seat Guide
• Bronze Conforming to ASTM B-62, 85/5/5/5

Disc
• Cast Iron Conforming to ASTM A-126-B

Spring
• 302 Stainless Steel

Stem
• Bronze Conforming to ASTM B-21

Seat, Disc, and Stem O-Rings
• EPDM

Seat
• Bronze

Flanged Gland
• Cast Iron Conforming to ASTM A-126-B

Cover Gasket and Packing
• Non-Asbestos

Nominal Pipe Size		Nominal Dimensions			Approx. Weight lbs kg
ANSI Inches DN	O.D. Inches mm	A Inches mm	B Inches mm	C Inches NPT	
2	2.375	9.375	9.625	½	23.0
DN50	60,3	238,1	244,5	15	10,0
2½	2.875	10.250	9.625	½	24.0
DN65	73,0	260.4	244,5	15	10,9
3	3.500	11.250	10.125	½	33.0
DN80	88,9	285.8	257,2	15	15,0
4	4.500	15.625	11.125	½	84.0
DN100	114,3	397,9	282,6	15	38,0
5	5.563	15.625	11.125	½	84.0
DN125	141,3	397,9	282,6	15	38,0
6	6.625	19.625	17.500	¾	156.0
DN150	168,3	498,5	444,5	20	70,0
8	8.625	23.625	18.000	¾	300.0
DN200	219,1	600,0	457,2	20	136,0
10	10.750	28.000	19.875	1	392.0
DN250	273,1	711,2	504,8	25	178,0
12	12.750	31.625	25.000	1	496.0
DN300	323,9	803,3	635,0	25	225,0
14	14.000	33.500	25.000	1	790.0
DN340	355,6	851.0	635,0	25	358,3

Please refer to General Notes on page 17.

Stem Guide
• Ductile Iron Conforming to ASTM A-536 or A-395

Finish
• Black Paint

ACCESSORIES

ACCESSORIES

The Grinnell line of accessories are designed to provide protection for the piping system mechanical equipment. The suction diffusers and strainers reduce maintenance time and labor and allow easy access to the piping system.

"Y" Strainer

Figure S853 "Y"
Page 79

Tee Strainer

Figure S855
Page 80

Suction Diffuser

Figure S810
Pages 81-82

"Y" STRAINER

Figure S853 "Y" Strainer

The Figure S853 "Y" Strainer is rated for 640 psi (44.1 bar) at 100°F (38°C). The "Y" Strainer provides economical strainer protection for piping equipment such as pumps, meters, valves, compressors, traps and similar equipment. The inlet and outlet ends are suitable for installation with Figure 705, 707 and 772 couplings.

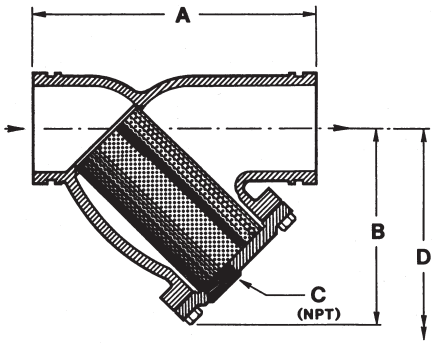
The Figure S853 "Y" Strainer perforated screen has the following standard perforations:

- Sizes 2" – 4" (DN 50 – DN 100) = 1/16" (1.6mm)
- Sizes 5" – 12" (DN 125 – DN 300) = 1/8" (3.2mm)

All covers have an NPT blowoff outlet (pipe plugs not included) and recessed seat in the cover to ensure screen alignment.

Self cleaning is done by opening the valve (not supplied) connected to the blowoff outlet. Advise when ordering strainers that are mounted in vertical pipng so that the cover will be rotated to position the blowoff at the lowest point.

Tech Data: G420



MATERIAL SPECIFICATIONS

Ductile Iron Body & Cover Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings
- Grade 65-45-12
- Tensile Strength, Minimum PSI – 65,000 (MPa-448)
- Yield Strength, Minimum PSI – 45,000 (MPa-310)
- Elongation in 2" (50mm), Minimum 12%

Screen

- Type 304 Stainless Steel ASTM A-240.
  (Other alloys are available, contact Tyco Fire & Building Products).

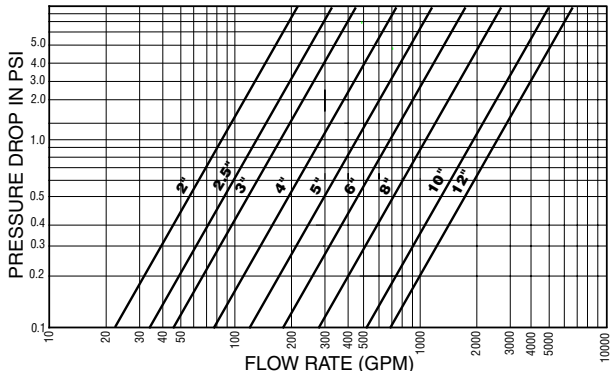
Gasket

- Non-Asbestos

Coating

- Black Enamel

Performance



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table.

Nominal Size Inches *mm*	Nominal Dimensions					Approx. Weight lbs *kg*
	Pipe O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C* Inches *mm*	D Screen Removal Inches *mm*	
2	2.375	7.88	5.25	0.50	7.00	12.0
50	*60.3*	*200.2*	*133.4*	*12.7*	*177.8*	*5.4*
2½	2.875	10.00	6.50	1.00	9.75	18.0
65	*73.0*	*254.0*	*165.1*	*25.4*	*247.7*	*8.2*
3	3.500	10.13	7.00	1.00	10.00	23.0
80	*88.9*	*257.3*	*177.8*	*25.4*	*254.0*	*10.4*
4	4.500	12.13	8.25	1.50	12.00	42.0
100	*114.3*	*308.1*	*209.6*	*38.1*	*304.8*	*19.1*
5	5.563	15.63	11.25	2.00	17.00	80.0
125	*141.3*	*397.0*	*285.8*	*50.8*	*431.8*	*36.3*
6	6.625	18.50	13.50	2.00	20.00	112.0
150	*168.3*	*469.9*	*342.9*	*50.8*	*508.0*	*50.8*
8	8.625	21.63	15.50	2.00	22.75	205.0
200	*219.1*	*549.4*	*393.7*	*50.8*	*577.9*	*93.0*
10	10.750	29.13	21.00	2.00	30.50	277.0
250	*273.1*	*739.8*	*533.4*	*50.8*	*774.7*	*125.6*
12	12.750	33.75	25.00	2.00	35.50	470.0
300	*323.9*	*857.3*	*635.0*	*50.8*	*901.7*	*213.2*

* Blowoff outlet threads conforming to ISO 7-1 are available upon request. Contact Tyco Fire & Building Products.

Please refer to General Notes on page 17.

TEE STRAINER

Figure S855 Tee Strainer

The Figure S855 Tee Strainer is rated for the following pressures:

- Sizes 2" – 5", 750 psi (51.7 bar) at 100°F (38°C)
- Size 6", 700 psi (48.2 bar) at 100°F (38°C)
- Size 8", 600 psi (41.4 bar) at 100°F (38°C)
- Size 10", 500 psi (34.5 bar) at 100°F (38°C)
- Size 12", 400 psi (27.6 bar) at 100°F (38°C)

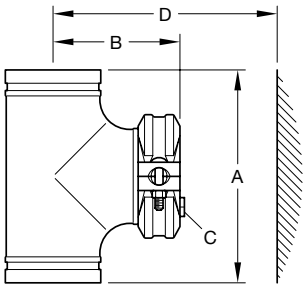
Tech Data: G430

The tee strainer is designed to remove particles from pipelines where a compact, accessible strainer is needed for the protection of pumps, meters, valves and similar mechanical equipment. The inlet and outlet ends are suitable for installation with Grinnell Couplings that provide quick and easy installation. The cover is secured by a Figure 772 Coupling for easy access to the screen. The cover is tapped and plugged to allow for draining.

The Figure S855 Tee Strainer perforated screen has the following perforations:

- Sizes 2" – 6" (DN 50 – DN 150) = ⅛" (3.2mm)
- Sizes 8" – 12" (DN 200 – DN 300) = 5/32" (4.0mm)

Note: Other perforation sizes are available upon request. Particle retention size should be specified when ordering nonstandard screens.



MATERIAL SPECIFICATIONS

Ductile Iron Body, Cover & Coupling Disc

- ASTM A-536 – Standard Specification for Ductile Iron Castings
- Grade 65-45-12
- Tensile Strength, Minimum PSI – 65,000 (MPa-448)
- Yield Strength, Minimum PSI – 45,000 (MPa-310)
- Elongation in 2" (50mm), Minimum 12%

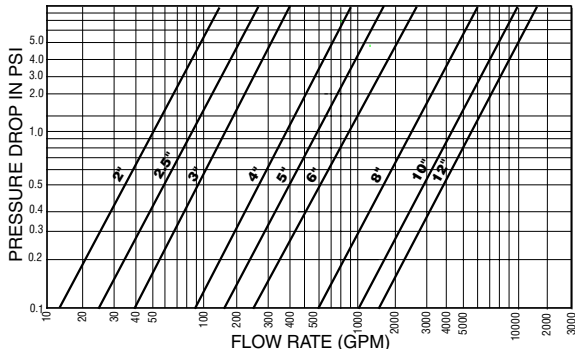
Screen

- 20 Gauge Type 304 Stainless Steel ASTM A-240 for Sizes 2" – 6"
- 18 Gauge Type 304 Stainless Steel ASTM A-240 forSizes 8" – 12"

Coating

- Black Enamel Paint

Performance



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table.

Nominal Size Inches *mm*	Nominal Dimensions: Pipe O.D. Inches *mm*	A Inches *mm*	B Inches *mm*	C Screen Removal Inches *mm*	D Tap Sizes Inches *mm*	Approx. Weight lbs *kg*
2	2.375	6.50	4.25	7.50	½	6.0
50	*60.3*	*165.0*	*108.0*	*191.0*	*12.7*	*2.7*
2½	2.875	7.50	4.75	8.75	½	11.0
65	*73.0*	*191.0*	*110.0*	*222.0*	*12.7*	*5.0*
3	3.500	8.50	5.25	10.00	½	12.0
80	*88.9*	*216.0*	*133.0*	*254.0*	*12.7*	*5.4*
4	4.500	10.00	6.13	12.00	½	20.0
100	*114.3*	*254.0*	*156.0*	*305.0*	*12.7*	*9.0*
5	5.563	11.00	6.63	13.50	¾	30.0
125	*141.3*	*279.0*	*168.0*	*342.0*	*19.1*	*13.0*
6	6.625	13.00	7.63	16.00	¾	40.0
150	*168.3*	*330.0*	*194.0*	*406.0*	*19.1*	*18.0*
8	8.625	15.50	9.13	19.44	¾	81.0
200	*219.1*	*394.0*	*232.0*	*494.0*	*19.1*	*36.0*
10	10.750	18.00	10.38	22.94	1	126.0
250	*273.0*	*457.0*	*264.0*	*583.0*	*25.4*	*57.0*
12	12.750	20.00	11.38	25.94	1	174.0
300	*323.9*	*508.0*	*289.0*	*659.0*	*25.4*	*79.0*

Please refer to General Notes on page 17.

SUCTION DIFFUSER

Figure S810 Suction Diffuser

The Figure S810 Suction Diffuser is compact and rugged for direct mounting to the suction side of a pump in either a horizontal or vertical position. In addition to removing foreign particles, the Figure S810 also provides proper flow conditions to the pump. Where space is limited, the Figure S810 can be used to replace the straight pipe normally required to reduce turbulance. The Figure S810 Suction Diffuser's permanent perforated stainless steel screen helps remove foreign particles. The inlet end is suitable for installation with Grinnell Couplings. The outlet end is provided with a 150# ANSI flat face flange. Integral straightening vanes in the diffuser outlet reduce turbulance so that stress and errosion on the pump is minimized.

Sizes: 3" (DN 80) – 16" (DN 400)

Maximum working pressure is 300 psi (20.7 bar) at 100°F (38°C).

Tech Data: G410

MATERIAL SPECIFICATIONS

Body and Cover

- Ductile Iron Conforming to ASTM A-536

Knobs

- Ductile Iron conforming to ASTM A-536 Grade 65-45-12 for sizes 3" x 2" – 10" x 8" (Stud/Nuts Carbon Steel conforming to ASTM A-193/194, for sizes10" x 10" and larger)

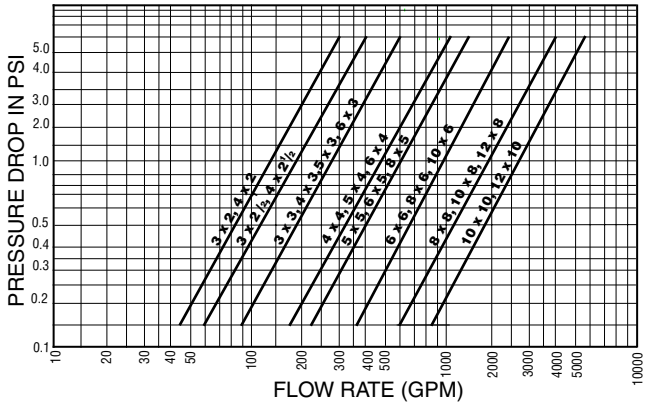
Screen

- 5/32" perforated Stainless Steel for sizes 3" x 2" – 6" x 6"; 1/8" perforated Stainless Steel for sizes 8" x 5" and larger. Start up screen is 20 mesh Stainless Steel.

Coating

- Black Enamel Paint

Performance



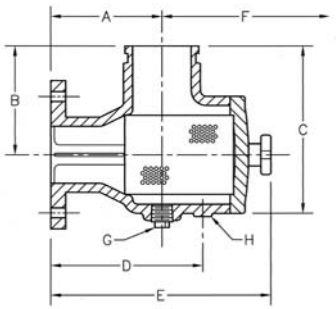
For sizes not shown, contact Tyco Fire & Building Products

Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table.

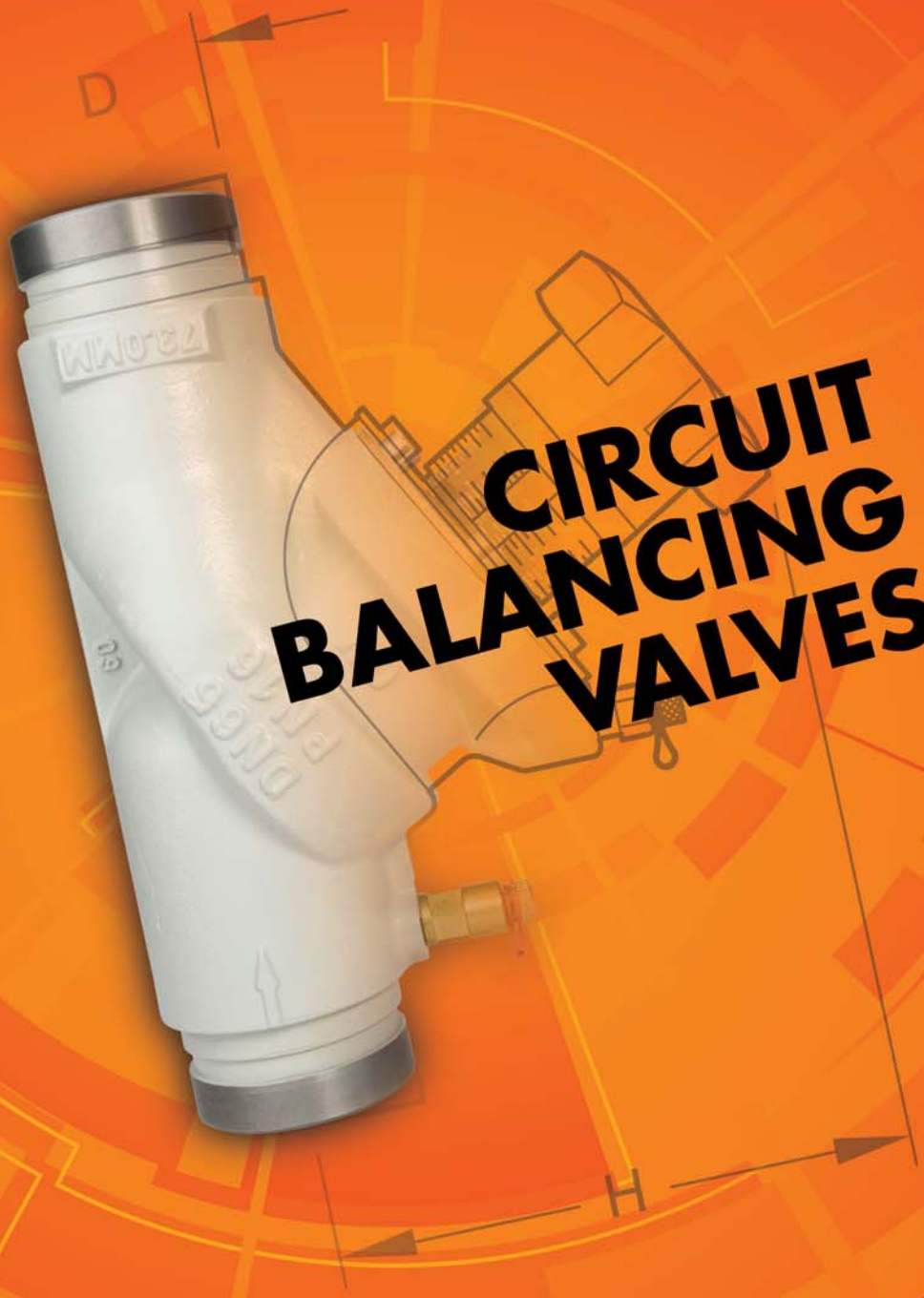
SUCTION DIFFUSER

Figure S810 Suction Diffuser

Nominal Dimensions									
Pipe Size Inlet x Outlet Inches *mm*	A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	E Inches *mm*	F Screen Removal Inches *mm*	G Plug NPT	H Pipe Support I.D. Inches *mm*	Approx. Weight lbs *kg*
3 x 2	5.50	5.50	8.48	7.38	11.56	9.63	0.75	1.38	38.0
80 x 50	*139.7*	*139.7*	*215.4*	*187.5*	*293.6*	*244.6*		*35.1*	*17.2*
3 x 2½	5.50	5.50	8.48	7.38	11.56	9.63	0.75	1.38	39.0
80 x 65	*139.7*	*139.7*	*215.4*	*187.5*	*293.6*	*244.6*		*35.1*	*17.7*
3 x 3	5.50	5.50	8.48	7.38	11.56	9.63	0.75	1.38	40.0
80 x 80	*139.7*	*139.7*	*215.4*	*187.5*	*293.6*	*244.6*		*35.1*	*18.1*
4 x 2	5.75	5.75	9.13	7.63	11.81	11.18	0.75	1.38	48.0
100 x 50	*146.1*	*146.1*	*231.9*	*193.8*	*300.0*	*284.0*		*35.1*	*21.8*
4 x 2½	6.50	6.50	10.48	8.75	13.13	9.63	1.00	1.38	49.0
100 x 65	*165.1*	*165.1*	*266.2*	*222.3*	*333.5*	*244.6*		*35.1*	*22.2*
4 x 3	6.50	6.50	10.48	8.75	13.13	9.63	1.00	1.38	50.0
100 x 80	*165.1*	*165.1*	*266.2*	*222.3*	*333.5*	*244.6*		*35.1*	*22.7*
4 x 4	6.50	6.50	10.48	8.75	13.13	9.63	1.00	1.38	52.0
100 x 100	*165.1*	*165.1*	*266.2*	*222.3*	*333.5*	*244.6*		*35.1*	*23.6*
5 x 3	6.50	6.50	10.48	8.75	13.13	11.50	1.00	1.38	94.0
125 x 80	*165.1*	*165.1*	*266.2*	*222.3*	*333.5*	*292.1*		*35.1*	*42.6*
5 x 4	6.50	6.50	11.94	10.00	15.75	14.00	1.00	1.38	96.0
125 x 100	*165.1*	*165.1*	*303.3*	*254.0*	*400.1*	*355.6*		*35.1*	*43.5*
5 x 5	7.50	7.50	11.94	10.00	15.75	14.88	1.00	1.38	101.0
125 x 125	*190.5*	*190.5*	*303.3*	*254.0*	*400.1*	*378.0*		*35.1*	*45.8*
6 x 3	8.00	8.00	13.31	10.50	16.88	16.56	1.00	1.38	103.0
150 x 80	*203.2*	*203.2*	*338.1*	*266.7*	*428.8*	*420.6*		*35.1*	*46.7*
6 x 4	8.00	8.00	13.31	10.50	16.88	16.56	1.00	1.38	106.0
150 x 100	*203.2*	*203.2*	*338.1*	*266.7*	*428.8*	*420.6*		*35.1*	*48.1*
6 x 5	8.00	8.00	13.31	10.50	16.88	16.56	1.00	1.38	110.0
150 x 125	*203.2*	*203.2*	*338.1*	*266.7*	*428.8*	*420.6*		*35.1*	*49.9*
6 x 6	8.00	8.00	13.31	10.50	16.88	16.56	1.00	1.38	113.0
150 x 150	*203.2*	*203.2*	*338.1*	*266.7*	*428.8*	*420.6*		*35.1*	*51.2*
8 x 5	9.00	9.00	14.38	11.50	17.88	16.88	1.00	1.38	135.0
200 x 125	*228.6*	*228.6*	*365.3*	*292.1*	*454.2*	*428.8*		*35.1*	*61.2*
8 x 6	9.00	9.00	15.31	11.50	17.88	16.88	1.00	1.38	137.0
200 x 150	*228.6*	*228.6*	*388.9*	*292.1*	*454.2*	*428.8*		*35.1*	*62.1*
8 x 8	9.00	9.00	16.75	11.75	20.75	22.88	1.25	1.38	222.0
200 x 200	*228.6*	*228.6*	*425.5*	*298.5*	*527.1*	*581.2*		*35.1*	*100.7*
10 x 6	9.48	9.48	15.50	11.94	18.31	16.88	1.00	1.38	230.0
250 x 150	*240.8*	*240.8*	*393.7*	*303.3*	*465.1*	*428.8*		*35.1*	*104.3*
10 x 8	9.00	9.00	18.44	11.75	20.75	22.88	1.25	1.38	236.0
250 x 200	*228.6*	*228.6*	*468.4*	*298.5*	*527.1*	*581.2*		*35.1*	*107.0*
10 x 10	11.00	11.00	20.00	14.00	26.38	30.75	1.25	1.38	343.0
250 x 250	*279.4*	*279.4*	*508.0*	*355.6*	*670.1*	*781.1*		*35.1*	*155.6*
12 x 8	9.00	9.00	19.63	11.75	20.75	22.88	1.25	1.38	357.0
300 x 200	*228.6*	*228.6*	*498.6*	*298.5*	*527.1*	*581.2*		*35.1*	*161.9*
12 x 10	11.00	12.75	21.00	14.00	26.38	30.75	1.25	1.38	357.0
300 x 250	*279.4*	*323.9*	*533.4*	*355.6*	*670.1*	*781.1*		*35.1*	*161.9*
12 x 12	12.00	12.00	22.06	15.25	26.18	30.75	1.25	1.38	357.0
300 x 300	*304.8*	*304.8*	*560.3*	*387.4*	*665.0*	*781.1*		*35.1*	*161.9*
14 x 10	11.00	11.00	22.50	14.00	26.38	30.75	1.25	1.38	507.0
350 x 250	*279.4*	*279.4*	*571.5*	*355.6*	*670.1*	*781.1*		*35.1*	*229.9*
14 x 12	12.00	12.00	22.38	15.25	26.18	31.00	1.25	1.38	601.0
350 x 300	*304.8*	*304.8*	*568.5*	*387.4*	*665.0*	*787.4*		*35.1*	*272.6*
14 x 14	14.00	14.00	25.00	17.50	27.75	33.13	2.00	1.38	706.0
350 x 350	*355.6*	*355.6*	*635.0*	*444.5*	*704.9*	*841.5*		*35.1*	*320.2*
16 x 14	14.00	14.00	26.00	17.50	27.88	31.00	2.00	1.38	750.0
400 x 350	*355.6*	*355.6*	*660.4*	*444.5*	*708.2*	*787.4*		*35.1*	*340.1*



Please refer to General Notes on page 17.



CIRCUIT BALANCING VALVES

CIRCUIT BALANCING VALVES

Grinnell® Model CB800 Circuit Balancing Valves are designed to achieve accurate and efficient balancing of hydronic heating or cooling systems. Circuit balancing valves provide superior accuracy in measuring flows rather than ball type circuit setters.

Balancing Valves

Solder
Page 87

Threaded
Page 87

Grooved
Page 86

Flanged
Page 86

MC2 Computer
Page 88

CIRCUIT BALANCING VALVES

CB800 CIRCUIT BALANCING VALVES

The CB800 valve serves 5 functions: throttling; measuring differential pressure; draining; filling; and positive shutoff. It is rated at 300 psi (20.7 bar) at 300° F (150°C). The valve is made of dezincification resistant brass and bronze components. Threaded and solder connections are available for sizes ½" (DN 15) – 2" (DN 50) sizes with bronze bodies. Flanged (125#) and grooved connections are available for sizes 2½" (DN 65) – 12" (DN 300) with cast iron bodies.

The Y-pattern provides low pressure drop and the globe style valve allows for precise throttling. The easy to adjust digital/vernier handwheel gives a minimum of 70 unique handwheel positions. The handwheel and test ports are located on one side and the test ports are on one end for easy access. There is a built-in memory stop to ensure the setting can be returned to a balanced position after shutoff. The self-sealing pressure/temperature test ports use standard insertion probes to eliminate additional components.

