

February 2010

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GRUVLOK[®]

Mechanical Piping Products

B U I L D I N G C O N N E C T I O N S T H A T L A S T



BUILDING CONNECTIONS THAT LAST



For over 150 years, Anvil has worked diligently to build a strong, vibrant tradition of making connections — from pipe to pipe and people to people.

We pride ourselves in providing the finest-quality pipe products and services with integrity and dedication to superior customer service at all levels.



We provide expertise and product solutions for a wide range of applications, from plumbing, mechanical, HVAC, industrial and fire protection to mining, oil and gas. Our comprehensive line of products includes: grooved pipe couplings, grooved and plain-end fittings, valves, cast and malleable iron fittings, forged steel fittings, steel pipe nipples and couplings, pipe hangers and supports, channel and strut fittings, mining and oil field fittings, along with much more.

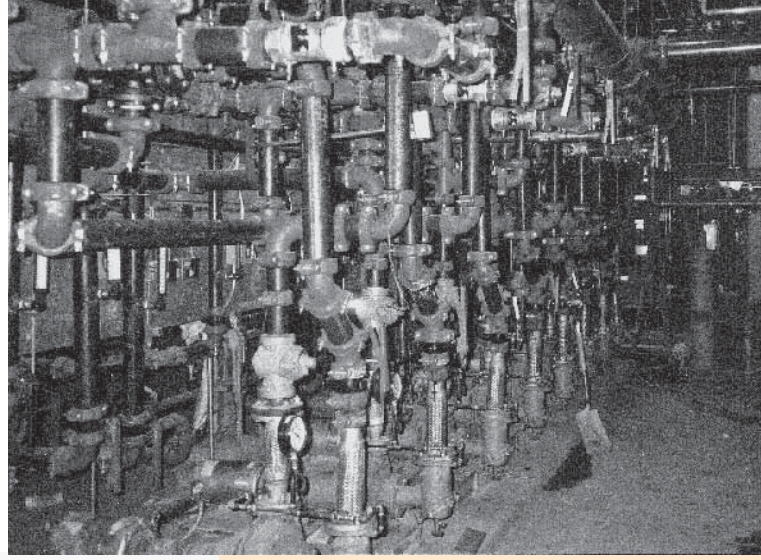


As an additional benefit to our customers, Anvil offers a complete and comprehensive Design Services Analysis for mechanical equipment rooms, to help you determine the most effective and cost-efficient piping solutions.

At Anvil, we believe that responsive and accessible customer support is what makes the difference between simply delivering products — and delivering solutions.



Mechanical Piping Products



Durable. Flexible. Safe. Easy to install. Easy to maintain. That's Anvil's Gruvlok® product line. Gruvlok gives your building the toughest, simplest, and most adaptable piping system possible.

Through a combination of roll-grooving and two-bolt coupling design, this innovative product line joins piping and other components into a single rugged yet flexible system. This makes Gruvlok products ideal for a variety of applications — particularly in tight spaces such as subfloors, UFAD systems, crawlspaces, trenches, and tunnels.

Gruvlok products eliminate the need for traditional expansion joints, allowing your system to expand and contract with your needs. With a Gruvlok union at every joint, you have the freedom to make on-site tweaks without altering the overall design of your system.

Maintenance is as simple and flexible as installation. Every component in a Gruvlok system is easily replaceable and easily accessed, so that you can make repairs without resorting to a total shut-down.

New 3-D CAD Library



Anvil's Gruvlok product line is now available in 3-D CAD Models, as well as the standard 2-D drawings, at www.anvilintl.com. Anvil also offers downloadable Master Format 3 Part Specifications.

Building Green with Anvil

Anvil manufactures an extensive line of products composed of 90% recycled materials, visit www.anvilintl.com for current certificates related to recycled material.

Products include:

- Gruvlok® Couplings, Fittings, and Flanges
- Anvil® Cast and Malleable Threaded Fittings
- Anvil Cast Iron Flanged Fittings
- Anvil Pipe Hangers and Supports
- Merit® Tee-Lets and Drop Nipples
- Beck Welded Pipe Nipples

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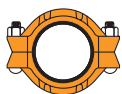
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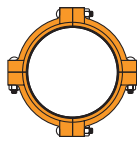
COUPLINGS

Fig. 7001 Pages 18-19

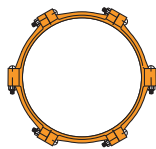
Standard Coupling



Size Range: 1" - 14"



Size Range: 16" - 24"



Size Range: 28" - 30"

Fig. 7011 Pages 20-21

Standard Coupling
Size 30"

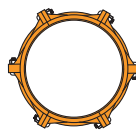


Fig. 7400 Pages 26-27

300 PSI Rigidlite® Coupling
Size Range: 1" - 8"

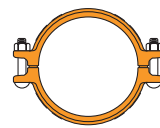


Fig. 7000 Pages 24-25

Lightweight Coupling
Size Range: 1" - 8"

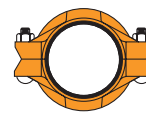
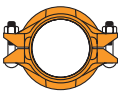
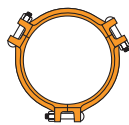


Fig. 7401 Pages 22-23

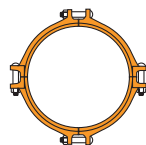
Rigidlok® Coupling



Size Range: 1½" - 14"



Size Range: 16"



Size Range: 18" - 24"

Fig. 7003 Pages 28-29

Hingelok® Coupling
Size Range: 1" - 4" and
5" - 8"

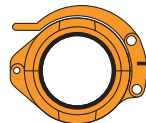


Fig. 7010 Pages 30-31

Reducing Coupling
Size Range: 2" x 1½" thru
8" x 6"

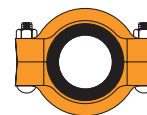


Fig. 7013 Pages 35-37

Gruvlok Flanges
(#300 Flange)
Size Range: 2" - 12"

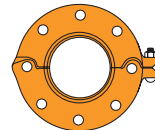
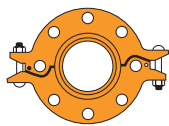
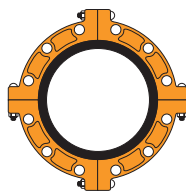


Fig. 7012 Pages 32-34

Gruvlok Flanges



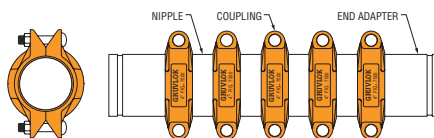
Size Range: 2" - 12"



Size Range: 14" - 24"

Fig. 7240 Pages 38-39

Expansion Joints
Size Range: 2" - 12"



BRANCH OUTLETS

Fig. 7042 Pages 40-41

Outlet Coupling
Size Range: 1½" - 6"

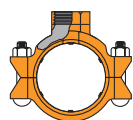


Fig. 7042F
Female IPS Outlet

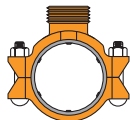


Fig. 7042M
Male IPS Outlet

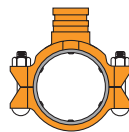
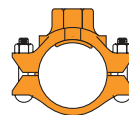


Fig. 7042G
Grooved Outlet

Fig. 7045 Pages 42-44

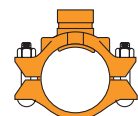


Clamp-T, FPT Branch
Size Range: 3" x 1¼" thru
8" x 4"

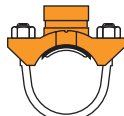


(U-Bolt)
Size Range: 2½" x ½" thru
4" x 1"

Fig. 7046 Pages 45-46



Clamp-T, Grooved Branch
Size Range: 3" x 1¼" thru
8" x 4"



(U-Bolt)
Size Range: 2½" x 1¼" thru
2½" x 1½"

Fig. 7047, Fig. 7048 & Fig. 7049 Page 47

Clamp-T Cross
Size Range: 2" x ½" thru 8" x 4"

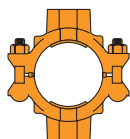


Fig. 7047
Thread x Thread

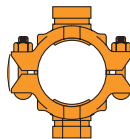


Fig. 7048
Groove x Groove

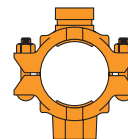


Fig. 7049
Groove x Thread

GROOVED FITTINGS

Fig. 7050 Page 49

90° Elbow
Size Range: 1" - 24"



Fig. 7063 Page 51

Tee with Threaded Branch
Size Range: 1" - 12"

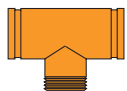


Fig. 7073 & Fig. 7097 Page 53

Eccentric Reducers
Size Range: 1 1/4" x 1" thru 24" x 20"



Fig. 7073
Groove x Groove



Fig. 7097
Groove x Thread

Fig. 7071 Page 56

True Wye
Size Range: 1" - 24"

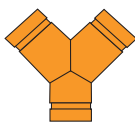


Fig. 7050RF Page 58

Reducing Base
Support Elbow
Groove x 150# Flange (GxP)
Size Range: 6" x 4" thru
12" x 10"



Fig. 7086 Page 60

Groove x Hose Nipple
Size Range: 1" - 12"



Fig. 7051 Page 49

45° Elbow
Size Range: 1" - 24"



Fig. 7061 Page 51

Reducing Tee Standard
Size Range: 1 1/4" x 1 1/4" x 1"
thru 24" x 24" x 20"

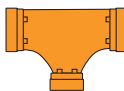


Fig. 7052 Page 49

22 1/2° Elbow
Size Range: 1" - 24"



Fig. 7064 Page 52

Reducing Tee with
Threaded Branch
Size Range: 2" x 2" x 3/4"
thru 24" x 24" x 12"

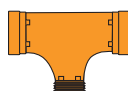


Fig. 7077, 7087 & 7079 Page 54

Swaged Nipples
Size Range: 2" x 1" thru 6" x 5"



Fig. 7077
Groove x Groove



Fig. 7078
Groove x Thread



Fig. 7079
Groove x Bevel

Fig. 7067 Page 56

Reducing Tee Wye
Size Range: 4" x 3" x 3"
thru 8" x 6" x 8"

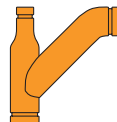


Fig. 7085 Page 58

Groove x Class 300
Flange Nipple
Size Range: 3" - 8"

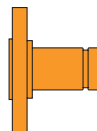


Fig. 7062 Page 61

Bullhead Tee Specialty Tees
(Gr x Gr x FPT)
Size Range: 5" x 5" x 8"
thru 6" x 6" x 8"



Fig. 7053 Page 49

11 1/4° Elbow
Size Range: 1" - 24"



Fig. 7060 Page 52

Tee
Size Range: 1" - 24"

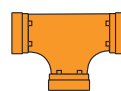


Fig. 7087 Page 57

Female Thread Adapter
Size Range: 1" - 4"



Fig. 7074 Page 59

Cap
Size Range: 1 1/4" - 24"



Fig. 7050DR Page 61

90° Drain Elbow
Size Range: 1 1/4" - 12"



Fig. 7050LR Page 50

90° Long Radius Elbow
Size Range: 1" - 24"



Fig. 7076 Page 53

Gr x Thd Concentric Reducer
Size Range: 1 1/2" x 1" thru
6" x 5"



Fig. 7069 Page 55

45° Lateral
Size Range: 1" - 24"



Fig. 7055 Page 57

90° Adapter Elbow
Size Range: 1" - 6"



Fig. 7075 Page 59

Bull Plug
Size Range: 2" - 6"



Fig. 7450 Page 62

90° Short Pattern Elbow
Size Range: 2" - 8"



Fig. 7051LR Page 50

45° Long Radius Elbow
Size Range: 1" - 24"



Fig. 7072 Page 54

Gr x Gr Concentric Reducer
Size Range: 1 1/4" - 1" thru
24" x 20"



Fig. 7070 Page 55

45° Reducing Lateral
Size Range: 3" x 3" x 2"
thru 24" x 24" x 20"



Fig. 7056 Page 57

45° Adapter Elbow
Size Range: 1" - 6"



Fig. 7068 Page 59

Cross
Size Range: 1" - 24"

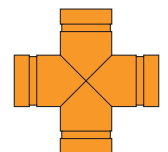
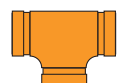


Fig. 7460 Page 62

Short Pattern Tee
Size Range: 2" - 8"



GROOVED FITTINGS

Fig. 7050-3D Page 63

Long Radius Elbows
Size Range: 2" - 24"

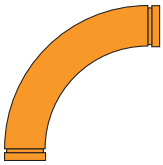


Fig. 7050-3D
90° Elbow

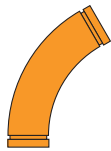


Fig. 7057-3D
60° Elbow



Fig. 7051-3D
45° Elbow



Fig. 7058-3D
30° Elbow



Fig. 7052-3D
22 1/2° Elbow



Fig. 7053-3D
11 1/4° Elbow

Fig. 7050-5D Page 64

Long Radius Elbows
Size Range: 2" - 24"

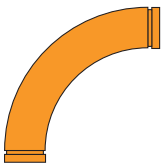


Fig. 7050-5D
90° Elbow

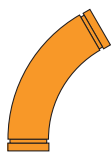


Fig. 7057-5D
60° Elbow



Fig. 7051-5D
45° Elbow



Fig. 7058-5D
30° Elbow



Fig. 7052-5D
22 1/2° Elbow



Fig. 7053-5D
11 1/4° Elbow

Fig. 7050-6D Page 65

Long Radius Elbows
Size Range: 2" - 24"

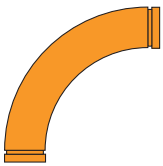


Fig. 7050-6D
90° Elbow

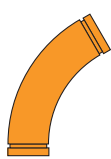


Fig. 7057-6D
60° Elbow



Fig. 7051-6D
45° Elbow



Fig. 7058-6D
30° Elbow



Fig. 7052-6D
22 1/2° Elbow



Fig. 7053-6D
11 1/4° Elbow

**Fig. 7080,
Fig. 7081 &
Fig. 7082** Page 60

Nipples
Size Range: 1" - 12"



Fig. 7080
Groove x Groove



Fig. 7081
Groove x MPT

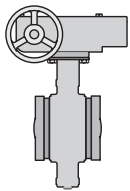


Fig. 7082
Groove x Bevel

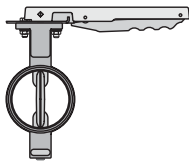
VALVES & ACCESSORIES

Series 7700 Pages 66-70

Butterfly Valve
Size Range: 2" - 12"



AN-7722-3
Series 7700
Butterfly Valve
with Gear Operator



AN-7721-3
Series 7700
Butterfly Valve
with 10 Position Lever Lock

Series 7600

Page 71

Butterfly Valve
Size Range: 2" - 6"

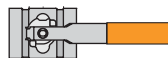
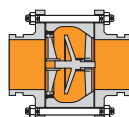


Fig. 400G Page 79

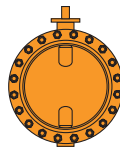
Grooved-End
Silent Check Valve
Size Range: 2" - 10"



Series 8000GR

Pages 72-74

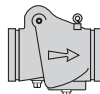
Butterfly Valve
Size Range: 14" - 24"



Series 7800

Pages 80-82

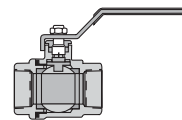
Check Valves
for use in Grooved-End
Piping Systems
Size Range: 2" - 12"



Series 171 Pages 75-76

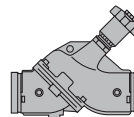
Brass Ball Valve

141S - Size Range: 1/2" - 2"
171N - Size Range: 1/4" - 4"
171S - Size Range: 1/2" - 4"



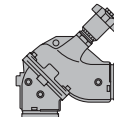
GBV-G Page 83

Balancing Valve
Ductile Iron, Grooved-
End Straight
Size Range: 2 1/2" - 12"



GBV-A Page 84

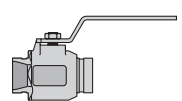
Balancing Valve
Ductile Iron, Grooved-
End Angle
Size Range: 2 1/2" - 12"



Series 7500

Pages 77-78

Ball Valve
Size Range: 2" - 6"



GBV-S & GBV-T

Page 85

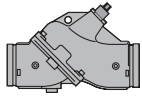
Globe Valves
Cast Bronze, Solder (GBV-S)
Cast Bronze, Threaded (GBV-T)
Size Range: 1/2" - 2"



VALVES & ACCESSORIES

FTV-S Pages 86-87

Tri-Service Valve (Straight)
Size Range: 2½" - 12"



FTV-A Pages 86-87

Tri-Service Valve
(Angle Body)
Size Range: 2½" - 12"

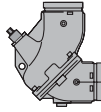


Fig. 7260 Pages 88-89

Gruvlok Tee Strainer
Size Range: 2" - 18"



Model 758G Page 90

Grooved-End
"Wye" Strainer
Size Range: 2" - 12"



Model 768G Page 91

Grooved-End
"Wye" Strainer
Size Range: 2" - 12"

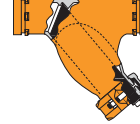
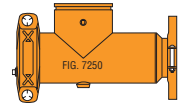


Fig. 7250 Pages 92-93

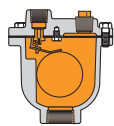
Suction Diffuser
Size Range: 2½" x 2½"
thru 16" x 14"



Model GAV-15

Page 94

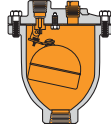
Automatic Air Vent
for Ultimate Performance
Size Range: ½" - 1"



Model GAV-30

Page 95

Automatic Air Vent
for Ultimate Performance
Size Range: ½" - ¾"



AnvilFlex™ AF21 Series Pages 96-99

Flex Connectors
Size Range: 2" - 12"



Fig. AF21-GG
Grooved Ends



Fig. AF21-GF
Grooved x Class
150 Flanged



Fig. AF21-FF
Class 150 Flanged x
Class 150 Flanged



Fig. AF21-RFF
Reducing Class 150
Flanged x
Class 150 Flanged



Fig. AF21-RGF
Reducing Grooved x
Class 150 Flanged

HIGH PRESSURE SYSTEMS

Fig. 7004 HPR®

Pages 100-101

Coupling
Size Range: 2" - 12"

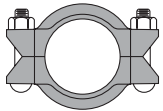


Fig. 7004 EG®

Pages 102-103

End Guard® Coupling
Size Range: 2" - 12"

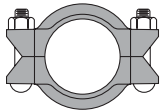


Fig. 7050 EG

Page 104

High Pressure 90° LR
Elbow
Size Range: 2" - 12"

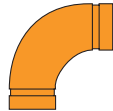


Fig. 7051 EG

Page 104

High Pressure 45° LR
Elbow
Size Range: 2" - 6"



Fig. 7022 EG

Page 105

High Pressure Header
Tee
Size: 2"

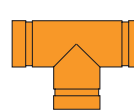


Fig. 7060 EG

Page 105

High Pressure Tee
Size Range: 2" - 6"

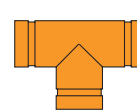
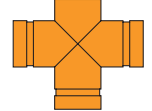


Fig. 7068 EG

Page 105

High Pressure Cross
Size Range: 2" - 6"



ADVANCED COPPER METHOD (IPS)

Fig. 7400 Page 107

Rigidlite® Coupling
Size Range: 2" - 8"

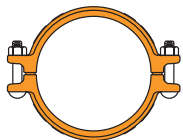


Fig. 7012 Pages 108-109

Gruvlok Flanges for
Gruvlok Advanced Copper
Method
Size Range: 2" - 8"



Fig. 7550 Page 110

90° Elbow
Size Range: 2" - 8"



Fig. 7551 Page 110

45° Elbow
Size Range: 2" - 8"



Fig. 7560 Page 110

Tees
Size Range: 2" - 8"

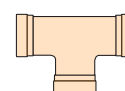


Fig. 7572 Page 111

Concentric Reducer (Gr x Gr)
Size Range: 2½" x 2" thru
6" x 5"

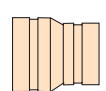


Fig. 7574 Page 111

End Caps
Size Range: 2" - 8"



Fig. 7561A Page 111

Reducing Tee (Gr x Gr x Gr)
Size Range: 2½" x 2½" x 2"
thru 8" x 8" x 6"

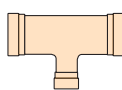


Fig. 7564A Page 112

Reducing Tee (Gr x Gr x Cup)
Size Range: 2" x 2" x ¾"
thru 4" x 4" x 2"

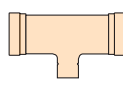


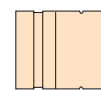
Fig. 7575 Page 112

Reducing Adapter (Gr x Cup)
Size Range: 2" x 1" thru
4" x 2"



Fig. 7582 Page 112

Transition Fitting
Size Range: 2" - 6"



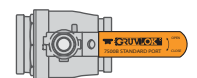
Series 7500B

Pages 113-115

Grooved-End Bronze Ball
Valve



Full Port
Size Range: 1½" - 3"



Standard Port
Size: 4"

CTS COPPER SYSTEM

Fig. 6400 Page 117

Rigid Coupling
Size Range: 2" - 8"

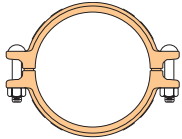


Fig. 6074 Page 118

End Caps
Size Range: 2" - 6"



Fig. 6050 Page 118

90° Elbow
Size Range: 2" - 8"



Fig. 6072 Page 120

Concentric Reducer (Gr x Gr)
Size Range: 2 1/2" x 2" thru
8" x 6"



Fig. 6051 Page 118

45° Elbow
Size Range: 2" - 8"



Fig. 6075 Page 120

Reducing Adapter (Gr x Cup)
Size Range: 2" x 1" thru
4" x 2"

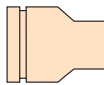


Fig. 6060 Page 118

Tees
Size Range: 2" - 8"

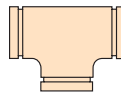


Fig. 6084 Page 120

Flange Adapter
Size Range: 2" - 6"

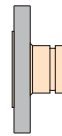


Fig. 6061 Page 119

Reducing Tee (Gr x Gr x Gr)
Size Range: 2 1/2" x 2 1/2" x 2"
thru 6" x 6" x 5"

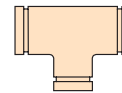
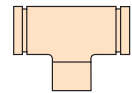


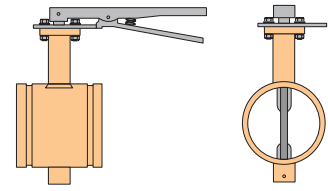
Fig. 6064 Page 119

Reducing Tee (Gr x Gr x Cup)
Size Range: 2" x 2" x 3/4"
thru 4" x 4" x 1 1/2"



Butterfly Valve Page 121

Size Range: 2 1/2" - 6"



DI-LOK® NIPPLE

Fig. 7088, Fig. 7089 & Fig. 7090 Page 123

Gruvlok DI-LOK® Nipple Di-Electric Pipe Connection
Size Range: 3/4" - 6"



Fig. 7088
Groove x Thread



Fig. 7089
Groove x Groove



Fig. 7090
Thread x Thread

Fig. 7068P Page 126

Cross
Size Range: 2" - 8"



Fig. 7075P Page 127

Bull Plug
Size Range: 2" - 8"



Fig. 7069P Page 126

45° Lateral
Size Range: 2" - 8"



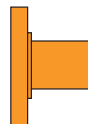
Fig. 7071P Page 126

90° True Wye
Size Range: 2" - 8"



Fig. 7084P & Fig. 7085P Page 127

Flange Nipples
Plain-End x Class 150
Size Range: 2" - 8"
Plain-End x Class 300
Size Range: 2" - 8"



PLAIN-END FITTINGS

Fig. 7005 Page 124

Roughneck® Coupling
Size Range: 2" - 16"

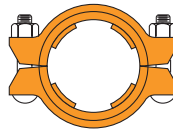


Fig. 7050P, Fig. 7051P & Fig. 7060P Page 125

Gruvlok Plain-End Fittings
Size Range: 2" - 8"



Fig. 7050P
90° Elbow



Fig. 7051P
45° Elbow

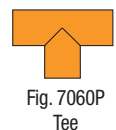


Fig. 7060P
Tee

Fig. 7061P Page 126

Reducing Tee
Size Range: 3" x 3" x 2"
thru 12" x 12" x 10"

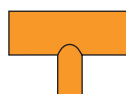


Fig. 7050LRP
Page 126

90° LR Elbow
Size Range: 2" - 8"

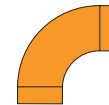


Fig. 7051LRP
Page 127

45° LR Elbow
Size Range: 2" - 8"



Fig. 7080P, Fig. 7081P & Fig. 7082P Page 128

Adapter Nipples
Size Range: 2" - 8"



Fig. 7080P
Plain x Groove



Fig. 7081P
Plain x Thread



Fig. 7082P
Plain x Bevel

Fig. 7077P Page 128

Swaged Nipple
Size Range: 2 1/2" x 2" thru
8" x 6"



HDPE COUPLINGS

Fig. 7305 Pages 129-130

HDPE Coupling
Size Range: 2" - 12"

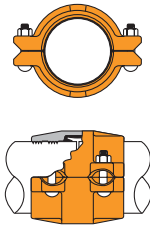


Fig. 7307 Pages 131-132

HDPE Transition Coupling
Size Range: 2" - 12"

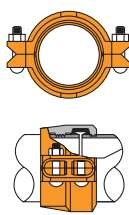
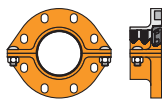


Fig. 7312 Pages 133-134

HDPE Flange Adapter
Size Range: 4" - 8"



SOCK-IT® METHOD

Fig. 7100 Page 135

90° Elbow
(Sock-It x Sock-It)
Size Range: 1" - 2"



Fig. 7105 Page 137

Reducing Outlet Tee
(Sock-It x Sock-It x NPT)
Size Range: 1" x 1" x 1/2"
thru 2 1/2" x 2 1/2" x 1"

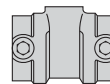


Fig. 7101 Page 136

90° Reducing Elbow
(Sock-It x NPT)
Size Range: 1" x 1/2" thru
1 1/2" x 1"

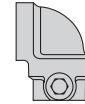


Fig. 7106 Page 137

Reducing Tee
(Sock-It x Sock-It x NPT)
Size Range: 1 1/4" x 1" x 1/2"
thru 2 x 1 1/2" x 1"

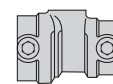


Fig. 7103 Page 136

Straight Tee
(Sock-It x Sock-It x Sock-It)
Size Range: 1" - 2"

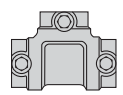
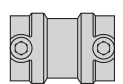


Fig. 7107 Page 136

Coupling
(Sock-It x Sock-It)
Size Range: 1" - 2"



STAINLESS STEEL METHOD

Fig. 7400SS Page 138

Rigidlite® Coupling
Size Range: 1 1/4" - 8"

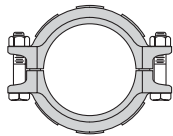
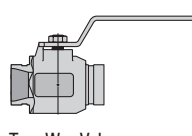
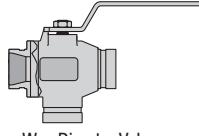


Fig. 7500SS Pages 144-145

Grooved-End Ball Valve
Size Range: 2" - 6"



Two-Way Valve



Three-Way Diverter Valve

SS TYPE 304 FITTINGS

Fig. 7074-SS04

Page 140

Stainless Steel Cap
Size Range: 1 1/4" - 12"



Fig. 7050-SS04

Page 140

90° Stainless Steel Elbow
Size Range: 1 1/4" - 12"

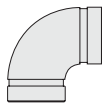


Fig. 7051-SS04

Page 140

45° Stainless Steel Elbow
Size Range: 1 1/4" - 12"

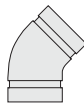


Fig. 7060-SS04

Page 140

Stainless Steel Tee
Size Range: 1 1/4" - 12"

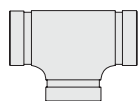


Fig. 7061-SS04

Page 141

Stainless Steel Reducing Tee
Size Range: 1 1/2" x 1 1/4"
thru 12" x 10"

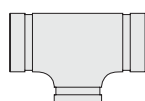


Fig. 7072-SS04

Page 141

Stainless Steel Concentric Reducer
Size Range: 1 1/2" x 1 1/4"
thru 12" x 10"



SS TYPE 316 FITTINGS

Fig. 7074SS

Page 142

Stainless Steel Cap
Size Range: 1 1/4" - 12"



Fig. 7050SS

Page 142

90° Stainless Steel Elbow
Size Range:
1 1/4" - 12"

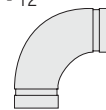


Fig. 7051SS

Page 142

45° Stainless Steel Elbow
Size Range:
1 1/4" - 12"



Fig. 7060SS

Page 142

Stainless Steel Tee
Size Range:
1 1/4" - 12"

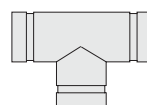


Fig. 7061SS

Page 143

Stainless Steel Reducing Tee
Size Range: 1 1/2" x 1 1/2" x 3/4"
thru 8" x 8" x 6"

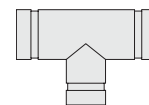


Fig. 7072SS

Page 143

Stainless Steel Concentric Reducer
Size Range: 1 1/2" x 1" thru
8" x 6"



Fig. 7073SS

Page 143

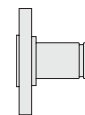
Stainless Steel Eccentric Reducer
Size Range: 1 1/2" x 1" thru
8" x 6"



Fig. 7084SS

Page 143

Stainless Steel Flange Adapter
Size Range: 2" - 12"



ROLL GROOVERS

Gruvlok roll grooving technology is protected by U.S. Patents 5450738, 5570603, 5778715 and others pending.

Model 1007 *Pages 146-147*

Roll Groover
Groover Capability: 2" - 16"



Model 3007 *Pages 146-147*

Roll Groover
Groover Capability: 2" - 16"



Model 3006 & 3006C *Pages 148-149*

Roll Groover
Groover Capability: 2" - 12"



PRODUCTS FOR GROOVED PIPING SYSTEM

The Gruvlok® System has been manufactured since the late 1960's. The Gruvlok product line has grown from standard couplings and fittings to today's extensive range of grooved product, plain-end product, butterfly valves, check valves, pump protection components, pipe preparation tools and various accessories.

Gruvlok is part of our overall commitment to provide today's piping industry with tomorrow's products.



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.



Certified to
ANSI/NSF 61

ISO 9001:2008

INDUSTRY & GOVERNMENT STANDARDS & APPROVALS

ANSI	American National Standards Institute	FAA	Federal Aviation Administration: HVAC, Plumbing, Fire Protection	NY-BSA	New York Board of Standards and Appeals
API	American Petroleum Institute: API Std. 5L, Sect. 7.5	FHA	Federal Housing Administration	NYC	New York City
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers	FM	Factory Mutual Engineering Corp.	TVA	Tennessee Valley Authority: Fire protection, storm drains
ASME	American Society of Mechanical Engineers: Power Piping, B 31.1; Chemical Plant and Petroleum Refinery Piping, B 31.3; Refrigeration Piping, B 31.5; Building Services Piping, B 31.9; Slurry Pipelines, B 31.11	GSA	General Services Administration: 15000 Series	UL	Underwriter's Laboratories, Inc.
ASTM	American Society of Testing and Materials: F 1476, F 1387	IAPMO	International Association of Plumbing & Mechanical Officials	ULC	Underwriter's Laboratories of Canada
AWWA	American Water Works Association: C 606	LLOYD'S	Lloyd's Register of Shipping		Bureau of Marine Inspection: Salt and fresh water, oil transfer
BV	Bureau Veritas	LPC	Loss Prevention Council		Bureau of Public Roads; Div. of Bridges: Drain lines and bridge crossings
CDF	California State Fire Marshal	MEA	Materials & Equipment Acceptance		Canadian Coast Guard
COE	Corps of Engineers: CEGS 15000	MIL	Military Specifications: MILP-10388 Fittings; MIL-C-10387 Couplings; MIL-P-11087A(CE) Steel Pipe, Grooved MIL-I-45208 Inspection Procedure		U.S. Coast Guard –Approves each vessel individually
CSA	Canadian Standards Association: B 242	NASA	National Aeronautics and Space Administration: 15000 Series	USGBC	United States Green Building Council
DNV	Det Norske Veritas Hong Kong Fire Services Board New Zealand Insurance Council New Zealand Building Act. (1991)	NAVFAC	Naval Facilities Engineering Command: NFGS 15000 Series	VA	Veterans Affairs : 15000 Series
		NFPA	National Fire Protection Association	VdS	Verband der Sachversicherer e.V.
		NIH	National Institute of Health (Dept. of Health): 15000 Series		
		NSF	NSF International		

Note: Please refer to product specific pages for exact listings and approvals related to a specific size for a specific product.

GRUVLOK® – THE ENGINEERED COUPLING

HOUSING (A) FLEXIBLE OR RIGID

The Gruvlok Coupling housing is designed to self-center around the pipe. The housing encircles and retains the gasket against the application of internal system pressure or vacuum.

The housing key sections fit into and engage the pipe-end grooves around the entire pipe circumference, thus restraining the pipe ends from separation due to the application of internal pressure.

Flexible Couplings provide designed-in clearances between the housing key sections and the pipe grooves to permit both angular and longitudinal movement of the pipe. Rigid couplings grip the pipe and lock the joint into position.

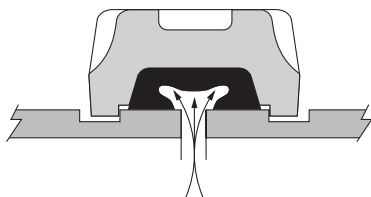
All housings are coated with paint for general service applications. The paint serves to provide protection against normal atmospheric corrosion. However, for couplings used in corrosive environments, hot-dip galvanizing, and stainless steel are available.

GASKET (B)

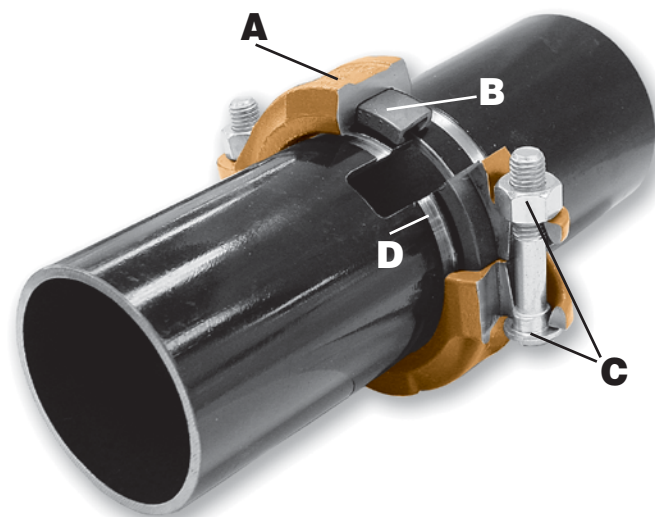
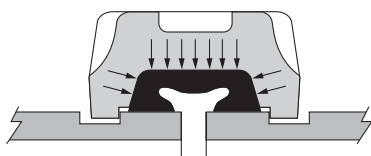
The unique single piece “C” style design of the gasket has been engineered to provide a pressure responsive, leak-tight seal in both pressure and vacuum applications without the aid of external forces. The “lips” of the gasket are molded so that upon installation onto the pipe ends they provide compression against the pipe surface to establish the leak-tight seal.

The gasket cavity functions as a “pressure reservoir”. Pressure within the pipe system is applied to the internal surfaces of the gasket which increases the sealing force and enhances the leak-tight seal. In vacuum systems, non-pressure-responsive seals tend to “lift off” the pipe, producing leak paths. However, the Gruvlok gasket reacts to the negative pressure (higher outside atmospheric pressure) as to improve the sealing capability of the gasket.

Gasket
Reaction
to Pressure



Gasket
Reaction
to Vacuum



BOLTS AND NUTS (C)

Heat treated oval neck track head bolts serve to connect and secure the housing segments together. The oval neck design prevents turning of the bolt while tightening the hex nut with a single wrench. The bolt size and corresponding wrench (or socket) size for the hex nuts are shown in the chart below.

ANSI

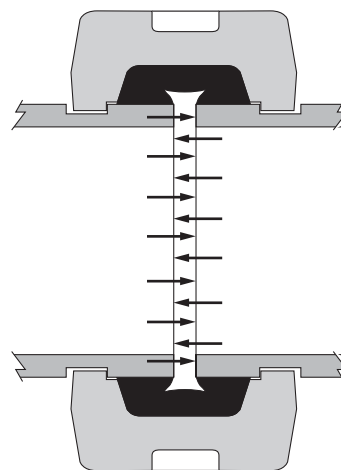
Bolt Size	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$
Wrench Size	$1\frac{1}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{4}$	$1\frac{7}{16}$	$1\frac{5}{8}$	2

METRIC

Bolt Size	M10	M12	M16	M20	M22
Wrench Size	16	22	24	30	34

GROOVED PIPE ENDS (D)

The ends of the pipe must have a groove in them which may be either cut grooved or roll grooved. The grooved pipe ends engage the coupling keys, thus, providing a self-restraining, mechanical joint capable of resisting the separation of the pipe ends due to the application of system pressure. The groove diameters must be dimensionally accurate to obtain the maximum benefit of the Gruvlok Coupling.



THE GRUVLOK® PIPING METHOD

Gruvlok couplings and grooved-end fittings are widely used for joining pipe in a wide variety of piping systems. Gruvlok couplings for grooved-end pipe are designed to provide a self-centering joint which accommodates the application of pressure, vacuum and other external forces, while limiting the burdensome need for special supports, expansion joints, etc.

The Gruvlok piping method offers many mechanical design features which benefit the design engineer, the contractor, and the end user. Utilization of the functional characteristics of the Gruvlok coupling will aid in pipe system design and must be considered for proper installation, assembly and performance.

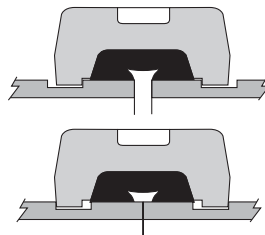
The design factors presented in the Gruvlok technical data section should always be referenced to when designing any grooved piping system to obtain the maximum benefit of the Gruvlok piping method.



GRUVLOK FEATURES

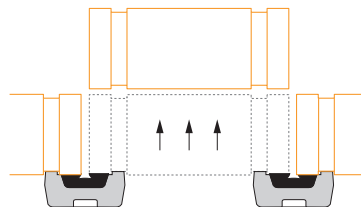
RIGIDITY OR FLEXIBILITY

Couplings are available where rigid connections are required. Couplings with flexible design allow for pipe expansion and contractions with temperature changes. The need for an expansion joint is minimized or eliminated.



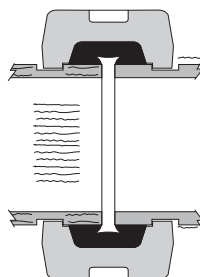
UNION AT EVERY JOINT

Gruvlok couplings can be disassembled easily permitting maintenance and servicing of the piping system. It will facilitate periodic rotation of pipe to distribute internal wear from slurries or other abrasive media.



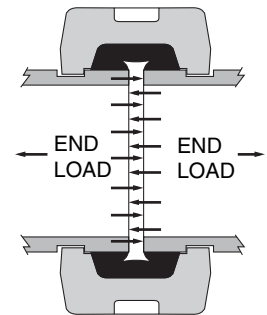
MINIMIZES NOISE & VIBRATION

The resilient elastomeric gasket and pre-designed gap of the Gruvlok coupling help isolate and absorb noise and vibration, this minimizes vibration transmission.



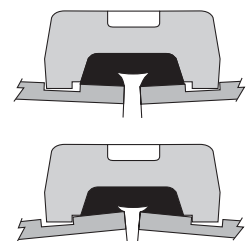
SELF RESTRAINED JOINT

The couplings engage the pipe around the entire circumference and restrain the pipe ends from separation due to pressure and other forces, up to the maximum coupling rated working pressure.



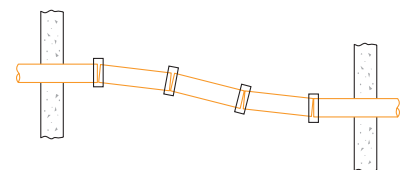
STRESS-FREE SYSTEM

Flexibility designed in the Gruvlok coupling absorbs and eliminates stress from settlement of buried pipe or those induced by seismic tremors.



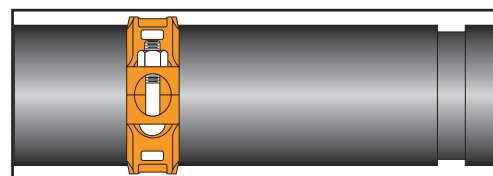
ACCOMMODATES MISALIGNMENT AND JOINT DEFLECTION

The flexibility designed into the Gruvlok coupling will accommodate misalignments caused by imprecise location of pipe opening through walls and floors, will provide pitch for drainage piping systems and facilitate laying pipe on uneven terrain, thus permitting deflection in any direction.



GRUVLOK® COUPLINGS FOR GROOVED-END PIPE

Gruvlok couplings for grooved-end pipe are available in nominal pipe sizes 1" thru 30" and metric sizes. The variety of coupling designs provides a universal means for the connection for pipe, fittings, and pipe system components. The wide assortment of Gruvlok couplings and gaskets permit selection of the most suitable combination for a specific application, thus providing the most versatile and economical pipe system installation.



MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

GRADE "E" EPDM (Green color code) NSF-61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services

GASKET TYPE:

Standard C Style
Flush Gap (1" - 14") (25mm - 350mm)

LUBRICATION:

Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:

Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

COUPLING DATA CHART NOTES

COUPLING DATA CHART NOTES

Nominal Size	O.D.	Max. Work. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from C		Coupling Dimensions			Coupling Bolts		Specified Torque		Approx. Wt. Ea.
					Per Coupling	Per in./ft.	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs/N-m		Lbs./kg

1

2

3

4

5

6

7

8

9

10

- 1** Gruvlok Couplings are identified by either the nominal ANSI pipe size in inches or pipe O.D. in millimeters (see column 2).
- 2** Nominal Outside Diameter of Pipe.
- 3** Maximum line pressure, including surge, to which a joint can be subjected. Working pressure ratings are based on standard wall steel pipe with standard cut or roll grooves in accordance with Gruvlok specifications. For Performance Data on other than standard wall pipe, refer to Technical data section.
NOTE: For one time field test only the maximum joint working pressure may be increased to 1.5 times the figure shown.
- 4** Maximum end load from all interior and/or exterior forces to which the joint can be subjected are based on standard wall steel pipe with standard cut or roll grooves in accordance with Gruvlok specifications.

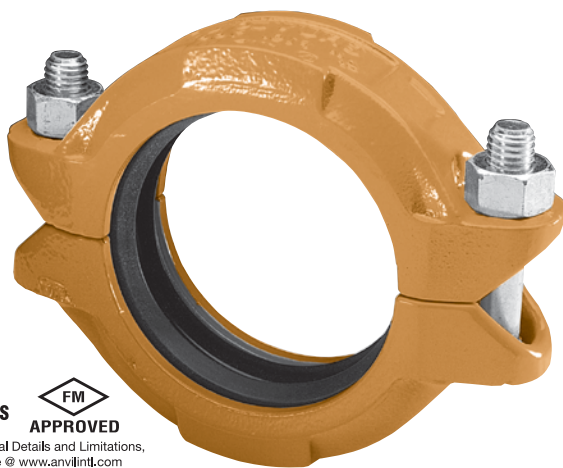
- 5** Range of pipe end separation is the gap between the pipe ends due to assembly.
- 6** Maximum allowable angular deflection of pipe from centerline when using standard cut grooved steel pipe. For details see design factors in Gruvlok Technical data section.
- 7** "X", "Y", and "Z" are external dimensions for reference purposes only.
- 8** The quantity of bolts equals the number of housing segments per coupling.
- 9** Nuts must be tightened alternating and evenly to the specified bolt torque. See individual product installation instructions for additional important information.
- 10** Approximate weight for a fully assembled coupling with gasket, bolts, and nuts.

NOTES

Introduction
Couplings
Outlets
Fittings
Valves & Accessories
High Pressure
Advanced Copper Method (IPS)
CTS Copper System
DI-LOK® Nipples
Plain-End Fittings
HDPE Couplings
Sock-It® Fittings
Stainless Steel Method
Roll Groovers
Installation & Assembly
Special Coatings
Design Services
Technical Data
Master Format 3 Part Specs.
Pictorial Index

FIG. 7001

Standard Coupling



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

The Gruvlok® Fig. 7001 Standard Coupling forms a flexible grooved end pipe joint connection with the versatility for a wide range of applications. Services include mechanical and plumbing, process piping, mining and oil field piping, and many others. The coupling design supplies optimum strength for working pressures to 1000 PSI (69 bar) without excessive casting weight.

The flexible design eases pipe and equipment installation while providing the designed-in benefit of reducing pipeline noise and vibration transmission without the addition of special components. To ease coupling handling and assembly and to assure consistent quality, sizes 1" through 14" couplings have two 180° segment housings, 16" through 24" sizes have four 90° - segment housings while the 28" O.D. and 30" O.D. couplings have six 60° segment housings. The 28" O.D. and 30" O.D. are weld-ring couplings.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style
Flush Gap (1" - 14")
"EG" Style

LUBRICATION:

Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:

Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

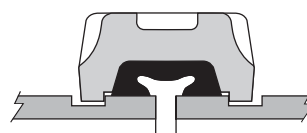


Fig. 7001 with
Standard Gasket

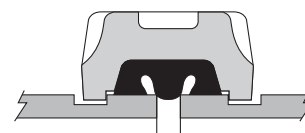
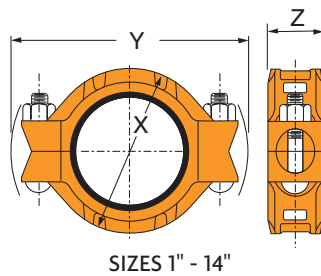


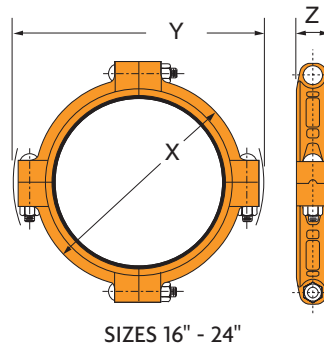
Fig. 7001 with
Flush Gap Gasket
(1" - 14")

FIG. 7001

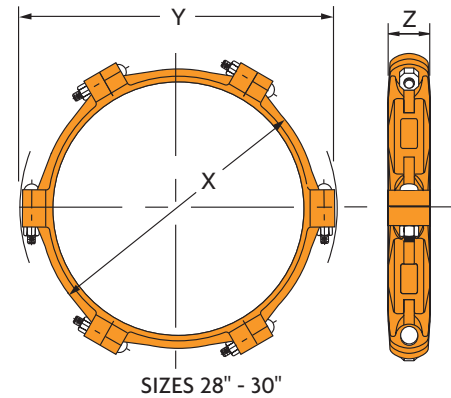
Standard Coupling



SIZES 1" - 14"



SIZES 16" - 24"



SIZES 28" - 30"

FIGURE 7001 STANDARD COUPLING DIMENSIONS

Nominal Size	O.D.	Max. Work. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from C		Coupling Dimensions			Bolt Dimensions*		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	of Pipe.	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	In./ft.-mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs/N-m	Lbs./kN	
1 25	1.315 33.4	1000 68.9	1,358 6.04	0-1/8 0-3.2	5° 26'	1.14 94.7	2 1/2 64	4 1/2 114	1 1/8 48	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.3 0.6
1 1/4 32	1.660 42.2	1000 68.9	2,164 9.63	0-1/8 0-3.2	4° 19'	0.90 75.3	2 3/4 70	4 1/2 114	1 1/8 48	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.4 0.6
1 1/2 40	1.900 48.3	1000 68.9	2,835 12.61	0-1/8 0-3.2	3° 46'	0.79 65.7	3 76	4 5/8 117	1 1/8 48	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.5 0.7
2 50	2.375 60.3	1000 68.9	4,430 19.71	0-1/8 0-3.2	3° 1'	0.63 52.6	3 3/8 92	6 1/8 156	1 1/8 48	2	1/2 x 3 M12 x 76	80 110	100 150	3.1 1.4
2 1/2 65	2.875 73.0	1000 68.9	6,492 28.88	0-1/8 0-3.2	2° 29'	0.52 43.3	4 1/4 108	6 1/2 165	1 1/8 48	2	1/2 x 3 M12 x 76	80 110	100 150	3.7 1.7
3 O.D. 76.1	2.996 76.1	1000 68.9	7,050 31.36	0-1/8 0-3.2	2° 23'	0.50 41.6	4 1/4 108	6 3/4 171	1 1/8 48	2	1/2 x 3 M12 x 76	80 110	100 150	4.3 2.0
3 80	3.500 88.9	1000 68.9	9,621 42.80	0-1/8 0-3.2	2° 3'	0.43 35.8	4 3/8 124	7 1/8 181	1 1/8 48	2	1/2 x 3 M12 x 76	80 110	100 150	4.3 2.0
3 1/2 90	4.000 101.6	1000 68.9	12,566 55.90	0-1/8 0-3.2	1° 48'	0.38 31.4	5 1/4 133	8 1/4 210	1 1/8 48	2	3/8 x 3 1/2 M16 x 89	100 135	130 175	5.1 2.3
4 100	4.500 114.3	1000 68.9	15,904 70.75	0-1/4 0-6.4	3° 11'	0.67 55.5	6 1/4 159	8 3/4 222	2 51	2	3/8 x 3 1/2 M16 x 89	100 135	130 175	6.8 3.1
5 125	5.563 141.3	1000 68.9	24,306 108.12	0-1/4 0-6.4	2° 35'	0.54 45.1	7 1/4 184	11 1/4 286	2 51	2	3/4 x 4 1/2 M20 x 110	130 175	180 245	9.6 4.4
6 1/2 O.D. 165.1	6.500 165.1	1000 68.9	33,183 147.61	0-1/4 0-6.4	2° 12'	0.46 38.4	8 1/4 210	11 1/4 298	2 51	2	3/4 x 4 1/2 M20 x 110	130 175	180 245	11.8 5.4
6 150	6.625 168.3	1000 68.9	34,472 153.34	0-1/4 0-6.4	2° 10'	0.45 37.8	8 3/8 219	11 1/4 298	2 51	2	3/4 x 4 1/2 M20 x 110	130 175	180 245	11.8 5.4
8 200	8.625 219.1	800 55.2	46,741 207.91	0-1/4 0-6.4	1° 40'	0.35 29.1	11 279	14 3/8 365	2 3/8 60	2	7/8 x 5 1/2 M22 x 140	180 245	220 300	21.7 9.8
10 250	10.750 273.0	800 55.2	72,610 322.99	0-1/4 0-6.4	1° 20'	0.28 23.3	13 1/8 333	16 3/8 422	2 3/8 67	2	7/8 x 5 1/2 M22 x 140	180 245	220 300	27.0 12.2
12 300	12.750 323.9	800 55.2	102,141 454.35	0-1/4 0-6.4	1° 7'	0.23 19.5	15 1/2 394	18 3/8 473	2 3/8 67	2	7/8 x 6 M22 x 150	180 245	220 300	35.0 15.9
14 350	14.000 355.6	300 20.7	46,181 205.43	0-1/4 0-6.4	1° 2'	0.22 18.0	16 1/8 410	20 1/2 521	3 76	2	7/8 x 5 1/2 M22 x 140	180 245	220 300	37.0 16.8
16 400	16.000 406.4	300 20.7	60,319 268.31	0-1/4 0-6.4	0° 54'	0.19 15.7	18 1/8 460	22 3/8 581	3 76	4	1 x 4 *	200 -	250 -	50.0 22.7
18 450	18.000 457.2	300 20.7	76,341 339.58	0-1/4 0-6.4	0° 48'	0.17 14.0	21 1/8 537	25 3/8 645	3 1/8 79	4	1 x 4 *	200 -	250 -	72.0 32.7
20 500	20.000 508.0	300 20.7	94,248 419.23	0-1/4 0-6.4	0° 43'	0.15 12.5	23 584	28 3/4 718	3 1/8 79	4	1 1/8 x 4 1/2 *	225 -	275 -	82.0 37.2
24 600	24.000 609.6	300 20.7	135,717 603.70	0-1/4 0-6.4	0° 36'	0.13 10.5	27 686	32 3/8 822	3 1/8 79	4	1 1/8 x 4 1/2 *	225 -	275 -	90.0 40.8
28" O.D. 733.4	28.875 733.4	150 10.3	98,226 436.93	0-1/4 0-6.4	0° 33'	0.12 9.6	33 1/2 851	35 1/2 902	3 1/8 79	6	1 x 5 1/2 *	200 -	250 -	105.0 47.6
30" O.D. 787.4	31.00 787.4	150 10.3	113,215 503.61	0-1/4 0-6.4	0° 28'	0.10 8.1	33 3/4 857	38 1/4 972	3 3/8 92	6	1 x 5 1/2 *	200 -	250 -	137.0 62.1

* Available in ANSI or metric bolt sizes only as indicated.
For additional details see "Coupling Data Chart Notes" on page 16.

§ - For additional Bolt Torque information on page 184.
See Installation & Assembly directions on page 151.
Not for use in copper systems.

FIG. 7011

Standard Coupling



The Gruzlok® Figure 7011 Standard Coupling is a flexible coupling designed to join roll grooved or cut grooved 30" O.D. pipe for a wide range of applications, including Commercial/Industrial Construction, Mining, Process Piping and many others. This coupling's operating temperature ranges from -40°F to 230°F (-40°C to 110°C) with the Grade E EPDM gasket and -20°F to 180°F (-29°C to 82°C) with the Grade T Nitrile gasket. The operating pressure ranges 15" of Hg. vacuum to 300 psig on standard wall steel pipe.

MATERIAL SPECIFICATIONS**HOUSING DESIGN:**

This six-segment coupling's housing is cast in ductile iron per ASTM A 536 Grade 65-45-12. Each housing segment is machined to assure a close dimensional fit with pipe ends that are prepared in accordance with Gruzlok "Large Diameter Roll and Cut Groove Specifications."

GASKET DESIGN:

The gasket design is a "C" Style cross section and features a larger cross section to provide optimal sealing throughout the range of pipe dimensional variations and operating conditions. The gasket is available in EPDM and Nitrile, to facilitate use in a wide range of applications. For Gruzlok gasket material recommendations see the Gruzlok catalog.

BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track bolts of carbon steel conforming to ASTM A 183 Grade 2, with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are zinc plated per ASTM B 633 as standard.

PIPE END PREPARATION:

Pipe grooving is simple, easy and quick. It is critical that the pipe ends be prepared in accordance with the Gruzlok "Large Diameter Roll and Cut Groove Specifications." For roll grooved pipe, grinding the weld seam on the interior and exterior of the pipe may be required. Not performing this operation may result in improper assembly of the coupling, gasket leakage and damage to the roll grooving machine.

FIG. 7011

Standard Coupling

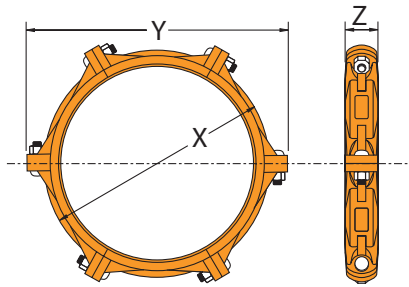


FIGURE 7011 STANDARD COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from $\mathcal{C}$		Coupling Dimensions			Coupling Bolts*		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	Per in./ft.	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m		Lbs./Kg
30 O.D.	30.000	300	212,058	0-3/16	0° 40'	0.14	34	39 1/2	5	6	1 1/4 x 4 3/4	600	800	200
750	762.0	20.7	943.2	0-4.8		11.5	864	1003	127		-	-	-	90.9

Working pressure and end load values are for standard wall pipe.

For additional information see "Coupling Data Chart Notes" from page 16.

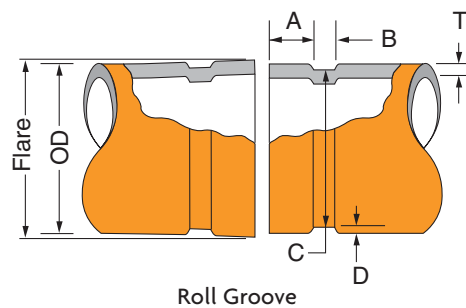
Roll and Cut Grooving Specifications can be found in the technical data section.

See technical data section for design factors.

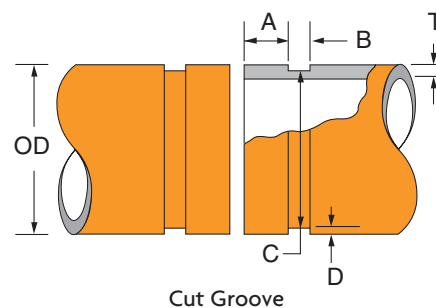
§ - For additional Bolt Torque information see page 184.

* Available in ANSI bolt sizes only as indicated.

See Installation & Assembly directions on page 152.



Roll Groove



Cut Groove

LARGE DIAMETER PIPE ROLL & CUT GROOVE SPECIFICATIONS

Nominal IPS Pipe Size	O.D.			Gasket Seat “A” +.030/- .060 +.77/-1.54	Groove Width “B” ±.030 ±.77	Groove Diameter “C”		Groove Depth “D” (Ref. Only)	Min. Wall Thickness “T”		Max. Flare Dia.
	Actual	Tolerance				Actual	Tol +0.000		Roll Groove	Cut Groove	
		In./mm	+In./mm								
In./DN(mm)	In./mm	+In./mm	-In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm	In./mm	In./mm
30 O.D.	30.000	0.093	0.031	1.750	0.625	29.500	0.063	0.250	0.250	0.625	30.200
750	762.0	2.36	0.79	44.45	15.88	749.30	1.60	6.35	6.35	15.88	767.1

- Pipe O.D. must be within specified dimensions.
- Gasket Seat must be free from scores, seams, chips, rust or other scale, which may interfere with proper sealing of the gasket. Gasket Seat width, dimension A, is to be measured from the pipe end to the vertical flank in the groove.
- Groove width, dimension B, is to be measured between the vertical flank of the grooveside walls.
- Groove depth must be uniform depth around the entire pipe circumference. (Reference column 6.)
- Maximum Flare Diameter is to be measured at the most extreme pipe end.
- **Out of Roundness:** Difference between the maximum and minimum pipe O.D. measured at 90° must not exceed the total pipe O.D. tolerance listed (Reference column 2).

- The maximum allowable tolerance from square cut ends is .125" measured from a true square line.
- Beveled end pipe in conformance with ANSI B16.25 (37 1/2°) is acceptable, however square cut is preferred.

SPECIAL ROLL GROOVING INSTRUCTION:

- Weld seams must be ground flush with the pipe O.D. and I.D. prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

FIG. 7401

Rigidlok® Coupling

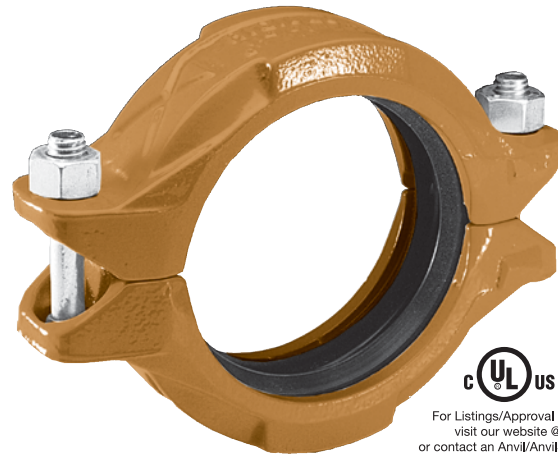
The Fig. 7401 Rigidlok Coupling from Gruvlok provides a rigid, locked in pipe connection. Rigidity is attained simply; it is designed in.

The Fig. 7401 Rigidlok coupling is based on a technologically advanced housing design that conforms to and grips the pipe. With the Fig. 7401 there emerges a new generation of rigid couplings.

Coupling installation is fast and easy, remove only one nut and swing the housing over the gasket and into the grooves. The exclusive Guidelok® feature automatically separates the grooved pipe ends and guides the coupling into position as the bolts are tightened. Precisely sized and oriented tines in the housing key section firmly grip the pipe. The combination of these designed in features produce a secure, rigid pipe joint connection.

This coupling is an ideal connector for service and applications that require a rigid connection.

The Fig. 7401 Rigidlok Coupling is designed for use with roll grooved or cut grooved standard weight and roll grooved lightweight pipe, as well as with grooved-end fittings and valves.



The Rigidlok Coupling maintains a rigid connection with support and hanging in conformance with applicable ANSI B31.1 Power Piping Code, ANSI B31.9 Building Service Pipe Code as well as NFPA 13 sprinkler systems.

The Fig. 7401 Rigidlok Coupling allows for working pressure ratings to 750 psi (51.7 bar) when used on standard wall roll or cut grooved pipe.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

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

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)

Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)

Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style

Flush Gap (1 1/2" - 14")

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7401

Rigidlok® Coupling

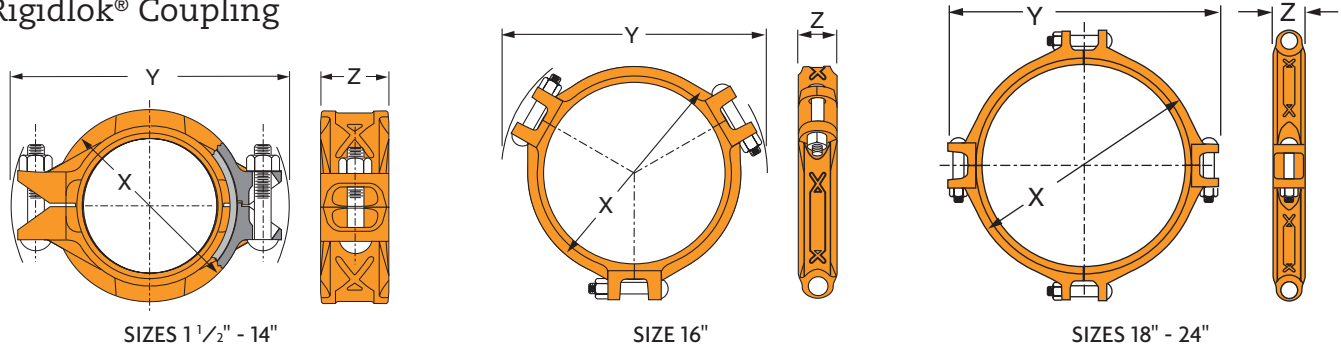


FIGURE 7401 RIDGIDLOK COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts*		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs/N-M		Lbs./kN
1½	1.900	750	2,126	0-¼	3	5½	1½	2	¾ x 2¼	30	45	1.8
40	48.3	51.7	9.46	0-3.2	76	130	48		M10 x 57	40	60	0.8
2	2.375	750	3,323	0-¼	3½	5½	1½	2	¾ x 2½	30	45	2.4
50	60.3	51.7	14.78	0-3.2	89	143	48		M10 x 63	40	60	1.1
2½	2.875	750	4,869	0-¼	4	6½	1¾	2	¾ x 2½	30	45	2.9
65	73.0	51.7	21.66	0-3.2	102	156	48		M10 x 63	40	60	1.3
3 O.D.	2.996	750	5,207	0-¼	4½	6½	1¾	2	½ x 3	80	100	3.4
76.1	76.1	51.7	23.52	0-3.2	105	156	48		M12 x 76	110	150	1.5
3	3.500	750	7,216	0-¼	4¾	7¼	1¾	2	½ x 3	80	100	3.6
80	88.9	51.7	32.10	0-3.2	121	184	48		M12 x 76	110	150	1.6
4	4.500	750	11,928	0-¼	5½	8½	2½	2	½ x 3	80	100	5.0
100	114.3	51.7	53.06	0-6.4	149	213	54		M12 x 76	110	150	2.3
5½ O.D.	5.500	750	17,819	0-¼	7	9¼	2½	2	¾ x 3½	100	130	6.9
139.7	139.7	51.7	79.26	0-6.4	178	248	54		M16 x 85	135	175	3.1
5	5.563	750	18,229	0-¼	7	10	2½	2	¾ x 3½	100	130	6.9
125	141.3	51.7	81.09	0-6.4	178	254	54		M16 x 85	135	175	3.1
6½ O.D.	6.500	750	24,887	0-¼	8	11	2½	2	¾ x 3½	100	130	7.6
165.1	165.1	51.7	110.70	0-6.4	203	279	54		M16 x 85	135	175	3.4
6	6.625	750	25,854	0-¼	8½	11½	2½	2	¾ x 3½	100	130	7.9
150	168.3	51.7	115.00	0-6.4	206	283	54		M16 x 85	135	175	3.6
8	8.625	600	35,056	0-¼	10½	14½	2½	2	¾ x 4½	130	180	15.9
200	219.1	41.4	155.94	0-6.4	267	359	67		M20 x 110	175	245	7.2
10	10.750	500	45,381	0-¼	12¾	17½	2½	2	1 x 6	200	250	25.6
250	273.1	34.5	201.87	0-6.4	327	445	67		M24 x 150	270	340	11.6
12	12.750	400	51,070	0-¼	15	19½	2½	2	¾ x 6	180	220	30.5
300	323.9	27.6	227.17	0-6.4	381	495	67		M22 x 150	245	300	13.8
14	14.000	300	46,181	0-¼	16¾	19¾	3	2	¾ x 5½	180	220	36.1
350	355.6	20.7	205.43	0-6.4	413	502	76		M22 x 140	245	300	16.4
16	16.000	300	60,319	0-¼	18½	22¼	3	3	¾ x 5½	180	220	42.0
400	406.4	20.7	268.31	0-6.4	460	565	76		M22 x 140	245	300	19.1
18	18.000	300	76,341	0-¼	20½	24¾	3½	4	1 x 4	200	250	51.6
450	457.2	20.7	339.58	0-6.4	521	619	79		M24 x 100	270	340	23.4
20	20.000	300	94,248	0-¼	23	26¾	3½	4	1 x 4	200	250	68.3
500	508.0	20.7	419.23	0-6.4	581	683	79		M24 x 100	270	340	31.0
24	24.000	250	113,097	0-¼	27½	30¾	3½	4	1 x 4	200	250	89.3
600	609.6	17.2	503.08	0-6.4	689	784	79		M24 x 100	270	340	40.5

* Available in ANSI or metric bolt sizes only as indicated.
 For additional details see "Coupling Data Chart Notes" from page 16.
 Not for use in copper systems.
 § - For additional Bolt Torque information, see page 184.
 See Installation & Assembly directions on page 153.

FIG. 7000

Lightweight Flexible Coupling



The Fig. 7000 Lightweight Flexible Coupling is designed for applications where system flexibility is desired.

The Fig. 7000 Coupling is approximately 30% lighter in weight than the Fig. 7001 Coupling, and allows for working pressure ratings up to 600 psi (41.4 bar).

The Figure 7000 Lightweight Flexible Coupling is intended for use in several applications. See gasket Grade Index for gasket recommendations.

See technical data section for design factors.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

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

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)

Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)

Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style

Flush Gap (1" - 8")

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7000

Lightweight Flexible Coupling

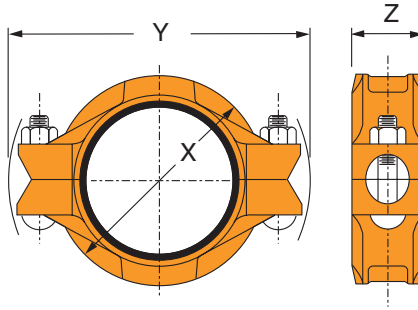


FIGURE 7000 COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from C		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	Per in./ft.	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m		Lbs./Kg
1	1.315	600	815	0-1/8	5° 26'	1.14	2 3/8	4 1/4	1 3/4	2	3/8 x 2 1/4	30	45	1.3
25	33.4	41.4	3.62	0-3.2		94.7	60	108	44		M10 x 57	40	60	0.6
1 1/4	1.660	600	1,299	0-1/8	4° 19'	0.90	2 3/4	4 3/8	1 3/4	2	3/8 x 2 1/4	30	45	1.4
32	42.2	41.4	5.78	0-3.2		75.3	70	111	44		M10 x 57	40	60	0.6
1 1/2	1.900	600	1,701	0-1/8	3° 46'	0.79	3	4 7/8	1 3/4	2	3/8 x 2 1/4	30	45	1.5
40	48.3	41.4	7.57	0-3.2		65.7	76	117	44		M10 x 57	40	60	0.7
2	2.375	600	2,658	0-1/8	3° 1'	0.63	3 1/2	5 1/2	1 3/4	2	3/8 x 2 1/4	30	45	1.7
50	60.3	41.4	11.82	0-3.2		52.6	89	140	44		M10 x 57	40	60	0.8
2 1/2	2.875	600	3,895	0-1/8	2° 29'	0.52	4	5 3/4	1 3/4	2	3/8 x 2 1/4	30	45	1.9
65	73.0	41.4	17.33	0-3.2		43.3	102	146	44		M10 x 57	40	60	0.9
3 O.D.	2.996	600	4,230	0-1/8	2° 23'	0.50	4	6 1/8	1 3/4	2	3/8 x 2 1/4	80	100	2.3
76.1	76.1	41.4	18.82	0-3.2		41.6	102	156	44		M10 x 57	110	150	1.0
3	3.500	600	5,773	0-1/8	2° 3'	0.43	4 7/8	6 3/4	1 3/4	2	1/2 x 2 3/4	80	100	2.9
80	88.9	41.4	25.68	0-3.2		35.8	117	171	44		M12 x 70	110	150	1.3
3 1/2	4.000	600	7,540	0-1/8	1° 48'	0.38	5 1/8	7 7/8	1 3/4	2	1/2 x 3	80	100	3.1
90	101.6	41.4	33.54	0-3.2		31.4	130	194	44		M12 x 76	110	150	1.4
4 1/4 O.D.	4.250	600	8,512	0-1/4	3° 22'	0.70	5 1/2	7 7/8	2	2	1/2 x 3	80	100	4.0
108.0	108.0	41.4	37.86	0-6.4		58.7	140	197	51		M12 x 76	110	150	1.8
4	4.500	600	9,543	0-1/4	3° 11'	0.67	5 7/8	8 1/8	2	2	1/2 x 3	80	100	4.6
100	114.3	41.4	42.45	0-6.4		55.5	149	206	51		M12 x 76	110	150	2.1
5 1/4 O.D.	5.236	500	10,766	0-1/4	2° 44'	0.57	6 1/2	9 7/8	2	2	5/8 x 3 1/2	100	130	5.7
133.0	133.0	34.5	47.89	0-6.4		47.7	165	232	51		M16 x 85	135	175	2.6
5 1/2 O.D.	5.500	500	11,879	0-1/4	2° 36'	0.54	6 3/4	9 7/8	2	2	5/8 x 3 1/2	100	130	6
139.7	139.7	34.5	52.84	0-6.4		45.4	171	238	51		M16 x 85	135	175	2.7
5	5.563	500	12,153	0-1/4	2° 35'	0.54	7	9 7/8	2	2	5/8 x 3 1/2	100	130	6.1
125	141.3	34.5	54.06	0-6.4		45.1	178	244	51		M16 x 85	135	175	2.8
6 1/4 O.D.	6.259	500	15,384	0-1/4	2° 17'	0.48	7 1/2	10 7/8	2	2	5/8 x 3 1/2	100	130	6.7
159.0	159.0	34.5	68.43	0-6.4		39.8	191	264	51		M16 x 85	135	175	3.0
6 1/2 O.D.	6.500	500	16,592	0-1/4	2° 12'	0.46	7 3/4	10 7/8	2	2	5/8 x 3 1/2	100	130	7.0
165.1	165.1	34.5	73.80	0-6.4		34.8	197	273	51		M16 x 85	135	175	3.2
6	6.625	500	17,236	0-1/4	2° 10'	0.45	8	11	2	2	5/8 x 3 1/2	100	130	8.1
150	168.3	34.5	76.67	0-6.4		37.8	203	279	51		M16 x 85	135	175	3.7
8	8.625	500	29,213	0-1/4	1° 40'	0.35	10	13 1/4	2 3/8	2	3/4 x 4 1/2	130	180	14.2
200	219.1	34.5	129.95	0-6.4		29.1	264	337	60		M20 x 110	175	245	6.4

For additional details see "Coupling Data Chart Notes" from page 16.