The circuit balancing valve is installed with flow in the direction of the arrow, and may be in the horizontal or vertical position. The handwheel can be positioned up or down, or on either side.

Tech Data: G450

MATERIAL SPECIFICATIONS

Body

- Sizes ½" (DN15) to 2" (DN50) solder or NPT threaded connection — brass resistant to dezincification (DZR)
- Sizes 2½" (DN16) to 12" (DN300), grooved or flanged connection — Cast Iron conforming to ASME/ ANSI B16.5

Valve Stem & Disc

- Brass Resistant to Dezincification (DZR)

O Ring

- EPDM E

Handwheel

- Thermoplastic

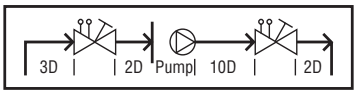
Valve Sizing

All balancing valves are sized to perform in a normal operation range between 25% and 100% of the full open position, at a minimum differential pressure between 1 to 3 ft. of water. It is recommended that for improved accuracy the valve is set to open 70%+.

When maximum flow is known but a pressure drop through the balancing valve is unknown, select a balancing valve for a maximum pressure drop of 2 ft. water (5.7 kPa) in the full open position as shown in the table to the right:

Accurate flow measurement requires that the velocity distribution near the balancing valve stays constant, regardless of the total flow through the pipe. Fittings, such as elbows and tees, disturb the normal flow profile which is established through straight pipe. Pumps create even greater disturbances. Failure to allow water flows around fittings and pumps to normalize can affect measuring accuracy by as much as 20% when the valve is in the fully open position. Minimum lengths (diameters, D) of straight pipe before and after the balancing valve prevent these errors. Valves are designed for vertical, horizontal or inclined installation.

Minimum Pipe Diameters from Fittings

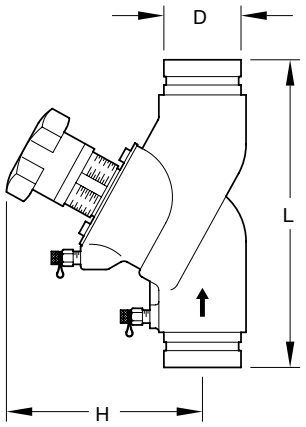


Flow		Size		Connection
GPM	(l/h)	Inches	(DN)	Swt thrd / Flng grv
0.5 - 4.1	(100 - 1000)	½	(15)	sweat thread
4.1 – 6.1	(1.0k – 1.5k)	¾	(20)	sweat thread
6.1 – 9.2	(1.5k – 2.3k)	1	(25)	sweat thread
9.2 – 20	(2.3k – 5.0k)	1-1/4	(32)	sweat thread
20 – 29	(5.0k – 7.2k)	1-1/2	(40)	sweat thread
29 – 40	(7.2k – 10k)	2	(50)	sweat thread
40 – 102	(10k - 25k)	2-1/2	(65)	flanged grooved
102 – 125	(25k – 31k)	3	(80)	flanged grooved
125 – 210	(31k – 50k)	4	(100)	flanged grooved
210 – 300	(50k – 76k)	5	(125)	flanged grooved
300 – 430	(76k – 108k)	6	(150)	flanged grooved
430 – 760	(108k – 190k)	8	(200)	flanged grooved
760 – 1350	(190k – 340k)	10	(250)	flanged grooved
1350 -1500	(340k – 377k)	12	(300)	flanged grooved

CIRCUIT BALANCING VALVES

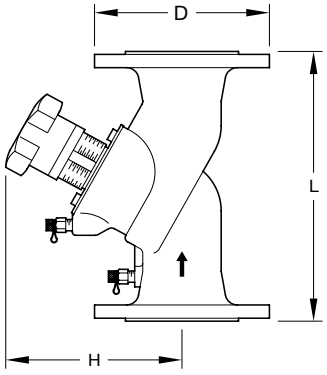
Model CB800

Grooved End



Size Inches	Connection	Nominal Dimensions L Inches mm	H Inches mm	D Inches mm	Approx. Weight Lbs. Kg.	PSI / °F PN / °C	Hand-wheel Turns
2½	Groove	11.44	7.38	2.88	18.7	235/300	8.0
65		*290,6*	*187,5*	*73,2*	*8,5*	*16/150*	
3	Groove	12.25	8.00	3.50	27.5	235/300	8.0
80		*311,2*	*203,2*	*88,9*	*12,5*	*16/150*	
4	Groove	13.75	9.44	4.50	45.1	235/300	8.0
100		*349,3*	*239,8*	*114,3*	*20,5*	*16/150*	
5	Groove	15.75	11.13	5.56	70.4	235/300	8.0
125		*400,0*	*282,7*	*141,2*	*32*	*16/150*	
6	Groove	18.88	11.25	6.63	95.7	235/300	8.0
150		*479,6*	*285,8*	*168,4*	*43,5*	*16/150*	
8	Groove	23.63	18.44	8.63	255.2	235/300	12.0
200		*600,2*	*468,4*	*219,2*	*116*	*16/150*	
10	Groove	28.75	18.88	10.75	376.2	235/300	12.0
250		*730,3*	*479,6*	*273,1*	*171*	*16/150*	
12	Groove	33.44	20.25	12.75	519.2	235/300	12.0
300		*849,4*	*514,4*	*323,9*	*136*	*16/150*	

Flanged End



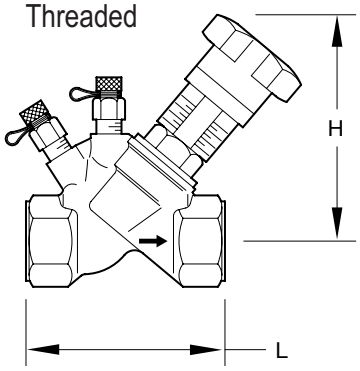
Size Inches	Connection	Nominal Dimensions L Inches mm	H Inches mm	D Inches mm	Approx. Weight Lbs. Kg.	PSI / °F PN / °C	Hand-wheel Turns
2½	Groove	11.44	7.38	7.25	18.7	235/300	8.0
65	*Flange*	*290,6*	*187,5*	*184,2*	*13,5*	*16/150*	
3	125#	12.25	8.00	7.88	39.6	235/300	8.0
80	*Flange*	*311,2*	*203,2*	*200,2*	*12,5*	*16/150*	
4	125#	13.75	9.50	8.69	61.6	235/300	8.0
100	*Flange*	*349,3*	*241,3*	*220,7*	*28*	*16/150*	
5	125#	15.75	11.13	9.88	89.1	235/300	8.0
125	*Flange*	*400,1*	*282,7*	*250,9*	*40,5*	*16/150*	
6	125#	18.88	11.25	11.25	113.3	235/300	8.0
150	*Flange*	*479,6*	*285,8*	*285,8*	*51,5*	*16/150*	
8	125#	23.63	18.38	13.38	284.9	235/300	12.0
200	*Flange*	*600,2*	*466,9*	*339,9*	*129,5*	*16/150*	
10	125#	28.75	18.94	15.94	431.2	235/300	12.0
250	*Flange*	*730,3*	*481,1*	*404,9*	*196,0*	*16/150*	
12	125#	33.50	20.25	18.13	580.8	235/300	12.0
300	*Flange*	*850,9*	*514,4*	*460,5*	*264*	*16/150*	

Please refer to General Notes on page 17.

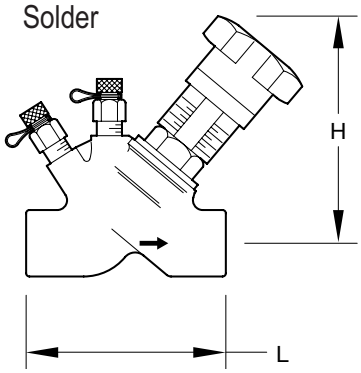
CIRCUIT BALANCING VALVES

Model CB800

Threaded



Solder



Size Inches	Connection	Nominal Dimen. L Inches mm	Nominal Dimen. H Inches mm	Approx. Weight Lbs. Kg.	PSI / °F PN / °C	Hand-wheel Turns
½	Female	3.13	4.13	1.4	235/300	7.0
15	*NPT*	*79,5*	*104,9*	*0.6*	*16/150*	
¾	Female	3.31	4.56	1.4	235/300	7.0
20	*NPT*	*84,1*	*115,8*	*0.6*	*16/150*	
1	Female	3.38	4.69	2.2	235/300	7.0
25	*NPT*	*85,6*	*119,1*	*1.0*	*16/150*	
1¼	Female	4.38	5.38	3.0	235/300	10.0
32	*NPT*	*111,3*	*136,7*	*1.4*	*16/150*	
1½	Female	4.75	5.44	3.9	235/300	10.0
40	*NPT*	*120,7*	*138,2*	*1.8*	*16/150*	
2	Female	5.94	5.81	5.6	235/300	10.0
50	*NPT*	*150,9*	*147,6*	*2.6*	*16/150*	
½	Female	3.50	4.50	1.4	235/300	7.0
15	*Solder*	*88,9*	*114,3*	*0.6*	*16/150*	
¾	Female	3.81	4.56	1.4	235/300	7.0
20	*Solder*	*96,8*	*115,8*	*0.6*	*16/150*	
1	Female	4.31	4.69	2.2	235/300	7.0
25	*Solder*	*109,5*	*119,1*	*1.0*	*16/150*	
1¼	Female	5.06	5.38	3.0	235/300	10.0
32	*Solder*	*128,5*	*136,7*	*1.4*	*16/150*	
1½	Female	5.56	5.44	3.9	235/300	10.0
40	*Solder*	*141,2*	*138,2*	*1.7*	*16/150*	
2	Female	6.56	5.81	5.6	235/300	10.0
50	*Solder*	*166,6*	*147,6*	*2.6*	*16/150*	

Please refer to General Notes on page 17.

Accessories

MC2 CIRCUIT BALANCING VALVE MEASURING COMPUTER

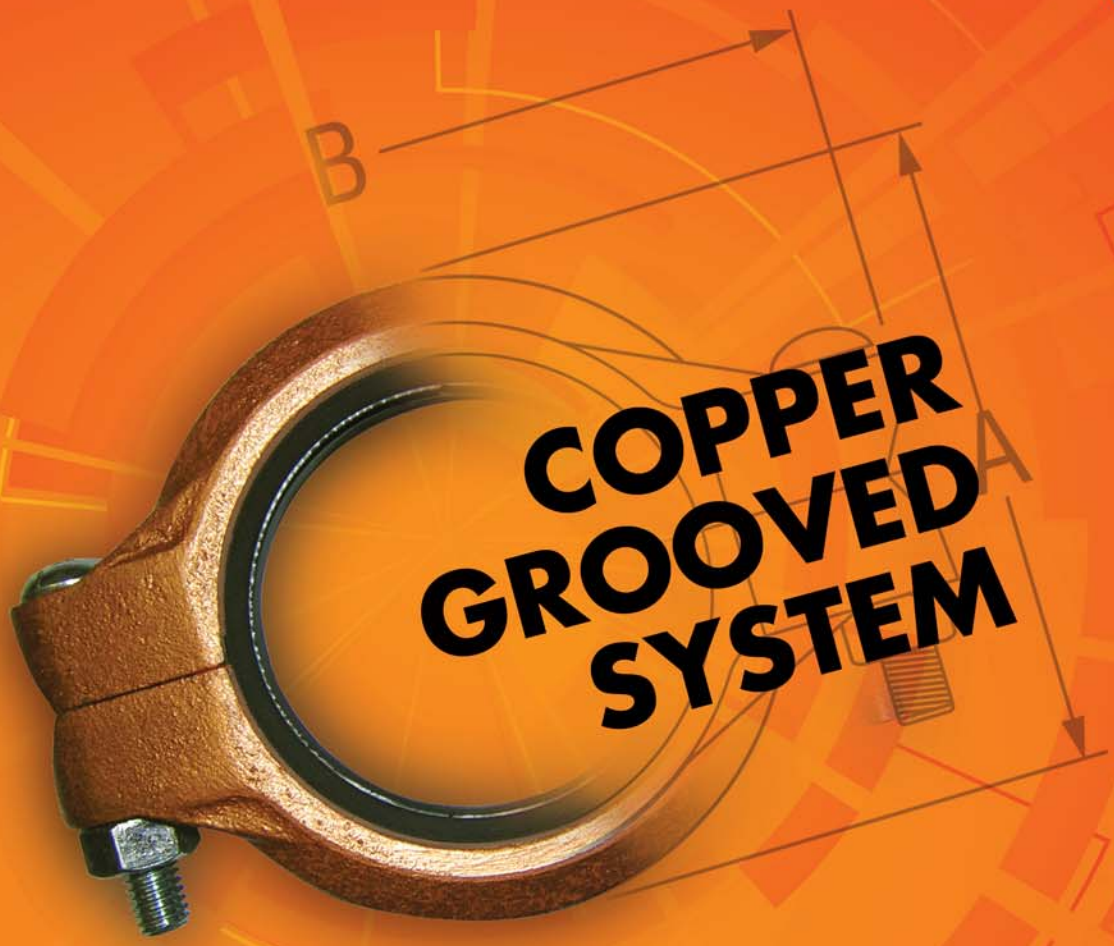
The Model MC2 is a hand-held computer balancing instrument designed to measure the flow in Grinnell Balancing Valves from ½" (DN15) to 12" (DN300). It automatically calculates the flow rate for a valve, measures the differential pressure, temperature, compares the actual and nominal flow values and displays the required presetting value. All results may be saved in the hand-held computer and downloaded and documented to a PC at a later time.

The easy to operate touch button keypad protects against water and dirt particles and the hand-held computer is supplied with a rechargeable power pact. The hand-held computer, all parts are stored in a convenient carrying case.

Insulation Kits for Grinnell CB800 Circuit Balancing Valves

Insulation shells are made of polyurethane. Specify size and end-connection type. Available for sizes ½" up to 8".

For accessories and replacement parts contact Tyco Fire & Building Products for details.



COPPER GROOVED SYSTEM

COPPER GROOVED SYSTEM

Grinnell® Copper Grooved System is designed for joining copper tube size components 2" to 8" (DN 50 to DN 200) type K, L, M and DWV. All couplings and fittings are rated for working pressures up to 300 psi depending on copper tubing size and type (see pressure rating chart).

Couplings

Figure 672
Rigid Coupling – Patented
Page 92

Flanges

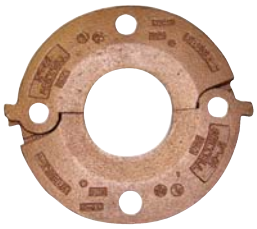


Figure 61
Flange Adapter
Page 93

Fittings

Pages 94-97

Valves

Model B680
Copper System Grooved
End Butterfly Valve
Page 98

Copper Grooving Tool

Model 1039-66
Roll Groover
Page 99

MATERIAL SPECIFICATIONS

The applicable material specifications for ductile iron and rubber gaskets apply:

Ductile Iron Housing Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings Grade 65-45-12

Gasket Specifications

- Tri-Seal Grade "EN" EPDM, NSF 61 approved compound, has a copper color code, for cold +86°F (+30°C) and hot +180°F (+82°C) potable water. Not recommended for petroleum service.

Bolt/Nut Specifications

- Carbon steel oval neck bolts and nuts are heat treated and conform to the physical properties of ASTM A-183 with a minimum tensile strength of 110,000 psi (758,422 kPa). Bolts and nuts are zinc electroplated to ASTM B633.

Coatings

- Copper – Acrylic Enamel

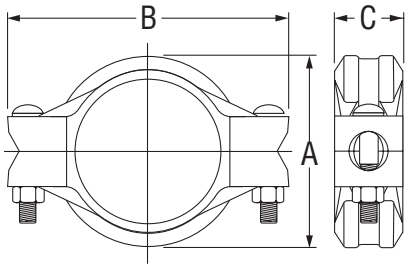
COUPLINGS

Figure 672 Rigid Coupling – Patented

The Figure 672 Rigid Coupling, size range 2" to 8" (DN 50 to DN 200) is capable of pressures up to 300 PSI (2,065 kPa) depending on copper tubing size and type. It provides a rigid joint by firmly gripping along the circumference of the copper tube grooves. The Figure 672 Coupling is supplied with a NSF61 approved grade EPDM EN tri-seal gasket.

Figure 672 Rigid Couplings are a proven dependable method of joining copper tubing and are an economical alternative to soldering (sweating) joints and can be used on type K, L, M, DWV copper tube.

Tech Data: G510



Nominal Size Inches *mm*	Copper Tubing O.D. Inches *mm*	Max.* Gap Inches *mm*	Nominal Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	Coupling Bolts Qty.	Size Inches	Approx. Weight lbs *kg*
2	2.125	0.06	3.09	4.65	1.72	2	⅜ x 2¼	2.1
50	*54,0*	*1,5*	*78,6*	*118,1*	*43,7*			*0,9*
2½	2.625	0.06	3.59	5.38	1.72	2	⅜ x 2¼	2.3
65	*66,7*	*1,5*	*91,3*	*136,7*	*43,7*			*1,1*
3	3.125	0.06	4.12	6.25	1.72	2	½ x 3	2.9
80	*79,4*	*1,5*	*104,7*	*158,8*	*43,7*			*1,3*
4	4.125	0.09	5.33	7.75	1.86	2	½ x 3	3.9
100	*104,8*	*2,3*	*135,3*	*196,9*	*47,2*			*1,8*
5	5.125	0.09	6.48	9.25	1.86	2	⅝ x 3¼	6.0
125	*130,7*	*2,3*	*164,6*	*235,0*	*47,2*			*2,7*
6	6.125	0.09	7.25	10.25	1.86	2	⅝ x 3¼	6.7
150	*155,6*	*2,3*	*184,1*	*260,4*	*47,2*			*3,0*
8	8.125	0.09	9.64	12.75	1.86	2	¾ x 4¾	10.5
200	*206,4*	*2,3*	*244,8*	*323,9*	*47,2*			*4,8*

* Maximum available gap between pipe ends, minimum gap = 0.

Certified to NSF/ANSI 61

See Tyco Fire & Building Products Publication TFP1800

PERFORMANCE PRESSURE RATINGS FIGURE 672 COUPLING

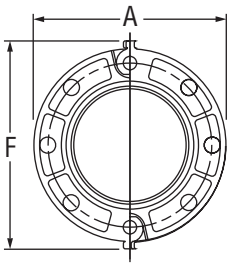
Nominal Size Inches *mm*	Type "K" ASTM B-88 Wall Thick Inches *mm*	Max. Working Pressure psi/*kPa*	Max. End Load lbs/*kN*	Type "L" ASTM B-88 Wall Thick Inches *mm*	Max. Working Pressure psi/*kPa*	Max. End Load lbs/*kN*	Type "M" ASTM B-88 Wall Thick Inches *mm*	Max. Working Pressure psi/*kPa*	Max. End Load lbs/*kN*	DWV ASTM B-306 Wall Thick Inches *mm*	Max. Working Pressure psi/*kPa*	Max. End Load lbs/*kN*
2	0.083	300	1.065	0.070	300	1.065	0.058	250	890	0.042	–	–
50	*2,1*	*2065*	*4,74*	*1,8*	*2065*	*4,74*	*1,5*	*1725*	*3,96*	*1,1*	*–*	*–*
2½	0.095	300	1.625	0.080	300	1.625	0.065	250	1.350	–	–	–
65	*2,4*	*2065*	*7,23*	*2,0*	*2065*	*7,23*	*1,7*	*1725*	*6,01*	*–*	*–*	*–*
3	0.109	300	2.300	0.090	300	2.300	0.072	250	1.415	0.045	100	765
80	*2,8*	*2065*	*10,23*	*2,3*	*2065*	*10,23*	*1,8*	*1725*	*6,30*	*1,1*	*690*	*3,40*
4	0.134	300	4.005	0.110	300	4.005	0.095	250	3.340	0.058	100	1.335
100	*3,4*	*2065*	*17,82*	*2,8*	*2065*	*17,82*	*2,4*	*1725*	*14,86*	*1,5*	*690*	*5,94*
5	0.160	300	6.190	0.125	300	6.19	0.109	200	4.125	0.072	100	2.060
125	*4,1*	*2065*	*27,55*	*3,2*	*2065*	*27,55*	*2,8*	*1375*	*18,36*	*1,8*	*690*	*9,17*
6	0.192	300	8.840	0.140	300	8.840	0.122	200	5.890	0.083	100	2.945
150	*4,9*	*2065*	*39,34*	*3,6*	*2065*	*39,34*	*3,1*	*1375*	*26,21*	*2,1*	*690*	*13,10*
8	0.271	300	15.550	0.200	300	15.550	0.170	200	10.370	0.109	100	5.180
200	*6,9*	*2065*	*69,2*	*5,1*	*2065*	*69,20*	*4,3*	*1375*	*46,10*	*2,8*	*690*	*23,0*

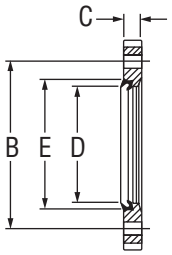
Please refer to General Notes on page 17.

FLANGES

Figure 61 Flange Adapter (ANSI Class 125/150)

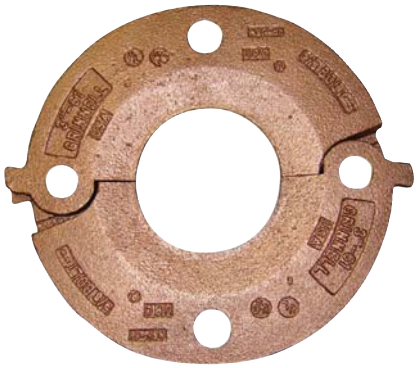
The Figure 61 Flange Adapter is capable of pressures up to 300 PSI (20,7 bar) depending on copper tubing size and type. It provides a direct transition from flanged components to a grooved copper tube system. I.P.S. size flange bolt patterns conform to ANSI Class 125 and 150. The Figure 61 Flange Adapter is supplied with NSF 61 approved grade EPDM EN Gasket.





Certified to NSF/ANSI 61

See Tyco Fire & Building Products Publication TFP1800



Tech Data: G515

Nominal Size Inches *mm*	Copper Tubing O.D. Inches *mm*	Nominal Dimensions						Bolts**		Approx. Weight lbs *kg*
		A Inches *mm*	B Inches *mm*	C Inches *mm*	D* Inches *mm*	E* Inches *mm*	F Inches *mm*	Qty.	Size Inches	
2	2.125	6.38	4.75	0.75	2.13	3.41	7.25	4	⅝ x 3	4.1
50	*54,0*	*162,1*	*120,7*	*19,1*	*54,0*	*86,6*	*184,2*			*1,9*
2½	2.625	7.00	5.50	0.88	2.63	3.91	7.88	4	⅝ x 3	5.7
65	*66,7*	*178,0*	*140,0*	*22,0*	*67,0*	*99,0*	*200,0*			*2,6*
3	3.125	7.50	6.00	0.94	3.13	4.53	9.88	4	⅝ x 3	6.7
80	*79,4*	*190,5*	*152,4*	*23,9*	*80,0*	*115,1*	*251,0*			*3,0*
4	4.125	9.00	7.50	0.94	4.13	5.53	9.90	8	⅝ x 3	8.5
100	*104,8*	*228,6*	*190,5*	*23,9*	*105,0*	*140,5*	*251,5*			*3,9*
5	5.125	10.00	8.50	1.00	5.13	6.72	11.38	8	¾ x 3½	10.3
125	*130,2*	*254,0*	*215,9*	*25,4*	*130,0*	*170,7*	*289,1*			*4,7*
6	6.125	11.00	9.50	1.00	6.13	7.78	11.88	8	¾ x 3½	11.5
150	*155,6*	*279,4*	*241,3*	*25,4*	*156,0*	*197,6*	*301,8*			*5,2*

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

** Bolts are not supplied. Bolt lengths shown are standard; it is the responsibility of the purchaser to verify correct length for the intended application.

Note: Phenolic Type "F" flange washer adapters 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
- Serrated flange surfaces

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.

Please refer to General Notes on page 17.

FITTINGS – COPPER SYSTEM

Cast fittings in 90°, 45° elbow, tees, caps, concentric reducers, and reducing tees are cast with a copper Alloy conforming to CDA C89833. Cast fittings are stronger and more durable than wrot copper fittings and are less susceptible to damage in transit or during installation. Reducing fittings are available with Groove x Groove or Groove x Cup End configurations.

Fittings are standard radius, full flow, designed for installation with Grinnell® Copper System Figure 672 Couplings or Figure 61 Flange Adapters.

Fittings are rated at the pressure rating of the Figure 672 Coupling or Figure 61 Flange being used.

For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Suppression Building Products.

CLASSIFIED UL WATER QUALITY

Tech Data: G520

MATERIAL SPECIFICATIONS

Cast Copper Alloy Fittings

- Copper Alloy Conforming to CDA C89833
- UL Classified in Accordance with ANSI/NSF61 and Bears the UL Water Quality Mark

Wrot Copper Fittings

- ASTM B-75 C12200; Wall Thickness Per ASTM B-88 Type L

FITTINGS

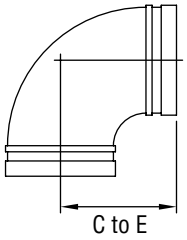
Figures 610, 601, 619 & 660

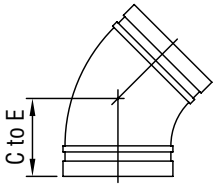
FIGURE 610
90° ELBOW CAST

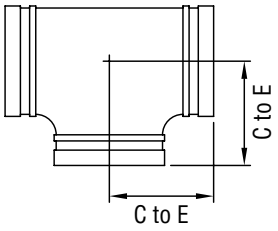
FIGURE 601
45° ELBOW CAST

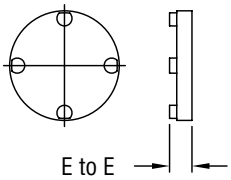
FIGURE 619
TEE CAST

FIGURE 660
CAP CAST









Nominal Size Inches *mm*	Copper Tube O.D. Inches *mm*	Figure 610		Figure 601		Figure 619		Figure 660	
		Nominal C to E Inches *mm*	Approx. Weight lbs *kg*	Nominal C to E Inches *mm*	Approx. Weight lbs *kg*	Nominal C to E Inches *mm*	Approx. Weight lbs *kg*	Nominal E to E Inches *mm*	Approx. Weight lbs *kg*
2	2.125	2.91	1.95	2.19	1.6	2.69	2.5	.92	.7
50	*54,0*	*73,9*	*0,9*	*55,6*	*0,7*	*68,3*	*1,13*	*23,4*	*,3*
2½	2.625	3.31	2.65	2.31	2.1	3.20	3.0	.92	1.0
65	*66,7*	*84,1*	*1,2*	*58,7*	*1,0*	*81,3*	*1,36*	*23,4*	*,5*
3	3.125	3.81	3.65	2.59	2.8	3.52	4.05	.92	1.4
80	*79,4*	*96,8*	*1,66*	*65,8*	*1,3*	*89,4*	*2,2*	*23,4*	*,6*
4	4.125	4.75	7.0	3.19	5.7	4.25	9.15	.92	2.4
100	*104,8*	*120,7*	*3,18*	*81,0*	*2,6*	*108,0*	*4,15*	*23,4*	*1,1*
5	5.125	5.94	11.6	3.25	8.0	5.94	17.75	.92	4.2
125	*130,2*	*150,9*	*5,26*	*82,6*	*3,6*	*150,9*	*8,05*	*23,4*	*1,9*
6	6.125	6.94	16.62	3.5	10.5	6.94	24.4	.92	5.9
150	*155,6*	*176,7*	*7,54*	*88,9*	*4,8*	*176,3*	*11,07*	*23,4*	*2,7*
8	8.125	7.75	23.6	4.25	16.9	7.75	36.25	.92	10.2
200	*206,4*	*196,9*	*10,7*	*108,0*	*7,7*	*196,9*	*16,44*	*23,4*	*4,6*

Please refer to General Notes on page 17.

FITTINGS

Figure 621 Reducing Tee

Nominal Size Inches *mm*	Copper Tube O.D. Inches *mm*	Nominal C to E Inches *mm*	Nominal C to RE Inches *mm*	Approx. Weight lbs *kg*
2½ x 2½ x 2	2.625 x 2.625 x 2.125	3.28	3.38	3.47
65 x 65 x 50	*66.7 x 66.7 x 54.0*	*83.3*	*85.9*	*1.57*
3 x 3 x 2	3.125 x 3.125 x 2.125	3.00	3.38	3.69
80 x 80 x 50	*79.4 x 79.4 x 54.0*	*76.2*	*85.9*	*1.67*
3 x 3 x 2½	3.125 x 3.125 x 2.625	3.25	3.5	4.13
80 x 80 x 65	*79.4 x 79.4 x 66.7*	*82.6*	*88.9*	*1.87*
4 x 4 x 2	4.125 x 4.125 x 2.125	3.66	4.13	6.75
100 x 100 x 50	*104.8 x 104.8 x 54.0*	*93.0*	*104.9*	*3.06*
4 x 4 x 2½	4.125 x 4.125 x 2.625	3.94	4.06	7.31
100 x 100 x 65	*104.8 x 104.8 x 66.7*	*100.1*	*103.1*	*3.32*
4 x 4 x 3	4.125 x 4.125 x 3.125	4.19	4.16	7.84
100 x 100 x 80	*104.8 x 104.8 x 79.4*	*106.4*	*105.7*	*3.56*
5 x 5 x 3	5.125 x 5.125 x 3.125	3.75	4.63	9.35
125 x 125 x 80	*130.2 x 130.2 x 79.4*	*95.3*	*117.6*	*4.24*
5 x 5 x 4	5.125 x 5.125 x 4.125	4.25	4.56	10.95
125 x 125 x 100	*130.2 x 130.2 x 104.8*	*108.0*	*115.8*	*4.97*
6 x 6 x 2½	6.125 x 6.125 x 2.625	3.63	5.13	10.78
150 x 150 x 65	*155.6 x 155.6 x 66.7*	*92.2*	*130.3*	*4.89*
6 x 6 x 3	6.125 x 6.125 x 3.125	3.69	5.19	11.05
150 x 150 x 80	*155.6 x 155.6 x 79.4*	*93.7*	*131.8*	*5.01*
6 x 6 x 4	6.125 x 6.125 x 4.125	4.19	5.13	12.86
150 x 150 x 100	*155.6 x 155.6 x 104.8*	*106.4*	*130.3*	*5.83*
6 x 6 x 5	6.125 x 6.125 x 5.125	4.69	5.196	14.75
150 x 150 x 125	*155.6 x 155.6 x 130.2*	*119.1*	*131.8*	*6.69*

Dimensional information in this chart is for cast fittings.

FIGURE 621 REDUCING TEE
GROOVE X GROOVE X GROOVE
CAST

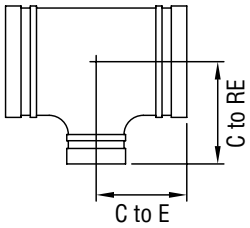
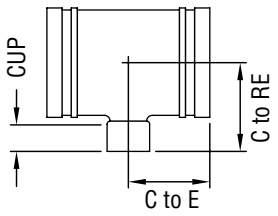


Figure 618 Reducing Tee

Nominal Size Inches *mm*	618 Groove x Groove x Cup Cast			
	C to E Inches *mm*	C to RE Inches *mm*	Cup Inches *mm*	Approx. Weight lbs *kg*
2 x 2 x ¾	2.20	2.04	0.81	1.5
50 x 50 x 20	*55,9*	*51,8*	*20,6*	*0,6*
2 x 2 x 1	2.33	2.26	094	1.5
50 x 50 x 25	*59,1*	*57,4*	*23,9*	*0,6*
2 x 2 x 1¼	2.48	2.41	0.99	1.5
50 x 50 x 32	*63,0*	*61,2*	*25,1*	*0,6*
2 x 2 x 1½	2.55	2.34	1.13	2.0
50 x 50 x 40	*64,7*	*59,4*	*28,7*	*0,8*
2½ x 2½ x ¾	2.27	2.24	0.81	2.0
65 x 65 x 20	*57,7*	*57,0*	*20,6*	*1,0*
2½ x 2½ x 1	2.40	2.46	0.94	2.0
65 x 65 x 25	*61,0*	*62,5*	*23,9*	*1,0*
2½ x 2½ x 1¼	2.52	2.63	0.99	2.0
65 x 65 x 32	*64,0*	*66,8*	*25,1*	*1,0*
2½ x 2½ x 1½	2.70	2.74	1.13	2.5
65 x 65 x 40	*68,6*	*69,6*	*28,7*	*1,2*
3 x 3 x ¾	2.45	2.64	0.81	3.0
80 x 80 x 20	*62,2*	*67,1*	*20,6*	*1,4*
3 x 3 x 1	2.54	2.85	0.94	3.0
80 x 80 x 25	*64,5*	*72,4*	*23,9*	*1,4*
3 x 3 x 1¼	2.63	2.95	0.99	3.0
80 x 80 x 32	*66,8*	*74,9*	*25,1*	*1,4*
3 x 3 x 1½	2.85	3.06	1.13	3.5
80 x 80 x 40	*72,4*	*77,7*	*28,7*	*1,6*
4 x 4 x ¾	2.95	3.06	0.81	5.0
100 x 100 x 20	*94,7*	*77,7*	*20,6*	*2,2*
4 x 4 x 1	3.10	3.28	0.96	5.5
100 x 100 x 25	*78,7*	*83,3*	*24,4*	*2,6*
4 x 4 x 1¼	3.25	3.53	0.99	6.0
100 x 100 x 32	*82,5*	*89,7*	*25,1*	*2,7*
4 x 4 x 1½	3.35	3.71	1.13	6.0
100 x 100 x 40	*85,1*	*94,2*	*28,7*	*2,7*

Please refer to General Notes on page 17.

FIGURE 618
REDUCING TEE
GROOVE X GROOVE X CUP
CAST

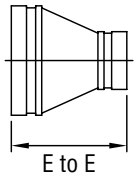


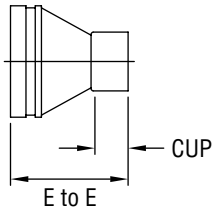
COUPLINGS

Figures 650 & 652 Concentric Reducer

FIGURE 650 CONCENTRIC REDUCER
GROOVE X GROOVE
CAST

FIGURE 652 CONCENTRIC REDUCER
GROOVE X CUP
WROT COPPER





Nominal Size Inches *mm*	650 Groove x Groove	
	E to E Inches *mm*	Approx. Weight lbs *kg*
2½ x 2	3.29	1.4
65 x 50	*83,6*	*0,6*
3 x 2	2.50	1.4
80 x 50	*63,5*	*0,6*
3 x 2½	2.50	1.4
80 x 65	*63,5*	*0,6*
4 x 2	4.75	3.2
100 x 50	*120,7*	*1,5*
4 x 2½	3.00	2.3
100 x 65	*76,2*	*1,1*
4 x 3	3.00	2.4
100 x 80	*76,2*	*1,1*
5 x 3	3.88	3.8
125 x 80	*98,6*	*1,7*
5 x 4	3.38	3.8
125 x 100	*85,9*	*1,7*
6 x 3	4.38	5.0
150 x 80	*111,3*	*2,3*
6 x 4	3.88	5.1
150 x 100	*98,6*	*2,3*
6 x 5	3.38	4.9
150 x 125	*85,9*	*2,2*
8 x 6	5.00	9.5
200 x 150	*127.0*	*4,3*

Nominal Size Inches *mm*	652 Groove x Groove x Cup		
	E to E Inches *mm*	Cup Inches *mm*	Approx. Weight lbs *kg*
2 x 1	2.70	0.91	0.5
50 x 25	*68,6*	*23,1*	*0,2*
2 x 1¼	3.00	0.97	0.4
50 x 32	*76,2*	*24,6*	*0,2*
2 x 1½	2.94	1.09	0.4
50 x 40	*74,7*	*27,7*	*0,2*
2½ x 1	2.28	0.91	0.5
65 x 25	*57,9*	*23,1*	*0,2*
2½ x 1¼	3.52	0.97	0.6
65 x 32	*89,4*	*24,6*	*0,3*
2½ x 1½	3.45	1.09	0.6
65 x 40	*87,6*	*27,7*	*0,3*
2½ x 2	3.30	1.34	0.6
65 x 50	*83,8*	*34,0*	*0,3*
3 x 1½	2.59	1.09	0.7
80 x 40	*65,8*	*27,7*	*0,3*
3 x 2	4.10	1.34	1.0
80 x 50	*104,1*	*34,0*	*0,5*
4 x 2	3.41	1.34	1.4
100 x 50	*86,6*	*34,0*	*0,6*

Please refer to General Notes on page 17.

VALVES

Model B680 Butterfly Valve with Lever Handle

The Model B680 is a lever handle bronze body butterfly valve designed for use with grooved copper tubing (CTS), fittings and couplings. The valve is rated to 300 psi (20 bar) and features a 10 position locking lever handle and EPDM encapsulated ductile iron disc.

CLASSIFIED UL WATER QUALITY

Tech Data: G530

MATERIAL SPECIFICATIONS

Body

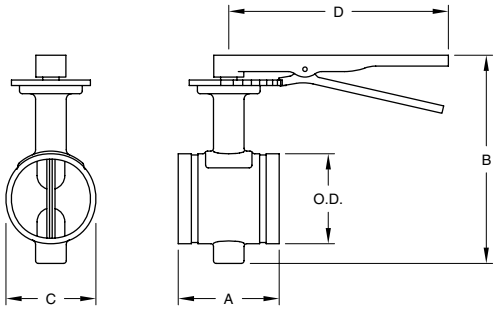
- Cast Bronze to ASTM B584-87 Copper Alloy UNS C90500

Disc

- Ductile Iron to ASTM A536 Gr. 65-45-12 Encapsulated with EPDM

Upper & Lower Shafts

- Stainless Steel Type 416 of ASTM A582
- UL Classified in Accordance with ANSI/NSF 61



Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Dimensions A Inches *mm*	B Inches *mm*	C Inches *mm*	D Inches *mm*	Weight lbs *kg*
2	2.125	3.19	5.31	2.45	10.0	4.9
50	*54,0*	*81,0*	*135,0*	*57,0*	*254,0*	*2,2*
2½	2.625	3.75	5.91	2.63	10.0	5.9
65	*66,7*	*96,0*	*150,0*	*67,0*	*254,0*	*2,7*
3	3.125	3.75	7.68	3.13	10.0	6.6
80	*79,4*	*96,0*	*195,0*	*79,0*	*254,0*	*3,0*
4	4.125	4.63	8.78	4.13	10.0	11.0
100	*104,8*	*118,0*	*223,0*	*105,0*	*254,0*	*5,0*
5	5.125	5.88	9.80	5.13	10.0	17.6
125	*130,2*	*149,0*	*249,0*	*130,0*	*254,0*	*8,0*
6	6.125	5.88	10.86	6.13	10.0	21.6
150	*155,6*	*149,0*	*276,0*	*156,0*	*254,0*	*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.

Please refer to General Notes on page 17.

Figure 407GG Dielectric Waterway Transition Fitting

The Figure 407GG Transition Fitting protects systems through an innovative steel-to-plastic design that establishes a dielectric waterway. The transition fitting separates dissimilar metals in the electrolyte (waterway) eliminating the local galvanic cell.

The Figure 407GG Transition Fitting allows the connection between steel (IPS) size pipe and copper tube (CTS) size.

Nominal Size Inches *mm*	Outside Diameter		407GG Groove x Groove	
	Steel (IPS)	Copper (CTS)	Nominal End to End Inches *mm*	Approx. Weight lbs *kg*
2	2.375	2.125	4.00	1.3
50	*60,3*	*54,0*	*101,6*	*0,6*
2½	2.875	2.625	4.00	3.3
65	*73,0*	*66,7*	*101,6*	*1,5*
3	3.500	3.125	4.00	4.5
80	*88,9*	*79,4*	*101,6*	*2,1*
4	4.500	4.125	4.00	5.8
100	*114,3*	*104,8*	*101,6*	*2,6*
5	5.563	5.125	4.00	7.8
125	*141,3*	*130,2*	*101,6*	*3,5*
6	6.625	6.125	4.00	10.1
150	*168,3*	*155,6*	*101,6*	*4,6*

COPPER ROLL GROOVER

Model 1039 – 66

- 1¼" – 6" SCH 40
- 2" – 8" Copper Tube

With ratchet hand crank, roll grooves 1¼" – 6", Schedule 40 or thin wall steel pipe on the scaffold or anywhere power is unavailable.

Capacity:

- 1¼" – 6" SCH 40 (7mm)
- 2" – 8" Copper Tube K, L, M and DWV

Model 1039 – 66 Mini-Mite Roll Groover service tool goes from in-place grooving and can be chucked in a Ridgid Model 300 in seconds with no gearbox removal.

Model 1039 – 66 Mini-Mite is self contained and can be entirely operated with its own multi-function crank. No additional tools are required. All hex drives on Model 1039 – 66 Mini-Mite are 15/16".

Mini-Mites require no modifications or parts changes to groove any pipe or tubing in their size range.

Standard equipment includes a multi-step depth gauge, copper rolls for 2" – 8". Steel rolls for 1¼" – 6" may be ordered seperately.

Please refer to General Notes on page 17.

STAINLESS STEEL SYSTEM

STAINLESS STEEL SYSTEM

The Grinnell® Stainless Steel System is designed for joining 1" (DN25) to 12" (DN300) stainless steel piping, Schedules 5, 10, and 40.

Stainless Steel Couplings

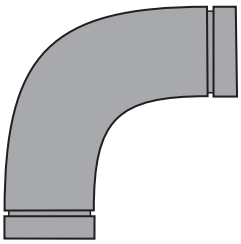
Figure 472 Stainless Steel Rigid Coupling – Patented
Page 104

Figure 770 High Pressure Rigid Coupling
Page 105

Figure 405 Stainless Steel Flexible Coupling
Page 106

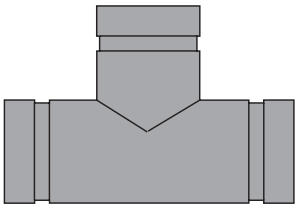
Stainless Steel Fittings

Elbows



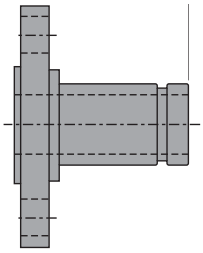
Page 108

Tees



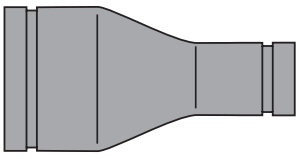
Pages 109, 112

Flange Adapter



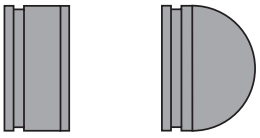
Page 113

Reducers



Pages 110-111

Cap



Page 109

MATERIAL SPECIFICATIONS

Stainless Steel Housing Specifications

- Type 316L, ASTM A-743/A-743M – Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion resistant, for General Application Grade CR-8M
- Tensile Strength, Minimum PSI – 70,000 (Mpa-485)
- Yield Strength, Minimum PSI – 30,000 (Mpa-205)
- Elongation in 2" Minimum 30%

Bolt/Nut Specifications

- Stainless Steel bolts are metric track head bolts conforming to ASTM A-193M Class 2, Type 316 Grade B8M
- Class 2 Stainless Steel nuts are heavy hex nuts conforming to ASTM A-194M, Type 316, Grade 8M
- Bolts are coated with an anti-galling agent

Gasket Specifications

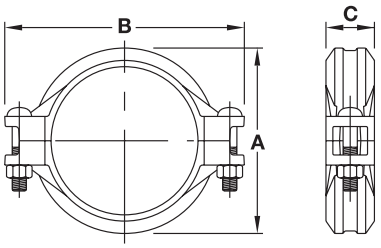
- **Grade "E" EPDM** gaskets have a green color code identification and conform to ASTM D-2000 for service temperatures from -30°F (-34°C) to 230°F (110°C). They are recommended for hot water not to exceed 230°F (110°C) plus a variety of dilute acids, oil free air and many chemical services. They are not recommended for petroleum services.
- **Grade "EN" EPDM** gaskets have a copper color code identification and are NSF-61 approved for cold and hot portable water up to +180° F (+82° C).
- **Grade "T" Nitrile** gaskets have an orange color code identification and conform to ASTM D-2000 for service temperatures from -20°F (-29°C) to 180°F (82°C). They are recommended for petroleum products, vegetable oils, mineral oils and air with oil vapors.
- **Grade "O" Fluoroelastomer** gaskets have a blue color code and conform to ASTM D-2000. They are recommended for oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons.

COUPLINGS

Figure 472 Stainless Steel Rigid Coupling – Patented

The Figure 472 Rigid Coupling is made of cast 316L stainless steel, and is capable of pressure up to 600 psi.

The Figure 472 Patented Coupling universal tongue and groove design allows the housing to grip along the full 360° of circumference of the pipe. Sizes 1¼" (DN 32) to 4" (DN 100) have gripping teeth to prevent rotation during installation.



Tech Data: G560

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max. Pressures Sch. 5 psi *bar*	Sch. 10 psi *bar*	Sch. 40 psi *bar*	Max. End Load lbs *kN*	Max. End Gap Inches *mm*	Nominal Dimension A Inches *mm*	B Inches *mm*	C Inches *mm*	Coupling Bolts Qty.	Size Inches *mm*	Approx. Weight lbs *kg*
1¼	1.660	200	300	600	649.7	0.06	2.76	4.37	1.81	2	⅜ x 2¼	1.1
32	*42.4*	*14*	*21*	*41*	*2.89*	*1.5*	*70*	*111*	*46*		*M10 x 57*	*0.5*
1½	1.900	200	300	600	852.0	0.08	2.99	4.61	1.81	2	⅜ x 2¼	1.1
40	*48.3*	*14*	*21*	*41*	*3.79*	*2.0*	*76*	*117*	*46*		*M10 x 57*	*0.5*
2	2.375	200	300	600	1,328.6	0.13	3.43	5.12	1.89	2	⅜ x 2¼	1.5
50	*60.3*	*14*	*21*	*41*	*5.91*	*3.3*	*87*	*130*	*48*		*M10 x 57*	*0.7*
2½	2.875	200	300	600	1,949.0	0.13	3.90	5.63	1.89	2	⅜ x 2¼	2.4
65	*73.0*	*14*	*21*	*41*	*8.67*	*3.3*	*99*	*143*	*48*		*M10 x 57*	*1.1*
3	3.500	200	300	600	2,886.4	0.13	4.65	6.26	1.89	2	½ x 3	2.6
80	*88.9*	*14*	*21*	*41*	*12.84*	*3.3*	*118*	*159*	*48*		*M12 x 76*	*1.2*
4	4.500	200	300	600	4,772.5	0.19	5.83	7.52	1.97	2	½ x 3	3.5
100	*114.3*	*14*	*21*	*41*	*21.23*	*4.8*	*148*	*191*	*50*		*M12 x 76*	*1.6*
5	5.563	200	300	600	7,292.5	0.19	7.09	9.72	2.05	2	⅝ x 3¼	7.5
125	*141.3*	*14*	*21*	*41*	*32.44*	*4.8*	*180*	*247*	*52*		*M16 x 83*	*3.4*
6	6.625	200	300	600	10,340.8	0.19	8.11	10.55	2.13	2	⅝ x 3¼	7.5
150	*168.3*	*14*	*21*	*41*	*46.00*	*4.8*	*206*	*268*	*54*		*M16 x 83*	*3.4*
8	8.625	200	300	600	17,527.7	0.19	10.55	13.54	2.64	2	¾ x 4¾	18.1
200	*219.1*	*14*	*21*	*41*	*77.97*	*4.8*	*268*	*344*	*67*		*M20 x 121*	*8.2*
10	10.750	200	300	600	27,227.8	0.13	12.83	16.42	2.64	2	1 x 6½	24.7
250	*273.0*	*14*	*21*	*41*	*121.12*	*3.3*	*326*	*417*	*67*		*M24 x 165*	*11.2*
12	12.750	–	300	600	43,696.6	0.13	15.39	18.86	2.64	2	1 x 6½	42.1
300	*323.9*	*–*	*21*	*41*	*194.38*	*3.3*	*391*	*479*	*67*		*M24 x 165*	*19.1*

The Fig. 472 Stainless Steel heavy Duty Rigid Coupling does not provide compensation for pipe system expansion and/or contraction associated with pipe system changes.

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

Maximum end gap and deflection is for cut grooved standard weight pipe. Values for roll grooved will be ½ that of cut grooved.

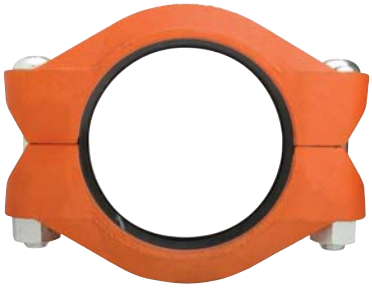
Please refer to General Notes on page 17.

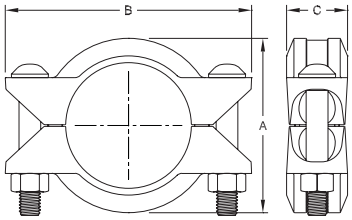
COUPLINGS

Figure 770 High Pressure Rigid Coupling

The Figure 770 High Pressure Rigid Coupling provides a rigid joint by firmly gripping along the full 360° circumference of the pipe grooves. Coupling housings are cast ductile iron to ASTM A-536. The Figure 770 Rigid Coupling is available with a grade "EN" EPDM NSF 61 approved tri-seal gasket for potable water applications. It is capable of pressures up to 500 PSI depending on pipe size and wall thickness.

Rigid Couplings are recommended for low temperature and vacuum applications.