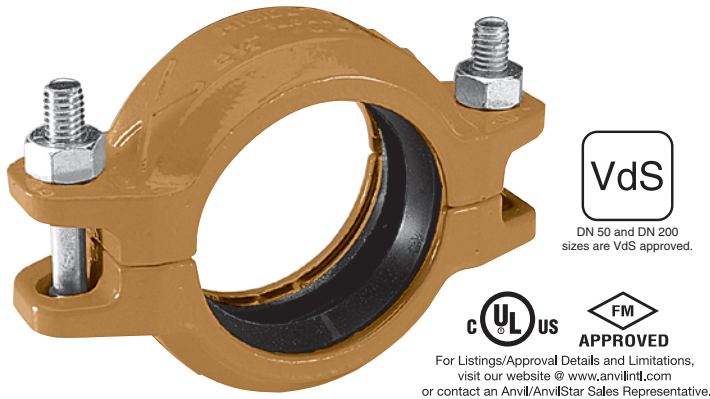
§ - For additional Bolt Torque information, see page 184.

Not for use in copper systems.

See Installation & Assembly directions on page 154.

FIG. 7400

Rigidlite® Coupling



The Fig. 7400 Rigidlite Coupling from Gruvlok is specially designed to provide a rigid, locked-in pipe connection to meet the specific demands of rigid design steel pipe and copper tube systems. Fast and easy swing-over installation of the rugged lightweight housing produces a secure, rigid pipe joint.

The Fig. 7400 Rigidlite Coupling is UL/ULC Listed and FM Approved for 300 psi (20.7 bar) with roll grooved or cut grooved steel pipe prepared in accordance with Gruvlok grooving specifications. Figure 7400 Rigidlite Coupling is available with the Grade “E” EPDM, “C” Style Gasket intended for use with the Gruvlok Advanced Copper Method.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade “E” EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade “T” Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR

Grade “O” Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)

Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade “L” Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)

Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style

Flush Gap (1" - 8")

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade “L”)

FIG. 7400

Rigidlite® Coupling

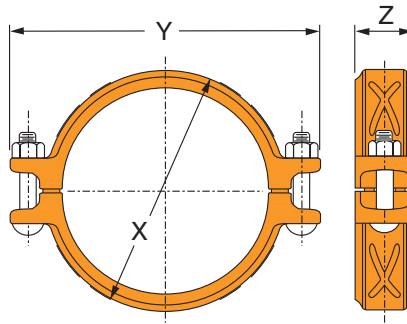


FIGURE 7400 RIGIDLITE COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m		Lbs./Kg
1	1.315	300	407	0-1/8	2 1/4	4 1/2	1 3/4	2	3/8 x 2 1/4	30	45	1.2
25	33.4	20.7	1.81	0-3.2	57	114	44		M10 x 57	40	60	0.5
1 1/4	1.660	300	649	0-1/8	2 5/8	4 3/4	1 3/4	2	3/8 x 2 1/4	30	45	1.3
32	42.2	20.7	2.89	0-3.2	67	121	44		M10 x 57	40	60	0.6
1 1/2	1.900	300	851	0-1/8	2 7/8	4 7/8	1 3/4	2	3/8 x 2 1/4	30	45	1.4
40	48.3	20.7	3.78	0-3.2	73	124	44		M10 x 57	40	60	0.6
2	2.375	300	1,329	0-1/8	3 1/4	5 1/2	1 3/4	2	3/8 x 2 1/4	30	45	1.6
50*	60.3	20.7	5.91	0-3.2	83	140	44		M10 x 57	40	60	0.7
2 1/2	2.875	300	1,948	0-1/8	3 3/8	6	1 3/4	2	3/8 x 2 1/4	30	45	1.9
65	73.0	20.7	8.66	0-3.2	98	152	44		M10 x 57	40	60	0.9
3 O.D.	2.996	300	2,115	0-1/8	4	5 5/8	1 3/4	2	3/8 x 2 1/4	30	45	1.9
76.1	76.1	20.7	9.41	0-3.2	102	149	44		M10 x 57	40	60	0.9
3	3.500	300	2,886	0-1/8	4 1/2	6 3/4	1 3/4	2	3/8 x 2 3/4	30	45	2.1
80	88.9	20.7	12.84	0-3.2	114	171	44		M10 x 70	40	60	1.0
4	4.500	300	4,771	0-1/4	5 5/8	7 3/4	1 7/8	2	3/8 x 2 3/4	30	45	3.1
100	114.3	20.7	21.22	0-6.4	143	197	48		M10 x 70	40	60	1.4
5 1/2 O.D.	5.500	300	7,127	0-1/4	6 3/4	9 1/4	2	2	1/2 x 3	80	100	4.5
139.7	139.7	20.7	31.70	0-6.4	171	235	51		M12 x 76	110	150	2.0
5	5.563	300	7,292	0-1/4	6 7/8	9 1/4	2	2	1/2 x 3	80	100	4.6
125	141.3	20.7	32.44	0-6.4	175	235	51		M12 x 76	110	150	2.1
6 1/2 O.D.	6.500	300	9,955	0-1/4	7 3/4	10 3/8	2	2	1/2 x 3	80	100	5.5
165.1	165.1	20.7	44.28	0-6.4	200	264	51		M12 x 76	110	150	2.5
6	6.625	300	10,341	0-1/4	7 7/8	10 3/8	2	2	1/2 x 3	80	100	5.5
150	168.3	20.7	46.00	0-6.4	200	264	51		M12 x 76	110	150	2.5
8	8.625	300	17,528	0-1/8	10 1/4	12 3/4	2 3/8	2	1/2 x 3	80	100	8.4
200*	219.1	20.7	77.97	0-3.2	260	324	60		M12 x 76	110	150	3.8

* DN 50 and DN 200 sizes are VdS approved.

For additional details see "Coupling Data Chart Notes" from page 16.

§ – For additional Bolt Torque information, see page 184.

See Installation & Assembly directions on page 155.

Other sizes available, contact a Gruvlok Representative for more information.

For use in copper systems, see page 107.

FIG. 7003

Hingelok® Coupling



SIZES 1" - 4"



SIZES 5" - 8"

The Fig. 7003 Hingelok Coupling is specially designed for applications requiring a quick connection and/or disconnection of a pipe joint. The Fig. 7003 Hingelok Coupling is ideal for those applications where frequent pipe removal is required for maintenance or any other reason. Fig. 7003 Hingelok Coupling provides for system working pressure ratings up to 300 psi (20.7 bar).

The Fig. 7003 Hingelok Coupling halves are permanently hinged to provide an assembly that eases handling and installation. The two coupling halves are hinged for ease of handling and are secured by a cam-action handle. Sizes 1" to 4" use toggle link plates and sizes 5" to 8" use a toggle bolt to attach the cam-action handle to the housings. The cam-action locking handle permits rapid installation without the need for additional tools and maintains secure closure of the coupling into the pipe grooves. Final assembly of the locking pin to the Hingelok Coupling adds an extra measure of security required in critical pipe joint applications.

MATERIAL SPECIFICATIONS

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

HANDLE:

Sizes 1" - 4": Cold Rolled Carbon Steel Handles
Sizes 5" - 8": Cast Ductile Iron Handles

LINKS:

Sizes 1" - 4": Cold Rolled Carbon Steel Links
Sizes 5" - 8": Heat Treated Steel Links

LOCKING PIN:

Locking Pin: Spring Steel

GASKETS: Materials

Properties as designated in accordance with ASTM D2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.
DO NOT USE GRUVLOK XTREME LUBRICANT WITH GRADE "L" SILICONE GASKET.

GASKET TYPE:

Standard C Style
Flush Gap (1" - 8")

LUBRICATION:

Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7003

Hingelok® Coupling

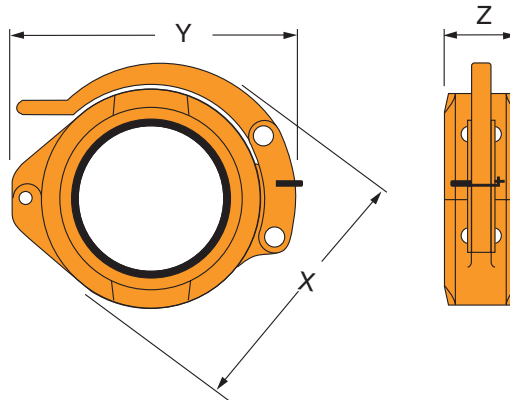


FIGURE 7003 HINGELOCK COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from $\mathcal{C}$		Coupling Dimensions			Approx. Wt. Ea.
					Per Coupling	Per in./ft.	X	Y	Z	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	mm/m	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	300 20.7	407 1.81	0-1/8 0-3.2	5° 26'	1.14 94.7	3 76	4 101	1 3/4 44	1.4 0.6
1 1/4 32	1.660 42.2	300 20.7	649 2.89	0-1/8 0-3.2	4° 19'	0.90 75.3	3 7/16 87	4 7/16 113	1 7/8 48	1.5 0.7
1 1/2 40	1.900 48.3	300 20.7	851 3.78	0-1/8 0-3.2	3° 46'	0.79 65.7	3 5/8 92	4 1/4 108	1 7/8 48	1.7 0.8
2 50	2.375 60.3	300 20.7	1,329 5.91	0-1/8 0-3.2	3° 1'	0.63 52.6	4 1/4 108	4 7/8 124	1 7/8 48	2.2 1.0
2 1/2 65	2.875 73.0	300 20.7	1,948 8.66	0-1/8 0-3.2	2° 29'	0.52 43.3	5 1/4 133	5 7/8 149	1 7/8 48	3.2 1.5
3 80	3.500 88.9	300 20.7	2,886 12.84	0-1/8 0-3.2	2° 3'	0.43 35.8	5 5/8 143	6 1/2 165	1 7/8 48	3.6 1.6
4 100	4.500 114.3	300 20.7	4,771 21.22	0-1/4 0-6.4	3° 11'	0.67 55.5	7 178	7 3/4 197	2 51	5.1 2.3
5 125	5.563 141.3	300 20.7	7,292 32.44	0-1/4 0-6.4	2° 35'	0.54 45.1	8 5/8 219	9 1/2 241	2 1/8 54	9.5 4.3
6 150	6.625 168.3	300 20.7	10,341 46.00	0-1/4 0-6.4	2° 10'	0.45 37.8	9 7/8 251	10 7/8 276	2 1/8 54	11.2 5.1
8 200	8.625 219.1	300 20.7	17,528 77.97	0-1/4 0-6.4	1° 40'	0.35 29.1	12 305	13 1/8 333	2 1/2 64	18.1 8.2

SPECIAL NOTE:

Fig. 7003 Hingelok Couplings are not designed for eccentric loading and therefore are not recommended for use at the end of concrete pumping booms or vertical risers above 30 feet (9.1 meters). Shockload must be considered and is to be included in the maximum working pressure listed above. Coupling keys, gasket cavity, and pipe grooves must be kept free of all foreign matter. Proper anchoring practice must always be exercised.

For additional details see "Coupling Data Chart Notes" from page 16.

Not for use in copper systems.

See Installation & Assembly directions on page 157.

CAUTION:

Hammering or banging on the handle or coupling housing could cause serious damage to the locking device and coupling assembly.

The result may be an unsuitable pipe joint and unusable coupling assembly.

When re-using, always check for gasket damage, housing hinge and handle for looseness, distortion bent or any other damage.

FIG. 7010

Reducing Coupling



The Fig. 7010 Reducing Coupling makes it possible to directly connect two different pipe sizes, eliminating the need for two couplings and a reducing fitting. The specially designed reducing coupling gasket with a center rib assures proper positioning of the gasket and prevents the smaller pipe from telescoping into the larger during assembly. Fig. 7010 Reducing Coupling allows for working pressure ratings up to 500 PSI (34.5 bar).

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12, or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalis solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7010 Reducing Coupling

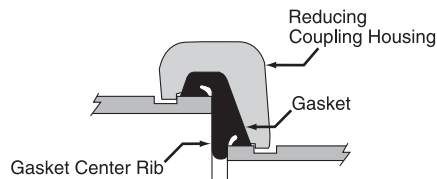


Fig. 7010
Coupling with Gasket

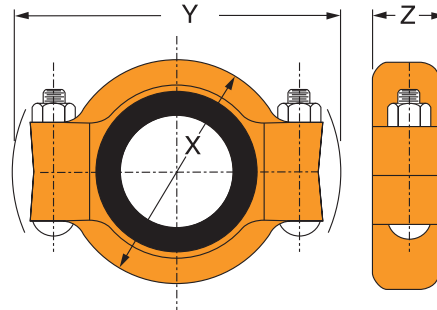


FIGURE 7010 REDUCING COUPLING

Nominal Size	Larger O.D.	Smaller O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from C		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
						Per Coupling	Per in./ft.	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m		Lbs./Kg
2 x 1½ 50 x 40	2.375 60.3	1.900 48.3	500 34.5	2,215 9.85	0-⅛ 0-3.2	1° 53'	0.39 32.9	3⅝ 92	5⅝ 149	1⅝ 48	2	½ x 2¾ M12 x 70	80 110	100 150	2.0 0.9
2½ x 2 65 x 50	2.875 73.0	2.375 60.3	500 34.5	3,246 14.44	0-⅛ 0-3.2	1° 33'	0.32 27.0	4¼ 108	6⅝ 162	1⅝ 48	2	½ x 2¾ M12 x 70	80 110	100 150	3.5 1.6
3 x 2 80 x 50	3.500 88.9	2.375 60.3	500 34.5	4,811 21.40	0-⅛ 0-3.2	1° 17'	0.27 22.4	4⅝ 124	7⅝ 181	1⅝ 48	2	½ x 2¾ M12 x 70	80 110	100 150	4.4 2.0
3 x 2½ 80 x 65	3.500 88.9	2.875 73.0	500 34.5	4,811 21.40	0-⅛ 0-3.2	1° 17'	0.27 22.4	4⅝ 124	7⅝ 181	1⅝ 48	2	½ x 2¾ M12 x 70	80 110	100 150	4.1 1.9
4 x 2 100 x 50	4.500 114.3	2.375 60.3	500 34.5	7,952 35.37	0-⅜ 0-4.8	2° 38'	0.55 45.9	6¼ 159	8⅝ 225	2 51	2	⅝ x 3½ M16 x 85	100 135	130 175	8.9 4.0
4 x 2½ 100 x 65	4.500 114.3	2.875 73.0	500 34.5	7,952 35.37	0-⅜ 0-4.8	2° 38'	0.55 45.9	6¼ 159	8⅝ 225	2 51	2	⅝ x 3½ M16 x 85	100 135	130 175	7.9 3.6
4 x 3 100 x 80	4.500 114.3	3.500 88.9	500 34.5	7,952 35.37	0-⅜ 0-4.8	2° 38'	0.55 45.9	6¼ 159	8⅝ 225	2 51	2	⅝ x 3½ M16 x 85	100 135	130 175	6.7 3.0
5 x 4 125 x 100	5.563 141.3	4.500 114.3	500 34.5	12,153 54.06	0-¼ 0-6.4	2° 5'	0.44 36.4	7¼ 184	10⅝ 270	2⅝ 54	2	¾ x 4½ M20 x 110	130 175	180 245	11.4 5.2
6 x 4 150 x 100	6.625 168.3	4.500 114.3	500 34.5	17,236 76.67	0-¼ 0-6.4	1° 44'	0.36 30.2	8¼ 210	11⅝ 295	2⅝ 54	2	¾ x 4½ M20 x 110	130 175	180 245	13.4 6.1
6 x 5 150 x 125	6.625 168.3	5.562 141.3	500 34.5	17,236 76.67	0-¼ 0-6.4	1° 44'	0.36 30.2	8½ 216	11⅝ 295	2⅝ 54	2	¾ x 4½ M20 x 110	130 175	180 245	13.5 6.1
8 x 6 200 x 150	8.625 219.1	6.625 168.3	500 34.5	29,213 129.95	0-¼ 0-6.4	1° 15'	0.26 21.8	10½ 267	14 356	2¼ 57	2	¾ x 4½ M20 x 110	130 175	180 245	17.7 8.0

Fig. 7010 Reducing Coupling should not be used with end caps in systems where a vacuum may be developed. Contact your Anvil Representative for details.

For additional details see "Coupling Data Chart Notes" from page 16.

§ - For additional Bolt Torque information, see page 184.

Not for use in copper systems.

See Installation & Assembly directions on page 158.

FIG. 7012

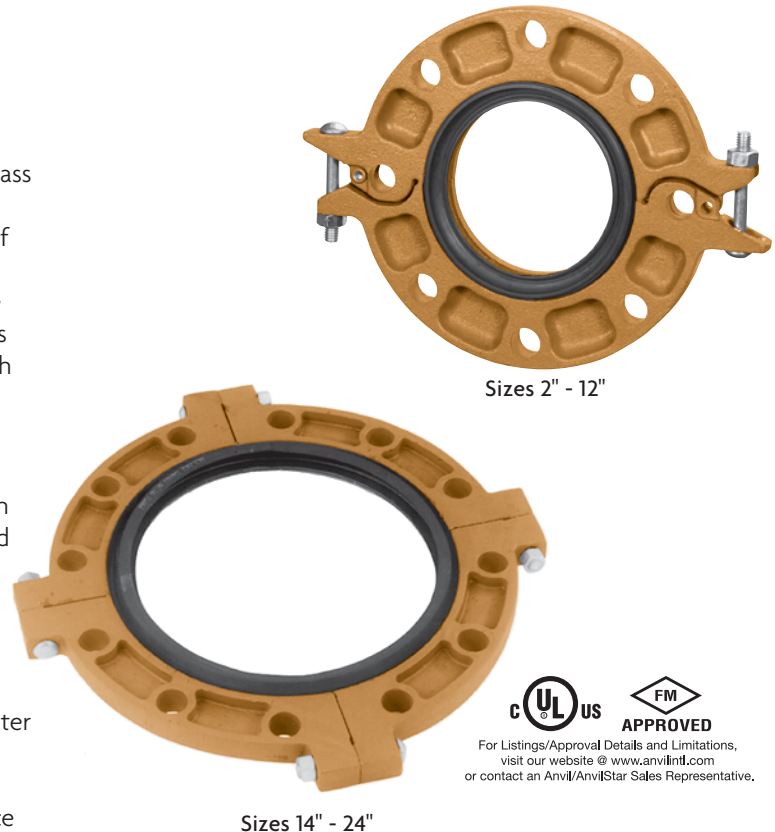
Gruvlok Flanges

The Gruvlok® Fig. 7012 Flange allows direct connection of Class 125 or Class 150 flanged components to a grooved piping system. The two interlocking halves of the 2" thru 12" sizes of the Gruvlok Flange are hinged for ease of handling, and are drawn together by a latch bolt which eases assembly on the pipe. Precision machined bolt holes, key and mating surfaces assure concentricity and flatness to provide exact fit-up with flanged, lug, and wafer styles of pipe system equipment. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.

The 14" thru 24" sizes of the Gruvlok Fig. 7012 Flange are cast in four segments. A sleek profile gasket design allows quick and easy assembly of the Gruvlok Flange onto the pipe.

All Gruvlok Fig. 7012 Flanges have designed-in anti-rotation tines which bite into and grip the sides of the pipe grooves to provide a secure, rigid connection.

The Gruvlok Fig. 7012 Flange requires the use of a steel adapter insert when used against rubber faced surfaces, wafer/lug design valves and serrated or irregular sealing surfaces. In copper systems a phenolic adapter insert is required, in place of the steel adapter insert. (See Installation and Assembly Instructions Section or contact your Anvil Rep. for details.)



MATERIAL SPECIFICATIONS

LATCH BOLT/NUT (2" - 12")

SEGMENT BOLT/NUT (14" - 24"):

Heat treated, zinc electroplated, carbon steel oval neck track bolts conforming to ASTM A 183 and zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard), Red (optional)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER.

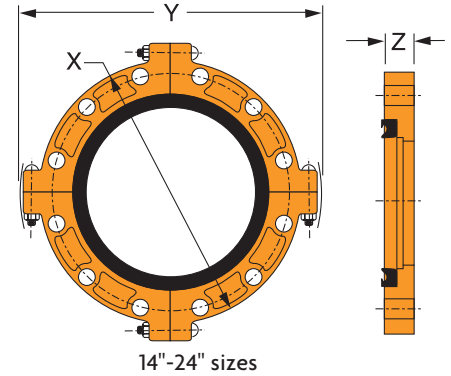
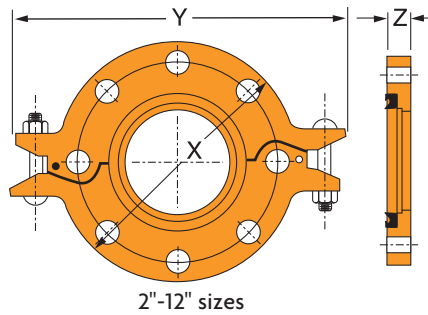
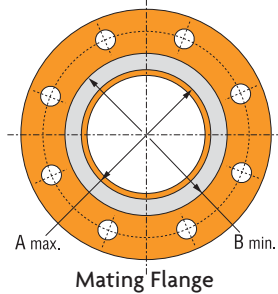
LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7012

Gruvlok Flanges



GRUVLOK FIGURE 7012 FLANGE: ANSI CLASS 150 OR ISO PN10 OR PN16 BOLT PATTERNS

Nominal Size	O.D.	Max. Working Pressure▼	Max. End Load▼	Latch Bolt			Dimensions			Sealing Surface		Mating Flange Bolts				Approx. Wt. Ea.
				Latch Bolt Size*	Specified Torque §		X	Y	Z	A Max.	B Min.	Mating Flange Bolts		Specified Torque §		
					Min.	Max.						Qty. ANSI	Size (ANSI)	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Ft.-Lbs/N-m	In./mm	In./mm	In./mm	In./mm	In./mm	PN10 (16)	In. (ISO) mm	Ft.-Lbs/N-m	Lbs./Kg		
2	2.375	300	1,329	3⁄8 x 2¾	30	45	6¼	8¾	¾	2¾	3⅛	4	5⁄8 x 2¾	110	140	4.2
50	60.3	20.7	5.91	M10 x 70	40	60	159	213	19	60	87	4	M16 x 70	149	190	1.9
2½	2.875	300	1,948	3⁄8 x 2¾	30	45	7	9½	¾	2⅞	4	4	5⁄8 x 2¾	110	140	4.6
65	73.0	20.7	8.66	M10 x 70	40	60	178	241	19	73	102	-	M16 x 70	149	190	2.1
3 O.D.	2.996	300	2,115	-	30	45	7¼	9¾	¾	3	4¼	-	-	110	140	4.8
76.1	76.1	20.7	9.41	M10 x 70	40	60	184	248	19	76	105	4	M16 x 70	149	190	2.2
3	3.500	300	2,886	3⁄8 x 2¾	30	45	7⅞	10½	¾	3½	4⅞	4	5⁄8 x 2¾	110	140	6.0
88.9	88.9	20.7	12.84	M10 x 70	40	60	200	267	19	89	116	8	M16 x 70	149	190	2.7
4	4.500	300	4,771	3⁄8 x 2¾	30	45	9	11½	¾	4½	5⅞	8	5⁄8 x 2¾	110	140	6.3
100	114.3	20.7	21.22	M10 x 70	40	60	229	292	19	114	141	8	M16 x 70	149	190	2.9
5½ O.D.	5.500	300	7,127	-	30	45	9⅞	12⅞	⅞	5⅞	6¾	-	-	220	250	15.6
139.7	139.7	20.7	31.70	M10 x 70	40	60	251	327	22	141	171	8	M16 x 75	298	339	7.1
5	5.563	300	7,292	3⁄8 x 2¾	30	45	10	12½	⅞	5⅞	6¾	8	¾ x 2⅞	220	250	8.8
125	141.3	20.7	32.44	M10 x 70	40	60	254	318	22	141	171	-	-	298	339	4.0
6½ O.D.	6.500	300	9,955	-	30	45	11¼	14	⅞	6⅝	7⅜	-	-	220	250	9.7
165.1	165.1	20.7	44.28	M10 x 70	40	60	286	356	22	168	198	8	M20 x 80	298	339	4.4
6	6.625	300	10,341	3⁄8 x 2¾	30	45	11	14	⅞	6⅝	7⅜	8	¾ x 3⅝	220	250	9.6
150	168.3	20.7	46.00	M10 x 70	40	60	279	356	22	168	198	8	M20 x 80	298	339	4.4
8	8.625	300	17,528	3⁄8 x 2¾	30	45	13½	16½	1	8⅝	10	8	¾ x 3¼	220	250	15.6
200	219.1	20.7	77.97	M10 x 70	40	60	343	419	25	219	254	8 (12)	M20 x 80	298	339	7.1
10	10.750	300	27,229	3⁄8 x 2¾	30	45	16	19	1	10¾	12⅞	12	⅞ x 3½	320	400	18.2
250	273.1	20.7	121.12	M10 x 70	40	60	406	483	25	273	308	12	M20 x 90	439	542	8.3
12	12.750	300	38,303	3⁄8 x 2¾	30	45	19	21¾	1¼	12¾	14⅞	12	⅞ x 3¾	320	400	29.9
300	323.9	20.7	170.38	M10 x 70	40	60	483	552	32	324	359	12	-	439	542	13.6
12 (PN)	12.750	300	38,303	-	30	45	18⅝	21¼	1	12¾	14⅞	12	-	320	400	20.9
300	323.9	20.7	170.38	M10 x 70	40	60	460	540	25	324	359	12	M20 x 90 ⚠	439	542	9.5
14	14.000	300	46,181	5⁄8 x 4¼	100	130	21	24	1½	14	16	12	1 x 4¼	360	520	52.5
350	355.6	20.7	205.43	-	136	176	533	610	38	356	406	-	-	488	705	23.8
16	16.000	300	60,319	5⁄8 x 4¼	100	130	23½	26½	1½	16	18	16	1 x 4¼	360	520	67.0
400	406.4	20.7	268.31	-	136	176	597	673	38	406	457	-	-	488	705	30.4
18	18.000	300	76,341	¾ x 5	130	180	25	29	1⅝	18	20	16	1⅝ x 4¾	450	725	82.5
450	457.2	20.7	339.58	-	176	244	635	737	41	457	508	-	-	610	983	37.4
20	20.000	300	94,248	¾ x 5	130	180	27½	31½	1¾	20	22	20	1⅝ x 4¾	450	725	106.5
500	508.0	20.7	419.23	-	176	244	699	800	44	508	559	-	-	610	983	48.3
24	24.000	250	113,097	⅞ x 5½	180	220	32	36½	1⅞	24	26	20	1¼ x 5½	620	1,000	138.5
600	609.6	17.2	503.08	-	244	298	813	927	48	610	660	-	-	841	1,356	62.8

+ PN 16 uses M24 x 90 (PN) Dimensions for bolt circle PN 10 & 16 Flange.

* Available in ANSI or metric bolt sizes only as indicated.

▼ Based on use with standard wall pipe.

§ - For additional Bolt Torque information, see page 184.

The Gruvlok Flange bolt hole pattern conforms to ANSI Class 150 and Class 125 flanges.

To avoid interference issues, flanges cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve only.

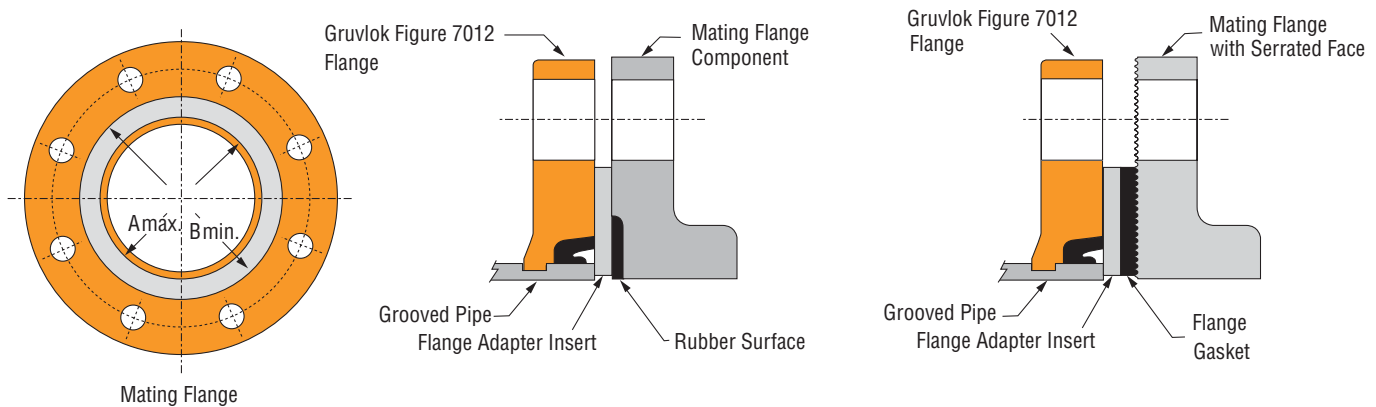
Mating flange bolts must be at least Intermediate Strength Bolting per ASME B16.5. Bolts with material properties equal or greater than SAE J429 Grade 5 are acceptable.

Refer to Gruvlok Products Catalog or Anvil's web site for more information on installing this flange. See Installation & Assembly directions on page 159-161.

For additional details see "Coupling Data Chart Notes" from page 16.

FIG. 7012

Gruvlok Flanges



- A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.
- B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- D. Gruvlok Flanges should not be used as anchor points for tierods across non-restrained joints.
- E. Fig. 7012 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- F. Gruvlok Flanges are not recommended for use against formed rubber flanges.
- G. Contact Gruvlok for Di-Electric Flange connections.

Applications which require a Gruvlok Flange Adapter Insert:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

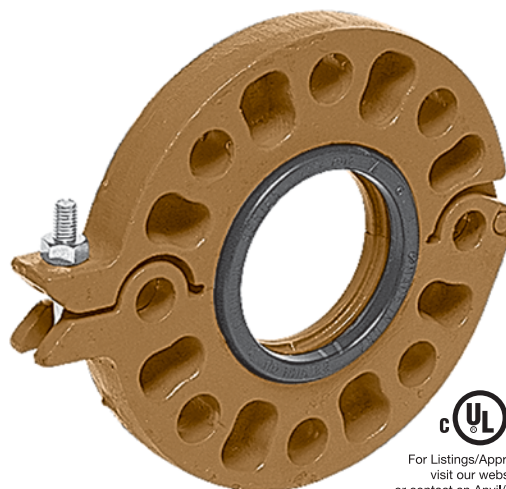
FIG. 7013

Gruvlok Flanges (#300 Flange)

The Gruvlok Fig. 7013 300# Flange allows direct connection of Class 250 or Class 300 flanged components to a Gruvlok piping system. The two halves of the 2" thru 12" sizes of both Gruvlok Flanges are drawn together by a latch bolt which eases assembly on the pipe. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.

Gruvlok Flanges have designed-in anti-rotation tines which bite into and grip the side of the pipe groove to provide a secure, rigid connection.

Gruvlok flange adapter insert required when mating to rubber surfaces or serrated faced mating flanges.



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

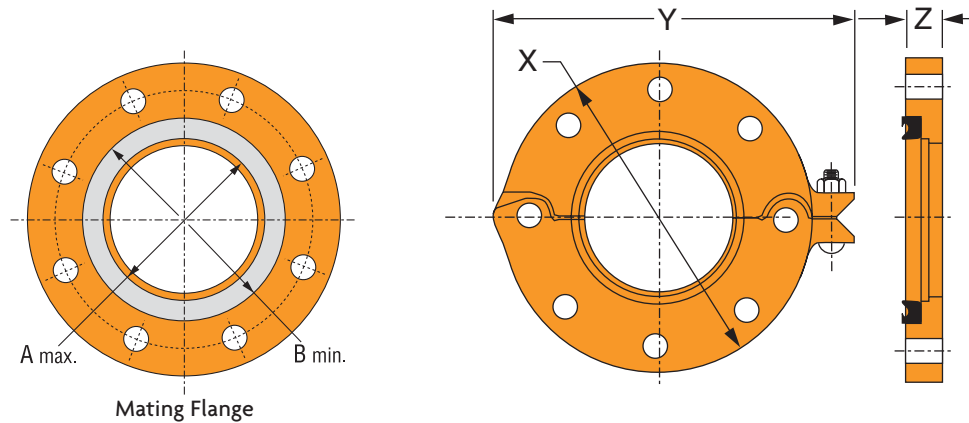
LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use for Grade "L")

FIG. 7013

Gruvlok Flanges (#300 Flange)


GRUVLOK FIGURE 7013 FLANGE: ANSI CLASS 250 AND 300 BOLT PATTERN

Nominal Size	O.D.	Max. Wk. Pressure ▼	Max. End Load ▼	Latch* Bolt Size	Specified Torque §		Dimensions			Sealing Surface		Mating Flange Bolts		Approx. Wt. Ea.
					Min.	Max.	X	Y	Z	A Max.	B Min.	Qty. ANSI	Size (ANSI) in.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In.	Ft.-Lbs/N-m		In./mm	In./mm	In./mm	In./mm	In./mm		(ISO) mm	Lbs./Kg
2	2.375	750	3,323	3/8 x 2 1/2	30	45	6 1/2	8	1	2 3/8	3 7/16	8	5/8 x 3	5.0
50	60.3	51.7	14.78	-	-	-	165	203	25	60	87	-	-	2.3
2 1/2	2.875	750	4,869	3/8 x 2 1/2	30	45	7 1/2	9 1/8	1	2 3/8	4	8	3/4 x 3 1/4	6.9
65	73.0	51.7	21.66	-	-	-	191	232	25	73	102	-	-	3.1
3	3.500	750	7,216	3/8 x 2 1/2	30	45	8 1/4	9 1/8	1 1/8	3 1/2	4 9/16	8	3/4 x 3 1/2	9.4
80	88.9	51.7	32.10	-	-	-	210	251	29	89	116	-	-	4.3
4	4.500	750	11,928	3/8 x 2 1/2	30	45	10	11 3/8	1 1/4	4 1/2	5 5/8	8	3/4 x 3 3/4	14.4
100	114.3	51.7	53.06	-	-	-	254	289	32	114	143	-	-	6.5
5	5.563	750	18,229	3/8 x 2 1/2	30	45	11	12 5/8	1 3/8	5 1/8	6 3/4	8	3/4 x 4 1/2	18.3
125	141.3	51.7	81.09	-	-	-	279	321	35	141	171	-	-	8.3
6	6.625	750	25,854	3/8 x 2 1/2	30	45	12 1/2	14 1/8	1 1/2	6 5/8	7 13/16	12	3/4 x 4 1/2	24.9
150	168.3	51.7	115.00	-	-	-	318	359	38	168	198	-	-	11.3
8	8.625	750	43,820	1/2 x 3 1/2	80	100	15	16 7/8	1 5/8	8 5/8	10	12	7/8 x 4 3/4	35.4
200	219.1	51.7	194.92	-	-	-	381	429	41	219	254	-	-	16.1
10	10.750	750	68,072	1/2 x 3 1/2	80	100	17 1/2	19 3/8	1 7/8	10 3/4	12 1/8	16	1 x 5	54.0
250	273.1	51.7	302.80	-	-	-	445	492	48	273	308	-	-	24.5
12	12.750	750	95,757	1/2 x 3 1/2	80	100	20 1/2	22 1/2	2	12 3/4	14 3/8	16	1 1/8 x 5 3/4	74.8
300	323.9	51.7	425.95	-	-	-	521	572	51	324	360	-	-	33.9

* Available in ANSI or metric bolt sizes only as indicated.

Effective sealing area of mating flange must be free from gouges, undulations or deformities of any type to ensure proper sealing of the gasket.

Flange cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve.

▼ Based on use with standard wall pipe.

Not for use with copper systems.

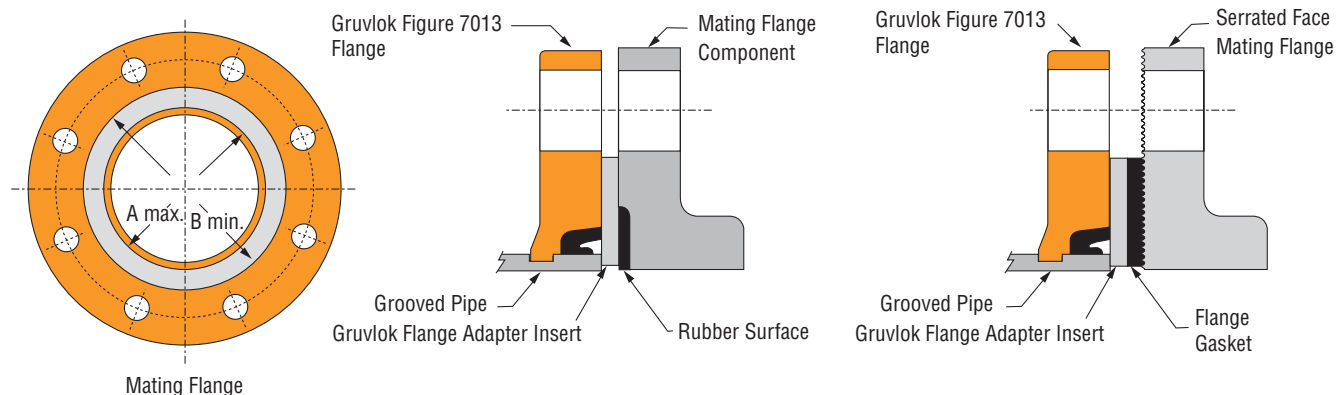
For additional details see "Coupling Data Chart Notes" from page 16.

§ - For additional Bolt Torque information, see page 184.

See Installation & Assembly directions or contact your Gruvlok Rep.

FIG. 7013

Gruvlok Flanges (#300 Flange)



- A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.
- B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- D. Gruvlok Flanges should not be used as anchor points for tierods across non-restrained joints.
- E. Fig. 7013 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- F. Gruvlok Flanges are not recommended for use against formed rubber flanges.
- G. Contact Gruvlok for Di-Electric Flange connections.

Applications which require a Gruvlok Flange Adapter Insert:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

FIG. 7240

Expansion Joints

The Gruvlok® Figure 7240 Expansion Joints take advantage of the axial expansion capabilities of the Gruvlok flexible couplings to produce a reliable grooved end expansion joint. The expansion joints are comprised of the Gruvlok Figure 7000 or 7001 flexible couplings and precision machined grooved end pipe nipples.

Ties are used to custom preset the expansion joints in the expanded, compressed or intermediate position to provide for the desired expansion and/or contraction compensation.

Installation is easy, simply follow the Gruvlok coupling installation and assembly instructions to install the expansion joint in the system and after installation is complete, remove the ties.

The expansion joints can be used as flexible connectors, however, they will not simultaneously provide for full axial expansion and angular deflection. Expansion joints require pipe anchoring capable of restraining the maximum system pressure end load.



NOTE: Expansion joint shown with shipping support. Contact a Gruvlok® representative for proper installation support requirements.

The service conditions are the same as the service conditions for coupling and gasket used in the expansions joint. Unless otherwise requested, this product will contain a silicone based lubricant. Refer to the Gruvlok catalog for coupling performance capabilities and material specifications. To order please provide the order form on the page 208.

NOTE: The Gruvlok Figure 7240 Expansion Joint is also available in stainless steel for use in grooved copper systems.

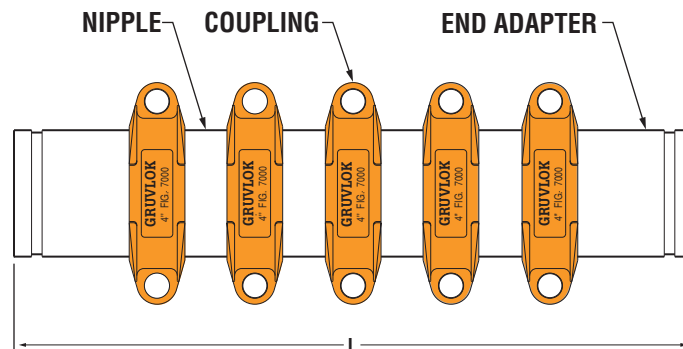
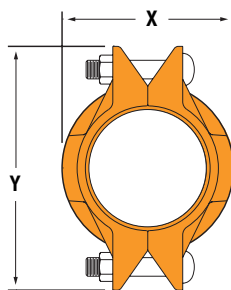


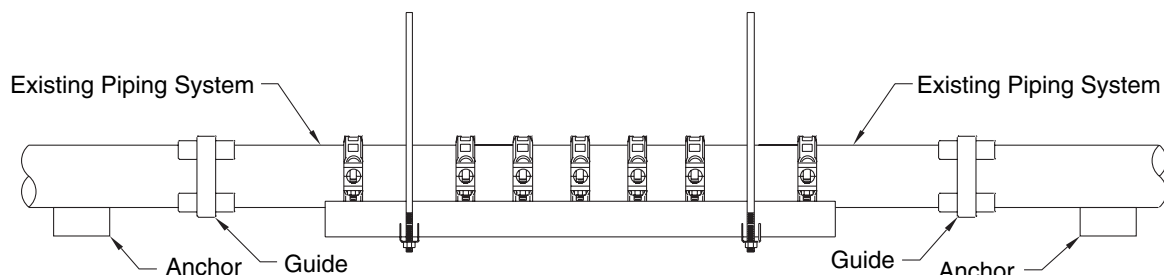
FIGURE 7240 PERFORMANCE DATA (INCHES)

Nominal Size	O.D.	Coupling Figure	X	Y	Compressed Length L	Expanded Length L	Coupling Movement Capability	Number of Couplings	Total Movement Capability
In./DN(mm)	In./mm		In./mm	In./mm	In./mm	In./mm	In./mm		In./mm
2 50	2.375 60.3	7000	3½ 89	5½ 125	30 762	31¼ 794	⅛ 3.2	10	1¼ 31.8
2½ 65	2.875 73.0	7000	4 100	5¾ 146	30 762	31¼ 794	⅛ 3.2	10	1¼ 31.8
3 80	3.500 88.9	7000	4⅝ 117	6¾ 171	30 762	31¼ 794	⅛ 3.2	10	1¼ 31.8
4 100	4.500 114.3	7000	5⅝ 149	8⅞ 206	17½ 445	18¾ 476	¼ 6.4	5	1¼ 31.8
5 125	5.562 141.3	7000	7 178	9⅞ 244	19 483	20¼ 514	¼ 6.4	5	1¼ 31.8
6 150	6.625 168.3	7000	8 200	11 279	19 483	20¼ 514	¼ 6.4	5	1¼ 31.8
8 200	8.625 219.0	7000	10⅝ 264	13¼ 337	22½ 572	23¾ 603	¼ 6.4	5	1¼ 31.8
10 250	10.750 273.1	7001	12⅝ 327	17½ 445	23½ 597	24¾ 629	¼ 6.4	5	1¼ 31.8
12 300	12.750 323.9	7001	15 381	19½ 495	23½ 597	24¾ 629	¼ 6.4	5	1¼ 31.8

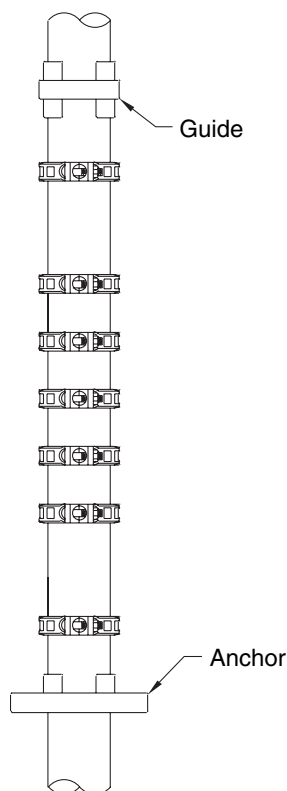
FIG. 7240

Expansion Joints

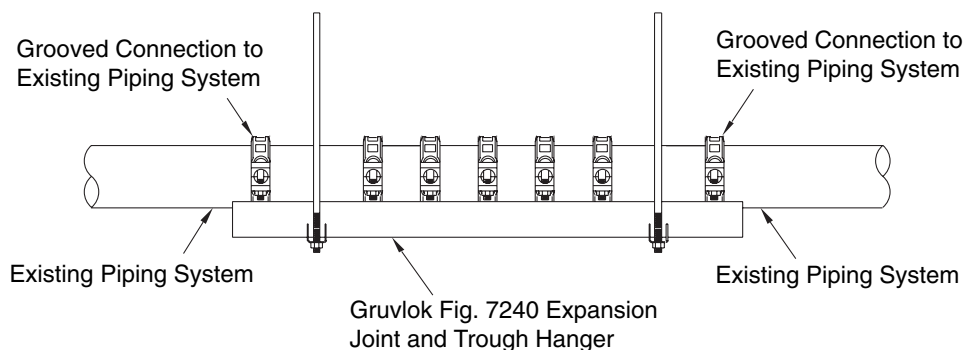
HANGER DETAILS



Vertical Support



Horizontal Support



Trough and Hanger

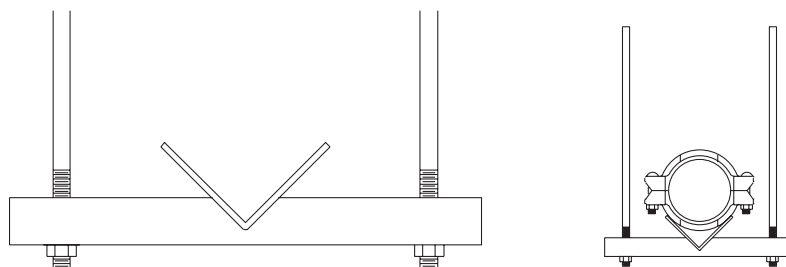


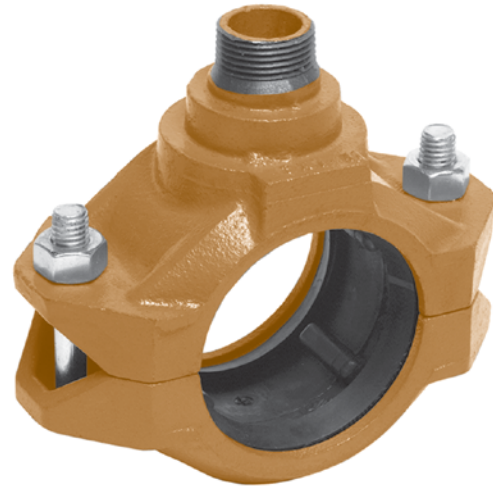
FIG. 7042

Outlet Coupling

The Gruzlok Fig. 7042 Outlet Coupling is designed to join two sections of grooved end pipe and form a reducing outlet connection. The outlet couplings are available for the 1 1/2" through 6" IPS or ISO run pipe sizes with the outlet pipe sizes ranging from 1/2" through 2".

Assembly of the coupling will create a gap between the pipe ends allowing the space required for the introduction of an outlet connection. The outlet connections are available grooved (Fig. 7042G), FPT (Fig. 7042F) and MPT (Fig. 7042M).

The gaskets are available in EPDM and Nitrile to suit a wide range of applications. The gasket design is a unique pressure responsive design that provides a higher sealing force as pressure is increased. The outlet gasket seal is reinforced by a steel ring and is mated to a machined housing surface to assure a leak-tight outlet seal. Center ribs inside the gasket ease positioning of the pipe during installation and provide additional support to the gasket. The outlet couplings are NOT recommended for vacuum applications or for use with the Gruzlok Advanced Copper Method.



The Figure 7074 Cast Caps are **NOT** recommended for use on run connections. Figure 7075 Bull Plugs must be used on end of line run connections. Figure 7074 Cast Caps may be used on Figure 7042G outlet connections. Flow into the outlet connection of the Figure 7042 Outlet Couplings must not exceed 7 ft./sec.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruzlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruzlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)

-40°F to 150°F (Service Temperature Range)(-40°C to 66°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 150°F (Service Temperature Range)(-29°C to 66°C)

Recommended for petroleum applications. air with oil vapor and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

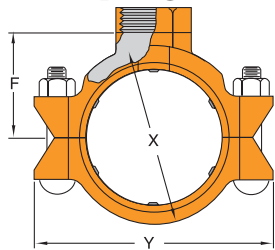
LUBRICATION:

Standard Gruzlok

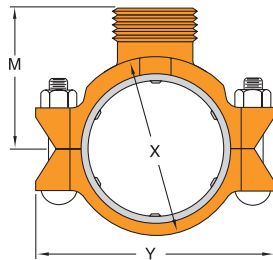
Gruzlok Xtreme™(Do Not use with Grade "L")

FIG. 7042

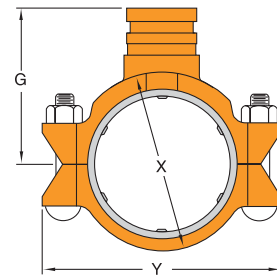
Outlet Coupling



Female IPS Outlet - 7042F



Male IPS Outlet - 7042M



Grooved Outlet - 7042G

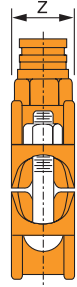


FIGURE 7042 - OUTLET COUPLING

Nominal Pipe Size			Working Pressure	Max. Run End Load	Range of Pipe End Separation	Coupling Dimensions						Bolt Size	Approx . Wt. Each
Run	Outlet					X	Y	Z	FPT F	MPT M	Grv. G		
	FPT F	MPT/Grv. M/G											
In./DN(mm)	In./mm	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1½ 40	½	—	500	1418	¾-1⅞	2⅞	4¾	2¾	2⅞	—	—	⅝ x 2⅞	2.6
	15	—	34.5	6.31	19-27	75	121	70	52	—	—	-	1.2
	¾	—	500	1418	¾-1⅞	2⅞	4¾	2¾	2⅞	—	—	⅝ x 2⅞	2.6
	20	—	34.5	6.31	19-27	75	121	70	52	—	—	-	1.2
	1	—	500	1418	¾-1⅞	2⅞	4¾	2¾	1⅞	—	—	⅝ x 2⅞	2.9
	25	—	34.5	6.31	19-27	75	121	70	49	—	—	-	1.3
2 50	½	—	500	2215	1⅞-1	3⅞	5¼	2¾	2⅞	—	—	⅝ x 2⅞	3.1
	15	—	34.5	9.85	17-25	87	133	70	59	—	—	-	1.4
	¾	—	500	2215	1⅞-1	3⅞	5¼	2¾	2⅞	—	—	⅝ x 2⅞	3.1
	20	—	34.5	9.85	17-25	87	133	70	59	—	—	-	1.4
	1	1	500	2215	1⅞-1	3⅞	5¼	2¾	2⅞	2⅞	3½	⅝ x 2⅞	3.3
	25	25	34.5	9.85	17-25	87	133	70	56	73	89	-	1.5
2½ 65	½	—	500	3246	1⅞-1½	4⅞	6½	3¼	2⅞	—	—	½ x 2⅞	4.8
	15	—	34.5	14.44	30-38	106	165	83	65	—	—	-	2.2
	¾	—	500	3246	1⅞-1½	4⅞	6½	3¼	2⅞	—	—	½ x 2⅞	4.6
	20	—	34.5	14.44	30-38	106	165	83	65	—	—	-	2.1
	1	—	500	3246	1⅞-1½	4⅞	6½	3¼	2⅞	—	—	½ x 2⅞	4.4
	25	—	34.5	14.44	30-38	106	165	83	62	—	—	-	2.2
	—	1¼	500	3246	1⅞-1½	4⅞	6½	3¼	—	3⅞	3⅞	½ x 2⅞	5.1
	32	34.5	14.44	30-38	106	165	83	—	92	92	-	2.3	
3 80	—	1½	500	3246	1⅞-1½	4⅞	6½	3¼	—	3⅞	3⅞	½ x 2⅞	5.9
	—	40	34.5	14.44	30-38	106	165	83	—	92	92	-	2.4
	¾	—	500	4811	1⅞-1½	4¾	7¼	3¼	2⅞	—	—	½ x 3	5.9
	20	—	34.5	21.40	30-38	121	184	83	72	—	—	-	2.7
	1	1	500	4811	1⅞-1½	4¾	7¼	3¼	2¾	3⅞	4	½ x 3	6.2
	25	25	34.5	21.40	30-38	121	184	83	70	86	102	-	2.8
	—	1½	500	4811	1⅞-1½	4¾	7¼	3¼	—	4	4	½ x 3	6.4
	40	34.5	21.40	30-38	121	184	83	—	102	102	-	2.9	
4 100	¾	—	500	7952	1⅞-1⅞	6⅞	8⅞	3⅞	3⅞	—	—	⅝ x 3½	9.2
	20	—	34.5	35.37	40-48	157	225	92	94	—	—	-	4.2
	1	—	500	7952	1⅞-1⅞	6⅞	8⅞	3⅞	3⅞	—	—	⅝ x 3½	9.5
	25	—	34.5	35.37	40-48	157	225	92	91	—	—	-	4.3
	—	1½	500	7952	1⅞-1⅞	6⅞	8⅞	3⅞	—	4⅞	4⅞	⅝ x 3½	9.5
	40	34.5	35.37	40-48	157	225	92	—	124	124	-	4.3	
6 150	—	2	500	7952	1⅞-1⅞	6⅞	8⅞	3⅞	—	4⅞	4⅞	⅝ x 3½	9.9
	—	50	34.5	35.37	40-48	157	225	92	—	124	124	-	4.5
	1	—	500	17236	1⅞-1⅞	8⅞	11¼	3⅞	4¾	—	—	⅝ x 3½	13.2
	25	—	34.5	76.66	41-51	206	286	94	121	—	—	-	6.0
	1½	1½	500	17236	1⅞-1⅞	8⅞	11¼	3⅞	4¾	6	6	⅝ x 3½	13.6
	40	34.5	76.66	41-51	206	286	94	121	154	152	-	6.2	
6 150	—	2	500	17236	1⅞-1⅞	8⅞	11¼	3⅞	—	6	6	⅝ x 3½	14.3
	—	50	34.5	76.66	41-51	206	286	94	—	154	152	-	6.5

Pipe ends must be prepared in accordance with Gruvlok "Roll or Cut Groove Specifications for Steel and Other IPS or ISO size Pipe".

Pressure and end load ratings are for use with standard wall steel pipe.

For a one-time field test only, the maximum working pressure may be increased 1½ times the figure shown.

Not for use in copper systems.

For additional details see "Coupling Data Chart Notes" from page 16.

See Installation & Assembly directions on page 162.

FIG. 7045

Clamp-T, FPT Branch



The Gruvlok Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak tight reliable seal in both positive pressure and vacuum conditions. The maximum working pressure for all sizes is 500 PSI (34.5 bar) when assembled on standard wall steel pipe.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

The Fig. 7045 Clamp-T female pipe thread branch is available with NPT or ISO 7/1 connection and the Fig. 7046 Clamp-T has grooved-end branch connection.

Clamp-T cross connections are available in various sizes allowing greater versatility in piping design.

NOTE: Variable End Configurations are Possible —
Thd x Thd and Gr. x Thd.
Sizes — 2" x 1/2" through 8" x 4"

CLAMP-T FLOW DATA (FRICTIONAL RESISTANCE)

Branch Size Inches	Fig. 7045 Threaded Branch	
	C.V. Value	Equiv. Pipe Length Feet
DN/mm	Meters	
1/2	22	1.0
15	-	0.3
3/4	25	2.0
20	-	0.6
1	44	2.0
25	-	0.6
1 1/4	76	2.5
32	-	0.8
1 1/2	89	4.0
40	-	1.2
2	164	3.5
50	-	1.1
2 1/2	152	12.5
65	-	3.8
3	318	8.5
80	-	2.6
4	536	8.0
100	-	2.4

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

U-BOLT:

Cold drawn steel and zinc plated.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements Contact a Gruvlok Representative for more information.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7045

Clamp-T, FPT Branch

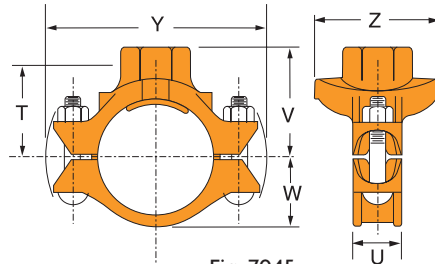


Fig. 7045

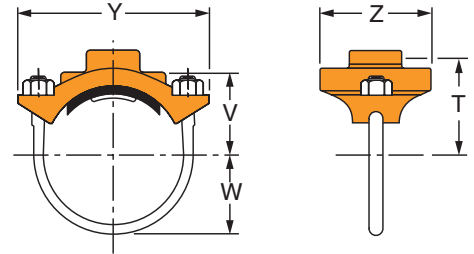


Fig. 7045 (U-Bolt)

FIGURE 7045-FPT BRANCH (TABLE CONTINUES TO NEXT PAGE)

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Ft.-Lbs/N-m		Lbs./Kg
2 x 1/2	2.375 x 0.840	1 1/2	1 5/8	500	2 3/16	9/16	2 5/8	1 1/2	5 1/2	3	1/2 U-Bolt	30	40	2.3
50 x 15	60.3 x 21.3	38	41	34.5	56	14	67	12	140	76	-	-	-	1.0
2 x 3/4	2.375 x 1.050	1 1/2	1 5/8	500	2 1/16	9/16	2 5/8	1 1/2	5 1/2	3	1/2 U-Bolt	30	40	2.3
50 x 20	60.3 x 26.7	38	41	34.5	52	14	67	38	140	76	-	-	-	1.0
2 x 1	2.375 x 1.315	1 1/2	1 5/8	500	1 15/16	9/16	2 5/8	1 1/2	5 1/2	3	1/2 U-Bolt	30	40	2.6
50 x 25	60.3 x 33.7	38	41	34.5	51	14	67	38	140	76	-	-	-	1.2
2 x 1 1/4	2.375 x 1.660	2	2 1/8	500	2 3/16	9/16	2 7/8	1 1/2	5 1/2	3 1/2	1/2 U-Bolt	30	40	2.7
50 x 32	60.3 x 42.4	51	54	34.5	55	14	73	38	140	89	-	-	-	1.2
2 x 1 1/2	2.375 x 1.900	2	2 1/8	500	2 3/16	9/16	2 7/8	1 1/2	7	3 1/2	1/2 U-Bolt	30	40	2.5
50 x 40	60.3 x 48.3	51	54	34.5	55	14	73	38	178	89	-	-	-	1.1
2 1/2 x 1/2	2.875 x 0.840	1 1/2	1 5/8	500	2 1/16	9/16	2 7/8	1 3/4	5 1/2	3	1/2 U-Bolt	30	40	3.0
65 x 15	73.0 x 21.3	38	41	34.5	62	14	73	44	140	76	-	-	-	1.4
2 1/2 x 3/4	2.875 x 1.050	1 1/2	1 5/8	500	2 1/16	9/16	2 7/8	1 3/4	5 1/2	3	1/2 U-Bolt	30	40	2.9
65 x 20	73.0 x 26.7	38	41	34.5	59	14	73	44	140	76	-	-	-	1.3
2 1/2 x 1	2.875 x 1.315	1 1/2	1 5/8	500	2 3/16	9/16	2 7/8	1 3/4	6 1/8	3	1/2 U-Bolt	30	40	2.9
65 x 25	73.0 x 33.7	38	41	34.5	55	14	73	44	156	76	-	-	-	1.3
2 1/2 x 1 1/4	2.875 x 1.660	2	2 1/8	500	2 1/16	9/16	3 1/8	1 3/4	6 1/8	3 3/8	1/2 U-Bolt	30	40	3.4
65 x 32	73.0 x 42.4	51	54	34.5	62	14	79	44	156	86	-	-	-	1.5
2 1/2 x 1 1/2	2.875 x 1.900	2	2 1/8	500	2 1/16	9/16	3 1/8	1 3/4	6 1/8	3 3/8	1/2 U-Bolt	30	40	3.4
65 x 40	73.0 x 48.3	51	54	34.5	62	14	79	44	156	86	-	-	-	1.5
3 x 1/2	3.500 x 0.840	1 1/2	1 5/8	500	2 1/16	9/16	3	2 1/8	7	3 3/4	1/2 U-Bolt	30	40	2.8
80 x 15	88.9 x 21.3	38	41	34.5	65	14	76	54	178	95	-	-	-	1.2
3 x 3/4	3.500 x 1.050	1 1/2	1 5/8	500	2 1/16	9/16	3	2 1/8	7	3 3/4	1/2 U-Bolt	30	40	2.7
80 x 20	88.9 x 26.7	38	41	34.5	62	14	76	54	178	95	-	-	-	1.2
3 x 1	3.500 x 1.315	1 1/2	1 5/8	500	2 1/16	9/16	3	2 1/8	7	3 3/4	1/2 U-Bolt	30	40	2.7
80 x 25	88.9 x 33.7	38	41	34.5	59	14	76	54	178	95	-	-	-	1.2
3 x 1 1/4	3.500 x 1.660	2	2 1/8	500	2 11/16	1 1/2	3 3/8	2 1/8	6 1/8	3 3/4	1/2 x 2 3/4	80	100	3.4
80 x 32	88.9 x 42.4	51	54	34.5	68	38	86	54	175	95	-	-	-	1.5
3 x 1 1/2	3.500 x 1.900	2	2 1/8	500	2 11/16	1 1/2	3 3/8	2 1/8	6 1/8	3 3/4	1/2 x 2 3/4	80	100	4.4
80 x 40	88.9 x 48.3	51	54	34.5	68	38	86	54	175	95	-	-	-	2.0
3 x 2	3.500 x 2.375	2 1/2	2 5/8	500	2 11/16	1 1/2	3 3/8	2 1/8	6 1/8	4 1/8	1/2 x 2 3/4	80	100	4.6
80 x 50	88.9 x 60.3	64	67	34.5	68	38	86	54	175	105	-	-	-	2.1
4 x 1/2	4.500 x 0.840	1 1/2	1 5/8	500	3 1/16	9/16	3 1/2	2 5/8	7 3/4	3 3/4	1/2 U-Bolt	30	40	2.9
100 x 15	114.3 x 21.3	38	41	34.5	76	14	89	67	197	95	-	-	-	1.3
4 x 3/4	4.500 x 1.050	1 1/2	1 5/8	500	3 1/16	9/16	3 1/2	2 5/8	7 3/4	3 3/4	1/2 U-Bolt	30	40	2.8
100 x 20	114.3 x 26.7	38	41	34.5	78	14	89	67	197	95	-	-	-	1.3
4 x 1	4.500 x 1.315	1 1/2	1 5/8	500	2 13/16	9/16	3 1/2	2 5/8	7 3/4	3 3/4	1/2 U-Bolt	30	40	2.7
100 x 25	114.3 x 33.7	38	41	34.5	73	14	89	67	197	95	-	-	-	1.2
4 x 1 1/4	4.500 x 1.660	2	2 1/8	500	3 3/16	1 7/8	3 7/8	2 5/8	7 1/2	3 3/4	1/2 x 2 3/4	80	100	4.5
100 x 32	114.3 x 42.4	51	54	34.5	81	48	98	67	191	95	-	-	-	2.0
4 x 1 1/2	4.500 x 1.900	2	2 1/8	500	3 3/16	1 7/8	3 7/8	2 5/8	7 1/2	3 3/4	1/2 x 2 3/4	80	100	4.6
100 x 40	114.3 x 48.3	51	54	34.5	81	48	98	67	191	95	-	-	-	2.1
4 x 2	4.500 x 2.375	2 1/2	2 5/8	500	3 3/16	1 7/8	4	2 5/8	7 1/2	4 1/8	1/2 x 2 3/4	80	100	7.7
100 x 50	114.3 x 60.3	64	67	34.5	84	48	102	67	191	105	-	-	-	3.5
4 x 2 1/2	4.500 x 2.875	2 3/4	2 7/8	500	3 11/16	1 7/8	4	2 5/8	7 1/2	4 3/8	1/2 x 2 3/4	80	100	5.2
100 x 65	114.3 x 73.0	70	73	34.5	78	48	102	67	191	111	-	-	-	2.4
4 x 3 O.D.	4.500 x 2.996	2 3/4	2 7/8	500	3	1 7/8	4	2 5/8	7 1/2	4 3/8	1/2 x 2 3/4	80	100	5.2
100 x 80	114.3 x 76.1	70	73	34.5	76	48	102	67	191	111	-	-	-	2.4
4 x 3	4.500 x 3.500	3 1/2	3 5/8	500	3 1/4	1 7/8	4 1/4	2 5/8	7 1/2	5 1/4	1/2 x 3 1/2	80	100	6.5
100 x 80	114.3 x 88.9	89	92	34.5	83	48	108	67	191	133	-	-	-	2.9

NOTE: 2 1/2", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5 1/2" O.D. and 6 1/2" O.D. pipe

(Additional larger sizes on next page.)

▼ Based on use with standard wall pipe.

Not for use in copper systems.

§ — For additional Bolt Torque information, see page 184.

See Installation & Assembly directions on page 163.

FIG. 7045

Clamp-T, FPT Branch

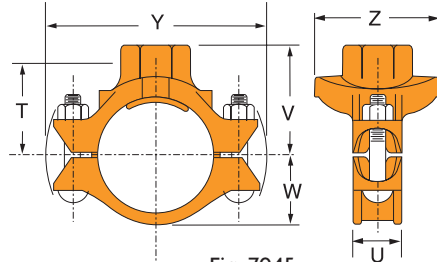


Fig. 7045

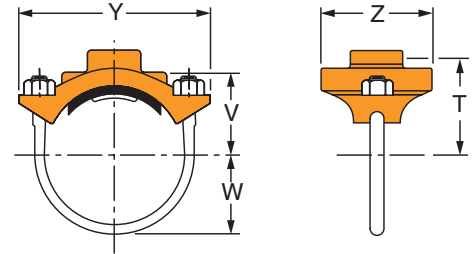


Fig. 7045 (U-Bolt)

FIGURE 7045-FPT BRANCH (CONTINUED FROM PREVIOUS PAGE)

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Fl.-Lbs/N-m		Lbs./Kg
5 x 1¼ 125 x 32	5.563 x 1.660 141.3 x 42.4	2 51	2½ 54	500 34.5	3⅛ 94	1⅞ 48	4⅜ 111	3¼ 83	9⅞ 232	3¼ 95	⅝ x 3¼ -	100	130	5.4 2.4
5 x 1½ 125 x 40	5.563 x 1.900 141.3 x 48.3	2 51	2½ 54	500 34.5	3⅛ 94	1⅞ 48	4⅜ 111	3¼ 83	9⅞ 232	3¼ 95	⅝ x 3¼ -	100	130	5.5 2.5
5 x 2 125 x 50	5.563 x 2.375 141.3 x 60.3	2½ 64	2⅞ 67	500 34.5	3⅛ 97	1⅞ 48	4½ 114	3¼ 83	9⅞ 232	4⅞ 105	⅝ x 3¼ -	100	130	5.7 2.6
5 x 2½ 125 x 65	5.563 x 2.875 141.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	3⅛ 97	1⅞ 48	4¾ 121	3¼ 83	9⅞ 232	4⅞ 111	⅝ x 3¼ -	100	130	7.0 3.2
5 x 3 O.D. 125 x 80	5.563 x 2.996 141.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	3¼ 95	1⅞ 48	4¾ 121	3¼ 83	9⅞ 232	4⅞ 111	¾ x 4½ -	130	180	7.0 3.2
5 x 3 125 x 80	5.563 x 3.500 141.3 x 88.9	3½ 89	3⅞ 92	500 34.5	4 102	1⅞ 48	5 127	3¼ 83	9⅞ 232	5¼ 133	⅝ x 3¼ -	100	130	8.7 3.9
6 x 1¼ 150 x 32	6.625 x 1.660 168.3 x 42.4	2 51	2½ 54	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	3¼ 95	⅝ x 4¼ -	100	130	7.8 3.5
6 x 1½ 150 x 40	6.625 x 1.900 168.3 x 48.3	2 51	2½ 54	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	3¼ 95	⅝ x 4¼ -	100	130	7.8 3.5
6 x 2 150 x 50	6.625 x 2.375 168.3 x 60.3	2½ 64	2⅞ 67	500 34.5	4⅞ 106	2 51	4⅞ 124	3⅞ 98	10⅞ 257	4⅞ 105	⅝ x 4¼ -	100	130	7.8 3.5
6 x 2½ 150 x 65	6.625 x 2.875 168.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	4⅞ 106	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ -	100	130	8.4 3.8
6 x 3 O.D. 150 x 80	6.625 x 2.996 168.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	4⅞ 105	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ -	100	130	8.4 3.8
6 x 3 150 x 80	6.625 x 3.500 168.3 x 88.9	3½ 89	3⅞ 92	500 34.5	4⅞ 111	2 51	5⅞ 137	3⅞ 98	10⅞ 257	5¼ 133	⅝ x 4¼ -	100	130	9.6 4.4
6 x 4 150 x 100	6.625 x 4.500 168.3 x 114.3	4½ 114	4⅞ 117	500 34.5	4⅞ 111	2 51	5½ 140	3⅞ 98	10⅞ 257	6½ 165	⅝ x 4¼ -	100	130	10.5 4.8
8 x 2 200 x 50	8.625 x 2.750 219.1 x 70.0	2½ 64	2⅞ 67	500 34.5	5⅞ 132	2¼ 57	5⅞ 149	5 127	12¾ 324	4⅞ 105	¾ x 4¼ -	130	180	11.3 5.1
8 x 2½ 200 x 65	8.625 x 2.875 219.1 x 73.0	2¾ 70	2⅞ 73	500 34.5	5⅞ 134	2¼ 57	6¼ 159	5 127	12¾ 324	4⅞ 111	¾ x 4½ -	130	180	11.1 5.0
8 x 3 O.D. 200 x 80	8.625 x 2.996 219.1 x 76.1	2¾ 70	2⅞ 73	500 34.5	5¼ 133	2¼ 57	6¼ 159	5 127	12¾ 324	4⅞ 111	¾ x 4½ -	130	180	11.1 5.0
8 x 3 200 x 80	8.625 x 3.500 219.1 x 88.9	3½ 89	3⅞ 92	500 34.5	5⅞ 137	2¼ 57	6⅞ 162	5 127	12¾ 324	5¼ 133	¾ x 4½ -	130	180	13.0 5.9
8 x 4 200 x 100	8.625 x 4.500 219.1 x 114.3	4½ 114	4⅞ 117	500 34.5	5⅞ 137	2¼ 57	6½ 165	5 127	12¾ 324	6½ 165	¾ x 4½ -	130	180	16.2 7.3

NOTE: 2½", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe

▼ Based on use with standard wall pipe.

Not for use in copper systems.

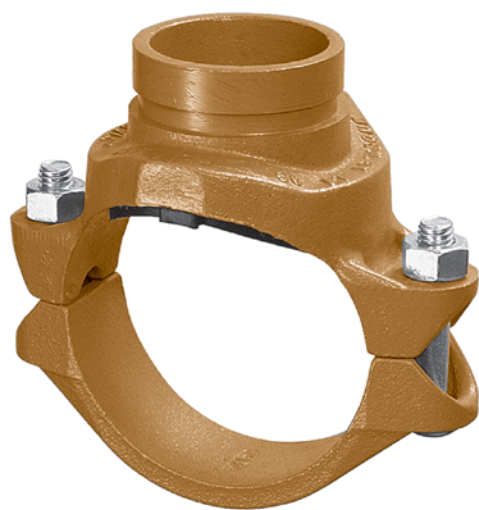
§ - For additional Bolt Torque information, see page 184.

(Additional smaller sizes on previous page.)

See Installation & Assembly directions on page 163.

FIG. 7046

Clamp-T, Grooved Branch



The Gruvlok Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak tight reliable seal in both positive pressure and vacuum conditions. The maximum working pressure for all sizes is 500 PSI (34.5 bar) when assembled on standard wall steel pipe.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

Clamp-T cross connections are available in most sizes allowing greater versatility in piping design.

CLAMP-T FLOW DATA
(FRICTIONAL RESISTANCE)

Branch Size	Fig. 7046 Grooved Branch	
	C.V. Value	Equiv. Pipe Length
In./DN/mm		Ft./Meters
1 1/4 32	5.4	5.0 1.5
1 1/2 40	95	3.5 1.1
2 50	148	4.5 1.4
2 1/2 65	205	7.0 2.1
3 80	294	9.5 2.9
4 100	571	7.0 2.1

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

U-BOLT:

Cold drawn steel and zinc plated.