Tech Data: G138

Nominal Pipe Size		Max.† Pressures psi bar	Max.† End Load lbs kN	Max.*‡ End Gap Inches mm	Nominal Dimensions			Coupling Bolts		Approx. Weight lbs kg
ANSI Inches DN	O.D. Inches mm				A Inches mm	B Inches mm	C Inches mm	Qty.	Size** Inches mm	
2	2.375	500	4,430.1	0.14	3.53	5.72	1.88	2	⅝ x 2¾	4.3
DN50	60,3	35	19,71	3,6	89,7	145,3	47,8		M16 x 70	2,0
2½	2.875	500	6,491.8	0.14	4.06	6.00	1.88	2	⅝ x 3½	5.0
DN65	73,0	35	28,88	3,6	103,1	152,4	47,8		M16 x 89	2,3
3	3.500	500	9,621.1	0.14	4.78	6.76	1.88	2	⅝ x 3½	5.3
DN80	88,9	35	42,79	3,6	121,4	171,7	47,8		M16 x 89	2,4
4	4.500	400	15,904.3	0.25	6.01	8.50	2.10	2	¾ x 4¼	7.7
DN100	114,3	28	70,74	6,4	152,7	215,9	53,3		M20 x 108	3,5
6	6.625	300	34,471.6	0.25	8.51	11.25	2.10	2	⅞ x 5½	16.2
DN150	168,3	21	153,33	6,4	216,2	285,8	53,3		M22 x 140	7,3
8	8.625	300	46,741.0	0.25	10.93	13.75	2.60	2	1 x 5½	24.0
DN200	219,1	21	207,90	6,4	277,6	349,3	66,0		M24 x 140	10,9
10	10.750	300	72,610.1	0.25	13.46	16.00	2.60	2	1 x 6½	32.0
DN250	273,0	21	322,97	6,4	341.9	406,4	66,0		M24 x165	14,5
12	12.750	250	102,141.0	0.25	15.52	18.00	2.60	2	1 x 6½	40.0
DN300	323,9	17	454,32	6,4	394,2	457,2	66,0		M24 x165	18.1

* Maximum available gap between pipe ends, minimum gap = 0.

† Maximum pressure and end load are total from all loads based on Schedule 10 stainless steel pipe. Pressure ratings and end loads may differ for other pipe materials and/or wall thickness. Contact Tyco Fire & Building Products for details.

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

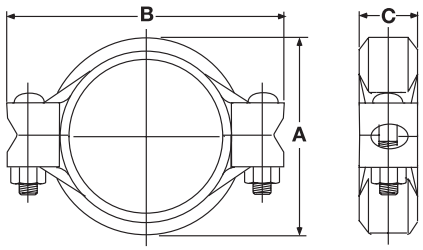
‡ Max End Gap and Deflection is for cut grooved standard weight pipe. Values for roll grooved pipe will be ½ that of cut grooved.

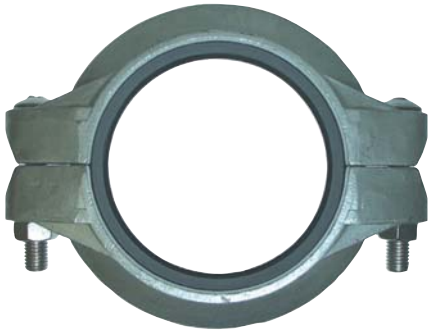
Please refer to General Notes on page 17.

COUPLINGS

Figure 405 Stainless Steel Flexible Coupling

The Figure 405 Flexible Coupling is made of 316L stainless steel and is capable of pressures up to 750 psi, depending on pipe size and wall thickness.





Tech Data: G565

Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	Max. Pressures Sch. 5 psi *bar*	Sch. 10 psi *bar*	Sch. 40 psi *bar*	Max. End Load lbs *kN*	Max. End Gap Inches *mm*	Deflection Degrees per Coupling	Inches/ Foot *mm/m*	Nominal Dimension A Inches *mm*	B Inches *mm*	C Inches *mm*	Coupling Bolts Qty.	Size Inches *mm*	Approx. Weight lbs *kg*
1¼	1.660	325	500	750	658.7	0.13	4°19'	0.90	2.56	4.17	1.81	2	⅜ x 2¼	1.5
32	*42.4*	*22*	*34*	*52*	*2.93*	*3.3*		*75.0*	*65*	*106*	*46*		*M10 x 57*	*0.7*
1½	1.900	325	500	750	849.7	0.13	3°46'	0.79	2.76	4.45	1.81	2	⅜ x 2¼	1.5
40	*48.3*	*22*	*34*	*52*	*3.78*	*3.3*		*65.8*	*70*	*113*	*46*		*M10 x 57*	*0.7*
2	2.375	225	350	500	1,328.6	0.13	3°01'	0.63	3.27	4.88	1.89	2	⅜ x 2¼	1.8
50	*60.3*	*16*	*24*	*34*	*5.91*	*3.3*		*52.5*	*83*	*124*	*48*		*M10 x 57*	*0.8*
2½	2.875	225	350	500	1,946.8	0.13	2°29'	0.52	3.70	5.51	1.89	2	⅜ x 2¼	2.0
65	*73.0*	*16.0*	*24*	*34*	*8.66*	*3.3*		*43.3*	*94*	*140*	*48*		*M10 x 57*	*0.9*
3	3.500	225	350	500	2,884.2	0.13	2°03'	0.43	4.37	6.50	1.89	2	½ x 3	3.1
80	*88.9*	*16*	*24*	*34*	*12.83*	*3.3*		*35.8*	*111*	*165*	*48*		*M12 x 76*	*1.4*
4	4.500	200	300	325	4,768.0	0.25	3°11'	0.67	5.71	7.76	2.05	2	½ x 3	4.0
100	*114.3*	*14*	*21*	*22*	*21.21*	*6.4*		*55.8*	*145*	*197*	*52*		*M12 x 76*	*1.8*
5	5.563	125	200	200	7,737.6	0.25	2°35'	0.54	6.89	9.76	2.05	2	⅝ x 3¼	7.1
125	*141.3*	*9*	*14*	*14*	*34.42*	*6.4*		*45.0*	*175*	*248*	*52*		*M16 x 83*	*3.2*
6	6.625	125	200	200	10,336.3	0.25	2°10'	0.45	7.95	10.67	2.05	2	⅝ x 3¼	7.1
150	*168.3*	*9*	*14*	*14*	*45.98*	*6.4*		*37.5*	*202*	*271*	*52*		*M16 x 83*	*3.2*
8	8.625	50	75	200	17,516.4	0.25	1°40'	0.35	10.20	13.54	2.52	2	¾ x 4¾	14.6
200	*219.1*	*3*	*5*	*14*	*77.92*	*6.4*		*29.2*	*259*	*344*	*64*		*M20 x 121*	*6.6*

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

Maximum available gap between pipe ends, minimum gap = 0.

Maximum end gap is for cut grooved standard weight pipe. Values for roll grooved will be ½ that of cut grooved.

Please refer to General Notes on page 17.

FITTINGS

Stainless Steel System

Fittings are available in full flow and fabricated versions in 304 and 316L S.S. Fabricated fittings are available with Schedule 10 or Schedule 40 wall thickness.

For pressure ratings of fittings refer to G570.

Tech Data: G570

MATERIAL SPECIFICATIONS

- Fabricated: 304/316L stainless steel conforming to ASTM A-312, Schedule 10 and Schedule 40.
- Full Flow: 304/316L stainless steel conforming to ASTM A-403 WPW or A-403 CR.

Figure 410 & 401 Stainless Steel Elbow

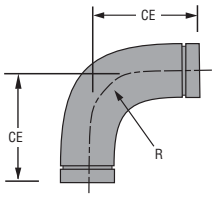


Figure 410
90° Elbow

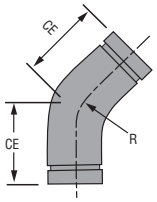


Figure 401
45° Elbow

	410 S.S. 90° Elbow					401 S.S. 45° Elbow			
	Full Flow			Fabricated		Full Flow		Fabricated	
Nominal Size Inches mm	Pipe O.D. Inches mm	C to E Inches mm	Approx. Weight lbs kg	C to E Inches mm	Approx. Weight lbs kg	C to E Inches mm	Approx. Weight lbs kg	C to E Inches mm	Approx. Weight lbs kg
1	1.315	2.88	1.0	3.50	0.7	2.00	0.6	2.50	0.6
25	*33.4*	*73.2*	*0.5*	*88.9*	*0.3*	*50.8*	*0.3*	*63.5*	*0.3*
1¼	1.660	3.13	1.0	3.88	0.9	2.00	0.8	2.50	0.6
32	*42.4*	*79.5*	*0.5*	*98.4*	*0.4*	*50.8*	*0.4*	*63.5*	*0.3*
1½	1.900	3.50	1.0	4.25	1.3	2.19	0.8	2.50	0.8
40	*48.3*	*88.9*	*0.5*	*108.0*	*0.6*	*55.6*	*0.4*	*63.5*	*0.4*
2	2.375	4.50	1.1	4.38	2	2.75	1.2	2.75	0.9
50	*60.3*	*114.3*	*0.5*	*111.1*	*0.9*	*69.9*	*0.5*	*69.9*	*0.4*
2½	2.875	5.00	1.7	5.75	2.8	2.81	1.7	3.00	1.0
65	*73.0*	*127.0*	*0.8*	*146.1*	*1.3*	*71.4*	*0.8*	*76.2*	*0.5*
3	3.500	4.50	2.6	5.88	3.8	2.00	1.3	3.38	2.1
80	*88.9*	*114.3*	*1.2*	*149.2*	*1.7*	*50.8*	*0.6*	*85.7*	*1.0*
4	4.500	6.00	4.7	7.50	5.7	2.50	2.3	4.00	3.6
100	*114.3*	*152.4*	*2.1*	*190.5*	*2.6*	*63.5*	*1.0*	*101.6*	*1.6*
5	5.563	7.50	8.4			3.13	4.2		
125	*141.3*	*190.5*	*3.8*			*79.4*	*1.9*		
6	6.625	9.00	10.3	10.75	14.4	3.75	5.1	5.50	8.4
150	*168.3*	*228.6*	*4.7*	*273.1*	*6.5*	*95.3*	*2.3*	*139.7*	*3.8*
8	8.625	12.00	17.6	15.00	29.3	5.00	13.8	7.25	16.5
200	*219.1*	*304.8*	*8.0*	*381.0*	*13.3*	*127.0*	*6.3*	*184.2*	*7.5*
10	10.750	15.00	49.2	18.00	41.8	6.25	24.6	8.50	21.0
250	*273.0*	*381.0*	*22.3*	*457.2*	*19.0*	*158.8*	*11.2*	*215.9*	*9.5*
12	12.750	18.00	78.4	21.00	46.5	7.50	39.2	10.00	23.0
300	*323.9*	*457.2*	*35.6*	*533.4*	*21.1*	*190.5*	*17.8*	*254.0*	*10.4*

Please refer to General Notes on page 17.

Figure 419 Tee & Figure 460 End Cap

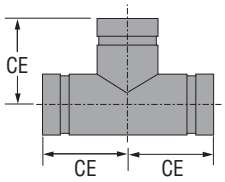


Figure 419 Tee

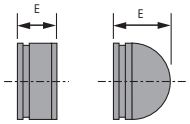


Figure 460
End Cap

	419 Tee				
	Full Flow			Fabricated	
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	C to E Inches *mm*	Approx. Weight lbs *kg*	C to E Inches *mm*	Approx. Weight lbs *kg*
1	1.315	2.88	1.0		
25	*33.4*	*73.2*	*0.5*		
1¼	1.660	3.13	1.0	2.75	1.3
32	*42.4*	*79.5*	*0.5*	*69.8*	*0.6*
1½	1.900	3.38	1.6	2.75	1.5
40	*48.3*	*85.9*	*0.7*	*69.8*	*0.7*
2	2.375	4.00	2.3	3.25	2.1
50	*60.3*	*101.6*	*1.0*	*82.5*	*0.9*
2½	2.875	3.07	2.2	3.75	2.8
65	*73.0*	*78.0*	*1.0*	*95.2*	*1.3*
3	3.500	3.77	3.1	4.25	3.9
80	*88.9*	*95.8*	*1.4*	*107.9*	*1.8*
4	4.500	4.47	4.9	5.00	7.8
100	*114.3*	*113.5*	*2.2*	*127.0*	*3.2*
5	5.563	5.91	7.1		
125	*141.3*	*150.1*	*3.2*		
6	6.625	5.91	11.7	6.50	15.2
150	*168.3*	*150.1*	*5.3*	*165.1*	*6.9*
8	8.625	7.79	20.0	7.75	18.1
200	*219.1*	*197.9*	*9.1*	*1196.8*	*8.2*
10	10.750	8.89	34.4	9.00	36.5
250	*273.0*	*225.8*	*15.6*	*228.6*	*16.2*
12	12.750	10.39	52.5	10.00	51.4
300	*323.9*	*263.9*	*23.8*	*254.0*	*23.4*

Please refer to General Notes on page 17.

	460 Cap				
	Full Flow			Fabricated	
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	E to E Inches *mm*	Approx. Weight lbs *kg*	E to E Inches *mm*	Approx. Weight lbs *kg*
1	1.315	.875	0.2	1.63	0.20
25	*33.4*	*22.2*	*0.1*	*41.3*	*0.10*
1¼	1.660	.875	.04	1.63	0.3
32	*42.4*	*22.2*	*0.2*	*41.3*	*0.1*
1½	1.900	.875	0.5	1.63	0.4
40	*48.3*	*22.2*	*0.2*	*41.3*	*0.2*
2	2.375	.875	0.7	1.63	0.5
50	*60.3*	*22.2*	*0.3*	*41.3*	*0.2*
2½	2.875	.875	1.0	1.75	0.7
65	*73.0*	*22.2*	*0.5*	*44.5*	*0.3*
3	3.500	.875	2.0	1.75	1.0
80	*88.9*	*22.2*	*0.9*	*44.5*	*0.4*
4	4.500	.875	3.1	1.75	1.6
100	*114.3*	*22.2*	*1.4*	*44.5*	*0.7*
5	5.563	3.00*	2.3		
125	*141.3*	*76.2*	*1.0*		
6	6.625	3.50*	1.5	1.88	3.7
150	*168.3*	*88.9*	*0.7*	*47.6*	*1.7*
8	8.625	4.00*	3.1	4.00	8.0
200	*219.1*	*101.6*	*1.4*	*101.6*	*3.6*
10	10.750	5.00*	6.0	4.00	11.5
250	*273.0*	*127.0*	*2.7*	*101.6*	*5.2*
12	12.750	6.00*	7.8	4.00	15.1
300	*323.9*	*152.4*	*3.5*	*101.6*	*6.8*

*Dished Cap

Figure 450 Concentric Reducers

	450 Concentric Reducers				
	Full Flow			Fabricated	
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	E to E Inches *mm*	Approx. Weight lbs *kg*	E to E Inches *mm*	Approx. Weight lbs *kg*
1½ x 1	1.900 x 1.315	3.38	1.4		
40 x 25	*48.3 x 33.7*	*85.9*	*0.6*		
1½ x 1¼	1.900 x 1.660	3.38	1.4	3.38	0.6
40 x 32	*48.3 x 42.4*	*85.9*	*0.6*	*85.9*	*0.3*
2 x 1	2.375 x 1.315	3.38	1.5	3.38	0.6
50 x 25	*60.33 x 33.7*	*85.9*	*0.7*	*85.9*	*0.3*
2 x 1¼	2.375 x 1.660	3.38	2.1		
50 x 32	*60.33 x 42.4*	*95.3*	*1.0*		
2 x 1½	2.375 x 1.900	3.38	2.5	3.38	0.7
50 x 40	*60.3 x 48.3*	*85.9*	*1.1*	*85.9*	*0.3*
2½ x 1	2.375 x 1.315	5.00	2.8		
65 x 25	*60.3 x 33.7*	*127.0*	*1.3*		
2½ x 1½	2.375 x 1.900	5.00	3.0		
65 x 40	*60.3 x 48.3*	*127.0*	*1.4*		
2½ x 2	2.875 x 2.375	5.00	3.5	5.00	1.3
65 x 50	*73.0 x 60.3*	*127.0*	*1.6*	*127.0*	*0.6*
3 x 1	3.500 x 1.315	5.00	4.0	5.00	1.3
80 x 25	*88.9 x 33.7*	*127.0*	*1.8*	*127.0*	*0.6*
3 x 1¼	3.500 x 1.660	5.00	4.1		
80 x 32	*88.9 x 42.4*	*127.0*	*1.9*		
3 x 1½	3.500 x 1.900	5.00	4.2		
80 x 40	*88.9 x 48.3*	*127.0*	*1.9*		
3 x 2	3.500 x 2.375	5.00	4.3	5.00	1.5
80 x 50	*88.9 x 60.3*	*127.0*	*2.0*	*127.0*	*0.7*
3 x 2½	3.500 x 2.875	5.00	4.4	5.00	1.6
80 x 65	*88.9 x 73.0*	*127.0*	*2.0*	*127.0*	*0.7*
4 x 2	4.500 x 2.375	5.00	4.8	6.00	2.7
100 x 50	*114.3 x 60.3*	*127.0*	*2.2*	*152.4*	*1.2*
4 x 2½	4.500 x 2.875	5.00	4.9	6.00	2.8
100 x 65	*114.3 73.0*	*127.0*	*2.2*	*152.4*	*1.3*
4 x 3	4.500 x 3.500	5.00	5.0	6.00	2.9
100 x 80	*114.3 x 88.9*	*127.0*	*2.3*	*152.4*	*1.3*
5 x 3	5.563 x 3.500	9.00	5.5	7.00	4.2
125 x 80	*141.3 x 88.9*	*228.6*	*2.5*	*177.8*	*1.9*
5 x 4	5.563 x 4.500	9.00	5.7	7.00	4.3
125 x 100	*141.3 x 114.3*	*228.6*	*2.6*	*177.8*	*1.9*
6 x 2	6.625 x 2.375	9.00	7.0	9.00	4.9
150 x 50	*168.3 x 60.3*	*228.6*	*3.2*	*228.6*	*2.2*
6 x 2½	6.675 x 2.875	9.00	6.8	9.00	5.1
150 x 65	*168.3 x 73.0*	*228.6*	*3.1*	*228.6*	*2.3*
6 x 3	6.625 x 3.500	9.00	6.9	9.00	5.7
150 x 80	*168.3 x 88.9*	*228.6*	*3.1*	*228.6*	*2.6*
6 x 4	6.625 x 4.500	9.00	7.0	9.00	6.1
150 x 100	*168.3 x 114.3*	*228.6*	*3.2*	*228.6*	*2.8*
8 x 4	8.625 x 4.500	9.00	9.6	9.50	10.3
200 x 100	*219.1 x 114.3*	*228.6*	*4.4*	*241.3*	*4.7*
8 x 6	8.625 x 6.625	6.00	9.6	9.50	10.6
200 x 150	*219.1 x 168.3*	*152.4*	*4.4*	*241.3*	*4.8*
10 x 4	10.750 x 4.500	10.00	11.5	10.00	15.1
250 x 100	*273.0 x 114.3*	*254.0*	*5.2*	*254.0*	*6.9*
10 x 6	10.750 x 6.625	10.00	12.4	10.00	15.8
250 x 150	*273.0 x 168.3*	*254.0*	*5.6*	*254.0*	*7.2*
10 x 8	10.750 x 8.625	7.00	14.9	10.00	15.8
250 x 200	*273.0 x 219.1*	*177.8*	*6.8*	*254.0*	*7.2*
12 x 6	12.750 x 6.625	14.00	23.0	10.50	22.4
300 x 150	*323.9 x 168.3*	*355.6*	*10.4*	*266.7*	*10.2*
12 x 8	12.750 x 8.625	14.00	22.0	10.50	23.0
300 x 200	*323.9 x 219.1*	*355.6*	*10.0*	*266.7*	*10.5*
12 x 10	12.750 x 10.750	8.00	26.0	10.50	23.7
300 x 250	*323.9 x 273.0*	*203.2*	*11.8*	*266.7*	*10.8*

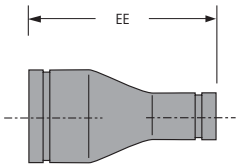


Figure 450
Concentric Reducer

Please refer to General Notes on page 17.

Figure 451 Eccentric Reducers

	451 Eccentric Reducers				
	Full Flow			Fabricated	
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	E to E Inches *mm*	Approx. Weight lbs *kg*	E to E Inches *mm*	Approx. Weight lbs *kg*
1½ x 1	1.900 x 1.315	3.38	1.4		
40 x 25	*48.3 x 33.7*	*85.9*	*0.6*		
1½ x 1¼	1.900 x 1.660	3.38	1.5	8.50	1.5
40 x 32	*48.3 x 42.4*	*85.9*	*0.7*	*215.9*	*0.7*
2 x 1	2.375 x 1.315	3.38	1.5	9.00	2.0
50 x 25	*60.33 x 33.7*	*85.9*	*0.7*	*228.6*	*0.9*
2 x 1¼	2.375 x 1.660	3.38	2.3		
50 x 32	*60.33 x 42.4*	*85.9*	*1.0*		
2 x 1½	2.375 x 1.900	3.38	2.5	9.00	2.0
50 x 40	*60.3 x 48.3*	*85.9*	*1.1*	*228.6*	*0.9*
2½ x 2	2.875 x 2.375	5.00	3.5	9.50	2.8
65 x 50	*73.0 x 60.3*	*127.0*	*1.6*	*241.3*	*1.3*
3 x 1	3.500 x 1.315	5.00	4.2	9.50	3.2
80 x 25	*88.9 x 33.7*	*127.0*	*1.9*	*241.3*	*1.5*
3 x 2	3.500 x 2.375	5.00	4.3	9.50	3.4
80 x 50	*88.9 x 60.3*	*127.0*	*2.0*	*241.3*	*1.5*
3 x 2½	3.500 x 2.875	5.00	4.5	9.50	3.5
80 x 65	*88.9 x 73.0*	*127.0*	*2.0*	*241.3*	*1.6*
4 x 2	4.500 x 2.375	5.00	4.8	10.00	4.6
100 x 50	*114.3 x 60.3*	*127.0*	*2.2*	*254.0*	*2.1*
4 x 2½	4.500 x 2.875	5.00	5.8	10.00	4.7
100 x 65	*114.3 73.0*	*127.0*	*2.6*	*254.0*	*2.1*
4 x 3	4.500 x 3.500	5.00	5.9	10.00	4.7
100 x 80	*114.3 x 88.9*	*127.0*	*2.7*	*254.0*	*2.1*
5 x 3	5.563 x 3.500	9.00	5.5	11.00	6.1
125 x 80	*141.3 x 88.9*	*228.6*	*2.5*	*279.4*	*2.8*
5 x 4	5.563 x 4.500	9.00	5.7	11.00	6.1
125 x 100	*141.3 x 114.3*	*228.6*	*2.6*	*279.4*	*2.8*
6 x 2	6.625 x 2.375	9.00	7.0		
150 x 50	*168.3 x 60.3*	*228.6*	*3.2*		
6 x 2½	6.675 x 2.875	9.00	7.0	11.50	8.0
150 x 65	*168.3 x 73.0*	*228.6*	*3.2*	*292.1*	*3.6*
6 x 3	6.625 x 3.500	9.00	7.0	11.50	8.7
150 x 80	*168.3 x 88.9*	*228.6*	*3.2*	*292.1*	*4.0*
6 x 4	6.625 x 4.500	9.00	7.0	11.50	9.1
150 x 100	*168.3 x 114.3*	*228.6*	*3.2*	*292.1*	*4.2*
8 x 3	8.625 x 3.500	10.00	9.3	12.00	13.2
200 x 80	*219.1 x 88.9*	*254.0*	*4.2*	*304.8*	*6.0*
8 x 4	8.625 x 4.500	10.00	9.7	12.00	13.4
200 x 100	*219.1 x 114.3*	*254.0*	*4.2*	*304.8*	*6.1*
8 x 6	8.625 x 6.625	10.00	7.0	12.00	13.6
200 x 150	*219.1 x 168.3*	*254.0*	*3.2*	*304.8*	*6.2*
10 x 6	10.750 x 6.625	13.00	12.4	13.00	20.4
250 x 150	*273.0 x 168.3*	*330.2*	*5.6*	*330.2*	*9.3*
10 x 8	10.750 x 8.625	13.00	11.5	13.00	20.9
250 x 200	*273.0 x 219.1*	*330.2*	*5.2*	*330.2*	*9.5*
12 x 6	12.750 x 6.625	14.00	20.4	14.00	20.6
300 x 150	*323.9 x 168.3*	*355.6*	*9.3*	*355.6*	*9.3*
12 x 8	12.750 x 8.625	14.00	21.1	14.00	29.1
300 x 200	*323.9 x 219.1*	*355.6*	*9.6*	*355.6*	*13.2*
12 x 10	12.750 x 10.750	14.00	21.1	14.00	29.9
300 x 250	*323.9 x 273.0*	*355.6*	*9.6*	*355.6*	*13.6*

Please refer to General Notes on page 17.

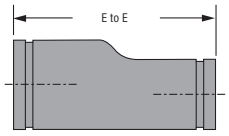


Figure 451
Eccentric Reducer

421 S.S. Reducing Tee

421 S.S. Reducing Tee							
	Full Flow				Fabricated		
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	C to E Inches *mm*	C to E Branch Inches *mm*	Approx. Weight lbs *kg*	C to E Inches *mm*	C to ER Inches *mm*	Approx. Weight lbs *kg*
1½ x 1½ x 1	1.900 x 1.900 x 1.315	3.38	3.38	1.6	2.75	2.75	1.3
40 x 40 x 25	*48.3 x 48.3 x 33.7*	*85.9*	*85.9*	*0.7*	*69.9*	*69.9*	*0.6*
1½ x 1½ x 1¼	1.900 x 1.900 x 1.660	3.38	3.38	1.6	2.75	2.75	1.3
40 x 40 x 32	*48.3 x 48.3 x 42.4*	*85.9*	*85.9*	*0.7*	*69.9*	*69.9*	*0.6*
2 x 2 x 1	2.375 x 2.375 x 1.315	3.25	3.25	2.2	3.25	3.25	1.8
50 x 50 x 25	*60.3 x 60.3 x 33.7*	*82.6*	*82.6*	*1.0*	*82.6*	*82.6*	*0.8*
2 x 2 x 1¼	2.375 x 2.375 x 1.660	3.25	3.25	2.4	3.25	3.25	1.8
50 x 50 x 32	*60.3 x 60.33 x 42.4*	*82.6*	*82.6*	*1.1*	*82.6*	*82.6*	*0.8*
2 x 2 x 1½	2.375 x 2.375 x 1.900	3.25	3.25	2.4	3.25	3.25	1.9
50 x 50 x 40	*60.3 x 60.3 x 48.3*	*82.6*	*82.6*	*1.1*	*82.6*	*82.6*	*0.9*
2½ x 2½ x 1	2.875 x 2.875 x 1.315	4.63	4.63	3.1	3.75	3.75	2.3
65 x 65 x 25	*73.0 x 73.0 x 33.4*	*117.6*	*117.6*	*1.4*	*96.3*	*96.3*	*1.0*
2½ x 2½ x 1½	2.875 x 2.875 x 1.900	4.63	4.63	3.4	3.75	3.75	2.4
65 x 65 x 40	*73.0 x 73.0 x 48.3*	*117.6*	*117.6*	*1.5*	*95.3*	*96.3*	*1.1*
2½ x 2½ x 2	2.875 x 2.875 x 2.375	4.63	4.63	3.6	3.75	3.75	2.4
65 x 65 x 50	*73.0 x 73.0 x 60.3*	*117.6*	*117.6*	*1.6*	*95.3*	*96.3*	*1.1*
3 x 3 x 1	3.500 x 3.500 x 1.315	4.25	4.25	4.3	4.25	4.25	3.2
80 x 80 x 25	*88.9 x 88.9 x 33.4*	*408.0*	*408.0*	*2.0*	*108.0*	*108.0*	*1.5*
3 x 3 x 1¼	3.500 x 3.500 x 1.660	4.25	4.25	4.3	4.25	4.25	3.2
80 x 80 x 32	*88.9 x 88.9 x 42.4*	*108.0*	*108.0*	*2.0*	*108.0*	*108.0*	*1.5*
3 x 3 x 1½	3.500 x 3.500 x 1.900	4.25	4.25	4.4	4.25	4.25	3.2
80 x 80 x 40	*88.9 x 88.9 x 48.3*	*108.0*	*108.0*	*2.0*	*108.0*	*108.0*	*1.5*
3 x 3 x 2	3.500 x 3.500 x 2.375	4.25	4.25	4.4	4.25	4.25	3.3
80 x 80 x 50	*88.9 x 88.9 x 60.3*	*108.0*	*108.0*	*2.0*	*108.0*	*108.0*	*1.5*
3 x 3 x 2½	3.500 x 3.500 x 2.875	4.25	4.25	4.4	4.25	4.25	3.5
80 x 80 x 65	*88.9 x 88.9 x 73.0*	*108.0*	*108.0*	*2.0*	*108.0*	*108.0*	*1.6*
4 x 4 x 2	4.500 x 4.500 x 2.375	4.47	4.47	4.4	5.00	5.00	5.6
100 x 100 x 50	*114.3 x 114.3 x 60.3*	*113.5*	*113.5*	*2.0*	*127.0*	*127.0*	*2.5*
4 x 4 x 2½	4.500 x 4.500 x 2.875	4.47	4.47	4.4	5.00	5.00	6.2
100 x 100 x 65	*114.3 x 114.03 x 73.0*	*113.5*	*113.5*	*2.0*	*127.0*	*127.0*	*2.8*
4 x 4 x 3	4.500 x 4.500 x 3.500	4.47	4.47	4.9	5.00	5.00	6.3
100 x 100 x 80	*114.3 x 114.3 x 88.9*	*113.5*	*113.5*	*2.2*	*127.0*	*127.0*	*2.9*
6 x 6 x 1½	6.625 x 6.625 x 1.900	5.91	5.91	9.3			
150 x 150 x 40	*168.3 x 168.3 x 48.3*	*150.1*	*150.1*	*4.2*			
6 x 6 x 2	6.625 x 6.625 x 2.375	5.91	5.91	9.3			
150 x 150 x 50	*168.3 x 168.3 x 60.3*	*150.1*	*150.1*	*4.2*			
6 x 6 x 3	6.625 x 6.625 x 3.500	5.91	5.91	9.3	6.50	6.50	12.7
150 x 150 x 80	*168.3 x 168.3 x 88.9*	*150.1*	*150.1*	*4.2*	*165.1*	*165.1*	*5.8*
6 x 6 x 4	6.625 x 6.625 x 4.500	5.91	5.91	9.3	6.50	6.50	12.7
150 x 150 x 100	*168.3 x 168.3 x 114.3*	*150.1*	*150.1*	*4.2*	*165.1*	*165.1*	*5.8*
8 x 8 x 4	8.625 x 8.625 x 4.500	7.79	7.79	18.1	7.75	7.75	15.7
200 x 200 x 100	*219.1 x 219.1 x 114.3*	*197.9*	*197.9*	*8.2*	*196.9*	*196.9*	*7.1*
8 x 8 x 6	8.625 x 8.625 x 6.625	7.79	7.79	18.1	7.75	7.75	16.5
200 x 200 x 150	*219.1 x 219.1 x 168.3*	*197.9*	*197.9*	*8.2*	*196.9*	*196.9*	*7.5*
10 x 10 x 6	10.750 x 10.750 x 6.625	8.89	8.89	29.3	9.00	9.00	24.8
250 x 250 x 150	*273.0 x 273.0 x 168.3*	*225.8*	*225.8*	*13.3*	*228.6*	*228.6*	*11.2*
10 x 10 x 8	10.750 x 10.750 x 8.625	8.89	8.89	31.7	9.00	9.00	29.1
250 x 250 x 200	*273.0 x 273.0 x 219.1*	*225.8*	*225.8*	*14.4*	*228.6*	*228.6*	*13.2*
12 x 12 x 8	12.750 x 12.750 x 8.625	10.39	10.39	44.0	10.00	10.00	52.6
300 x 300 x 200	*323.9 x 323.9 x 219.1*	*263.9*	*263.9*	*20.0*	*254.0*	*254.0*	*23.9*
12 x 12 x 10	12.750 x 12.750 x 10.750	10.39	10.39	44.0	10.00	10.00	55.8
300 x 300 x 250	*323.9 x 323.9 x 273.0*	*263.9*	*263.9*	*20.0*	*254.0*	*254.0*	*25.3*

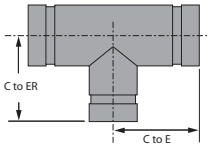


Figure 421
Reducing Tee

Please refer to General Notes on page 17.

Figure 441 Flange Adapter

Groove x Class 150 Flange			
Nominal Size Inches *mm*	Pipe O.D. Inches *mm*	E to E Inches *mm*	Approx. Weight lbs *kg*
1	1.315	3.00	2.3
25	*33.4*	*76.2*	*1.0*
1¼	1.660	4.00	2.9
32	*42.4*	*101.6*	*1.3*
1½	1.900	4.00	3.8
40	*48.3*	*101.6*	*1.7*
2	2.375	4.00	6.0
50	*60.3*	*101.6*	*2.7*
2½	2.875	4.00	8.8
65	*73.0*	*101.6*	*4.0*
3	3.500	4.00	10.0
80	*88.9*	*101.6*	*4.5*
4	4.500	6.00	15.7
100	*114.3*	*152.4*	*7.1*
5	5.563	6.00	18.1
125	*141.3*	*152.4*	*8.2*
6	6.625	6.00	21.4
150	*168.3*	*152.4*	*9.7*
8	8.625	6.00	34.6
200	*219.1*	*152.4*	*15.7*
10	10.750	8.00	46.3
250	*273.0*	*203.2*	*21.0*
12	12.750	8.00	74.4
300	*323.9*	*203.2*	*33.8*

Please refer to General Notes on page 17.

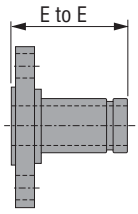


Figure 441
Flange Adapter

Tech Data: G568

PLAIN END PIPING SYSTEM

PLAIN END PIPING SYSTEM

The Grinnell Plain End Piping System is designed for use in both maintenance and new system applications and eliminates the need for pipe end preparation. The Figure 909 Plain End Coupling features case hardened gripping teeth that securely grip onto the pipe surface. The coupling is designed for schedule 40 steel pipe and is not for use with steel pipe with a Brinell hardness greater than 150, nor plastic pipe, cast or ductile iron pipe.

Contact Tyco Fire & Building Products on other materials and pipe schedules. Bolt torque ratings must be followed to ensure a properly assembled coupling. Refer to Installation Instructions G995.

Plain End Couplings

Figure 909
Plain End Coupling

Plain End Fittings

Elbows

Pages 119-120

Tees

Pages 119, 121

Caps

Page 119

Laterals, Wyes, Cross

Pages 122-123

Adapter Nipples

Pages 125-126

Flange Adapter

Page 124

PLAIN END PIPING SYSTEM

MATERIAL SPECIFICATIONS

Coupling Ductile Iron Housing Specifications

- ASTM A-536 – Standard Specification for Ductile Iron Castings Grade 65-45-12
- Tensile Strength, Minimum PSI – 65,000 (MPa-448)
- Yield Strength, Minimum PSI – 45,000 (MPa-310)
- Elongation in 2" (50mm), Minimum 12%
- ASTM A-153 – Standard Specification for Hot Dip Galvanizing

Bolt/Nut Specifications

- Carbon steel oval neck bolts and nuts are heat treated and conform to the physical properties of ASTM A-183 with a minimum tensile strength of 110,000 psi (758,422 kPa). Bolts and nuts are zinc electroplated to ASTM B633.
- Gold color coded metric bolts conforming to the physical properties of ASTM F568M are available upon request. Contact Tyco Fire & Building Products.

Fitting Specifications

- Carbon Steel: According to ASTM A-53 Grade B
- Tensile Strength, Minimum PSI – 60,000 (MPa-415)
- Yield Strength, Minimum PSI – 35,000 (MPa-240)
- Sizes 1¼" – 10" – Schedule 40
- Sizes 12" – 24" – Std. Wall (.375)

Coatings

- Orange – Non-Lead (Standard)
- Ral Red – Non-Lead (Optional)
- Hot Dipped Zinc Galvanized (Optional)

Gasket Specifications

- **Grade "E" EPDM** gaskets have a green color code identification and conform to ASTM D-2000 for service temperatures from -30°F (-34°C) to 230°F (110°C). They are recommended for hot water not to exceed 230°F (110°C), plus a variety of dilute acids, oil free air and many chemical services. They are not recommended for petroleum services. For low temperature and vacuum systems, a Tri-Seal Grade "E" EPDM gasket with rigid coupling is recommended.
- **Grade "T" Nitrile** gaskets have an orange color code identification and conform to ASTM D-2000 for service temperatures from -20°F (-29°C) to 180°F (82°C). They are recommended for petroleum products, vegetable oils, mineral oils, and air with oil vapors.

Coatings

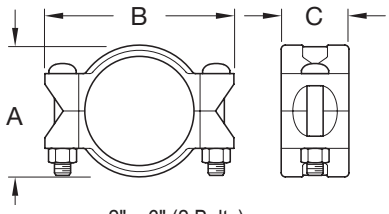
- Orange – Non-Lead (Standard)

PLAIN END COUPLING

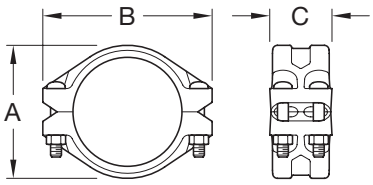
Figure 909 Plain End Coupling

The Grinnell Figure 909 Plain End Coupling utilizes hardened gripping teeth to securely grip onto plain and beveled end pipe surfaces. It is capable of pressures up to 750 psi (51,7 bar) depending on pipe size and wall thickness. The Figure 909 Plain End Coupling is designed for Schedule 40 steel pipe and is not for use with steel pipe with a Brinnell hardness greater than 150, plastic, cast or ductile iron pipes. Contact Tyco Fire & Building Products for recommendations on other materials and pipe schedules.

Tech Data: G190



2" – 6" (2 Bolts)



8" – 10" (4 Bolts)

Nominal Pipe Size		Max.† Pressures psi *bar*	Max.† End Load lbs *kN*	Nominal Dimensions			Coupling Bolts			Approx. Weight lbs *kg*
ANSI Inches *DN*	O.D. Inches *mm*			A Inches *mm*	B Inches *mm*	C Inches *mm*	Qty.	Size** Inches *mm*	Bolt Torque lbs-ft *Nm*	
2	2.375	750	3322.6	3.69	5.75	3.31	2	⅝ x 3½	150	5.4
DN50	*60,3*	*51,7*	*14,78*	*93,7*	*146,1*	*403,4*		*M16 x 90*	*203,0*	*2,4*
2½	2.875	600	3895.1	4.17	6.25	3.31	2	⅝ x 3½	150	5.9
DN65	*73,0*	*41,4*	*17,33*	*105,9*	*158,8*	*403,4*		*M16 x 90*	*203,0*	*2,7*
3	3.500	600	5772.7	4.81	7.56	3.31	2	¾ x 4¾	200	9.0
DN80	*88,9*	*41,4*	*25,68*	*122.2*	*192,0*	*84,1*		*M20 x 121*	*271,0*	*4,1*
4	4.500	450	7,156.9	5.93	8.63	3.88	2	¾ x 4¾	200	13.5
DN100	*114,3*	*31,0*	*31,83*	*150,6*	*219,2*	*98,6*		*M20 x 121*	*271,0*	*6,1*
6	6.625	300	10,341.5	8.19	11.68	4.25	2	1 x 6½	250	23.5
DN150	*168,3*	*20,7*	*46,00*	*208,0*	*296,7*	*108,0*		*M24 x 165*	*339,0*	*10,7*
8	8.625	250	14,606.6	10.69	13.63	4.91	4	⅞ x 5½	250	35.1
DN200	*219,1*	*17,2*	*64,97*	*271,5*	*346,2*	*124,7*		*M22 x 140*	*339,0*	*15,9*
10	10.750	250	22,690.6	13.13	15.88	4.91	4	⅞ x 5½	300	48.5
DN250	*273,0*	*17,2*	*100,93*	*333,5*	*403,4*	*124,7*		*M22 x 140*	*407,0*	*22,0*

** Gold color coded metric bolt sizes are available upon request

† 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 Tyco Fire & Building Products for details.

Note: The Figure 909 Plain End Coupling is designed for use with Schedule 40 Steel Pipe and is not for use with steel pipe with a Brinnell hardness greater than 150, Plastic, Cast or Ductile Iron Pipe.

May be used with Schedule 10, Schedule 40 or Schedule 80 Steel Pipe, Stainless Steel Pipe or Grinnell Plain End Fittings.

Please refer to General Notes on page 17.

PLAIN END FITTINGS

Figures 910, 901, 919 & 960

Plain end fittings are manufactured to provide minimum pressure drop and uniform flow. Fittings are designed for use with the Figure 909 Plain End Couplings only.

Plain end fittings are available in a variety of styles.

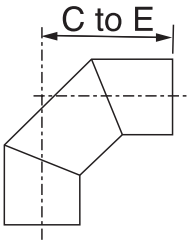
Fittings are supplied with a rust inhibiting paint. Hot dip zinc galvanizing is available.

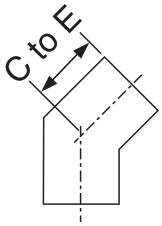
Figure 910
90° Elbow

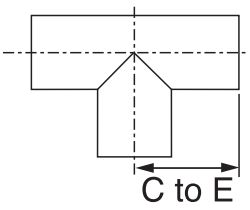
Figure 901
45° Elbow

Figure 919
Tee

Figure 960
Bull Plug







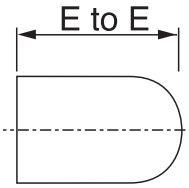


Figure 910 90° Elbow				Figure 901 45° Elbow		Figure 919 Tee		Figure 960 Bull Plug	
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2	2.375	4¾	2.7	3⅛	2.0	4¼	3.5	4	2.3
50	*60.3*	*121*	*1.2*	*79*	*0.9*	*108*	*1.6*	*102*	*1.0*
2½	2.875	5½	4.8	3½	3.5	4¾	6.2	5	3.0
65	*73.0*	*140*	*2.2*	*89*	*1.6*	*121*	*2.8*	*127*	*1.4*
3	3.500	6¼	7.2	3¾	4.8	5⅛	8.6	6	4.5
80	*88.9*	*159*	*3.3*	*95*	*2.2*	*130*	*3.9*	*152*	*2.0*
4	4.500	7¾	12.3	4¼	8.0	5⅞	13.8	7	7.5
100	*114.3*	*197*	*5.6*	*108*	*3.6*	*149*	*6.3*	*178*	*3.4*
5	5.563	9½	13.4	5⅛	9.2	6⅞	21.7	8½	12.5
125	*141.3*	*241*	*6.1*	*130*	*4.2*	*175*	*9.8*	*216*	*5.7*
6	6.625	11	31	5¾	18.5	7⅝	30.9	10	17.0
150	*168.3*	*279*	*14.1*	*146*	*8.4*	*194*	*14.0*	*254*	*7.7*
8	8.625	11	38.7	6	24.9	10	61.1	11	29.0
200	*219.1*	*279*	*17.6*	*152*	*11.3*	*254*	*27.7*	*279*	*13.2*

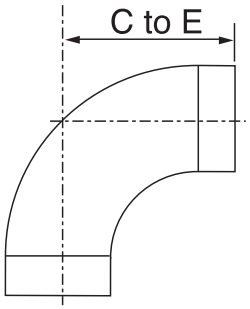
Please refer to General Notes on page 17.

PLAIN END FITTINGS

Figures 910LR & 901LR

Figure 910LR
90° Elbow Long Radius

Figure 901LR
45° Elbow Long Radius



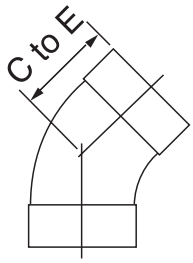


Figure 910LR 90° Elbow				Figure 901LR 45° Elbow	
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2	2.375	5	2.5	3⅜	1.8
50	*60.3*	*127*	*1.1*	*86*	*0.8*
2½	2.875	5¾	4.9	3¾	3.6
65	*73.0*	*146*	*2.2*	*95*	*1.6*
3	3.500	6½	6.5	4	4.5
80	*88.9*	*165*	*2.9*	*102*	*2.0*
4	4.500	8	11.5	4½	7.5
100	*114.3*	*203*	*5.2*	*114*	*3.4*
5	5.563	9¾	21.5	5⅜	13.8
125	*141.3*	*248*	*9.8*	*137*	*6.3*
6	6.625	11¼	28.5	6	17.3
150	*168.3*	*286*	*12.9*	*152*	*7.8*
8	8.625	15	56.7	8	34.0
200	*219.1*	*381*	*25.7*	*203*	*15.4*

Please refer to General Notes on page 17.

PLAIN END FITTINGS

Figure 921

Figure 921
Reducing Tee

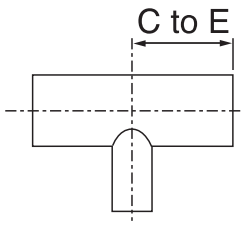


Figure 921 Reducing Tee		
Nominal Size Inches *mm*	Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
3 x 3 x 2	51/2	7.1
80 x 80 x 50	*140*	*3.2*
4 x 4 x 2	57/8	11.3
100 x 100 x 50	*149*	*5.1*
4 x 4 x 21/ 2	57/8	11.6
100 x 100 x 65	*149*	*5.3*
4 x 4 x 3	57/8	11.9
100 x 100 x 80	*149*	*5.4*
6 x 6 x 2	75/8	24.6
150 x 150 x 50	*194*	*11.2*
6 x 6 x 3	75/8	25.4
150 x 150 x 80	*194*	*11.5*
6 x 6 x 4	75/8	26.2
150 x 150 x 100	*194*	*11.9*
8 x 8 x 2	10	42.0
200 x 200 x 50	*254*	*19.1*
8 x 8 x 3	10	44.0
200 x 200 x 80	*254*	*20.0*
8 x 8 x 4	10	46.0
200 x 200 x 100	*254*	*20.9*
8 x 8 x 5	10	48.0
200 x 200 x 125	*2254*	*21.8*
8 x 8 x 6	10	50.0
200 x 200 x 150	*254*	*22.7*

Please refer to General Notes on page 17.

PLAIN END FITTINGS

Figure 927

Figure 927
Cross

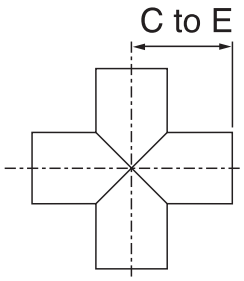


Figure 927 Cross			
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	Center To End Inches mm	Approx. Wt. Ea. lbs kg
2	2.375	4¼	4.4
50	*60.3*	*108*	*2.0*
2½	2.875	4¾	7.8
65	*73.0*	*121*	*3.5*
3	3.500	5⅛	10.7
80	*88.9*	*130*	*4.9*
4	4.500	5⅞	17
100	*114.3*	*149*	*7.7*
5	5.563	6⅞	26.7
125	*141.3*	*175*	*12.1*
6	6.625	7⅝	37.7
150	*168.3*	*194*	*17.1*
8	8.625	10	74.6
200	*219.1*	*254*	*33.8*

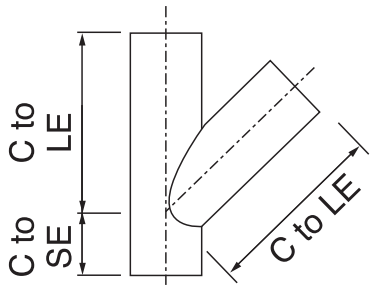
Please refer to General Notes on page 17.

PLAIN END FITTINGS

Figure 914 & 924

Figure 914
45° Lateral

Figure 924
90° True Wye



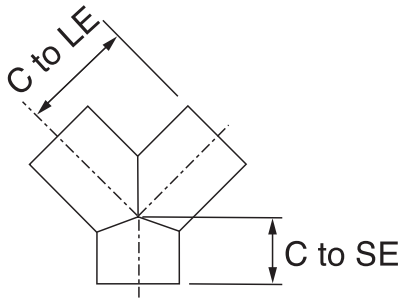


Figure 914 45° Lateral					Figure 924 90° True Wye		
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	Center To Long End Inches *mm*	Center To Short End Inches *mm*	Approx. Wt. Ea. lbs *kg*	Center To Long End Inches *mm*	Center To Short End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2	2.375	7¼	2¾	5.1	4¼	2¾	3.5
50	*60.3*	*184*	*70*	*2.3*	*108*	*70*	*1.6*
2½	2.875	7¾	3	9.5	4¾	3	6.2
65	*73.0*	*197*	*76*	*4.3*	*121*	*76*	*2.8*
3	3.500	8¾	3¼	12.8	5⅛	3¼	8.5
80	*88.9*	*222*	*83*	*5.8*	*130*	*83*	*3.9*
4	4.500	10¾	3¾	22.2	5⅞	3¾	14.0
100	*114.3*	*273*	*95*	*10.1*	*149*	*95*	*6.4*
5	5.563	12¾	4	38.0	6⅞	4	21.6
125	*141.3*	*324*	*102*	*17.2*	*175*	*102*	*9.8*
6	6.625	14	4½	54.0	7⅝	4½	31.2
150	*168.3*	*356*	*114*	*24.5*	*194*	*114*	*14.2*
8	8.625	18	6	92.0	10	6	53.6
200	*219.1*	*457*	*152*	*41.7*	*254*	*152*	*24.3*

Please refer to General Notes on page 17.

PLAIN END FITTINGS

Adapter Flanges - Figure 941 & 942

Figure 941
Plain End x Class 150 Flange

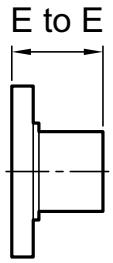


Figure 941 Plain-End Class 150 Flange				Figure 942 Plain-End Class 300 Flange	
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	End To End Inches *mm*	Approx. Wt. Ea. lbs *kg*	End To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2	2.375	4	6.0	4	8.2
50	*60.3*	*102*	*2.7*	*102*	*3.7*
2½	2.875	4	9.2	4	11.9
65	*73.0*	*102*	*4.2*	*102*	*5.4*
3	3.500	4	10.4	4	15.5
80	*88.9*	*102*	*4.7*	*102*	*7.0*
4	4.500	6	19.1	6	28.0
100	*114.3*	*152*	*8.7*	*152*	*12.7*
5	5.563	6	23.0	6	35.0
125	*141.3*	*152*	*10.4*	*152*	*15.9*
6	6.625	6	29.5	6	50.0
150	*168.3*	*152*	*13.4*	*152*	*22.7*
8	8.625	6	43.5	6	72.0
200	*219.1*	*152*	*19.7*	*152*	*32.7*

Please refer to General Notes on page 17.

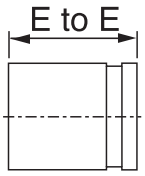
PLAIN END FITTINGS

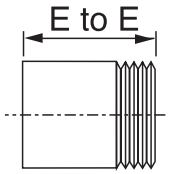
Adapter Nipples - Figure 393, 991 & 993

Figure 393
Plain x Groove

Figure 991
Plain x Thread

Figure 993
Plain x Plain





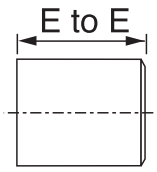


Figure 393, 991, 993 Adapter Nipples			
Nom. Size Inches *mm*	Pipe O.D. Inches *mm*	End To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2	2.375	4	1.2
50	*60.3*	*102*	*0.5*
2½	2.875	4	1.9
65	*73.0*	*102*	*0.9*
3	3.500	4	2.5
80	*88.9*	*102*	*1.1*
4	4.500	6	5.5
100	*114.3*	*152*	*2.5*
5	5.563	6	7.4
125	*141.3*	*152*	*3.4*
6	6.625	6	9.5
150	*168.3*	*152*	*4.3*
8	8.625	6	14.2
200	*219.1*	*152*	*6.4*

Please refer to General Notes on page 17.