STAINLESS STEEL BOLTS & NUTS:

Stainless Steel Bolts and Nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative for more information.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7046

Clamp-T, Grooved Branch

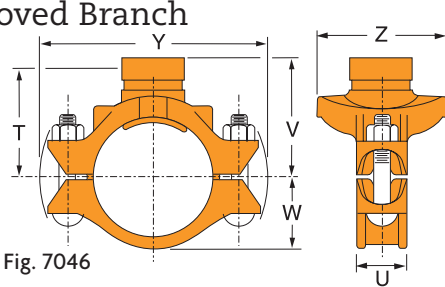


Fig. 7046

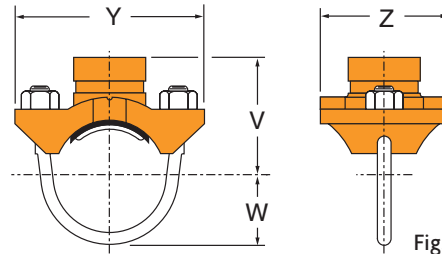


Fig. 7046 (U-Bolt)

FIGURE 7046-GR BRANCH

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions					Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		U	V Grooved	W	Y	Z		Min.	Max.	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Ft.-Lbs/N-m		Lbs./Kg
2½ x 1¼• 65 x 32	2.875 x 1.660 73.0 x 42.4	2 51	2½ 54	500 34.5	⅞ 14	3⅞ 79	1¼ 44	6⅞ 156	3½ 89	½ U-Bolt -	30	40	3.4 1.5
2½ x 1½ 65 x 40	2.875 x 1.900 73.0 x 48.3	2 51	2½ 54	500 34.5	⅞ 14	3⅞ 79	1¼ 44	6⅞ 156	3½ 89	½ U-Bolt -	30	40	3.4 1.5
3 x 1¼ 80 x 32	3.500 x 1.660 88.9 x 42.4	2 51	2½ 54	500 34.5	1½ 38	3½ 89	2½ 54	6⅞ 175	3¾ 95	½ x 2¾ -	80	100	3.4 1.5
3 x 1½ 80 x 40	3.500 x 1.900 88.9 x 48.3	2 51	2½ 54	500 34.5	1½ 38	3½ 89	2½ 54	6⅞ 175	3¾ 95	½ x 2¾ -	80	100	4.4 2.0
3 x 2 80 x 50	3.500 x 2.375 88.9 x 60.3	2½ 64	2⅝ 67	500 34.5	1½ 38	3½ 89	2½ 54	6⅞ 175	4⅞ 105	½ x 2¾ -	80	100	4.6 2.1
4 x 1¼ 100 x 32	4.500 x 1.660 114.3 x 42.4	2 51	2½ 54	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	3¾ 95	½ x 2¾ -	80	100	4.2 1.9
4 x 1½ 100 x 40	4.500 x 1.900 114.3 x 48.3	2 51	2½ 54	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	3¾ 95	½ x 2¾ -	80	100	4.3 2.0
4 x 2 100 x 50	4.500 x 2.375 114.3 x 60.3	2½ 64	2⅝ 67	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	4⅞ 105	½ x 2¾ -	80	100	4.6 2.1
4 x 2½ 100 x 65	4.500 x 2.875 114.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	4⅞ 111	½ x 2¾ -	80	100	5.0 2.3
4 x 3 O.D. 100 x 80	4.500 x 2.996 114.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	4⅞ 111	½ x 2¾ -	80	100	5.0 2.3
4 x 3 100 x 80	4.500 x 3.500 114.3 x 88.9	3½ 89	3⅞ 92	500 34.5	1⅞ 48	4 102	2⅝ 67	7⅞ 191	5¼ 133	½ x 3½ -	80	100	5.6 2.5
5 x 1¼ 125 x 32	5.563 x 1.660 141.3 x 42.4	2 51	2½ 54	500 34.5	1⅞ 48	4¼ 108	3¼ 83	9⅞ 232	3¾ 95	½ x 2¾ -	80	100	5.6 2.5
5 x 1½ 125 x 40	5.563 x 1.900 141.3 x 48.3	2 51	2½ 54	500 34.5	1⅞ 48	4¼ 108	3¼ 83	9⅞ 232	3¾ 95	⅝ x 3¼ -	100	130	5.6 2.5
5 x 2 125 x 50	5.563 x 2.375 141.3 x 60.3	2½ 64	2⅝ 67	500 34.5	1⅞ 48	4¼ 108	3¼ 83	9⅞ 232	4⅞ 105	⅝ x 3¼ -	100	130	5.5 2.5
5 x 2½ 125 x 65	5.563 x 2.875 141.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	1⅞ 48	4¼ 108	3¼ 83	9⅞ 232	4⅞ 111	⅝ x 3¼ -	100	130	5.8 2.6
5 x 3 125 x 80	5.563 x 3.500 141.3 x 88.9	3½ 89	3⅞ 92	500 34.5	1⅞ 48	4⅞ 117	3¼ 83	9⅞ 232	5¼ 133	⅝ x 3¼ -	100	130	7.1 3.2
6 x 1½ 150 x 40	6.625 x 1.900 168.3 x 48.3	2 51	2½ 54	500 34.5	2 51	5 127	3⅞ 98	10⅞ 257	3¾ 95	⅝ x 4¼ *	100	130	7.2 3.3
6 x 2 150 x 50	6.625 x 2.375 168.3 x 60.3	2½ 64	2⅝ 67	500 34.5	2 51	5 127	3⅞ 98	10⅞ 257	4⅞ 105	⅝ x 4¼ *	100	130	7.8 3.5
6 x 2½ 150 x 65	6.625 x 2.875 168.3 x 73.0	2¾ 70	2⅞ 73	500 34.5	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ *	100	130	7.6 3.4
6 x 3 O.D. 150 x 80	6.625 x 2.996 168.3 x 76.1	2¾ 70	2⅞ 73	500 34.5	2 51	5⅞ 130	3⅞ 98	10⅞ 257	4⅞ 111	⅝ x 4¼ *	100	130	7.6 3.4
6 x 3 150 x 80	6.625 x 3.500 168.3 x 88.9	3½ 89	3⅞ 92	500 34.5	2 51	5⅞ 130	3⅞ 98	10⅞ 257	5¼ 133	⅝ x 4¼ *	100	130	8.0 3.6
6 x 4 150 x 100	6.625 x 4.500 168.3 x 114.3	4½ 114	4⅞ 117	500 34.5	2 51	5¼ 133	3⅞ 98	10⅞ 257	6½ 165	⅝ x 4¼ *	100	130	10.4 4.7
8 x 2 200 x 50	8.625 x 2.375 219.1 x 60.3	2½ 64	2⅝ 67	500 34.5	2¼ 57	6⅞ 156	5 127	12¾ 324	4¼ 108	¾ x 4½ -	130	180	10.4 4.7
8 x 2½ 200 x 65	8.625 x 2.875 219.1 x 73.0	2¾ 70	2⅞ 73	500 34.5	2¼ 57	6⅞ 156	5 127	12¾ 324	4⅞ 111	¾ x 4½ M20 x 110	130 175	180 245	10.6 4.8
8 x 3 200 x 80	8.625 x 3.500 219.1 x 88.9	3½ 89	3⅞ 92	500 34.5	2¼ 57	6⅞ 156	5 127	12¾ 324	5¼ 133	¾ x 4½ M20 x 110	130 175	180 245	11.5 5.2
8 x 4 200 x 100	8.625 x 4.500 219.1 x 114.3	4½ 114	4⅞ 117	500 34.5	2¼ 57	6⅞ 159	5 127	12¾ 324	6½ 165	¾ x 4½ M20 x 110	130 175	180 245	16.2 7.3

NOTE: 2 ½", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5 ½" O.D. and 6 ½" O.D. pipe

▼ Based on use with standard wall pipe.

Not for use in copper systems.

• Cannot be used in cross configuration.

§ - For additional Bolt Torque Information, see page 184.

See Installation & Assembly directions on page 163.

FIG. 7047, FIG. 7048 & FIG. 7049

Clamp-T, Cross



Fig. 7047



Fig. 7048

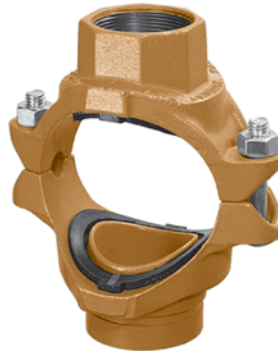


Fig. 7049

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

The Fig. 7045 Clamp-T female pipe thread branch is available with NPT or ISO 7/1 connection and the Fig. 7046 Clamp-T has grooved-end branch connection.

Clamp-T cross connections are available allowing greater versatility in piping design.

NOTE: 2 1/2" x 1 1/4" Figure 7046 cannot be used in cross configuration.

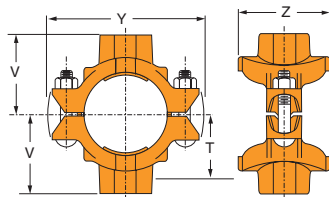


Fig. 7047 - Thread x Thread

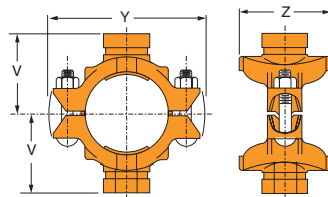


Fig. 7048 - Groove x Groove

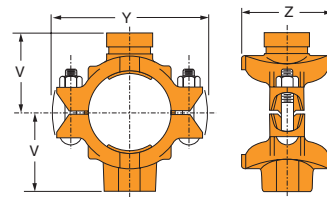


Fig. 7049 - Groove x Thread



NOTE: In addition, 2 x 1 1/2" through 2 x 1 1/2" can now be made into crosses from the new design.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative for more information.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™ (Do Not use with Grade "L")

Not for use in copper systems.

GRUVLOK FITTINGS FOR GROOVED-END PIPE

Gruvlok fittings are available through 24" nominal pipe size in a variety of styles. Use the Fitting Size Table to convert nominal pipe size to corresponding pipe O.D.

These fittings are designed to provide minimum pressure drop and uniform strength.

Depending on styles and size, Gruvlok fittings are provided in various materials including malleable iron, ductile iron, forged steel or fabricated steel.

Pressure ratings of Gruvlok standard fittings conform to those of Fig. 7001 Gruvlok coupling.

Not for use in copper systems.



FLOW DATA – FRICTIONAL RESISTANCE (EXPRESSED AS EQUIVALENT STRAIGHT PIPE)

Nom. Size	O.D.	Pipe Wall Thickness	Elbow		Tee	
			90°	45°	Branch	Run
In./DN(mm)	In./mm	In./mm	ft./m	ft./m	ft./m	ft./m
1	1.315	0.133	1.7	0.9	4.4	1.7
25	33.4	3.4	0.5	0.3	1.3	0.5
1 1/4	1.660	0.140	2.3	1.2	5.8	2.3
32	42.2	3.6	0.7	0.4	1.8	0.7
1 1/2	1.900	0.145	2.7	1.3	6.7	2.7
40	48.3	3.7	0.8	0.4	2.0	0.8
2	2.375	0.154	3.4	1.7	8.6	3.4
50	60.3	3.9	1.0	0.5	2.6	1.0
2 1/2	2.875	0.203	4.1	2.1	10.3	4.1
65	73.0	5.2	1.2	0.6	3.1	1.2
3 O.D.	2.996	0.197	4.3	2.2	10.8	4.3
76.1	76.1	5.0	1.3	0.7	3.3	1.3
3	3.500	0.216	5.1	2.6	12.8	5.1
80	88.9	5.5	1.6	0.8	3.9	1.6
4 1/4 O.D.	4.250	0.220	6.4	3.2	16.1	6.4
108.0	108.0	5.6	2.0	1.0	4.9	2.0
4	4.500	0.237	6.7	3.4	16.8	6.7
100	114.3	6.0	2.0	1.0	5.1	2.0
5 1/4 O.D.	5.236	0.248	8.0	4.0	20.1	8.0
133.0	133.0	6.3	2.4	1.2	6.1	2.4
5 1/2 O.D.	5.500	0.248	8.3	4.2	20.9	8.3
139.7	139.7	6.3	2.5	1.3	6.4	2.5
5	5.563	0.258	8.4	4.2	21.0	8.4
125	141.3	6.6	2.6	1.3	6.4	2.6
6 1/4 O.D.	6.259	0.280	9.7	4.9	24.3	9.7
159.0	159.0	7.1	3.0	1.5	7.4	3.0
6 1/2 O.D.	6.500	0.280	10.0	5.0	24.9	10.0
165.1	165.1	7.1	3.0	1.5	7.6	3.0
6	6.625	0.280	10.1	5.1	25.3	10.1
150	168.3	7.1	3.1	1.6	7.7	3.1
8	8.625	0.322	13.3	6.7	33.3	13.3
200	219.1	8.2	4.1	2.0	10.1	4.1
10	10.750	0.365	16.7	8.4	41.8	16.7
250	273.1	9.3	5.1	2.6	12.7	5.1
12	12.750	0.375	20.0	10.0	50.0	20.0
300	323.9	9.5	6.1	3.0	15.2	6.1
14	14.000	0.375	22.2	11.7	64.2	22.9
350	355.6	9.5	6.8	3.4	19.6	7.0
16	16.000	0.375	25.5	12.4	73.9	26.4
400	406.4	9.5	7.8	3.9	22.5	8.0
18	18.000	0.375	28.9	14.5	87.2	31.1
450	457.2	9.5	8.8	4.4	26.6	9.5
20	20.000	0.375	32.2	16.1	97.3	34.8
500	508.0	9.5	9.8	4.9	29.7	10.6
24	24.000	0.375	38.9	19.5	113.0	40.4
600	609.6	9.5	11.9	5.9	34.4	12.3

For the reducing tee and branches, use the value that is corresponding to the branch size. For example: for 6" x 6" x 3" tee, the branch value of 3" is 12.8 ft (3.9).

MATERIAL SPECIFICATIONS

CAST FITTINGS:

Ductile iron conforming to ASTM A 536

Malleable iron conforming to ASTM A 47

FABRICATED FITTINGS:

1-6" Carbon steel, Schedule 40, conforming to ASTM A 53, Grade B

8-12" Carbon steel, Schedule 30, conforming to ASTM A 53, Grade B

14-24" Carbon steel, 0.375 wall, conforming to ASTM A 53, Grade B

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized conforming to ASTM A 153 (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

FITTING SIZE

Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
1	1.315	5	5.563
25	33.4	140	141.3
1 1/4	1.660	6 1/4 O.D.	6.259
32	42.2	159.0	159.0
1 1/2	1.900	6 1/2 O.D.	6.500
40	48.3	165.1	165.1
2	2.375	6	6.625
50	60.3	150	168.3
2 1/2	2.875	8	8.625
65	73.0	200	219.1
3 O.D.	2.996	10	10.750
76.1	76.1	250	273.0
3	3.500	12	12.750
80	88.9	300	323.9
3 1/2	4.000	14	14.000
65	101.6	350	355.6
4 1/4 O.D.	4.250	16	16.000
108.0	108.0	400	406.4
4	4.500	18	18.000
100	114.3	450	457.2
5 1/4 O.D.	5.236	20	20.000
133.0	133.0	500	508.0
5 1/2 O.D.	5.500	24	24.000
139.7	139.7	600	609.6

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok Fittings are identified by either the Nominal size in inches or the Pipe O.D. in/mm.

FIG. 7050

90° Elbow*

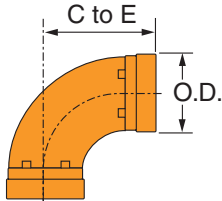


FIGURE 7050 90° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	2¼ C	0.6
25	33.4	57	0.3
1¼	1.660	2¾ C	1.0
32	42.2	70	0.5
1½	1.900	2¾ C	1.2
40	48.3	70	0.5
2	2.375	3¼ C	1.7
50	60.3	83	0.8
2½	2.875	3¼ C	2.6
65	73.0	95	1.2
3 O.D.	2.996	4 C	3.6
76.1	76.1	102	1.6
3	3.500	4¼ C	4.0
80	88.9	108	1.8
3½	4.000	4½ C	5.5
90	101.6	114	2.5
4¼ O.D.	4.250	4¾ C	7.7
108.0	108.0	121	3.5
4	4.500	5 C	7.7
100	114.3	127	3.5
5¼ O.D.	5.236	5¼ C	10.4
133.0	133.0	133	4.7
5½ O.D.	5.500	5¼ C	10.9
139.7	139.7	133	4.9
5	5.563	5½ C	11.1
125	141.3	140	5.0
6¼ O.D.	6.259	6 C	15.2
159.0	159.0	152	6.9
6½ O.D.	6.500	6½ C	17.4
165.1	165.1	165	7.9
6	6.625	6½ C	16.5
150	168.3	165	7.5
8	8.625	7¾ C	30.6
200	219.1	197	13.9
10	10.750	9 C	53.5
250	273.1	229	24.3
12	12.750	10 C	82
300	323.9	254	37.2
14	14.000	21	169.0
350	355.6	533	76.7
16	16.000	24	222.0
400	406.4	610	100.7
18	18.000	27	280.0
450	457.2	686	127.0
20	20.000	30	344.0
500	508.0	762	156.0
24	24.000	36	490.0
600	609.6	914	222.3

FIG. 7051

45° Elbow*

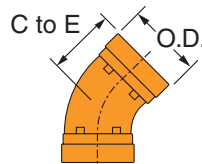


FIGURE 7051 45° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	1¾ C	0.5
25	33.4	44	0.2
1¼	1.660	1¾ C	0.7
32	42.2	44	0.3
1½	1.900	1¾ C	0.9
40	48.3	44	0.4
2	2.375	2 C	1.5
50	60.3	51	0.7
2½	2.875	2½ C	1.9
65	73.0	57	0.9
3 O.D.	2.996	2½ C	2.2
76.1	76.1	64	1.0
3	3.500	2½ C	3.3
80	88.9	64	1.5
3½	4.000	2¾ C	4.3
90	101.6	70	2.0
4¼ O.D.	4.250	2¾ C	4.4
108.0	108.0	83	2.0
4	4.500	3 C	5.4
100	114.3	76	2.4
5¼ O.D.	5.236	3¼ C	7.3
133.0	133.0	83	3.3
5½ O.D.	5.500	3¼ C	7.8
139.7	139.7	83	3.5
5	5.563	3¼ C	9.0
125	141.3	83	4.1
6¼ O.D.	6.259	3½ C	10.1
159.0	159.0	89	4.6
6½ O.D.	6.500	3½ C	11.1
165.1	165.1	89	5.0
6	6.625	3½ C	11.2
150	168.3	89	5.1
8	8.625	4¼ C	19.8
200	219.1	108	9.0
10	10.750	4¾ C	34.3
250	273.1	121	15.6
12	12.750	5¼ C	50.0
300	323.9	133	22.7
14	14.000	8¾	92.0
350	355.6	222	41.7
16	16.000	10	117.0
400	406.4	254	53.1
18	18.000	11¼	146.0
450	457.2	286	66.2
20	20.000	12½	179.0
500	508.0	317	81.2
24	24.000	15	255.0
600	609.6	381	115.7

FIG. 7052

22 ½° Elbow

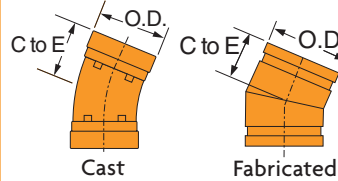


FIGURE 7052 22½° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	¾	0.5
25	33.4	83	0.2
1¼	1.660	1¾	0.7
32	42.2	44	0.3
1½	1.900	1¾	0.8
40	48.3	44	0.4
2	2.375	1½ C	1.5
50	60.3	48	0.7
2½	2.875	2	1.9
65	73.0	51	0.9
3	3.500	2¼ C	3.2
80	88.9	57	1.5
3½	4.000	2½	4.0
90	101.6	64	1.8
4	4.500	2¾ C	5.3
100	114.3	67	2.4
5	5.563	2¾	7.2
125	141.3	73	3.3
6	6.625	3¾ C	8.2
150	168.3	79	3.7
8	8.625	3¾ C	17.8
200	219.1	98	8.1
10	10.750	4¾	30.0
250	273.1	111	13.6
12	12.750	4¾	40.4
300	323.9	124	18.3
14	14.000	5	46.0
350	355.6	127	20.9
16	16.000	5	52.2
400	406.4	127	23.7
18	18.000	5½	65.0
450	457.2	140	29.5
20	20.000	6	80.0
500	508.0	152	36.3
24	24.000	7	112.0
600	609.6	178	50.8

FIG. 7053

11 ¼° Elbow

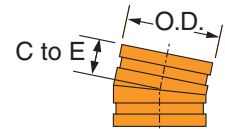


FIGURE 7053 11¼° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	1¾	0.3
25	33.4	35	0.1
1¼	1.660	1¾	0.5
32	42.2	35	0.2
1½	1.900	1¾	0.7
40	48.3	35	0.3
2	2.375	1¾	0.9
50	60.3	35	0.4
2½	2.875	1½	1.5
65	73.0	38	0.7
3	3.500	1½	2.0
80	88.9	38	0.9
3½	4.000	1¾	2.8
90	101.6	44	1.3
4	4.500	1¾	3.3
100	114.3	44	1.5
5	5.563	2	5.0
125	141.3	51	2.3
6	6.625	2	6.5
150	168.3	51	2.9
8	8.625	2	10.0
200	219.1	51	4.5
10	10.750	2½	14.5
250	273.1	54	6.6
12	12.750	2¼	18.7
300	323.9	57	8.5
14	14.000	3½	32.1
350	355.6	89	14.6
16	16.000	4	42.0
400	406.4	102	19.1
18	18.000	4½	53.2
450	457.2	114	24.1
20	20.000	5	65.7
500	508.0	127	29.8
24	24.000	6	96.0
600	609.6	152	43.5

C - Cast malleable or ductile iron, all others are fabricated steel.

* 14"-24" Standard Radius 90° & 45° Elbows are 1 ½."

Center to end dimensions and weights may differ from those shown in chart, contact a Gruvlok Representative for more information.



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FIG. 7050LR

90° Long Radius Elbow*

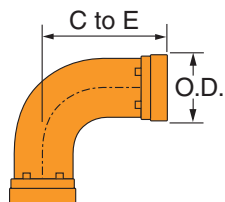


FIGURE 7050 LR LONG RADIUS 90° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	3½	0.9
25	33.4	89	0.4
1¼	1.660	3¾	1.3
32	42.2	98	0.6
1½	1.900	4¼	1.7
40	48.3	108	0.8
2	2.375	4¾ C	2.5
50	60.3	136	1.1
2½	2.875	5¼	4.9
65	73.0	146	2.2
3	3.500	5¾ C	6.5
80	88.9	181	2.9
3½	4.000	7¼	9.7
90	101.6	184	4.4
4	4.500	7½ C	11.5
100	114.3	191	5.2
5	5.563	9½	20.9
125	141.3	241	9.5
6	6.625	10¾	29.1
150	168.3	273	13.2
8	8.625	15	59.2
200	219.1	381	26.9
10	10.750	18	104.0
250	273.1	457	47.2
12	12.750	21	147.0
300	323.9	533	66.7
14	14.000	21	169.0
350	355.6	533	76.7
16	16.000	24	222.0
400	406.4	610	100.7
18	18.000	27	280.0
450	457.2	686	127.0
20	20.000	30	344.0
500	508.0	762	156.0
24	24.000	36	490.0
600	609.6	914	222.3

FIG. 7051LR

45° Long Radius Elbow*

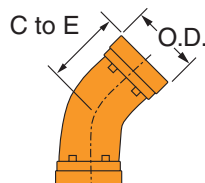


FIGURE 7051 LR LONG RADIUS 45° ELBOW*			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	2½	0.7
25	33.4	64	0.3
1¼	1.660	2½	1.0
32	42.2	64	0.5
1½	1.900	2½	1.2
40	48.3	64	0.5
2	2.375	2¾	1.7
50	60.3	70	0.8
2½	2.875	3	2.9
65	73.0	76	1.3
3	3.500	3¾	4.3
80	88.9	86	2.0
3½	4.000	3½	5.3
90	101.6	89	2.4
4	4.500	4	7.2
100	114.3	102	3.3
5	5.563	5	12.2
125	141.3	127	5.5
6	6.625	5½	17.4
150	168.3	140	7.9
8	8.625	7¼	34.0
200	219.1	184	15.4
10	10.750	8½	57.4
250	273.1	216	26.0
12	12.750	10	82.6
300	323.9	254	37.5
14	14.000	8¾	92.0
350	355.6	222	41.7
16	16.000	10	117.0
400	406.4	254	53.1
18	18.000	11¼	146.0
450	457.2	286	66.2
20	20.000	12½	179.0
500	508.0	317	81.2
24	24.000	15	255.0
600	609.6	381	115.7

C - Cast malleable or ductile iron, all others are fabricated steel.

* 14"-24" Standard Radius 90° & 45° Elbows are 1 ½.

Center to end dimensions and weights may differ from those shown in chart, Contact a Gruvlok Representative for more information.



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FIG. 7063

Tee w/ Threaded Branch

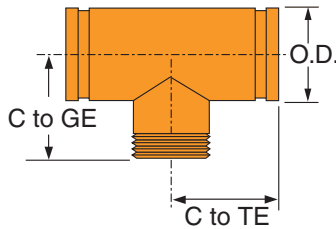


FIGURE 7063 TEE WITH THREADED BRANCH

Nominal Size	O.D.	C to GE	C to TE	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1	1.315	2 1/4	2 1/4	0.9
25	33.4	57	57	0.4
1 1/4	1.660	2 3/4	2 3/4	1.4
32	42.2	70	70	0.6
1 1/2	1.900	2 3/4	2 3/4	1.7
40	48.3	70	70	0.8
2	2.375	3 1/4	4 1/4	2.9
50	60.3	83	108	1.3
2 1/2	2.875	3 3/4	3 3/4	4.7
65	73.0	95	95	2.1
3	3.500	4 1/4	6	8.1
80	88.9	108	152	3.7
3 1/2	4.000	4 1/2	4 1/2	8.8
90	101.6	114	114	4.0
4	4.500	5	7 1/4	13.5
100	114.3	127	184	6.1
5	5.563	5 1/2	5 1/2	16.7
125	140	140	140	7.6
6	6.625	6 1/2	6 1/2	25.6
150	168.3	165	165	11.6
8	8.625	7 3/4	7 3/4	45.0
200	219.1	197	197	20.4
10	10.750	9	9	73.0
250	273.1	229	229	33.1
12	12.750	10	10	98.0
300	323.9	254	254	44.5



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C - Cast malleable or ductile iron, all others are fabricated steel.

FIG. 7061

Reducing Tee Standard

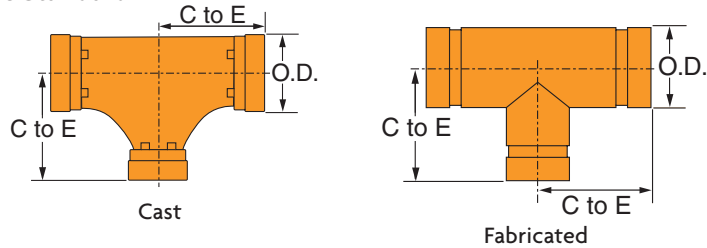


FIGURE 7061 STANDARD REDUCING TEE

Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
1 1/4 x 1 1/4 x 1	2 3/4	1.5	6 x 6 x 2 1/2	6 1/2 C	26.5	14 x 14 x 8	11	103
32 x 32 x 25	70	0.7	150 x 150 x 65	165	12.0	350 x 350 x 200	279	46.7
1 1/2 x 1 1/2 x 1	2 3/4	1.8	6 x 6 x 3	6 1/2 C	26.5	14 x 14 x 10	11	104
40 x 40 x 25	70	0.8	150 x 150 x 80	165	12.0	350 x 350 x 250	279	47.2
1 1/2 x 1 1/2 x 1 1/4	2 3/4	1.8	6 x 6 x 4	6 1/2 C	26.5	14 x 14 x 12	11	105
40 x 40 x 32	70	0.8	150 x 150 x 100	165	12.0	350 x 350 x 300	279	47.6
2 x 2 x 1	3 1/4 C	2.6	6 x 6 x 5	6 1/2 C	28.0	16 x 16 x 4	12	126
50 x 50 x 25	83	1.2	150 x 150 x 125	165	12.7	400 x 400 x 100	305	57.2
2 x 2 x 1 1/4	3 1/4	1.7	8 x 8 x 1 1/2	7 3/4	33.0	16 x 16 x 6	12	127
50 x 50 x 32	83	0.8	200 x 200 x 40	197	15.0	400 x 400 x 150	305	57.6
2 x 2 x 1 1/2	3 1/4 C	2.7	8 x 8 x 2	7 3/4	32.7	16 x 16 x 8	12	128
50 x 50 x 40	83	1.2	200 x 200 x 50	197	14.8	400 x 400 x 200	305	58.1
2 1/2 x 2 1/2 x 1	3 3/4	4.1	8 x 8 x 2 1/2	7 3/4	33.0	16 x 16 x 10	12	129
65 x 65 x 25	95	1.9	200 x 200 x 65	197	15.0	400 x 400 x 250	305	58.5
2 1/2 x 2 1/2 x 1 1/4	3 3/4	4.2	8 x 8 x 3	7 3/4	33.5	16 x 16 x 12	12	130
65 x 65 x 32	95	1.9	200 x 200 x 80	197	15.2	400 x 400 x 300	305	59.0
2 1/2 x 2 1/2 x 1 1/2	3 3/4	4.3	8 x 8 x 4	7 3/4 C	50.0	16 x 16 x 14	12	132
65 x 65 x 40	95	2.0	200 x 200 x 100	197	22.7	400 x 400 x 350	305	59.9
2 1/2 x 2 1/2 x 2	3 3/4	4.4	8 x 8 x 5	7 3/4	34.7	18 x 18 x 4	15 1/2	188
65 x 65 x 50	95	2.0	200 x 200 x 125	197	15.7	450 x 450 x 100	394	85.3
3 x 3 x 1	4 1/4 C	7.0	8 x 8 x 6	7 3/4 C	54.0	18 x 18 x 6	15 1/2	190
80 x 80 x 25	108	3.2	200 x 200 x 150	197	24.5	450 x 450 x 150	394	86.2
3 x 3 x 1 1/4	4 1/4	5.8	10 x 10 x 1 1/2	9	52.0	18 x 18 x 8	15 1/2	192
80 x 80 x 32	108	2.6	250 x 250 x 40	229	23.6	450 x 450 x 200	394	87.1
3 x 3 x 1 1/2	4 1/4	5.9	10 x 10 x 2	9	52.2	18 x 18 x 10	15 1/2	194
80 x 80 x 40	108	2.7	250 x 250 x 50	229	23.7	450 x 450 x 250	394	88.0
3 x 3 x 2	4 1/4 C	5.5	10 x 10 x 2 1/2	9	52.6	18 x 18 x 12	15 1/2	196
80 x 80 x 50	108	2.5	250 x 250 x 65	229	23.9	450 x 450 x 300	394	88.9
3 x 3 x 2 1/2	4 1/4	6.3	10 x 10 x 3	9	53.0	18 x 18 x 14	15 1/2	201
80 x 80 x 65	108	2.9	250 x 250 x 80	229	24.0	450 x 450 x 350	394	91.2
4 x 4 x 1	3 3/4	7.0	10 x 10 x 4	9	53.6	18 x 18 x 16	15 1/2	203
100 x 100 x 25	95	3.2	250 x 250 x 100	229	24.3	450 x 450 x 400	394	92.1
4 x 4 x 1 1/4	5	9.6	10 x 10 x 5	9	54.2	20 x 20 x 6	17 1/4	240
100 x 100 x 32	127	4.4	250 x 250 x 125	229	24.6	500 x 500 x 150	438	108.9
4 x 4 x 1 1/2	5	10.2	10 x 10 x 6	9	55.0	20 x 20 x 8	17 1/4	242
100 x 100 x 40	127	4.6	250 x 250 x 150	229	24.9	500 x 500 x 200	438	109.8
4 x 4 x 2	5 C	10.2	10 x 10 x 8	9	64.7	20 x 20 x 10	17 1/4	244
100 x 100 x 50	127	4.6	250 x 250 x 200	229	29.3	500 x 500 x 250	438	110.7
4 x 4 x 2 1/2	5 C	11.2	12 x 12 x 1	10	77.0	20 x 20 x 12	17 1/4	246
100 x 100 x 65	127	5.1	300 x 300 x 25	254	34.9	500 x 500 x 300	438	111.6
4 x 4 x 3	5 C	11.4	12 x 12 x 2	10	80.0	20 x 20 x 14	17 1/4	248
100 x 100 x 80	127	5.2	300 x 300 x 50	254	36.3	500 x 500 x 350	438	112.5
5 x 5 x 1	5 1/2	13.6	12 x 12 x 2 1/2	10	78.0	20 x 20 x 16	17 1/4	250
125 x 125 x 25	140	6.2	300 x 300 x 65	254	35.4	500 x 500 x 400	438	113.4
5 x 5 x 1 1/2	5 1/2	13.8	12 x 12 x 3	10	74.6	20 x 20 x 18	17 1/4	252
125 x 125 x 40	140	6.3	300 x 300 x 80	254	33.8	500 x 500 x 450	438	114.3
5 x 5 x 2	5 1/2	14	12 x 12 x 4	10	75.1	24 x 24 x 8	20	327
125 x 125 x 50	140	6.4	300 x 300 x 100	254	34.1	600 x 600 x 200	508	148.3
5 x 5 x 2 1/2	5 1/2	14.3	12 x 12 x 5	10	75.6	24 x 24 x 10	20	330
125 x 125 x 65	140	6.5	300 x 300 x 125	254	34.3	600 x 600 x 250	508	149.7
5 x 5 x 3	5 1/2	14.6	12 x 12 x 6	10	76.2	24 x 24 x 12	20	334
125 x 125 x 80	140	6.6	300 x 300 x 150	254	34.6	600 x 600 x 300	508	151.5
5 x 5 x 4	5 1/2 C	17.9	12 x 12 x 8	10	76.3	24 x 24 x 14	20	340
125 x 125 x 100	140	8.1	300 x 300 x 200	254	34.6	600 x 600 x 350	508	154.2
6 x 6 x 1	6 1/2	20.5	12 x 12 x 10	10	77.6	24 x 24 x 16	20	342
150 x 150 x 25	165	9.3	300 x 300 x 250	254	35.2	600 x 600 x 400	508	155.1
6 x 6 x 1 1/2	6 1/2	21.0	14 x 14 x 4	11	100.0	24 x 24 x 18	20	345
150 x 150 x 40	165	9.5	350 x 350 x 100	279	45.4	600 x 600 x 450	508	156.5
6 x 6 x 2	6 1/2 C	26.4	14 x 14 x 6	11	101	24 x 24 x 20	20	347
150 x 150 x 50	165	12.0	350 x 350 x 150	279	45.8	600 x 600 x 500	508	157.4

Center to end dimensions and weights may differ from those shown in chart, contact a Gruvlok Representative for more information.

See Fitting Size chart on page 48 for O.D.

FIG. 7064

Reducing Tee w/ Threaded Branch

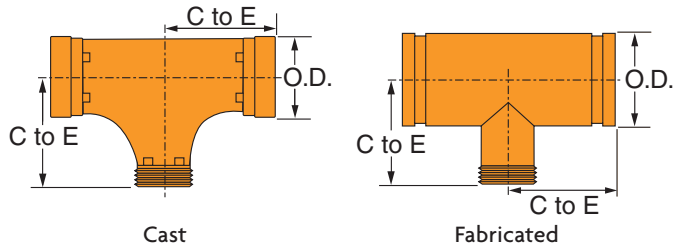


FIG. 7060

Tee

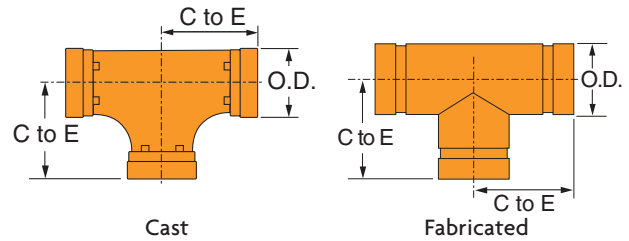


FIGURE 7064 REDUCING TEE WITH THREADED BRANCH

Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs/Kg	In./DN(mm)	In./mm	Lbs/Kg
2 x 2 x 3/4	3 1/4	1.6	8 x 8 x 4	7 3/4	50.0
50 x 50 x 20	83	0.7	200 x 200 x 100	197	22.7
2 x 2 x 1	3 1/4 C	2.6	8 x 8 x 5	7 3/4	41.0
50 x 50 x 25	83	1.2	200 x 200 x 125	197	18.6
2 x 2 x 1 1/4	3 1/4	1.7	8 x 8 x 6	7 3/4	54.0
50 x 50 x 32	83	0.8	200 x 200 x 150	197	24.5
2 x 2 x 1 1/2	3 1/4 C	2.7	10 x 10 x 2	9	61.8
50 x 50 x 40	83	1.2	250 x 250 x 50	229	28.0
2 1/2 x 2 1/2 x 1	3 3/4	4.1	10 x 10 x 3	9	63.0
65 x 65 x 25	95	1.9	250 x 250 x 80	229	28.6
2 1/2 x 2 1/2 x 1 1/2	3 3/4	4.3	10 x 10 x 4	9	64.0
65 x 65 x 40	95	2	250 x 250 x 100	229	29.0
2 1/2 x 2 1/2 x 2	3 3/4	4.4	10 x 10 x 5	9	65.1
65 x 65 x 50	95	2	250 x 250 x 125	229	29.5
3 x 3 x 3/4	4 1/4	5.7	10 x 10 x 6	9	55.0
80 x 80 x 20	108	2.6	250 x 250 x 150	229	24.9
3 x 3 x 1	4 1/4 C	7.0	10 x 10 x 8	9	64.7
80 x 80 x 25	108	3.2	250 x 250 x 200	229	29.3
3 x 3 x 1 1/2	4 1/4	5.3	12 x 12 x 3	10	84.9
80 x 80 x 40	108	2.4	300 x 300 x 80	254	38.5
3 x 3 x 2	4 1/4	5.5	12 x 12 x 4	10	85.8
80 x 80 x 50	108	2.5	300 x 300 x 100	254	38.9
3 x 3 x 2 1/2	4 1/4	5.8	12 x 12 x 5	10	87.0
80 x 80 x 65	108	2.6	300 x 300 x 125	254	39.5
4 x 4 x 3/4	3 3/4	7.2	12 x 12 x 6	10	88.3
100 x 100 x 20	95	3.3	300 x 300 x 150	254	40.1
4 x 4 x 1	3 3/4	7.0	12 x 12 x 8	10	91.2
100 x 100 x 25	95	3.2	300 x 300 x 200	254	41.4
4 x 4 x 1 1/2	5	9.2	12 x 12 x 10	10	94.8
100 x 100 x 40	127	4.2	300 x 300 x 250	254	43.0
4 x 4 x 2	5	10.2	14 x 14 x 8	11	110.0
100 x 100 x 50	127	4.6	350 x 350 x 200	279	49.7
4 x 4 x 2 1/2	5	11.2	14 x 14 x 10	11	114.0
100 x 100 x 65	127	5.1	350 x 350 x 250	279	51.5
4 x 4 x 3	5	11.4	14 x 14 x 12	11	117.0
100 x 100 x 80	127	5.2	350 x 350 x 300	279	52.8
5 x 5 x 2	5 1/2	14.5	16 x 16 x 8	12	135.0
125 x 125 x 50	140	6.6	400 x 400 x 200	305	61.2
5 x 5 x 3	5 1/2	16.1	16 x 16 x 10	12	139.0
125 x 125 x 80	140	7.3	400 x 400 x 250	305	63.0
5 x 5 x 4	5 1/2	17.9	16 x 16 x 12	12	142.0
125 x 125 x 100	140	8.1	400 x 400 x 300	305	64.4
6 x 6 x 2	6 1/2	26.4	18 x 18 x 10	15 1/2	204.0
150 x 150 x 50	165	12	450 x 450 x 250	394	92.5
6 x 6 x 2 1/2	6 1/2	26.5	18 x 18 x 12	15 1/2	209.0
150 x 150 x 65	165	12	450 x 450 x 300	394	94.8
6 x 6 x 3	6 1/2	26.5	18 x 18 x 14	15 1/2	211.0
150 x 150 x 80	165	12	450 x 450 x 350	0	95.7
6 x 6 x 4	6 1/2	26.5	18 x 18 x 16	15 1/2	216.0
150 x 150 x 100	165	12	450 x 450 x 400	0	98.0
6 x 6 x 5	6 1/2	28.0	24 x 24 x 8	20	334.0
150 x 150 x 125	165	12.7	600 x 600 x 200	508	152
8 x 8 x 2	7 3/4	37.5	24 x 24 x 10	20	342.0
200 x 200 x 50	197	17	600 x 600 x 250	508	155
8 x 8 x 3	7 3/4	38.7	24 x 24 x 12	20	349.0
200 x 200 x 80	197	17.6	600 x 600 x 300	508	158

C - Cast malleable or ductile iron, all others are fabricated steel.
See Fitting Size chart on page 48 for O.D.

FIGURE 7060 - TEE

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	2 1/4 C	0.9
25	33.4	57	0.4
1 1/4	1.660	2 3/4 C	1.5
32	42.2	70	0.7
1 1/2	1.900	2 3/4 C	1.8
40	48.3	70	0.8
2	2.375	3 1/4 C	2.4
50	60.3	83	1.1
2 1/2	2.875	3 3/4 C	4.0
65	73.0	95	1.8
3 O.D.	2.996	4 C	4.6
76.1	76.1	101	2.1
3	3.500	4 1/4 C	5.8
80	88.9	108	2.6
3 1/2	4.000	4 1/2 C	9.8
90	101.6	114	4.4
4 1/4 O.D.	4.250	4 3/4 C	9.3
108.0	108.0	121	4.2
4	4.500	5 C	10.3
100	114.3	127	4.7
5 1/4 O.D.	5.236	5 1/4 C	14.1
133.0	133.0	133	6.4
5 1/2 O.D.	5.500	5 1/2 C	16.1
139.7	139.7	140	7.3
5	5.563	5 1/2 C	16.2
125	141.3	140	7.3
6 1/4 O.D.	6.259	6 C	20.8
159.0	159.0	152	9.4
6 1/2 O.D.	6.500	6 1/2 C	24.4
165.1	165.1	165	11.1
6	6.625	6 1/2 C	25.7
150	168.3	165	11.7
8	8.625	7 3/4 C	41.1
200	219.1	197	18.6
10	10.750	9 C	74.5
250	273.1	229	33.8
12	12.750	10 C	94.7
300	323.9	254	43.0
14	14.000	11	118.0
350	355.6	279	53.5
16	16.000	12	146.0
400	406.4	305	66.2
18	18.000	15 1/2	218.0
450	457.2	394	98.9
20	20.000	17 1/4	275.0
500	508.0	438	125
24	24.000	20	379.0
600	609.6	508	172



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FIG. 7076

Gr x Thd

Concentric Reducers

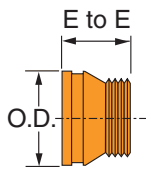


FIG. 7073 & FIG. 7097

Eccentric Reducers

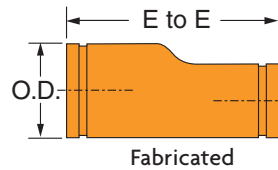


Fig. 7073— Gr. x Gr.

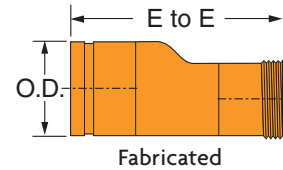


Fig. 7097 – Gr. x Thd.

FIGURE 7076 – CONCENTRIC REDUCER GROOVE BY THREAD

Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1½ x 1	2½	0.6
40 x 25	64	0.3
2 x ¾	2½	1.0
50 x 80	64	0.5
2 x 1	2½	0.8
50 x 25	64	0.4
2 x 1¼	2½	1.3
50 x 32	64	0.6
2 x 1½	2½	1.3
50 x 40	64	0.6
2½ x 1	2½	1.0
65 x 25	64	0.5
2½ x 1¼	2½	1.0
65 x 32	64	0.5
2½ x 1½	2½	1.3
65 x 40	64	0.6
2½ x 2	2½	1.2
65 x 50	64	0.5
3 x ¾	2½	1.2
80 x 80	64	0.5
3 x 1	2½	1.2
80 x 25	64	0.5
3 x 1½	2½	1.3
80 x 40	64	0.6
3 x 2	2½	1.3
80 x 50	64	0.6
3 x 2½	2½	1.5
80 x 65	64	0.7
3½ x 3	3	1.8
90 x 80	76	0.8
4 x 1	3	2.2
100 x 25	76	1.0
4 x 1½	3	2.3
100 x 40	76	1.0
4 x 2	3	2.3
100 x 50	76	1.0
4 x 2½	3	2.3
100 x 65	76	1.0
4 x 3	3	2.6
100 x 80	76	1.2
4 x 3½	3	2.5
100 x 90	76	1.1
5 x 4	3½	4.5
125 x 100	89	2.0
6 x 1	4	6.0
150 x 25	102	2.7
6 x 2	4	6.0
150 x 50	102	2.7
6 x 3	4	6.0
150 x 80	102	2.7
6 x 4	4	5.9
150 x 100	102	2.7
6 x 5	4	5.8
150 x 125	102	2.6

All are Fabricated Steel.

See Fitting Size chart on page 48 for O.D.

FIGURE 7073 & 7097 ECCENTRIC REDUCER

Nominal Size	End to End	Approx. Wt. Ea.	Nominal Size	End to End	Approx. Wt. Ea.	Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
1¼ x 1	8½	1.5	4 x 3½	10	8.5	14 x 6	13	78
32 x 25	216	0.7	100 x 90	254	3.9	350 x 150	330	35.4
1½ x ¾	8½	1.6	5 x 2	11	9.3	14 x 8	13	80
40 x 20	216	0.7	125 x 50	279	4.2	350 x 200	330	36.3
1½ x 1	8½	1.7	5 x 2½	11	9.9	14 x 10	13	84
40 x 25	216	0.8	125 x 65	279	4.5	350 x 250	330	38.1
1½ x 1¼	8½	4.5	5 x 3	11	10.7	14 x 12	13	88
40 x 32	216	2.0	125 x 80	279	4.9	350 x 300	330	39.9
2 x ¾	9	2.1	5 x 4	11	11.9	16 x 8	14	91
50 x 80	229	1.0	125 x 100	279	5.4	400 x 200	356	41.3
2 x 1	9	2.2	6 x 1	11½	12.0	16 x 10	14	96
50 x 25	229	1.0	150 x 25	292	5.4	400 x 250	356	43.5
2 x 1¼	9	2.4	6 x 1½	11½	12.1	16 x 12	14	99
50 x 32	229	1.1	150 x 40	292	5.5	400 x 300	356	44.9
2 x 1½	9	2.5	6 x 2	11½	12.2	16 x 14	14	104
50 x 40	229	1.1	150 x 50	292	5.5	400 x 350	356	47.2
2½ x 1	9½	3.2	6 x 2½	11½	12.8	18 x 10	15	110
65 x 25	241	1.5	150 x 65	292	5.8	450 x 250	381	49.9
2½ x 1¼	9½	3.4	6 x 3	11½	13.6	18 x 12	15	113
65 x 32	241	1.5	150 x 80	292	6.2	450 x 300	381	51.3
2½ x 1½	9½	3.6	6 x 4	11½	14.9	18 x 14	15	117
65 x 40	241	1.6	150 x 100	292	6.8	450 x 350	381	53.1
2½ x 2	9½	4.0	6 x 5	11½	16.2	18 x 16	15	121
65 x 50	241	1.8	150 x 125	292	7.3	450 x 400	381	54.9
3 x 1	9½	4.0	8 x 3	12	17.9	20 x 10	20	145
80 x 25	241	1.8	200 x 80	305	8.1	500 x 250	508	65.8
3 x 1¼	9½	4.3	8 x 4	12	19.7	20 x 12	20	149
80 x 32	241	2.0	200 x 100	305	8.9	500 x 300	508	67.6
3 x 1½	9½	4.5	8 x 5	12	21.4	20 x 14	20	152
80 x 40	241	2.0	200 x 125	305	9.7	500 x 350	508	68.9
3 x 2	9½	4.8	8 x 6	12	23.2	20 x 16	20	156
80 x 50	241	2.2	200 x 150	305	10.5	500 x 400	508	70.8
3 x 2½	9½	5.6	10 x 4	13	29.7	20 x 18	20	160
80 x 65	241	2.5	250 x 100	330	13.5	500 x 450	508	72.6
3½ x 3	9½	6.6	10 x 5	13	31.7	24 x 10	20	174
90 x 80	241	3.0	250 x 125	330	14.4	600 x 250	508	78.9
4 x 1	10	5.9	10 x 6	13	34.0	24 x 12	20	179
100 x 25	254	2.7	250 x 150	330	15.4	600 x 300	508	81.2
4 x 1¼	10	6.3	10 x 8	13	34.4	24 x 14	20	184
100 x 32	254	2.9	250 x 200	330	15.6	600 x 350	508	83.5
4 x 1½	10	6.4	12 x 4	14	44.8	24 x 16	20	189
100 x 40	254	2.9	300 x 100	356	20.3	600 x 400	508	85.7
4 x 2	10	6.7	12 x 6	14	45.2	24 x 18	20	194
100 x 50	254	3.0	300 x 150	356	20.5	600 x 450	508	88
4 x 2½	10	7.3	12 x 8	14	47.7	24 x 20	20	199
100 x 65	254	3.3	300 x 200	356	21.6	600 x 500	508	90.3
4 x 3	10	7.9	12 x 10	14	52.0			
100 x 80	254	3.6	300 x 250	356	23.6			

Fabricated Steel *Figure 7097 is available in sizes 1¼ x 1 through 12 x 10.

Center to end dimensions may differ from those shown above. Contact a Gruvlok Representative for more information.

See Fitting Size chart on page 48 for O.D.

See Fitting Size chart on page 48 for O.D.



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FIG. 7077, FIG. 7078 & FIG. 7079

Swaged Nipples

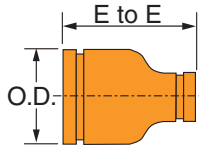


Fig. 7077
Gr x Gr

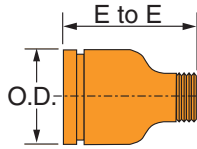


Fig. 7078
Gr x Thd

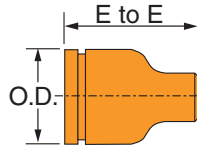


Fig. 7079
Gr x Bev

FIGURE 7077, 7078 & 7079 SWAGED NIPPLES

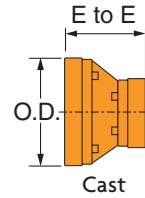
Nominal Size	End to End	Approx. Wt. Ea.	Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
2 x 1	6½ C	2.0	4 x 2½	9	8.0
50 x 25	165	0.9	100 x 65	229	3.6
2 x 1¼	6½	2.0	4 x 3	9	8.0
50 x 32	165	0.9	100 x 80	229	3.6
2 x 1½	6½	2.0	4 x 3½	9	8.0
50 x 40	165	0.9	100 x 90	229	3.6
2½ x 1	7	3.5	5 x 2	11	12.0
65 x 25	178	1.6	125 x 50	279	5.4
2½ x 1¼	7	3.5	5 x 2½	11	12.0
65 x 32	178	1.6	125 x 65	279	5.4
2½ x 1½	7	3.5	5 x 3	11	12.0
65 x 40	178	1.6	125 x 80	279	5.4
2½ x 2	7	3.5	5 x 4	11	12.0
65 x 50	178	1.6	125 x 100	279	5.4
3 x 1	8	5.0	6 x 1	12	19.0
80 x 25	203	2.3	150 x 25	305	8.6
3 x 1¼	8	5.0	6 x 1¼	12	19.0
80 x 32	203	2.3	150 x 32	305	8.6
3 x 1½	8	5.0	6 x 1½	12	19.0
80 x 40	203	2.3	150 x 40	305	8.6
3 x 2	8	5.0	6 x 2	12	19.0
80 x 50	203	2.3	150 x 50	305	8.6
3 x 2½	8	5.0	6 x 2½	12	19.0
80 x 65	203	2.3	150 x 65	305	8.6
3½ x 3	8	7.0	6 x 3	12	19.0
90 x 80	203	3.2	150 x 80	305	8.6
4 x 1	9	8.0	6 x 3½	12	17.0
100 x 25	229	3.6	150 x 90	305	7.7
4 x 1¼	9	8.0	6 x 4	12	19.0
100 x 32	229	3.6	150 x 100	305	8.6
4 x 1½	9	8.0	6 x 5	12	19.0
100 x 40	229	3.6	150 x 125	305	8.6
4 x 2	9	8.0			
100 x 50	229	3.6			

This product is not ULC Listed.
See Fitting Size chart on page 48 for O.D.

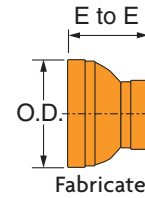


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FIG. 7072 – Gr x Gr Concentric Reducers



Cast



Fabricated

FIGURE 7072 CONCENTRIC REDUCER

Nominal Size	End to End	Approx. Wt. Ea.	Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
1¼ x 1	2½	0.6	8 x 4	5 C	9.0
32 x 25	64	0.3	200 x 100	127	4.1
1½ x 1	2½	0.6	8 x 5	5	11.5
40 x 25	64	0.3	200 x 125	127	5.2
1½ x 1¼	2½	0.6	8 x 6	5 C	10.6
40 x 32	64	0.3	200 x 150	127	4.8
2 x 1	2½	0.8	10 x 4	6	20
50 x 25	64	0.4	250 x 100	152	9.1
2 x 1¼	2½ C	1.3	10 x 5	6	20
50 x 32	64	0.6	250 x 125	152	9.1
2 x 1½	2½ C	1.3	10 x 6	6 C	20
50 x 40	64	0.6	250 x 150	152	9.1
2½ x 1	2½	1.0	10 x 8	6	23.9
65 x 25	64	0.5	250 x 200	152	10.8
2½ x 1¼	2½	1.0	12 x 4	7	25
65 x 32	64	0.5	300 x 100	178	11.3
2½ x 1½	2½	1.3	12 x 6	7	29
65 x 40	64	0.6	300 x 150	178	13.2
2½ x 2	2½ C	1.6	12 x 8	7	29
65 x 50	64	0.7	300 x 200	178	13.2
3 x 1	2½	1.2	12 x 10	7	32.4
80 x 25	64	0.5	300 x 250	178	14.7
3 x 1¼	2½	1.3	14 x 6	13	54.3
80 x 32	64	0.6	350 x 150	330	24.6
3 x 1½	2½	1.3	14 x 8	13	54.5
80 x 40	64	0.6	350 x 200	330	24.7
3 x 2	2½ C	1.4	14 x 10	13	55.7
80 x 50	64	0.6	350 x 250	330	25.3
3 x 2½	2½ C	1.5	14 x 12	13	57.3
80 x 65	64	0.7	350 x 300	330	26.0
3½ x 3	3	1.8	16 x 8	14	65.4
90 x 80	76	0.8	400 x 200	356	29.7
4 x 1	3	2.2	16 x 10	14	66.7
100 x 25	76	1.0	400 x 250	356	30.3
4 x 1¼	3	2.2	16 x 12	14	68.1
100 x 32	76	1.0	400 x 300	356	30.9
4 x 1½	3	2.3	16 x 14	14	71.0
100 x 40	76	1.0	400 x 350	356	32.2
4 x 2	3 C	2.4	18 x 10	15	82.3
100 x 50	76	1.1	450 x 250	381	37.3
4 x 2½	3 C	2.6	18 x 12	15	83.6
100 x 65	76	1.2	450 x 300	381	37.9
4 x 3	3 C	3.2	18 x 14	15	86.2
100 x 80	76	1.5	450 x 350	381	39.1
4 x 3½	3	3.6	18 x 16	15	87.2
100 x 90	76	1.6	450 x 400	381	39.6
5 x 2	3½	4.6	20 x 10	20	123.0
125 x 50	89	2.1	500 x 250	508	55.8
5 x 2½	3½	4.5	20 x 12	20	125.0
125 x 65	89	2.0	500 x 300	508	56.7
5 x 3	3½	4.4	20 x 14	20	129.0
125 x 80	89	2.0	500 x 350	508	58.5
5 x 4	3½ C	4.5	20 x 16	20	131.0
125 x 100	89	2.0	500 x 400	508	59.4
6 x 1	4	6.8	20 x 18	20	133.0
150 x 25	102	3.1	500 x 450	508	60.3
6 x 1½	4	6.9	24 x 10	20	147.0
150 x 40	102	3.1	600 x 250	508	66.7
6 x 2	4 C	6.0	24 x 12	20	149.0
150 x 50	102	2.7	600 x 300	508	67.6
6 x 2½	4	6.0	24 x 14	20	152.0
150 x 65	102	2.7	600 x 350	508	68.9
6 x 3	4 C	5.4	24 x 16	20	153.0
150 x 80	102	2.4	600 x 400	508	69.4
6 x 4	4 C	5.6	24 x 18	20	154.0
150 x 100	102	2.5	600 x 450	508	69.9
6 x 5	4 C	6.0	24 x 20	20	155.0
150 x 125	102	2.7	600 x 500	508	70.3
8 x 3	5	12.0			
200 x 80	127	5.5			

C - Cast malleable or ductile iron, all others are fabricated steel.

FIG. 7069

45° Lateral

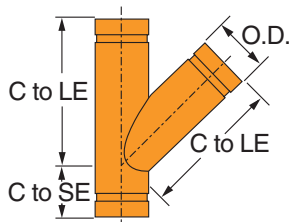


FIGURE 7069 LATERALS

Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	5 127	2 1/4 57	1.5 0.7
1 1/4 32	1.660 42.2	5 3/4 146	2 1/2 64	2.5 1.1
1 1/2 40	1.900 48.3	6 1/4 159	2 3/4 70	3.5 1.6
2 50	2.375 60.3	7 178	2 3/4 70	4.5 2.0
2 1/2 65	2.875 73.0	7 3/4 197	3 76	10.0 4.5
3 80	3.500 88.9	8 1/2 216	3 1/4 83	11.0 5.0
3 1/2 90	4.000 101.6	10 254	3 1/2 89	14.0 6.4
4 100	4.500 114.3	10 1/2 267	3 3/4 95	18.3 8.3
5 125	5.563 141.3	12 1/2 318	4 102	30.0 13.6
6 150	6.625 168.3	14 356	4 1/2 114	46.6 21.1
8 200	8.625 219.1	18 457	6 152	82.8 37.6
10 250	10.750 273.1	20 1/2 521	6 1/2 165	127 57.4
12 300	12.750 323.9	23 584	7 178	165 74.8
14 350	14.000 355.6	26 1/2 673	7 1/2 191	215 97.5
16 400	16.000 406.4	29 737	8 203	345 157
18 450	18.000 457.2	32 813	8 1/2 216	425 193
20 500	20.000 508.0	35 889	9 229	517 235
24 600	24.000 609.6	40 1016	10 254	940 426



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FIG. 7070

45° Reducing Lateral

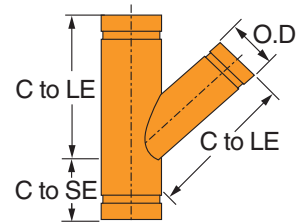


FIGURE 7070 REDUCING LATERAL

Nominal Size	Center to Long End	Center to Short End	Approx. Wt. Ea.	Nominal Size	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg	In./DN(mm)	In./mm	In./mm	Lbs./Kg
3 x 3 x 2 80 x 80 x 50	8 1/2 216	3 1/4 83	9.8 4.4	12 x 12 x 10 300 x 300 x 250	23 584	7 178	168 76.2
3 x 3 x 2 1/2 80 x 80 x 65	8 1/2 216	3 1/4 83	11.5 5.2	14 x 14 x 4 350 x 350 x 100	26 1/2 673	7 1/2 191	173 78.5
4 x 4 x 2 100 x 100 x 50	10 1/2 267	3 3/4 95	15.5 7.0	14 x 14 x 6 350 x 350 x 150	26 1/2 673	7 1/2 191	185 83.9
4 x 4 x 2 1/2 100 x 100 x 65	10 1/2 267	3 3/4 95	17.0 7.7	14 x 14 x 8 350 x 350 x 200	26 1/2 673	7 1/2 191	195 88.5
4 x 4 x 3 100 x 100 x 80	10 1/2 267	3 3/4 95	18.5 8.4	14 x 14 x 10 350 x 350 x 250	26 1/2 673	7 1/2 191	223 101
5 x 5 x 2 125 x 125 x 50	12 1/2 318	4 102	22.5 10.2	14 x 14 x 12 350 x 350 x 300	26 1/2 673	7 1/2 191	240 109
5 x 5 x 3 125 x 125 x 80	12 1/2 318	4 102	26.5 12.0	16 x 16 x 6 400 x 400 x 150	29 737	8 203	235 107
5 x 5 x 4 125 x 125 x 100	12 1/2 318	4 102	30.5 13.8	16 x 16 x 8 400 x 400 x 200	29 737	8 203	250 113
6 x 6 x 2 150 x 150 x 50	14 356	4 1/2 114	33.0 15.0	16 x 16 x 10 400 x 400 x 250	29 737	8 203	263 119
6 x 6 x 3 150 x 150 x 80	14 356	4 1/2 114	37.0 16.8	16 x 16 x 12 400 x 400 x 300	29 737	8 203	283 128
6 x 6 x 4 150 x 150 x 100	14 356	4 1/2 114	40.0 18.1	16 x 16 x 14 400 x 400 x 350	29 737	8 203	307 139
6 x 6 x 5 150 x 150 x 125	14 356	4 1/2 114	45.0 20.4	18 x 18 x 6 450 x 450 x 150	32 813	8 1/2 216	275 125
8 x 8 x 4 200 x 200 x 100	18 457	6 152	59.6 27.0	18 x 18 x 8 450 x 450 x 200	32 813	8 1/2 216	306 139
8 x 8 x 5 200 x 200 x 125	18 457	6 152	68.0 30.8	18 x 18 x 10 450 x 450 x 250	32 813	8 1/2 216	321 146
8 x 8 x 6 200 x 200 x 150	18 457	6 152	75.0 34.0	18 x 18 x 12 450 x 450 x 300	32 813	8 1/2 216	333 151
10 x 10 x 4 250 x 250 x 100	20 1/2 521	6 1/2 165	83.0 37.6	18 x 18 x 14 450 x 450 x 350	32 813	8 1/2 216	358 162
10 x 10 x 5 250 x 250 x 125	20 1/2 521	6 1/2 165	100.0 45.4	18 x 18 x 16 450 x 450 x 400	32 813	8 1/2 216	382 173
10 x 10 x 6 250 x 250 x 150	20 1/2 521	6 1/2 165	105.0 47.6	20 x 20 x 12 500 x 500 x 300	35 889	9 229	390 177
10 x 10 x 8 250 x 250 x 200	20 1/2 521	6 1/2 165	116.0 52.6	20 x 20 x 14 500 x 500 x 350	35 889	9 229	410 186
12 x 12 x 4 300 x 300 x 100	23 584	7 178	137.0 62.1	20 x 20 x 16 500 x 500 x 400	35 889	9 229	440 200
12 x 12 x 6 300 x 300 x 150	23 584	7 178	140.0 63.5	24 x 24 x 16 600 x 600 x 400	40 1016	10 254	725 329
12 x 12 x 8 300 x 300 x 200	23 584	7 178	147.0 66.7	24 x 24 x 20 600 x 600 x 500	40 1016	10 254	785 356

See Fitting Size chart on page 48 for O.D.

FIG. 7066 – Tee Wye

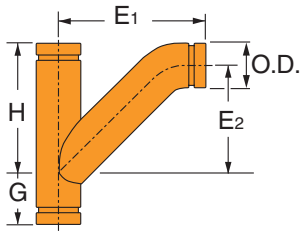


FIGURE 7066 TEE WYES

Nominal Size	G	H	E1	E2	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2 x 2 x 2 50 x 50 x 50	2 3/4 70	7 178	9 229	4 3/8 117	6.4 2.9
2 1/2 x 2 1/2 x 2 1/2 65 x 65 x 65	3 76	7 3/4 197	10 1/2 267	5 3/4 146	11.5 5.2
3 x 3 x 3 80 x 80 x 80	3 3/4 83	8 1/2 216	11 1/2 292	6 1/2 165	16.5 7.5
3 1/2 x 3 1/2 x 3 1/2 90 x 90 x 90	3 3/2 89	10 254	13 330	7 3/4 197	22 10.0
4 x 4 x 3 100 x 100 x 80	3 3/4 95	10 1/2 267	12 3/4 327	7 3/4 200	23 10.4
4 x 4 x 4 100 x 100 x 100	3 3/4 95	10 1/2 267	13 3/8 346	8 3/8 206	26 11.8
5 x 5 x 3 125 x 125 x 80	4 102	12 1/2 318	14 1/4 362	9 3/4 235	32 14.5
5 x 5 x 4 125 x 125 x 100	4 102	12 1/2 318	15 1/4 384	9 3/4 244	35 15.9
5 x 5 x 5 125 x 125 x 125	4 102	12 1/2 318	16 1/4 410	10 254	40 18.1
6 x 6 x 3 150 x 150 x 80	4 1/2 114	14 356	15 1/4 389	10 3/8 262	50 22.7
6 x 6 x 4 150 x 150 x 100	4 1/2 114	14 356	16 1/4 413	10 3/4 273	55 24.9
6 x 6 x 5 150 x 150 x 125	4 1/2 114	14 356	17 1/4 438	11 1/8 283	58 26.3
6 x 6 x 6 150 x 150 x 150	4 1/2 114	14 356	18 1/4 464	11 1/2 292	60.5 27.4
8 x 8 x 3 200 x 200 x 80	6 152	18 457	18 3/8 462	13 3/8 335	100 45.4
8 x 8 x 4 200 x 200 x 100	6 152	18 457	19 483	13 1/2 343	110 49.9
8 x 8 x 5 200 x 200 x 125	6 152	18 457	20 508	13 3/8 352	111 50.3
8 x 8 x 6 200 x 200 x 150	6 152	18 457	21 1/8 537	14 3/8 365	112 50.8
8 x 8 x 8 200 x 200 x 200	6 152	18 457	23 1/4 591	15 1/4 387	120 54.4
10 x 10 x 3 250 x 250 x 80	6 1/2 165	20 1/2 521	19 3/8 505	14 3/8 378	130 59.0
10 x 10 x 4 250 x 250 x 100	6 1/2 165	20 1/2 521	20 3/4 527	15 1/4 387	135 61.2
10 x 10 x 5 250 x 250 x 125	6 1/2 165	20 1/2 521	21 3/8 556	15 3/4 400	140 63.5
10 x 10 x 6 250 x 250 x 150	6 1/2 165	20 1/2 521	22 3/8 581	16 1/8 410	145 65.8
10 x 10 x 8 250 x 250 x 200	6 1/2 165	20 1/2 521	27 1/4 692	19 3/4 489	150 68.0
10 x 10 x 10 250 x 250 x 250	6 1/2 165	20 1/2 521	27 1/4 692	18 457	190 86.2
12 x 12 x 3 300 x 300 x 80	7 178	23 584	20 3/4 527	15 3/4 400	140 63.5
12 x 12 x 4 300 x 300 x 100	7 178	23 584	21 1/2 546	16 406	145 65.8
12 x 12 x 6 300 x 300 x 150	7 178	23 584	23 3/4 603	17 432	165 74.8
12 x 12 x 8 300 x 300 x 200	7 178	23 584	26 660	18 457	175 79.4
12 x 12 x 10 300 x 300 x 250	7 178	23 584	28 711	18 3/4 476	200 90.7
12 x 12 x 12 300 x 300 x 300	7 178	23 584	31 787	20 1/2 521	240 109

FIG. 7067 – Reducing Tee Wye

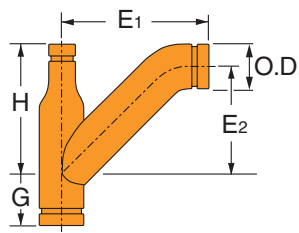


FIGURE 7067 REDUCING TEE WYES

Nominal Size	G	H	E1	E2	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
4 x 3 x 3 100 x 80 x 80	1 3/8 41	7 3/8 187	10 3/4 273	5 3/8 143	16.0 7.3
4 x 3 x 4 100 x 80 x 100	3 3/4 95	10 1/2 267	13 3/8 346	8 3/8 206	27.0 12.2
5 x 3 x 3 125 x 80 x 80	1 3/4 32	9 3/4 248	11 1/2 292	6 1/2 165	25.0 11.3
5 x 3 x 5 125 x 80 x 125	4 102	12 1/2 318	16 3/8 410	10 254	44.0 20.0
5 x 4 x 3 125 x 100 x 80	1 3/8 48	9 3/8 232	11 3/8 302	6 3/8 175	21.0 9.5
5 x 4 x 4 125 x 100 x 100	1 3/8 48	9 3/8 232	12 3/4 324	7 3/4 184	25.0 11.3
6 x 4 x 6 150 x 100 x 150	4 1/2 114	14 356	18 1/4 464	11 1/2 292	61.0 27.7
6 x 5 x 3 150 x 125 x 80	1 3/4 32	10 3/4 273	13 330	8 203	27.0 12.2
6 x 5 x 4 150 x 125 x 100	1 3/4 32	10 3/4 273	13 3/8 352	8 3/8 213	31.0 14.1
8 x 6 x 4 200 x 150 x 100	2 51	12 305	14 3/4 375	9 3/4 235	45.0 20.4
8 x 6 x 8 200 x 150 x 200	6 152	18 457	23 3/4 591	15 1/4 387	95.0 43.1

FIG. 7071 – True Wye

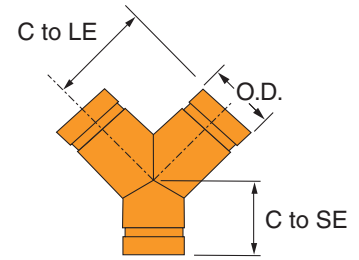


FIGURE 7071 TRUE WYE

Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	2 1/4 57	2 1/4 57	1.1 0.5
1 1/4 32	1.660 42.2	2 3/4 70	2 1/2 64	1.5 0.7
1 1/2 40	1.900 48.3	2 3/4 70	2 3/4 70	1.8 0.8
2 50	2.375 60.3	3 1/4 83	2 3/4 70	2.3 1.0
2 1/2 65	2.875 73.0	3 3/4 95	3 76	5.0 2.3
3 80	3.500 88.9	4 1/4 108	3 3/4 83	6.1 2.8
3 1/2 90	4.000 101.6	4 1/2 114	3 1/2 89	8.3 3.8
4 100	4.500 114.3	5 127	3 3/4 95	10.5 4.8
5 125	5.563 141.3	5 1/2 140	4 102	15 6.8
6 150	6.625 168.3	6 1/2 165	4 1/2 114	21.6 9.8
8 200	8.625 219.1	7 3/4 197	6 152	36.0 16.3
10 250	10.750 273.1	9 229	6 1/2 165	51.0 23.1
12 300	12.750 323.9	10 254	7 178	160.0 72.6
14 350	14.000 355.6	11 279	7 1/2 191	136.0 61.7
16 400	16.000 406.4	12 305	8 203	166.0 75.3
18 450	18.000 457.2	15 1/2 394	8 1/2 216	234 106
20 500	20.000 508.0	17 1/4 438	9 229	281 128
24 600	24.000 609.6	20 508	10 254	523 237

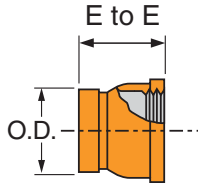


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See Fitting Size chart on page 48 for O.D.