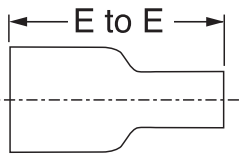
PLAIN END FITTING

Swagged Nipple – Figure 999

Figure 999 Swagged Nipple		
Nominal Size Inches *mm*	End Center To End Inches *mm*	Approx. Wt. Ea. lbs *kg*
2½ x 2	7	3.0
65 x 50	*178*	*1.4*
3 x 2	8	4.5
80 x 50	*203*	*2.0*
3 x 2½	8	4.5
80 x 65	*203*	*2.0*
4 x 2	9	7.5
100 x 50	*229*	*3.4*
4 x 2½	9	7.5
100 x 65	*229*	*3.4*
4 x 3	9	7.5
100 x 80	*229*	*3.4*
5 x 2	11	11.5
125 x 50	*279*	*5.2*
5 x 3	11	11.5
125 x 80	*279*	*5.2*
5 x 4	11	11.5
125 x 100	*279*	*5.2*
6 x 2	12	17.0
150 x 50	*305*	*7.7*
6 x 2½	12	17.0
150 x 65	*305*	*7.7*
6 x 3	12	17.0
150 x 80	*305*	*7.7*
6 x 4	12	17.0
150 x 100	*305*	*7.7*
6 x 5	12	17.0
150 x 125	*305*	*7.7*
8 x 3	13	29.0
200 x 80	*330*	*13.2*
8 x 4	13	29.0
200 x 100	*330*	*13.2*
8 x 5	13	29.0
200 x 125	*330*	*13.2*
8 x 6	13	29.0
200 x 150	*330*	*13.2*

Please refer to General Notes on page 17.

Figure 999
Swagged Nipple




GASKETS

GASKETS

Grinnell® 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.

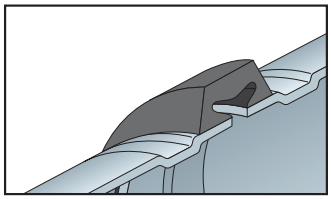
The Grinnell Gasket is designed to provide a three-way sealing action.

(1) Installation of the gasket over the outside sealing surface of the pipe compresses the lip seal thus forming 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.

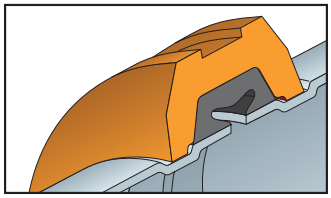
(3) The introduction of the system pressure energizes the pressure responsive seal of the gasket and further enhances the sealing action.

Tech Data: G610



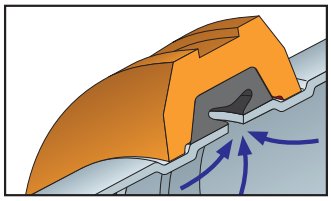
FIRST SEAL

C-shaped rubber gasket seals on pipe ends.



SECOND SEAL

The housings compress the gasket to increase the sealing capacity.



THIRD SEAL

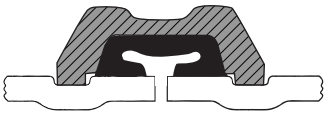
The system pressure or vacuum will then maximize the leak-tight seal.

For Fire Protection Pressure Rating and Listing / Approval information contact Tyco Fire & Building Products.

GASKETS

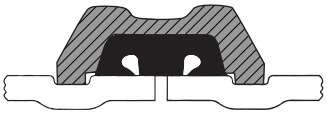
Styles

Standard



The standard style gasket, with a "C" shape configuration, is the most commonly used. It is provided as the standard gasket in the Figure 705, 707, 770, 772, 405 and 472 Grinnell Couplings. The gasket is available in Grade "E" and "EN" EPDM, Grade "T" Nitrile, Grade "L" Silicone, and Grade "O" Fluoroelastomer.

Tri-Seal

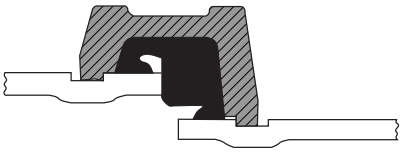


The tri-seal gasket is designed to close off the gap or gasket cavity. This is accomplished by positioning the center "rib" of the gasket over the gap between the pipes. The tri-seal gasket has two tapered sealing edges in addition to the center rib for additional strength and sealing.

The Tri-Seal gasket can be used with the Figure 705, 707, 770, 772, 405, 472 and 672 Grinnell Couplings. It is recommended for use in low temperature and vacuum services (greater than 10" Hg) applications and potable water systems. Note only a petroleum-free silicone based lubricant is recommended for low temperature applications. The gasket is available in Grade "E", "EN" EPDM and Grade "T" Nitrile.

Note: Rigid couplings are recommended for vacuum and low temperature applications.

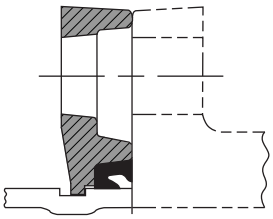
Reducing Coupling



The reducing 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 Figure 716 Grinnell Reducing Coupling and is available in Grade "E" EPDM and Grade "T" Nitrile.

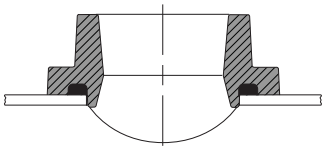
Reducing couplings are not recommended for low temperature applications.

Flange Adapter



This gasket is specifically designed for use with the Figure 71 Flange Adapter. The gasket has an optimum amount of rubber to provide a dependable seal between both the pipe and mating surface. The gasket is available in Grade "E" EPDM, and Grade "T" Nitrile.

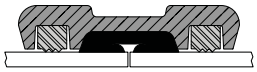
Mechanical Tee and Strap



The gasket provides a compression type seal, which is designed to conform to the exterior curve (OD) of the pipe. This design is unique to both the Figure 730 Mechanical Tee (threaded and grooved) and Figure 40-5 Strap. The gasket is available in Grade "E" EPDM, and Grade "T" Nitrile.

Note: When used in low temperature applications, use a petroleum-free silicone based lubricant, otherwise no lubricant is required on Mechanical Tee and Strap gaskets.

Plain End Coupling



This gasket is designed for use with the Figure 909 Plain End Coupling.

Grinnell gaskets are designed exclusively for use with Grinnell manufactured coupling housing. The mixing of other manufacturer's gaskets or housings with Grinnell gaskets or housings may result in pipe joint leakage or failure and will void the Tyco Fire & Building Products limited warranty.

GASKETS

Grinnell® Gasket Grade & Recommendations

The Gasket Recommendation Table has been developed to assure maximum service life. The table was developed from information supplied by the material manufacturers of the elastomer, technical reference literature and testing conducted by Tyco Fire & Building Products.

In evaluating the gasket grade for intended service applications the following consideration must be reviewed: system operating temperature, fluid or solution concentration, and duration of service.

All gasket recommendations are based on a temperature of 70°F (21°C) unless otherwise noted.

Technical and Engineering Services should be consulted (Phone 866-500-4768, Fax 401-781-7317) if combinations of service solutions are being considered.

Contact Tyco Fire & Building Products for recommendations for services not listed.

Gasket recommendations apply to Grinnell gaskets and valves only.

Grade	Temp. Range	Compound	Color Code	General Service Application
E	-30ºF (-34ºC) to +230ºF (+110ºC)	EPDM	Green	Hot water, dilute acids, alkalies, oil free air, and many chemical services not involving petroleum products. Excellent oxidation resistance. NOT FOR USE WITH HYDROCARBONS.
E Tri- Seal	-30ºF (-34ºC) to +230ºF (+110ºC)	EPDM	Green	Hot water, dilute acids, alkalies, and many chemical services not involving petroleum products. Excellent oxidation resistance. NOT FOR USE WITH HYDROCARBONS. Recommended for low temperature and vacuum services.
T	-20ºF (-29ºC) to +180ºF (+82ºC)	Nitrile	Orange	Petroleum products, vegetable oils, mineral oils and air with oils. Not Recommended for Hot Water Systems. Not Recommended for Hot Dry Air Systems.
O	+20ºF (-7ºC) to +300ºF (+149ºC)	Fluoroelastomer	Blue	Oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons.
L	-30ºF (-34ºC) to +350ºF (+177ºC)	Silicone	Red Gasket	Air without hydrocarbons, dry heat.
EN & EN Tri-Seal	Cold and Hot Potable Water up to +180ºF (+82ºC)		Copper	NSF 61 Approved for potable water. Not recommended for petroleum service.

GASKETS

- Contact Tyco Fire & Building Products for an engineering evaluation and recommendation where the gasket grade is shown in parenthesis.
- Specify gasket grade when ordering.
- For vacuum or low temperature systems, use tri-seal gasket. For low temperature applications, 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).
- For services not listed, contact Tyco Fire & Building Products for recommendation.
- Where more than one gasket is shown, the preferred gasket grade is listed first.

AIR AND WATER

Service	Gasket Grade
Air, (no oil vapors) Temp. -30°F (-34°C) to +230°F (+110°C)	E
Air, Oil Vapor Temp. -20°F (-29°C) to +150°F (+66°C)	T
Water, Temp. to +230°F (+110°C) (NOT RECOMMENDED FOR STEAM SERVICE)	E
Water, Acid Mine	E/T
Water, Chlorine	E
Water, Deionized	E
Water, Seawater	E
Water, Waste (NO PETROLEUM PRODUCTS)	E

Chemical Composition	Gasket Grade
Acetic Acid up to 10%	E
Acetone	E
Acetylene	E/T
Alkalis	E
Aluminum Chloride	E/T
Aluminum Fluoride	E/T
Aluminum Hydroxide	E
Aluminum Nitrate	E/T
Aluminum Salts	T
Ammonia Gas, Cold	E
Ammonia Liquid	E
Ammonium Chloride	E/T
Amyl Acetate	E
Amyl Alcohol	E
Aniline	E
Arsenic Acid to 75%	T
Barium Carbonate	E
Barium Chloride	E/T
Barium Hydroxide	E/T
Benzoic Acid	E
Benzyl Alcohol	E
Borax Solutions	E
Boric Acid	E/T
Butyl Alcohol	E/T
Butylene	T
Calcium Bisulphate	T
Calcium Chloride	E/T
Calcium Hydroxide (Lime)	E/T
Calcium Sulfate	E/T
Calcium Sulfide	E
Carbitol	E/T
Carbon Dioxide, Dry	E/T

Chemical Composition	Gasket Grade
Carbon Dioxide, Wet	E/T
Carbon Monoxide	E
Caustic Potash	T
Chrome Alum	T
Citric Acid	E/T
Copper Chloride	T
Copper Cyanide	E/T
Copper Sulphate	E/T
Cupric Fluoride	E
Cupric Sulphate	E/T
Dioctyl Phthalate	E
Ethane	E
Ethanolamine	E
Ethyl Alcohol	E
Ethyl Chloride	E
Ethylene Chlorohydrin	E
Ethylene Diamine	T
Ethylene Glycol	E/T
Ferric Sulphate	T
Fluboric Acid	E/T
Fly Ash	E
Fomaldehyde	E/T
Formamide	E/T
Formic Acid	E
Fructose	E/T
Furfuryl Alcohol	E
Glycerin	E/T
Glycerol	E/T
Glycol	E/T
Heptane	T
Hexaldehyde	E
Hexane	T

Chemical Composition	Gasket Grade
Hexylene Glycol	T
Hydrochloric Acid to 36%, 75°F (24°C) Max	E
Hydrofluosilicic Acid	E
Isobutyl Alcohol	E
Isopropyl Alcohol	E
Lead Acetate	T
Lithium Bromide	T
Magnesium Chloride	E/T
Magnesium Hydroxide	E/T
Magnesium Sulphate	E/T
Methyl Alcohol, Methanol	E/T
Methyl Isobutyl Carbinol	E
Mineral Oils	T
Nickel Chloride	E/T
Nickel Plating Solution	E/T
125°F (52°C) Max	
Nitric Acid, to 10%, 75°F (24°C) Max	E
Nitrous Oxide	E
Ozone	E
Phosphate Ester	E
Phosphoric Acid to 75%, 70°F (21°C) Max	E/T
Potassium Bromide	E/T
Potassium Carbonate	E/T
Potassium Chloride	E
Potassium Chromate	T
Potassium Hydroxide	T
Propylene Glycol	E
Salicylic Acid	E
Silver Nitrate	E

Chemical Composition	Gasket Grade
Soda Ash, Sodium Carbonate	E/T
Sodium Bicarbonate	E/T
Sodium Bisulphate	E/T
Sodium Bisulphite (black liquor)	E/T
Sodium Bromide	E/T
Sodium Chlorate	E
Sodium Chloride	E/T
Sodium Cyanide	E/T
Sodium Hydroxide, to 50%	E
Sodium Hypochlorite, to 20%	E
Sodium Metaphosphate	T
Sodium Nitrate	E
Sodium Peroxide	E
Sodium Phosphate	T
Sodium Silicate	T
Sodium Sulpfide	T
Sodium Sulpfite Solution, to 20%	T
Sodium Thiosulphate, "Hypo"	T
Stannous Chloride, to 15%	T
Stearic Acid	T
Sulphur	E
Sulphuric Acid, to 25%, 150°F (66°C) Max	E
Toluene 30%	T
Triethanolamine	E/T
Trisodium Phosphate - 11lbs./50gal. (5Kg/189L)	E
Urea	T
Vegetable Oil	T
Vinyl Acetate	E

GASKETS LUBRICANTS

During installation of a Grinnell® Coupling, always lubricate the gasket. For couplings using the tri-seal gasket in a low temperature application, use a petroleum-free silicone based lubricant. For mechanical tees and straps when used in low temperature applications, use a petroleum-free silicone based lubricant, otherwise no lubricant is required.

Grinnell Mechanical Piping Products recommends two kinds of lubricant:

La-Co Industries Lubri-Joint

Dow Corning® 7 Release Compound (Silicone)

Check lubricant chart to be certain the proper lubricant is recommended for the service intended. For information on health safety, contact Tyco Fire & Building Products for Material Safety Data Sheets (MSDS).

Application	La-Co Industries Lubri-Joint	Dow Corning® 7 Release Compound (Silicone)
Chilled Water	•	•
Heating	•	•
Compressed Air	•	•
Drainage	•	•
Sewage	•	•
Low Temp./Vacuum	•	•
Fire Protection	•	•

The table below will give an indication on the approximate number of gaskets which can be lubricated with one container of lubricant.

Gasket Size	Lubri-Joint 1 qt (946 ml) Container	Silicone 5.3 oz (150 g) Tube
1¼" / 32mm	650	116
1½" / 40mm	570	94
2" / 50mm	440	73
3" / 80mm	300	50
4" / 100mm	220	36
6" / 150mm	135	22
8" / 200mm	110	18
10" / 250mm	85	14
12" / 300mm	65	10
14" / 350mm	55	9
16" / 400mm	50	8
18" / 450mm	38	6
20" / 500mm	33	5
24" / 600mm	20	3

Available in:

- 1 Quart
- 1 Gallon

Silicone Gasket Lubricant recommended for use with tri-seal gasket (Dow Corning D.C. No. 7)* available in:

- 5.3 oz Tube
- 8 lb Can

* Dow Corning is a registered trademark of Dow Corning Corporation.

PREPARATION EQUIPMENT & GROOVED DATA

GROOVE DATA

Roll Groove Standard Specification for Steel & Other IPS Pipe

(1) The maximum allowable tolerances for IPS Pipe from square cut ends is: 0.030" (0.76mm) for sizes 1¼" thru 3"; 0.045" (1.14mm) for sizes 4" thru 6"; and 0.060" (1.52mm) for sizes 8" 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 uniform depth around the circumference of the pipe.

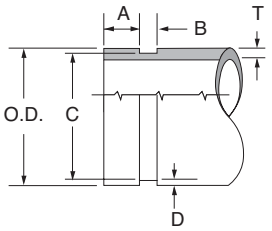
(4) Groove Depth "D" is a reference dimension only. The Groove Diameter "C" must be maintained.

(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 Inches / *mm*	Pipe O.D. Inches / *mm*			A ±0.030" ±0.76mm Inches / *mm*	B ±0.030" ±0.76mm Inches / *mm*	C Groove Diameter Inches / *mm*		D Groove Depth (ref. only) Inches / *mm*	T Minimum Wall Inches / *mm*	Maximum Allow Flare Diameter Inches / *mm*
		Tolerance								
	O.D.	+	-			*Actual*	*Tol. +0.000*			
1¼	1.660	0.016	0.016	0.625	0.281	1.535	-0.015	0.062	0.065	1.77
32	*42.4*	*0.41*	*0.41*	*15.88*	*7.14*	*38.99*	*-0.38*	*1.60*	*1.65*	*44.96*
1½	1.900	0.019	0.019	0.625	0.281	1.775	-0.015	0.062	0.065	2.01
40	*48.3*	*0.48*	*0.48*	*15.88*	*7.14*	*45.09*	*-0.38*	*1.60*	*1.65*	*51.05*
2	2.375	0.024	0.024	0.625	0.344	2.250	-0.015	0.062	0.065	2.48
50	*60.3*	*0.61*	*0.61*	*15.88*	*8.74*	*57.15*	*-0.38*	*1.60*	*1.65*	*62.99*
2½	2.875	0.029	0.029	0.625	0.344	2.720	-0.018	0.078	0.083	2.98
65	*73.0*	*0.74*	*0.74*	*15.88*	*8.74*	*69.09*	*-0.46*	*1.98*	*2.11*	*75.69*
76.1mm	3.000	0.030	0.030	0.625	0.344	2.845	-0.018	0.076	0.083	3.10
	76.1	*0.76*	*0.76*	*15.88*	*8.74*	*72.26*	*-0.46*	*1.93*	*2.11*	*78.74*
3	3.500	0.035	0.031	0.625	0.344	3.344	-0.018	0.078	0.083	3.60
80	*88.9*	*0.89*	*0.79*	*15.88*	*8.74*	*84.94*	*-0.46*	*1.98*	*2.11*	*91.44*
108.0mm	4.250	0.043	0.031	0.625	0.344	4.084	-0.020	0.083	0.083	4.35
	108.0	*1.09*	*0.79*	*15.88*	*8.74*	*103.73*	*-0.51*	*2.11*	*2.11*	*110.49*
4	4.500	0.045	0.031	0.625	0.344	4.334	-0.020	0.083	0.083	4.60
100	*114.3*	*1.14*	*0.79*	*15.88*	*8.74*	*110.08*	*-0.51*	*2.11*	*2.11*	*116.84*
133.0mm	5.250	0.053	0.031	0.625	0.344	5.084	-0.022	0.083	0.109	5.35
	133.4	*1.35*	*0.79*	*15.88*	*8.74*	*129.13*	*-0.56*	*2.11*	*2.77*	*135.89*
139.7mm	5.500	0.056	0.031	0.625	0.344	5.334	-0.022	0.083	0.109	5.60
	139.7	*1.42*	*0.79*	*15.88*	*8.74*	*135.48*	*-0.56*	*2.11*	*2.77*	*142.24*
5	5.563	0.056	0.031	0.625	0.344	5.395	-0.022	0.084	0.109	5.66
125	*141.3*	*1.42*	*0.79*	*15.88*	*8.74*	*137.03*	*-0.56*	*2.13*	*2.77*	*143.76*
159.0mm	6.250	0.063	0.031	0.625	0.344	6.084	-0.030	0.083	0.109	6.35
	159.0	*1.60*	*0.79*	*15.88*	*8.74*	*154.53*	*-0.76*	*2.11*	*2.77*	*161.29*
165.1mm	6.500	0.063	0.031	0.625	0.344	6.330	-0.022	0.085	0.109	6.60
	165.1	*1.60*	*0.79*	*15.88*	*8.74*	*160.78*	*-0.56*	*2.16*	*2.77*	*167.64*
6	6.625	0.063	0.031	0.625	0.344	6.455	-0.022	0.085	0.109	6.73
150	*168.3*	*1.60*	*0.79*	*15.88*	*8.74*	*163.96*	*-0.56*	*2.16*	*2.77*	*170.94*
216.3mm	8.516	0.063	0.031	0.750	0.469	8.331	-0.025	0.092	0.109	8.69
	216.3	*1.60*	*0.79*	*19.05*	*11.91*	*211.61*	*-0.64*	*2.34*	*2.77*	*220.73*
8	8.625	0.063	0.031	0.750	0.469	8.441	-0.025	0.092	0.109	8.80
200	*219.1*	*1.60*	*0.79*	*19.05*	*11.91*	*214.40*	*-0.64*	*2.34*	*2.77*	*223.52*
10	10.750	0.063	0.031	0.750	0.469	10.562	-0.027	0.094	0.134	10.92
250	*273.0*	*1.60*	*0.79*	*19.05*	*11.91*	*268.27*	*-0.69*	*2.39*	*3.40*	*277.37*
12	12.750	0.063	0.031	0.750	0.469	12.531	-0.030	0.109	0.156	12.92
300	*323.9*	*1.60*	*0.79*	*19.05*	*11.91*	*318.19*	*-0.76*	*2.77*	*3.96*	*328.17*
14	14.000	0.063	0.031	0.938	0.469	13.781	-0.030	0.109	0.156	14.10
350	*355.6*	*1.60*	*0.79*	*23.83*	*11.91*	*350.04*	*-0.76*	*2.77*	*3.96*	*358.14*
16	16.000	0.063	0.031	0.938	0.469	157.81	-0.030	0.109	0.165	16.10
400	*406.4*	*1.60*	*0.79*	*23.83*	*11.91*	*400.84*	*-0.76*	*2.77*	*4.19*	*408.94*
18	18.000	0.063	0.031	1.000	0.469	17.781	-0.030	0.109	0.165	18.16
450	*457.2*	*1.60*	*0.79*	*25.40*	*11.91*	*451.64*	*-0.76*	*2.77*	*4.19*	*461.26*
20	20.000	0.063	0.031	1.000	0.469	19.781	-0.030	0.109	0.188	20.16
500	*508.0*	*1.60*	*0.79*	*25.40*	*11.91*	*502.44*	*-0.76*	*2.77*	*4.78*	*512.06*
24	24.000	0.063	0.031	1.000	0.500	23.656	-0.030	0.172	0.218	24.20
600	*609.6*	*1.60*	*0.79*	*25.40*	*12.70*	*600.86*	*-0.76*	*4.37*	*5.54*	*614.68*

Tech Data: G710



Please refer to General Notes on page 17.

GROOVE DATA

Cut Groove Standard Specification for Steel & Other IPS Pipe

(1) The maximum allowable tolerances for IPS Pipe from square cut ends is: 0.030" (0.76mm) for sizes 1¼" thru 3"; 0.045" (1.14mm) for sizes 4" thru 6"; and 0.060" (1.52mm) for sizes 8" 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.

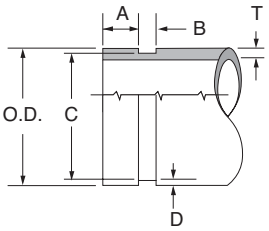
(3) Groove Diameter "C" must be uniform depth around the circumference of the pipe.

(4) Groove Depth "D" is a reference dimension only. The Groove Diameter "C" must be maintained.

(5) Minimum Wall Thickness "T" is the minimum wall thickness that should be cut grooved.

Nominal Pipe Size Inches / mm	Pipe O.D. Inches / mm			A ±0.030" ±0.76mm Inches / mm	B ±0.030" ±0.76mm Inches / mm	C Groove Diameter Inches / mm		D Groove Depth (ref. only) Inches / mm	T Minimum Wall Inches / mm
	O.D.	Tolerance +	Tolerance -			Actual	Tol. +0.000		
1¼	1.660	0.016	0.016	0.625	0.313	1.535	-0.015	0.062	0.062
32	42.4	0.41	0.41	15.88	7.95	38.99	-0.38	1.60	1.60
1½	1.900	0.019	0.019	0.625	0.313	1.775	-0.015	0.062	0.062
40	48.3	0.48	0.48	15.88	7.95	45.09	-0.38	1.60	1.60
2	2.375	0.024	0.024	0.625	0.313	2.250	-0.015	0.062	0.062
50	60.3	0.61	0.61	15.88	7.95	57.15	-0.38	1.60	1.60
2½	2.875	0.029	0.029	0.625	0.313	2.720	-0.018	0.078	0.078
65	73.0	0.74	0.74	15.88	7.95	69.09	-0.46	1.98	1.98
76.1mm	3.000	0.030	0.030	0.625	0.313	2.845	-0.018	0.076	0.076
	76.1	0.76	0.76	15.88	7.95	72.26	-0.46	1.93	1.93
3	3.500	0.035	0.031	0.625	0.313	3.344	-0.018	0.078	0.078
80	88.9	0.89	0.79	15.88	7.95	84.94	-0.46	1.98	1.98
108.0mm	4.250	0.042	0.031	0.625	0.375	4.084	-0.020	0.083	0.083
	108.0	1.07	0.79	15.88	9.53	103.73	-0.51	2.11	2.11
4	4.500	0.045	0.031	0.625	0.375	4.334	-0.020	0.083	0.083
100	114.3	1.14	0.79	15.88	9.53	110.08	-0.51	2.11	2.11
133.0mm	5.250	0.052	0.031	0.625	0.375	5.084	-0.020	0.083	0.083
	133.4	1.32	0.79	15.88	9.53	129.13	-0.51	2.11	2.11
139.7mm	5.500	0.056	0.031	0.625	0.375	5.334	-0.020	0.083	0.083
	139.7	1.42	0.79	15.88	9.53	135.48	-0.51	2.11	2.11
5	5.563	0.056	0.031	0.625	0.375	5.395	-0.022	0.084	0.084
125	141.3	1.42	0.79	15.88	9.53	137.03	-0.56	2.13	2.13
159.0mm	6.250	0.063	0.031	0.625	0.375	6.084	-0.022	0.083	0.083
	159.0	1.60	0.79	15.88	9.53	154.53	-0.56	2.11	2.11
165.1mm	6.500	0.063	0.031	0.625	0.375	6.330	-0.022	0.085	0.085
	165.1	1.60	0.79	15.88	9.53	160.78	-0.56	2.16	2.16
6	6.625	0.063	0.031	0.625	0.375	6.455	-0.022	0.085	0.085
150	168.3	1.60	0.79	15.88	9.53	163.96	-0.56	2.16	2.16
216.3mm	8.516	0.063	0.031	0.750	0.438	8.331	-0.025	0.092	0.092
	216.3	1.60	0.79	19.05	11.13	211.61	-0.64	2.34	2.34
8	8.625	0.063	0.031	0.750	0.438	8.441	-0.025	0.092	0.092
200	219.1	1.60	0.79	19.05	11.13	214.40	-0.64	2.34	2.34
10	10.750	0.063	0.031	0.750	0.500	10.562	-0.027	0.094	0.094
250	273.0	1.60	0.79	19.05	12.70	268.27	-0.69	2.39	2.39
12	12.750	0.063	0.031	0.750	0.500	12.531	-0.030	0.109	0.109
300	323.9	1.60	0.79	19.05	12.70	318.19	-0.76	2.77	2.77
14	14.000	0.063	0.031	0.938	0.500	13.781	-0.030	0.109	0.281
350	355.6	1.60	0.79	23.83	12.70	350.04	-0.76	2.77	7.14
16	16.000	0.063	0.031	0.938	0.500	157.81	-0.030	0.109	0.312
400	406.4	1.60	0.79	23.83	12.70	400.84	-0.76	2.77	7.92
18	18.000	0.063	0.031	1.000	0.500	17.781	-0.030	0.109	0.312
450	457.2	1.60	0.79	25.40	12.70	451.64	-0.76	2.77	7.92
20	20.000	0.063	0.031	1.000	0.500	19.781	-0.030	0.109	0.312
500	508.0	1.60	0.79	25.40	12.70	502.44	-0.76	2.77	7.92
24	24.000	0.063	0.031	1.000	0.562	23.656	-0.030	0.172	0.375
600	609.6	1.60	0.79	25.40	14.27	600.86	-0.76	4.37	9.53

Tech Data: G710



Please refer to General Notes on page 17.

GROOVE DATA

Roll Groove Standard Specification for Copper Tubing

(1) Nominal Tubing, ASTM B-88 drawn copper tubing size.

(2) Outside Diameter "OD", of roll grooved tubing shall not vary more than the tolerance listed. The maximum tolerance from square cut ends is: 0.030" (0.76mm) for sizes 2" – 3" (54.0 – 79.4mm); 0.045" (1.14mm) for sizes 4" – 6" (104.8 – 155.6mm); 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 Width Bottom "B", to 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.

(6) Groove Depth "D", is a reference dimension only. The Groove Diameter "C" must be maintained.

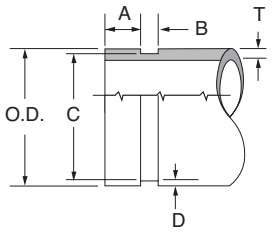
(7) Minimum Wall Thickness "T", per ASTM B-306 drain waste and vent (DWV) is minimum wall thickness copper tubing, which may be roll grooved.

(8) Maximum Flare Diameter is the O.D. at the most extreme tubing diameter.

Nominal Tubing Size Inches *mm*	Tubing O.D. Inches mm			A ±0.030" ±0.76mm Inches *mm*	B ±0.030" ±0.76mm Inches *mm*	C Groove Diameter Inches mm		D Nominal Groove Depth Inches *mm*	T Minimum Wall Inches *mm*	Maximum Flare Diameter Inches *mm*
	O.D.	Tolerance +	Tolerance -			*Actual*	*Tol. 0.000*			
2"	2.125	0.002	0.002	0.610	0.300	2.029	-0.020	0.048	0.064	2.220
	54.0	*0.05*	*0.05*	*15.5*	*7.6*	*51.5*	*-0.51*	*1.2*	*1.6*	*56.4*
2½"	2.625	0.002	0.002	0.610	0.300	2.525	-0.020	0.050	0.065	2.720
	66.7	*0.05*	*0.05*	*15.5*	*7.6*	*64.1*	*-0.51*	*1.2*	*1.7*	*69.1*
3"	3.125	0.002	0.002	0.610	0.300	3.025	-0.020	0.050	DWV	3.220
	79.4	*0.05*	*0.05*	*15.5*	*7.6*	*76.8*	*-0.51*	*1.2*		*81.8*
4"	4.125	0.002	0.002	0.610	0.300	4.019	-0.020	0.053	DWV	4.220
	104.8	*0.05*	*0.05*	*15.5*	*7.6*	*102.1*	*-0.51*	*1.4*		*107.2*
5"	5.125	0.002	0.002	0.610	0.300	4.999	-0.020	0.053	DWV	5.220
	130.2	*0.05*	*0.05*	*15.5*	*7.6*	*127.0*	*-0.51*	*1.4*		*132.6*
6"	6.125	0.002	0.002	0.610	0.300	5.999	-0.020	0.063	DWV	6.220
	155.6	*0.05*	*0.05*	*15.5*	*7.6*	*152.3*	*-0.51*	*1.6*		*158.0*
8"	8.125	0.002	0.004	0.610	0.300	7.959	-0.020	0.083	DWV	8.220
	206.4	*0.05*	*0.10*	*15.5*	*7.6*	*202.2*	*-0.51*	*2.1*		*208.8*

Please refer to General Notes on page 17.

Tech Data: G720



See Tyco Fire & Building Products Publicaton TFP1800

PIPE TAPE

Model PT 1000 was developed to check the groove diameter in roll-grooved pipe. The tape measures the groove in steel pipe 1" – 12" and copper tube 2" – 8".

The loop extending from the metal housing consists of a clear-plastic window with a vertical indicator line and the adjustable metal measuring tape. The adjustable measuring tape has groove tolerance blocks (thick black lines) that are visible through the plastic view window. The groove tolerance blocks are marked with the associated pipe diameters.

Model PT 2000 measures the groove in steel pipe from 1" – 36" in 100th's of inches.

Note: The Grinnell Roll Pipe Measuring Tape is not a calibrated tool and is to be used for reference only. To ensure accuracy, always check grooved pipe dimensions with calibrated gauges or calipers. For Roll Groove Standard Specifications for Steel Pipe and Other IPS Pipe, refer to Data Sheet G710 or TFP1898. For Roll Groove Standard Specification for Copper Tube, refer to Data Sheet G720.

PORTABLE ROLL GROOVERS

With Electric Motor

Self-contained portable roll grooving machines are supplied with electric motors for roll grooving pipe on the job site. Each machine comes in a shipping/storage box and includes a hydraulic hand pump, top and bottom rolls (note roll sizes on page 151), guards and foot switch.

Additional rolls may be ordered with machines. Refer to Roll Selection Chart on page 151, or contact Tyco Fire & Building Products.

Pace Model	Size Range				Drive
	Schedule 40	Schedule 10	Std. Wall	Copper	
1112	1" – 12"			2" – 8"	1½ HP, 110 v
1010	1½" – 6"	1½" – 12"			½ HP, 110 v
1023	1¼" – 12"		12" – 24"	2" – 8"	1½ HP, 110 v
1021	1¼" – 12"		12" – 24"	2" – 8"	2 HP, 220 v

Roll Grooving Machines are available for rent. Contact your Tyco Fire & Building Products representative for details and availability.

PORTABLE ROLL GROOVERS

With Electric Motor

Model 1112 Specifications:

- Schedule 40 Capacity 1" – 12"
- Copper Tube 2 – 8" (K, L, M and DWV)
- Pipe Rotation Speed of 35 RPM
- Hydraulic Pressure at Roller is 15,000 PSI Max
- Electric Motor 1½ HP, 60 Hz, 110 v

Floor Space Required: 32" x 32"

Weight: 220 lbs

STANDARD EQUIPMENT
Electric Drive Motor, Groove Depth Gauge, Hydraulic Hand Pump, Top and Bottom Rolls 1" – 12", Shipping/Storage Box, Guards, Foot Switch

OPTIONAL EQUIPMENT
Top and Bottom copper Rolls 2" – 8", Nipple Bracket, Mounting Feet

Model 1010 Specifications:

- Schedule 40 1½" – 6"
- Schedule 10 1½" – 12"
- Pipe Rotation Speed of 30 RPM
- Hydraulic Pressure at Roller is 8,000 PSI Max
- Electric Motor ½ HP, 60 Hz, 110 v

Floor Space Required: 32" x 32"

Weight: 300 lbs

STANDARD EQUIPMENT
Electric Motor, Groove Depth Gauge, Hydraulic Pump, Shipping/Storage Box, Top and Bottom Rolls 1½" – 12", Guards, Foot Switch

OPTIONAL EQUIPMENT
Mounting Feet

Model 1023 Specifications:

- Schedule 40 1¼ – 12"
- Standard Wall 12 – 24"
- Copper Tube 2 – 8" (K, L, M and DWV)
- Pipe Rotation Speed of 30 RPM
- Hydraulic Pressure at Roller is 16,000 PSI Max
- Electric Motor 1½ HP, 60 Hz, 110 v

Floor Space Required: 31½" x 33½"

Weight: 430 lbs

STANDARD EQUIPMENT
Electric Motor, Groove Depth Gauge, Hydraulic Pump, Shipping/Storage Box, Rolls as Specified on Price List, Guards, Foot Switch

OPTIONAL EQUIPMENT
Top and Bottom Copper Rolls, Nipple Bracket, Mounting Feet

Model 1021 Specifications:

- Schedule 40 1½" – 12"
- Standard Wall 12" – 24"
- Copper Tube 2" – 8" (K, L, M and DWV)
- Pipe Rotation Speed of 30 RPM
- Hydraulic Pressure at Roller is 8,000 PSI Max
- Electric Motor 2 HP, 60 Hz, 220 v

Floor Space Required: 32" x 32"

Weight: 300 lbs

STANDARD EQUIPMENT
Electric Motor, Groove Depth Gauge, Hydraulic Pump, Shipping/Storage Box, Rolls as Specified on Price List, Guards, Foot Switch

OPTIONAL EQUIPMENT
Top and Bottom Copper Rolls, Nipple Bracket, Mounting Feet

PORTABLE ROLL GROOVERS

For Rigid® 300 Pipe Threader

Models 1012, 1022 and 1041 Roll Grooving Machines are designed to be mounted quickly and easily on a Rigid® Model 300 unit.*

Pace Model	Size Range				Drive
	Schedule 40	Schedule 10	Std. Wall	Copper	
1012	1" – 12"			2" – 8"	Rigid® 300
1022	1¼" – 12"		12" – 16"	2" – 8"	Rigid® 300
1041	1" – 6"	1" – 12"		2" – 8"	Rigid® 300

* Rigid is a registered trademark of Rigid Tool Company.

PORTABLE ROLL GROOVERS

For Use with Rigid® 300

Model 1012 Specifications:

- Schedule 40 1" – 12"
- Copper Tube Capacity 2" – 8" (K, L, M and DWV)
- Hydraulic Hand Pump

Weight: 125 lbs

STANDARD EQUIPMENT
Top & Bottom Rolls 1" – 12", Groove Depth Guage, Hydraulic Hand Pump, Guards

OPTIONAL EQUIPMENT
Top and Bottom Copper Rolls, Pipe Nipple, and Stabilizer Bracket

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Model 1022 Specifications:

- Schedule 40 Capacity 1¼" – 12"
- Standard Wall Capacity 12" – 16"
- Copper Tube Capacity 2" – 6" (K, L, M)
- Hydraulic Pressure at Roller is 16,000 PSI Max

Weight: 285 lbs

STANDARD EQUIPMENT
Top & Bottom Rolls 1¼" – 16", Hydraulic Hand Pump, Grooved Depth Guage, Shipping/Storage Box, Pipe Nipple and Stabilizer Bracket, Guards

OPTIONAL EQUIPMENT
Top and Bottom Copper Rolls

Model 1041 Specifications:

- Schedule 40 Capacity 1" – 6"
- Schedule 10 Capacity 1" – 12"
- Copper Tube Capacity 2" – 6" (K, L, M and DWV)
- Hydraulic Pressure at Roller is 8,000 PSI Max

Weight: 94 lbs

STANDARD EQUIPMENT
Top & Bottom Rolls 1" – 12", Hydraulic Hand Pump, Grooved Depth Guage and Guards

OPTIONAL EQUIPMENT
Top and Bottom Copper Rolls

MINI-MITES

Field Portable

Field Portable Mini-Mites are designed to be adapted for use with Rigid® Model 300 machines. Model 1039-66 can be operated with its own hand ratchet so that no other tools are required.

Pace Model	Size Range				Drive
	Schedule 40	Schedule 10	Std. Wall	Copper	
1039-66	1¼" – 6"			2" – 8"	Rigid® 300, hand crank
1034	1¼" – 6"				Rigid® 300
1066				2" – 8"	Rigid® 300

MINI-MITES

Field Portable

Model 1039-66 Specifications:

- Schedule 40 Capacity 1¼" – 6"
- Copper Tube Capacity 2" – 8" (K, L, M and DWV)
- Manual Grooving With Ratchet Hand Crank
- Can be Used with Rigid® Model 300 With No Gearbox Removal
- Self-contained

STANDARD EQUIPMENT
Rolls 2" – 8" Copper, Multi-Function Ratchet Hand Crank

OPTIONAL EQUIPMENT
Top and Bottom Rolls Steel Pipe

Model 1034 Specifications:

- Schedule 40 Capacity 1¼" – 6"
- Used with the Rigid® Model 300 Threader

STANDARD EQUIPMENT
Rolls 1¼" – 6" Steel Pipe

Model 1066 Specifications:

- Copper Tube Capacity 2" – 8" (K, L, M and DWV)
- Used With the Rigid® Model 300 Threader

STANDARD EQUIPMENT
Rolls 2" – 8" Copper

AUTOMATED ROLL GROOVERS

The Automated Roll Grooving Machines are designed for use in the shop. The machines have a self-contained hydraulic system that produces consistent quality roll grooves in high production runs.

Pace Model	Size Range				Drive
	Schedule 40	Schedule 10	Std. Wall	Copper	
2021	1¼" – 12"		12" – 24"	2" – 8"	3 HP, 220 v
2010	1½" – 6"	1½" – 12"			½ HP, 110 v

AUTOMATED ROLL GROOVERS

Model 2021 Specifications:

- Schedule 40 1¼" – 12"
- Standard Wall 12" – 24"
- Copper Tubing 2" – 8" (K, L, M and DWV)
- Pipe Rotation Speed of 30 RPM
- Hydraulic Pressure at the Roller is 16,000 PSI Max
- Electric Motor 3 HP, 60 Hz, 220 v, 3 PH
- Hydraulic Pump Motor 1 HP, 60 Hz, 220 v, 3 PH
- Ships Completely Assembled With 4" – 6" Top and Bottom Rollers.

Floor Space Required: 30" x 20"

STANDARD EQUIPMENT
Electric Drive Motor, Limit Switch for Depth Gauging, Groove Depth Gauge, Hydraulic Pump, Model 4037 Nipple Bracket, Rolls As Specified in Price List, Guards, Foot Switch

Model 2010 Specifications:

- Schedule 40 1½" – 6"
- Schedule 10 1½" – 12"
- Pipe Rotation Speed of 30 RPM
- Hydraulic Pressure at the Roller is 8000 PSI Max
- Electric Motor ½ HP, 60 Hz, 110 v, 1 PH
- Hydraulic Pump Motor 1 HP, 60 Hz, 110 v, 3 PH
- Ships Completely Assembled With 4" – 6" Top and Bottom rollers.

Floor Space Required: 30" x 22"

Weight: 510 lbs

STANDARD EQUIPMENT
Electric Drive Motor, Limit Switch for Depth Gauging, Groove Depth Gauge, Hydraulic Pump, Model 4037 Nipple Bracket, Rolls As Specified in Price List, Guards, Foot Switch

PORTABLE CUT GROOVER

Pace Model	Size Range				Drive
	Schedule 40	Schedule 10	Schedule 80	Std. Wall	
1000	2" – 8"		2½" – 8"		1 HP, 115-230 v
1000	2" – 12" *				1 HP, 115-230 v

* With optional collet chucks for 10" – 12" pipe.

Model 1000 Specifications:

- Schedule 40 2" – 12"
- Schedule 80 2½" – 8"
- Collet Chucks for 10" and 12" Pipe Available
- Tooling for Cut Grooving Ductile Iron Pipe Also Available
- Special Collet Chucks for Non-Standard Dimension Pipe Can Be Supplied
- Motor is 1 HP, 115-230 v, 1 PH

Weight: 185 lbs

Height: 38"

STANDARD EQUIPMENT
Collet Chucks for 2" – 8", 4 High Speed Steel Grooving Blades, Groove Gauge, Shipping/Storage Box

ACCESSORIES

Pipe Support Stands

Model 4031:

Capacity: 1" – 4" Pipe; 600 lbs max

A 22" diameter base with 2" column gives this stand plenty of strength for supporting any pipe size in its size range. The saddle has two roller bar bearings for free rotation of the pipe, and absorbs vibration to ensure a smooth, uniform groove. Saddle height is adjustable over a 10" range.

Model 4000:

Capacity: 2" – 8" Pipe; 900 lbs max

The base of this stand is the same as used in the Model 4031. A saddle with four roller bearings provides greater side support for the pipe and increases dampening of vibration without impairing the unit's free-rolling characteristics. Saddle height is adjustable over a 10" range.

Model 4033:

Capacity: 2" – 14" Pipe; 1,200 lbs max

This extra-heavy-duty pipe support stand uses two 2" columns on a 22" diameter base to give it exceptional stability and resistance to vibration and pendulum effect. Each column incorporates a sturdy, threaded post infinitely adjustable over a 10" range. The saddle utilizes six roller bearings in an array that provides excellent support for all pipes in its size range.

Model 4040:

Capacity: 12" – 24" Pipe; 4,000 lbs max

Fabricated of 6" diameter steel pipe welded to a 36" base, the stand can support up to two tons of pipe during grooving operations. Pipe saddle height is adjustable over a 5" range.

ACCESSORIES

Porta-Bore/Nipple Bracket

Porta-Bore Model 3013:

- Solid Alloy Aluminum Construction.
- Motor is a 10 Amp draw industrial drill motor 110 v with internal 4-speed gear box 110, 175, 245, 385 RPM.
- Circuit breaker assures no safety hazard to the operator or machine.
- Chain clamp is standard on all units and clamps to pipe diameters.
- Optional speed toggle clamps; 1¼" – 6" pipe.
- Oil feed.

Weight: 42 lbs

Nipple Bracket Model 4037:

- Capacity: 8" – 24" Pipe
- Fits Models 1020, 1021, 1023, 2020 & 2021 Roll Groovers

MACHINE

Selection Chart

	Model	Size Range				Drive	Rolls Supplied			Part No.
		Schedule 40	Schedule 10	Std. Wall	Copper		Size	Steel	Copper	
Portable w/Electric Motor	1112	1" – 12"			2" – 8"	1½ HP, 110 v	1" – 12"	X		41048
	1010	1½" – 6"	1½" – 12"			½ HP, 110 v	1½" – 12"	X		41030
	1023	1¼" – 12"		12" – 24"	2" – 8"	1½ HP, 110 v	1¼" – 12"	X		41029
	1023						2" – 12"	X		41250
	1023						1¼" – 24"	X		41251
	1023						2" – 24"	X		41252
	1021	1¼" – 12"		12" – 24"	2" – 8"	2 HP, 220 v	1¼" – 12"	X		41253
	1021						2" – 12"	X		41254
	1021						1¼" – 24"	X		41255
	1021						2" – 24"	X		41256
For Rigid® 300	1021	1" – 12"			2" – 8"	Rigid® 300	1" – 12"	X		41041
	1022	1¼" – 12"		12" – 16"	2" – 8"	Rigid® 300	1¼" – 16"	X		41027
	1041	1" – 6"	1" – 12"		2" – 8"	Rigid® 300	1" – 12"	X		41018
Mini-Mites	1039-66	1¼" – 6"			2" – 8"	Rigid 300®, Hand Crank	2" – 8" CTS		X	41047
	1034	1¼" – 6"				Rigid® 300	1¼" – 6" IPS	X		41015
	1066				2" – 8"	Rigid® 300	2 – 8" CTS		X	41014
Automated	2021	1¼" – 12"		12" – 24"		3 HP, 220 v	1¼" – 12"	X		41257
	2021						2" – 12"	X		41258
	2021						1¼" – 24"	X		41032
	2021						2" – 24"	X		41259
	2010	1½" – 6"	1½" – 12"			½ HP, 110 v	1½" – 12"	X		41031
Portable Cut Groover	1000	2" – 8"				1 HP, 115 v				41260
	1000	2" – 8"				1 HP, 115 v				41261

For machine rental program, contact Tyco Fire & Building Products.

ACCESSORIES

	Model	Size Range	Capacity	Part No.
Pipe Stands	4031	1" – 4"	600 lbs	41037
	4000	2" – 8"	900 lbs	41038
	4033	2" – 14"	1200 lbs	41039
	4040	12" – 24"	4000 lbs	41040
Porta-Bore	3013	Up to 4¼" holes in pipe 1¼" – 1"		41049
Nipple Bracket	4037	8" – 24" Fits Model 1020, 1021, 1023, 2020, 2021		41035
Nipple Bracket	4045	4" – 12" Fits Model 1012, 1112		41512
Mounting Feet	4039	Fits Portable Roll Groovers and Model 1000		41034
Mounting Feet	4046	Fits Portable Roll Groovers for Models		41013

Note: Nipple Bracket and Mounting Feet are not included with the roll grooving machine and must be ordered separately. The use of a Nipple Bracket is recommended for 8" or larger pipe, and as a guide when grooving short pieces of pipe.

ROLL SELECTION CHART

For Machine	Pipe	Size	Top Roll Part No.	Size	Bottom Roll Part No.	Grooved Depth Gauge	Part No.
1021, 1023, 2021	Sch. 40	1¼" – 1½"	412625	1¼" – 1½"	41281		
		2" – 3½"	41263	2" – 3½"	41282		
		4" – 6"	41264	4" – 6"	41283		
		8" – 12"	41265	8" – 12"	41284		
	Std. Wall	14" – 16"	41266	14" – 16"	41285		
		18" – 24"	41267	18" – 24"	41286		
	Copper Tube	2" – 8"	41268	2" – 8"	41287	Depth Gauge 4043	41509
1010, 2010	Sch. 10 & 40	1½" – 6"	41269	1½"	41288		
				2" – 3½"	41289		
				4" – 6"	41290		
	Sch. 10	8" – 12"	41270	8" – 12"	41291		
1040, 2040	Sch. 40	1" – 1½"	41271	1" – 1½"	41292		
		1" – 6"	41272	2" – 6"	41293		
		2" – 6"	41273				
	Sch. 10	8" – 12"	41274	8" – 12"	41294		
	Copper Tube	2" – 8"	41275	2" – 8"	41295	Depth Gauge 4021	41510
1012, 1112, 2112	Sch. 40	1" – 1½"	41276	1" – 1½"	41296		
		2" – 6"	41277	2" – 6"	41297		
		8" – 12"	41278	8" – 12"	41298		
	Copper Tube	2" – 8"	41506	2" – 8"	41507	Depth Gauge 4021	41510
1021,1022, 1023, 2021	Stainless Steel 10 Ga.			2" – 3½"	41299		
				4" – 6"	41500		
				8" – 12"	41501		
				14" – 16"	41504		
				18" – 24"	41505		
1040, 1041, 1112, 2112	Stainless Steel 10 Ga.			2" – 6"	41502		
				8" – 12"	41503		
1034, 1039	Sch. 40		41279			Drive Shaft 1¼" – 6"	41511
1039	Copper Tube		41280			Drive Shaft 2" – 8"	41513
						Depth Gauge 4021	41510
1066	Copper Tube		41508			Depth Gauge 4021	41510
						Drive Shaft 2" – 8"	41514

PRESSURE & DESIGN DATA

DESIGN DATA

Tech Data: G820

Rigid Joints

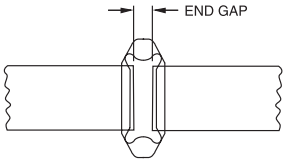
Grinnell® Rigid Couplings provide rigid gripping of the pipe. They are designed to bring the pipe ends closely together and the coupling clamps firmly onto the pipe OD and also into the bottom of the grooves. Because Rigid Couplings clamp around the entire pipe surface, they provide resistance to flexural and torsional loads and therefore permit longer spacing to ASME/ANSI B31.1 (Power Piping) and ASME/ANSI B39.1 (Building Services) requirements.