FIG. 7087 GR X FPT

Female Thread Adapter



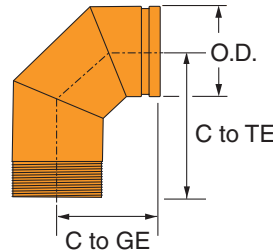
**FIGURE 7087 FEMALE
THREAD ADAPTER**

Nominal Size	Grooved End O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	2 $\frac{1}{16}$ 52	0.7 0.3
1 $\frac{1}{4}$ 32	1.660 42.2	2 $\frac{5}{16}$ 59	1.4 0.6
1 $\frac{1}{2}$ 40	1.900 48.3	2 $\frac{5}{16}$ 59	1.5 0.7
2 50	2.375 60.3	2 $\frac{1}{2}$ 64	1.6 0.7
3 80	3.500 88.9	2 $\frac{3}{4}$ 70	2.5 1.1
4 100	4.500 114.3	3 $\frac{1}{4}$ 83	4.5 2.0

This product is not UL/ULC Listed or FM Approved.

FIG. 7055 GR X MPT

90° Adapter Elbow

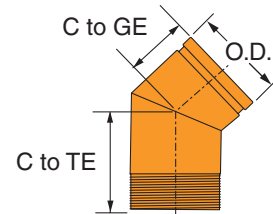


**FIGURE 7055
90° ADAPTER ELBOWS**

Nominal Size	Fitting O.D.	Center to Grooved End	Center to Threaded End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	2 $\frac{1}{4}$ 57	2 $\frac{1}{4}$ 57	0.6 0.3
1 $\frac{1}{4}$ 32	1.660 42.2	2 $\frac{3}{4}$ 70	2 $\frac{3}{4}$ 70	1.0 0.5
1 $\frac{1}{2}$ 40	1.900 48.3	2 $\frac{3}{4}$ 70	2 $\frac{3}{4}$ 70	1.2 0.5
2 50	2.375 60.3	3 $\frac{1}{4}$ 83	4 $\frac{1}{4}$ 108	2.3 1.0
2 $\frac{1}{2}$ 65	2.875 73.0	3 $\frac{3}{4}$ 95	3 $\frac{3}{4}$ 95	3.7 1.7
3 80	3.500 88.9	4 $\frac{1}{4}$ 108	6 152	6.5 2.9
3 $\frac{1}{2}$ 90	4.000 101.6	4 $\frac{1}{2}$ 114	6 $\frac{1}{4}$ 159	8.2 3.7
4 100	4.500 114.3	5 127	7 $\frac{1}{4}$ 184	11 5.0
6 150	6.625 168.3	6 $\frac{1}{2}$ 165	6 $\frac{1}{2}$ 165	19.8 9.0

FIG. 7056 GR X MPT

45° Adapter Elbow



**FIGURE 7056
45° ADAPTER ELBOWS**

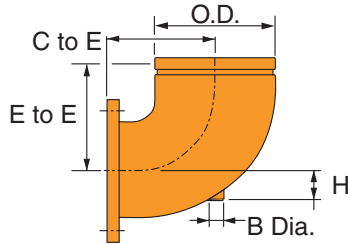
Nominal Size	Fitting O.D.	Center to Grooved End	Center to Threaded End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	1 $\frac{3}{4}$ 44	1 $\frac{3}{4}$ 44	0.6 0.3
1 $\frac{1}{4}$ 32	1.660 42.2	1 $\frac{3}{4}$ 44	1 $\frac{3}{4}$ 44	0.7 0.3
1 $\frac{1}{2}$ 40	1.900 48.3	1 $\frac{3}{4}$ 44	1 $\frac{3}{4}$ 44	0.8 0.4
2 50	2.375 60.3	2 51	3 76	1.6 0.7
2 $\frac{1}{2}$ 65	2.875 73.0	2 $\frac{1}{4}$ 57	2 $\frac{1}{4}$ 57	2.2 1.0
3 80	3.500 88.9	2 $\frac{1}{2}$ 64	4 $\frac{1}{4}$ 108	4.3 2.0
3 $\frac{1}{2}$ 90	4.000 101.6	2 $\frac{3}{4}$ 70	2 $\frac{3}{4}$ 70	4.2 1.9
4 100	4.500 114.3	3 76	5 $\frac{1}{4}$ 133	7.5 3.4
6 150	6.625 168.3	3 $\frac{1}{2}$ 89	3 $\frac{1}{2}$ 89	11.1 5.0



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REDUCING BASE SUPPORT ELBOW

FIG. 7050RF – Grooved x 150# Flanged (GxF)



**FIGURE 7050 RF REDUCING
BASE SUPPORT ELBOWS**

Nominal Size	Grooved End O.D.	Center to End	H	B Dia. Threaded	Approx. Wt. Ea. GxF
In./DN(mm)	In./mm	In./mm	In./mm	NPSC	Lbs./Kg
6 x 4 150 x 100	6.625 168.3	12 305	2½ 64	1½ 38	38.5 17.5
6 x 5 150 x 125	6.625 168.3	12½ 318	2½ 64	1½ 38	45.4 20.6
8 x 5 200 x 125	8.625 219.1	16 406	3 76	1½ 38	65.5 29.7
8 x 6 200 x 150	8.625 219.1	16 406	3 76	1½ 38	73 33.1
10 x 6 250 x 150	10.750 273.1	19 483	3½ 89	1½ 38	100 45.4
10 x 8 250 x 200	10.750 273.1	19 483	3½ 89	1½ 38	127 57.6
12 x 8 300 x 200	12.750 323.9	22 559	4 102	1½ 38	155 70.3
12 x 10 300 x 250	12.750 323.9	22 559	4 102	1½ 38	186 84.4

This product is not UL/ULC Listed or FM Approved.

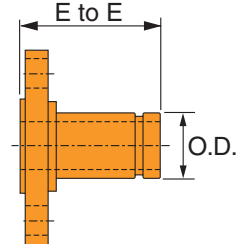


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GROOVED FLANGE NIPPLES

FIG. 7084 – Groove x Class 150 Flange Nipples

FIG. 7085 – Groove x Class 300 Flange Nipples



**FIGURE 7084
GROOVE X CLASS 150
FLANGE NIPPLES**

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	3 76	2.5 1.1
1¼ 32	1.660 42.2	4 102	3.8 1.7
1½ 40	1.900 48.3	4 102	4.1 1.9
2 50	2.375 60.3	4 102	6.0 2.7
2½ 65	2.875 73.0	4 102	9.2 4.2
3 80	3.500 88.9	4 102	10.4 4.7
3½ 90	4.000 101.6	4 102	14.0 6.4
4 100	4.500 114.3	6 152	19.1 8.7
5 125	5.563 141.3	6 152	23.0 10.4
6 150	6.625 168.3	6 152	29.5 13.4
8 200	8.625 219.1	6 152	43.5 19.7
10 250	10.750 273.1	8 203	68.2 30.9
12 300	12.750 323.9	8 203	96.1 43.6
14 350	14.000 355.6	* *	* *
16 400	16.000 406.4	* *	* *
18 450	18.000 457.2	* *	* *
20 500	20.000 508.0	* *	* *
24 600	24.000 609.6	* *	* *

* Contact a Gruklok Representative for dimensions & weights.

**FIGURE 7085
GROOVE X CLASS 300
FLANGE NIPPLES**

End to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
3 76	3.6 1.6
4 102	4.6 2.1
4 102	7.1 3.2
4 102	8.2 3.7
4 102	11.9 5.4
4 102	15.5 7.0
4 102	21.0 9.5
6 152	28.0 12.7
6 152	35.0 15.9
6 152	50.0 22.7
6 152	72.0 32.7
8 203	* *
8 203	* *
* *	* *
* *	* *
* *	* *
* *	* *
* *	* *

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FIG. 7074

Cap

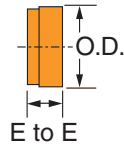


FIGURE 7074 CAP			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1C	1.315	1¼	0.3
25	33.4	32	0.1
1¼ C	1.660	1¼	0.4
32	42.2	32	0.2
1½ C	1.900	1¼	0.5
40	48.3	32	0.2
2 C	2.375	1	0.5
50	60.3	25	0.2
2½ C	2.875	1	0.7
65	73.0	25	0.3
3 O.D. C	2.996	1	0.8
76.1	76.1	25	0.4
3 C	3.500	1	1.1
80	88.9	25	0.5
3½ C	4.000	1	1.4
90	101.6	25	0.6
4¼ O.D. C	4.250	1½	2.0
108.0	108.0	29	0.9
4 C	4.500	1½	2.8
100	114.3	29	1.3
5¼ O.D. C	5.236	1½	3.2
133.0	133.0	29	1.5
5½ O.D. C	5.500	1½	4.0
139.7	139.7	29	1.8
5 C	5.563	1½	4.0
125	141.3	29	1.8
6¼ O.D. C	6.259	1½	5.1
159.0	159.0	29	2.3
6½ O.D. C	6.500	1½	6.0
165.1	165.1	29	2.7
6 C	6.625	1½	6.0
150	168.3	33	2.7
8 C	8.625	1½	12.5
200	219.1	38	5.7
10 C	10.750	1½	21.9
250	273.1	38	9.9
12 C	12.750	1½	33.8
300	323.9	38	15.3
14*	14.000	8½	40
350	355.6	216	18.1
16*	16.000	9	45
400	406.4	229	20.4
18*	18.000	10	58
450	457.2	254	26.3
20*	20.000	11	79
500	508.0	279	35.8
24*	24.000	12½	100
600	609.6	318	45.4

* Machined Cap

C - Cast Malleable or Ductile Iron

FIG. 7075

Bull Plug

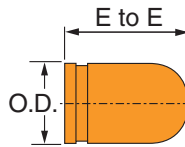


FIGURE 7075 BULL PLUG			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	4	2.5
50	60.3	102	1.1
2½	2.875	5	3.1
65	73.0	127	1.4
3	3.500	6	4.4
80	88.9	152	2.0
4	4.500	7	7.4
100	114.3	178	3.4
5	5.563	*	*
125	141.3	*	*
6	6.625	10	18.5
150	168.3	254	8.4

* Contact a GUVLOK Representative for dimensions & weights.
This product is not UL/ULC Listed or FM Approved.

FIG. 7068

Cross

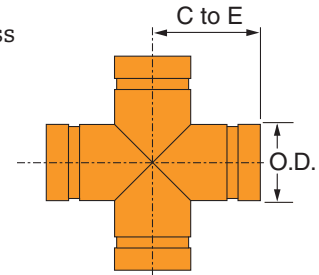


FIGURE 7068 CROSS			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	2¼	1.3
25	33.4	57	0.6
1¼	1.660	2¼	2.1
32	42.2	70	1.0
1½	1.900	2¼	2.5
40	48.3	70	1.1
2	2.375	3¼	2.9
50	60.3	83	1.3
2½	2.875	3¼	5.2
65	73.0	95	2.4
3	3.500	4¼	7.5
80	88.9	108	3.4
3½	4.000	4½	9.8
90	101.6	114	4.4
4	4.500	5	12.2
100	114.3	127	5.5
5	5.563	5½	17.6
125	141.3	140	8.0
6	6.625	6½	28.3
150	168.3	165	12.8
8	8.625	7¼	48.0
200	219.1	197	21.8
10	10.750	9	70.0
250	273.1	229	31.8
12	12.750	10	110
300	323.9	254	49.9
14	14.000	11	140
350	355.6	279	63.5
16	16.000	12	170
400	406.4	305	77.1
18	18.000	15½	260
450	457.2	394	118
20	20.000	17¼	320
500	508.0	438	145
24	24.000	20	585
600	609.6	508	265



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NIPPLES

FIG. 7086

GR x HOSE Nipples

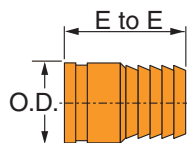


FIGURE 7086 HOSE NIPPLES

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	3¼	0.4
25	33.4	83	0.2
1¼	1.660	3½	0.7
32	42.2	92	0.3
1½	1.900	4	0.8
40	48.3	102	0.4
2	2.375	4½	1.3
50	60.3	117	0.6
2½	2.875	5½	2.1
65	73.0	140	1.0
3	3.500	6	3.3
80	88.9	152	1.5
4	4.500	7¼	5.5
100	114.3	184	2.5
5	5.563	9¾	8.1
125	141.3	248	3.7
6	6.625	11	13.2
150	168.3	279	6.0
8	8.625	12½	24.0
200	219.1	318	10.9
10	10.750	14	29.0
250	273.1	356	13.2
12	12.750	16	46.0
300	323.9	406	20.9

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FIG. 7080

GR x GR

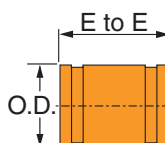


FIG. 7081

GR x MPT

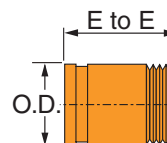


FIG. 7082

GR x BEV



**FIGURES 7080, 7081 & 7082
ADAPTER NIPPLES**

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	3	0.4
25	33.4	76	0.2
1¼	1.660	4	0.8
32	42.2	102	0.4
1½	1.900	4	0.9
40	48.3	102	0.4
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
3½	4.000	4	3.1
90	101.6	102	1.4
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
10	10.750	8	27.0
250	273.1	203	12.2
12	12.750	8	33.0
300	323.9	203	15.0

This product is not ULC Listed.



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FIG. 7062

Bullhead Tee Specialty Tees (GR x GR x FPT)

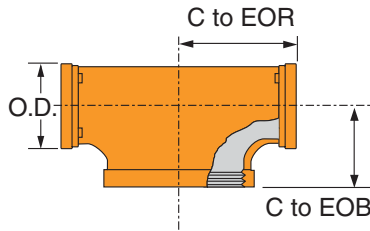


FIGURE 7062 BULLHEAD TEE (GR x GR x FPT)

Nominal Size	Center to End of Run	Center to End of Branch	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
5 x 5 x 8 125 x 125 x 200	7¾ 197	5½ 140	31.0 14.1
6 x 6 x 8 150 x 150 x 200	7¾ 197	6½ 165	37.6 17.1

See Fitting Size chart on page 48 for O.D.

These fittings are designed to provide minimal pressure drop and uniform strength. Pressure ratings of Gruvlok Fittings conforms to those of Fig. 7001 Gruvlok Standard Coupling.



FIG. 7065

Standpipe Tee (GR x GR x FPT)

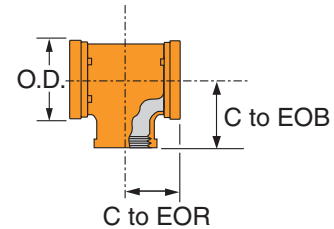


FIGURE 7065 STANDPIPE TEE (GR x GR x FPT)

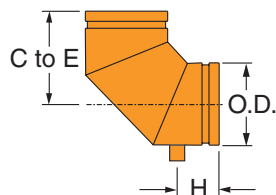
Nominal Size	O.D.	Center to End of Run	Center to End of Branch	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
4 x 4 x 2½ 100 x 100 x 65	4.500 114.3	3¼ 83	4 102	7.6 3.4
6 x 6 x 2½ 150 x 150 x 65	6.625 168.3	3¼ 83	5½ 130	11.2 5.1

See Fitting Size chart on page 48 for O.D.

These fittings are designed to provide minimal pressure drop and uniform strength. Pressure ratings of Gruvlok Fittings conforms to those of Fig. 7001 Gruvlok Standard Coupling.

FIG. 7050DR

90° Drain elbow



Available fabricated Schedule 10 only.

Drain elbow has a standard 1" female NPT outlet.

FIGURE 7050DR 90° DRAIN ELBOW

Nominal Size	O.D.	Max Working Pressure	Dimensions		Approx. Wt. Ea.
			C to E	H	
In./DN(mm)	In./mm	PSI/bar	In./mm	In./mm	Lbs./Kg
1¼ 32	1.660 42.2	300 20.7	2¾ 69	1¾ 44	0.7 0.3
1½ 40	1.900 48.3	300 20.7	2¾ 69	1¾ 44	1.7 0.8
2 50	2.375 60.3	300 20.7	3¼ 83	1¾ 44	2.0 0.9
2½ 65	2.875 73.0	300 20.7	3¾ 95	1⅞ 48	2.5 1.1
3 80	3.500 88.9	300 20.7	4¼ 108	2 51	3.2 1.5
4 100	4.500 114.3	300 20.7	5 127	2¼ 57	4.6 2.1
5 125	5.583 141.3	300 20.7	5½ 140	2⅝ 60	11.5 5.2
6 150	6.625 168.3	300 20.7	6½ 165	2⅝ 60	9.6 4.4
8 200	8.625 219.1	300 20.7	7¾ 197	2½ 64	15.8 7.2
10 250	10.750 273.1	300 20.7	9 229	2¾ 69	48.5 22.0
12 300	12.750 323.9	300 20.7	10 254	2¾ 69	66.0 29.0

GRUVLOK® FIRE-RITE™ SHORT PATTERN FITTINGS

FIG. 7450

90° Short Pattern Elbow

The Gruvlok® Fire-Rite™ short pattern 90° elbows in 2" to 8" size range with a 300 psi pressure rating.

Fire-Rite™ fittings are painted to industry specification and are available galvanized for more corrosive environments.

CAD designed increased internal diameters provides superior flow capability.



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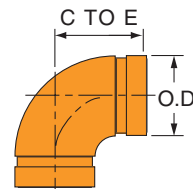
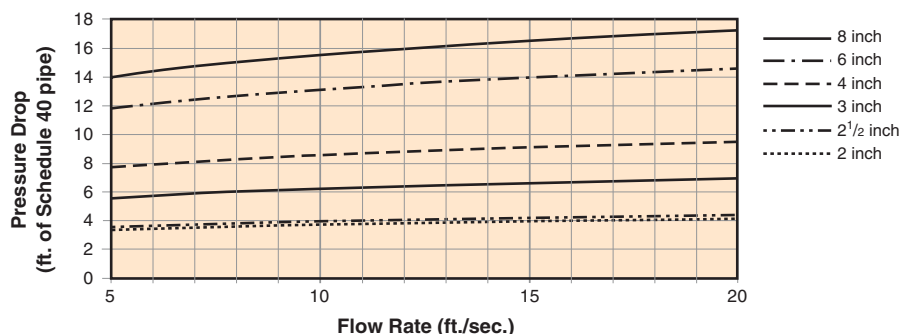


FIGURE 7450 90° ELBOW SHORT PATTERN FITTING – PRESSURE DROP



Gruvlok short pattern fittings exceed the headloss requirements of NFPA 13.

For Fig. 7450 90° grooved end elbows use the value shown.

Note: Above values are shown for Schedule 40 pipe to be consistent with industry practices.

FIGURE 7450 90° ELBOW

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	2¾ 70	1.7 0.8
2½ 65	2.875 73.0	3 76	2.6 1.2
3 80	3.500 88.9	3½ 86	3.5 1.6
4 100	4.500 114.3	4 102	6.5 3.0
6 150	6.625 168.3	5½ 140	14.8 6.7
8 200	8.625 219.1	6¾ 175	25.6 11.6

All are Ductile Iron.

FIG. 7460

Short Pattern Tee

The Gruvlok® Fire-Rite™ short pattern fitting tees in 2" to 8" size range with a 300 psi pressure rating.

Fire-Rite™ fittings are painted to industry specification and are available galvanized for more corrosive environments.

CAD designed increased internal diameters provides superior flow capability.

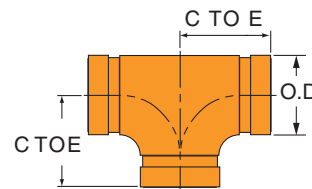
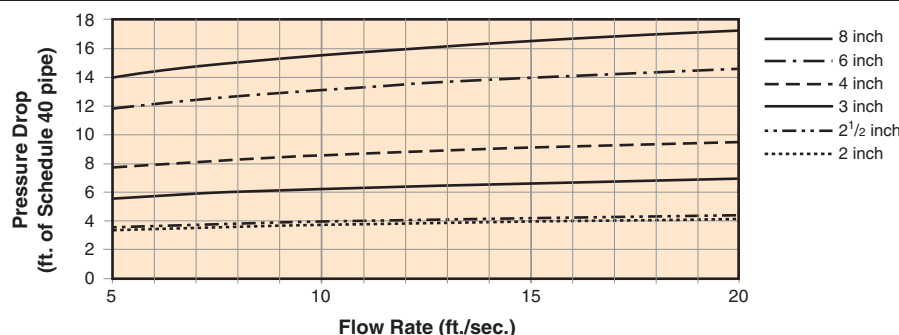


FIGURE 7460 TEE SHORT PATTERN FITTING – PRESSURE DROP



Gruvlok short pattern fittings exceed the headloss requirements of NFPA 13.

For Fig. 7460 Tee branch use 2½ times the value shown.

For Fig. 7460 Tee run use the value shown.

Note: Above values are shown for Schedule 40 pipe to be consistent with industry practices.

FIGURE 7460 TEE

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	2¾ 70	2.5 1.1
2½ 65	2.875 73.0	3 76	3.5 1.6
3 80	3.500 88.9	3½ 86	4.8 2.2
4 100	4.500 114.3	4 102	8.1 3.7
6 150	6.625 168.3	5½ 140	19.1 8.7
8 200	8.625 219.1	6¾ 175	35.2 16.0

All are Ductile Iron.

FIG. 7050 3D

Long Radius Elbows

1. Long radius elbows 3D in sizes up to and including 4" are provided with 4" (101.6 mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.
2. Grooved or plain-end available - specify choice on order.
3. Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).

4. Bends to conform to above radii.
5. C to E tolerances: 2" through 6" $\pm \frac{1}{8}$ " (3.2 mm);
8" through 16" $\pm \frac{1}{4}$ " (6.4 mm);
18" through 24" $\pm \frac{3}{8}$ " (9.5 mm).
6. All weights are approximate, based on calculated weight of pipe.

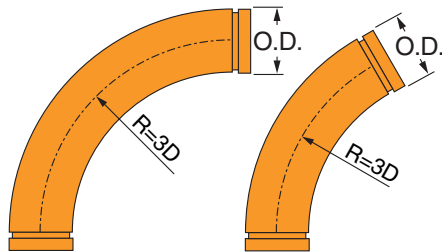


Fig. 7050-3D,
90° Elbow

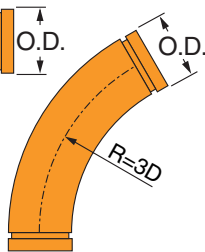


Fig. 7057-3D,
60° Elbow

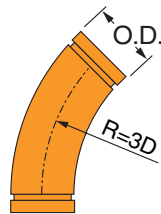


Fig. 7051-3D,
45° Elbow

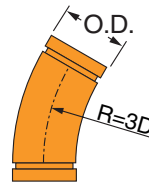


Fig. 7058-3D,
30° Elbow

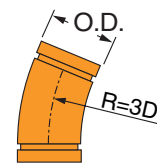


Fig. 7052-3D,
22 1/2° Elbow

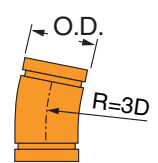


Fig. 7053-3D,
11 1/4° Elbow

FIGURE 7050-3D 90° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	10	5.3
50	60.3	254	2.4
2 1/2	2.875	11 1/2	9.5
65	73	292	4.3
3	3.500	13	14.0
80	88.9	330	6.4
3 1/2	4.000	14 1/2	18.6
90	101.6	368	8.4
4	4.500	16	24.1
100	114.3	406	10.9
5	5.563	20	40.9
125	141.3	508	18.6
6	6.625	24	63.7
150	168.3	610	28.9
8	8.625	32	127.8
200	219.1	813	58.0
10	10.750	40	226.4
250	273.1	1016	102.7
12	12.750	48	332.7
300	323.9	1219	150.9
14	14.000	56	427.3
350	355.6	1422	193.8
16	16.000	64	560.1
400	406.4	1626	254.1
18	18.000	72	710.7
450	457.2	1829	322.4
20	20.000	80	879.3
500	508	2032	398.8
24	24.000	96	1270.3
600	609.6	2438	576.2

FIG. 7057-3D 60° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
7 1/2	4.3
191	2.0
8 1/4	7.7
210	3.5
9 1/4	11.0
235	5.0
10	14.4
254	6.5
11	18.5
279	8.4
13 3/4	31.3
349	14.2
16 1/2	48.8
419	22.1
22	97.9
559	44.4
27 1/4	173.4
692	78.7
32 3/4	254.8
832	115.6
38 1/4	327.3
972	148.5
43 3/4	429.0
1111	194.6
49 1/4	544.4
1251	246.9
54 3/4	673.5
1391	305.5
65 1/2	973.0
1664	441.3

FIG. 7051-3D 45° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6 1/2	3.9
165	1.8
7 1/4	6.7
184	3.0
7 3/4	9.5
197	4.3
8 1/2	12.3
216	5.6
9	15.7
229	7.1
11 1/4	26.5
286	12.0
13 1/2	41.3
343	18.7
18	82.9
457	37.6
22 1/2	146.9
572	66.6
27	215.9
686	97.9
31 1/2	227.3
800	103.1
36	363.5
914	164.9
40 1/2	461.3
1029	209.2
45	540.7
1143	245.3
53 3/4	824.4
1365	373.9

FIG. 7058-3D 30° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
5 3/4	3.4
146	1.5
6	5.8
152	2.6
6 1/2	8.0
165	3.6
6 3/4	10.2
171	4.6
7 1/4	12.8
184	5.8
9	21.8
229	9.9
10 3/4	33.9
273	15.4
14 1/2	68.0
368	30.8
18	120.5
457	54.7
21 3/4	177.0
552	80.3
25 1/4	227.3
641	103.1
29	297.9
737	135.1
32 1/2	378.1
826	171.5
36	467.8
914	212.2
43 3/4	675.7
1099	304.1

FIG. 7052-3D 22 1/2° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
5 1/4	3.2
133	1.5
5 1/2	5.3
140	2.4
5 3/4	7.3
146	3.3
6	9.2
152	4.2
6 1/2	11.4
165	5.2
8	19.4
203	8.8
9 1/2	30.1
241	13.7
12 3/4	60.5
324	27.4
16	107.2
406	48.6
19 1/4	157.5
489	71.4
22 1/2	202.3
572	91.8
25 1/2	265.2
648	120.3
28 3/4	336.5
730	152.6
32	416.3
813	188.8
38 1/4	601.4
972	272.8

FIG. 7053-3D 11 1/4° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
4 1/2	2.8
114	1.3
4 3/4	4.6
121	2.1
5	6.2
127	2.8
5	7.6
127	3.4
5 1/4	9.3
133	4.2
6 1/2	15.8
165	7.2
7 3/4	24.6
197	11.2
10 1/2	49.3
267	22.4
13	87.3
330	39.6
15 1/2	128.3
394	58.2
18 1/4	164.8
464	74.8
20 3/4	216.0
527	98.0
23.35	274.1
593	124.3
26	339.2
660	153.9
31	490.0
787	222.3

FIG. 7050 5D

Long Radius Elbows

- Long radius elbows 5D in sizes up to and including 4" are provided with 4" (101.6 mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.
- Grooved or plain-end available.
- Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).
- Bends to conform to above radii.
- C to E tolerances: 2" through 6" $\pm \frac{1}{8}$ " (3.2 mm);
8" through 16" $\pm \frac{1}{4}$ " (6.4 mm);
18" through 24" $\pm \frac{3}{8}$ " (9.5 mm).
- All weights are approximate, based on calculated weight of pipe.

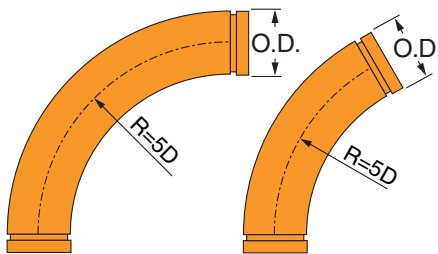


Fig. 7050-5D,
90° Elbow

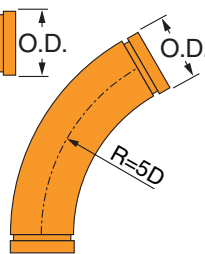


Fig. 7057-5D,
60° Elbow

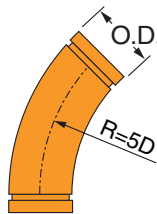


Fig. 7051-5D,
45° Elbow

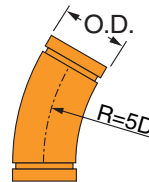


Fig. 7058-5D,
30° Elbow

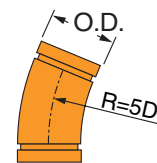


Fig. 7052-5D,
22 1/2° Elbow

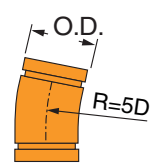


Fig. 7053-5D,
11 1/4° Elbow

FIGURE 7050-5D 90° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	14	7.2
50	60.3	356	3.3
2 1/2	2.875	16 1/2	13.3
65	73	419	6.0
3	3.500	19	19.9
80	88.9	483	9.0
3 1/2	4.000	21 1/2	26.9
90	101.6	546	12.2
4	4.500	24	35.4
100	114.3	610	16.1
5	5.563	30	60.0
125	141.3	762	27.2
6	6.625	36	93.5
150	168.3	914	42.4
8	8.625	48	187.6
200	219.1	1219	85.1
10	10.750	60	332.4
250	273.1	1524	150.8
12	12.750	72	488.4
300	323.9	1829	221.5
14	14.000	84	627.4
350	355.6	2134	284.6
16	16.000	96	822.2
400	406.4	2438	372.9
18	18.000	108	1,043.4
450	457.2	2743	473.3
20	20.000	120	1,290.9
500	508	3048	585.5
24	24.000	144	1,864.8
600	609.6	3658	845.9

FIG. 7057-5D 60° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
9 3/4	5.6
248	2.5
11 1/4	10.2
286	4.6
12 3/4	15.0
324	6.8
12 1/4	20.0
311	9.1
15 1/2	26.0
394	11.8
19 1/2	44.1
495	20.0
23 1/4	68.6
591	31.1
31	137.7
787	62.5
39	244.1
991	110.7
46 3/4	358.6
1187	162.7
54 1/2	460.7
1384	209.0
62 1/4	603.8
1581	273.9
70	766.2
1778	347.5
77 3/4	947.9
1975	430.0
93 1/4	1,369.3
2369	621.1

FIG. 7051-5D 45° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
8 1/4	4.8
210	2.2
9 1/4	8.6
235	3.9
10 1/4	12.5
260	5.7
11 1/4	16.5
286	7.5
12 1/2	21.3
318	9.7
15 1/2	36.1
394	16.4
18 1/2	56.2
470	25.5
24 1/2	112.8
622	51.2
30 3/4	199.9
781	90.7
37	293.7
940	133.2
43	377.3
1092	171.1
49 1/4	494.5
1251	224.3
55 1/4	627.6
1403	284.7
61 1/2	776.4
1562	352.2
73 1/4	1,121.6
1873	508.7

FIG. 7058-5D 30° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6 3/4	4.0
171	1.8
7 1/2	7.0
191	3.2
8	10.0
203	4.5
8 3/4	13.0
222	5.9
9 1/2	16.6
241	7.5
11 1/4	28.1
298	12.7
14	43.8
356	19.9
18 3/4	87.9
476	39.9
23 1/2	155.8
597	70.7
28	228.9
711	103.8
32 3/4	294.0
832	133.4
37 1/2	385.3
953	174.8
42 1/4	489.0
1073	221.8
46 3/4	605.0
1187	274.4
56 1/4	873.9
1429	396.4

FIG. 7052-5D 22 1/2° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6	3.6
152	1.6
6 1/2	6.2
165	2.8
7	8.8
178	4.0
7 1/2	11.3
191	5.1
8	14.3
203	6.5
10	24.1
254	10.9
12	37.6
305	17.1
16	75.4
406	34.2
20	133.7
508	60.6
24	196.4
610	89.1
28	252.3
711	114.4
32	330.7
813	150.0
36	419.7
914	190.4
40	519.2
1016	235.5
48	750.1
1219	340.2

FIG. 7053-5D 11 1/4° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
5	3.0
127	1.4
5 1/4	5.0
133	2.3
5 1/2	6.9
140	3.1
5 3/4	8.7
146	3.9
6	10.7
152	4.9
7 1/2	18.2
191	8.3
9	28.3
229	12.8
12	56.8
305	25.8
15	100.6
381	45.6
18	147.8
457	67.0
21	189.8
533	86.1
24	248.8
610	112.9
27	315.7
686	143.2
30	390.6
762	177.2
35 1/4	564.3
908	256.0

FIG. 7050 6D

Long Radius Elbows

1. Long radius elbows 6D in sizes up to and including 4" are provided with 4" (101.6 mm) long integral tangent. Remaining sizes provided with integral tangents with lengths equal to nominal pipe size.
2. Grooved or plain-end available.
3. Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).

4. Bends to conform to above radii.
5. C to E tolerances: 2" through 6" $\pm \frac{1}{8}$ " (3.2 mm);
8" through 16" $\pm \frac{1}{4}$ " (6.4 mm);
18" through 24" $\pm \frac{3}{8}$ " (9.5 mm).
6. All weights are approximate, based on calculated weight of pipe.

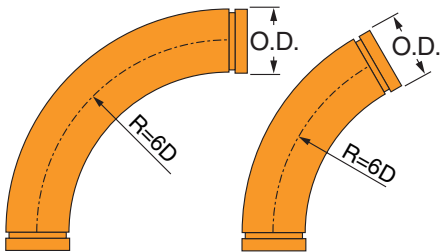


Fig. 7050-6D,
90° Elbow

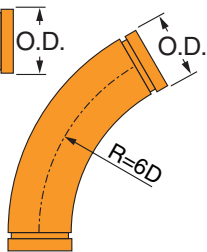


Fig. 7057-6D,
60° Elbow

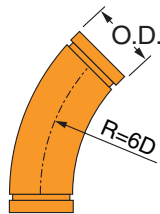


Fig. 7051-6D,
45° Elbow

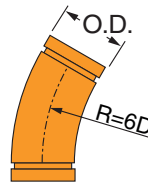


Fig. 7058-6D,
30° Elbow

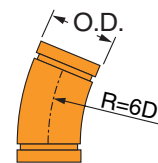


Fig. 7052-6D,
22 1/2° Elbow

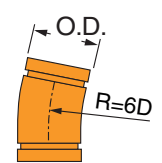


Fig. 7053-6D,
11 1/4° Elbow

FIGURE 7050-6D 90° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	16	8.2
50	60.3	406	3.7
2 1/2	2.875	19	15.2
65	73	483	6.9
3	3.500	22	22.9
80	88.9	559	10.4
3 1/2	4.000	25	31.1
90	101.6	635	14.1
4	4.500	28	41.1
100	114.3	711	18.6
5	5.563	35	69.6
125	141.3	889	31.6
6	6.625	42	108.4
150	168.3	1067	49.2
8	8.625	56	217.5
200	219.1	1422	98.7
10	10.750	70	385.4
250	273.1	1778	174.8
12	12.750	84	566.2
300	323.9	2134	256.8
14	14.000	98	727.4
350	355.6	2489	329.9
16	16.000	112	953.3
400	406.4	2845	432.4
18	18.000	126	1,209.7
450	457.2	3200	548.7
20	20	140	1,496.6
500	508	3556	678.8
24	24	168	2,162.0
600	609.6	4267	980.7

FIG. 7057-6D 60° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
11	6.3
279	2.9
12 3/4	11.4
324	5.2
14 1/2	17.0
368	7.7
16 1/4	22.8
413	10.3
18	29.8
457	13.5
22 1/4	50.5
565	22.9
26 3/4	78.6
679	35.7
35 3/4	157.7
908	71.5
44 3/4	279.4
1137	126.7
53 1/2	410.5
1359	186.2
62 1/2	527.3
1588	239.2
71 1/2	691.1
1816	313.5
80 1/2	877.1
2045	397.8
89 1/4	1,085.1
2267	492.2
107 1/4	1,567.5
2724	711.0

FIG. 7051-6D 45° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
9	5.3
229	2.4
10 1/4	9.5
260	4.3
11 1/2	14.0
292	6.4
12 3/4	18.6
324	8.4
14	24.1
356	10.9
17 1/2	40.9
445	18.6
21	63.7
533	28.9
28	127.8
711	58.0
35	226.4
889	102.7
41 3/4	332.7
1060	150.9
48 3/4	427.3
1238	193.8
55 3/4	560.1
1416	254.1
62 3/4	710.7
1594	322.4
69 3/4	879.3
1772	398.8
83 3/4	1,270.3
2127	576.2

FIG. 7058-6D 30° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
7 1/4	4.3
184	2.0
8	7.7
203	3.5
8 1/4	11.0
222	5.0
9 3/4	14.4
248	6.5
10 1/2	18.5
267	8.4
13	31.3
330	14.2
15 3/4	48.8
400	22.1
21	97.9
533	44.4
26	173.4
660	78.7
31 1/4	254.8
794	115.6
36 1/2	327.3
927	148.5
41 3/4	429.0
1060	194.6
47	544.4
1194	246.9
52 1/4	673.5
1327	305.5
62 1/2	973.0
1588	441.3

FIG. 7052-6D 22 1/2° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6 1/2	3.9
165	1.8
7	6.7
178	3.0
7 1/2	9.5
191	4.3
8 1/4	12.3
210	5.6
8 3/4	15.7
222	7.1
11	26.5
279	12.0
13 1/4	41.3
337	18.7
17 1/2	82.9
445	37.6
22	146.9
559	66.6
26 1/4	215.9
667	97.9
30 3/4	277.3
781	125.8
35 3/4	363.5
895	164.9
39 1/2	461.3
1003	209.2
44	570.7
1118	258.9
52.34	824.4
1329	373.9

FIG. 7053-6D 11 1/4° ELBOW	
Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
5 1/4	3.2
133	1.5
5 1/2	5.3
140	2.4
5 3/4	7.3
146	3.3
6	9.2
152	4.2
6 1/2	11.4
165	5.2
8	19.4
203	8.8
9 1/2	30.1
241	13.7
12 3/4	60.5
324	27.4
16	107.2
406	48.6
19	157.5
483	71.4
22 1/4	202.3
565	91.8
25 1/2	265.2
648	120.3
28 3/4	336.5
730	152.6
31 3/4	416.3
806	188.8
38 1/4	601.4
972	272.8

SERIES 7700

Butterfly Valve



AN-7721-3

Series 7700 butterfly valve
with 10 position lever lock



AN-7722-3

Series 7700 butterfly valve
with gear operator

Used in commercial grooved-end piping systems 2" through 12".

The uniqueness of the Series 7700 Gruvlok Butterfly Valve begins with the spherical bore of the disc seat area. This facilitates a constant DISC-TO-SEAT loading that maintains a leak tight stem seal regardless of disc position. The stem sealing force is constant through the full disc cycle and operating torques are kept low which increases valve life. The design provides a bubble tight seal from full vacuum to 300 psi when the valve is closed. The valve is rated for dead-end service to a full pressure rating of 300 psi.

The stem-to-disc connection provides zero backlash. The high strength, corrosion resistant, stainless steel stems are blow-out proof. Each stem is fitted with a secondary seal that also provides a lifetime lubrication chamber.

The Series 7700 valve is designed with the contractor in mind. The valve body is a rugged one-piece casting with an integral mounting base for gear operator or handle actuation, while providing room for a minimum of 2" of pipe insulation. The valve is designed and manufactured to meet or exceed the requirements of MSS SP-67.

For data on fire protection listings/approvals, contact your Anvil representative.



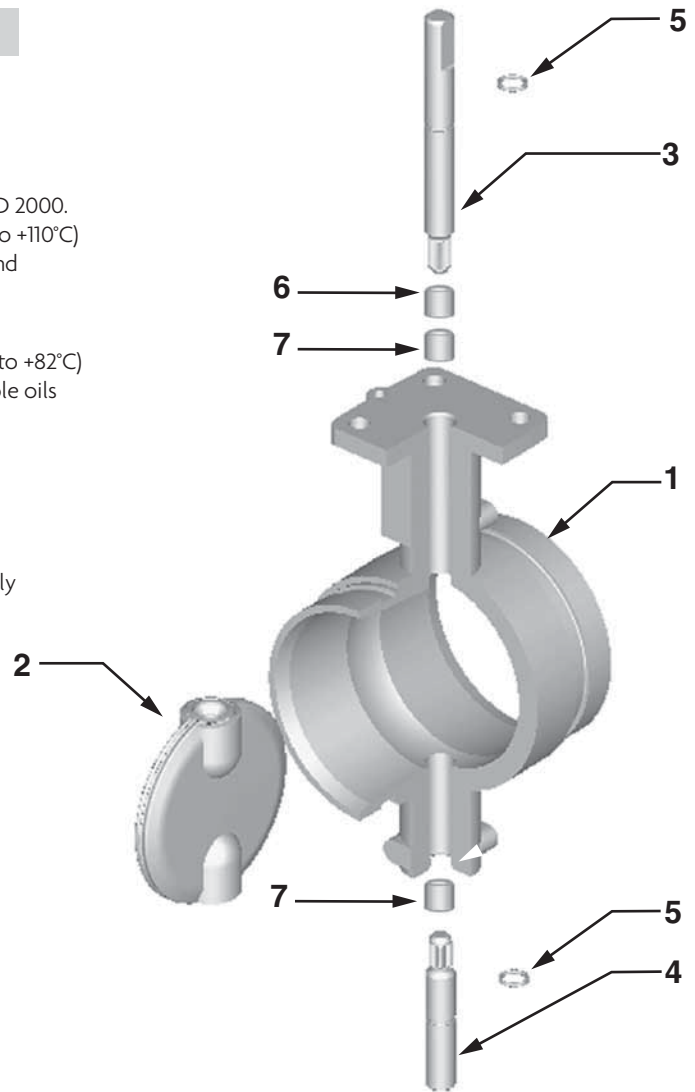
For Listings/Approval Details and Limitations,
visit our website @ www.anvilintl.com
or contact an Anvil/AnvilStar Sales Representative.

SERIES 7700

Butterfly Valve

MATERIAL SPECIFICATIONS

1. **BODY:** Ductile Iron conforming to ASTM A 536, Grade 65-45-12
Body Coating: Nylon: +230°F (+110°C) maximum service temperature
Epoxy: +180°F (+82°C) maximum service temperature
2. **DISC:** Ductile Iron conforming to ASTM A 536 Grades 65-45-12
Disc Encapsulation: Properties as specified in accordance with ASTM D 2000.
☐ **Grade E (EPDM):** Service Temperature Range -40°F to +230°F (-40°C to +110°C)
Recommended for water service, dilute acids, alkalis, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM SERVICES.
☐ **Grade T (Nitrile):** Service Temperature Range -20°F to +180°F (-29°C to +82°C)
Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils.
NOT FOR USE IN HOT WATER SERVICES.
- 3, 4. **UPPER AND LOWER SHAFT:** Type 416 Stainless Steel
5. **O-RINGS:** Compatible with disc coating
- 6, 7. **TOP AND BOTTOM BRONZE SLEEVE BUSHINGS:** 8", 10", & 12" Valve only



*** Special Options -**
Call an Anvil Representative for
pricing and availability.
E- Silicone Free

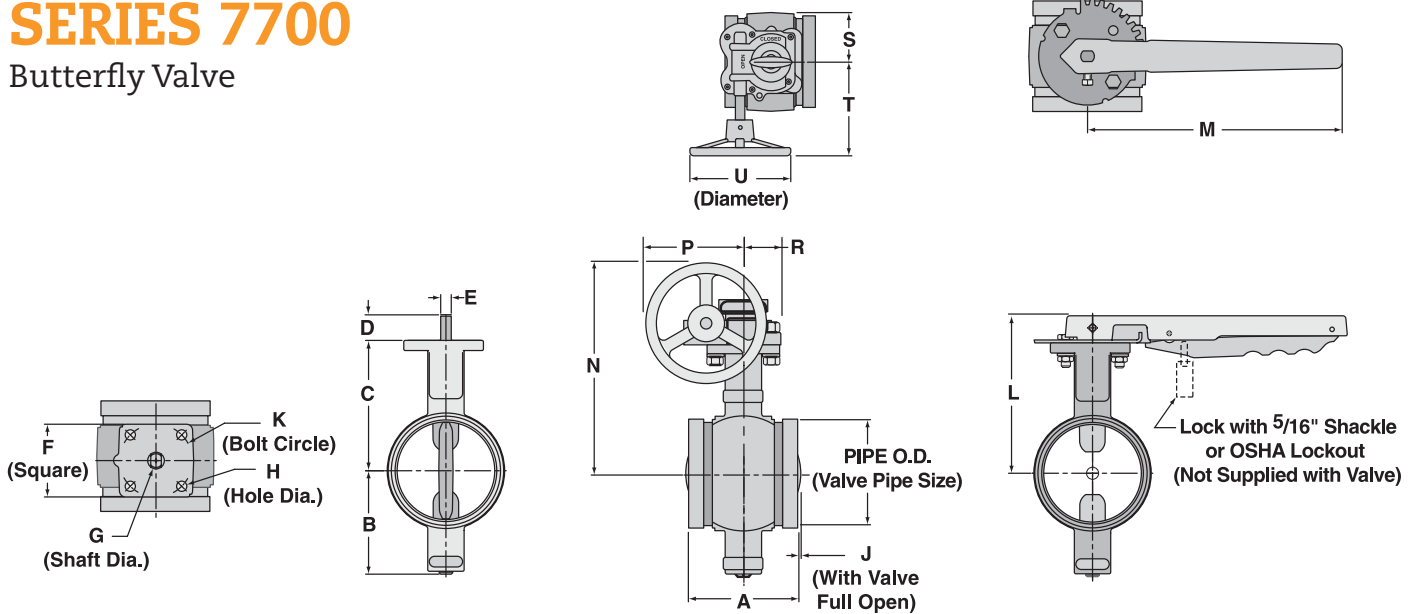
GRUVLOK BUTTERFLY VALVES SERIES 7700 (ORDERING INFORMATION)

Sample Part Number 8" AN7721-3* —>	8"	A	N	77	2	1 -	3*
	Size	Body Style	Body Coating	Series	Disc Coating	Operator	Stem
	2" - 12"	A	N - Nylon E - Epoxy	77-77XX	1 - Nitrile (Grade T) 2 - EPDM (Grade E)	0 - None 1 - 10 Pos. L/Lock 2 - Gear Operator D - Infinite Pos. w/Memory Stop 4 - Short 10 Pos. L/Lock Operator	3 - 416 S.S.

NOTE: For operator safety, hand levers on 8" valves are limited to applications with a 25 PSI (1.7 bar) maximum pressure.
For operator safety, hand levers on 10" and 12" valves are not available.

SERIES 7700

Butterfly Valve



SERIES 7700 BUTTERFLY VALVE DIMENSIONS

Dimensions	Valve Size (ANSI/DN)								
	2	2½	3	4	5	6	8	10	12
O.D.	2⅝	2⅞	3½	4½	5⅞	6⅝	8⅝	10¾	12¾
in./mm	60.3	73.0	88.9	114.3	141.3	168.3	219.1	273.1	323.9
A	3⅞	3⅞	3⅞	4⅝	5⅞	5⅞	5¼	6¼	6½
in./mm	81.0	96.8	96.8	117.3	147.6	147.6	133.4	158.8	165.1
B	3	3⅞	3⅞	4¼	5	5½	6⅞	8	9
in./mm	75.4	80.8	96.5	108.5	126.5	138.9	175.8	202.9	229.4
C	4⅞	4⅞	5⅞	5⅞	5⅞	6⅞	7¾	9½	10½
in./mm	105.9	111.3	129.0	136.7	149.4	161.8	196.9	240.3	266.7
D	1⅞	1⅞	1⅞	1⅞	1⅞	1⅞	1⅞	1⅞	1⅞
in./mm	26.9	26.9	26.9	26.9	26.9	26.9	41.1	41.1	41.1
E	⅞	⅞	⅞	⅞	⅞	⅞	¾	¾	¾
in./mm	11.1	11.1	11.1	11.1	11.1	11.1	19.1	19.1	19.1
F	3	3	3	3	3	3	5	5	5
in./mm	76.2	76.2	76.2	76.2	76.2	76.2	127.0	127.0	127.0
G	⅞	⅞	⅞	⅞	⅞	⅞	1	1¼	1¼
in./mm	14.3	14.3	14.3	14.3	22.2	22.2	25.4	31.8	31.8
H	⅞	⅞	⅞	⅞	⅞	⅞	½	½	½
in./mm	11.1	11.1	11.1	11.1	11.1	11.1	13.5	13.5	13.5
J	-	-	-	-	-	⅞	1⅞	1⅞	2¾
in./mm	-	-	-	-	-	3.3	34.8	47.0	70.1
K	3	3	3	3	3	3	5	5	5
in./mm	76.2	76.2	76.2	76.2	76.2	76.2	127.0	127.0	127.0
L	5⅞	5½	6¼	6½	7	7½	9⅞	-	-
in./mm	135.1	140.5	158.2	165.9	178.6	191.0	240.3	-	-
M	10½	10½	10½	10½	10½	10½	15	-	-
in./mm	266.7	266.7	266.7	266.7	266.7	266.7	381.0	-	-
N	7⅞	8	8⅞	9	9½	10	14⅞	16⅞	20⅞
in./mm	198.0	203.3	221.1	228.7	241.4	253.9	379.2	422.7	525.3
P	4	4	4	4	4	4	8⅞	8⅞	11⅞
in./mm	102.1	102.1	102.1	102.1	102.1	102.1	204.5	204.5	295.4
R	1½	1½	1½	1½	1½	1½	2⅞	2⅞	2⅞
in./mm	38.2	38.2	38.2	38.2	38.2	38.2	58.5	58.5	65.5
S	2	2	2	2	2	2	2⅞	2⅞	3¼
in./mm	51.0	51.0	51.0	51.0	51.0	51.0	66.0	66.0	83.0
T	6⅞	6⅞	6⅞	6⅞	6⅞	6⅞	10⅞	10⅞	13⅞
in./mm	160.3	160.3	160.3	160.3	160.3	160.3	275.3	275.3	350.3
U	5	5	5	5	5	5	12	12	18
in./mm	127.0	127.0	127.0	127.0	127.0	127.0	304.8	304.8	457.2

Note: 3" or 5" handwheels may be included on valves sizes 2" - 4". Contact your Anvil Rep. for additional information.

SERIES 7700

Butterfly Valve Performance Data

Maximum Working Pressure Rating: 300 PSI

(Commercial Applications - Sizes 2" thru 12")

CV VALUES									
Valve Size	O.D.	Disc Position (degrees open)							
		25°	30°	40°	50°	60°	70°	80°	90°
In./mm	In./mm								
2	2.375	4	7	19	44	48	80	111	158
50	60.3	0.3	0.5	1.3	3.0	3.3	5.5	7.7	10.9
2½	2.875	9	14	34	78	84	142	196	280
65	73.0	0.6	1.0	2.3	5.4	5.8	9.8	13.5	19.3
3	3.500	14	20	50	112	128	215	285	400
80	88.9	1.0	1.4	3.4	7.7	8.8	14.8	19.7	27.6
4	4.500	29	41	100	239	250	420	582	826
100	114.3	2.0	2.8	6.9	16.5	17.2	29.0	40.1	57.0
5	5.563	62	76	182	415	445	780	1,100	1,480
125	141.3	4.3	5.2	12.5	28.6	30.7	53.8	75.8	102.0
6	6.625	96	141	325	755	809	1,370	1,920	2,678
150	168.3	6.6	9.7	22.4	52.1	55.8	94.5	132.4	184.6
8	8.625	172	252	592	1,365	1,460	2,430	3,410	4,819
200	219.1	11.9	17.4	40.8	94.1	100.7	167.5	235.1	332.3
10	10.750	230	328	792	1,825	1,962	3,260	4,590	6,431
250	273.1	15.9	22.6	54.6	125.8	135.3	224.8	316.5	443.4
12	12.750	418	604	1,440	3,350	3,590	5,980	8,750	11,947
300	323.9	28.8	41.6	99.3	231.0	247.5	412.3	603.3	823.7

HEADLOSS EQUIVALENT LENGTH OF PIPE					
Valve Size	O.D.	Equivalent Feet of Pipe* C=120			Max. Insulating Thickness
		Sch. 10	Sch. 30	Sch. 40	
In./mm	In./mm	Ft./m			In./mm
2	2.375	5.8	-	4.7	2
50	60.3	1.8	-	1.4	50
2½	2.875	5.1	-	3.7	2½
65	73.0	1.6	-	1.1	65
3	3.500	9.6	-	7.2	2
80	88.9	2.9	-	2.2	50
4	4.500	7.5	-	5.7	2½
100	114.3	2.3	-	1.7	65
5	5.563	7.0	-	5.6	2½
125	141.3	2.1	-	1.7	65
6	6.625	6.1	-	4.8	2½
150	168.3	1.9	-	1.5	65
8	8.625	6.3	5.7	-	2½
200	219.1	1.9	1.7	-	65
10	10.750	11.3	10.2	-	3
250	273.1	3.4	3.1	-	80
12	12.750	8.4	7.4	-	3½
300	323.9	2.6	2.3	-	90

* The equivalent feet of pipe is based on the Hazen and Williams formula and the flow rates typically used with each size valve.

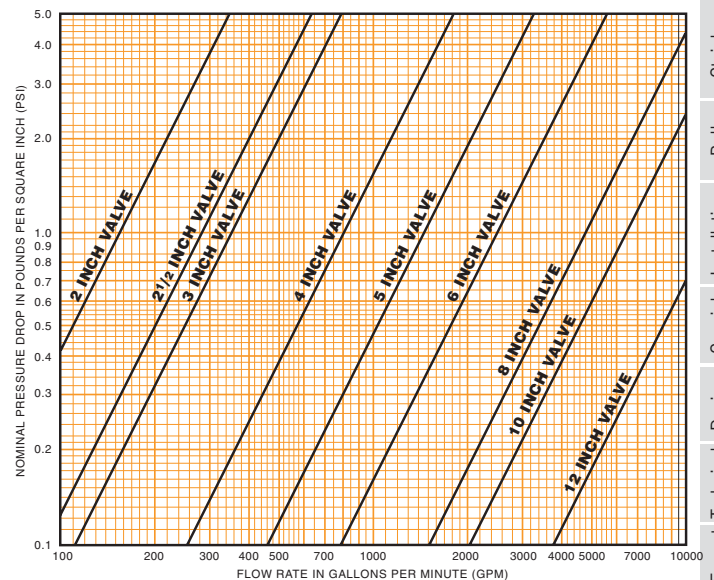
VALVE WEIGHT AND TORQUE VALUES							
Valve Size	O.D.	* Approx. Wt. Ea.	Operating Pressure				
			50 PSIG	100 PSIG	150 PSIG	200 PSIG	300 PSIG
In./mm	In./mm	Lbs./Kg	† Breakaway Torque (In. - Lbs) / N-m				
2	2.375	5	65	72	75	80	85
50	60.3	2.3	7.3	8.1	8.5	9.0	9.6
2½	2.875	10	75	82	82	90	94
65	73.0	4.5	8.5	9.3	9.3	10.2	10.6
3	3.500	11	75	85	95	115	120
80	88.9	5.0	8.5	9.6	10.7	13.0	13.6
4	4.500	15	180	195	200	205	220
100	114.3	6.8	20.3	22.0	22.6	23.2	24.9
5	5.563	20	224	307	320	347	452
125	141.3	9.0	25.3	34.7	36.2	39.2	51.1
6	6.625	46	276	376	404	428	599
150	168.3	20.9	31.2	42.5	45.6	48.4	67.7
8	8.625	68	613	794	880	880	1,067
200	219.1	30.8	69.3	78.4	89.7	99.4	120.6
10	10.750	78	742	864	1,160	1,452	1,680
250	273.1	35.4	83.8	97.6	131.1	164.1	189.8
12	12.750	91	2,220	2,633	2,917	3,210	4,200
300	323.9	41.3	250.8	297.5	329.6	362.7	474.5

† These values are valid for water and lubricating fluid service only.

Contact Anvil for information on torques for dry and non-lubricating fluid service.

* Weights may vary based on valve options selected.

PRESSURE DROP (PSI) VS. (GPM)



SERIES 7700

Butterfly Valve

Resistance to various chemicals, as a function of temperature °F (Fahrenheit)

NYLON COATING

Coating Condition after 18 months immersion

RESISTANCE				
	68°F	104°F	140°F	176°F
Alcohols				
benzyl alcohol	L	P	P	P
butanol	G***	L	P	
ethanol (pure)	G***	G	L	
glycerine (pure)	G	G	L	P
glycol	G	G	G	P
methanol (pure)	G***	L	P	
Chlorinated solvents				
carbon tetrachloride	P			
methyl bromide	G	P		
methyl chloride	G	P		
perchloroethylene	G	G	L	
trichloroethane	L	P		
trichloroethylene	G	L		
Phenols				
	P	P	P	P
Various Organic Compounds				
anethole	G			
carbon disulphide	G***	L**	P	
diacetone alcohol	G	G***	L	P
dimethyl formamide	G	G	L	
ethylene chlorhydrin	P	P		
ethylene oxide	G	G	L	P
furfural	G	G***	L	P
glucose	G	G	G	G
tetraethyl lead	G			
tetrahydrofurare	G	G	L	
Salts, esters, ethers				
amyl acetate	G	G	G	L
butyl acetate	G	G	G	L
diethyl ether		G		
diethylphosphate	G	G	G	L
diethylphthalate	G	G	G	L
ethyl acetate	G	G	G	
fatty acid esters	G	G	G	G
methyl acetate	G	G	G	
methyl sulfate	G	L		
tributylphosphate	G	G	G	L
tricresylphosphate	GG	G	G	L
Various Products				
beer	G			
cider	G			
crude petroleum	G	G	G***	
diesel fuel	G	G	G***	
fruit juices	G	G		
fuel-oil	G	G	G	
greases	G	G	G	G
ground nut oil	G	G		
high octane gasoline	G	G	G***	
kerosene (paraffin)	G	G	G***	
linseed cake	G	G	G	G
milk	G	G	G	G
mustard	G			
normal gasoline	G	G	G***	
oils	G	G	G	G

RESISTANCE				
	68°F	104°F	140°F	176°F
Various Products (cont'd.)				
solutions or emulsions of D.D.T. or lindane hydroxy-quinoline (agricultural sprays)	G			
soap solution	G			
stearin	G	G	G	
solvent naptha	G	G	G***	
natural gas	G	G		
turpentine	G	G	G***	
vinegar	G			
wine	G			
Inorganic Acids				
chromic acid (10%)	P	P	P	P
hydrochloric acid (1%)	G	L	P	P
hydrochloric acid (10%)	G	L	P	P
nitric acid (all concentrations)	P	P	P	P
phosphoric acid (50%)	G	L	P	P
sulphuric acid (1%)	G	L	L	P
sulphuric acid (10%)	G	L	P	P
sulphur trioxide	L	P	P	P
Other Inorganic products				
agriculture sprays	G	G		
bleach solutions	L	P	P	P
bromine	P	P		
chlorine	P	P	P	P
fluorine	P	P	P	P
hydrogen	G	G	G	G
hydrogen peroxide (20 volumes)	G	L		
mercury	G	G	G	G
oxygen	G	G	L	P
ozone	L	P	P	P
potassium permanganate (5%)	P	P		
sea water	G	G	G	
soda water	G	G	G	G
sulphur	G	G		
water	G	G	G	G
Aldehydes & Ketones				
acetaldehyde	G	L	P	
acetone	G	G***	L	P
benzaldehyde	G	L	P	
cyclohexanone	G	L	P	
formaldehyde (technical grade)	G	L	P	
methylethylketone (MEK)	G	G	L	P
methylethylketone (MIBK)	G	G	L	P
Hydrocarbons				
acetylene	G	G	G	G
benzene	G	G***	L	
butane	G	G	G	
cyclohexane	G	G	G	L
decane	G	G	G	L
HFA (Forane®)	G			
hexane	G	G	G	
methane	G	G	G	
naphthalene	G	G	G	L
propane	G	G	G	
styrene	G	G***		

RESISTANCE				
	68°F	104°F	140°F	176°F
Hydrocarbons (cont'd.)				
tulene	G	G***	L	L
xylene	G	G***	L	L
Inorganic Bases				
ammonium hydroxide (concentrated)	G	G	G	G
ammonia (liquid or gas)	G	G		
lime-wash	G	G	G	
potassium hydroxide (50%)	G	L	P	P
sodium hydroxide (5%)	G	G	L	
sodium hydroxide (10%)	G	L	L	
sodium hydroxide (50%)	G	L	P	P
Organic acids & anhydrides				
acetic acid	L	P	P	P
acetic anhydride	L	P	P	P
citric acid	G	G	L	P
formic acid	P	P	P	P
lactic acid	G	G	G	L
oleic acid	G	G	G	L
oxalic acid	G	G	L	P
picric acid	L	P	P	P
tartaric acid (saturated solution)	G	G	G	L
uric acid	G	G	G	L
Inorganic Salts				
alum	G	G	G	
aluminium sulphate	G	G	G	G
ammonium nitrate	G	G	G	
barium chloride	G	G	G	G
calcium arsenate (concentrated solutions or slurries)	G	G	G	
calcium chloride	G	G	G	G
calcium sulphate	G	G	L	
copper sulphate	G	G	G	G
diammonium phosphate	G	G	L	
magnesium chloride (50%)	G	G	G	G
potassium ferrocyanide	G	G	G	
potassium nitrate	G*	L*	P	P
potassium sulphate	G	G	G	G
sodium carbonate	G	G	L	P
sodium chloride (saturated)	G	G	G	G
sodium silicate	G	G	G	
sodium sulphide	G	L	L	
trisodium phosphate	G	G	G	G
Organic bases				
aniline (pure)	L	P	P	P
diethanolamine (20%)	G	G***	G***	L
pyridine (pure)	L	P	P	P
urea	G	G	L	L

LEGEND				
* = Slight Yellowing				
** = Yellowing				
*** = Swelling observed				
G = Good				
L = Limited				
P = Poor				

SERIES 7600

Butterfly Valve

The versatile Series 7600 Grooved-End Butterfly Valve has features that can satisfy a wide range of service requirements and allow it to be used with diverse fluids. Its ductile iron body is epoxy coated to resist atmospheric attack, and the elastomer encapsulated disc can be ordered with EPDM or nitrile materials. Rugged enough to take the punishment, yet the Series 7600 Valve is light in weight for easy handling and installation.

The Series 7600 Valve is rated 200 PSI (13.8 bar) to full vacuum, at temperatures from 0° to 150° F (-17.8° to 65.6° C). Every valve is seat tested to 110% of rated pressure.

GENERAL SPECIFICATIONS

BODY: One-piece ductile iron, fully epoxy coated – light weight for easy handling.

DISC: Streamlined profile for maximum flow and minimal seat wear. The ductile iron disc is available with a choice of EPDM or Nitrile coverings.

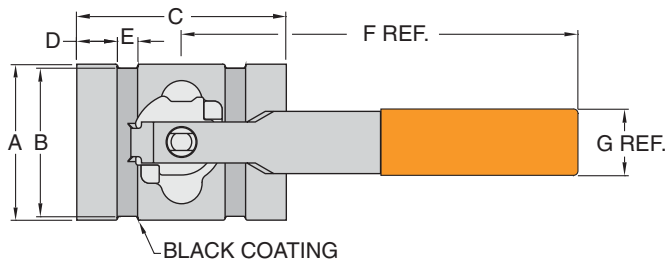
STEM/DISC ATTACHMENT: A splined interference fit creates a permanent rigid connection between the disc and stem, and eliminates the need for pins or bolts in the flow way.

STEM: Two-piece design for maximum flow. Top stem is Double D, giving positive indication of disc position at all times.

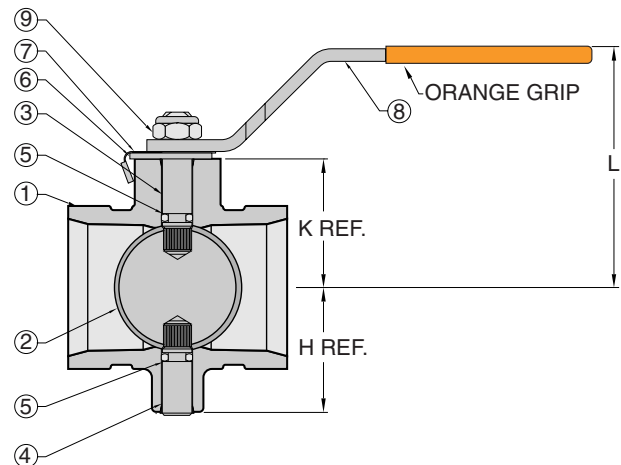
STEM SEAL: The interference between the rubber covered disc hub and the smooth, epoxy coated body provides the primary stem seal. O-rings on both upper and lower stems provide a secondary seal.

HANDLE: Two position on/off handle is standard.

TESTING AND CONFORMANCE: Testing to MSS SP-67. Grooved ends conform to the requirements of AWWA C606 for steel pipe.



MATERIAL SPECIFICATIONS



1. BODY: Epoxy Coated, ASTM A 536
2. DISC: EPDM or NBR, ASTM A 536
3. LOWER STEM: AISI 410
4. UPPER STEM: AISI 410
5. STEM O-RING: NBR
6. LATCH PLATE: Zinc Plated, ASTM A 228
7. LATCH SPRING: Electrolytic Coloring, ASTM A 228
8. NUT, SELF LOCKING: ASTM A 563
9. HANDLE: Zinc Plated, ASTM A 619

SERIES 7600 BUTTERFLY VALVE DIMENSIONS

Size	DIMENSIONS									
	A	B	C	D	E	F	G	H	K	L
In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
2 50	2 ³ / ₈ 60.3	2 ¹ / ₄ 57.2	3 ⁷ / ₁₆ 87.4	5 ⁵ / ₈ 15.9	5 ⁵ / ₁₆ 8.7	6 152.4	1 25.4	1 ¹³ / ₁₆ 46.0	2 50.8	3 ³ / ₁₆ 81.0
2½ 65	2 ¹⁵ / ₁₆ 74.2	2 ³ / ₄ 70.2	3 ¹³ / ₁₆ 96.8	5 ⁵ / ₈ 15.9	¾ 8.9	6 152.4	1 25.4	2 ¹ / ₁₆ 52.3	2 ⁷ / ₁₆ 62.0	3 ⁵ / ₈ 91.9
3 80	3 ⁹ / ₁₆ 90.3	3 ³ / ₈ 86.4	3 ¹³ / ₁₆ 96.8	5 ⁵ / ₈ 15.9	¾ 8.9	8 ⁷ / ₁₆ 214.4	1 25.4	2 ⁵ / ₈ 66.5	2 ¹¹ / ₁₆ 68.1	4 ¹ / ₄ 108.0
4 100	4 ⁹ / ₁₆ 116.1	4 ³ / ₈ 111.8	4 ⁵ / ₈ 117.3	5 ⁵ / ₈ 15.9	¾ 8.9	8 ⁷ / ₁₆ 214.4	1 25.4	3 ⁵ / ₁₆ 84.1	3 ⁵ / ₁₆ 84.1	4 ¹⁵ / ₁₆ 125.5
6 150	6 ³ / ₄ 171.0	6 ⁹ / ₁₆ 166.6	5 ¹ / ₄ 133.4	5 ⁵ / ₈ 15.9	¾ 8.9	12 ¹ / ₄ 311.2	1 ¹ / ₄ 31.8	4 ³ / ₈ 111.3	4 ³ / ₈ 111.3	7 177.8

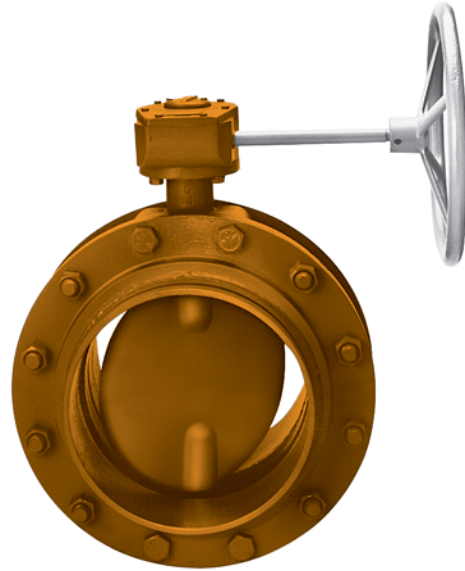
SERIES 8000GR

Butterfly Valve

For use in Grooved-End Piping Systems 14" to 24"

FEATURES

- Up to 200 psig (13.8 bar) WOG (non-shock)
- Outstanding flow characteristics
- Low torque operation
- Superior flow control
- Streamline profile disc
- Suitable for HVAC applications
- Vacuum service to 29.5" (750 mm) Hg
- End-of-line service capabilities



BUTTERFLY VALVE PERFORMANCE DATA

PRESSURE RATINGS:

150 PSIG (10.3 bar) WOG (non-shock)
 200 PSIG (13.8 bar) WOG (non-shock)
 Special order - available upon request.
 29.5" (750 mm) Hg Vacuum Service

TEMPERATURE RATINGS:

Grade E (EPDM):

-40°F to 230°F (-40°C to 110°C) (Service Temperature Range)

Recommended for water service, dilute acids, alkaline, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM SERVICES.

Grade T (Nitrile)

-20°F to 180°F (Service Temperature Range) (-29°C to 82°C)

Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils.

NOT FOR USE IN HOT WATER SERVICES.

FIGURE 8000GR - WEIGHT

Valve Size ANSI	O.D.	Weight	
		Valve Only	Valve with Gear Operator
<i>In./DN(mm)</i>	<i>In./mm</i>	<i>Lbs./Kg.</i>	<i>Lbs./Kg.</i>
14	14	354	378
350	355.6	160.6	171.5
16	16	428	452
400	406.4	194.1	205.0
18	18	524	548
450	457.2	237.7	248.6
20	20	704	728
500	508.0	319.3	330.2
24	24	1,027	1,097
600	609.6	465.8	497.6

SERIES 8000GR

Butterfly Valve

MATERIAL SPECIFICATIONS

BODY: Cast Iron - ASTM A 126 CL.B

EXTENSION BODY:

Pipe - ASTM A 53 Steel

Flange - ANSI B16.5 Forged Steel

LINER: Grade E (EPDM), GRADE T (Nitrile)

DISC:

Stainless Steel - ASTM A 351

Aluminum Bronze - ASTM B 148 C95400

Ductile Iron - ASTM A 536 Grade 65-45-12

DRIVE SHAFT:

Stainless Steel - ASTM A 582 Type 416

Stainless Steel - ASTM A 276 Type 316

BOTTOM SHAFT:

Stainless Steel - ASTM A 582 Type 416

Stainless Steel - ASTM A 276 Type 316

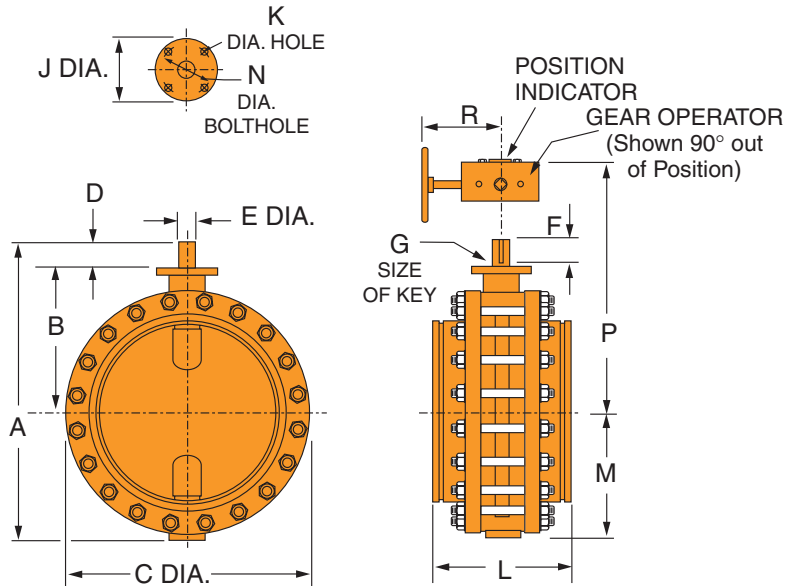
RETAINING SCREW: Steel

THRUST WASHER: Acetal

PLUG: Cast Iron - ASTM A 126 CL.B

UPPER BEARING: Teflon (Reinforced)

LOWER BEARING: Teflon (Reinforced)



SERIES 8000GR BUTTERFLY VALVES - DIMENSIONS

Valve Size ANSI	O.D.	A	B	C	D	E	F	G	J	K	L	M	N	P	R
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
14 350	14.000 356	26 ¹ / ₄ 667	13 ³ / ₄ 337	21 533	2 ¹ / ₄ 57	1 ¹ / ₂ 38	2 51	3 ⁵ / ₈ x 3 ⁵ / ₈ 87	6 152	1 ¹ / ₂ 13	13 ¹ / ₁₆ 332	10 ³ / ₄ 273	5 127	17 ¹⁵ / ₁₆ 456	10 254
16 400	16.000 406	29 ¹ / ₂ 749	14 ³ / ₄ 375	23 ¹ / ₂ 597	2 ¹ / ₄ 57	1 ¹ / ₂ 38	2 51	3 ⁵ / ₈ x 3 ⁵ / ₈ 87	6 152	1 ¹ / ₂ 13	14 ⁵ / ₁₆ 364	12 ¹ / ₂ 318	5 127	19 ⁷ / ₁₆ 494	10 254
18 450	18.000 457	32 ³ / ₄ 832	15 ³ / ₄ 400	25 635	3 76	1 ³ / ₄ 44	2 ³ / ₈ 60	3 ⁵ / ₈ x 3 ⁵ / ₈ 87	6 ³ / ₄ 171	1 ¹ / ₂ 13	15 ³ / ₁₆ 391	14 356	5 127	20 ¹ / ₁₆ 519	10 254
20 500	20.000 508	34 864	16 ³ / ₄ 413	27 ¹ / ₂ 699	3 76	1 ³ / ₄ 44	2 ⁵ / ₈ 66	3 ⁵ / ₈ x 3 ⁵ / ₈ 87	6 ³ / ₄ 171	1 ¹ / ₂ 13	16 ³ / ₁₆ 416	15 381	5 127	20 ¹⁵ / ₁₆ 532	10 254
24 600	24.000 610	39 ³ / ₈ 1,000	19 ¹ / ₈ 486	32 813	3 76	2 ¹ / ₄ 57	3 ¹ / ₄ 83	1 ¹ / ₂ x 1 ¹ / ₂ 116	9 ¹ / ₂ 241	1 ¹³ / ₁₆ 21	18 ¹ / ₄ 464	16 ³ / ₄ 425	6 ¹ / ₂ 165	24 ³ / ₈ 619	10 ¹ / ₄ 260

SERIES 8000GR BUTTERFLY VALVES (ORDERING INFORMATION)

Sample Part Number	18"	G	C -	8	2	8	2	6
18" GC-8282-6 —>	Valve Size	Body Style	Body Material	Series	Seat Material	Disc Material	Operator	Stem
	14" - 24"	G - Grooved End	C - Cast Iron	8 - 8000	1 - Nitrile 2 - EPDM	0 - Nickel Plate Ductile Iron 7 - 316 S.S. 8 - Bronze (Al-Brz.)	0 - None 2 - Gear Operator 3 - Pneumatic 4 - Electric 5 - Spring Return Pneumatic 6 - Square Nut (with Gear Operator) 7 - Chain Wheel (with Gear)	6 - 416 S.S. w/ RTFE Bearing 7 - 316 S.S. w/ RTFE Bearing

SERIES 8000GR

Butterfly Valve

Torque is the rotary effort required to operate a valve. This turning force in a butterfly valve is determined by three factors; the friction of the disc and seat due to interference for sealing, bearing friction, and fluid dynamic torque.

Breakaway torque is the total of the torques resulting from bearing friction and disc/seat interference friction at a given pressure differential. This value is normally the highest required torque to operate a valve, and is used to size the actuator. Listed below are recommended sizing torques.

NOTE: These values are based on testing performed in the Gruvlok Research & Development Center. These values include a safety factor and are valid for water and lubricating fluids only at 70° F (21° C).

Since torques are greatly increased for dry and non-lubricating fluids and temperature variations, contact your Gruvlok Sales Office for accurate values in these applications.

ACTUATOR SIZING FOR GENERAL SERVICE APPLICATION SERIES 8000GR BREAKAWAY TORQUE

Line Pressure (PSI)/Bar	Valve Size (In.)				
	14	16	18	20	24
	Breakaway Torque (In. - Lbs.) / N-m				
50 3.4	4,000 452	4,800 542	5,400 610	10,000 1,130	13,000 1,469
100 6.9	4,800 542	5,200 588	6,200 701	12,500 1,412	18,000 2,034
150 10.3	5,500 621	6,500 734	8,500 960	13,500 1,525	21,500 2,429

NOTE: For Teflon seated valves, contact your Gruvlok Sales Office.

These values are valid for water and lubricating fluid service only.

Contact factory for information on torques for dry and non-lubricating fluid service.

CV VALUES (WATER @ 70°F SP. GR. = 1.00)

Valve Size In./mm	Disc Position (Degrees Open)							
	25°	30°	40°	50°	60°	70°	80°	90°
14 350	650 44.8	825 56.9	1,500 103.4	2,300 158.6	3,500 241.3	6,200 427.5	9,700 668.8	10,500 723.9
16 400	850 58.6	1,000 68.9	1,850 127.6	2,900 199.9	4,600 317.2	7,500 517.1	10,600 730.8	13,500 930.8
18 450	1,100 75.8	1,400 96.5	2,450 168.9	3,800 262.0	5,000 344.7	9,700 668.8	13,850 954.9	18,000 1,241.1
20 500	1,400 96.5	1,650 113.8	3,050 210.3	4,800 330.9	7,400 510.2	12,500 861.8	17,750 1,223.8	23,000 1,585.8
24 600	2,000 137.9	2,400 165.5	4,200 289.6	6,600 455.1	10,500 723.9	17,000 1,172.1	23,000 1,585.8	31,000 2,137.4

Fluid Dynamic Torque is the force exerted when a fluid passes over the surface of the butterfly valve disc. The magnitude of this force is dependent on valve size, disc opening and flow through the valve. Typically, fluid dynamic torque is a maximum at an approximate 75° disc opening. Generally, the effects of dynamic torque can be ignored when the velocity is less than 15 feet/second for liquids and 15,000 feet/minute for gases to minimize the effects of turbulence on the valve. For applications above these limits, consult engineering.

The formula for determining the velocity for liquids is:

$$V = 0.0022 \frac{Q}{A}$$

V = Velocity of liquid (feet/second)

Q = Flow (gallons/minute)

A = Area of upstream pipe (sq. ft.)

See "Area of Pipe" chart

The formula for determining the velocity of gases:

$$V_g = \frac{Q_f}{A}$$

V_g = Velocity of gas (feet/minute)

Q_f = Flow of gas @ flowing condition*
(cubic feet/minute)

A = Area of upstream pipe (sq. ft.)

See "Area of Pipe" Chart

* Flowing condition means at temperature and pressure of gas stream in the valve

AREA OF PIPE

Pipe Size (Sch 40)	Area
In./mm	Sq. ft./Sq. cm
14 350	0.940 873.29
16 400	1.227 1,140
18 450	1.553 1,443
20 500	1.931 1,794
24 600	2.792 2,594

FIG. 141S, FIG. 171N & FIG. 171S

International Brass Ball Valves

The Anvil Figure 141S, 171N and 171S Brass Ball Valves have a rugged, dependable design, meeting rigid specification for world wide use. Every valve is individually tested in an open and closed position at 80 psi (5.5 bar). The two piece 171S and 171N full port design are available in sizes 1/4" - 4". A "T" handled version of the 171N is also available as Figure 171N-T in sizes 3/8" - 1". The two piece 141S standard port is available in sizes 1/2" - 2". All valves conform to MSS-SP-110, MSS-SP-25 and Federal Specification WW-V-35B Type II, Class A Style 3.

Features of these valves include triple stem seal, hard chrome plated ball, blowout proof stem, adjustable packing gland, a bubble tight shut off and a floating ball for an economical solution for residential, commercial and industrial applications.

Anvil's Brass Ball Valves are available in the soldered end standard port (Figure 141S), full port threaded end (Figure 171N), and full port soldered end (Figure 171S).

Size Range: 1/2" - 2" (141S)
1/4" - 4" (171N/171S)

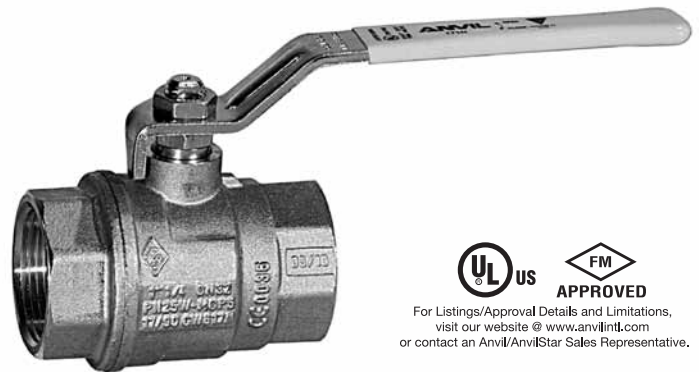
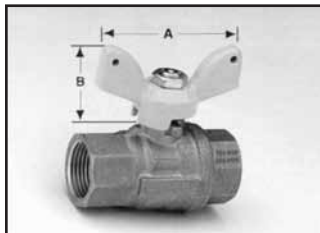


Figure 171N

Pressure Rating: from full vacuum to 600 psi (41.4 bar)
WOG 150 psi (10.3 bar) steam

"T" HANDLE



171N "T" HANDLE

Size In./DN(mm)	A In./mm	B In./mm
1/4 - 3/8 - 1/2 8 - 10 - 15	2.0 50	1.08 27.5
3/4 - 1 20 - 25	2.5 64	1.30 33.0

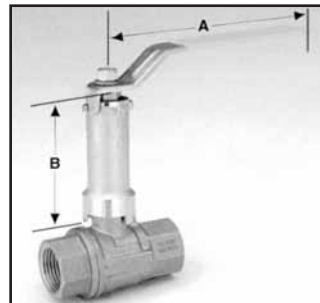
LOCK DEVICE



171N LOCK DEVICE

Size In./DN(mm)	A In./mm
1/4 - 3/8 - 1/2 8 - 10 - 15	1.28 32.5
3/4 - 1 20 - 25	1.57 40.0
1 1/4 - 1 1/2 32 - 40	1.91 48.5
2 50	1.95 49.5

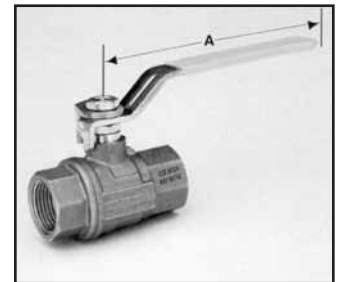
STEM EXTENSION (Brass)



171N STEM EXTENSION (BRASS)

Size In./DN(mm)	A In./mm	B In./mm
1/4 - 3/8 - 1/2 8 - 10 - 15	3.8 97.0	2.4 60.5
3/4 - 1 20 - 25	4.8 121.5	2.6 67.0
1 1/4 - 1 1/2 32 - 40	5.9 151.0	2.6 67.0
2 50	6.4 162.0	2.6 67.0

MEMORY STOP



MEMORY STOP

Size In./DN(mm)	A In./mm
1/4 - 3/8 - 1/2 8 - 10 - 15	3.8 97.0
3/4 - 1 20 - 25	4.8 121.5
1 1/4 - 1 1/2 32 - 40	5.9 151.0
2 50	6.4 162.0

MATERIAL SPECIFICATIONS

BODY: Brass, ASTM B 124, Alloy C37700

RETAINER: Brass, ASTM B 124, Alloy C37700

BALL: Brass, ASTM B 124, Alloy C37700 Chrome Plated

STEM: Brass, ASTM B 124, Alloy C37700 Nickel Plated

SEAT RING: PTFE

PACKING: PTFE

PACKING NUT: Steel, Zinc

PACKING GLAND: Brass, ASTM B 124, Alloy C37700 Nickel Plated

FRICTION WASHER: PTFE

STEM O-RING: NBR 75 Shore A

HANDLE: Steel, Zinc Plated to 2", Aluminum to 4"

HANDLE COVER: Yellow PVC Coated to 2", Yellow Enamel to 4"

HANDLE NUT: Steel, Zinc Plated

AVAILABLE OPTIONS*

LEVER HANDLE: 1/4" - 4"

LOCK DEVICE: 1/4" - 2" (171N)

MEMORY STOP: 1/4" - 2" (171N/171S)

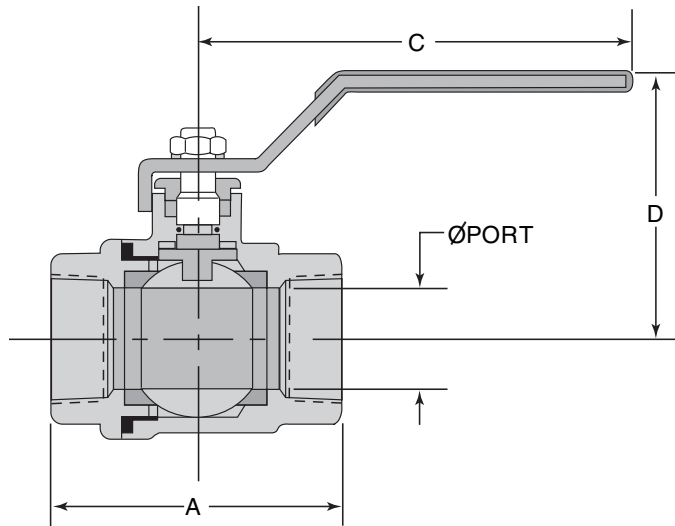
STEM EXTENSION: 1/4" - 4" (171N)

"T" HANDLE: 1/4" - 1" (171N)

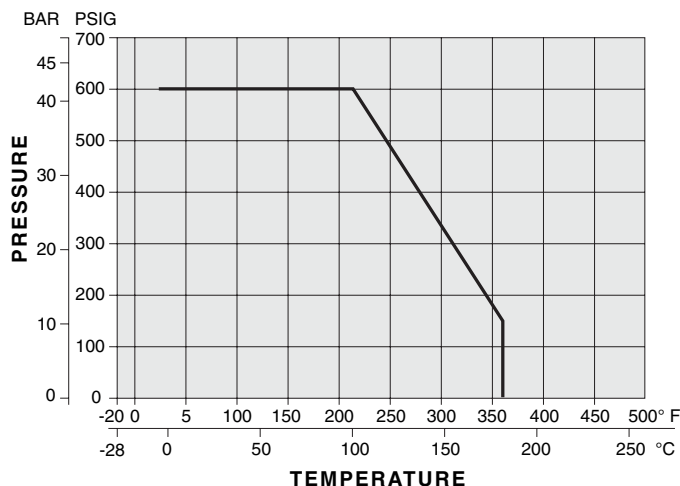
* Not all options available for all sizes. Please contact your Anvil Representative for assistance.

FIG. 141S, FIG. 171N & FIG. 171S

International Brass Ball Valves



PRESSURE VS. TEMPERATURE



NOTES

1. Dimensions of solder joint ends conform to ANSI B16.22. Solder end valves are designed to be used with solders not exceeding a melting point of 470°F/250°C. Higher temperatures may damage the seal material.

2. For solder joint valves, the pressure/temperature rating is dependent on the solder material used. Please refer to the limitations listed in ANSI B16.18.

3. Rate of Flow Calculations for liquids:
To determine the flow rate of a liquid passing through a valve, use the following formula:

$$Q_L = C_v \left(\sqrt{\frac{\Delta P}{S_L}} \right)$$

Where: Q_L = flow of liquid in gallons per minute (GPM)
 C_v = flow coefficient
 ΔP = pressure drop (PSI)
 S_L = specific gravity of liquid

DIMENSIONS

Valve Code	Size	Port Dia.	A	C	D	Cv	Approx. Wt. Ea.
	In./mm	In./mm	In./mm	In./mm	In./mm		Lbs./Kg
141S STANDARD PORT SOLDERED END	1/2	1/2	2 1/16	3 7/8	1 13/16	6.3	0.7
	15	12	52	98	46		0.3
	3/4	9/16	2 11/16	3 7/8	1 15/16	9.5	0.8
	20	14	68	98	49		0.4
	1	3/4	3 3/16	4 13/16	2 5/16	22.2	1.1
	25	19	81	122	59		0.5
171N FULL PORT THREADED END	1 1/4	1	3 3/16	4 13/16	2 1/2	30.8	1.5
	32	25	90	122	63		0.7
	1 1/2	1 1/4	4	6	3 1/16	60.9	2.2
	40	32	102	152	78		1.0
	2	1 5/16	5 1/16	6	3 5/16	92.9	3.1
	50	40	128	152	84		1.4
	1/4	3/8	2	3 7/8	1 3/4	6	0.3
	8	10	51	98	45		0.1
	3/8	3/8	2	3 7/8	1 3/4	7	0.3
	10	10	51	98	45		0.1
	1/2	9/16	2 7/16	3 7/8	1 7/8	19	0.4
	15	14	62	98	48		0.2
171S FULL PORT SOLDERED END	3/4	3/4	2 11/16	4 13/16	2 1/4	35	.7
	20	19	68	122	57		0.3
	1	1 5/16	3 3/16	4 13/16	2 5/16	50	1.0
	25	24	78	122	62		0.5
	1 1/4	1 1/4	3 7/16	6	3 1/16	104	2.0
	32	32	87	152	78		0.9
	1 1/2	1 5/16	3 7/8	6	3 5/16	268	3.1
	40	40	98	152	84		1.4
	2	1 15/16	4 3/16	6 3/8	3 13/16	309	4.2
	50	49	110	162	97		1.9
	2 1/2	2 5/16	5 5/16	8 1/16	5	629	8.0
	65	65	141	205	127		3.7
171S FULL PORT SOLDERED END	3	3 1/8	6 1/16	8 5/16	5 7/16	1018	12.0
	80	79	164	205	138		5.9
	4	3 15/16	7 7/8	10 1/4	6 5/16	1622	22.0
	100	100	194	260	160		10.0
	1/2	9/16	2 1/2	3 7/8	1 7/8	19	0.5
	15	14	64	98	48		0.2
	3/4	3/4	3	4 13/16	2 5/16	35	0.7
	20	19	76	122	59		0.3
	1	1	3 3/16	4 13/16	2 1/2	50	1.1
	25	25	91	122	64		0.5
	1 1/4	1 1/4	4 1/16	6	3 1/8	104	2.0
	32	32	103	152	79		0.9
171S FULL PORT SOLDERED END	1 1/2	1 5/16	4 3/16	6	3 3/8	268	2.7
	40	40	116	152	86		1.2
	2	1 15/16	5 7/16	6 7/16	3 11/16	309	3.9
	50	49	138	164	94		1.8
	2 1/2	2 5/16	6 7/8	8 1/16	5	629	9.4
	65	65	175	205	127		4.3
	3	3 1/8	8 3/16	8 1/16	5 7/16	1018	14.5
	80	79	208	205	138		6.6
171S FULL PORT SOLDERED END	4	3 15/16	10 5/16	10 1/4	6 5/16	1622	24.7
	100	100	262	260	160		11.2

SERIES 7500

Ball-valves



The Series 7500 grooved-end ball valve line consists of a 2" to 6" standard port, two piece design, and is available in configurations to address a broad spectrum of application requirements.

The Series 7500 has generous factors of safety for pressure retention and stem torsional strength. In addition, it has a blow-out proof stem design, low operating torque, and high Cv.

The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified.

Grooved ends conform to the requirements of AWWA C606 for steel pipe.

For special configurations, contact your Gruvlok representative.

For stainless steel, see the stainless steel section.

PRESSURE-RATING:

740 psig CWP (51 bar) in ASTM A 395 Ductile Iron

FIGURE 7500 MATERIAL SPECIFICATIONS

DUCTILE IRON/CARBON STEEL

BODY: Ductile Iron ASTM A 395

ENDPLATE: Ductile Iron ASTM A 395

BALL: Carbon Steel Chrome Plated

STEM: Carbon Steel Chrome Plated

THRUST WASHER: RTFE

STEM SEAL: Flouroelastomer

RETAINING RING: Carbon Steel

HANDLE: Carbon Steel Zinc Plated

HANDLE NUT: Carbon Steel Zinc Plated

SEAT: RTFE

BODY SEAL: Flouroelastomer

LOCK PLATE*: 300 Series Stainless Steel

* Optional

DUCTILE IRON/STAINLESS STEEL

BODY: Ductile Iron ASTM A 395

ENDPLATE: Ductile Iron ASTM A 395

BALL: Stainless Steel ASTM A 351 Grade CF8M

STEM: 316 Stainless Steel

THRUST WASHER: RTFE

STEM SEAL: Flouroelastomer

RETAINING RING: Carbon Steel

HANDLE: Carbon Steel Zinc Plated

HANDLE NUT: 300 Series Stainless Steel

SEAT: RTFE

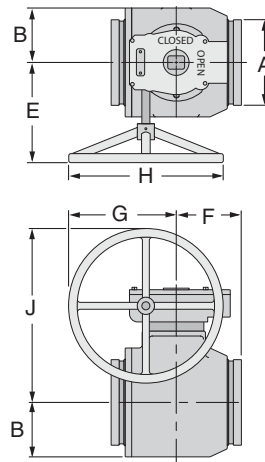
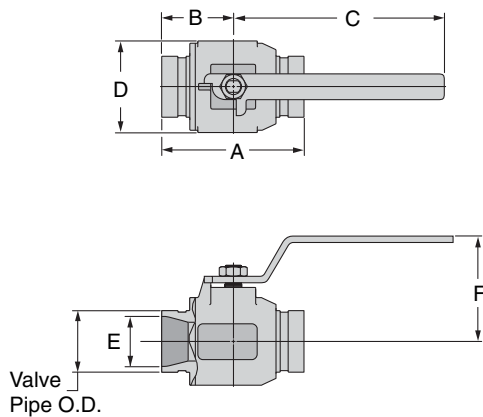
BODY SEAL: Flouroelastomer

LOCK PLATE*: 300 Series Stainless Steel

* Optional

SERIES 7500

Ball-valves



6" - 7500
Ball Valve with
Gear Actuator

7500 BALL VALVE									
Size ANSI	O.D.	Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	Cv	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm		Lbs./Kg
2 50	2.375 60.3	5½ 140	2¾ 70	8¼ 209	3⅜ 81	1⅝ 49	4⅞ 105	165	8 3.6
3 80	3.500 88.9	6¾ 171	3⅝ 85	10 254	4⅜ 122	2⅞ 74	4⅜ 121	310	18 8.2
4 100	4.500 114.3	8¼ 210	4⅞ 105	16 406	6⅞ 176	3⅜ 97	6 152	815	38 17.2
6 * 150	6.625 168.3	10⅞ 257	5⅞ 128	28 711	8⅞ 215	5⅞ 144	7⅞ 194	1500	106 48.1

* Bare Stem

7500 BALL VALVE WITH GEAR ACTUATOR													
Size ANSI	O.D.	Dimensions											Approx. Wt. Ea.
		A	B	C	D	E	F	G	H	J	K	L	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
6 150	6.625 168.3	6⅝ 168.7	4¼ 107.4	8⅞ 214.6	5½ 140.5	10¼ 260.4	5⅞ 128.0	8⅞ 206.4	12 304.8	13½ 342.9	1⅜ 45.2	1 25.4	9.6 4.4

SERIES 7500 BALL VALVES (ORDERING INFORMATION)							
Sample Part Number 4" GI-7512-1 —>	4"	G	I -	75	1	2 -	1
	Size	Configuration	Body/End Material	Series	Ball and Stem Material	Seat Material	Operator
	2" - 6"	G - 2 Way Grooved End	I - Ductile Iron ASTM A395	75 - 7500	1 - Chrome Plated Carbon Steel 2 - 316 Stainless Steel	2 - RTFE / Fluoroelastomer Special Requirements X - Write on Order	1 - 2 Position Handle 2 - 2 Position Locking Handle 3 - Bare Stem 4 - Gear Actuator (6" Only)

6" is available bare stem or with gear actuator.

FIG. 400G

Grooved-End Silent Check Valve

Available in Sizes 2" thru 10"

The 400G is a center guided, spring loaded, silent check valve. Designed and engineered for silent operation with low head loss, the valve disc will close prior to the reversal of flow, thereby preventing or minimizing water hammer and damaging shock.

- The 400G can be used in any HVAC, industrial or commercial grooved piping systems.
- The valve is designed for liquid service with any pipe orientation, flow up or down.
- Bronze metal seats are standard, with Stainless Steel or resilient seats available as an option.
- Flow coefficients for this valve are some of the lowest in the industry and are listed for each size on the drawing.

NOTE: Valve is designed for liquid service only. Install 3 to 4 pipe diameters downstream from pump discharge or elbows to avoid flow turbulence.

MAX. NON-SHOCK WORKING PSI 125# ANSI B16.1 FLANGE RATING		
Size	Temperature	
2" - 10"	150°F 65°C	200°F 90°C
	200 PSI 13.8 bar	190 PSI 13.1 bar

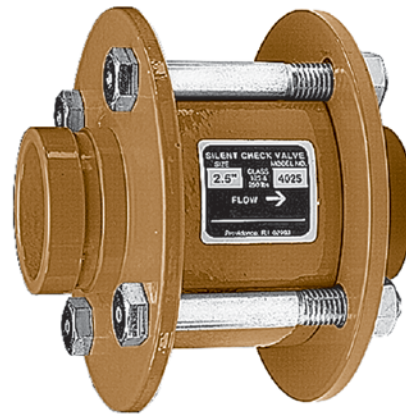


FIGURE 400G GROOVED-END SILENT CHECK VALVE

Valve Size	O.D.	Model	A	B	Cv Flow *	Approx. Wt. Each
In./mm	In./mm	Number	In./mm	In./mm		Lbs./Kg
2 50	2.375 60.3	402G	6 152	6 152	66 1,676	12 5.4
2½ 65	2.875 73.0	4025G	6¼ 159	7 178	88 2,235	15 6.8
3 80	3.500 88.9	403G	6¾ 164	7½ 191	130 3,302	20 9.1
4 100	4.500 114.3	404G	8½ 206	9 229	228 5,791	36 16.3
5 125	5.563 141.3	405G	11¼ 286	10 254	350 8,890	50 22.7
6 150	6.625 168.3	406G	12¼ 311	11 279	520 13,208	68 30.8
8 200	8.625 219.1	408G	13¾ 349	13½ 343	900 22,860	140 63.5
10 250	10.750 273.1	410G	16 406	16 406	1,450 36,830	198 89.8

* Flow coefficient is the number of U.S. gallons/minute of 60° F (16° C) water that will flow through a valve with 1 psi (0.069 bar) of pressure drop across the valve.

MATERIAL SPECIFICATIONS

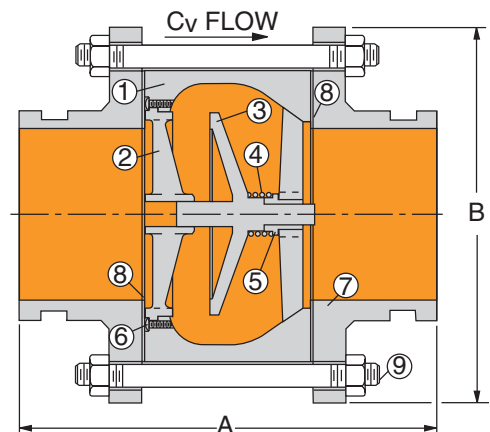
STANDARD MATERIALS:

Cast Iron body ASTM A 48, Class 35
Bronze Disc and Seat ASTM B 584 Alloy 838
Ductile Iron Grooved-Ends ASTM A 395

OPTIONAL TRIM MATERIALS:

Bronze with Nitrile seats
Stainless Steel seats
Stainless with Nitrile seats

1. BODY: Cast Iron ASTM A 48, Class 35
2. SEAT: Bronze ASTM B 584, Copper Alloy 838
3. PLUG: Bronze ASTM B 584, Copper Alloy 838
4. SPRING: Stainless Steel T304, ASTM A 313
5. BUSHING: Bronze ASTM B 584, Copper Alloy 838
6. SCREWS: Stainless Steel T304, ASTM A 276
7. GROOVED-END: Ductile Iron ASTM A 395
8. GASKET: Non Asbestos
For gasket grade recommendations see the Technical Data section
9. BOLTS: Carbon Steel
Other materials and resilient seats are available... contact your Sales representative.



SERIES 7800

Check Valves

For use in Grooved-End Piping Systems

The Gruvlok Series 7800 Check Valve is a compact, cost effective valve offering low pressure-drop, non-slam performance. The Series 7800 Check Valve assembly is lighter and faster to install, and costs less than flanged and wafer valve assemblies.

In the full-open position the Series 7800 swing clapper is held tightly against the valve body, out of the flow stream, to provide maximum flow area and prevention of clapper flutter. The clapper design produces quick, non-slam closure before flow reversal can occur, while meeting FM requirements for an anti-water hammer valve rating.

Each valve is hydrostatically tested for leak tightness to 500 PSI. The clapper-seat design permits leak free sealing of back pressures in service conditions ranging from 300 PSI (20.7 bar) to as low as 1 PSI (0.07 bar) (28" water head).



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

PERFORMANCE:

Pressure Rating:

Commercial Applications - Sizes 2" thru 12" inclusive, 300 psi (20.7 bar) maximum working pressure.

MATERIAL SPECIFICATIONS

BODY: Ductile iron conforming to ASTM A 536, Grade 65-45-12

COATING: Rust inhibiting paint on exterior and interior - color, black enamel Nickel Electroplated, Zn Electroplated (optional)

CLAPPER: 2" - 5" Type 304 or 302 stainless steel to ASTM A 167 6"-12" Ductile iron conforming to ASTM A 536, Grade 65-45-12

CLAPPER FACING:

Grade E EPDM: -40° to 230°F (-40° to 110°C) Service Temperature Range Recommended for water service, dilute acids, alkaline, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM SERVICES.

Grade T Nitrile: -20° to 180°F (-29° to 80°C) Service Temperature Range Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils.
NOT FOR USE IN HOT WATER SERVICES.

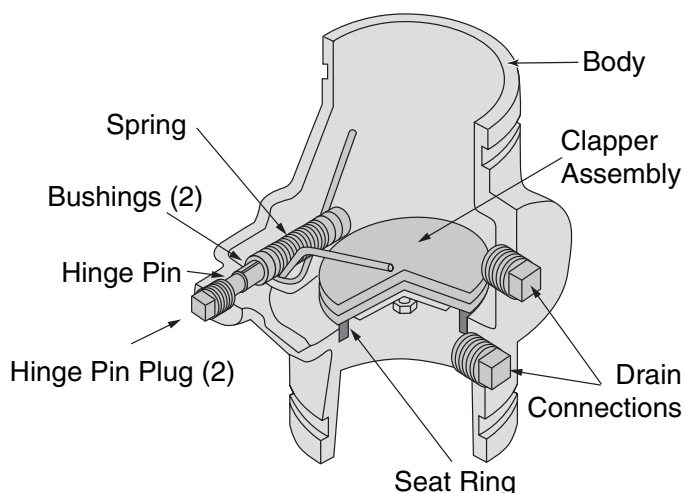
SEAT RING: Type 304 stainless steel to ASTM A 123, ASTM A 213, ASTM A 312 or ASTM A 269

SPRING: Type 302 stainless steel to ASTM A 313

HINGE PIN: Type 304 or 302 stainless steel to ASTM A 580

HINGE PIN BUSHINGS: Sintered bronze to ASTM B 438

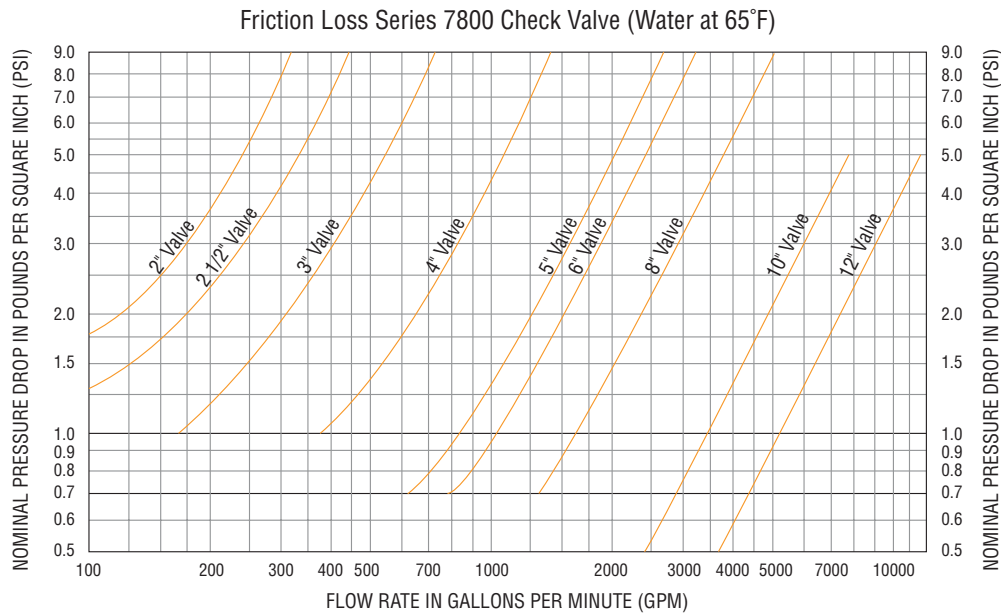
HINGE PIN PLUGS & DRAIN PLUGS: Cast iron to ASTM A 126 Class A



SERIES 7800

Check Valves

For use in Grooved-End Piping Systems



FLOW DATA:

The approximate friction losses, based on the Hazen and Williams formula, expressed in equivalent length of pipe is given below. The friction losses have been calculated on the basis of flow rates typically used with each size valve.

FLOW DATA - FRICTION LOSS (FT. OF PIPE)							
Valve Size	O.D.	C=100			C=120		
		Sch. 10	Sch. 30	Sch. 40	Sch. 10	Sch. 30	Sch. 40
In./mm	In./mm	Ft./m	Ft./m	Ft./m	Ft./m	Ft./m	Ft./m
2 50	2.375 60.3	10 3.0	— —	8 2.4	14 4.3	— —	11 3.4
2½ 65	2.875 73.0	14 4.3	— —	10 3.0	20 6.1	— —	15 4.6
3 80	3.500 88.9	17 5.2	— —	12 3.7	23 7.0	— —	17 5.2
4 100	4.500 114.3	17 5.2	— —	13 4.0	23 7.0	— —	18 5.5
5 125	5.563 141.3	14 4.3	— —	11 3.4	20 6.1	— —	15 4.6
6 150	6.625 168.3	23 7.0	— —	19 5.8	33 10.1	— —	26 7.9
8 200	8.625 219.1	35 10.7	32 9.8	30 9.1	50 15.2	45 13.7	43 13.1
10 250	10.750 273.1	28 8.5	25 7.6	24 7.3	40 12.2	36 11.0	34 10.4
12 300	12.750 323.9	31 9.4	28 8.5	26 7.9	44 13.4	39 11.9	37 11.3

IMPORTANT NOTE:

Check valve life may be shortened and system damage may occur if check valves are installed too close to a source of unstable flow.

Check valves must be installed at a reasonable distance away from pumps, elbows, expanders, reducers or other similar devices.

Sound piping practices dictate a minimum of five (5) times the pipe diameter for general use. Distances between three (3) and five (5) diameters are allowable provided the flow velocity is less than 8 feet per second. Distances less than 3 diameters are not recommended.

This valve may be installed vertically or horizontally. In a horizontal installation, the hinge pin is to be located on top.

Not for use in copper systems.

SERIES 7800

Check Valves

For use in Grooved-End Piping Systems

SERIES 7800 CHECK VALVES (ORDERING INFORMATION)

Sample Part Number 4" 7811—>	4"	78	1	1	X
	Size	Series	Clapper Facing Material	Body Finish	Special Configuration
	2" - 12"	78 - 7800	1 - EPDM (Std) 2 - Nitrile (Std) 3 - Special	1 - Painted (Std) 2 - Ni Electroplated (Optional) 3 - Zn Electroplated (Optional) 4 - Special	1 - Stainless Steel Clapper sizes (6" - 12") 2 - Other*

* Contact a Gruvlok representative for more information.

MATERIAL SPECIFICATIONS

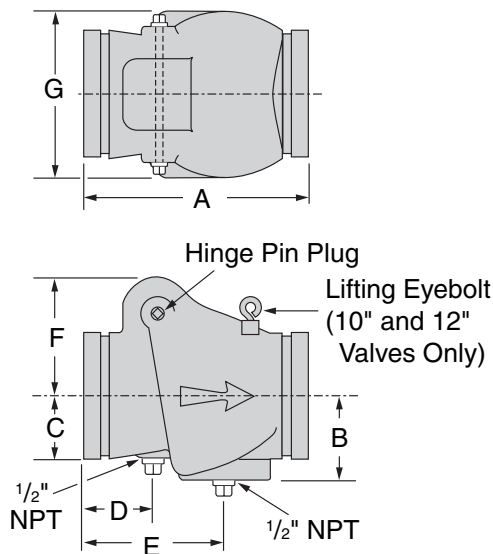


FIGURE 7800 CHECK VALVE

Nominal Size	O.D.	Nominal Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	G	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg.
2 50	2.375 60.3	6 ³ / ₄ 171	2 ³ / ₈ 60	1 ⁷ / ₁₆ 36	1 ³ / ₄ 44	4 ¹ / ₂ 114	3 ³ / ₁₆ 81	4 ³ / ₈ 111	7.5 3.4
2½ 65	2.875 73.0	7 ¹ / ₄ 184	2 ⁷ / ₁₆ 61	1 ¹ / ₁₆ 39	1 ³ / ₄ 44	3 ¹³ / ₁₆ 96	3 ⁵ / ₈ 92	4 ¹ / ₂ 114	10.5 4.8
3 80	3.500 88.9	7 ³ / ₄ 197	2 ⁵ / ₈ 67	2 51	11 ³ / ₁₆ 46	4 ¹ / ₁₆ 103	3 ¹¹ / ₁₆ 93	4 ¹⁵ / ₁₆ 125	11.5 5.2
4 100	4.500 114.3	8 ¹ / ₈ 206	3 ¹ / ₈ 79	2 ¹ / ₄ 57	2 ¹ / ₂ 64	5 ¹ / ₁₆ 128	4 ¹ / ₄ 108	6 152	13.5 6.1
5 125	5.563 141.3	9 ¹ / ₄ 248	3 ¹ / ₂ 89	2 ³ / ₄ 70	2 ⁷ / ₁₆ 61	5 ¹³ / ₁₆ 147	4 ⁵ / ₈ 117	6 ³ / ₄ 171	19.0 8.6
6 150	6.625 168.3	12 ³ / ₄ 324	4 ¹ / ₄ 108	3 ⁵ / ₁₆ 84	3 ¹ / ₈ 79	6 ¹ / ₄ 159	6 ³ / ₄ 171	8 ¹ / ₂ 216	33.5 15.2
8 200	8.625 219.1	14 ³ / ₈ 365	5 ¹ / ₁₆ 128	3 ¹⁵ / ₁₆ 100	4 102	5 ¹⁵ / ₁₆ 150	8 203	10 ¹ / ₄ 260	59.0 26.8
10 250	10.750 273.1	18 457	6 ⁵ / ₁₆ 160	4 ¹⁵ / ₁₆ 125	4 ⁹ / ₁₆ 115	6 ⁵ / ₈ 175	9 ⁹ / ₁₆ 233	12 ¹¹ / ₁₆ 322	130.0 59.0
12 300	12.750 323.9	21 533	7 ⁵ / ₁₆ 185	6 152	5 ¹ / ₁₆ 128	7 ¹ / ₄ 184	10 ³ / ₈ 264	14 ³ / ₄ 375	183.0 83.0

GBV-G & GBV-A

Balancing Valves

Ductile Iron ASTM A536 GR65-45-12

The Series GBV is a multi-turn, Y-style globe valve designed for accurate determination and control of fluid flow to circuits requiring precise balancing.

Max. Working Pressure

300 PSI / 20.7 bar (PN20)

Max. Working Temperature

300°F (150°C)



Straight Shown

FEATURES & BENEFITS

- Pressure differential ports on both sides of the valve
- Convertible design, straight to 90° angle by removing and replacing four set screws
- Positive shutoff for equipment servicing
- Multi-turn adjustment
- Ergonomically designed handwheel
- Micrometer type adjustment scale
- Tamper-proof hidden memory stop

MATERIAL SPECIFICATIONS

BODY, BONNET: Ductile Iron ASTM A536 GR65-45-12

STEM & DISC: Brass Alloy B16

ELASTOMERS: EPDM

HANDWHEEL: Reinforced Nylon; ABS

GBV-G – Balancing Valve

2 1/2" to 12" Ductile Iron, Grooved-End Straight

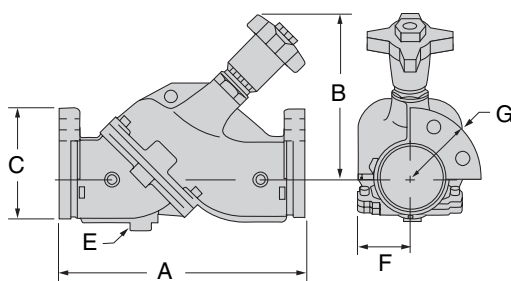


FIGURE GBV-G GROOVED-END STRAIGHT BALANCING VALVES

Nominal Size	O.D.	A	B Open	C	E	F	Flange Diameter		Approx. Wt. Each
							G Flange 125#	G Flange 250#	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2½	2.875	12	9⅝	2¾	1	2⅞	7	7½	25
65	73.0	305	244	70	25	65	178	191	11.3
3	3.500	12	10½	2⅞	1	3	7½	8¼	28
80	88.9	305	267	61	25	76	191	210	12.7
4	4.500	14	10⅞	3	1¼	3⅞	9¼	10	41
100	114.3	356	268	76	32	87	235	254	18.6
5	5.563	17½	13⅞	3⅝	1¼	4⅞	10	11	90
125	141.3	445	331	92	32	125	254	279	40.8
6	6.625	20⅞	13¾	4⅞	2	5⅞	11	12½	130
150	168.3	525	349	112	51	149	279	318	59.0
8	8.625	28⅞	24⅝	5⅞	2¼	7⅞	13½	15	310
200	219.1	716	625	144	57	200	343	381	140.6
10	10.750	30	26½	6⅞	2¼	9⅞	16	17½	460
250	273.1	762	673	166	57	240	406	445	208.7
12	12.750	38⅞	28⅞	7⅞	2¼	12⅞	19	20½	870
300	323.9	966	722	194	57	321	483	521	394.6

NOTE: Grooved-Ends are for connection of components with dimensions conforming to Gruvlok® standard grooved specifications for IPS pipe.

GBV-G & GBV-A

Balancing Valves

Ductile Iron, Grooved-End and Cast Bronze, Solder & Threaded GBV

GBV-A – Balancing Valve
2½" to 12" Ductile Iron, Grooved-End Angle

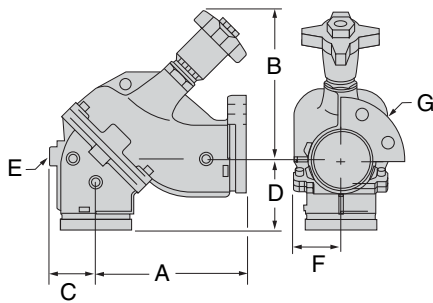


FIGURE GBV-A GROOVED-END ANGLE BALANCING VALVES

Nominal Size	O.D.	A	B Open	C	D	E	F	Flange Diameter		Approx. Wt. Each
								G Flange 125#	G Flange 250#	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2½ 65	2.875 73.0	7⅞ 187	9⅝ 244	2¾ 70	4⅝ 117	1 25	2⅞ 65	7 178	7½ 191	25 11.3
3 80	3.500 88.9	8⅞ 213	10½ 267	2⅞ 61	3⅞ 98	1 25	3 76	7½ 191	8¼ 210	28 12.7
4 100	4.500 114.3	9⅞ 244	10⅞ 268	3 76	4⅞ 111	1¼ 32	3⅞ 87	9¼ 235	10 254	41 18.6
5 125	5.563 141.3	12 305	13⅞ 331	3⅞ 92	5½ 140	1¼ 32	4⅞ 125	10 254	11 279	90 40.8
6 150	6.625 168.3	14⅞ 359	13¾ 349	4⅞ 112	6⅝ 168	2 51	5⅞ 149	11 279	12½ 318	130 59.0
8 200	8.625 219.1	18⅞ 481	24⅞ 625	5⅞ 144	9⅞ 233	2¼ 57	7⅞ 200	13½ 343	15 381	310 140.6
10 250	10.750 273.1	20⅞ 515	26½ 673	6⅞ 166	9¾ 248	2¼ 57	9⅞ 240	16 406	17½ 445	460 208.7
12 300	12.750 323.9	24⅞ 611	28⅞ 722	7⅞ 194	14 356	2¼ 57	12⅞ 321	19 483	20½ 521	870 394.6

NOTE: Grooved-Ends are for connection of components with dimensions conforming to Gruvlok® standard grooved specifications for IPS pipe.

GBV-S & GBV-T

Five Turn Circuit Balancing Valves

Solder (GBV-S) & NPT Threaded (GBV-T)

The Series GBV is a multi-turn, Y-style globe valve designed for accurate determination and control of fluid flow to circuits requiring precise balancing.

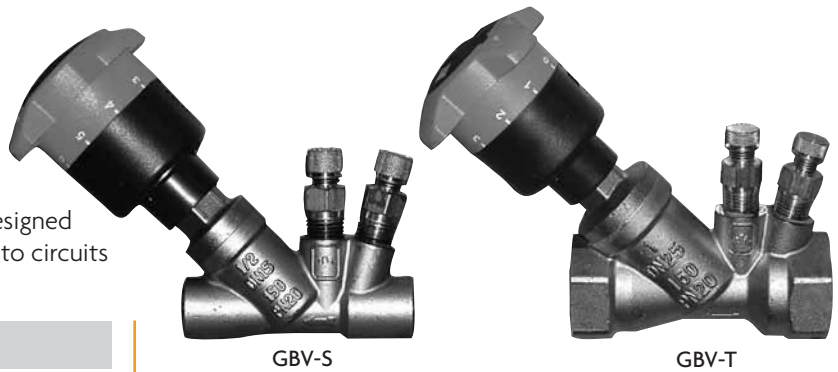
FEATURES & BENEFITS

- Multi-turn adjustment
- Pressure differential ports on both sides of the valve
- Positive shutoff for equipment servicing
- Micrometer type handwheel adjustment
- Tamper-proof memory stop
- Precision instrument function and performance
- Easiest and fastest field balancing

THROTTLING PERFORMANCE

- Ball valves adapted for balancing have only a 90° range from open to closed. A small adjustment in the ball opening can mean a huge change in flow. GBV sweat and threaded balancing valves in Cast Bronze from 1/2" to 2" have four full turns, providing 16 times finer adjustment than a ball valve.

See pages 173-175 for installation instructions.



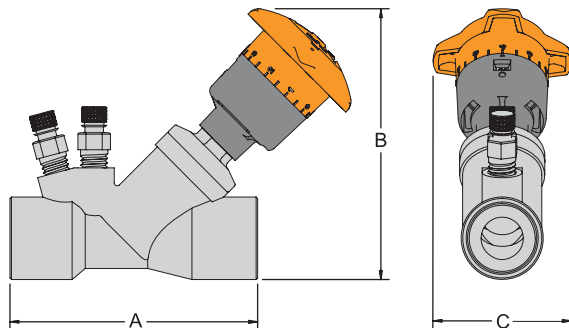
BALANCED CIRCUITS

Many systems tend to be oversized, causing some circuits to have too much flow, or insufficient flow, depending on their proximity to the source of the flow. The benefits of a balanced circuit:

- Save energy
- Make occupied spaces more comfortable
- Ensure that pumps operate against the lowest possible pressure
- Reduce capital and maintenance costs
- Ensure that the system operates according to the intent of the design

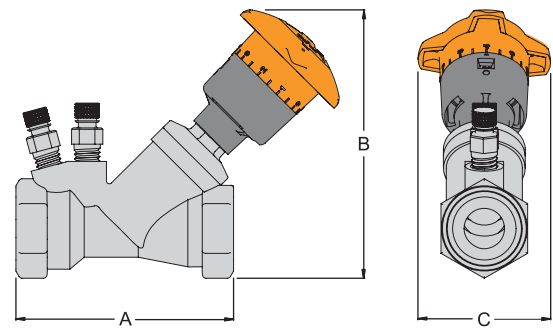
1/2" - 2" CAST BRONZE, SOLDER & THREADED GBV'S

- Sweat and Threaded 1/2" to 2"
- Unique flow control plug
 - Precision contoured channels
 - High strength accurately molded resin
- Ergonomically designed handwheel
- Micrometer type adjustment scale
- Tamper-proof hidden memory stop



MODEL: GBV-S 1/2" - 2"

Model	Nominal Size	A	B	C	Approx. Wt. Ea.
	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
GBV050VS	1/2"	3 1/16	4 1/16	2 3/4	1.1
	15	81	116	70	0.5
GBV075VS	3/4"	3 1/16	4 1/16	2 3/4	1.1
	20	93	118	70	0.5
GBV100VS	1"	4 1/16	4 15/16	2 3/4	1.7
	25	108	126	70	0.8
GBV125VS	1 1/4"	4 15/16	5 3/8	2 3/4	2.3
	32	125	137	70	1.0
GBV150VS	1 1/2"	5 11/16	5 5/8	2 3/4	3.2
	40	144	142	70	1.5
GBV200VS	2"	7	6 3/8	2 3/4	5.4
	50	179	162	70	2.5



MODEL: GBV-T 1/2" - 2"

Model	Nominal Size	A	B	C	Approx. Wt. Ea.
	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
GBV050VT	1/2"	3	4 1/8	2 3/4	1.1
	15	80	117	70	0.5
GBV075VT	3/4"	3 1/4	4 7/8	2 3/4	1.2
	20	83	125	70	0.6
GBV100VT	1"	3 13/16	5 1/4	2 3/4	1.9
	25	97	135	70	0.8
GBV125VT	1 1/4"	4 1/8	5 5/8	2 3/4	2.3
	32	110	143	70	1.1
GBV150VT	1 1/2"	5 1/8	5 7/8	2 3/4	3.5
	40	129	150	70	1.6
GBV200VT	2"	6	6 1/16	2 3/4	6.0
	50	153	170	70	2.5

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

SERVICE RECOMMENDATIONS:

The Model FTV-S & FTV-A Tri-Service Valve is primarily designed for installation in pump discharge piping where it functions as a spring loaded silent check valve, flow control valve and shut off valve.

OPERATION:

The Model FTV Tri-Service Valve operates automatically and silently. Line pressure of approximately $\frac{1}{4}$ PSI will open the disc. The spring closes the disc as the line flow approaches zero in order to prevent flow reversal & water hammer. The flow through the valve can be adjusted from bubble tight shut off to full flow by the threaded rising stem.

FEATURES:

The unique convertible body design permits the valve to be changed on site from the straight to the angle configuration.

Flow measurement (where an approximate indication is acceptable) is obtained by flow measuring ports on each side of the valve seat. Pressure differential is easily recorded using differential pressure measurement devices. If precision accuracy is required, we recommend that a Gruvlok® Circuit Balancing Valve be installed downstream from the FTV valve.

See pages 169-172 for installation instructions.

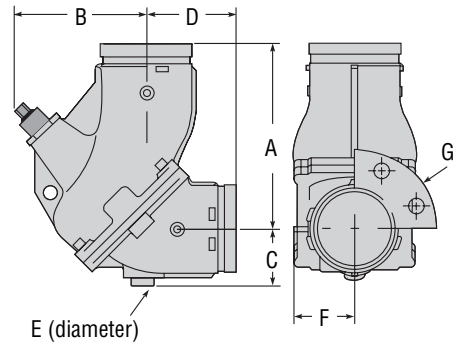
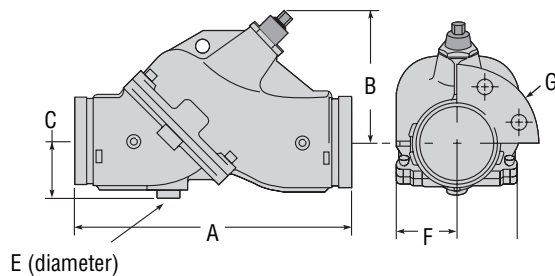


FEATURES & BENEFITS

- Three functions, one valve —
 1. Spring-closure design,
 2. Non-slam check valve,
 3. Flow throttling valve
- Reduced field installation and material cost
- Stainless steel spring
- High-strength resin seat EPDM for 8" and larger
- Anti-rotation lugs on the inlet and outlet. These lugs, combined with the Gruvlok® flange adapter provides for a ridged rotation free installation
- Flow measurement and pump throttling capabilities
- Temperature measurement capability
- Spring-closure design check valve prevents gravity or reverse circulation when pump is not operating
- Bonnet "O" Ring can be replaced under full system pressure by back seating of valve stem
- Suitable for maximum working pressure to 375 psi (26 bar) and temperatures to 230°F. (110°C).
- Valve seat can be changed in the field without use of special tools
- Low pressure drop due to "Y" pattern valve design
- Valve Cv designed to ASHRAE flow recommendations for quiet system operation
- Drip-tight shut off valve smoke development rating of 50 or less

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve



MODEL FTV-S (STRAIGHT)

Connection Size	A	B (fully open)	C	E	F	Flange 125/150 PSI G	Flange 250/300 PSI G	Approx. Wt. Each
In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2 1/2 65	12 305	7 178	2 3/4 70	1 25	2 9/16 65	7 178	7 1/2 191	19 9
3 80	12 305	7 13/16 198	2 7/16 62	1 25	3 80	7 1/2 191	8 1/4 210	24 11
4 100	14 356	8 203	3 80	1 1/4 32	3 7/16 87	9 1/4 235	10 254	42 19
5 125	17 1/2 445	10 1/8 257	3 5/8 92	1 1/4 32	4 5/16 125	10 254	11 279	81 37
6 150	20 11/16 525	10 3/8 264	4 7/16 113	2 51	5 7/8 149	11 279	12 1/2 318	120 54
8 200	28 3/16 716	22 13/16 579	5 11/16 144	2 1/4 57	7 7/8 200	13 1/2 343	15 381	300 136
10 250	30 762	28 5/8 727	6 9/16 167	2 1/4 57	9 15/32 241	16 409	17 1/2 445	450 204
12 300	38 1/16 967	32 5/8 829	7 5/8 194	2 1/4 57	12 5/8 321	19 483	20 1/2 521	850 390

See Page 48 for O.D. Size

MODEL FTV-A (ANGLE)

Connection Size	A	B (fully open)	C	D	E	F	Flange 125/150 PSI G	Flange 250/300 PSI G	Approx. Wt. Each
In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2 1/2 65	7 3/8 187	7 178	2 3/4 70	4 5/8 117	1 25	2 9/16 65	7 178	7 1/2 191	19 9
3 80	8 3/16 208	7 13/16 198	2 7/16 62	3 7/8 98	1 25	3 80	7 1/2 191	8 1/4 210	24 11
4 100	9 5/8 244	8 203	3 80	4 3/8 111	1 1/4 32	3 7/16 87	9 1/4 235	10 254	42 19
5 125	12 305	10 1/8 257	3 5/8 92	5 1/2 140	1 1/4 32	4 5/16 125	10 254	11 279	81 37
6 150	14 1/8 359	10 3/8 264	4 7/16 113	6 5/8 168	2 51	5 7/8 149	11 279	12 1/2 318	120 54
8 200	18 15/16 481	18 3/4 476	5 11/16 144	9 3/16 233	2 1/4 57	7 7/8 200	13 1/2 343	15 381	300 136
10 250	20 5/16 516	24 610	6 9/16 167	9 3/4 248	2 1/4 57	9 15/32 241	16 409	17 1/2 445	450 204
12 300	24 1/16 611	26 1/4 667	7 5/8 194	14 356	2 1/4 57	12 5/8 321	19 483	20 1/2 521	860 390

See Page 48 for O.D. Size

MATERIAL SPECIFICATIONS

BODY: Ductile Iron ASTM A 536 Grade 65-45-12

DISC: Bronze ASTM B 584 C-84400

STEM: Stainless Steel ASTM A 582 Type 416

SEAT: High Strength Engineered Resin

SPRING: Stainless Steel ASTM A 302

"O" RINGS: BUNA

FLANGES: Ductile Iron ASTM A 536 Grade 65-45-12 with EPDM² Gaskets (Optional)

INSULATION: Optional¹

NOTE 1: Optional pre-formed insulation is available to meet ASTM D 1784 Class 14253-C, MEA #7-87, ASTM E 136 with a flame spread rating of 25 or less and a smoke development rating of 50 or less.

NOTE 2: EPDM is not suitable for oil service.

NOTE: For temperatures between 230°F and 300°F (110°C and 149°C) specify Viton Elastomers

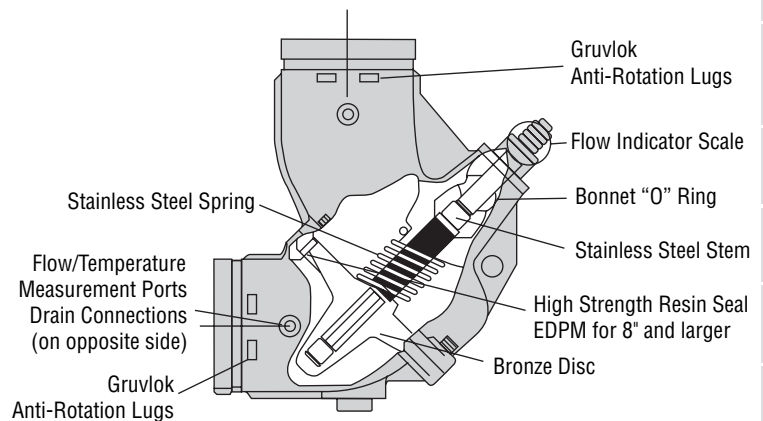


FIG. 7260

Tee Strainer

The Fig. 7260 Tee Strainer provides an economical, compact and hydraulically efficient means of protecting valuable piping system components. The in-line, twin-fold strainer basket provides more than 100% of the projected pipe area for open flow through the strainer screen which results in excellent flow performance across the strainer.

Gruvlok Strainers are designed and tested to ensure long term, reliable service in working pressures up to 750 psi (51.7 bar), depending on size and the pressure rating of the connecting coupling.

MATERIAL SPECIFICATIONS

BODY:

2" - 12" malleable iron conforming to ASTM A 47 or Ductile iron conforming to ASTM A 536.

14" - 18" Carbon steel pipe conforming to ASTM A 53.

STRAINER BASKET:

Stainless steel type 304 bar and woven wire screen. 12 mesh in sizes 2" - 3" and 6 mesh in sizes 4" - 18". Other mesh sizes available on request.

ACCESS COUPLING & END CAP:

2" - 12" Malleable iron conforming to ASTM A 47 or Ductile iron conforming to ASTM A 536.

14" - 18" Low carbon steel conforming to ASTM A 53

BOLTS & NUTS:

Heat treated, oval-neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are provided zinc electroplated as standard.

COUPLING GASKETS:

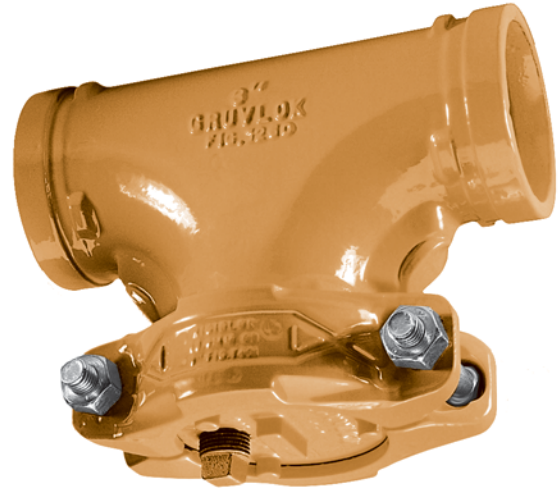
Elastomer properties as designated by ASTM D 2000 Grade "E" EPDM -40°F to +230°F (services temp. range)
Other options available upon request.

DRAIN PLUG: Carbon steel square head plug conforming to ASME B16.11

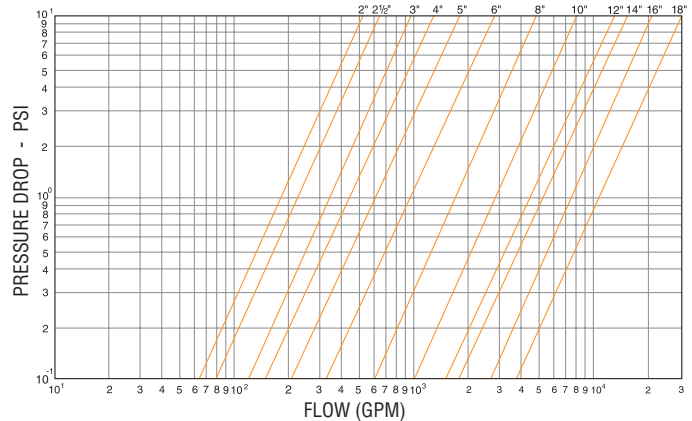
TAP SIZES: 2"-4" - 1/2 NPT, 5"-8" - 3/4 NPT, 10"-18" - 1 NPT,

COATING:

2" - 12" - Rust-inhibiting paint — color: orange (standard)
Hot Dip Galvanized conforming to ASTM A 153 (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact a Gruvlok Representative.



FLOW CHARACTERISTICS

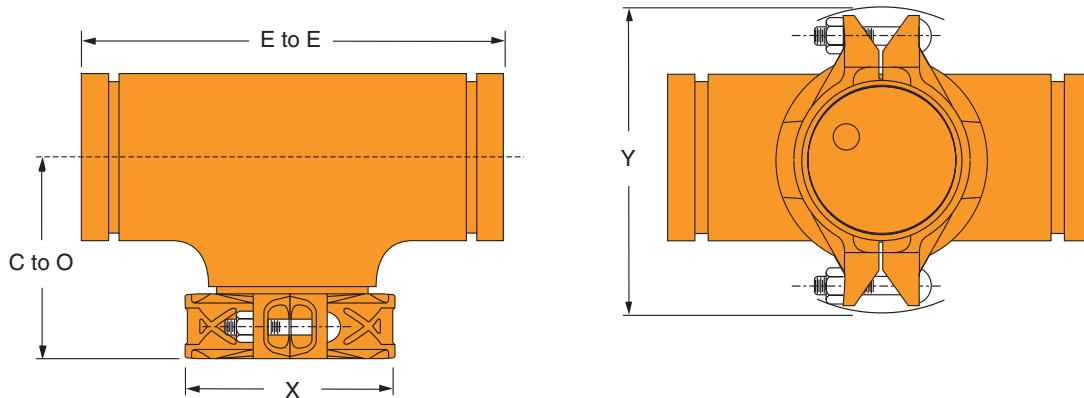


NOTE:

Most U.S. piping engineers specify system startup instructions for new systems which include removing and cleaning the strainer screen after system flushing of main piping before the system is put into normal operation. After flushing, replace the strainer screen. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across a strainer, 50% clogged, is approximately twice as great as that of a clean strainer. Strainer baskets need a routine maintenance program to maintain efficiency and to prevent excess pressure drop caused by a clogged screen.

FIG. 7260

Tee Strainer



NOTE: The above illustration shows the required orientation of the Rigidlok access coupling for assembly with a grooved-end flange.

FIGURE 7260 TEE STRAINER

Nominal Size	O.D.	Maximum* Working Pressure	E to E	C to O	X	Y	Basket Removal	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	Clearance	Lbs./Kg
2	2.375	750	6½	4¼	3½	5⅞	4⅜	6.0
50	60.3	51.7	165	108	89	149	111	2.7
2½	2.875	750	7½	4¾	4	6½	5⅞	8.0
65	73.0	51.7	191	121	102	165	130	3.6
3	3.500	750	8½	5¼	4¾	7	6	13.0
80	88.9	51.7	216	133	121	178	152	5.9
4	4.500	750	10	6⅞	5⅞	8⅞	7¼	19.0
100	114.3	51.7	254	156	149	213	184	8.6
5	5.563	750	11	6⅞	7	10⅞	8¼	30.0
125	141.3	51.7	279	168	178	257	210	13.6
6	6.625	750	13	7⅞	8⅞	11⅞	9¾	45.0
150	168.3	51.7	330	194	206	283	248	20.4
8	8.625	600	15½	9⅞	10½	14⅞	12	79.0
200	219.1	41.4	394	232	267	359	305	35.8
10	10.750	500	18	10⅞	12⅞	17⅞	14¼	133
250	273.1	34.5	457	264	327	435	362	60.3
12	12.750	400	20	11⅞	15	19⅞	16¼	187
300	323.9	27.6	508	289	381	486	413	84.8
14	14.000	300	22	12¾	16⅞	20½	17¼	272
350	355.6	20.7	559	324	410	521	438	123.4
16	16.000	300	24	12	18⅞	22¼	20	350
400	406.4	20.7	610	305	460	565	508	158.8
18	18.000	300	31	15½	20½	24⅞	24½	400
450	457.2	20.7	787	394	521	619	622	181.4

*Maximum working pressure is based upon the performance capability of the Gruvlok Strainer. Maximum system working pressure is dependent upon the couplings used for installation and the pressure capability of other system components.

14" - 18" Fabricated

Not for use with copper systems.

MODEL 758G

Grooved-End "Wye" Strainer

SERVICE RECOMMENDATIONS

For use in water, oil & gas piping to provide economical protection for pumps, meters, valves, compressors, traps & similar equipment.

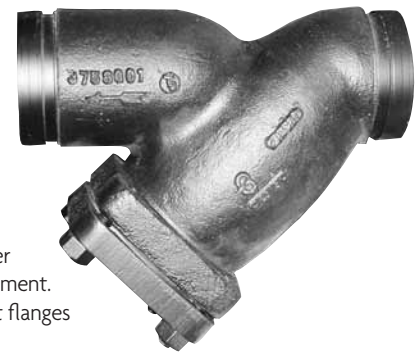
SCREENS

Standard screens for Y-Strainer are perforated 304 Stainless Steel with spot welded seam. Mesh lining is available in all alloys for extra fine straining. Recommended standard perforations are listed below in the material specifications.

GRUVLOK STRAINER BASKET

Furnished as standard in sizes 8" (43 mm) and larger. A one-quarter turn securely locks the screen in its seat and frees the serviceman for securing the cover flange to the body of the strainer.

Contact a Gruvlok Rep. for other applications.



CONSTRUCTION

All covers have an NPT blowoff outlet at location "C". Recessed seat in the cover ensures accurate screen alignment. Bosses at the inlet and outlet flanges are provided for gauge taps.

Self-cleaning is done by opening the valve or plug connected to the blowoff outlet. (Advise when strainers are to be mounted in vertical piping, so we can rotate the cover to position the blowoff at the lowest point.)

BLOWOFF OUTLETS

Tapped NPT size specified in the dimension table. Blowoff outlets are not normally furnished with plugs.

INDIVIDUALLY HYDROSTATICALLY TESTED

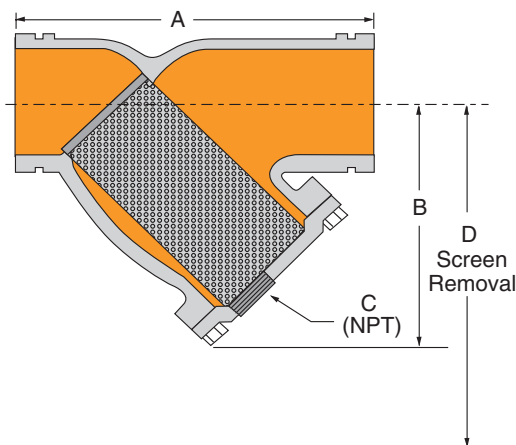
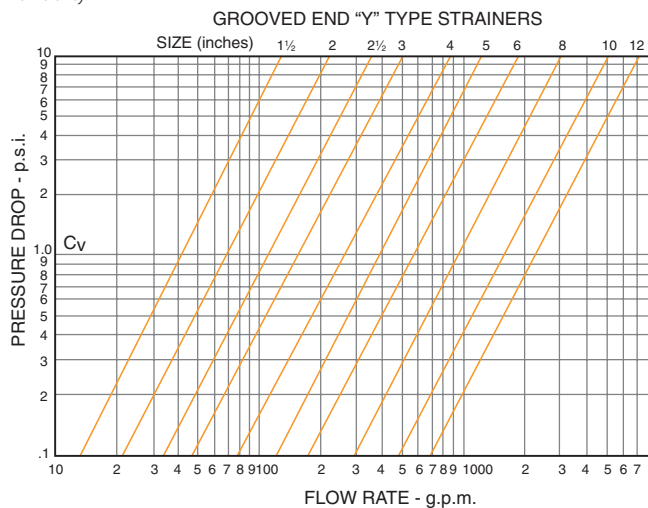
Working Pressures Non-Shock

640 PSI @ 150°F (45 Bar @ 65°C)

FLOW DATA:

NOTE 1. Most U.S. piping engineers specify system startup instructions for new systems which include removing the pre-filter screen after system flushing of the main piping before the system is put into normal operation. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across the diffuser basket strainer, 50% clogged, is approximately twice as great as that of a clean strainer.

NOTE 2. Suction Diffuser baskets need a routine maintenance program to maintain system efficiency.



MATERIAL SPECIFICATIONS

BODY & COVER: Ductile Iron ASTM A 395 Grade 60-40-18

FLAT GASKETS: Non-asbestos

SCREEN:

2" - 4" Type 304 Stainless Steel 1/16" (1.6mm) dia. holes
5" - 12" Type 304 Stainless Steel 1/8" (3.2mm) dia. holes.

COUPLING: Ductile iron ASTM A 536 Grade 65-45-12

FIGURE 758 G GROOVED-END "WYE" STRAINER

Nominal Size	O.D.	Dimensions				Approx. Wt. Each
		A	B	C Plug Size	D	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
2	2.375	7 7/8	5 1/4	1/2	7	12.0
50	60.3	200	133	25	178	5.4
2 1/2	2.875	10	6 1/2	1	9 3/4	18.0
65	73.0	254	165	25	248	8.2
3	3.500	10 1/8	7	1	10	23.0
80	88.9	257	178	25	254	10.4
4	4.500	12 1/8	8 3/4	1 1/2	12	42.0
100	114.3	308	210	38	305	19.1
5	5.563	15 5/8	11 1/4	2	17	80.0
125	141.3	396	286	51	432	36.3
6	6.625	18 1/2	13 1/2	2	20	112.0
150	168.3	470	343	51	508	50.8
8	8.625	21 5/8	15 1/2	2	22 3/4	205.0
200	219.1	549	394	51	577	93.0
10	10.750	25 3/4	18 1/2	2	28	277.0
250	273.1	654	470	51	711	125.6
12	12.750	30	21 1/4	2	30	470.0
300	323.9	762	552	51	762	213.2

*Maximum working pressure is based upon the performance capability of the Gruvlok® Strainer.

Maximum system working pressure is dependant upon the couplings used for installation and the pressure capacity of other system components.

Not for use with copper systems.

MODEL 768G

Globally Sourced Grooved-end “Wye” Strainer

The Grooved-end Wye-Strainers are designed to strain debris and foreign matter from piping systems and thus provide inexpensive protection for costly pumps, meters and other components. The Strainer can be installed quickly and easily with two mechanical couplings and the straight flow through design provides for lower pressure drop. This strainer features a stainless steel screen that is secured with an end cap and mechanical coupling. Cleaning and maintenance of the screen can be accomplished easily by removing the coupling. The Strainer is suitable for vertical and horizontal installations.