Flexible Joints

Grinnell 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/contraction and piping misalignment.

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.

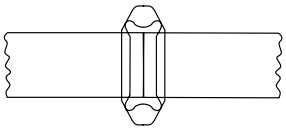


Pipe Ends Gapped for Expansion

For design purposes, the maximum pipe end gap should be reduced to account for field practices as follows:

End Gap Reduction	
Pipe Size Inches *mm*	Maximum Pipe End Gap
1¼ – 3 *42.4 – 88.9*	50%
4 – 24 *114.3 – 610.0*	25%

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

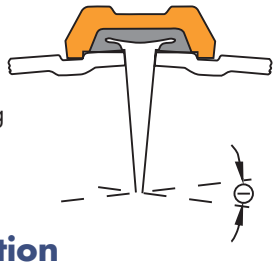
The following values should be used as available pipe end movements for Grinnell Figure 705, 707 and 716 Flexible Couplings:

Pipe End Movements		
Pipe Size Inches *mm*	Cut Grooved Inches *mm*	Roll Grooved Inches *mm*
1¼ – 3 *42.4 – 88.9*	0 – 0.063 *0 – 1.6*	0 – 0.031 *0 – 0.8*
4 – 24 *114.3 – 610.0*	0 – 0.188 *0 – 2.4*	0 – 0.094 *0 – 2.4*

* Roll grooved joints provide ½ the available movement of cut grooved joints.

Angular Deflection

Grinnell Flexible Couplings are capable of accommodating angular deflection.



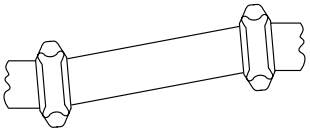
The deflection published is a maximum value. For design purposes the maximum deflection should be reduced to account for field practices as shown:

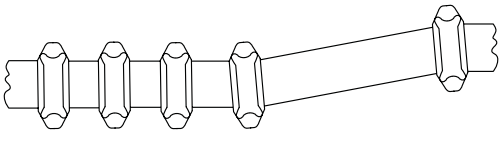
Deflection	
Pipe Size Inches *mm*	Maximum Pipe Deflection Reduction
1¼ – 3 *42.4 – 88.9*	50%
4 – 24 *114.3 – 610.0*	25%

Expansion/Contraction

Grinnell Flexible Couplings are capable of accommodating pipe thermal movements provided they are properly gapped and a sufficient quantity of flexible couplings are used. Note that 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.





DESIGN DATA

Thermal Movement

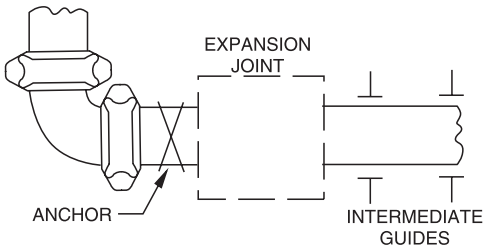
The following guidelines are similar to any expansion joint:

It is recommended that anchors be installed at changes of direction on the pipe lines 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.

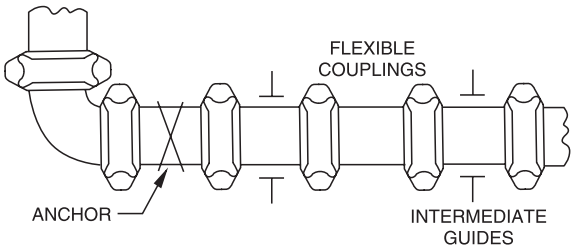


(2) Design the system with flexible and/or rigid couplings and allow the pipe to move in directions desired, with the use of anchors and guides if so required. With this method, it is important to ensure that movement at branch connections, changes of direction, equipment hookup, etc., will not cause 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" Schedule 40 Steel Pipe, Roll Grooved, 150' long, anchored at each end.
- Maximum Temperature = 200°F (93.3°C)
- Minimum Temperature = 40°F (4.4°C)
- Install Temperature = 80°F (26.6°C)



Activation Force	
Pipe Size Inches *mm*	Activation Force lbs *N*
1¼	35
42.4	*156*
1½	45
48.3	*200*
2	70
60.3	*311*
2½	100
73.0	*645*
76.1mm	110
	489
3	145
88.9	*645*
4	240
114.3	*1068*
5	375
139.7, 141.3	*1668*
165.1mm	500
	2224
6	520
168.3	*2313*
8	880
219.1	*3914*
10	1365
273.0	*6072*
12	1915
323.9	*8518*

DESIGN DATA

Thermal Movement

To calculate the number of couplings required in this example to compensate for the Thermal Expansion and Contraction of the pipe:

(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" per 100'
40°F = 0.30" per 100'
Difference = 0.31" per 100'
For 150' of pipe = 0.31 x 1.5" = 0.47" per 150'

(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:

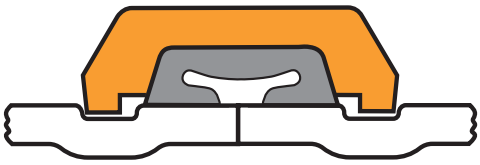
200°F = 1.52" per 100'
80°F = 0.61" per 100'
Difference = 0.91" per 100'
For 150' of pipe = 0.91 x 1.5 = 1.36" per 150'

(3) Couplings Required

Available linear movement for a 6" Figure 707 Flexible Coupling on roll grooved pipe = 0.094" per coupling.

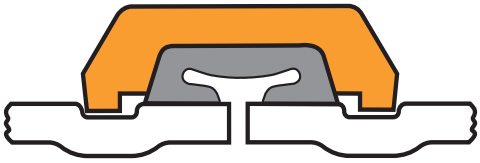
(a) Fully butted together for contraction only. Therefore the number of Figure 707 Flexible Couplings required:

- 0.47" / 0.094" per coupling = 5.0
- Use 5 Figure 707 couplings for pipe contraction



(b) Fully gapped apart for expansion only. Therefore the number of Figure 707 Flexible Couplings required:

- 1.36" / 0.094" per coupling = 14.47
- Use 15 Figure 707 Flexible Couplings for pipe expansion



THERMAL EXPANSION OF CARBON STEEL IN INCHES/100 FEET (MILLIMETERS/30.5METERS) BETWEEN 0°F (-18°C) & INDICATED TEMPERATURE

Temperature F° (C°)	Inches/100 Feet (mm/30.5M)
-40 (-40)	-0.30 (-7.62)
-30 (-34.4)	-0.23 (-5.84)
-20 (-28.9)	-0.15 (-3.81)
-10 (-23.3)	-0.08 (-2.03)
0 (-17.8)	0.00 (0.00)
10 (-12.2)	0.08 (2.03)
20 (-6.7)	0.15 (3.81)
30 (-1.1)	0.23 (5.84)
40 (4.4)	0.30 (7.62)
50 (10.0)	0.38 (9.65)
60 (15.6)	0.46 (11.68)
70 (21.1)	0.53 (13.46)
80 (26.7)	0.61 (15.50)
90 (32.2)	0.68 (17.27)
100 (37.8)	0.76 (19.30)
110 (43.3)	0.84 (21.34)
120 (48.9)	0.91 (23.11)
130 (54.4)	0.99 (25.15)
140 (60.0)	1.06 (26.92)
150 (65.6)	1.14 (28.96)
160 (71.1)	1.22 (30.99)
170 (76.7)	1.29 (32.77)
180 (82.2)	1.37 (34.80)
190 (87.8)	1.44 (36.58)
200 (93.3)	1.52 (38.61)
210 (98.9)	1.60 (40.64)
220 (104.4)	1.67 (42.42)
230 (110.0)	1.75 (44.45)

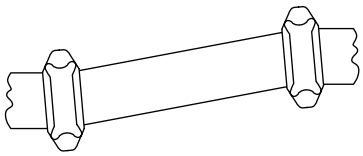
Mean Coef. of thermal expansion = 0.00000633 in/in/°F
Source: ASME B31.9

DESIGN DATA

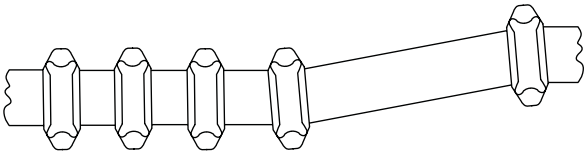
Misalignment & Deflection

Grinnell® Flexible Couplings provide for restrained joints and allow for deflection to aid where the pipe or equipments 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.



If it is desired to have both deflection and linear movement available, then the system should have sufficient flexible joints to accommodate the requirement.

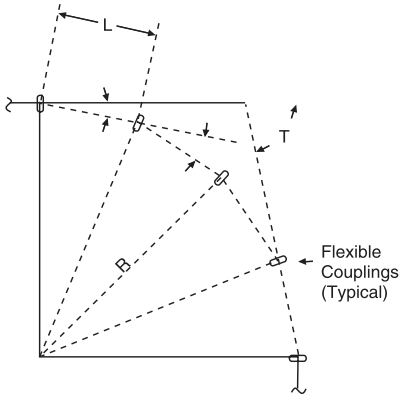


Flexible couplings are also useful in laying out curved piping systems.

$$R = \frac{L}{(2)\ (\text{Sin}\ \frac{\ominus}{2})}$$

$$L = (2)\ (R)\ (\text{Sin}\ \frac{\ominus}{2})$$

$$N = \frac{T}{\ominus}$$



R = Radius of curve

L = Pipe length

$\ominus$ = Deflection from centerline, in degrees, for each coupling (see table)

N = Number of flexible couplings needed

T = Total deflection, in degrees, required

DESIGN DEFLECTION FOR ROLL GROOVED PIPE

Deflection O (Roll Grooved Pipe)	
Pipe Size Inches *mm*	Figures 705 & 707
1¼ *42.4*	1.08°
1½ *48.3*	0.94°
2 *60.3*	0.75°
2½ *73.0*	0.62°
76.1mm	0.60°
3 *88.9*	0.51°
4 *114.3*	1.19°
5 *139.7, 141.3*	0.97°
165.1mm	0.83°
6 *168.3*	0.81°
8 *219.1*	0.63°
10 *273.0*	0.50°
12 *323.9*	0.42°

Incorporates the recommended safety factor reduction for field practices (50% for sizes 1¼ – 3" and 25% for sizes 4 – 12").

DESIGN DATA

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								
Pipe Size Inches *mm*	Pipe Length in Feet/*Meters*							
	10	12	15	22	25	30	35	40
	3.3	*3.7*	*4.6*	*6.7*	*7.6*	*9.1*	*10.7*	*12.2*
	Avg. Hangers Per Pipe Length							
1¼ - 2	2	2	2	3	4	4	5	6
42.4 – 60.3								
2½ - 4	1	2	2	2	2	3	4	4
73.0 – 114.3								
5 - 24	1	1	2	2	2	3	3	3
139.7 – 609.6								

For pipe runs when linear movement is not required:

Distance Between Supports	
Nominal Size Inches *mm*	Maximum Distance Between Supports Feet *Meters*
1¼ - 1½	12
42.4 - 48.3	*3.7*
2 - 8	15
60.3 - 219.1	*4.6*
10 - 12	16
273.0 - 323.9	*4.9*
14 - 16	18
355.6 - 406.4	*5.5*
18 - 24	20
457.2 - 609.6	*6.1*

Note: The requirements of ANSI, ASME or other code groups may require additional supports.

RIGID JOINTS

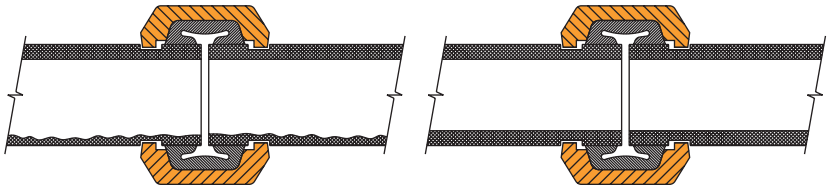
For pipe runs with rigid couplings:

Pipe Size Inches mm	Suggested Maximum Span Between Supports – Feet/*Meters*			
	Water Service		Air Service	
	I	II	I	II
1¼	7	11	9	11
42.4	*2.1*	*3.4*	*2.7*	*3.4*
1½	7	12	9	13
48.3	*2.1*	*3.7*	*2.7*	*4.0*
2	10	13	13	15
60.3	*3.0*	*4.0*	*4.0*	*4.6*
2½	11	14	14	16
73.0	*3.4*	*4.3*	*4.3*	*4.9*
76.1mm	11	14	14	16
	3.4	*4.3*	*4.3*	*4.9*
3	12	15	15	17
88.9	*3.7*	*4.6*	*4.6*	*5.2*
4	14	17	17	21
114.3	*4.3*	*5.2*	*5.2*	*6.4*
5	16	19	20	24
141.3	*4.9*	*5.8*	*6.1*	*7.3*
165.1mm	17	20	21	25
	5.2	*6.1*	*6.4*	*7.6*
6	17	20	21	25
168.3	*5.2*	*6.1*	*6.4*	*7.6*
8	19	21	24	28
219.1	*5.8*	*6.4*	*7.3*	*8.5*
10	19	21	24	31
273.0	*5.8*	*6.4*	*7.3*	*9.4*
12	23	21	30	33
323.9	*7.0*	*6.4*	*9.1*	*10.1*
14	23	21	30	33
355.6	*7.0*	*6.4*	*9.1*	*10.1*
16	27	21	35	33
406.4	*8.2*	*6.4*	*10.7*	*10.1*
18	27	21	35	33
457.2	*8.2*	*6.4*	*10.7*	*10.1*
20	30	21	39	33
508.0	*9.1*	*6.4*	*11.9*	*10.1*
24	32	21	42	33
609.6	*9.8*	*6.4*	*12.8*	*10.1*

Rotational Movement

Grinnell® Flexible Couplings are suitable for use in seismic as well as mining 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 and to increase pipe life in slurry applications.

For mining applications where the pipe needs to be rotated, the system should be depressurized. The pipe couplings bolts/nuts can be loosened, pipe rotated and the bolts/nuts re-tightened and the system be put back in service.

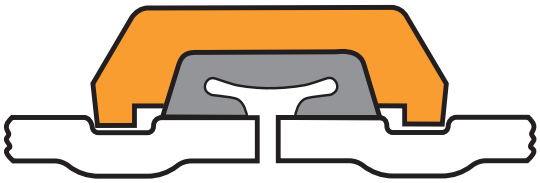


Even distribution of pipe wear can be achieved with this method on the inner service of the pipe.

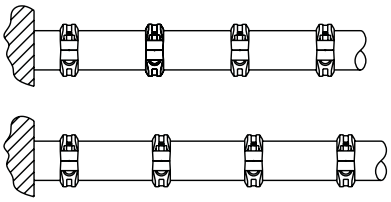
Note: Precautions are necessary to monitor pipe wall thickness to evaluate pressure capability of the pipe with reduced wall.

Linear Movement

Flexible couplings are designed with the Couplings Keys engaging the pipe without gripping on the bottom of the groove while still providing for a restrained mechanical joint.



The inherent flexibility of the coupling must be considered when deciding on support arrangements for the piping system as movement can occur in more than one plane (linear movement, angular deflection and rotational movement).

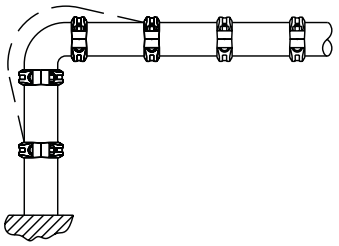


Upon system pressurization, each pipe end within the flexible couplings will expand to the maximum published value. The coupling keys make contact with the face of the groove and restrain the joint. In piping systems, this movement will be accumulative.

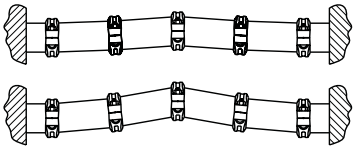
DESIGN DATA

Angular Movement

System movement can be accommodated by providing for sufficient offset lengths. Temperature increases/decreases can further increase this movement.

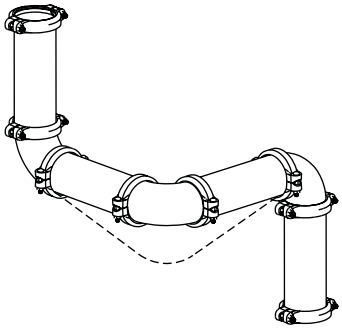


When systems are anchored with partially deflected joints, the system can move to the fully deflected condition upon pressurization resulting in the "snaking" of the piping system. Lightweight hangers may not be suitable to prevent the lateral motion.



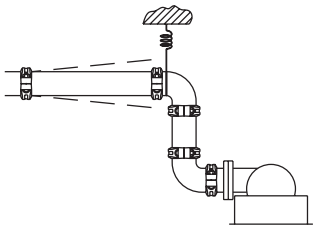
Pipe Support

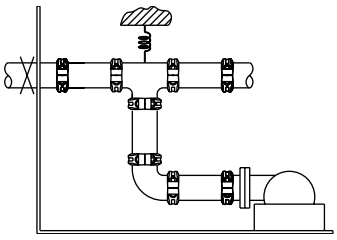
Pipe hanger positioning is important when considering pipe "sagging" due to the flexible nature of the piping system. Proper positioning of hangers near the elbow, for example, should be considered.

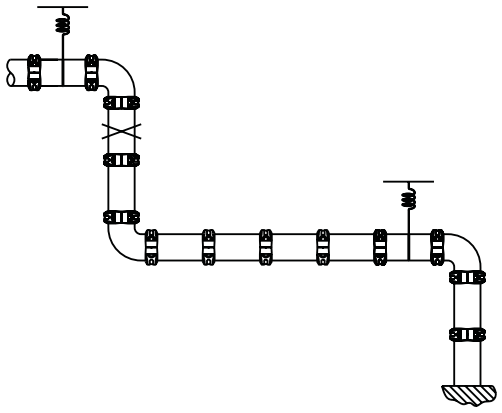


The use of spring hangers or other methods can be considered to accommodate vibrations. Base supports, pressure thrust anchors and pipe offsets can be used to direct pipe movement.

The use of rigid couplings can be considered to reduce the movement available with flexible couplings. Consideration to other methods of accommodation of pipe movements may be required.



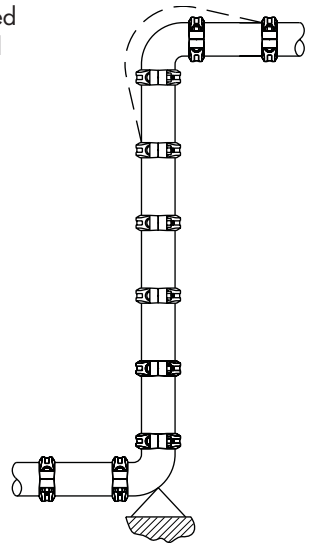


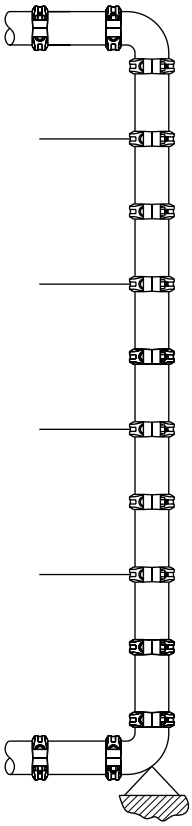


DESIGN DATA

Vertical Piping

Risers comprised of rigid couplings can be considered 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, for example, at the top. Offsets may be necessary.

Should the riser contain branch connections, the movement which occurs at these locations with flexible couplings will also need to be considered.

One solution would be to anchor the vertical piping at appropriate locations to prevent movement which can cause stresses at the branches or equipment. The use of rigid couplings can be an advantage.

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 depressurizing and draining the system. Material and gasket selection should be verified to be compatible for the specific application.

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Challenges From "Design to Build"...

Are you experiencing any of these issues with your Mechanical Equipment Room design or installations?

- There is not enough room to easily fit all the pumps, piping and equipment.
- Your material costs are too high.
- Your installation costs are too high and you're losing profit.
- You often run into unexpected interferences on the job.
- You simply don't have enough designers to complete the work you bid on.
- Project life cycles are becoming shorter and you're working on a very tight deadline.

If so, Grinnell Mechanical Services can help.

How We Can Help...

Grinnell Mechanical Services provides engineers and contractors with a complete piping solution for the "Design to Build" process. Our technical experts will give you an honest assessment of your project illustrating labor and material cost comparisons, creating a virtual model of the piping systems and identifying any potential interferences or more efficient pipe routing opportunities that may occur. We tag and ship the items directly to your job site to reduce your handling costs and work with you to support the products you've installed.

Grinnell Mechanical Services Provides You:

- 3D Modeling of Pump Assemblies and Equipment Connections
- Technical Support
- Thermal Pipe Movement Analysis
- Estimating, Cost Comparisons and 3D Computer Modeling
- Installed Cost Analysis
- Grinnell Product CAD Blocks
- Shop Drawing Packages

GRINNELL MECHANICAL SERVICES

SUPERIOR TECHNICAL SUPPORT

Integrated into Tyco Fire & Building Products' world-class Research & Development facility in Rhode Island, Grinnell Mechanical Services gives you access directly to the individuals who design, test and build our products everyday. Simply call our toll-free number and we will be glad to help you out.

THERMAL PIPE MOVEMENT ANALYSIS

Through our Thermal Pipe Movement Analysis, we guide and educate specifiers and installers on the various installation methods for the proper use of grooved couplings, fittings, and thermal expansion compensation in piping systems.

We will provide you with an honest assessment of your systems, and offer cost-effective solutions to the design to save you hours of rework and modifications to meet the performance requirements for the project.

DECREASING COSTS: INSTALLATION AND MATERIAL HANDLING

Pump Cost Comparisons

Using a 3D computer-generated pump assembly, we develop an itemized "Bill of Materials" with tagged components. We will then provide you with a cost comparison of your project using welded/flanged components versus grooved components, taking into account, gauge connections, vibration isolators, pipe lengths and header clearances.

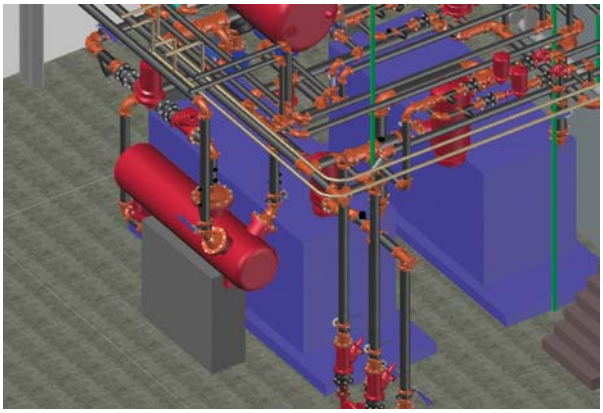
Our 3D service is often used for estimating, submittals, purchasing and field assembly processes, thus reducing costs and job delivery time. All Grinnell grooved components selected for the job can be crated together and tagged for delivery directly to the job site – further reducing material handling costs and improving your profitability.

Installed Cost Analysis

Labor is often the most expensive portion of a mechanical installation. You can reduce the labor costs using grooved joining methods instead of traditional time-consuming and dangerous welding/soldering techniques.

Using MCAA estimated man-hour data and our Bill of Materials, we can compare the cost savings of grooved piping solutions with traditional welded/flanged joining methods. During the process, our technical experts also work to reduce your costs by reviewing the plans and specifications for design redundancies and document conflicts.

The final summary sheet itemizes the costs by categories and details dollar and man-hour saving estimates, detailing the savings for you.



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SHORT ON RESOURCES AND TIME?

The best defense is a good offense. Making sure your projects are planned appropriately from the start will save you time and money and prevent on-site rework. Grinnell Mechanical Services can help you design your projects when you're short on time or resources, and make sure that your HVAC solution will fit in the space it is allotted.

SHOP DRAWING PACKAGE

Our Shop Drawing Package gives you a 3D model of the Mechanical Equipment Room in your HVAC project. Utilizing state-of-the-art 3D CAD software, we virtually assemble the pipes, valves, fittings, and equipment blocks in the room. The piping plan, flow diagram, mechanical details, and specifications are continuously cross-referenced throughout this process. By working in the virtual environment, we identify interferences before they actually happen. Our designers check for valve redundancies, document conflicts, fitting reductions and other cost reducing opportunities. By generating fully dimensioned piping plans and elevations with references to the actual building structure, we can provide exact cut lengths of pipe with a minimum of field cutting and fitting, simplifying the installation process. We will work to give you the most cost effective and efficient piping solution possible.

SITE SURVEYS

For those looking to get ahead on a project with limited internal resources, our staff is available to perform Site Surveys. We will take actual site measurements of existing structures and develop them into accurate shop drawings, putting you and the material on site and on time.

MECHANICAL SERVICES

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- Check & Verify Overall Piping Arrangement
- Check for Interferences
- Check for Design Redundancies
- Check for Cost Reduction Opportunities
- Check Material & Equipment Compatibility
- Check for Document Conflicts
- Site Survey Measurement & Check (OPTIONAL)

Most Cost Effective & Efficient Design.

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LIMITED WARRANTY

Products manufactured by TFBP are warranted solely to the original Buyer for **ten (10) years** against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire & Building Products or for products and components which have been subject to misuse, improper installation, corrosion, or other external sources of damage or which have not been installed, maintained, modified or repaired in accordance with TFBP's installation instructions. Materials found by TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP shall not be responsible for mechanical and/or sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

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