MATERIAL SPECIFICATIONS

BODY: Ductile iron ASTM A 536 Grade 65-45-12

END CAP: Ductile iron ASTM A 536 Grade 65-45-12

SCREEN:*

2" - 3" Type 304 Stainless Steel to ASTM A 240 - 1/16" (1.6 mm) perforations

4" - 12" Type 304 Stainless Steel to ASTM A 240 - 1/8" (3.2 mm) perforations

Other perforations are available upon request

COUPLING: Ductile iron ASTM A 536 Grade 65-45-12

GASKET:*

EPDM Temp range -40°F - +230°F (-40° to 110°C)

Nitrile Temperature range -20°F to 180°F (-29° to 82°C)

BLOW DOWN PORT:

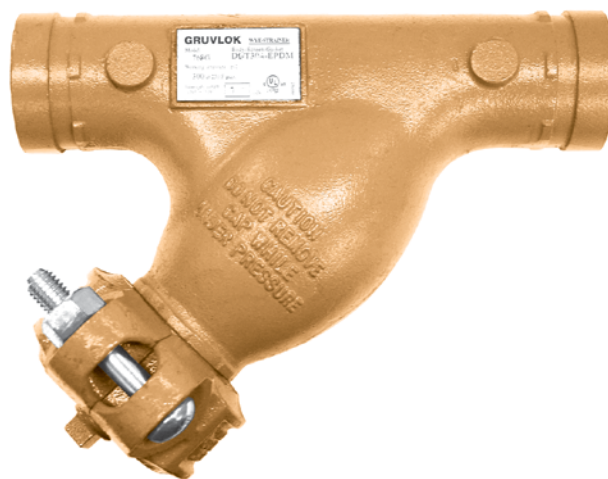
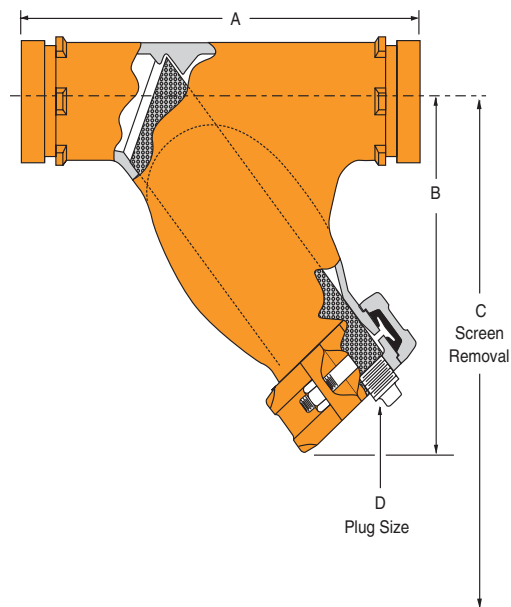
2" & 2 1/2": 1/2" tapped with plug,

3" & 4": 1" tapped with plug,

6" - 12": 1 1/2" tapped with plug

* Custom screens and/or gaskets are available upon request.

Strainer baskets need a routine maintenance program to maintain efficiency and to prevent excess pressure drop caused by a clogged screen.



Values for flow of water at +60°F (+16°C)

$$C_v = \frac{Q}{\sqrt{\Delta P}}$$

Where:

Q = Flow (GPM)

C_v = flow coefficient

ΔP = Pressure drop (PSI)

FIGURE 768 G GROOVED-END “WYE” STRAINER

Nominal Size	O.D.	Working Pressure	Dimensions				Cv Values	Approx. Wt. Each
			A	B	C	D Plug Size		
In./DN(mm)	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm		Lbs./Kg
2	2.375	300	9 3/4	7 1/8	4 9/16	1/2	59	9.3
50	60.3	20.7	248	192	116	12		4.2
2 1/2	2.875	300	10 3/4	7 13/16	4 13/16	1/2	92	13.2
65	73.0	20.7	273	211	122	12		6.0
3	3.500	300	11 3/4	8 11/16	5 1/16	1	162	18.0
80	88.9	20.7	298	231	129	25		8.2
4	4.500	300	14 1/4	10 5/8	6 5/8	1	284	26.4
100	114.3	20.7	362	281	168	25		12.0
5	5.563	300	16 1/2	13	10 3/16	1	410	46.4
125	141.3	20.7	419	330	258	25		22.0
6	6.625	300	18 1/2	14 1/16	8 5/8	1 1/2	770	70.4
150	168.3	20.7	470	357	219	38		32.0
8	8.625	300	24	17 7/8	11 3/16	1 1/2	1010	121.0
200	219.1	20.7	610	454	284	38		55.0
10	10.750	300	27	20 9/16	12 5/8	1 1/2	1800	182.6
250	273.1	20.7	686	522	320	38		83.0
12	12.750	300	30	24	14 3/8	1 1/2	2800	277.2
300	323.9	20.7	762	609	366	38		126.0
14	14.000	300	40	29 15/16	18 7/8	1 1/2	4600	418.0
350	355.6	20.7	1016	760	480	38		190.0
16	16.000	300	42	30 1/16	19	1 1/2	5800	495.0
400	406.4	20.7	1067	777	483	38		225.0

Not for use in copper systems.

- Pressure ratings listed are CWP (cold water pressure) or maximum working pressure within the service temperature range of the gasket used in the coupling. This rating may occasionally differ from maximum working pressures listed and/or approved by UL, ULC, and/or FM as testing conditions and test pipes differ.
- Maximum working pressure and end loads listed are total of internal and external pressures and loads based on Sch. 40 steel pipe with roll grooves to ANSI C606-97 specifications.
- For one time field test only the maximum joint working pressure may be increased 1 1/2 times the figures shown.
- Warning: Piping systems must always be depressurized and drained before attempting disassembly and or removal of any components.

FIG. 7250

Suction Diffuser

The Fig. 7250 Gruvlok Suction Diffuser protects your pump and saves you money on your overall installed cost while offering you these advantages:

SAVES SPACE:

Mounts directly to the pump inlet.

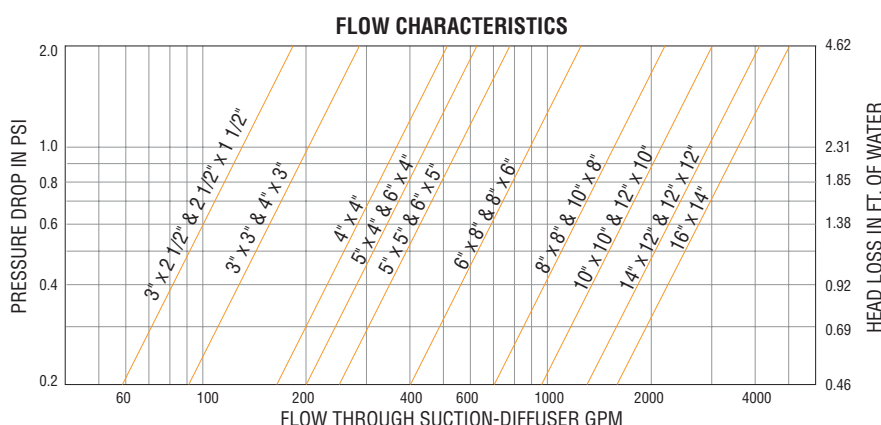
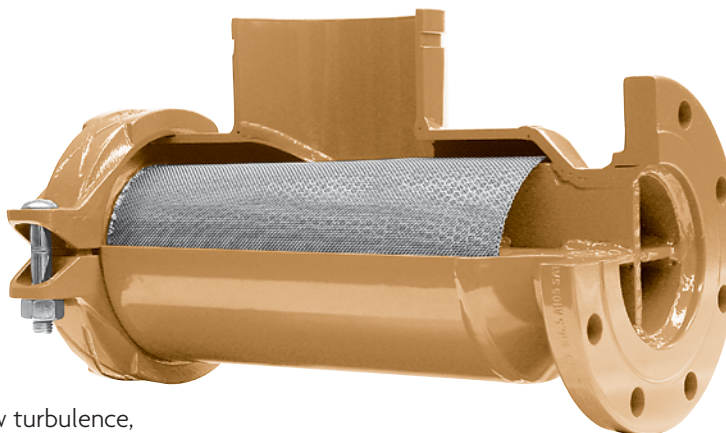
SAVES LABOR AND MATERIAL:

The lightweight compact design is easily installed with no need for welding.

IMPROVES PUMP PERFORMANCE:

The one-piece diffuser vane and strainer design reduces flow turbulence, streamlines the flow, and traps any hazardous foreign material to better protect your pump.

PIPE SUPPORT LUG STANDARD



FLOW DATA:

NOTE 1. Most U.S. piping engineers specify system startup instructions for new systems which include removing the pre-filter screen after system flushing of the main piping before the system is put into normal operation. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across the diffuser basket strainer, 50% clogged, is approximately twice as great as that of a clean strainer.

NOTE 2. Suction Diffuser baskets need a routine maintenance program to maintain system efficiency.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information

HOUSING:

Sizes 2 1/2" x 2 1/2" through 10" x 8":

Carbon steel Schedule 40 conforming to ASTM A 53, Grade B.

Sizes 10" x 10" through 16" x 14":

Carbon steel .375" standard weight wall conforming to ASTM A 53, Grade B.

DIFFUSER BASKET:

Stainless steel type 304, #16 perforated plate with 3/16" diameter holes. (51% open area). Pre-Filter: Stainless steel type 304 screen - 16 mesh. (removable).

COUPLINGS:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

FLANGES:

Carbon steel class 150# conforming to ASME B 16.5.

DRAIN & GAGE PLUGS:

Carbon steel square head plugs conforming to ASME B16.11.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified -40°F to 230°F

(Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code) -20°F to 180°F

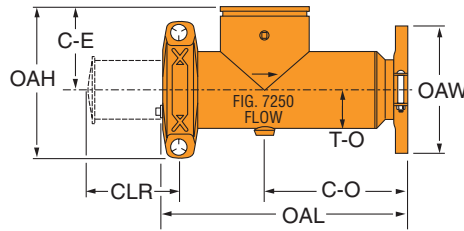
(Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

FIG. 7250

Suction Diffuser



SIZES 2½" X 2½" thru 16" x 14"

FIGURE 7250 SUCTION DIFFUSER

Nominal Size	O.D.	System Side (Grooved)	Pump Side (Flanged)	C-E	C-O	OAL	OAH	OAW Flange O.D.	CLR	T-O	Orifice Cylinder Open Area	Max. Working Pressure	Approx. Wt. Each
In./DN(mm)	In./mm	In./DN(mm)	In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In. Sq./cm. Sq.	PSI/bar	Lbs./Kg
2½ x 2½ 65 x 65	2.875 x 2.875 73.0 x 73.0	2½ 65	2½ 65	5 127	8 203	13½ 343	9 229	7 178	13½ 343	2¼ 57	48 310	300 20.7	32 14.5
3 x 2 80 x 50	3.500 x 2.375 88.9 x 60.3	3 80	2 50	5 127	8 203	13½ 343	9 229	6 152	13½ 343	2¼ 57	42 271	300 20.7	34 15.4
3 x 2½ 80 x 65	3.500 x 2.875 88.9 x 73.0	3 80	2½ 65	5 127	8 203	13½ 343	9 229	7 178	13½ 343	2¼ 57	48 310	300 20.7	34 15.4
3 x 3 80 x 80	3.500 x 3.500 88.9 x 88.9	3 80	3 80	5 127	8 203	13½ 343	9 229	7½ 191	10¼ 260	2¾ 71	58 374	300 20.7	35 15.9
4 x 2½ 100 x 65	4.500 x 2.875 114.3 x 73.0	4 100	2½ 65	5 127	8 203	13½ 343	9 229	7 178	13½ 343	2¼ 57	48 310	300 20.7	36 16.3
4 x 3 100 x 80	4.500 x 3.500 114.3 x 88.9	4 100	3 80	5 127	8 203	13½ 343	9 229	7½ 191	10¼ 260	2¾ 71	58 374	300 20.7	37 16.8
4 x 4 100 x 100	4.500 x 4.500 114.3 x 114.3	4 100	4 100	6½ 165	10½ 267	17½ 445	11¼ 298	9 229	13½ 343	3¾ 94	94 607	300 20.7	70 31.8
5 x 4 125 x 100	5.563 x 4.500 141.3 x 114.3	5 125	4 100	6½ 165	10½ 267	17½ 445	11¼ 298	9 229	13½ 343	3¾ 94	94 607	300 20.7	72 32.7
5 x 5 125 x 125	5.563 x 5.563 141.3 x 141.3	5 125	5 125	6½ 165	10½ 267	17½ 445	13¾ 349	10 254	13½ 343	4¾ 110	117 755	300 20.7	75 34.0
6 x 3 150 x 80	6.625 x 3.500 168.3 x 88.9	6 150	3 80	6½ 165	10½ 267	17½ 445	11¼ 298	7½ 191	13½ 343	3¾ 94	94 607	300 20.7	72 34.0
6 x 4 150 x 100	6.625 x 4.500 168.3 x 114.3	6 150	4 100	6½ 165	10½ 267	17½ 445	11¼ 298	9 229	13½ 343	3¾ 94	94 607	300 20.7	73 33.1
6 x 5 150 x 125	6.625 x 5.563 168.3 x 141.3	6 150	5 125	6½ 165	10½ 267	17½ 445	13¾ 349	10 254	13½ 343	4¾ 110	117 755	300 20.7	75 34.0
6 x 6 150 x 150	6.625 x 6.625 168.3 x 168.3	6 150	6 150	7¾ 197	13¾ 337	21½ 546	14¾ 375	11 279	16¼ 413	4¾ 110	167 1,077	300 20.7	120 54.4
8 x 5 200 x 125	8.625 x 5.563 219.1 x 141.3	8 200	5 125	7¾ 197	13¾ 337	21½ 546	14¾ 375	10 254	16¼ 413	4¾ 110	167 1,077	300 20.7	128 58.1
8 x 6 200 x 150	8.625 x 6.625 219.1 x 168.3	8 200	6 150	7¾ 197	13¾ 337	21½ 546	14¾ 375	11 279	16¼ 413	4¾ 110	167 1,077	300 20.7	130 59.0
8 x 8 200 x 200	8.625 x 8.625 219.1 x 219.1	8 200	8 200	9 229	15¼ 387	24½ 622	17½ 445	13½ 343	19¼ 502	5¾ 137	266 1,716	300 20.7	190 86.2
10 x 8 250 x 200	10.750 x 8.625 273.1 x 219.1	10 250	8 200	9 229	15¼ 387	24½ 622	17½ 445	13½ 343	19¼ 502	5¾ 137	266 1,716	300 20.7	200 90.7
10 x 10 250 x 250	10.750 x 10.750 273.1 x 273.1	10 250	10 250	10 254	17¼ 438	28 711	19½ 498	16 406	23¾ 603	6¾ 162	384 2,477	300 20.7	225 102.1
12 x 10 300 x 250	12.750 x 10.750 323.9 x 273.1	12 300	10 250	10 254	17¼ 438	28 711	19½ 498	16 406	23¾ 603	6¾ 162	384 2,477	300 20.7	230 104.3
12 x 12 300 x 300	12.750 x 12.750 323.9 x 323.9	12 300	12 300	11 279	24¼ 616	36 914	20½ 521	19 483	34¼ 870	8 203	695 4,484	300 20.7	382 173.3
14 x 10 350 x 250	14.000 x 10.750 355.6 x 273.1	14 350	10 250	11 279	24¼ 616	36 914	20½ 521	16 406	34¼ 870	8 203	695 4,484	300 20.7	382 173.3
14 x 12 350 x 300	14.000 x 12.750 355.6 x 323.9	14 350	12 300	11 279	24¼ 616	36 914	20½ 521	19 483	34¼ 870	8 203	695 4,484	300 20.7	382 173.3
14 x 14 350 x 350	14.000 x 14.000 355.6 x 355.6	14 350	14 350	12 305	26¼ 667	39 991	23 584	21 533	36 914	9 229	817 5,271	300 20.7	467 211.8
16 x 14 400 x 350	16.000 x 14.000 406.4 x 355.6	16 400	14 350	12 305	26¼ 667	39 991	23 584	21 533	36 914	9 229	817 5,271	300 20.7	467 211.8

Other sizes available on special request. Contact Gruvlok Rep. for ordering information.
 Dimensions may vary Contact Gruvlok Rep. for certified values.
 Not for use in copper systems.
 Product must be supported by pipe supports (supports not included).

- "CLR" Dimension indicates clearance needed for diffuser basket removal.
- Drain Holes: (End Cap)
-¾" NPT for sizes 2½ x 2½ thru 6 x 5, -1" NPT for sizes 6 x 6 thru 16 x 14.
- Pipe Support - Use 1¼" SCH. 40 Pipe for 2½" thru 10" pipe and 2" SCH. 40 Pipe for 12" and larger diffusers.
- "Orifice Cylinder Open Area" is the total area of the opening in the diffuser basket after the pre-filter screen has been removed.

MODELS GAV-15

Automatic Air Vents For Ultimate Performance

- Two Sizes Equip All Riser Systems
- Spherical Float for Strength
- Stainless Steel Float and Trim
- Special Design Eliminates Blow-by

The Air Vent (GAV) features a Stainless Steel spherical float design. Air in the piping system is vented through the discharge valve that is normally open. Rising water activates the float to close the valve. The valve outlet is tapped to take a safety drain line.

Simplicity of design in the GAV ensures long-lasting efficiency. The Stainless Steel float and valve mechanism involve no wearing parts, and no intricate function. The precision formed cast iron body custom fits the float and valve, and protectively houses their operation under the most demanding conditions.

Max. Working Pressure

175 PSI (12 bar) @ 150° F (66° C)
150 PSI (10 bar) @ 250° F (121° C)

Test Pressure

300 PSI (21 bar) @ 70° F (21° C)



MODEL GAV-15 AUTOMATIC AIR VENT

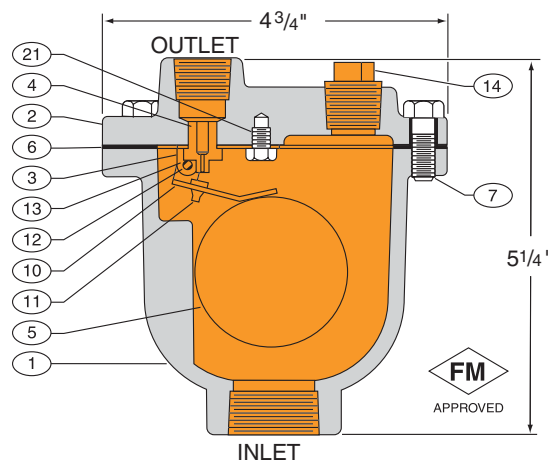
Valve Size	Maximum Temp.	Inlet Size NPT	Outlet Size NPT	Orifice Size	Approx. Wt. Ea
In./mm	°F/°C	In./mm	In./mm	In./mm	Lbs./Kg
1/2 15	250 120	1/2 15	1/2 15	1/16 2	5 1/2 3
3/4 20	250 120	3/4 20	1/2 15	1/16 2	5 1/2 3
1 25	250 120	1 25	1/2 15	1/16 2	5 1/2 3

MODEL GAV-15 AUTOMATIC AIR VENT

Type	Max. Water Pressure	Max. Temp.	Inlet Size	Outlet Size NPT	Valve Orifice	Overall			Approx. Wt. Ea
						Height	Width	Length	
	PSI/bar	°F/°C	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
GAV-15	150 10	250 120	1/2, 3/4 & 1 15, 20 & 25	3/8 10	1/16 2	5 1/4 130	4 3/4 100	4 3/4 100	5 1/2 2.5

MATERIAL SPECIFICATIONS

1. BODY: Cast Iron ASTM A 126, Class B
2. COVER: Cast Iron ASTM A 126, Class B
3. LEVER FRAME: Stainless Steel-T304, ASTM A 240
4. SEAT: Stainless Steel-T303, 582
5. FLOAT: Stainless Steel-T304, ASTM A 240
6. GASKET: Non Asbestos
7. COVER BOLT: Carbon Steel-Sae Grade 5
10. FLOAT ARM: Stainless Steel-T304, ASTM A 240
11. ORIFICE BUTTON: Viton
12. PIVOT PIN: Stainless Steel-T303, 582
13. PIN RETAINER: Stainless Steel-Ph 15-7 MO
14. PIPE PLUG 1/2": Steel
21. LOCATOR: Stainless Steel-T304, ASTM F 593



MODELS GAV-30

Automatic Air Vents for Ultimate Performance

- Two Sizes Equip All Riser Systems
- Spherical Float for Strength
- Stainless Steel Float and Trim
- Special Design Eliminates Blow-by

The Air Vent (GAV) features a Stainless Steel spherical float design. Air in the piping system is vented through the discharge valve that is normally open. Rising water activates the float to close the valve. The valve outlet is tapped to take a safety drain line.

Simplicity of design in the GAV ensures long-lasting efficiency. The Stainless Steel float and valve mechanism involve no wearing parts, and no intricate function. The precision formed cast iron body custom fits the float and valve, and protectively houses their operation under the most demanding conditions.

Max. Working Pressure

300 PSI

Test Pressure

450 PSI



MODEL GAV-30 AUTOMATIC AIR VENT

Valve Size	Maximum Temp.	Inlet Size NPT	Outlet Size NPT	Orifice Size	Approx. Wt. Each.
In./mm	°F/°C	In./mm	In./mm	In./mm	Lbs./Kg
1/2 15	250 120	1/2 15	1/2 15	1/16 2	8 3
3/4 20	250 120	3/4 20	1/2 15	1/16 2	8 3

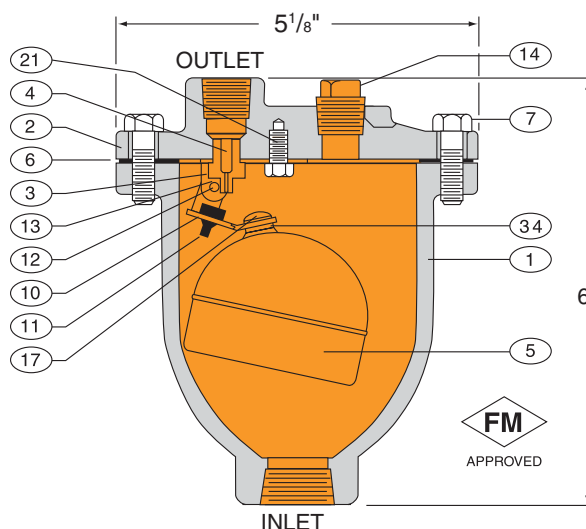
MODEL GAV-30 AUTOMATIC AIR VENT

Type	Max. Water Pressure	Max. Temp.	Inlet Size	Outlet Size NPT	Valve Orifice	Overall			Approx. Wt. Each.
						Height	Width	Length	
	PSI/bar	°F/°C	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
GAV-30	300 20.7	250 120	1/2, 3/4 & 1 15, 20 & 25	1/2 15	1/16 2	6 150	5 1/8 125	5 1/8 125	7 1/2 3.4

MATERIAL SPECIFICATIONS

1. BODY: Cast Iron ASTM A 126, Class B
2. COVER: Cast Iron ASTM A 126, Class B
3. LEVER FRAME: Stainless Steel ASTM A 240
4. SEAT: Stainless Steel-T303, 582
5. FLOAT: Stainless Steel-T304, ASTM A 240
6. GASKET: Non Asbestos
7. COVER BOLT: Alloy Steel ASTM A 449 Grade 5
10. FLOAT ARM: Stainless Steel-T304, ASTM A 240
11. ORIFICE BUTTON: Viton
12. PIVOT PIN: Stainless Steel-T303, 582
13. PIN RETAINER: Stainless Steel-Ph 15-7 MO
14. PIPE PLUG: Steel
17. FLOAT RETAINER: Stainless Steel T304, ASTM F 879
21. LOCATOR: Stainless Steel-T304, ASTM F 593
34. LOCK WASHER: Stainless Steel T304, ASTM A 240

NOTE: All specification as last revised



ANVILFLEX™ FLEX CONNECTORS

AnvilFlex™ Flexible connectors are used to prevent damage to pumps caused by piping stress. AnvilFlex™ connectors also absorb vibration and noise found in pump installations. AnvilFlex™ connectors are easily installed and reduce the possibility of pump failure.

They are designed to be pressure tested 1.5 times their maximum rated working pressure and manufactured with a 4:1 safety factor. Their compact design saves valuable space.

See page 176 for installation instructions.

Working pressure of standard hose and braid up to 1,325 psi (91 bar) or full vacuum and operating temperatures of -400°F (-240° C) to +1,500°F (816° C).

AnvilFlex™ connectors are manufactured with 321 stainless steel annular corrugated close pitch metal flexible hose. Other stainless steel and corrosion resistant alloys are available. Contact your Gruvlok representative for additional information.



MATERIAL SPECIFICATIONS

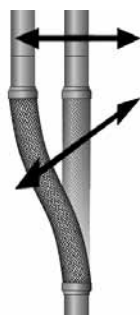
HOSE: 300 Series Stainless Steel

BRAID: Stainless Steel Type 304

ENDS: Schedule 40 Carbon Steel Grooved-Ends

MOTION CLASSIFICATIONS

AnvilFlex™ flex connectors are braided pump connectors capable of handling the following movements:



PARALLEL



VIBRATION

PARALLEL OFFSET MOTION:

Motion that occurs when one end of the hose assembly is deflected in a plane perpendicular to the longitudinal axis with the ends remaining parallel. Offset is measured as displacement of the free end centerline from the fixed end centerline.

MOTION FREQUENCY:

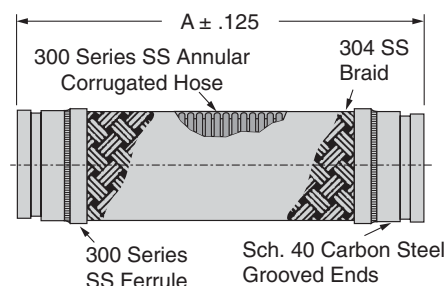
Permanent Offset - The maximum fixed parallel offset to which the corrugated metal hose assembly may be bent without damage to the convolutions. No further motion is to be imposed other than normal vibration.

Intermittent Offset is motion that occurs on a regular or irregular cyclic basis. It is normally the result of thermal expansion and contraction or other non-continuous actions.

NOTE: AnvilFlex™ flex connectors are manufactured with a 4:1 safety factor

FIG. AF21-GG

Grooved Ends
Flex Connector

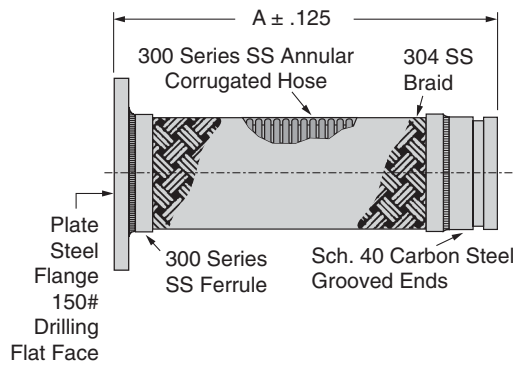


AF21-GG GRXGR FLEX CONNECTORS

Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset *		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	In./mm		In./mm	PSI/bar	In./mm	In./mm	Lbs./kN
2	2.375	AF0390232007	12	450	1¼	¾	2.5
50	60.3		304.8	31.0	31.8	9.5	1.1
2½	2.875	AF0390232106	12	300	1¼	¾	3.5
65	73.0		304.8	20.7	31.8	9.5	1.6
3	3.500	AF0390232031	12	275	¾	¼	4.5
80	88.9		304.8	19.0	19.1	6.4	2.0
4	4.500	AF0390232114	14	270	½	¼	8.0
100	114.3		355.6	18.6	12.7	6.4	3.6
5	5.563	AF0390232122	16	225	¾	¾	12.0
125	141.3		406.4	15.5	22.2	9.5	5.4
6	6.625	AF0390232130	16	165	¾	¼	14.0
150	168.3		406.4	11.4	15.9	6.4	6.4
8	8.625	AF0390232148	16	155	½	¼	20.0
200	219.1		406.4	10.7	12.7	6.4	9.1
10	10.750	AF0390232155	20	150	¾	¼	38.0
250	273.1		508.0	10.3	15.9	6.4	17.2
12	12.750	AF0390232163	20	145	½	¼	46.0
300	323.9		508.0	10.0	12.7	6.4	20.9

FIG. AF21-GF

Grooved x Class 150 Flanged
Flex Connectors

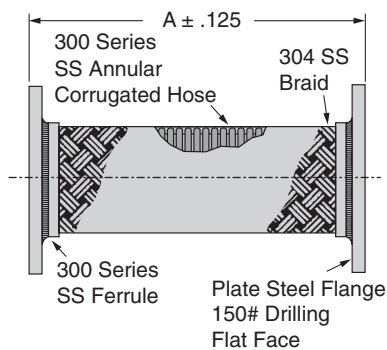


AF21-GF GRXFL FLEX CONNECTORS							
Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	In./mm		In./mm	PSI/bar	In./mm	In./mm	Lbs./kN
2	2.375	AF0390232197	12	450	1 1/8	5/8	7.2
50	60.3		304.8	31.0	47.6	15.9	3.3
2 1/2	2.875	AF0390232213	12	300	1 1/8	5/8	8.5
65	73.0		304.8	20.7	41.3	15.9	3.9
3	3.500	AF0390232171	12	275	1 1/8	1/2	10.4
80	88.9		304.8	19.0	28.6	12.7	4.7
4	4.500	AF0390232189	12	270	5/8	1/4	14.0
100	114.3		304.8	18.6	15.9	6.4	6.4
5	5.563	AF0390232247	14	225	7/8	3/8	18.4
125	141.3		355.6	15.5	22.2	9.5	8.3
6	6.625	AF0390232254	14	165	3/4	3/8	23.7
150	168.3		355.6	11.4	19.1	9.5	10.8
8	8.625	AF0390232262	15	155	5/8	1/4	39.6
200	219.1		381.0	10.7	15.9	6.4	18.0
10	10.750	AF0390232270	16	150	5/8	1/4	40
250	273.1		406.4	10.3	15.9	6.4	18.1
12	12.750	AF0390232288	17	145	1/2	1/4	50
300	323.9		431.8	10.0	12.7	6.4	22.7

* See Motion Classification on previous page for additional information.

FIG. AF21-FF

Class 150 Flanged x Class 150
Flanged Flex Connectors

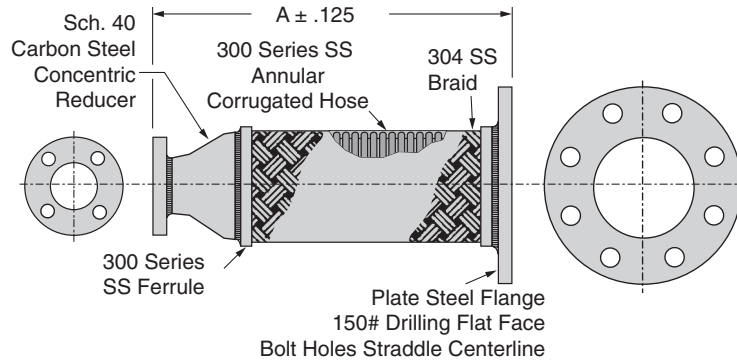


AF21-FF FLXFL FLEX CONNECTORS							
Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	In./mm		In./mm	PSI/bar	In./mm	In./mm	Lbs./kN
2	2.375	AF0390232387	9	450	1 1/8	3/8	10.0
50	60.3		228.6	31.0	28.6	9.5	4.5
2 1/2	2.875	AF0390232395	9	300	1	3/8	12.0
65	73.0		228.6	20.7	25.4	9.5	5.4
3	3.500	AF0390232403	9	275	5/8	1/4	14.0
80	88.9		228.6	19.0	15.9	6.4	6.4
4	4.500	AF0390232429	9	270	1/2	1/4	19.0
100	114.3		228.6	18.6	12.7	6.4	8.6
5	5.563	AF0390232437	11	225	3/4	3/8	25.0
125	141.3		279.4	15.5	19.1	9.5	11.3
6	6.625	AF0390232445	11	165	5/8	1/4	30.0
150	168.3		279.4	11.4	15.9	6.4	13.6
8	8.625	AF0390232452	12	155	1/2	1/4	54.0
200	219.1		304.8	10.7	12.7	6.4	24.5
10	10.750	AF0390232460	13	150	1/2	1/4	75.0
250	273.1		330.2	10.3	12.7	6.4	34.0
12	12.750	AF0390232478	14	145	1/2	1/4	105.0
300	323.9		355.6	10.0	12.7	6.4	47.6

* See Motion Classification on previous page for additional information.

FIG. AF21-RFF

Class 150 Flanged x Class 150
Flanged Reducing Flex Connectors



AF21-RFF FLXFL REDUCING FLEX CONNECTORS

Nominal Size		Small O.D.	Large O.D.	Length	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
Small Flange	Large Flange					Permanent	Intermittent	
In./DN(mm)	In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	Lbs./kN
1½ 40	2 50	1.660 42.2	2.375 60.3	14 355.6	450 31.0	1½ 38.1	⅝ 15.9	6.7 3.0
	2½ 65	1.660 42.2	2.875 73.0	14 355.6	300 20.7	1¼ 31.8	⅜ 9.5	6.9 3.1
	2 50	2.375 60.3	2.875 73.0	14 355.6	300 20.7	1¼ 31.8	⅜ 9.5	8.1 3.7
2 50	3 80	2.375 60.3	3.500 88.9	14 355.6	275 19.0	¾ 19.1	⅜ 9.5	10.1 4.6
	4 100	2.375 60.3	4.500 114.3	15 381.0	270 18.6	½ 12.7	¼ 6.4	12.0 5.4
	2½ 65	2.875 73.0	3.500 88.9	14 355.6	275 19.0	¾ 19.1	⅜ 9.5	11.2 5.1
	4 100	2.875 73.0	4.500 114.3	15 381.0	270 18.6	½ 12.7	¼ 6.4	14.7 6.7
2½ 65	5 125	2.875 73.0	5.563 141.3	18 457.2	225 15.5	¾ 19.1	⅜ 9.5	18.9 8.6
	6 150	2.875 73.0	6.625 168.3	19 482.6	165 11.4	¾ 19.1	⅜ 9.5	25.3 11.5
3 80	4 100	3.500 88.9	4.500 114.3	15 381.0	270 18.6	½ 12.7	¼ 6.4	15.5 7.0
	5 125	3.500 88.9	5.563 141.3	18 457.2	225 15.5	¾ 19.1	⅜ 9.5	19.7 8.9
	6 150	3.500 88.9	6.625 168.3	19 482.6	165 11.4	¾ 19.1	⅜ 9.5	26.1 11.8
	5 125	4.500 114.3	5.563 141.3	18 457.2	225 15.5	¾ 19.1	⅜ 9.5	21.6 9.8
4 100	6 150	4.500 114.3	6.625 168.3	19 482.6	165 11.4	¾ 19.1	⅜ 9.5	28.0 12.7
	8 200	4.500 114.3	8.625 219.1	20 508.0	155 10.7	⅝ 15.9	¼ 6.4	38.4 17.4
5 125	6 150	5.563 141.3	6.625 168.3	19 482.6	165 11.4	¾ 19.1	⅜ 9.5	31.0 14.1
	8 200	5.563 141.3	8.625 219.1	20 508.0	155 10.7	⅝ 15.9	¼ 6.4	40.7 18.5
6 150	8 200	6.625 168.3	8.625 219.1	20 508.0	155 10.7	½ 12.7	¼ 6.4	41.7 18.9
	10 250	6.625 168.3	10.750 273.1	20 508.0	150 10.3	½ 12.7	¼ 6.4	83.1 37.7
8 200	10 250	8.625 219.1	10.750 273.1	20 508.0	150 10.3	½ 12.7	¼ 6.4	95.0 43.1
10 250	12 300	10.750 273.1	12.750 323.9	22 558.8	145 10.0	½ 12.7	¼ 6.4	125.9 57.1

**FOR TEMP
ABOVE 70°F
(21.6° C)**

Temperature	Factor S.S.
°F / °C	
70 21.1	1.00
200 93.3	0.94
300 148.8	0.88
400 204.4	0.83
500 260.0	0.78
600 315.6	0.74

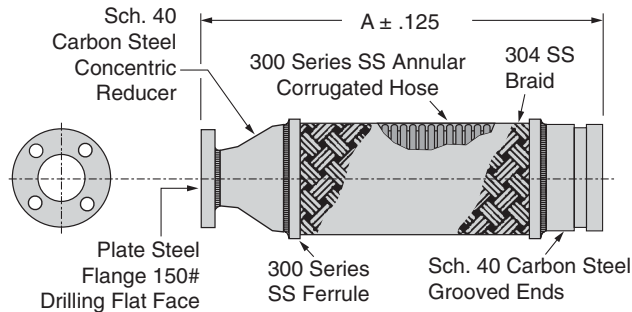
For safe working pressure above 70°F (21.1° C), Multiply pressure shown at 70°F, times correction factor of require temperature.

* See Motion Classification on page 96 for additional information.

Working pressures shown for the hose and braid are based on an operating temperature of 70° F (21° C) with a 4:1 safety factor.

FIG. AF21-RGF

Grooved x Class 150 Flanged
Reducing Flex Connectors



AF21-RGF GRXFL REDUCING FLEX CONNECTORS

Nominal Size		Small O.D.	Large O.D.	Length	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
Small Flange	Large Groove & Hose					Permanent	Intermittent	
In./DN(mm)	In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	Lbs./kN
1½ 40	2	1.660	2.375	14	450	1½	¾	6.7
	50	42.2	60.3	355.6	31.0	38.1	15.9	3.0
	2½	1.660	2.875	14	300	1¼	¾	6.9
	65	42.2	73.0	355.6	20.7	31.8	9.5	3.1
2 50	2½	2.375	2.875	14	300	1¼	¾	8.1
	65	60.3	73.0	355.6	20.7	31.8	9.5	3.7
	3	2.375	3.500	14	275	¾	¾	10.1
	80	60.3	88.9	355.6	19.0	19.1	9.5	4.6
2½ 65	4	2.375	4.500	14	270	½	¼	12.0
	100	60.3	114.3	355.6	18.6	12.7	6.4	5.4
	3	2.875	3.500	14	275	¾	¾	11.2
	80	73.0	88.9	355.6	19.0	19.1	9.5	5.1
3 80	4	2.875	4.500	14	270	½	¼	14.7
	100	73.0	114.3	355.6	18.6	12.7	6.4	6.7
	5	2.875	5.563	18	225	¾	¾	18.9
	125	73.0	141.3	457.2	15.5	19.1	9.5	8.6
4 100	6	2.875	6.625	19	165	¾	¾	25.3
	150	73.0	168.3	482.6	11.4	19.1	9.5	11.5
	4	3.500	4.500	15	270	½	¼	15.5
	100	88.9	114.3	381.0	18.6	12.7	6.4	7.0
5 125	5	3.500	5.563	18	225	¾	¾	19.7
	125	88.9	141.3	457.2	15.5	19.1	9.5	8.9
	6	3.500	6.625	19	165	¾	¾	26.1
	150	88.9	168.3	482.6	11.4	19.1	9.5	11.8
6 150	5	4.500	5.563	18	225	¾	¾	21.6
	125	114.3	141.3	457.2	15.5	19.1	9.5	9.8
	6	4.500	6.625	19	165	¾	¾	28.0
	150	114.3	168.3	482.6	11.4	19.1	9.5	12.7
8 200	8	4.500	8.625	20	155	¾	¾	38.4
	200	114.3	219.1	508.0	10.7	15.9	6.4	17.4
	6	5.563	6.625	19	165	¾	¾	31.0
	150	141.3	168.3	482.6	11.4	19.1	9.5	14.1
10 250	8	5.563	8.625	20	155	¾	¾	40.7
	200	141.3	219.1	508.0	10.7	15.9	6.4	18.5
	6	6.625	8.625	20	155	½	¼	41.7
	200	168.3	219.1	508.0	10.7	12.7	6.4	18.9
10 250	8	8.625	10.750	23	150	½	¼	84.0
	250	219.1	273.1	584.2	10.3	12.7	6.4	38.1
	10	10.750	12.750	25	145	½	¼	102.0
	300	273.1	323.9	635.0	10.0	12.7	6.4	46.3

FOR TEMP ABOVE 70°F (21.6° C)

Temperature	Factor S.S.
°F / °C	
70 21.1	1.00
200 93.3	0.94
300 148.8	0.88
400 204.4	0.83
500 260.0	0.78
600 315.6	0.74

For safe working pressure above 70°F (21.1° C), Multiply pressure shown at 70°F, times correction factor of required temperature.

* See Motion Classification on page 96 for additional information.

Working pressures shown for the hose and braid are based on an operating temperature of 70° F (21° C) with a 4:1 safety factor.

HIGH PRESSURE COUPLINGS

FIG. 7004 HPR®

Coupling

The Gruvlok Fig. 7004 HPR is designed to provide the versatility of a grooved joint while providing a connection for rigid pipe joint applications.

The Fig. 7004 HPR coupling permits working pressure ratings up to 1200 psi (82.8 bar).

This coupling is also suited for lower pressure systems which experience pressure pulses. Systems used for high pressure auto and truck washes will benefit from the increased pressure capability.

Working Pressure & End Load values are based on grooved standard wall pipe.

Fig. 7004 HPR provides a basically rigid joint and does not allow for expansion or contraction. Painted couplings are green.



UL US **FM** **APPROVED**
For Listings/Approval Details and Limitations,
visit our website @ www.anvilintl.com
or contact an Anvil/AnvilStar Sales Representative.

NOTE: Sizes 2" - 6" when used with a cast fig. 7050 fitting the UL/FM pressure is limited to 500 psi.

NOTE: Fig. 7004 HPR can be used with EG fittings as a commercial joint only.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:

Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: Green (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)

Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)

Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style

Flush Gap (2" - 12")

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™(Do Not use with Grade "L")

FIG. 7004 HPR®

Coupling

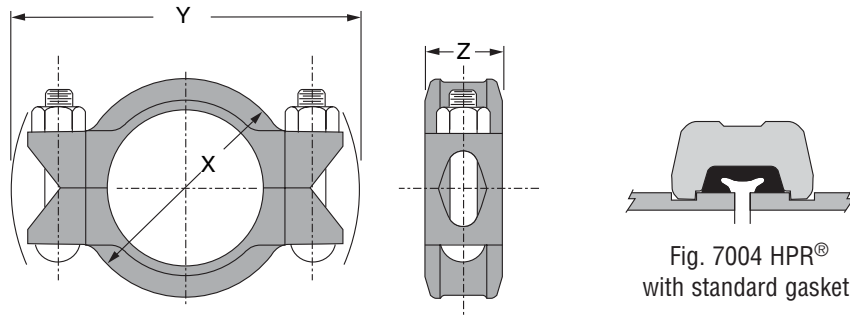


Fig. 7004 HPR®
with standard gasket.

FIGURE 7004 HPR COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm		In./mm	Lbs./Kg
2	2.375	1200	5,316	0 - 1/8	3 3/8	6 1/4	1 1/8	2	5/8 x 2 3/4	3.9
50	60.3	82.8	23.65	0 - 3.2	92	159	48		—	1.8
2 1/2	2.875	1200	7,790	0 - 1/8	4 1/4	6 7/8	1 7/8	2	5/8 x 3 1/2	4.6
65	73.0	82.8	34.65	0 - 3.2	108	175	48		M16 x 85	2.1
3	3.500	1200	11,545	0 - 1/8	4 7/8	7 1/2	1 7/8	2	5/8 x 3 1/2	5.2
80	88.9	82.8	51.36	0 - 3.2	124	191	48		M16 x 85	2.4
4	4.500	1200	19,085	0 - 1/4	6 1/4	9 1/2	2 1/4	2	3/4 x 4 1/2	8.6
100	114.3	82.8	84.90	0 - 6.4	159	241	57		M20 x 110	3.9
5	5.563	1200	29,167	0 - 1/4	7 1/2	11	2 1/4	2	7/8 x 5 1/2	14.0
125	141.3	82.8	129.74	0 - 6.4	191	279	57		M22 x 150	6.4
6	6.625	1200	41,366	0 - 1/4	8 3/4	12 1/8	2 1/4	2	7/8 x 5 1/2	15.5
150	168.3	82.8	184.00	0 - 6.4	222	308	57		M22 x 150	7.0
8	8.625	1000	58,426	0 - 1/4	11 1/8	14 7/8	2 5/8	2	1 x 5 1/2	25.6
200	219.1	68.9	259.89	0 - 6.4	283	378	67		—	11.6
10	10.750	800	72,610	0 - 1/4	13 1/2	17	2 5/8	2	1 x 6 1/2	32.3
250	273.1	55.2	322.99	0 - 6.4	343	432	67		—	14.7
12	12.750	800	102,141	0 - 1/4	15 7/8	19 1/4	2 5/8	2	1 x 6 1/2	43.9
300	323.9	55.2	454.35	0 - 6.4	403	489	67		—	19.9

For additional details, see coupling data chart notes from page 16.

Not for use in copper systems.

FIG. 7004 EG®

End Guard® Coupling

The Gruvlok Fig. 7004EG Coupling uses the specially designed “End Guard” gasket with “EG” grooved pipe. The “EG” gasket has a center rib which extends between the pipes to provide for pipe end protection which makes it ideally suited for internally lined or coated pipe applications.

The Fig. 7004EG Coupling permits working pressure ratings up to 2500 psi (172.4 bar).

Working Pressure and End Load values are based on “EG” cut grooved extra heavy steel pipe. Fig. 7004EG provides a basically rigid joint and does not allow for expansion or contraction. Beveled end pipe should not be used with “EG” gaskets. Painted couplings are green.



MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE

Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: Green (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade “E” EPDM (Green color code)

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade “T” Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)

Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.

NOT FOR USE IN HOT WATER OR HOT AIR.

GASKET TYPE:

“EG” Style

LUBRICATION:

Standard Gruvlok

Gruvlok Xtreme™(Do Not use with Grade “L”)

FIG. 7004 EG®

End Guard® Coupling

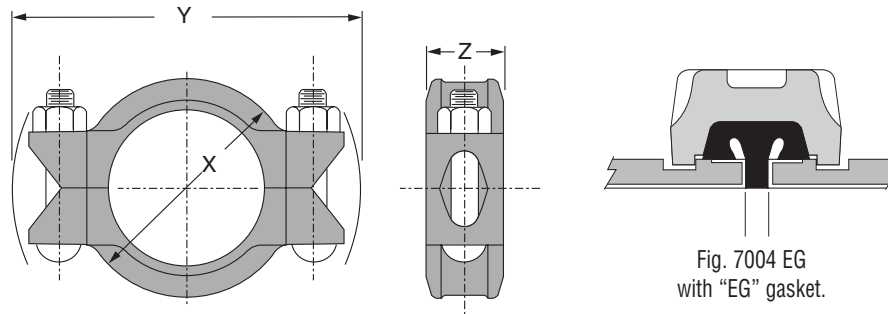


Fig. 7004 EG
with "EG" gasket.

FIGURE 7004 END GUARD (EG) COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm	In./mm	In./mm		In./mm	Lbs./Kg
2	2.375	2500	11,075	0 - 1/8	3 5/8	6 1/4	1 1/8	2	5/8 x 2 3/4	4.1
50	60.3	172.4	49.27	0 - 3.2	92	159	48		—	1.9
2 1/2	2.875	2500	16,230	0 - 1/8	4 1/4	6 7/8	1 7/8	2	5/8 x 3 1/2	5.1
65	73.0	172.4	72.19	0 - 3.2	108	175	48		M16 x 85	2.3
3	3.500	2500	24,053	0 - 1/8	4 7/8	7 1/2	1 7/8	2	5/8 x 3 1/2	5.5
80	88.9	172.4	106.99	0 - 3.2	124	191	48		M16 x 85	2.5
4	4.500	2500	39,761	0 - 1/4	6 1/4	9 1/2	2 1/4	2	3/4 x 4 1/2	9.0
100	114.3	172.4	176.86	0 - 6.4	159	241	57		M20 x 110	4.1
6	6.625	2000	68,943	0 - 1/4	8 3/4	12 1/8	2 1/4	2	7/8 x 5 1/2	15.5
150	168.3	137.9	306.67	0 - 6.4	222	308	57		M22 x 150	7.0
8	8.625	1500	87,639	0 - 1/4	11 1/8	14 7/8	2 5/8	2	1 x 5 1/2	25.6
200	219.1	103.4	389.84	0 - 6.4	283	378	67		—	11.6
10	10.750	1250	113,453	0 - 1/4	13 1/2	17	2 5/8	2	1 x 6 1/2	32.3
250	273.1	86.2	504.66	0 - 6.4	343	432	67		—	14.7
12	12.750	1250	159,595	0 - 1/4	15 5/8	19 1/4	2 5/8	2	1 x 6 1/2	43.9
300	323.9	86.2	709.92	0 - 6.4	403	489	67		—	19.9

For additional details, see coupling data chart notes from page 16.
Not for use in copper systems.

HIGH PRESSURE FITTINGS

Gruvlok End Guard fittings are fabricated from extra heavy (XS) materials. The groove conforms to Gruvlok End Guard cut grooving specification. These fittings may be used for high pressure systems and where lined or coated fittings are required. Gruvlok EG fittings conform to NACE STD-RP-04-72 (Contact a Gruvlok Representative with specific service details). End Guard fittings should only be used with Series 7004 EG Couplings.

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
1	1.315	3	3.500
25	33.7	80	88.9
1¼	1.660	4	4.500
32	42.4	100	114.3
1½	1.900	5	5.563
40	48.3	140	141.3
2	2.375	6	6.625
50	60.3	150	168.3
2½	2.875	8	8.625
65	73.0	200	219.1

MATERIAL SPECIFICATIONS

ELBOWS: Extra strong forged steel fittings conforming to ASTM A 234 with welded tangents of schedule 80 steel pipe conforming to ASTM A 53, type "S", Grade "B".

TEES & CROSSES: Segment welded schedule 80 steel pipe conforming to ASTM A 53, type "S", Grade "B".

COATINGS: Rust inhibiting paint, Color: Green Standard or Hot-Dipped Galvanized (Optional). Other Colors Available (IE: RAL3000 and RAL9000). For other Coating requirements contact a Gruvlok Representative.

FIG. 7050 EG - High Pressure 90° LR Elbow

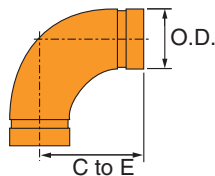


FIGURE 7050 EG, HIGH PRESSURE 90° LR ELBOW			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	3¼	2.5
50	60.3	83	1.1
2½	2.875	3¾	4.2
65	73.0	95	1.9
3	3.500	4¼	6.0
80	88.9	108	2.7
4	4.500	5	11.0
100	114.3	127	5.0
6	6.625	6½	27.2
150	168.3	165	12.4
8	8.625	*	*
200	219.1	*	*
10	10.750	*	*
250	273.0	*	*
12	12.750	*	*
300	323.9	*	*

* Contact a Gruvlok Representative for more information.

FIG. 7051 EG - High Pressure 45° LR Elbow

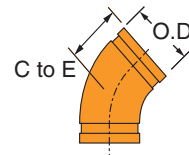


FIGURE 7051 EG, HIGH PRESSURE 45° LR ELBOW			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	2	1.8
50	60.3	51	0.8
2½	2.875	2¼	2.9
65	73.0	57	1.3
3	3.500	2½	4.3
80	88.9	64	2.0
4	4.500	3	7.5
100	114.3	76	3.4
6	6.625	3½	16.5
150	168.3	89	7.5

HIGH PRESSURE FITTINGS

FIG. 7060 EG - High Pressure Tee

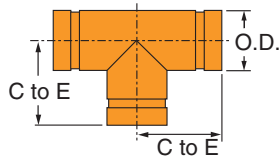


FIGURE 7060 EG - HIGH PRESSURE TEE			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	3¼ 83	3.3 1.5
2½ 65	2.875 73.0	3¾ 95	5.1 2.3
3 80	3.500 88.9	4¼ 108	9.3 4.2
4 100	4.500 114.3	5 127	15.9 7.2
6 150	6.625 168.3	6½ 165	38.5 17.5

FIG. 7022 EG - High Pressure Header Tee

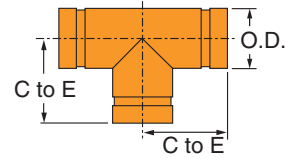


FIG. 7022 EG - HIGH PRESSURE HEADER TEE			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	6½ 165	4.9 2.2
2 50	2.375 60.3	5 127	3.6 1.6

FIG. 7068 EG - High Pressure Cross

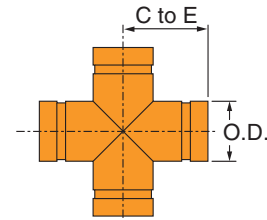


FIG. 7068 EG - HIGH PRESSURE CROSS			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	3¼ 83	3.9 1.8
2½ 65	2.875 73.0	3¾ 95	6.8 3.1
3 80	3.500 88.9	4¼ 108	11.5 5.2
4 100	4.500 114.3	5 127	19.3 8.8
6 150	6.625 168.3	6½ 165	46.0 20.9

GRUVLOK® ADVANCED COPPER METHOD TECHNICAL DATA



COPPER FITTINGS:

Copper per ASTM B 75 and ANSI B16.22, alloy 2" - 6" C12200 8" copper fittings are 316 Stainless Steel

PERFORMANCE DATA:

The Gruvlok Advanced Copper Method may be used with types K, L, M and DWV copper tubing. The pressure ratings shown below are for Gruvlok Fig. 7400 Rigidlite Coupling, Fig. 7012 Gruvlok Flange, and Gruvlok Advanced Copper Method Fittings when used with the specific type of tubing indicated.

MATERIAL SPECIFICATIONS

99.9% Lead-Free!

HOUSING: Ductile iron conforming to ASTM A 536, Grade 65-45-12

COATING: Rust inhibiting paint — Color: orange (standard).

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

BOLTS & NUTS: Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are provided zinc electroplated as standard. Stainless Steel bolts and nuts are also available.

HINGE PIN: (Gruvlok 7012 Flange) Carbon steel

GASKETS: Properties as designated in accordance with ASTM D2000 Grade E EPDM (Green color code) NSF 61 Certified

Service Temperature Range: -40°F to +190°F (-40°C to +88°C)

Recommended for water service, dilute acids, alkalis, alkaline solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM SERVICES.

LUBRICATION:

Gruvlok Xtreme™ lubricant only

NOTE: Lubricant is to be applied to the entire surface, both internal and external of the gasket. For additional important information concerning Gruvlok Xtreme™ Lubricant see Gruvlok Data Sheet 3 "Gruvlok Lubricants".

Contact a Gruvlok Representative for additional details.

PERFORMANCE DATA COUPLING ADVANCED COPPER METHOD

TYPE "K" ASTM B 88			
1 Nominal Tube Size	2 Wall Thickness	3 Max. Joint Work. Pressure	4 Max. Permis. End Load
Inches	In./mm	PSI/bar	Lbs./kN
2	0.083	300	1,329
50	2.11	20.7	5.91
2½	0.095	300	1,948
65	2.41	20.7	8.66
3	0.109	300	2,886
80	2.77	20.7	12.84
4	0.134	300	4,771
100	3.4	20.7	21.22
5	0.160	300	7,289
125	4.06	20.7	32.42
6	0.192	300	10,341
150	4.88	20.7	46.00
8	0.271	300	15,555
200	6.88	20.7	69.19

TYPE "L" ASTM B 88		
2 Wall Thickness	3 Max. Joint Work. Pressure	4 Max. Permis. End Load
In./mm	PSI/bar	Lbs./kN
0.070	300	1,329
1.78	20.7	5.91
0.080	300	1,948
2.03	20.7	8.66
0.090	300	2,886
2.29	20.7	12.84
0.110	300	4,771
2.79	20.7	21.22
0.125	300	7,289
3.18	20.7	21.42
0.140	300	10,341
3.56	20.7	46
0.200	300	15,555
5.08	20.7	69.19

TYPE "M" ASTM B 88		
2 Wall Thickness	3 Max. Joint Work. Pressure	4 Max. Permis. End Load
In./mm	PSI/bar	Lbs./kN
0.058	250	1,108
1.47	17.2	4.93
0.065	250	1,623
1.65	17.2	7.22
0.072	250	2,405
1.83	17.2	10.75
0.095	250	3,976
2.41	17.2	17.69
0.109	200	4,859
2.77	13.8	21.61
0.122	200	6,894
3.10	13.8	30.67
0.170	200	10,370
4.32	13.8	46.12

DWV ASTM B 306		
2 Wall Thickness	3 Max. Joint Work. Pressure	4 Max. Permis. End Load
In./mm	PSI/bar	Lbs./kN
—	—	—
—	—	—
—	—	—
—	—	—
0.045	100	962
1.14	6.9	4.28
0.058	100	1,590
1.47	6.9	7.07
0.072	100	2,430
1.83	6.9	10.81
0.083	100	3,447
2.11	6.9	15.33
0.109	100	5,185
2.77	6.9	23.06

NOTES:

(1) Gruvlok Coupling and Gruvlok Flange size are identified by nominal tubing size.

(2) Nominal tube wall thickness.

(3) Maximum line pressure, including surge, to which joint shall be subjected. Working pressure ratings are based on the specified copper tubing roll grooved per Gruvlok Copper Method Copper-Prep Specifications.

NOTE: For one time field test only. The maximum joint working pressure may be increased to 1½ times the figure shown.

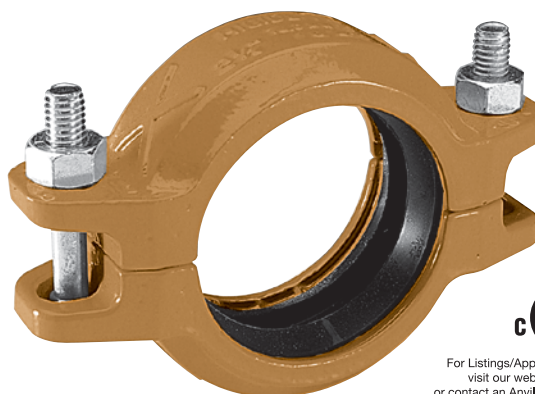
(4) Maximum end load from all internal and/or external forces, to which the joint shall be subjected.

FIG. 7400

Rigidlite® Coupling

The Fig. 7400 Rigidlite Coupling provides a rigid, locked-in connection to meet the specific demands of copper tubing installation. Available with the Grade “E”, EPDM “C” style gasket as the standard gasket. The Rigidlite Coupling maintains a rigid connection, on copper piping systems.

Go to technical data section for installation instructions.



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard)

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade “E” EPDM (Green color code) NSF 61 Certified

-40°F to 190°F (Service Temperature Range)(-40°C to 88°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

LUBRICATION:

Gruvlok Xtreme™ lubricant only. **NOTE:** Lubricant is to be applied to the entire surface, both internal and external, of the gasket. For additional important information concerning Gruvlok Xtreme™ Lubricant see Gruvlok Data Sheet 3 “Gruvlok Lubricants”.

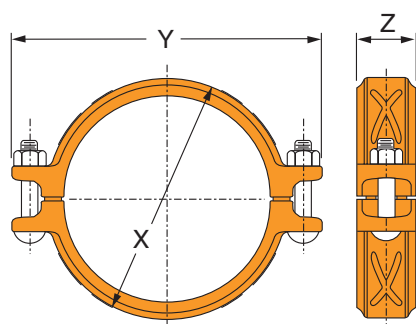


FIGURE 7400 RIGIDLITE COUPLING

Nominal Size	O.D.	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
			X	Y	Z	Qty.	Size.	Min.	Max	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm		In./mm	Ft. -Lbs./N-m		Lbs./Kg
2	2.375	0 - 1/8	3/4	5 1/2	1 1/4	2	3/8 x 2 1/4	30	45	1.6
50	60.3	0 - 3.2	83	140	44		M10 x 57	40	60	0.7
2 1/2	2.875	0 - 1/8	3 3/8	5	1 1/4	2	3/8 x 2 1/4	30	45	1.9
65	73.0	0 - 3.2	98	127	44		M10 x 57	40	60	0.9
3	3.500	0 - 1/8	4 1/2	6 3/4	1 3/4	2	3/8 x 2 3/4	30	45	2.1
80	88.9	0 - 3.2	114	171	44		M10 x 70	40	60	1.0
4	4.500	0 - 1/4	5 5/8	7 3/4	1 7/8	2	3/8 x 2 3/4	30	45	3.1
100	114.3	0 - 6.4	143	197	48		M10 x 70	40	60	1.4
5	5.563	0 - 1/4	6 3/8	9 1/4	2	2	1/2 x 3	80	100	4.6
125	141.3	0 - 6.4	175	235	51		M12 x 76	110	150	2.1
6	6.625	0 - 1/4	7 1/8	10 3/8	2	2	1/2 x 3	80	100	5.5
150	168.3	0 - 6.4	200	264	51		M12 x 76	110	150	2.5
8	8.625	0 - 1/8	10 1/4	12 3/4	2 3/8	2	1/2 x 3	80	100	8.4
200	219.1	0 - 3.2	260	324	60		M12 x 76	110	150	3.8

For additional details see “Coupling Data Chart Notes” from page 16.

§ – For additional Bolt Torque information, see page 184.

See Installation & Assembly directions on page 155.

FIG. 7012

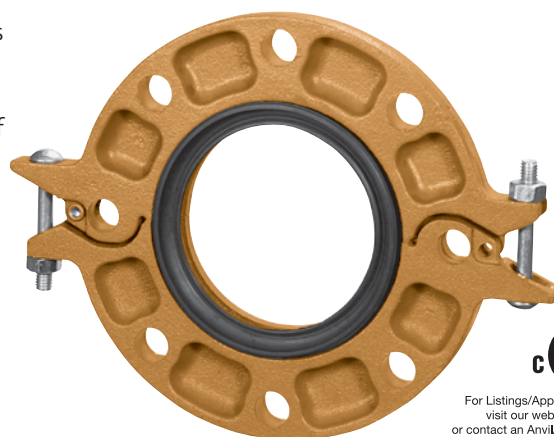
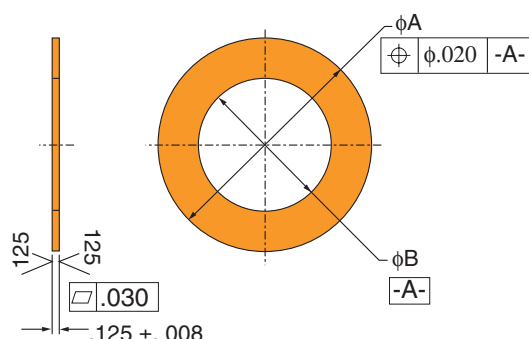
Gruvlok Flanges for Gruvlok Advanced Copper Method

The Gruvlok® Fig. 7012 Flange allows direct connection of Class 125 or Class 150 flanged components to a Gruvlok Advanced Copper Method piping system. The two interlocking halves of the 2" thru 8" sizes of the Gruvlok Flange are hinged for ease of handling, and are drawn together by a latch bolt which eases assembly on the pipe. Precision machined bolt holes, key and mating surfaces assure concentricity and flatness to provide exact fit-up with flanged, lug, and wafer styles of pipe system equipment. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.

All Gruvlok Fig. 7012 Flanges have designed-in anti-rotation tines which bite into and grip the sides of the pipe grooves to provide a secure, rigid connection.

The Gruvlok Fig. 7012 Flange requires the use of a steel adapter insert when used against rubber faced surfaces, wafer/lug design valves and serrated or irregular sealing surfaces. In copper systems a phenolic adapter insert is required, in place of the steel adapter insert. (See Installation and Assembly Instructions Section or contact your Anvil Rep. for details.)

OPTIONAL PHENOLIC FLANGE ADAPTER INSERT



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

MATERIAL SPECIFICATIONS

LATCH BOLT/NUT (2" - 8"):

Heat treated, zinc electroplated, carbon steel oval neck track bolts conforming to ASTM A 183 and zinc electroplated carbon steel heavy hex nuts conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:

Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:

Rust inhibiting paint Color: ORANGE (standard), Red (optional).

Hot Dipped Zinc Galvanized (optional)

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 190°F (Service Temperature Range) (-40°C to 88°C)

Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

LUBRICATION:

Gruvlok Xtreme™ lubricant only. **NOTE:** Lubricant is to be applied to the entire surface, both internal and external, of the gasket. For additional important information concerning Gruvlok Xtreme™ Lubricant see Gruvlok Data Sheet 3 "Gruvlok Lubricants".

7012 DIMENSIONAL DATA

Nominal Size	Markings	A	B
In./DN(mm)		In./mm	In./mm
2 50	2-7012 ANSI	4 101.6	2 1/4 57.2
2 1/2 65	2 1/2-7012 ANSI	4 3/4 120.7	2 3/4 69.9
3 80	3-7012 ANSI	5 1/4 133.4	3 3/8 85.9
4 100	4-7012 ANSI	6 3/4 171.5	4 3/8 111.3
5 125	5-7012 ANSI	7 5/8 193.5	5 1/16 138.2
6 150	6-7012 ANSI	8 3/8 218.9	6 1/2 165.1
8 200	8-7012 ANSI	10 7/8 276.1	8 1/2 215.9

NOTES:

1. Material Specification: Natural canvas phenolic

FIG. 7012

Gruvlok Flanges for Gruvlok Advanced Copper Method

GRUVLOK FIGURE 7012 FLANGE: ANSI CLASS 150 OR ISO PN10 OR PN16 BOLT PATTERNS

Nominal Size	O.D.	Max. Working Pressure ▼	Max. End Load ▼	Latch Bolt		Range Dimensions			Sealing Surface		Mating Flange Bolts				Approx. Wt. Ea.	
				Latch* Bolt Size	Specified Torque §		X	Y	Z	A Max.	B Min.	Mating Flange Bolts		Specified Torque §		
					Min.	Max.						Qty. ANSI	Size (ANSI)	Min.		Max.
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Ft.-Lbs/N-m	In./mm	In./mm	In./mm	In./mm	In./mm	PN10 (16)	In. (ISO) mm	Ft.-Lbs/N-m	Lbs./Kg		
2	2.375	300	1,329	¾ x 2¼	30	45	6¼	8¾	¾	2¾	3⅞	4	¾ x 2¼	110	140	4.2
50	60.3	20.7	5.91	M10 x 70	40	60	159	213	19	60	87	4	M16 x 70	149	190	1.9
2½	2.875	300	1,948	¾ x 2¼	30	45	7	9½	¾	2⅞	4	4	¾ x 2¼	110	140	4.6
65	73.0	20.7	8.66	M10 x 70	40	60	178	241	19	73	102	-	M16 x 70	149	190	2.1
3	3.500	300	2,886	¾ x 2¼	30	45	7⅞	10½	¾	3½	4⅞	4	¾ x 2¼	110	140	6.0
80	88.9	20.7	12.84	M10 x 70	40	60	200	267	19	89	116	8	M16 x 70	149	190	2.7
4	4.500	300	4,771	¾ x 2¼	30	45	9	11½	¾	4½	5⅞	8	¾ x 2¼	110	140	6.3
100	114.3	20.7	21.22	M10 x 70	40	60	229	292	19	114	141	8	M16 x 70	149	190	2.9
5	5.563	300	7,292	¾ x 2¼	30	45	10	12½	⅞	5⅞	6¾	8	¾ x 2⅞	220	250	8.8
125	141.3	20.7	32.44	M10 x 70	40	60	254	318	22	141	171	-	-	298	339	4.0
6	6.625	300	10,341	¾ x 2¼	30	45	11	14	⅞	6⅞	7⅞	8	¾ x 3⅞	220	250	9.6
150	168.3	20.7	46.00	M10 x 70	40	60	279	356	22	168	198	8	M20 x 80	298	339	4.4
8	8.625	300	17,528	¾ x 2¼	30	45	13½	16½	1	8¾	10	8	¾ x 3¼	220	250	15.6
200	219.1	20.7	77.97	M10 x 70	40	60	343	419	25	219	254	8 (12)	M20 x 80	298	339	7.1

† PN 16 uses M24 x 90 (PN) Dimensions for bolt circle PN 10 & 16 Flange.

* Available in ANSI or metric bolt sizes only as indicated.

▼ Based on use with standard wall pipe.

§ - For additional Bolt Torque information, see page 184.

The Gruvlok Flange bolt hole pattern conforms to ANSI Class 150 and Class 125 flanges.

Effective sealing area of mating flange must be free from gouges, undulations or deformities of any type to ensure proper sealing of the gasket.

To avoid interference issues, flanges cannot be assembled directly to Series 7700 butterfly valve.

Flange can be assembled to one side of series 7500 and 7600 valve only.

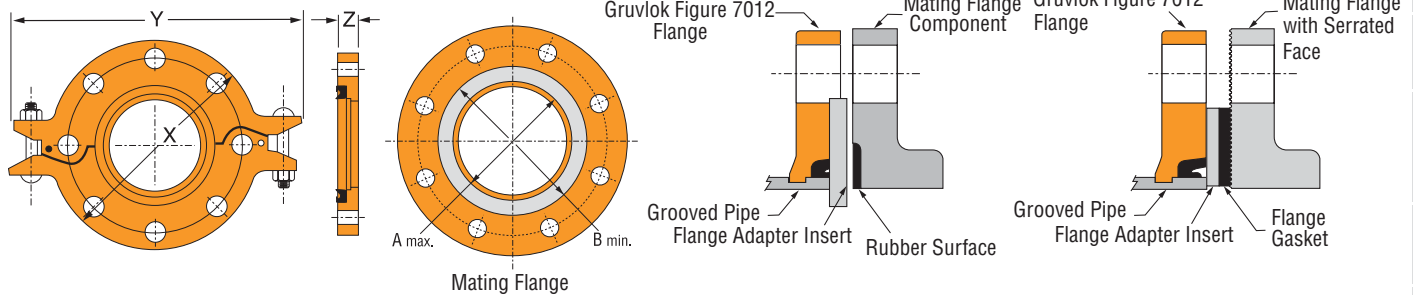
Gruvlok Flange adapter insert required when mating to rubber surfaces or serrated faced mating flanges.

Mating flange bolts must be at least Intermediate Strength Bolting per ASME B16.5. Bolts with material properties equal or greater than SAE J429 Grade 5 are acceptable.

Refer to Gruvlok Products Catalog or Anvil's web site for more information on installing this flange.

For additional details, see coupling data chart notes from page 16.

See Installation & Assembly directions on page 159-161.



- The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.
- Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- Gruvlok Flanges should not be used as anchor points for tie-rods across non-restrained joints.
- Fig. 7012 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Phenolic Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- Gruvlok Flanges are not recommended for use against formed rubber flanges.
- An additional bolt is recommended for the hinge side of the 2" - 8" Figure 7012 when connecting to lug valves.
- Contact Gruvlok for Di-Electric Flange connections.

APPLICATIONS WHICH REQUIRE A GRUVLOK FLANGE ADAPTER INSERT:

- When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
- When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
- When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
- When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

ADVANCED COPPER METHOD FITTINGS

Gruvlok Advanced Copper Method Fittings are wrought fittings, per ASTM B75 and ANSI B16.22 alloy C12200 copper, full flow design with ends grooved to Gruvlok Copper- Prep Specifications. Installation is quick and easy with Gruvlok Fig. 7400 Rigidlite Coupling or Fig. 7012 Gruvlok Flange.

GRUVLOK ADVANCED COPPER METHOD NOTES:

- 1) The Gruvlok Advanced Copper Method has been designed and tested for use only with the Fig. 7400 Rigidlite Coupling and Fig. 7012 Gruvlok Flange. Use of couplings or flanges from other manufacturers is not recommended.
- 2) To provide dielectric protection, a dielectric component is recommended for connection into the pipeline at the transition point between the steel pipe and copper tube.

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok Fittings are identified by either the Nominal size in inches or the Pipe O.D. in mm.

Temperature Range: -40°F to 190°F (-40°C to 88°C)

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
1 25	1.315 33.7	3 80	3.500 88.9
1¼ 32	1.660 42.4	4 100	4.500 114.3
1½ 40	1.900 48.3	5 140	5.563 141.3
2 50	2.375 60.3	6 150	6.625 168.3
2½ 65	2.875 73.0	8 200	8.625 219.1



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FIG. 7550

90° Elbow

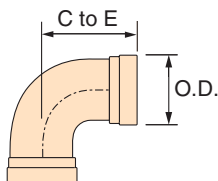


FIGURE 7550 90° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	3¼ 83	0.9 0.4
2½ 65	2.875 73.0	3¾ 95	1.5 0.7
3 80	3.500 88.9	4¼ 108	2.4 1.1
4 100	4.500 114.3	5 127	5.5 2.5
5 125	5.563 141.3	5½ 140	9.3 4.2
6 150	6.625 168.3	6½ 165	17.6 8.0
8 200	8.625 219.1	12 305	29.4 13.3

8" fittings are copper coated stainless steel. See chart above for O.D.

FIG. 7551

45° Elbow

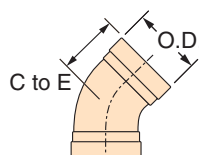


FIGURE 7551 45° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	2⅞ 54	0.6 0.3
2½ 65	2.875 73.0	2¾ 60	1.1 0.5
3 80	3.500 88.9	2¾ 67	1.6 0.7
4 100	4.500 114.3	3⅝ 86	3.5 1.6
5 125	5.563 141.3	3¾ 83	6.1 2.8
6 150	6.625 168.3	3½ 89	11.7 5.3
8 200	8.625 219.1	7½ 191	19.4 8.8

8" fittings are copper coated stainless steel. See chart above for O.D.

FIG. 7560

Tees

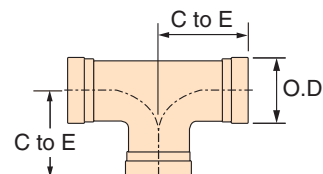


FIGURE 7560 TEES			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	3¼ 83	1.7 0.8
2½ 65	2.875 73.0	3¾ 95	2.5 1.1
3 80	3.500 88.9	4¼ 108	3.5 1.6
4 100	4.500 114.3	5 127	7.3 3.3
5 125	5.563 141.3	5½ 140	7.9 3.6
6 150	6.625 168.3	6½ 165	13.4 6.1
8 200	8.625 219.1	7¾ 197	41.7 18.9

8" fittings are copper coated stainless steel. See chart above for O.D.

ADVANCED COPPER METHOD FITTINGS



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FIG. 7572 - (Gr x Gr) Concentric Reducer

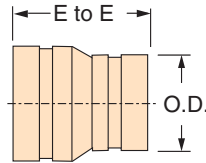


FIGURE 7572 (GR X GR) CONCENTRIC REDUCER					
Nom. Size	End to End	Approx. Wt. Ea.	Nom. Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
2½ x 2	3¼	0.6	5 x 3	5½	2.8
65 x 50	83	0.3	125 x 80	140	1.3
3 x 2	3⅝	1.0	5 x 4	5⅝	3.3
80 x 50	98	0.5	125 x 100	143	1.5
3 x 2½	3⅝	0.9	6 x 3	6½	4.9
80 x 65	92	0.4	150 x 80	165	2.2
4 x 2	5	2.2	6 x 4	6½	4.8
100 x 50	127	1.0	150 x 100	165	2.2
4 x 2½	4¾	2.0	6 x 5	6½	5.2
100 x 65	121	0.9	150 x 125	165	2.4
4 x 3	4¾	2.0			
100 x 80	121	0.9			

8" fittings fabricated upon request.
See chart on previous page for O.D.
Contact your Gruvlok Representative for more information.

FIG. 7574 - End Caps

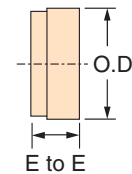


FIGURE 7574 END CAPS			
Nom. Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	1¼	0.3
50	60.3	32	0.1
2½	2.875	1¼	0.4
65	73.0	32	0.2
3	3.500	1¼	0.6
80	88.9	32	0.3
4	4.500	1¼	1.0
100	114.3	32	0.5
5	5.563	1¼	2.2
125	141.3	32	1.0
6	6.625	1¼	2.8
150	168.3	32	1.3
8	8.625	4	11.0
200	219.1	203	5.0

8" fittings are copper coated stainless steel.
See chart on previous page for O.D.

FIG. 7561A

(Gr x Gr x Gr) Reducing Tee

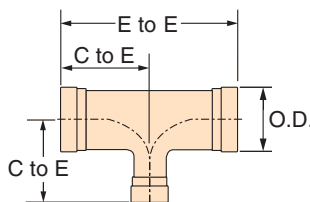


FIGURE 7561A (GR X GR X GR) REDUCING TEE							
Nom. Size	Center to End	End to End	Approx. Wt. Ea.	Nom. Size	Center to End	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg	In./DN(mm)	In./mm	In./mm	Lbs./Kg
2½ x 2½ x 2	3¾	7½	1.8	6 x 6 x 3	6½	13	11.7
65 x 65 x 50	95	191	0.8	150 x 150 x 80	165	330	5.3
3 x 3 x 2	4¼	8½	2.7	6 x 6 x 4	6½	13	12.1
80 x 80 x 50	108	216	1.2	150 x 150 x 100	165	330	5.5
3 x 3 x 2½	4¼	8½	2.1	6 x 6 x 5	6½	13	12.4
80 x 80 x 65	108	216	1.0	150 x 150 x 125	165	330	5.6
4 x 4 x 2	5	10	4.8	8 x 8 x 2½	7¾	15	18
100 x 100 x 50	127	254	2.2	200 x 200 x 65	197	381	8.2
4 x 4 x 2½	5	10	4.9	8 x 8 x 3	7¾	15	18.2
100 x 100 x 65	127	254	2.2	200 x 200 x 80	197	381	8.3
4 x 4 x 3	5	10	5.1	8 x 8 x 4	7¾	15	18.4
100 x 100 x 80	127	254	2.3	200 x 200 x 100	197	381	8.3
5 x 5 x 3	5½	11	7.5	8 x 8 x 5	7¾	15	18.8
125 x 125 x 80	140	279	3.4	200 x 200 x 125	197	381	8.5
5 x 5 x 4	5½	11	7.8	8 x 8 x 6	7¾	15	19
125 x 125 x 100	140	279	3.5	200 x 200 x 150	197	381	8.6
6 x 6 x 2½	6½	13	11.5				
150 x 150 x 65	165	330	5.2				

8" fittings are copper coated stainless steel.
See chart on previous page for O.D.

ADVANCED COPPER METHOD FITTINGS



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FIG. 7564A

(Gr x Gr x Cup) Reducing Tee

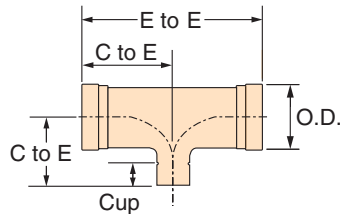


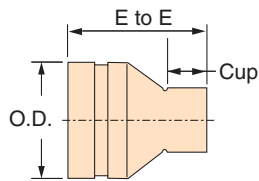
FIGURE 7564A (GR X GR X CUP) REDUCING TEE

Nominal Size	Center to End	End to End	Cup	Approx. Wt. Ea.	Nominal Size	Center to End	End to End	Cup	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 x 2 x 3/4 50 x 50 x 20	3/4 83	6 1/2 165	0.75 19	1.0 0.5	3 x 3 x 3/4 80 x 80 x 20	4 1/4 108	8 1/2 216	— —	2.5 1.1
2 x 2 x 1 50 x 50 x 25	3/4 83	6 1/2 165	0.91 23	1.0 0.5	3 x 3 x 1 80 x 80 x 25	4 1/4 108	8 1/2 216	0.91 23	2.5 1.1
2 x 2 x 1 1/4 50 x 50 x 32	3/4 83	6 1/2 165	0.97 25	1.1 0.5	3 x 3 x 1 1/4 80 x 80 x 32	4 1/4 108	8 1/2 216	0.97 25	2.5 1.1
2 x 2 x 1 1/2 50 x 50 x 40	3/4 83	6 1/2 165	1.09 28	1.1 0.5	3 x 3 x 1 1/2 80 x 80 x 40	4 1/4 108	8 1/2 216	1.09 28	2.6 1.2
2 1/2 x 2 1/2 x 3/4 65 x 65 x 80	3/4 95	7 1/2 191	— —	1.6 0.7	3 x 3 x 2 80 x 80 x 50	4 1/4 108	8 1/2 216	1.34 34	2.7 1.2
2 1/2 x 2 1/2 x 1 65 x 65 x 25	3/4 95	7 1/2 191	0.91 23	1.7 0.8	4 x 4 x 3/4 100 x 100 x 20	5 127	10 254	— —	4.5 2.0
2 1/2 x 2 1/2 x 1 1/4 65 x 65 x 32	3/4 95	7 1/2 191	0.97 25	1.7 0.8	4 x 4 x 1 100 x 100 x 25	5 127	10 254	0.91 23	4.6 2.1
2 1/2 x 2 1/2 x 1 1/2 65 x 65 x 40	3/4 95	7 1/2 191	1.09 28	1.7 0.8	4 x 4 x 1 1/4 100 x 100 x 32	5 127	10 254	0.97 25	4.7 2.1
2 1/2 x 2 1/2 x 2 65 x 65 x 50	3/4 95	7 1/2 191	1.34 34	1.8 0.8	4 x 4 x 1 1/2 100 x 100 x 40	5 127	10 254	1.09 28	4.7 2.1
					4 x 4 x 2 100 x 100 x 50	5 127	10 254	1.34 34	4.8 2.2

See chart on page 110 for O.D.

FIG. 7575

(Gr x Cup) Reducing Adapter



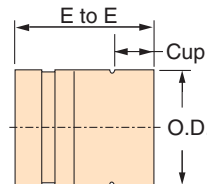
**FIGURE 7575
(GR x CUP) REDUCING ADAPTER**

Nominal Size	End to End	Cup	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 x 1 50 x 25	3 76	0.91 23	0.4 0.2
2 x 1 1/4 50 x 32	3 76	0.97 25	0.4 0.2
2 x 1 1/2 50 x 40	2 7/8 73	1.09 28	0.4 0.2
2 1/2 x 1 65 x 25	3 1/2 89	0.91 23	0.6 0.3
2 1/2 x 1 1/4 65 x 32	3 1/2 89	0.97 25	0.6 0.3
2 1/2 x 1 1/2 65 x 40	3 1/2 89	1.09 28	0.7 0.3
2 1/2 x 2 65 x 50	3 3/4 83	1.34 34	0.7 0.3
3 x 1 1/2 80 x 40	3 7/8 98	1.09 28	1.1 0.5
3 x 2 80 x 50	3 7/8 98	1.34 34	1.0 0.5
4 x 2 100 x 50	5 127	1.34 34	2.2 1.0

See chart on page 110 for O.D.

FIG. 7582

Transition Fitting



**FIGURE 7582
TRANSITION FITTING**

Nominal Size	O.D.	End to End	Cup	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	2 3/4 70	1 3/8 35	0.4 0.2
2 1/2 65	2.875 73.0	3 76	1 1/2 38	0.6 0.3
3 80	3.500 88.9	3 7/16 87	1 11/16 42	1.0 0.5
4 100	4.500 114.3	4 7/16 112	2 3/16 55	2.0 0.9
5 125	5.563 141.3	5 7/16 138	2 5/8 67	3.3 1.5
6 150	6.625 168.3	6 3/8 162	3 1/4 79	5.3 2.4

See chart on page 110 for O.D.

SERIES 7500B

Grooved-End Bronze Ball Valve



SERIES 7500B
with Stem Extension Kit

SERIES 7500B

The Gruvlok® 7500B Cast Bronze Ball Valve is the ONLY grooved-end ball valve on the market for copper systems. Available in Full Port Configurations in sizes 1 1/2" through 3" and with a streamlined port in the 4" version, the 7500B fits a wide range of applications from commercial plumbing and industrial applications, to oilfield and mining.

Durable temperature resistant virgin PTFE seats and a solid 316 stainless steel ball and stem in combination with Gruvlok End configurations, make the 7500B among the most specifiable valves in the industry.

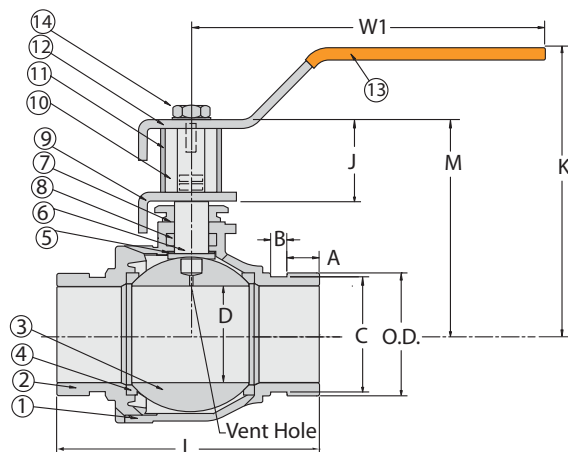
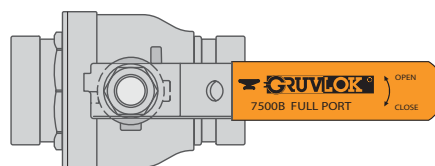
HOW TO ORDER: Specify size and figure number
(example: 2" GC-7500B)

FEATURES

- For use in grooved-end pipe systems 1 1/2" to 4"
- 300 psi bubble tight shutoff
- 190° F (88° C) operating temperature
- Low torque operation
- Superior flow – Full port 1 1/2" to 3", Standard port 4"
- Solid 316 stainless steel ball and stem
- Vented ball
- Virgin PTFE seats
- Adjustable packing gland
- Additional options available –
locking device, memory stop, oval handle style and stem extension
- Suitable for HVAC applications
- End-of-line service capabilities
- MSS-SP-110

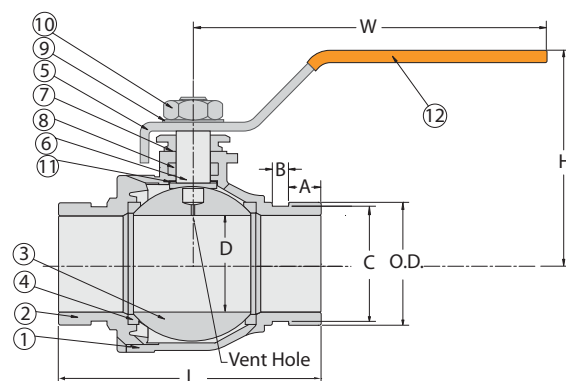
SERIES 7500B

Grooved-End Bronze Ball Valve - Full Port



MATERIAL SPECIFICATIONS

1. BODY: Bronze ASTM B 584 C92200 Lead Washed
2. END PLUG: Specially Treated Bronze ASTM B 584 C92200
3. BALL: Stainless Steel - Type 316
4. BALL SEAT (2): PTFE
5. THRUST WASHER: PTFE
6. STEM: Stainless Steel - Type 316
7. PACKING NUT: Brass ASTM B 16 C36000
8. STEM PACKING: PTFE
9. PLATE: Steel-Zinc Plated
10. HEXAGONAL SLOT: Brass ASTM B 16 C36000
11. BUSHING: Brass ASTM B 16 C36000
12. HANDLE: Steel-Zinc Plated
13. HANDLE SLEEVE: Vinyl
14. SCREW: Steel-Zinc Plated



MATERIAL SPECIFICATIONS

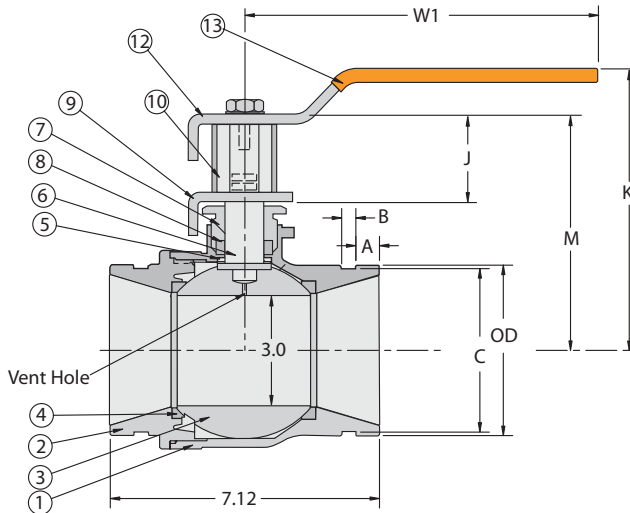
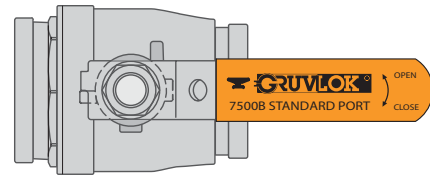
1. BODY: Bronze C92200 Lead Washed
2. END PLUG: Specially Treated Bronze ASTM B 584 C92200
3. BALL: Stainless Steel - Type 316
4. BALL SEAT (2): Virgin PTFE
5. HANDLE: Steel-Zinc Plated, ASTM A 228
6. STEM: Stainless Steel - Type 316
7. PACKING NUT: Brass ASTM B 16 C36000
8. STEM PACKING: PTFE
9. SPRING WASHER: Stainless Steel - Type 304
10. HANDLE NUT: Stainless Steel - Type 304
11. THRUST WASHER: Carbon RPTFE
12. HANDLE SLEEVE: Vinyl

SERIES 7500B FULL PORT - DIMENSIONS

Nominal Size	O.D.	A	B	C	D	H	J	K	L	M	W	W1
In./DN(mm)	In./mm											
1½ 40	1.910 48.5	⅝ 16.0	⅝ ₁₆ 7.9	1¼ 45.1	1½ 38.1	2⅛ ₁₆ 67.8	2¼ 57.1	4¾ 120.9	4¼ 108.0	3⅝ 91.4	5⅝ 129.8	6⅝ ₁₆ 159.8
	1.888 48.0											
2 50	2.375 60.3	⅝ 16.0	⅝ ₁₆ 7.9	2¼ 57.2	2 50.8	3⅝ ₁₆ 90.9	2¼ 57.1	5⅛ ₁₆ 144.0	5⅛ ₁₆ 128.5	4½ 114.6	6.29 159.8	6⅝ ₁₆ 159.8
	2.365 60.1											
2½ 65	2.876 73.1	⅝ 16.0	⅝ ₁₆ 7.9	2⅛ ₁₆ 69.1	2½ 63.5	4⅝ ₁₆ 126.0	2¼ 57.1	7⅛ ₁₆ 179.1	6⅝ 155.4	5¾ 146.6	9¼ 235.0	9¼ 235.0
	2.870 72.9											
3 80	3.500 88.9	⅝ 16.0	⅝ ₁₆ 7.9	3⅝ ₁₆ 84.9	3 76.2	5⅞ ₁₆ 137.2	2¼ 57.1	7½ 190.5	7 177.8	6¼ 159.5	9¼ 235.0	9¼ 235.0
	3.490 88.6											

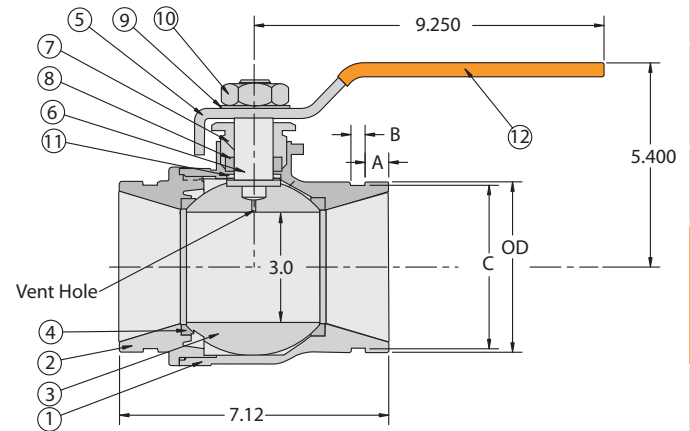
SERIES 7500B

Grooved-End Bronze Ball Valve - **Standard Port 4"**



MATERIAL SPECIFICATIONS

1. BODY: Bronze ASTM B 584 C92200 Lead Washed
2. END PLUG: Specially Treated Bronze ASTM B 584 C92200
3. BALL: Stainless Steel - Type 316
4. BALL SEAT (2): PTFE
5. THRUST WASHER: PTFE
6. STEM: Stainless Steel - Type 316
7. PACKING NUT: Brass ASTM B 16 C36000
8. STEM PACKING: PTFE
9. PLATE: Steel-Zinc Plated
10. HEXAGONAL SLOT: Brass ASTM B 16 C36000
11. BUSHING: Brass ASTM B 16 C36000
12. HANDLE: Steel-Zinc Plated
13. HANDLE SLEEVE: Vinyl
14. SCREW: Steel-Zinc Plated



MATERIAL SPECIFICATIONS

1. BODY: Specially Treated Bronze ASTM B 584 C92200
2. END PLUG: Specially Treated Bronze ASTM B 584 C92200
3. BALL: Stainless Steel - Type 316
4. BALL SEAT (2): Virgin PTFE
5. HANDLE: Steel-Zinc Plated, ASTM A 228
6. STEM: Stainless Steel - Type 316
7. PACKING NUT: Brass ASTM B 16 C36000
8. STEM PACKING: PTFE
9. SPRING WASHER: Stainless Steel - Type 304
10. HANDLE NUT: Stainless Steel - Type 304
11. THRUST WASHER: Carbon RPTFE
12. HANDLE SLEEVE: Vinyl

SERIES 7500B STANDARD PORT 4" - DIMENSIONS

Nominal Size	O.D.	A	B	C	J	K	L	M	W1
In./DN(mm)	In./mm								
4 100	4.545 115.4	5/8 16.0	3/8 9.5	4 1/16 109.5	2 1/4 57.1	7 1/2 190.5	7 1/8 180.8	6 1/4 159.5	9 1/4 235.0
	4.469 113.5								

GRUVLOK® CTS COPPER SYSTEM



The Gruvlok® CTS Copper System offers an installer of large diameter copper tubing an alternative to the conventional soldering and brazing.

This new grooved copper system is faster and easier to install. Temperature and weather conditions are no longer a factor when planning installations. There is no sweating or brazing as this system requires only a wrench for assembly on grooved end pipe.

The copper system is “flame-free”. Essentially you save time and enjoy a very reliable system that is both versatile and economical. Safety is a factor as there is no fire hazard, especially in a retrofit installation. The ease of assembly is a great benefit in new construction and ease of disassembly is ideal for renovation, retrofit or expansion.

BENEFITS

- Fast and easy to assemble.
- No flame, no sweat
- Each joint has a union.
- Provides rigidity
- Easily roll grooved
- Proven joint reliability
- Accepted and approved.
- Economical and reliable

FIG. 6400

Rigid Coupling

The Figure 6400 Rigid Coupling is specially designed to provide a rigid pipe connection to meet the specific demands of copper tubing installation size 2"-8". Fast and easy swing-over installation of the rugged lightweight housing produces a secure rigid pipe joint. Available with Grade "E" Copper EPDM flush gap style gasket. Gasket has service temperature range of -40°F to +230°F. NSF 61 Certified for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service.

MATERIAL SPECIFICATIONS

HOUSING:

Ductile iron conforming to ASTM A-536, Grade 65-54-12

COATINGS:

Rust inhibiting enamel paint — Color: Copper

For other coating requirements contact your Anvil Representative.

ANSI BOLTS AND HEAVY HEX NUTS:

Heat treated carbon steel oval neck bolts conforming to the physical properties of ASTM A 183 with a minimum tensile strength of 110,000 PSI. Bolts and nuts are provided zinc electroplated as standard.

GASKETS:

Grade "E" EPDM Flush Gap Gasket (Copper Color Code)

Service Temperature Range: -40°F to +230°F (-40°C to +110°C)

Recommended for water service, diluted acids, alkaline solutions, oil-free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

NSF 61 Certified for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service.

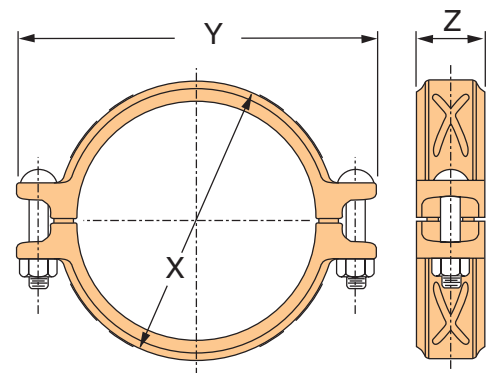


FIGURE 6400 RIGID COUPLING

Nominal Size	Copper Tube Diameter	Max Wk. Pressure	Max End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In.	In./mm	PSI/bar	Lbs./kN	In./mm	In./mm				In./mm	Lbs./Kg
2	2.125 54.0	300 20.7	1063 4.73	0 - 0.16 0 - 3.2	3.00 76	5.00 127	1.68 43	2	3/8 x 2 1/4	1.53 0.69
2 1/2	2.625 66.7	300 20.7	1623 7.22	0 - 0.16 0 - 3.2	3.50 89	5.50 140	1.68 43	2	3/8 x 2 1/4	1.78 0.81
3	3.125 79.4	300 20.7	2300 10.23	0 - 0.16 0 - 3.2	4.18 106	6.28 159	1.68 43	2	1/2 x 3	2.76 1.25
4	4.125 104.8	300 20.7	4007 17.82	0 - 0.17 0 - 4.2	5.20 132	7.50 191	1.70 43	2	1/2 x 3	3.27 1.48
5	5.125 130.2	300 20.7	6186 27.51	0 - 0.17 0 - 4.2	6.20 157	9.10 231	1.80 46	2	5/8 x 3 1/4	4.71 2.14
6	6.125 155.6	300 20.7	8835 39.30	0 - 0.17 0 - 4.2	7.20 183	10.20 259	1.80 46	2	5/8 x 3 1/4	5.24 2.38
8	8.125 206.4	300 20.7	15547 69.15	0 - 0.17 0 - 4.2	9.32 237	12.40 315	2.00 51	2	5/8 x 3 1/4	7.67 3.48

Pressure ratings and end loads are based on use with ASTM B88 Type K or L tubing. For pressure ratings on Type M and DWV, contact your Anvil Representative.
See Installation & Assembly directions on page 156.

CTS COPPER FITTINGS

CTS Copper Fittings are produced with groove and cup ends in a variety of fitting configurations. The fittings are constructed to ASTM B75 UNS C12200 with minimum copper content of 99.9%. Fitting pressure ratings match the ratings of the Figure 6400 Coupling.

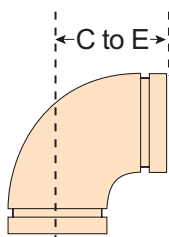


FIG. 6050

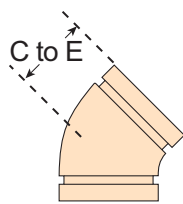


FIG. 6051

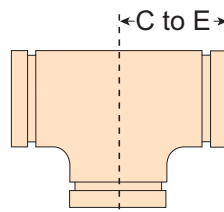


FIG. 6060

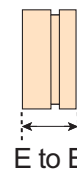


FIG. 6074

DIMENSIONS/WEIGHTS — ELBOWS, TEES & CAPS

Nominal Size	Copper Tube Diameter	Fig. 6050 90° Elbow		Fig. 6051 45° Elbow		Fig. 6060 Tee		Fig. 6074 Cap	
		C to E	Wt. Ea.	C to E	Wt. Ea.	C to E	Wt. Ea.	E to E	Wt. Ea.
<i>In.</i>	<i>In./mm</i>	<i>In./mm</i>	<i>Lbs./kg</i>	<i>In./mm</i>	<i>Lbs./kg</i>	<i>In./mm</i>	<i>Lbs./kg</i>	<i>In./mm</i>	<i>Lbs./kg</i>
2	2.125 54.0	2.91 74	0.75 0.34	2.19 56	0.61 0.28	2.69 68	1.45 0.66	2.00 51	0.36 0.16
2½	2.625 66.7	3.31 84	1.15 0.52	2.31 59	0.89 0.40	3.20 81	2.37 1.07	2.00 51	0.50 0.23
3	3.125 79.4	3.81 97	1.88 0.85	2.59 66	1.38 0.63	3.52 89	3.38 1.53	2.00 51	0.69 0.31
4	4.125 104.8	4.75 121	4.07 1.85	3.19 81	2.99 1.36	4.25 108	5.77 2.62	2.00 51	1.15 0.52
5	5.125 130.2	5.94 151	6.94 3.15	3.25 83	4.00 1.81	5.94 151	12.84 5.82	2.75 70	1.81 0.82
6	6.125 155.6	6.94 176	11.12 5.04	3.63 92	6.16 2.79	6.94 176	21.00 9.52	3.13 80	2.68 1.22
8	8.125 206.4	7.75 197	21.81 9.89	4.25 108	13.66 6.20	7.75 197	21.81 9.89	— —	— —

REDUCING TEES

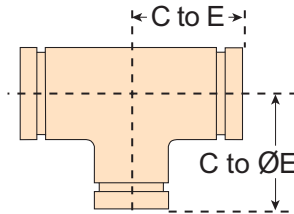


FIG. 6061

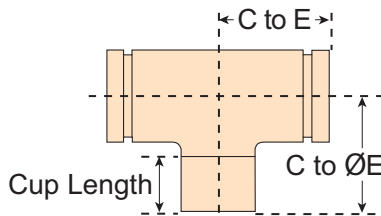


FIG. 6064

DIMENSIONS/WEIGHTS – REDUCING TEES

Nominal Size	Fig. 6061 Groove x Groove x Groove			Fig. 6064 Groove x Groove x Cup			
	C to E	C to ØE	Wt. Ea	C to E	C to ØE	Cup Length	Wt Ea.
In.	In./mm	In./mm	Lbs./kg	In./mm	In./mm	In./mm	Lbs./kg
2 x 2 x ¾	—	—	—	2.20 56	1.98 50	0.75 19	0.88 0.40
2 x 2 x 1	—	—	—	2.33 59	2.20 56	0.91 23	1.03 0.47
2 x 2 x 1¼	—	—	—	2.48 63	2.35 60	0.97 25	1.12 0.51
2 x 2 x 1½	—	—	—	2.55 65	2.28 58	1.09 28	1.25 0.57
2½ x 2½ x ¾	—	—	—	2.27 58	2.18 55	0.75 19	1.25 0.57
2½ x 2½ x 1	—	—	—	2.40 61	2.40 61	0.91 23	1.38 0.63
2½ x 2½ x 1¼	—	—	—	2.52 64	2.57 65	0.97 25	1.56 0.71
2½ x 2½ x 1½	—	—	—	2.70 69	2.68 68	1.09 28	1.88 0.85
2½ x 2½ x 2	3.28 83	3.38 86	2.54 1.15	—	—	—	—
3 x 3 x ¾	—	—	—	2.45 62	2.60 66	0.75 19	1.88 0.85
3 x 3 x 1	—	—	—	2.54 65	2.79 71	0.91 23	2.04 0.93
3 x 3 x 1¼	—	—	—	2.63 67	2.89 73	0.97 25	2.13 0.97
3 x 3 x 1½	—	—	—	2.85 72	3.00 76	1.09 28	2.25 1.02
3 x 3 x 2	3.00 76	3.38 86	2.90 1.32	—	—	—	—
3 x 3 x 2½	3.25 83	3.50 89	3.16 1.43	—	—	—	—
4 x 4 x ¾	—	—	—	2.95 75	3.00 76	0.75 19	3.63 1.65
4 x 4 x 1	—	—	—	3.10 79	3.22 82	0.91 23	3.94 1.79
4 x 4 x 1¼	—	—	—	3.25 83	3.47 88	0.97 25	4.24 1.92
4 x 4 x 1½	—	—	—	3.35 85	3.65 93	1.09 28	4.47 2.03
4 x 4 x 2	3.66 93	4.13 105	5.14 2.33	—	—	—	—
4 x 4 x 2½	3.94 100	4.06 103	5.36 2.43	—	—	—	—
4 x 4 x 3	4.19 106	4.16 106	5.88 2.67	—	—	—	—
5 x 5 x 3	3.75 95	4.63 118	7.45 3.38	—	—	—	—
5 x 5 x 4	4.25 108	4.56 116	8.13 3.69	—	—	—	—
6 x 6 x 2½	3.63 92	5.13 130	9.42 4.27	—	—	—	—
6 x 6 x 3	3.69 94	5.19 132	10.06 4.56	—	—	—	—
6 x 6 x 4	4.19 106	5.13 130	10.86 4.93	—	—	—	—
6 x 6 x 5	4.69 119	5.19 132	12.73 5.77	—	—	—	—

CONCENTRIC REDUCERS

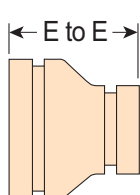


FIG. 6072

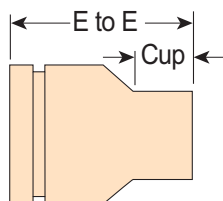


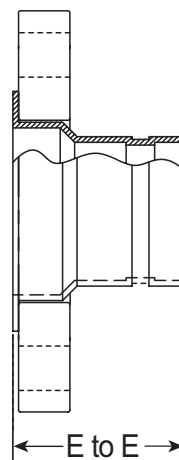
FIG. 6075

DIMENSIONS/WEIGHTS – REDUCERS

Nominal Size	Fig. 6072 Groove x Groove		Fig. 6075 Groove x Cup		
	E to E	Wt. Ea.	E to E	Cup Length	Wt Ea.
In.	In./mm	Lbs./kg	In./mm	In./mm	Lbs./kg
2 x 1	—	—	2.70 68.6	0.91 23.1	0.32 0.15
2 x 1¼	—	—	3.00 76.2	0.97 24.6	0.36 0.16
2 x 1½	—	—	2.94 74.7	1.09 27.7	0.38 0.17
2½ x 1	—	—	3.25 82.6	0.91 23.1	0.53 0.24
2½ x 1¼	—	—	3.52 89.4	0.97 24.6	0.59 0.27
2½ x 1½	—	—	3.45 87.6	1.09 27.7	0.59 0.27
2½ x 2	3.29 83.6	0.58 0.26	3.30 83.8	1.34 34.0	0.58 0.26
3 x 1½	—	—	3.68 93.5	1.09 27.7	0.84 0.38
3 x 2	2.50 63.5	0.58 0.26	4.10 104.1	1.34 34.0	0.97 0.44
3 x 2½	2.50 63.5	0.62 0.28	—	—	—
4 x 2	4.75 120.7	1.71 0.78	4.75 120.7	1.34 34.0	1.76 0.80
4 x 2½	3.00 76.2	1.12 0.51	—	—	—
4 x 3	3.00 76.2	1.22 0.55	—	—	—
5 x 3	3.88 98.6	2.11 0.96	—	—	—
5 x 4	3.38 85.9	1.97 0.89	—	—	—
6 x 3	4.38 111.3	2.96 1.34	—	—	—
6 x 4	3.88 98.6	2.87 1.30	—	—	—
6 x 5	3.38 85.9	2.78 1.26	—	—	—
8 x 6	5.00 127.0	6.60 2.99	—	—	—

FIG. 6084

Flange Adapter



The Gruvlok® Fig. 6084 Flange Adapter allows for direct connection of Class 125 or Class 150 flanged components to the CTS Copper System. The CTS Copper Flange Adapter (Sizes 2" thru 6") conform to ANSI class 125/150 bolt patterns and is rated at 300 PSIG (20.7 bar). The flange is powder coated with Nylon-11.

FIGURE 6084 FLANGE ADAPTER

Nominal Size	Copper Tube Diameter	E to E	Approx. Wt. Ea.
In.	In./mm	In./mm	Lbs./kg
2	2.125 54.0	3.0 76.2	0.85 0.39
2½	2.625 66.7	3.5 88.9	1.34 0.61
3	3.125 79.4	3.5 88.9	1.73 0.78
4	4.125 104.8	3.5 88.9	2.43 1.10
5	5.125 130.2	3.5 88.9	3.27 1.48
6	6.125 155.6	4.0 101.6	4.78 2.17

BUTTERFLY VALVE

The lever handle bronze body butterfly valve is designed for use with grooved copper tubing (CTS), fittings and couplings. This valve features a 10 position lever handle, bronze body and EPDM rubber encapsulated dual-seal disc. Both bronze valve body and the EPDM rubber disc obtained certification to ANSI/NSF 61 for use in potable water systems, and is rated to 300 PSI (20 bar).

MATERIAL SPECIFICATIONS

VALVE BODY:

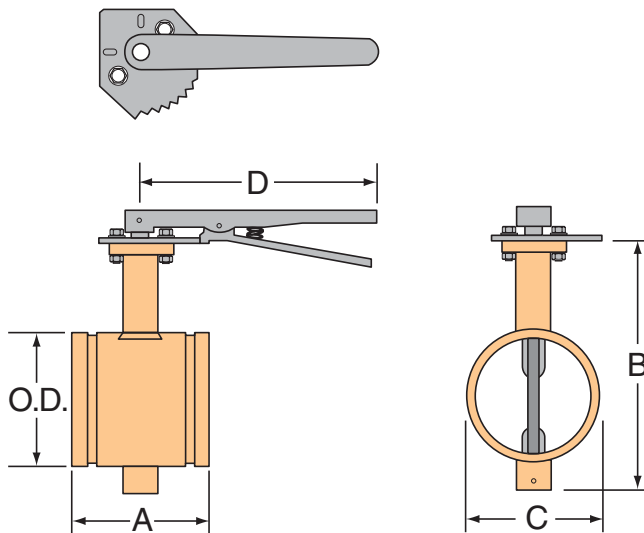
Bronze to ASTM B584 C90500 (88-10-0-2) certified to ANSI/NSF 61 for use in cold +86°F (+30°C) and hot +180°F (+82°C) potable water system.

DISC:

Ductile iron to ASTM A536 Gr. 65-45-12 encapsulated with EPDM.
Grade "E" EPDM: Service temperature range: -40°F to +230°F (-40°C to +110°C). Recommended for water service, diluted acids, alkaline solutions, and oil-free air.
NOT RECOMMENDED FOR USE IN PETROLEUM APPLICATIONS.

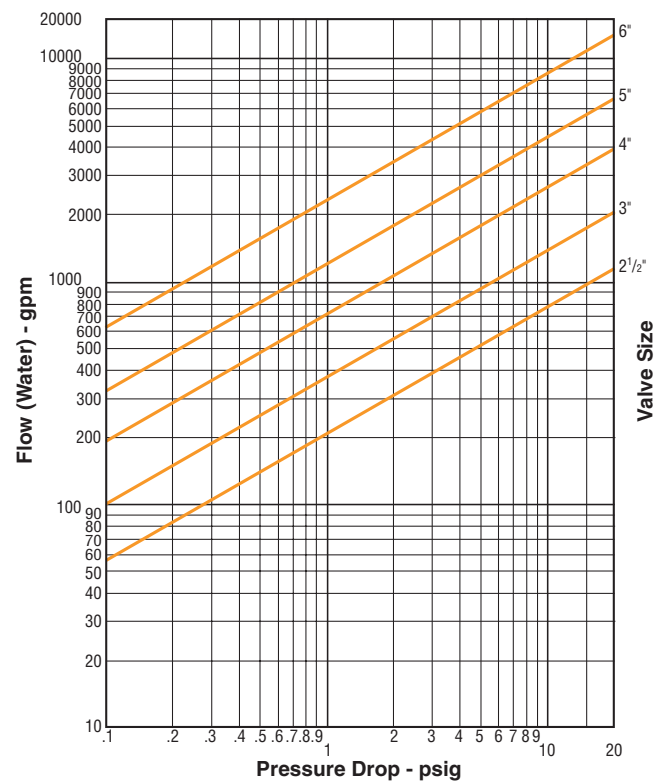
UPPER & LOWER SHAFTS:

Stainless Steel Type 416 of ASTM A582.



DIMENSIONS/WEIGHTS — BUTTERFLY VALVE

Nominal Size	Copper Tube Diameter	Dimensions				Weight
		A	B	C	D	
In.	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./kg
2½	2.625 66.7	3.77 96	6.23 158	2.76 70	10.8 274	5.90 2.68
3	3.125 79.4	3.77 96	6.74 171	3.13 80	10.8 274	6.60 2.99
4	4.125 104.8	4.63 118	8.60 218	4.10 104	10.8 274	11.00 4.99
5	5.125 130.2	5.27 134	10.22 260	5.10 130	10.8 274	17.60 7.98
6	6.125 155.6	5.27 134	11.10 282	6.12 155	10.8 274	21.60 9.80



Values for flow of water at +60°F (+16°C)

$$C_v = \frac{Q}{\sqrt{\Delta P}}$$

Where: C_v = Flow coefficient

Q = Flow (GPM)

ΔP = Pressure drop (psi)

BUTTERFLY VALVE TORQUE DATA

Nominal Size	Operating Torque	
	N-M	Lbs./Ft.
2½	12.5	9
3	18.0	13
4	43.0	32
5	62.0	46
6	72.0	53

NOTES

FIG. 7088, 7089 & 7090

Gruvlok DI-LOK® Nipple • Di-Electric Pipe Connection

The Gruvlok Fig. 7088, 7089 and 7090 DI-LOK Nipple inhibits the formation of a galvanic cell between steel pipe and copper tube at the transition from threaded or grooved-end steel pipe to a Gruvlok Advanced Copper Method pipe system. Patented Gruvlok Advanced Copper Method tube end preparation makes it possible to connect copper tube to steel pipe using a standard Gruvlok Figure 7400 Rigidlite Coupling or a Figure 7012 Gruvlok Flange; costly special adapter couplings are not needed. Gruvlok DI-LOK Nipples are easily installed between the copper tube and steel pipe in groove to groove or groove to thread configurations, producing a dielectric connection.

The separation of copper from steel by the DI-LOK Nipple virtually eliminates the galvanic cell created by the dissimilar metals. The Gruvlok Figure 7400 Rigidlite Coupling and Figure 7012 Gruvlok Flange provide tines which produce an electrical connection on the outside of the DI-LOK Nipple providing a means for transmission of stray current outside of the fluid media effectively eliminating acceleration of corrosion to the wetted metals.

The Gruvlok DI-LOK Nipple is manufactured from ASTM A 513 steel tube which provides tighter dimensional controls to that of steel pipe. The tube is zinc electroplated per ASTM B 633 which provides added corrosion resistance and produces an

attractive, easily identified appearance. Polypropylene molded into the steel tube creates a liner which meets the polypropylene tube lining requirements of ASTM F 492. The polypropylene serves as a dielectric insulator between the copper tube and the steel pipe.

The grooved-ends are cut grooved to standard Gruvlok groove dimensions, meeting the dimensional requirements of AWWA C606. The NPT threaded end of the DI-LOK Nipple is in conformance with ANSI B1.20.1.

The DI-LOK Nipple is designed for use at temperatures from -40°F to 230°F (-40°C to 110°C) and pressures to 300 PSIG (20.7 bar) in a wide range of applications.

MATERIAL SPECIFICATIONS

HOUSING: Steel Tube to ASTM A 513

LINER: Polypropylene to ASTM D 4140

INSTALLATION & ASSEMBLY: For installation and assembly of grooved-end connections, see "Fig. 7400 Gruvlok Rigidlite Coupling" and "Fig. 7012 Gruvlok Flange".



FIG. 7088 - Groove by Thread

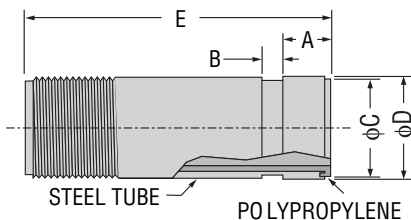


FIG. 7089 - Groove by Groove

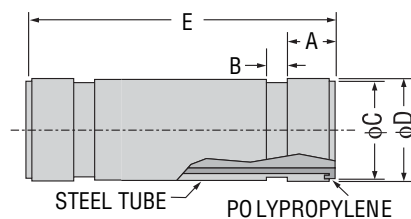


FIG. 7090 - Thread by Thread

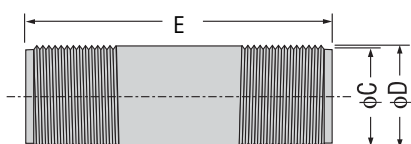


FIGURE 7088, 7089 & 7090 DI-LOK NIPPLES									
Nom. IPS Pipe Size	O.D.	A +/- .030 +/- .76	B +/- .030 +/- .76	C Actual	Tolerance +0.000	D Actual	Tolerance	E +/- .090 +/- 2.29	Approx. Wt. Ea.
NIPS/DN	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
3/4 19	1.050 26.7	n/a	n/a	7/8 22	n/a	1 1/16 26.7	+ .005/- .000 + .13/- .00	3.000 76	0.2 0.1
1 25	1.315 33.7	n/a	n/a	1 1/8 28	n/a	1 1/8 33.7	+ .005/- .000 + .13/- .00	4.000 102	0.4 0.2
1 1/4 32	1.660 42.4	n/a	n/a	1 1/2 37	n/a	1 1/8 42.4	+ .006/- .000 + .15/- .00	4.000 102	0.6 0.3
1 1/2 40	1.900 48.3	n/a	n/a	1 11/16 43	n/a	2 48.3	+ .006/- .000 + .15/- .00	4.000 102	0.8 0.4
2 50	2.375 60.3	5/8 15.88	5/8 7.92	2 1/4 57	-0.015 -0.37	2 3/8 60.3	+ .007/- .000 + .18/- .00	4.000 102	1.0 0.5
2 1/2 65	2.875 73.0	5/8 15.88	5/8 7.92	2 3/4 69	-0.018 -0.45	2 7/8 73.0	+ .008/- .000 + .20/- .00	6.000 152	1.6 0.7
3 80	3.500 88.9	5/8 15.88	5/8 7.92	3 3/8 85	-0.018 -0.45	3 1/2 88.9	+ .010/- .000 + .25/- .00	6.000 152	2.0 0.9
4 100	4.500 114.3	5/8 15.88	5/8 9.53	4 1/8 110	-0.020 -0.50	4 1/2 114.3	+ .013/- .000 + .33/- .00	6.000 152	4.5 2.0
5 125	5.563 141.3	5/8 15.88	5/8 9.53	5 3/8 137	-0.022 -0.55	5 1/2 141.3	± .010 ± .25	6.000 152	7.3 3.3
6 150	6.625 168.3	5/8 15.88	5/8 9.53	6 1/2 164	-0.022 -0.55	6 3/8 168.3	± .015 ± .38	6.000 152	9.5 4.3

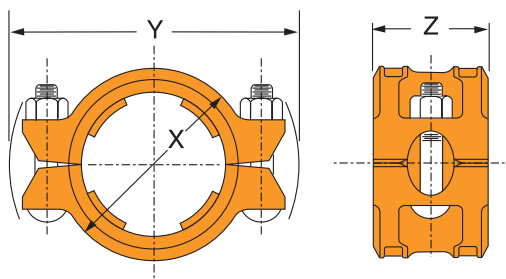
Figure 7088 available in Nominal Pipe Sizes 2" through 4" only.
Figure 7089 available in Nominal Pipe Sizes 2" through 6" only.
Figure 7090 available in Nominal Pipe Sizes 3/4" through 2" only.

FIG. 7005

Roughneck® Coupling



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.



The Fig. 7005 Roughneck Coupling is an effective and reliable way of joining plain-end or beveled end pipe. The Roughneck Coupling is ideal for use in a variety of applications including mining, process piping, manifold piping and oilfield services. The unique gripper action provides a positive pipe joint and allows for working pressure ratings up to 750 PSI (52 bar).

MATERIAL SPECIFICATIONS

HOUSING: Ductile Iron conforming to ASTM A 536, or Malleable Iron conforming to ASTM A 47, Grade 32510.

BOLT & NUTS: Heat treated, oval-neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

GRIPPERS: 2"-8" heat treated, electroplated carbon steel. 10"-16" heat treated stainless steel.

COATINGS: Rust inhibiting paint - Color: Orange Standard Hot dipped Zinc Galvanized (Optional) Other Colors Available (IE: RAL3000 and RAL9000). For other Coating requirements contact a Gruvlok Representative.

GASKET: Grade E (EPDM) or Grade T (Nitrile) Elastomers with properties as designed by ASTM D 2000 for each gasket grade.

FIGURE 7005 ROUGHNECK® COUPLING

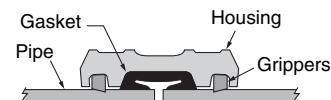
Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	No. of Grippers	Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN		In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m	Ft.-Lbs./N-m	Lbs./Kg
2	2.375	750	3,323	8	3 3/4	6 3/8	3 1/2	2	5/8 x 3 1/4	150	190	6.6
50	60.3	51.7	14.78		95	162	89		-	203	257	3.0
2 1/2	2.875	600	3,895	8	4 1/4	7 1/8	3 1/2	2	5/8 x 3 1/4	150	190	7.4
65	73.0	41.4	17.33		108	181	89		-	203	257	3.4
3	3.500	600	5,773	8	4 7/8	8 3/8	3 1/2	2	3/4 x 4 1/2	200	250	10.5
80	88.9	41.4	25.68		124	206	89		-	271	339	4.8
4	4.500	450	7,157	8	6 3/8	9 3/8	4 1/8	2	3/4 x 4 1/2	200	250	16.4
100	114.3	31.0	31.84		162	238	105		-	271	339	7.4
5	5.563	350	8,507	8	7 1/2	11 1/8	4 3/8	2	7/8 x 5	250	300	23.8
125	141.3	24.1	37.84		191	283	111		-	339	406	10.8
6	6.625	300	10,341	12	8 3/4	12 7/8	4 3/8	2	1 x 6	250	300	31.7
150	168.3	20.7	46.00		222	327	111		-	339	406	14.4
8	8.625	300	17,528	12	10 7/8	14 1/2	4 1/2	4	7/8 x 5	250	300	38.6
200	219.1	20.7	77.97		276	368	114		-	339	406	17.5
10	10.750	300	27,229	8	12 5/8	18	5 3/8	4	1 x 6 1/2	500	600	40
250	273.1	20.7	121.12		321	457	137		-	678	814	18.1
12	12.750	250	31,919	12	14 7/8	20 3/4	5 3/8	4	1 x 6 1/2	550	700	56
300	323.9	17.2	141.98		378	514	137		-	746	949	25.4
14	14.000	200	30,788	12	16 3/4	22 7/8	6 1/4	4	1 x 6 1/2	550	700	88
350	355.6	13.8	136.95		425	562	159		-	746	949	39.9
16	16.000	150	30,159	12	18 3/4	24	6 1/4	4	1 x 6 1/2	550	700	95
400	406.4	10.3	134.15		476	610	159		-	746	949	43.1

See Coupling data chart notes on page 16.

§ - For additional Bolt Torque information, see page 184.

Not for use in copper or PVC systems.

See Installation & Assembly directions on page 164.



Working pressure and end load are based on a properly assembled Roughneck coupling with bolts fully torqued to the above specifications, on plain-end or beveled standard wall steel pipe and Gruvlok Plain- End Fittings.

Roughneck Couplings are designed to be used on plain-end pipe and Gruvlok Plain-End Fittings only. For externally coated pipe applications, contact a Gruvlok Representative.

Not recommended for use on steel pipe with a hardness greater than 150 Brinell, plastic, HDPE, cast iron or other brittle pipe.

*Bolt torque ratings shown must be applied at installation.

GRUVLOK PLAIN-END FITTINGS

Gruvlok plain-end fittings are manufactured to provide minimum pressure drop and uniform flow. Fittings are designed for use with the Fig. 7005 Roughneck Couplings only.

Gruvlok plain-end fittings are available in sizes through 8" nominal pipe size in a variety of styles. Depending on size and configuration, fittings are either segment-welded steel or forged steel.

Fittings are normally coated with a rust inhibiting paint.

Other coatings including Hot Dipped Zinc Galvanizing, are available.

MATERIAL SPECIFICATIONS

SEGMENT WELDED STEEL FITTINGS:

Sizes 2" - 4" Carbon Steel pipe conforming to ASTM A 53, Type "F";

Sizes 5" - 8"; Carbon Steel pipe conforming to ASTM A 53, Type "E" or "S", Grade "B".

STEEL FITTINGS: Forged Steel conforming to ASTM A 106.

ADAPTER FLANGES:

Class 150 - Carbon Steel conforming to ANSI B16.5

Class 300 - Carbon Steel conforming to ANSI B16.5

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
2 50	2.375 60.3	4 100	4.500 114.3
2½ 65	2.875 73.0	5 140	5.563 141.3
3 80	3.500 88.9	6 150	6.625 168.3
3½ 90	4.000 101.6	8 200	8.625 219.1

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok® Fittings are identified by either the Nominal size in inches or the Pipe O.D. In./mm.

FIG. 7050P - 90° Elbow

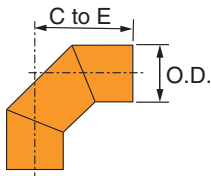


FIGURE 7050P 90° ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4¾ 121	2.7 1.2
2½ 65	2.875 73.0	5½ 140	4.8 2.2
3 80	3.500 88.9	6¼ 159	7.2 3.3
3½ 90	4.000 101.6	7 178	9.4 4.3
4 100	4.500 114.3	7¾ 197	12.3 5.6
5 125	5.563 141.3	9½ 241	13.4 6.1
6 150	6.625 168.3	11 279	31 14.1
8 200	8.625 219.1	11 279	38.7 17.6

FIG. 7051P - 45° Elbow

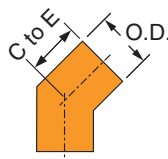


FIGURE 7051P 45° ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	3⅝ 79	2.0 0.9
2½ 65	2.875 73.0	3½ 89	3.5 1.6
3 80	3.500 88.9	3¾ 95	4.8 2.2
3½ 90	4.000 101.6	4 102	6.2 2.8
4 100	4.500 114.3	4¼ 108	8.0 3.6
5 125	5.563 141.3	5⅞ 130	9.2 4.2
6 150	6.625 168.3	5¾ 146	18.5 8.4
8 200	8.625 219.1	6 152	24.9 11.3

FIG. 7060P - Tee

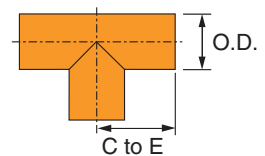


FIGURE 7060P TEE			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4¼ 108	3.5 1.6
2½ 65	2.875 73.0	4¾ 121	6.2 2.8
3 80	3.500 88.9	5⅞ 130	8.6 3.9
3½ 90	4.000 101.6	5½ 140	11 5.0
4 100	4.500 114.3	5⅞ 149	13.8 6.3
5 125	5.563 141.3	6⅞ 175	21.7 9.8
6 150	6.625 168.3	7⅞ 194	30.9 14.0
8 200	8.625 219.1	10 254	61.1 27.7

GRUVLOK PLAIN-END FITTINGS

FIG. 7068P - Cross

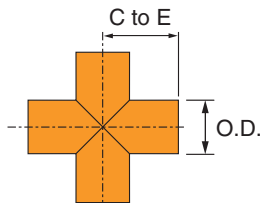


FIGURE 7068P - CROSS			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4 1/4 108	4.4 2.0
2 1/2 65	2.875 73.0	4 3/4 121	7.8 3.5
3 80	3.500 88.9	5 1/8 130	10.7 4.9
3 1/2 90	4.000 101.6	5 1/2 140	13.7 6.2
4 100	4.500 114.3	5 7/8 149	17 7.7
5 125	5.563 141.3	6 7/8 175	26.7 12.1
6 150	6.625 168.3	7 7/8 194	37.7 17.1
8 200	8.625 219.1	10 254	74.6 33.8

FIG. 7069P - 45° Lateral

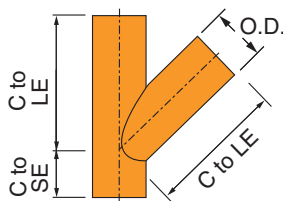


FIGURE 7069P - 45° LATERAL				
Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	7 1/4 184	2 3/4 70	5.1 2.3
2 1/2 65	2.875 73.0	7 3/4 197	3 76	9.5 4.3
3 80	3.500 88.9	8 3/4 222	3 3/4 83	12.8 5.8
3 1/2 90	4.000 101.6	10 254	3 1/2 89	20.0 9.1
4 100	4.500 114.3	10 3/4 273	3 3/4 95	22.2 10.1
5 125	5.563 141.3	12 3/4 324	4 102	38.0 17.2
6 150	6.625 168.3	14 356	4 1/2 114	54.0 24.5
8 200	8.625 219.1	18 457	6 152	92.0 41.7

FIG. 7071P - 90° True Wye

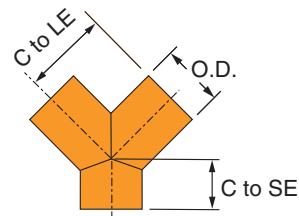


FIGURE 7071P - 90° TRUE WYE				
Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4 1/4 108	2 3/4 70	3.5 1.6
2 1/2 65	2.875 73.0	4 3/4 121	3 76	6.2 2.8
3 80	3.500 88.9	5 1/8 130	3 3/4 83	8.5 3.9
3 1/2 90	4.000 101.6	5 1/2 140	3 1/2 89	10.0 4.5
4 100	4.500 114.3	5 7/8 149	3 3/4 95	14.0 6.4
5 125	5.563 141.3	6 7/8 175	4 102	21.6 9.8
6 150	6.625 168.3	7 7/8 194	4 1/2 114	31.2 14.2
8 200	8.625 219.1	10 254	6 152	53.6 24.3

FIG. 7061P - Reducing Tee

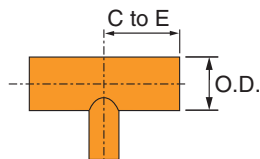


FIGURE 7061P REDUCING TEE					
Nominal Size	Center To End	Approx. Wt. Ea.	Nominal Size	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
3 x 3 x 2 80 x 80 x 50	5 1/2 140	7.1 3.2	8 x 8 x 4 200 x 200 x 100	10 254	46.0 20.9
4 x 4 x 2 100 x 100 x 50	5 7/8 149	11.3 5.1	8 x 8 x 5 200 x 200 x 125	10 254	48.0 21.8
4 x 4 x 2 1/2 100 x 100 x 65	5 7/8 149	11.6 5.3	8 x 8 x 6 200 x 200 x 150	10 254	50.0 22.7
4 x 4 x 3 100 x 100 x 80	5 7/8 149	11.9 5.4	10 x 10 x 4 250 x 250 x 100	11 1/2 292	74.0 33.6
6 x 6 x 2 150 x 150 x 50	7 7/8 194	24.6 11.2	10 x 10 x 6 250 x 250 x 150	11 1/2 292	78.0 35.4
6 x 6 x 3 150 x 150 x 80	7 7/8 194	25.4 11.5	10 x 10 x 8 250 x 250 x 200	11 1/2 292	86.0 39.0
6 x 6 x 4 150 x 150 x 100	7 7/8 194	26.2 11.9	12 x 12 x 6 300 x 300 x 150	13 1/2 343	112.0 50.8
8 x 8 x 2 200 x 200 x 50	10 254	42.0 19.1	12 x 12 x 8 300 x 300 x 200	13 1/2 343	118.0 53.5
8 x 8 x 3 200 x 200 x 80	10 254	44.0 20.0	12 x 12 x 10 300 x 300 x 250	13 1/2 343	130.0 59.0

FIG. 7050LRP - 90° LR Elbow

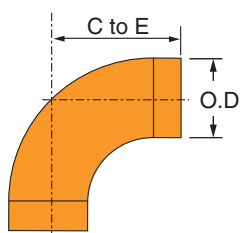


FIGURE 7050 LRP - 90° LR ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	5 127	2.5 1.1
2 1/2 65	2.875 73.0	5 3/4 146	4.9 2.2
3 80	3.500 88.9	6 1/2 165	6.5 2.9
3 1/2 90	4.000 101.6	7 1/4 184	9.8 4.4
4 100	4.500 114.3	8 203	11.5 5.2
5 125	5.563 141.3	9 3/4 248	21.5 9.8
6 150	6.625 168.3	11 1/4 286	28.5 12.9
8 200	8.625 219.1	15 381	56.7 25.7

GRUVLOK PLAIN-END FITTINGS

FIG. 7051LRP - 45° LR Elbow

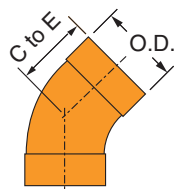


FIGURE 7051 LRP - 45° LR ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	3 ³ / ₈	1.8
50	60.3	86	0.8
2½	2.875	3 ³ / ₄	3.6
65	73.0	95	1.6
3	3.500	4	4.5
80	88.9	102	2.0
3½	4.000	4 ¹ / ₄	6.7
90	101.6	108	3.0
4	4.500	4 ¹ / ₂	7.5
100	114.3	114	3.4
5	5.563	5 ³ / ₈	13.8
125	141.3	137	6.3
6	6.625	6	17.3
150	168.3	152	7.8
8	8.625	8	34.0
200	219.1	203	15.4

FIG. 7075P - Bull Plug

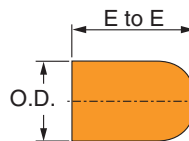


FIGURE 7075P - BULL PLUG			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	4	2.3
50	60.3	102	1.0
2½	2.875	5	3.0
65	73.0	127	1.4
3	3.500	6	4.5
80	88.9	152	2.0
3½	4.000	6½	5.5
90	101.6	165	2.5
4	4.500	7	7.5
100	114.3	178	3.4
5	5.563	8½	12.5
125	141.3	216	5.7
6	6.625	10	17.0
150	168.3	254	7.7
8	8.625	11	29.0
200	219.1	279	13.2

FIG. 7084P & FIG. 7085P

(Plain-End x Class 150 or 300) Flange Nipples

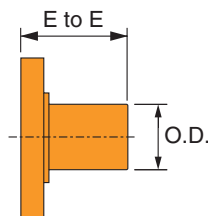


FIGURE 7084P PLAIN-END X CLASS 150 FLANGE NIPPLES			
Nominal Size	O.D.	End To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2	2.375	4	6.0
50	60.3	102	2.7
2½	2.875	4	9.2
65	73.0	102	4.2
3	3.500	4	10.4
80	88.9	102	4.7
3½	4.000	4	14.0
90	101.6	102	6.4
4	4.500	6	19.1
100	114.3	152	8.7
5	5.563	6	23.0
125	141.3	152	10.4
6	6.625	6	29.5
150	168.3	152	13.4
8	8.625	6	43.5
200	219.1	152	19.7

FIGURE 7085P PLAIN-END X CLASS 300 FLANGE NIPPLES	
End To End	Approx. Wt. Ea.
In./mm	Lbs./Kg
4	8.2
102	3.7
4	11.9
102	5.4
4	15.5
102	7.0
4	21.0
102	9.5
6	28.0
152	12.7
6	35.0
152	15.9
6	50.0
152	22.7
6	72.0
152	32.7

GRUVLOK PLAIN-END FITTINGS

ADAPTER NIPPLES

FIG. 7080P

Plain x Grooved

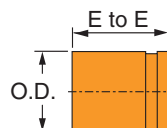


FIG. 7081P

Plain x Thread

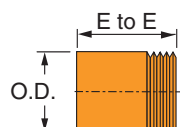
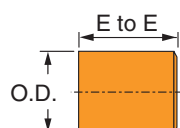


FIG. 7082P

Plain x Bevel



**FIGURE 7080P, 7081P, 7082P
ADAPTER NIPPLES**

Nominal Size	O.D.	End To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4 102	1.2 0.5
2½ 65	2.875 73.0	4 102	1.9 0.9
3 80	3.500 88.9	4 102	2.5 1.1
3½ 90	4.000 101.6	4 102	3.1 1.4
4 100	4.500 114.3	6 152	5.5 2.5
5 125	5.563 141.3	6 152	7.4 3.4
6 150	6.625 168.3	6 152	9.5 4.3
8 200	8.625 219.1	6 152	14.2 6.4

FIG. 7077P

Swaged Nipples

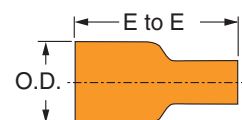


FIGURE 7077P SWAGED NIPPLES

Nominal Size	End Center To End	Approx. Wt. Ea.	Nominal Size	End Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
2½ x 2 65 x 50	7 178	3.0 1.4	6 x 2 150 x 50	12 305	17.0 7.7
3 x 2 80 x 50	8 203	4.5 2.0	6 x 2½ 150 x 65	12 305	17.0 7.7
3 x 2½ 80 x 65	8 203	4.5 2.0	6 x 3 150 x 80	12 305	17.0 7.7
4 x 2 100 x 50	9 229	7.5 3.4	6 x 4 150 x 100	12 305	17.0 7.7
4 x 2½ 100 x 65	9 229	7.5 3.4	6 x 5 150 x 125	12 305	17.0 7.7
4 x 3 100 x 80	9 229	7.5 3.4	8 x 3 200 x 80	13 330	29.0 13.2
5 x 2 125 x 50	11 279	11.5 5.2	8 x 4 200 x 100	13 330	29.0 13.2
5 x 3 125 x 80	11 279	11.5 5.2	8 x 5 200 x 125	13 330	29.0 13.2
5 x 4 125 x 100	11 279	11.5 5.2	8 x 6 200 x 150	13 330	29.0 13.2

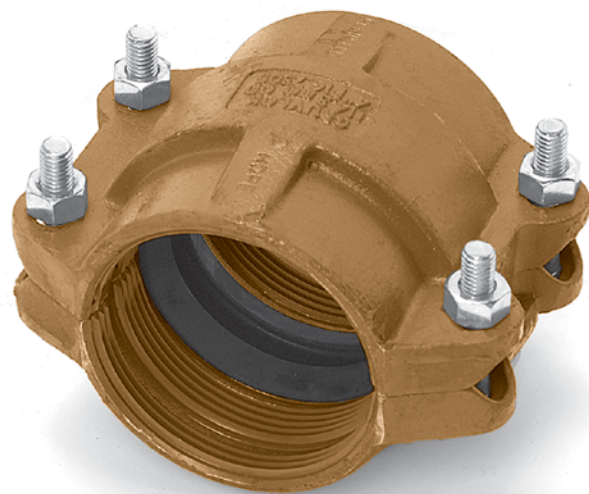
See chart on page 125 for O.D.

FIG. 7305

HDPE Coupling

The Gruvlok Figure 7305 couplings are designed for mechanically joining HDPE (high density polyethylene) pipe and fittings. Each coupling uses four bolts to drive the sharply machined housing teeth into the outside of the pipe. The teeth are arranged in two banks, each bank consisting of at least three rows of spiral teeth which effectively grip the pipe, providing a secure mechanical joint with pressure capabilities exceeding that of the HDPE pipe itself. The banks of teeth are positioned away from the gasket enhancing the sealing ability of the gasket throughout its operating temperature range.

The Figure 7305 features a low profile contoured housing with a ramp along the outside diameter allowing the coupling to glide over most obstacles, while long lengths of the pipeline are being relocated. This cost effective easy to assemble mechanical joint is used to join SDR 32.5 to 7.3 wall thickness HDPE pipe conforming to ASTM D 2447, D 3000, D 3035, or F 714 and eliminates the need for costly fusion equipment.



MATERIAL SPECIFICATIONS

HOUSING:

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

COATING:

Rust inhibiting paint – color: orange

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated carbon steel heavy hex nuts conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)

Service Temperature Range: -30°F to 230°F (-34°C to 110°C).

Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)

Service Temperature Range: -20°F to 180°F (-29°C to 82°C).

Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.

NOT FOR USE WITH HOT WATER OR HOT AIR.

For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7305

HDPE Coupling

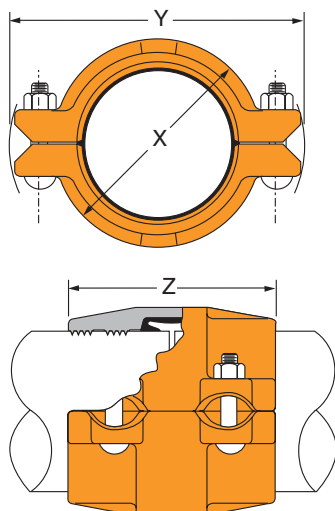


FIGURE 7305 HDPE COUPLING

Nominal Size	O.D.	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
		X	Y	Z	Qty.	Size	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm		In.	Lbs./Kg
2 50	2.375 60.3	3 $\frac{3}{8}$ 86	5 $\frac{1}{2}$ 140	4 $\frac{5}{8}$ 117	4	1 $\frac{1}{2}$ x 2 $\frac{3}{8}$ -	4.5 2.0
3 80	3.500 88.9	4 $\frac{5}{8}$ 117	6 $\frac{3}{4}$ 171	4 $\frac{5}{8}$ 117	4	1 $\frac{1}{2}$ x 3 -	8.5 3.9
4 100	4.500 114.3	5 $\frac{1}{4}$ 133	8 203	5 $\frac{3}{4}$ 146	4	1 $\frac{1}{2}$ x 3 -	12 5.4
6 150	6.625 168.3	7 $\frac{1}{2}$ 191	11 279	5 $\frac{7}{8}$ 149	4	5 $\frac{16}{16}$ x 3 $\frac{1}{2}$ -	18 8.2
8 200	8.625 219.1	10 254	13 $\frac{1}{4}$ 337	6 152	4	5 $\frac{16}{16}$ x 3 $\frac{1}{2}$ -	30 13.6
10 250	10.750 273.1	12 305	15 $\frac{3}{4}$ 400	6 $\frac{1}{2}$ 165	4	3 $\frac{3}{4}$ x 4 $\frac{3}{4}$ -	43 19.5
12 300	12.750 323.9	14 $\frac{3}{8}$ 365	17 $\frac{7}{8}$ 454	7 $\frac{1}{4}$ 184	4	3 $\frac{3}{4}$ x 4 $\frac{3}{4}$ -	58 26.3

HDPE PIPE DIMENSIONAL SPECIFICATIONS

Nominal Size	O.D. Actual	Tolerance +/-	Out Of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
2 50	2.375 60.3	0.006 0.15	0.035 0.89	0.325 8.3	0.264 6.7	0.216 5.5	0.153 3.9	0.140 3.6	0.113 2.9	-
3 80	3.500 88.9	0.016 0.41	0.040 1.02	0.479 12.2	0.389 9.9	0.318 8.1	0.226 5.7	0.206 5.2	0.167 4.2	0.108 2.7
4 100	4.500 114.3	0.020 0.51	0.040 1.02	0.616 15.6	0.500 12.7	0.409 10.4	0.290 7.4	0.265 6.7	0.214 5.4	0.138 3.5
6 150	6.625 168.3	0.030 0.76	0.050 1.27	0.908 23.1	0.736 18.7	0.602 15.3	0.427 10.8	0.327 8.3	0.265 6.7	0.204 5.2
8 200	8.625 219.1	0.039 0.99	0.075 1.91	1.182 30.0	0.958 24.3	0.784 19.9	0.556 14.1	0.507 12.9	0.340 8.6	0.265 6.7
10 250	10.750 273.1	0.048 1.22	0.075 1.91	1.473 37.4	1.194 30.3	0.977 24.8	0.694 17.6	0.632 16.1	0.512 13.0	0.331 8.4
12 300	12.750 323.9	0.057 1.45	0.075 1.91	1.747 44.4	1.417 36.0	1.159 29.4	0.823 20.9	0.750 19.1	0.607 15.4	0.392 10.0

1. Per ASTM F 714

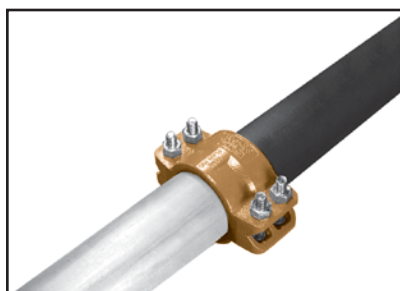
2. Per ASTM D 2447 and D 3035

See Installation & Assembly directions on page 165.

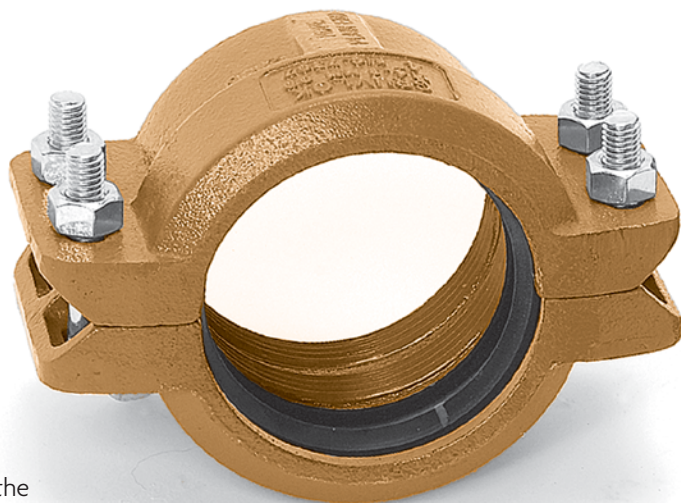
FIG. 7307

HDPE Transition Coupling

The Gruvlok Figure 7307 HDPE transition coupling allows for transition from HDPE pipe or fittings to grooved-end pipe prepared per Gruvlok standard cut or roll groove specifications for steel pipe or Gruvlok fittings. The Figure 7307 incorporates two banks of machined teeth on one side of the housing, and a key section on the other, that engages specifically grooved steel pipe or fittings. The banks of teeth are positioned away from the gasket enhancing the sealing ability of the gasket. The temperature and pressure capabilities of the Figure 7307 exceed the highest temperature and pressure ratings of the HDPE pipe.



The Figure 7307 features a low profile contoured housing with a ramp along the outside diameter on the half of the HDPE coupling. This easy to assemble mechanical joint is used to join HDPE pipe (conforming to ASTM D 2447, D 3000, D 3035, or F 714) to roll grooved or cut grooved standard weight and, roll grooved lightweight pipe, as well as with grooved-end fittings and valves. The coupling can be used with HDPE pipe having SDR values of 7.3 to 32.5.



MATERIAL SPECIFICATIONS

HOUSING:

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

COATING:

Rust inhibiting paint – color: orange

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated carbon steel heavy hex nuts conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)

Service Temperature Range: -30°F to 230°F (-34°C to 110°C).

Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)

Service Temperature Range: -20°F to 180°F (-29°C to 82°C).

Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.

NOT FOR USE WITH HOT WATER OR HOT AIR.

For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7307

HDPE Transition Coupling

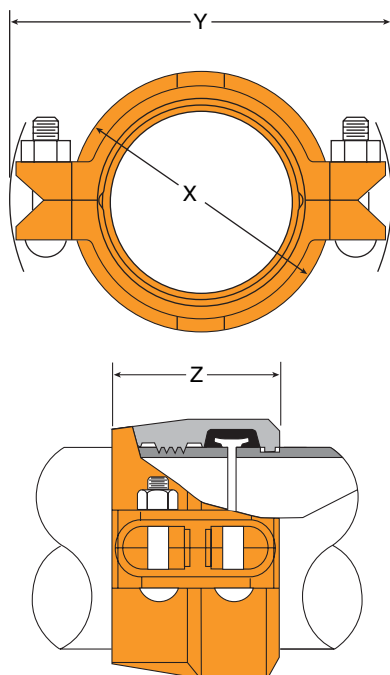


FIGURE 7307 HDPE TRANSITION COUPLING

Nominal Size	O.D. Actual	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
		X	Y	Z	Qty.	Size	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm		In./mm	Lbs./Kg
2 50	2.375 60.3	3 ³ / ₈ 86	6 152	3 ¹ / ₈ 79	4	1/2 x 2 ³ / ₈ -	4.5 2.0
3 80	3.500 88.9	4 ¹ / ₂ 114	7 ¹ / ₈ 181	3 ¹ / ₈ 79	4	1/2 x 3 -	6 2.7
4 100	4.500 114.3	5 ³ / ₄ 146	8 ¹ / ₂ 216	3 ³ / ₄ 95	4	1/2 x 3 -	8.5 3.9
6 150	6.625 168.3	8 203	11 ¹ / ₄ 286	3 ³ / ₄ 95	4	5/8 x 3 ¹ / ₂ -	12.5 5.7
8 200	8.625 219.1	10 ¹ / ₂ 267	13 ³ / ₈ 346	4 ¹ / ₄ 108	4	5/8 x 3 ¹ / ₂ -	20.5 9.3
10 250	10.750 273.1	12 ³ / ₈ 321	17 432	5 127	4	7/8 x 5 ¹ / ₂ -	34.5 15.6
12 300	12.750 323.9	14 ³ / ₄ 375	19 ¹ / ₂ 495	5 127	4	7/8 x 5 ¹ / ₂ -	42.5 19.3

HDPE PIPE DIMENSIONAL SPECIFICATIONS

Nominal Size	O.D. Actual	Tolerance +/-	Out of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
2 50	2.375 60.3	0.006 0.15	0.035 0.89	0.325 8.3	0.264 6.7	0.216 5.5	0.153 3.9	0.140 3.6	0.113 2.9	-
3 80	3.500 88.9	0.016 0.41	0.040 1.02	0.479 12.2	0.389 9.9	0.318 8.1	0.226 5.7	0.206 5.2	0.167 4.2	0.108 2.7
4 100	4.500 114.3	0.020 0.51	0.040 1.02	0.616 15.6	0.500 12.7	0.409 10.4	0.290 7.4	0.265 6.7	0.214 5.4	0.138 3.5
6 150	6.625 168.3	0.030 0.76	0.050 1.27	0.908 23.1	0.736 18.7	0.602 15.3	0.427 10.8	0.327 8.3	0.265 6.7	0.204 5.2
8 200	8.625 219.1	0.039 0.99	0.075 1.91	1.182 30.0	0.958 24.3	0.784 19.9	0.556 14.1	0.507 12.9	0.340 8.6	0.265 6.7
10 250	10.750 273.1	0.048 1.22	0.075 1.91	1.473 37.4	1.194 30.3	0.977 24.8	0.694 17.6	0.632 16.1	0.512 13.0	0.331 8.4
12 300	12.750 323.9	0.057 1.45	0.075 1.91	1.747 44.4	1.417 36.0	1.159 29.4	0.823 20.9	0.750 19.1	0.607 15.4	0.392 10.0

1. Per ASTM F 714

2. Per ASTM D 2447 and D 3035

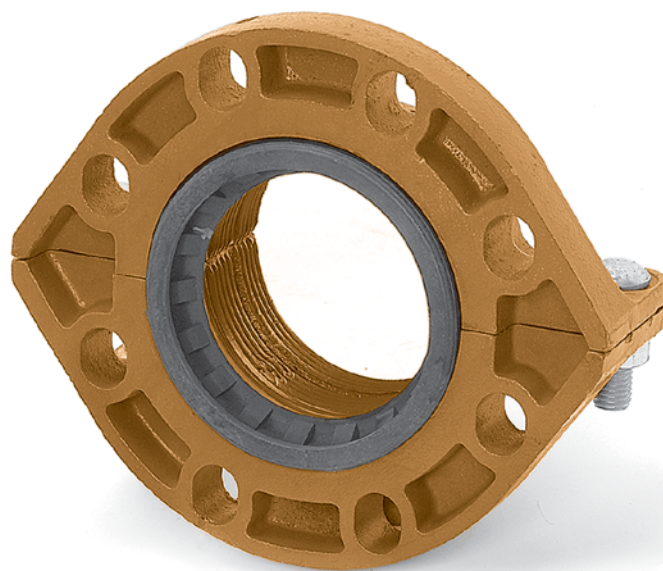
3. For steel pipe requirements refer to Gruvlok Groove Specifications for steel pipe.

See Installation & Assembly directions on page 166.

FIG. 7312

HDPE Flange Adapter

The Gruvlok® Figure 7312 forms a cost-effective, easy-to-assemble mechanical joint between HDPE (high density polyethylene) pipe and fittings and ANSI Class 125 or Class 150 piping components without the need for costly fusion equipment. The flanged couplings are designed for wall thickness' SDR 32.5 to 7.3 HDPE pipe and fittings conforming to ASTM D 2447, D 3000, D 3035, or F 174. Each coupling uses two bolts to drive the sharply machined housing teeth into the outside of the pipe. The teeth are arranged in two banks, each bank consisting of at least three rows of spiral teeth that effectively grip the pipe, providing a secure mechanical joint with pressure capabilities exceeding that of the HDPE pipe itself. The banks of teeth are positioned away from the gasket, enhancing the sealing ability of the gaskets throughout the entire operating temperature range.



MATERIAL SPECIFICATIONS

HOUSING:

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

COATING:

Rust inhibiting paint – color: orange

Other Colors Available (IE: RAL3000 and RAL9000)

For other Coating requirements contact a Gruvlok Representative.

ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)

Service Temperature Range: -30°F to 230°F (-34°C to 110°C).

Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.

NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)

Service Temperature Range: -20°F to 180°F (-29°C to 82°C).

Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.

NOT FOR USE WITH HOT WATER OR HOT AIR.

For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7312

HDPE Flange Adapter

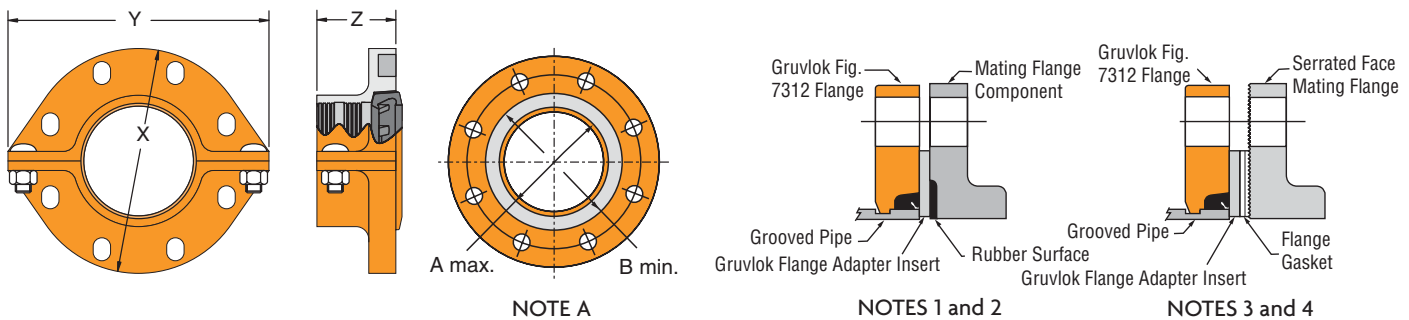


FIGURE 7312 HDPE FLANGE ADAPTER

Nominal Size	O.D.	Flange Dimensions			Sealing Surface		Latch Bolt		Mating Flange Bolts		Approx. Wt. Ea.
		X	Y	Z	A Max.	B Min.	Qty.	Size	Qty.	Size	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm		In./mm		In./mm	Lbs./Kg
4 100	4.500 114.3	9 229	10 ³ / ₈ 264	3 ¹ / ₈ 79	4 ¹ / ₂ 114	5 ³ / ₄ 146	2	5/8 x 1 ⁵ / ₈	8	5/8 x 3	15 6.8
6 150	6.625 168.3	11 ¹ / ₄ 286	12 ³ / ₈ 314	3 ¹ / ₈ 98	6 ¹ / ₈ 168	7 ³ / ₄ 197	2	5/8 x 1 ⁵ / ₈	8	3/4 x 3 ¹ / ₂	22 10.0
8 200	8.625 219.1	13 ¹ / ₂ 343	14 ¹ / ₄ 378	3 ¹ / ₂ 89	8 ¹ / ₈ 219	10 ¹ / ₄ 260	2	3/4 x 2	8	3/4 x 3 ¹ / ₂	26 12.7

- The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of gasket.
- Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- Gruvlok Flanges should not be used as anchor points for tierods across nonrestrained joints.
- Fig. 7312 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- Gruvlok Flanges are not recommended for use against formed rubber flanges.

HDPE PIPE DIMENSIONAL SPECIFICATIONS

Nominal Size	O.D. Actual	Tolerance +/-	Out of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
4 100	4.500 114.3	0.020 0.51	0.040 1.02	0.616 15.6	0.500 12.7	0.409 10.4	0.290 7.4	0.265 6.7	0.214 5.4	0.138 3.5
6 150	6.625 168.3	0.030 0.76	0.050 1.27	0.908 23.1	0.736 18.7	0.602 15.3	0.427 10.8	0.327 8.3	0.265 6.7	0.204 5.2
8 200	8.625 219.1	0.039 0.99	0.075 1.91	1.182 30.0	0.958 24.3	0.784 19.9	0.556 14.1	0.507 12.9	0.340 8.6	0.265 6.7

- Per ASTM F 714
 - Per ASTM D 2447 and D 3035
- See Installation & Assembly directions on page 167.

APPLICATIONS WHICH REQUIRE A GRUVLOK® FLANGE ADAPTER INSERT:

- When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok Flange.
- When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
- When mating to a serrated flange surface, a standard fullfaced flange gasket is installed against the serrated flange face, and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard flange gasket.
- When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

SOCK-IT® PIPING METHOD FITTINGS

The Gruvlok® Sock-It® Piping Method provides a quick, secure and reliable method of joining plain-end steel pipe. Several Sock-It configurations are available: tees with NPT outlets, reducing run tees with NPT outlets, straight couplings, 90 elbows, straight tees and reducing elbows. Pressure energized elastomeric gaskets provide the Sock-It with a leaktight seal. Specially designed lock bolts secure the pipe in the Sock-It Fitting, providing a fast, dependable way of joining small diameter plain-end pipe.

Working pressure ratings shown are for reference only and are based on schedule 40 pipe. For the latest UL/ULC Listed and FM approved pressure ratings versus pipe schedule see www.anvilintl.com or contact your local Gruvlok Sales Representative.

See Installation & Assembly directions on page 168.

MATERIAL SPECIFICATIONS

HOUSING: Cast iron ASTM A 126 CLASS A

BOLTS: Case hardened carbon steel, dichromate finish.

GASKETS: EPDM, as specified in accordance with ASTM D 2000



FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
1/2	0.840	1 1/2	1.900
15	21.3	40	48.3
3/4	1.050	2	2.375
20	26.7	50	60.3
1	1.315	2 1/2	2.875
25	33.7	65	73.0
1 1/4	1.660		
32	42.4		

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok Fittings are identified by either the Nominal size in inches or the Pipe O.D. in mm.



For Listings/Approval Details and Limitations, visit our website @ www.anvilintl.com or contact an Anvil/AnvilStar Sales Representative.

NOTE: All Sock-It® fittings are UL/ULC Listed and FM Approved for 175 psi working pressure when used to join XL Pipe and Dyna-Flow Pipe.

FIG. 7100 - 90° Elbow (Sock-It® x Sock-It®)

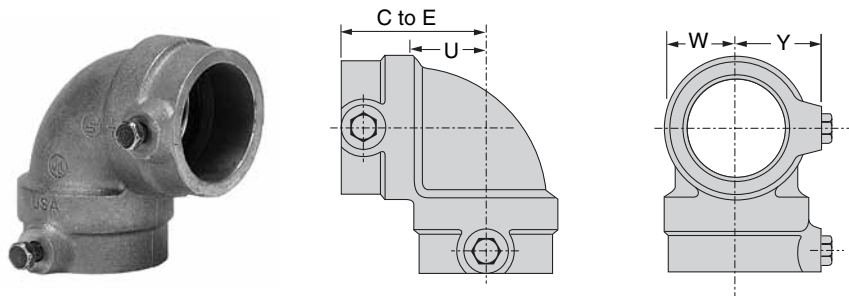
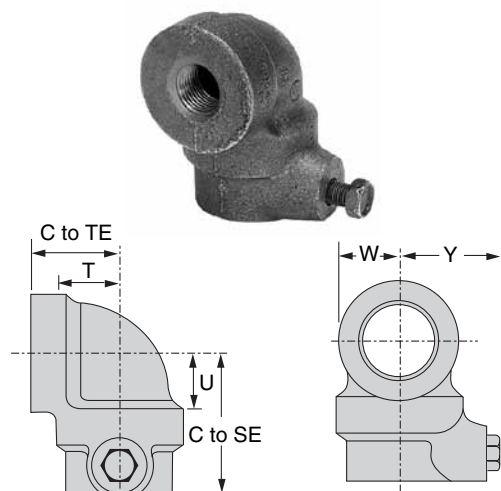


FIGURE 7100 SOCK-IT® ELBOW (S X S)								
Nominal Size	O.D.	Max. Working Pressure		Dimensions				Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	Center To End	U*	W	Y	
In./DN(mm)	In./mm	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1	1.315	300	300	2 5/16	7/8	1 1/16	1 3/4	1.9
25	33.7	20.7	20.7	59	22	27	44	0.9
1 1/4	1.660	300	300	2 7/16	1	1 1/4	1 13/16	2.3
32	42.4	20.7	20.7	62	25	32	46	1.0
1 1/2	1.900	300	300	2 9/16	1 1/8	1 3/8	1 15/16	2.7
40	48.3	20.7	20.7	67	29	35	49	1.2
2	2.375	175	250	3 1/4	1 1/16	1 7/8	2 1/16	4.0
50	60.3	12.1	17.2	83	40	41	56	1.8

* "U" - Run take-out dimension.

SOCK-IT® PIPING METHOD FITTINGS

FIG. 7101 - 90° Reducing Elbow (Sock-It® x NPT)



C to SE - Center to Sock-It® End
C to TE - Center to Thread End
* "U" - Take-out dimension, Sock-It® End.
** "T" - Take-out dimension, Thread End.

FIGURE 7101 SOCK-IT® REDUCING ELBOW (S X NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	Center to TE	Center To SE	U*	T**	W	Y	
In./DN(mm)	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1 x 1/2 25 x 15	300 20.7	300 20.7	1 1/16 37	2 5/16 59	7/8 22	1 25	1 1/16 27	1 1/16 43	1.7 0.8
1 x 3/4 25 x 20	300 20.7	300 20.7	1 1/16 37	2 5/16 59	7/8 22	1 25	1 1/16 27	1 1/16 43	1.6 0.7
1 x 1 25 x 25	300 20.7	300 20.7	1 1/16 37	2 5/16 59	7/8 22	1 25	1 1/16 27	1 1/16 43	1.5 0.7
1 1/4 x 1/2 32 x 15	300 20.7	300 20.7	1 9/16 40	2 1/2 64	1 1/16 17	1 1/8 29	1 1/4 32	1 3/16 46	2.2 1.0
1 1/4 x 3/4 32 x 20	300 20.7	300 20.7	1 9/16 40	2 1/2 64	1 1/16 17	1 25	1 1/4 32	1 3/16 46	2.1 1.0
1 1/4 x 1 32 x 25	300 20.7	300 20.7	1 9/16 40	2 1/2 64	1 1/16 17	1 25	1 1/4 32	1 3/16 46	2 0.9
1 1/2 x 1/2 40 x 15	300 20.7	300 20.7	1 11/16 43	2 1/2 64	1 25	1 1/4 32	1 3/8 35	1 5/16 49	2.5 1.1
1 1/2 x 3/4 40 x 20	300 20.7	300 20.7	1 11/16 43	2 1/2 64	1 25	1 1/8 29	1 3/8 35	1 5/16 49	2.4 1.1
1 1/2 x 1 40 x 25	300 20.7	300 20.7	1 11/16 43	2 1/2 64	1 25	1 1/8 29	1 3/8 35	1 5/16 49	2.3 1.0

FIG. 7103 - Straight Tee (Sock-It® x Sock-It® x Sock-It®)

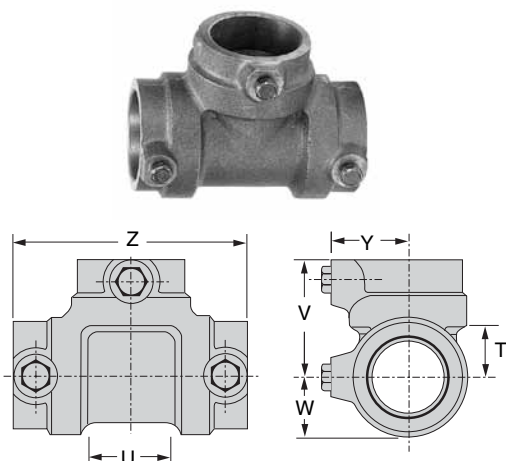


FIGURE 7103 SOCK-IT® STRAIGHT TEE (S x S x S)

Nominal Size	O.D.	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	In./mm	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.7	300 20.7	300 20.7	1 3/16 21	1 5/8 41	2 1/4 57	1 1/16 27	1 11/16 43	4 1/2 114	2.3 1.0
1 1/4 32	1.660 42.4	175 12.1	300 20.7	1 25	2 51	2 1/16 62	1 1/4 32	1 13/16 46	4 7/8 124	2.9 1.3
1 1/2 40	1.900 48.3	175 12.1	300 20.7	1 1/16 17	2 1/8 54	2 9/16 65	1 3/8 35	1 15/16 49	5 1/8 130	3.4 1.5
2 50	2.375 60.3	175 12.1	250 17.2	1 1/16 23	2 5/8 67	3 76	1 11/16 43	2 3/16 56	6 152	5.6 2.5

* "U" - Run take-out dimension.
*** "T" - Outlet take-out dimension.

FIG. 7107 - Coupling (Sock-It® x Sock-It®)

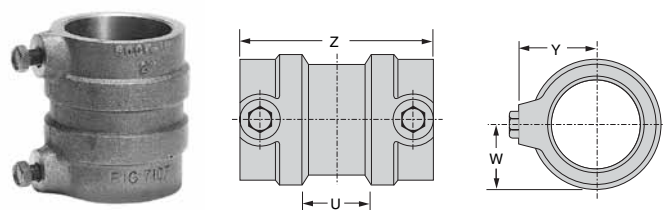


FIGURE 7107 SOCK-IT® COUPLING (S x S)

Nominal Size	O.D.	Max. Working Pressure		Dimensions				Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	U*	W	Y	Z	
In./DN(mm)	In./mm	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.7	300 20.7	300 20.7	1/4 6	1 1/16 27	1 11/16 43	3 3/8 79	1.7 0.8
1 1/4 32	1.660 42.4	300 20.7	300 20.7	1/4 6	1 1/4 32	1 13/16 46	3 3/8 79	1.9 0.9
1 1/2 40	1.900 48.3	300 20.7	300 20.7	1/4 6	1 3/8 35	1 15/16 49	3 3/4 83	2.1 1.0
2 50	2.375 60.3	175 12.1	250 17.2	1/4 6	1 3/8 41	2 3/16 56	3 3/8 92	2.9 1.3

* "U" - Run take-out dimension.

SOCK-IT® PIPING METHOD FITTINGS

FIG. 7105 - Reducing Outlet Tee (Sock-It® x Sock-It® x NPT)

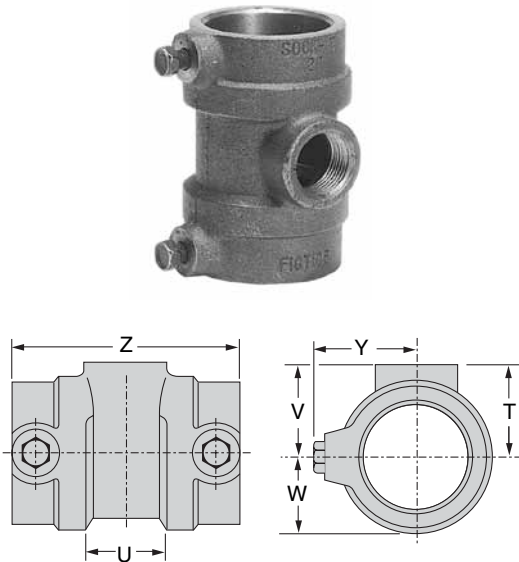


FIGURE 7105 SOCK-IT® REDUCING OUTLET TEE (S X S X NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1 x 1 x 1/2 25 x 25 x 15	300 20.7	300 20.7	1 25	1 3/8 35	1 1/16 37	1 1/16 27	1 11/16 43	4 1/4 108	2.0 0.9
1 x 1 x 3/4 25 x 25 x 20	300 20.7	300 20.7	7/8 22	1 3/8 35	1 1/16 37	1 1/16 27	1 11/16 43	4 1/4 108	1.9 0.9
1 x 1 x 1 25 x 25 x 25	300 20.7	300 20.7	7/8 22	1 3/8 35	1 1/16 37	1 1/16 27	1 11/16 43	4 1/4 108	1.9 0.9
1 1/4 x 1 1/4 x 1/2 32 x 32 x 15	300 20.7	300 20.7	1 1/8 29	1 3/8 35	1 5/8 41	1 1/4 32	1 13/16 46	4 1/4 108	2.2 1.0
1 1/4 x 1 1/4 x 3/4 32 x 32 x 20	300 20.7	300 20.7	1 25	1 3/8 35	1 5/8 41	1 1/4 32	1 13/16 46	4 1/4 108	2.2 1.0
1 1/4 x 1 1/4 x 1 32 x 32 x 25	300 20.7	300 20.7	1 25	1 3/8 35	1 5/8 41	1 1/4 32	1 13/16 46	4 1/4 108	2.0 0.9
1 1/2 x 1 1/2 x 1/2 40 x 40 x 15	300 20.7	300 20.7	1 1/4 32	1 3/8 35	1 3/4 44	1 3/8 35	1 15/16 49	4 3/8 111	2.7 1.2
1 1/2 x 1 1/2 x 3/4 40 x 40 x 20	300 20.7	300 20.7	1 1/8 29	1 3/8 35	1 3/4 44	1 3/8 35	1 15/16 49	4 3/8 111	2.6 1.2
1 1/2 x 1 1/2 x 1 40 x 40 x 25	300 20.7	300 20.7	1 1/8 29	1 3/8 35	1 3/4 44	1 3/8 35	1 15/16 49	4 3/8 111	2.5 1.1
2 x 2 x 1/2 50 x 50 x 15	175 12.1	250 17.2	1 1/2 38	1 3/8 35	1 5/8 49	1 5/8 41	2 3/16 56	4 3/4 121	3.5 1.6
2 x 2 x 3/4 50 x 50 x 20	175 12.1	250 17.2	1 3/8 35	1 3/8 35	1 5/8 49	1 5/8 41	2 3/16 56	4 3/4 121	3.4 1.5
2 x 2 x 1 50 x 50 x 25	175 12.1	250 17.2	1 3/8 35	1 3/8 35	1 5/8 49	1 5/8 41	2 3/16 56	4 3/4 121	3.3 1.5
2 1/2 x 2 1/2 x 3/4 65 x 65 x 20	175 12.1	175 12.1	1 1/2 38	1 3/8 35	2 1/8 54	1 5/8 49	2 1/2 62	4 3/4 121	5.2 2.4
2 1/2 x 2 1/2 x 1 65 x 65 x 25	175 12.1	175 12.1	1 1/2 38	1 3/8 35	2 1/8 54	1 5/8 49	2 1/2 62	4 3/4 121	5.2 2.4

* "U" - Run take-out dimension.

** "T" - Outlet take-out dimension.

FIG. 7106 - Reducing Tee (Sock-It® x Sock-It® x NPT)

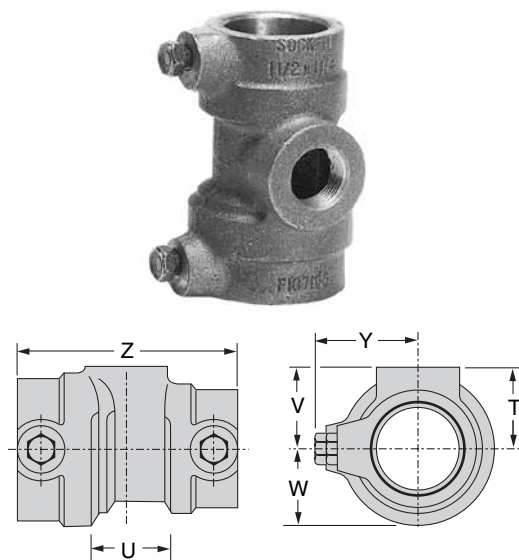


FIGURE 7106 SOCK-IT® REDUCING TEE (S x S x NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	PSI/bar	PSI/bar	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1 1/4 x 1 x 1/2 32 x 25 x 15	300 2.1	300 2.1	1 25	1 3/8 35	1 1/16 37	1 1/4 32	1 13/16 46	4 1/4 108	2.1 1.0
1 1/4 x 1 x 3/4 32 x 25 x 20	300 20.7	300 20.7	7/8 22	1 3/8 35	1 1/16 37	1 1/4 32	1 13/16 46	4 1/4 108	2.1 1.0
1 1/4 x 1 x 1 32 x 25 x 25	300 20.7	300 20.7	7/8 22	1 3/8 35	1 1/16 37	1 1/4 32	1 13/16 46	4 1/4 108	2.0 0.9
1 1/2 x 1 1/4 x 1/2 40 x 32 x 15	300 20.7	300 20.7	1 1/8 29	1 3/8 35	1 5/8 40	1 3/8 35	1 15/16 49	4 3/8 111	2.5 1.1
1 1/2 x 1 1/4 x 3/4 40 x 32 x 20	300 20.7	300 20.7	1 25	1 3/8 35	1 5/8 40	1 3/8 35	1 15/16 49	4 3/8 111	2.4 1.1
1 1/2 x 1 1/4 x 1 40 x 32 x 25	300 20.7	300 20.7	1 25	1 3/8 35	1 5/8 40	1 3/8 35	1 15/16 49	4 3/8 111	2.2 1.0
2 x 1 1/2 x 1/2 50 x 40 x 15	175 12.1	250 17.2	1 1/4 32	1 3/8 35	1 3/4 44	1 5/8 41	2 3/16 56	4 9/16 116	3.2 1.5
2 x 1 1/2 x 3/4 50 x 40 x 20	175 12.1	250 17.2	1 1/8 29	1 3/8 35	1 3/4 44	1 5/8 41	2 3/16 56	4 9/16 116	3.1 1.4
2 x 1 1/2 x 1 50 x 40 x 25	175 12.1	250 17.2	1 1/8 29	1 3/8 35	1 3/4 44	1 5/8 41	2 3/16 56	4 9/16 116	3.0 1.4

* "U" - Run take-out dimension.

** "T" - Outlet take-out dimension.

FIG. 7400SS

Rigidlite® Coupling

The Gruvlok Figure 7400SS coupling is available in 1 1/4" – 8" sizes. The standard material is ASTM A 743 CF8M (Type 316) cast stainless steel which is ideal for corrosive environments.

Any Gruvlok gasket material may be utilized in the 7400SS coupling for a broad array of applications. Gasket properties are as designated in accordance with ASTM D 2000. The 7400SS is provided with ASTM A 193 B8M bolts and ASTM A 194 Grade 8M nuts.



MATERIAL SPECIFICATIONS

STAINLESS STEEL BOLTS & NUTS:

Hex head stainless steel bolts, Type 316 per ASTM A 193 Grade B8M class 1 and heavy hex stainless steel nuts, Type 316 per ASTM A 194 Grade 8M class 1. Nuts and bolts are zinc plated to prevent common thread galling. Contact a Gruvlok Representative for more information.

HOUSING:

Cast Stainless Steel (Type 316) - ASTM A 743 CF8M

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified

-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)

-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

Grade "O" Fluoro-Elastomer (Blue color code)

-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)

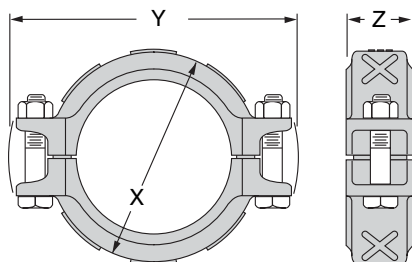
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:

Standard C Style
Flush Gap (1 1/4" – 8")

LUBRICATION:

Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")



CAUTION: Contact your local Gruvlok representative for corrosive application environments.

No coatings or zinc options.

* All bolts are hex head design Type 316 Grade B8M Class 1 stainless steel to ASTM A 193, with Type 316 Grade 8M stainless steel heavy hex nuts conforming to ASTM A 194. Use of suitable anti-galling thread compound is recommended.

† Ratings apply when used with Schedule 40 ASTM A 312 Type 304 stainless steel pipe for all sizes. Refer to ratings chart for additional data.

FIGURE 7400SS - RIGIDLITE STAINLESS STEEL COUPLING

Nominal Size	O.D.	Max. Wk. Pressure†	Max. End Load†	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts*		Specified Torque		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
					In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m	Lbs./Kg	
1 1/4	1.660	300	649	0-1/8	2 7/8	4 1/8	1 3/4	2	3/8 x 2 1/4	15	20	1.6
32	42.4	20.7	2.89	0-3.2	73	105	44		M10 x 57	21	27	0.7
1 1/2	1.900	300	851	0-1/8	3 1/8	4 5/8	1 3/4	2	3/8 x 2 1/4	15	20	1.7
40	48.3	20.7	3.78	0-3.2	79	117	44		M10 x 57	21	27	0.8
2	2.375	300	1,329	0-1/8	3 3/8	5 3/8	1 3/4	2	3/8 x 2 1/4	15	20	2.1
50	60.3	20.7	5.91	0-3.2	92	137	45		M10 x 57	21	27	1.0
2 1/2	2.875	300	1,948	0-1/8	4 1/8	5 7/8	1 3/4	2	3/8 x 2 1/4	15	20	2.3
65	73.0	20.7	8.66	0-3.2	105	149	44		M10 x 57	21	27	1.0
3	3.500	300	2,886	0-1/8	4 3/8	6 3/8	1 3/4	2	1/2 x 2 3/4	50	60	3.1
80	88.9	20.7	12.84	0-3.2	117	168	44		M12 x 70	68	80	1.4
4	4.500	300	4,771	0-1/4	6	7 3/4	1 7/8	2	1/2 x 2 3/4	50	60	4.4
100	114.3	20.7	21.22	0-6.4	152	197	48		M12 x 70	68	80	2.0
6	6.625	275	9,480	0-1/4	8 1/8	11 1/8	2	2	3/4 x 3	80	100	7.8
150	168.3	19.0	42.17	0-6.4	206	283	51		M20 x 76	110	150	3.5
8	8.625	275	16,067	0-1/4	10 3/8	13 3/8	2 3/8	2	3/4 x 3	80	100	13.2
200	219.1	19.0	71.47	0-6.4	264	346	60		M20 x 76	110	150	6.0

GRUVLOK STAINLESS STEEL FITTINGS

Anvil offers two different sets of stainless steel fittings. The Gruklok Series Fittings have full flow designs formed from type 304SS pipe. The Schedule 10 fittings are fabricated from segmentally welded 316SS unless otherwise noted and are also available as Schedule 40 and/or Type 304SS.

GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI)

The following are pressure ratings for Gruklok Stainless Steel Piping Systems. The ratings for Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10 Stainless Steel pipe. Using roll sets that were designed for roll grooving standard wall pipe may

significantly reduce the pressure ratings that can be obtained. The Model 1007/3007 roll groovers require the use of the optional Schedule 10 roll set to groove Schedule 5S and 10S. For grooving Schedule 40S on the Model 1007/3007 roll groovers, the standard steel roll grooving set should be used.

**GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI)
ON 304 AND 316 STAINLESS STEEL ROLL GROOVED PIPE**

Nominal Pipe Size	Pipe O.D.	Nominal Wall Thickness	Pipe Schedule Number	Coupling and Flanges									
				Fig. 7000 Lightweight	Fig. 7001 Standard	Fig. 7003 Hingelok	Fig. 7004 HPR	Fig. 7010* Reducing	Fig. 7012 Flange	Fig. 7013 Flange	Fig. 7400 Rigidlite	Fig. 7401 Rigidlok	Fig. 7400SS Coupling
In./DN(mm)	In./mm	Inches	—	PSI									
1 25	1.315 33.4	0.065	5S	400	400	—	—	—	—	—	300	—	—
		0.109	10S	400	500	—	—	—	—	—	300	—	—
		0.133	40	500	750	—	—	—	—	—	300	—	—
1¼ 32	1.660 42.4	0.065	5S	400	400	—	—	—	—	—	300	—	275
		0.109	10S	500	500	—	—	—	—	—	300	—	300
		0.140	40	500	750	—	—	—	—	—	300	—	300
1½ 40	1.900 48.3	0.065	5S	400	400	275	—	—	—	—	300	400	275
		0.109	10S	500	500	300	—	—	—	—	300	500	300
		0.145	40	500	750	300	—	—	—	—	300	750	300
2 50	2.375 60.3	0.065	5S	250	325	250	325	250	250	275	250	325	275
		0.109	10S	500	500	300	500	500	300	300	300	500	300
		0.154	40	500	750	300	750	500	300	300	300	750	300
2½ 65	2.875 73.0	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.203	40	500	750	300	750	500	300	300	300	750	300
3 80	3.500 88.9	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.216	40	500	750	300	750	500	300	300	300	750	300
4 100	4.500 114.3	0.083	5S	200	250	200	250	200	200	250	200	250	200
		0.120	10S	300	400	300	400	300	300	300	300	400	300
		0.237	40	500	750	300	750	500	300	300	300	750	300
5 125	5.563 141.3	0.109	5S	125	200	125	200	125	125	200	125	200	—
		0.134	10S	200	300	200	300	200	200	300	200	300	—
		0.258	40	300	500	300	500	300	300	300	300	500	—
6 150	6.625 168.3	0.109	5S	75	125	75	125	75	75	125	75	125	125
		0.134	10S	200	200	200	200	200	200	200	200	200	250
		0.280	40	300	500	300	500	300	300	300	300	500	275
8 200	8.625 219.1	0.109	5S	50	75	50	75	50	50	75	50	75	75
		0.148	10S	150	200	150	200	150	150	200	150	200	150
		0.322	40	300	400	300	400	300	300	300	300	400	275
10 250	10.750 273.0	0.134	5S	—	50	—	50	—	50	50	—	50	—
		0.165	10S	—	100	—	100	—	100	100	—	100	—
		0.365	40	—	400	—	400	—	300	300	—	400	—
12 300	12.750 323.9	0.156	5S	—	75	—	75	—	50	75	—	75	—
		0.180	10S	—	125	—	125	—	100	125	—	125	—
		0.375	40	—	400	—	400	—	300	300	—	400	—

- Notes:**
- 1) Pressure ratings based on ASTM A312 Type 304 stainless steel pipe or equivalent.
 - 2) Failure to use Rollers specifically designed for Stainless Steel Pipe may significantly reduce pressure retention capabilities.
 - 3) Pressure ratings on cut grooved pipe meet or exceed the schedule 40 pressure ratings listed above. For information regarding higher ratings contact Anvil.
 - 4) * For pressure ratings on Figure 7010 Reducing Couplings use larger pipe size.
 - 5) For pressure ratings for the reducing tees, concentric reducers and eccentric reducers, use the rating of the weakest end.
 - 6) Pressure ratings on schedule 10 stainless steel pipe may be increased by using Anvil's 1007/3007 roll groovers with the schedule 10 roller set. Contact Anvil for details.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 304



Gruvlok **A** Series Stainless Steel Fittings are full flow design with ends grooved to Gruvlok specifications. The **A** Series standard material is formed from Type 304 Stainless Steel. The **A** Series Fittings are annealed after forming and grooving to provide increased corrosion resistance. Gruvlok **A** Series Stainless Steel 45° and 90° elbows and tees have compact center-to-end dimensions which make installation quick and easy with the Gruvlok Figure 7400SS Coupling, or other Gruvlok products.

PRESSURE RATINGS FOR STAINLESS STEEL PIPE & FITTINGS

Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10S stainless steel pipe. Using roll sets that were designed for roll grooving carbon steel pipe may significantly reduce the pressure ratings that can be obtained. Consult Gruvlok for applications that involve roll grooving 10" or larger stainless steel pipe or that involves Schedule 5S stainless steel pipe.

A SERIES SS FITTING PRESSURE RATINGS										
Sizes	1¼"	1½"	2"	2½"	3"	4"	6"	8"	10"	12"
Pressure (psi)	500	500	500	500	500	500	400	250	100	200

FIG. A7050-SS04

90° Stainless Steel Elbow
Type 304

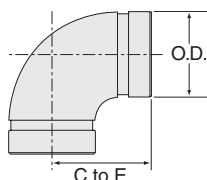


FIGURE A7050SS 90° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	2⅞ 71.44	0.8 0.4
1½ 40	3 76.20	1.0 0.5
2 50	3⅛ 93.66	1.3 0.6
2½ 65	4⅞ 109.54	1.8 0.8
3 80	5⅞ 128.59	2.9 1.3
4 100	6⅞ 160.34	4.6 2.1
6 150	9 228.60	11.2 5.1
8 200	12 304.80	22.7 10.3
10 250	15 381.00	35.3 16.0
12 300	18 457.20	56.9 25.8

FIG. A7051-SS04

45° Stainless Steel Elbow
Type 304

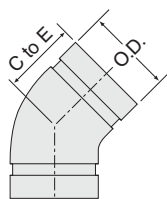


FIGURE A7051SS 45° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	1¾ 44.45	0.4 0.2
1½ 40	1⅞ 47.63	0.5 0.2
2 50	2⅞ 53.98	0.7 0.3
2½ 65	3⅞ 60.33	0.9 0.4
3 80	4⅞ 71.44	1.5 0.7
4 100	5⅞ 84.14	2.4 1.1
6 150	7⅞ 114.30	6.0 2.7
8 200	9⅞ 149.23	11.7 5.3
10 250	11⅞ 180.98	17.6 8.0
12 300	14⅞ 219.08	27.6 12.5

FIG. A7060-SS04

Stainless Steel Tees
Type 304

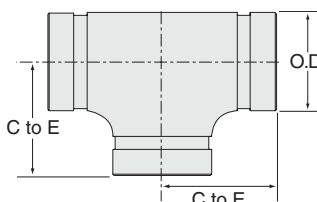


FIGURE A7060SS STAINLESS STEEL TEE		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	2¼ 69.85	1.1 0.5
1½ 40	2⅝ 74.61	1.3 0.6
2 50	3⅞ 80.96	3.2 1.5
2½ 65	4⅞ 93.66	4.4 2.0
3 80	5⅞ 101.60	5.8 2.6
4 100	6⅞ 125.41	8.6 3.9
6 150	9⅞ 165.10	18.5 8.4
8 200	11⅞ 204.79	33.4 15.1
10 250	14⅞ 241.30	35.3 16.0
12 300	17⅞ 279.40	52.7 23.9

FIG. A7074-SS04

Stainless Steel Caps
Type 304

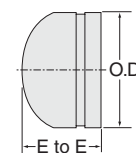


FIGURE A7074SS STAINLESS STEEL CAP		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	1¾ 44.45	0.4 0.2
1½ 40	1⅞ 44.45	0.4 0.2
2 50	2 50.80	0.4 0.2
2½ 65	2⅞ 55.56	0.9 0.4
3 80	3⅞ 65.09	1.1 0.5
4 100	4⅞ 74.61	1.5 0.7
6 150	6⅞ 90.49	3.1 1.4
8 200	8⅞ 101.60	6.6 3.0
10 250	10⅞ 127.00	9.9 4.5
12 300	12⅞ 152.40	15.2 6.9

Notes: 1) *Dimensions may differ from those shown above. Contact a Gruvlok Representative for more information.
2) For **A** Series 304 SS refer to the pressure ratings chart above.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 304

FIG. A7061-SS04

Stainless Steel Reducing Tees
Type 304

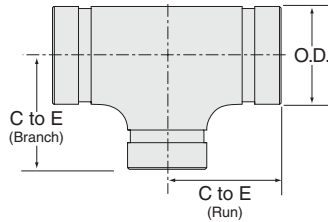


FIGURE A7061SS
STAINLESS STEEL REDUCING TEE

Nominal Size	Center to End (Run)	Center to End (Branch)	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1½ x 1¼ 40 x 32	2⅝ 74.61	2¾ 69.85	1.3 0.6
2 x 1¼ 50 x 32	3⅝ 80.96	2⅝ 74.61	1.8 0.8
2 x 1½ 50 x 40	3⅝ 80.96	3⅝ 77.79	1.8 0.8
2½ x 1½ 65 x 40	3⅝ 93.66	3⅝ 84.14	2.7 1.2
2½ x 2 65 x 50	3⅝ 93.66	3⅝ 90.49	2.7 1.2
3 x 1½ 80 x 40	4 101.60	3⅝ 90.49	3.1 1.4
3 x 2 80 x 50	4 101.60	3⅝ 93.66	5.1 2.3
3 x 2½ 80 x 65	4 101.60	3⅝ 98.43	5.4 2.4
4 x 2 100 x 50	4⅝ 125.41	4⅝ 109.54	8.0 3.6
4 x 2½ 100 x 65	4⅝ 125.41	4⅝ 117.48	5.3 2.4
4 x 3 100 x 80	4⅝ 125.41	4⅝ 120.65	8.6 3.9
6 x 3 150 x 80	6½ 165.10	5⅝ 147.64	16.8 7.6
6 x 4 150 x 100	6⅝ 155.58	6 152.40	16.8 7.6
8 x 4 200 x 100	8⅝ 204.79	7⅝ 182.56	29.7 13.4
8 x 6 200 x 150	8⅝ 204.79	7⅝ 195.26	33.4 15.1
10 x 6 250 x 150	9½ 241.30	8⅝ 255.43	21.6 9.8
10 x 8 250 x 200	9½ 241.30	9⅝ 230.19	32.2 14.6
12 x 8 300 x 200	11 279.40	10⅝ 255.59	47.2 21.4
12 x 10 300 x 250	11 279.40	10⅝ 268.29	49.2 22.3

FIG. A7072-SS04

Stainless Steel Concentric Reducers
Type 304

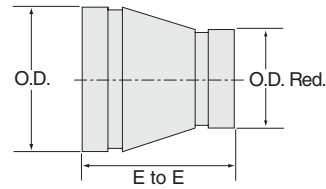


FIGURE A7072SS
STAINLESS STEEL CONCENTRIC REDUCER

Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1½ x 1¼ 40 x 32	¾ 95.25	0.4 0.2
2 x 1¼ 50 x 32	4⅝ 104.78	0.7 0.3
2 x 1½ 50 x 40	4⅝ 104.78	0.7 0.3
2½ x 1½ 65 x 40	4⅝ 112.71	1.1 0.5
2½ x 2 65 x 50	4⅝ 112.71	1.1 0.5
3 x 1½ 80 x 40	4¾ 120.65	1.3 0.6
3 x 2 80 x 50	4¾ 120.65	1.3 0.6
3 x 2½ 80 x 65	4¾ 120.65	1.3 0.6
4 x 2 100 x 50	5⅝ 134.94	1.8 0.8
4 x 2½ 100 x 65	5⅝ 134.94	1.8 0.8
4 x 3 100 x 80	5⅝ 134.94	2.0 0.9
6 x 3 150 x 80	6¾ 171.45	3.8 1.7
6 x 4 150 x 100	6¾ 171.45	4.0 1.8
8 x 4 200 x 100	7⅝ 192.09	6.6 3.0
8 x 6 200 x 150	7⅝ 192.09	7.3 3.3
10 x 6 250 x 150	8⅝ 220.66	9.7 4.4
10 x 8 250 x 200	8⅝ 220.66	10.6 4.8
12 x 8 300 x 200	9⅝ 239.71	15.0 6.8
12 x 10 300 x 250	9⅝ 239.71	15.9 7.2

- Notes:**
- 1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
 - 2) For Series 304 SS pressure ratings refer to the chart on page 140.
 - 3) The pressure rating for the reducing tees and concentric reducers is based upon the rating of the weakest end.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 316



Gruklok Schedule 10 Stainless Steel Fittings are segmentally welded with ends grooved to Gruklok specifications. The standard material is 316 Stainless Steel unless otherwise noted with 304SS and/or Schedule 40 optional. Installation is quick and easy with the Gruklok Figure 7400SS Coupling, or other Gruklok product.

FIG. 7050SS

90° Stainless Steel Elbow
Type 316

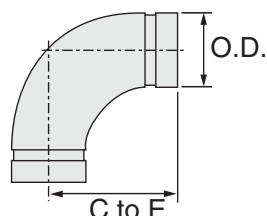


FIGURE 7050SS 90° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	3⅝ 98	1.2 0.5
1½ 40	4¼ 108	1.4 0.6
2 50	4⅝ 111	2.3 1.0
2½ 65	5¼ 146	3.3 1.5
3 80	5⅝ 149	4.6 2.1
4 100	7½ 191	7.9 3.6
6 150	10¾ 273	17.0 7.7
8 200	15 381	29.4 13.4
10 250	18 457	41.8 18.9
12 300	21 533	46.5 21.1

FIG. 7051SS

45° Stainless Steel Elbow
Type 316

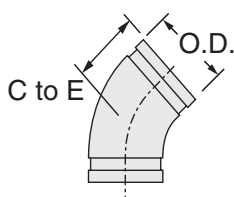


FIGURE 7051SS 45° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	2½ 64	0.7 0.3
1½ 40	2½ 64	0.9 0.4
2 50	2½ 64	1.5 0.7
2½ 65	3 76	1.9 0.9
3 80	3⅝ 86	3.3 1.5
4 100	4 102	5.4 2.4
6 150	5½ 140	11.2 5.1
8 200	7¼ 184	19.8 9.0
10 250	8½ 216	21.0 9.5
12 300	10 254	23.0 10.4

FIG. 7060SS

Stainless Steel Tees
Type 316

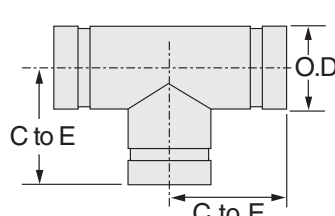


FIGURE 7060SS STAINLESS STEEL TEE		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	2¾ 70	1.5 0.7
1½ 40	2¾ 70	1.8 0.8
2 50	3¼ 83	2.4 1.1
2½ 65	3¾ 95	4.0 1.8
3 80	4¼ 108	5.8 2.6
4 100	5 127	10.3 4.7
6 150	6½ 165	25.7 11.7
8 200	7¾ 197	41.1 18.6
10 250	9 229	36.0 16.3
12 300	10 254	48.4 22.0

FIG. 7074SS

Stainless Steel Caps
Type 316

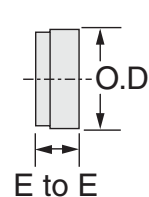


FIGURE 7074SS STAINLESS STEEL CAP		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1¼ 32	1⅝ 41	0.4 0.2
1½ 40	1⅝ 41	0.5 0.2
2 50	1⅝ 41	0.8 0.4
2½ 65	1¾ 45	1.1 0.5
3 80	1¾ 45	1.6 0.7
4 100	1¾ 45	2.8 1.3
6 150	1⅞ 48	3.7 1.7
8 200	2¼ 57	8.8 4.0
10 250	2¼ 57	12.1 5.5
12 300	2¼ 57	17.3 7.8

Notes:

- 1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
- 2) Fabricated fittings weights are based on Schedule 10 pipe.
- 3) Fabricated Schedule 10, 316SS and Schedule 40 Center to End dimensions are the same.
- 4) The pressure rating for the Gruklok Schedule 10 Stainless Steel Fittings are equal to the pressure rating of the coupling used on Schedule 10 pipe as shown in the Working Pressure Ratings Chart for Stainless Steel Roll Grooved Pipe on page 139.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 316

FIG. 7061SS

Stainless Steel Reducing Tees
Type 316

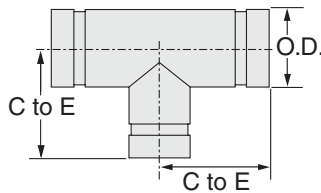


FIGURE 7061SS STAINLESS STEEL REDUCING TEE		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1½ x 1½ x ¾	2¾	1.3
40 x 40 x 20	70	0.6
1½ x 1½ x 1	2¾	1.4
40 x 40 x 25	70	0.6
1½ x 1½ x 1¼	2¾	1.5
40 x 40 x 32	70	0.7
2 x 2 x ¾	3¼	2.0
50 x 50 x 20	83	0.9
2 x 2 x 1	3¼	2.1
50 x 50 x 25	83	1.0
2 x 2 x 1¼	3¼	2.3
50 x 50 x 32	83	1.0
2 x 2 x 1½	3¼	2.5
50 x 50 x 40	83	1.1
2½ x 2½ x ¾	3¾	2.8
65 x 65 x 20	95	1.3
2½ x 2½ x 1	3¾	3.0
65 x 65 x 25	95	1.4
2½ x 2½ x 1½	3¾	3.5
65 x 65 x 40	95	1.6
2½ x 2½ x 2	3¾	3.8
65 x 65 x 50	95	1.7
3 x 3 x ¾	4¼	4.0
80 x 80 x 20	108	1.8
3 x 3 x 1	4¼	4.1
80 x 80 x 25	108	1.9
3 x 3 x 1¼	4¼	4.2
80 x 80 x 32	108	1.9
3 x 3 x 1½	4¼	4.3
80 x 80 x 40	108	1.9
3 x 3 x 2	4¼	4.5
80 x 80 x 50	108	2.0
3 x 3 x 2½	4¼	4.8
80 x 80 x 65	108	2.2
4 x 4 x 2	5	5.8
100 x 100 x 50	127	2.6
4 x 4 x 2½	5	5.9
100 x 100 x 65	127	2.7
4 x 4 x 3	5	6.0
100 x 100 x 80	127	2.7
6 x 6 x 3	6½	14.0
150 x 150 x 80	165	6.4
6 x 6 x 4	6½	14.5
150 x 150 x 100	165	6.6
8 x 8 x 4	7¾	29.6
200 x 200 x 100	197	13.5
8 x 8 x 6	7¾	31.1
200 x 200 x 150	197	14.1

Notes:

- *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
- Fabricated fittings weights are based on Schedule 10 pipe.
- Fabricated Schedule 10, 316SS and Schedule 40 Center to End dimensions are the same.
- The pressure rating for the Gruvlok Schedule 10 Stainless Steel Fittings are equal to the pressure rating of the coupling used on Schedule 10 pipe as shown in the Working Pressure Ratings Chart for Stainless Steel Roll Grooved Pipe on page 139.
- The pressure rating for the reducing tees, concentric reducers and eccentric reducers should be based upon the dimension of the weakest end.

FIG. 7072SS

Stainless Steel Concentric Reducers – Type 316

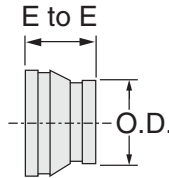


FIGURE 7072SS STAINLESS STEEL CONCENTRIC REDUCER		
Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1½ x 1	6½	0.7
40 x 25	165	0.3
1½ x 1¼	6½	0.7
40 x 32	165	0.3
2 x 1	7	0.9
50 x 25	178	0.4
2 x 1¼	7	0.9
50 x 32	178	0.4
2 x 1½	7	1.2
50 x 40	178	0.5
2½ x 1	7½	1.1
65 x 25	191	0.5
2½ x 1½	7½	1.2
65 x 40	191	0.5
2½ x 2	7½	1.2
65 x 50	191	0.5
3 x 1	7½	1.8
80 x 25	191	0.8
3 x 1¼	7½	1.8
80 x 32	191	0.8
3 x 1½	7½	1.9
80 x 40	191	0.9
4 x 2	8	2.9
100 x 50	203	1.3
4 x 2½	8	3.1
100 x 65	203	1.4
4 x 3	8	3.1
100 x 80	203	1.4
6 x 2½	9½	7.1
150 x 65	241	3.2
6 x 3	9½	7.0
150 x 80	241	3.2
6 x 4	9½	7.0
150 x 100	241	3.2
8 x 4	10	11.7
200 x 100	254	5.3
8 x 6	10	11.5
200 x 150	254	5.2

FIG. 7073SS

Stainless Steel Eccentric Reducers – Type 316

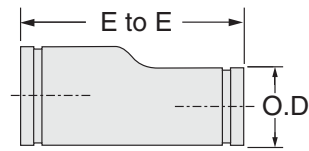


FIGURE 7073SS STAINLESS STEEL ECCENTRIC REDUCER		
Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
1½ x 1	8½	1.7
40 x 25	216	0.8
1½ x 1¼	8½	4.5
40 x 32	216	2.0
2 x 1	9	2.2
50 x 25	229	1.0
2 x 1¼	9	2.4
50 x 32	229	1.1
2 x 1½	9	2.5
50 x 40	229	1.1
2½ x 1	9½	3.2
65 x 25	241	1.5
2½ x 1½	9½	3.6
65 x 40	241	1.6
2½ x 2	9½	4.0
65 x 50	241	1.8
3 x 1	9½	4.0
80 x 25	241	1.8
3 x 1¼	9½	4.3
80 x 32	241	2.0
3 x 1½	9½	4.5
80 x 40	241	0.9
4 x 2	10	6.7
100 x 50	254	3.0
4 x 2½	10	7.3
100 x 65	254	3.3
4 x 3	10	7.9
100 x 80	254	3.6
6 x 2½	11½	12.8
150 x 65	292	5.8
6 x 3	11½	13.6
150 x 80	292	6.2
6 x 4	11½	14.9
150 x 100	292	6.8
8 x 4	12	19.7
200 x 100	305	8.9
8 x 6	12	23.2
200 x 150	305	10.5

FIG. 7084SS

Groove x Class 150
Stainless Steel Flange Adapter
Type 304

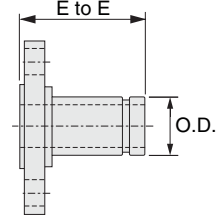


FIGURE 7084SS STAINLESS STEEL FLANGE ADAPTER		
Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg
2	3⅞	5.7
50	79.38	2.6
2½	3⅞	8.6
65	85.73	3.9
3	3⅞	9.7
80	85.73	4.4
4	3⅞	14.6
100	90.49	6.6
5	3¾	17.5
125	95.25	7.9
6	3⅞	19.4
150	100.01	8.8
8	4½	32.9
200	114.30	14.9
10	4¾	45.0
250	120.65	20.4
12	4¾	70.8
300	120.65	32.1

SERIES 7500 SS

Grooved-End Ball Valve

The Anvil Series 7500 Stainless Steel Grooved-End Ball Valve line consists of 2" to 6" standard port two piece design. Diverter valves feature full port configurations.

The all stainless steel valve incorporates additional features for more demanding applications. These features include standard reinforced PTFE seats, live loaded PTFE chevron stem seals, and lock-out provisions for 2" - 4". Gear operator standard for 6" valves.

The 7500 stainless steel grooved-end ball valve is rated to 720 psig (50 bar) CWP.



MATERIAL SPECIFICATIONS

BODY: Stainless Steel ASTM A 351 Grade CF8M

ENDPLATE: Stainless Steel ASTM A 351 Grade CF8M

BALL: Stainless Steel ASTM A 351 Grade CF8M

STEM: 316 Stainless Steel

THRUST WASHER: RTFE

STEM SEAL: PTFE Chevron

HANDLE: Carbon Steel, Zinc Plated

HANDLE NUT: 300 Series Stainless Steel

SEAT: RTFE

BODY SEAL: Flouroelastomer

LOCK PLATE: 300 Series Stainless Steel

LOCK STOP: 300 Series Stainless Steel

FOLLOWER: 300 Series Stainless Steel

PACKING NUT: 300 Series Stainless Steel

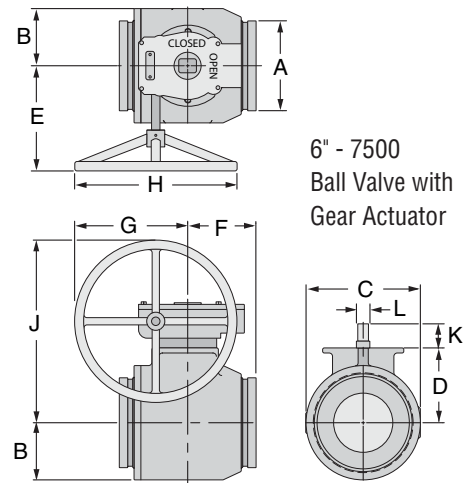
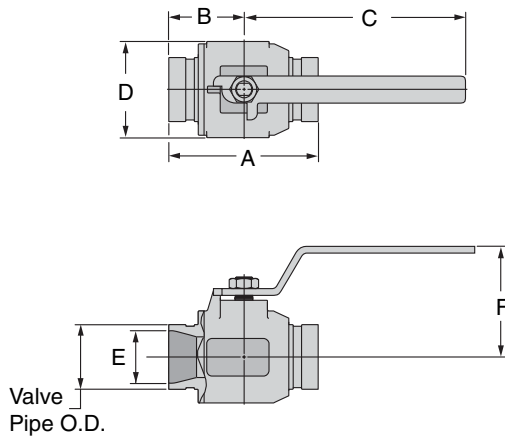
BELLEVILLE WASHER: 17-7 Stainless Steel

SERIES 7500 SS GROOVED END BALL VALVES (ORDERING INFORMATION)

Sample Part Number 4" G1-7512-1	4"	G	I-	75	1	2-	1
	Size	Configuration	Body/End Material	Series	Ball and Stem Material	Seat/Seals	Operator
	2" - 6"	G - 2 Way Grooved End	I - Ductile Iron ASTM A395	75 - 7500	1 - Chrome Plated Carbon Steel	1 - Nylon/Flouroelastomer	1 - 2 Position Handle
		D - 3 Way Diverter, Grooved End Standard Port (2")	S - Stainless Steel ASTM A351 Grade CF8M		2 - 316 Stainless Steel	2 - RTFE/Flouroelastomer	2 - 2 Position Locking Handle
		F - 3 Way Diverter, Grooved End Full Port (2")					3 - Bare Stem

SERIES 7500 SS

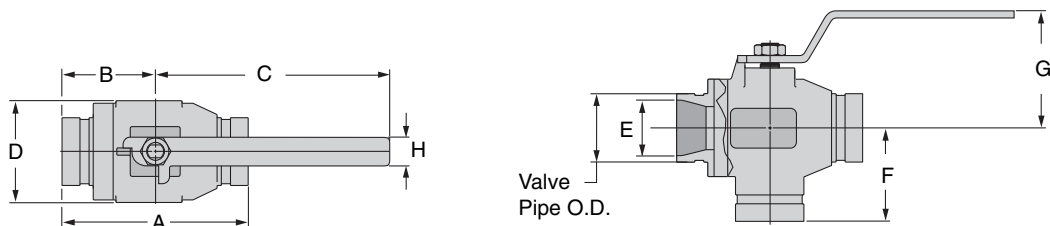
Grooved-End Ball Valve



7500 SS BALL VALVE									
Size ANSI	O.D.	Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	Cv	
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm		Lbs./Kg
2 50	2.375 60.3	5½ 140	2¾ 70	8¼ 209	3⅜ 81	1⅝ 49	4⅞ 105	165	8 3.6
3 80	3.500 88.9	6¾ 171	3⅝ 85	10 254	4⅜ 122	2⅞ 74	4⅜ 121	310	18 8.2
4 100	4.500 114.3	8¼ 210	4⅞ 105	16 406	6⅝ 176	3⅜ 97	6 152	815	38 17.2
6 * 150	6.625 168.3	10⅞ 257	5⅞ 128	28 711	8⅞ 215	5⅞ 144	7⅞ 194	1500	106 48.1

* Bare Stem

7500 SS BALL VALVE WITH GEAR ACTUATOR												
Size ANSI	O.D.	Dimensions										
		A	B	C	D	E	F	G	H	J	K	L
In./DN(mm)	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm
6 150	6.625 168.3	6⅝ 168.7	4¼ 107.4	8⅞ 214.6	5½ 140.5	10¼ 260.4	5⅞ 128.0	8⅞ 206.4	12 304.8	13½ 342.9	1⅜ 45.2	1 25.4
												9.6 4.4



7500 SS THREE-WAY DIVERTER VALVES									
Size ANSI	O.D.	Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	Cv	
In./DN	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm		Lbs./Kg
2 RP 50	2.375 RP 60.3	6.50 165	3.25 83	8.22 209	4.13 105	1.50 38	3.25 83	36	9 19.8
2 FP 50	2.375 FP 60.3	6.50 165	3.25 83	10.38 264	5.38 137	2.00 51	3.25 83	135	14.2 31.2

Note: Contact your Gruvlok representative for actuator mounting details. Full port only.

MODEL 1007 & 3007

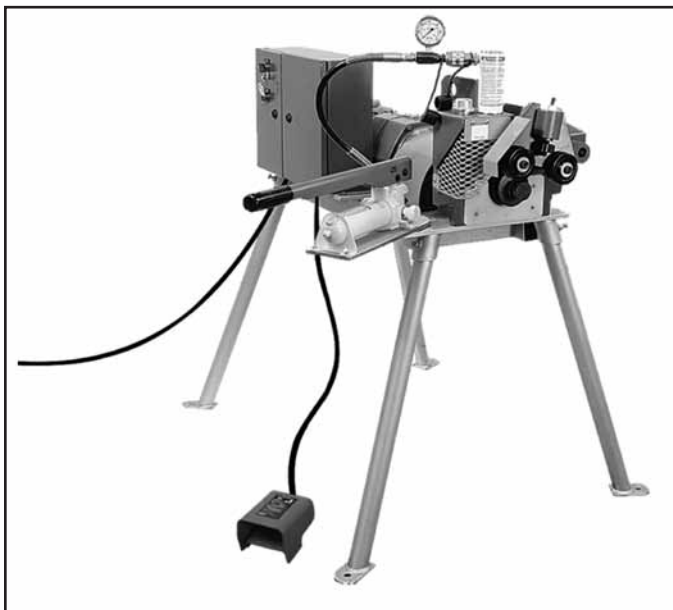
Roll Groovers

A. 1007 STANDARD EQUIPMENT - Roll Groover complete with groove and drive rolls for 2" - 12" steel pipe, Steel/CTS Dual Guide Roll Assembly, one and one-half horsepower electric motor drive with foot switch. Two stage hydraulic hand pump, mounting base with footed support legs. Complete set-up and operating instructions; 2" - 6" rolls on tool, 8" - 12" rolls stored in box, and three depth gauges covering the range of 2" through 12" pipe are mounted on the tool.

Shipped in closed wood crate that can be used for storage or rental tool return.

Shipping Weight: 620 lbs.

MODEL 1007 ROLL GROOVERS

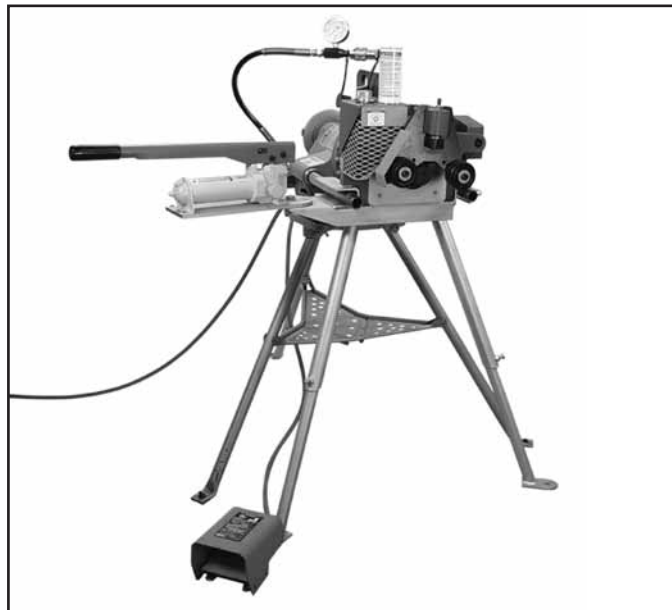


A. 3007 STANDARD EQUIPMENT - Roll Groover complete with groove and drive rolls for 2" - 12" steel pipe, Steel/CTS Dual Guide Roll Assembly, two stage hydraulic hand pump, mounting base with footed support legs for direct attachment to your Ridgid® 300 Power Drive. Complete set-up and operating instructions; 2" - 6" rolls on tool; 8" - 12" rolls stored in box, and three depth gauges covering the range of 2"-12" pipe are mounted on the tool. Required Ridgid 300 Power Drive not included.

Shipped in closed wood crate that can be used for storage or rental tool return.

Shipping Weight: 330 lbs.

MODEL 3007 ROLL GROOVERS



B. OPTIONAL EQUIPMENT

Steel Pipe Option:

- 2"-12" Schedule 10 Rolls: Consisting of 2"-6" and 8"-12" roll sets.
- 14"-16" Steel Grooving Rolls (Model 1007 only).

Advanced Copper Method Option:

- 2"-6" Advanced Copper Method (IPS Copper) Grooving Assembly with groove and drive rolls, M&L Advanced Copper Method guide roll assembly, and a 2"-6" Universal Diameter Gauge.
- 2"-6" Type K Advanced Copper Method (IPS Copper) Grooving Assembly.
- 3"-6" Type DWV Advanced Copper Method (IPS Copper) Grooving Assembly.
- 8" Advanced Copper Method Assembly with groover and drive roll, hydraulic copper guide roll unit suitable for K, L, M, and DWV tubing, and an 8" Universal Diameter Gauge.

CTS Copper System Option:

- 2"-8" CTS Copper System Grooving Rolls, 2"-4" CTS Depth Gauge, and 5"-8" CTS Depth Gauge.

Other:

- Optional 230 volt, 60Hz, 15 amp, single phase electrical panel with motor is available for the 1007 Roll Groover.

Gruvlok roll grooving technology is protected by U.S. Patents 5450738, 5570603, 5778715 and others pending.

MODEL 1007 & 3007

Roll Groovers

G - GROOVER CAPABILITY

GROOVER CAPABILITY											
Pipe Material	Pipe Size/Wall Thickness (Schedule)										
In.	2	2½	3	4	5	6	8	10	12	14	16
DN(mm)	50	65	80	100	125	150	200	250	300	350	400
Steel	Schedule 40									Std.	Std.
Stainless	Steel Schedule 40S									n/a	n/a
Copper	K, L, M & DWV							n/a	n/a	n/a	n/a

NOTES:

- (1) All wall thickness shown are the maximum wall thickness for the indicated pipe material.
- (2) Minimum wall thickness for each pipe materials and size is:
 Steel: 2" - 12" – Sch. 10, 14" & 16" Standard Wall
 Stainless Steel: 2" - 12" – Sch. 10S requires optional roller sets
 Copper: 2" - 2½" – Type M
 3" - 8" – Type DWV
- (3) Contact a Gruvlok Representative for information on grooving alternate materials

NOTE: Some sizes may require optional equipment.

D - GROOVER TIMES

MODEL 1007 & MODEL 3007 STEEL PIPE GROOVING TIMES (MIN: SEC.)											
Pipe Size (In./DN(mm)) – Sch. 40 (Std. Wall) Steel Pipe											
2	2½	3	4	5	6	8	10	12	14	16	
50	65	80	100	125	150	200	250	300	350	400	
0:20	0:20	0:25	0:30	1:00	1:20	1:35	1:50	2:20	2:40	3:00	

This chart shows approximate grooving times with the groover setup for the proper size and groove diameter and the pipe properly positioned on the groover. The times shown are average times from

the start of rotation of the pipe in the grooving rolls to completed groove.

- **WIDE GROOVING RANGE—**
2" thru 16" standard wall & schedule 10 steel pipe,
2" thru 12" Schedule 10S and 40S Stainless Steel and
2" thru 8" copper tube type K, L, M, and DWV. (Adv. Copper Method or CTS Copper System)
- **PIPE LENGTHS—**20' random schedule 40 (standard wall) to 5" groove by groove nipples. The shortest roll groove nipple capability in the industry; hands-clear operation.
- **HANDS CLEAR GROOVING OF PIPE AND NIPPLES—**
Enhanced operator safety provided by outboard guide roll assembly.
- **ACCURATE, REPEATABLE-GROOVE DIAMETER CONTROL—**
Simplified direct action design provides positive, repeatable, control for grooving carbon and stainless piping. For grooving copper, universal diameter gauge must be utilized.
- **FAST GROOVING TIMES—** Large capacity two-stage pump. Two-stage design saves time engaging pipe while providing smooth application of optimum grooving force with reduced operator effort.
- **BETTER CONTROL OF PIPE FLARE—** Outboard guide roll assembly registers pipe for proper orientation.
- **QUICK, EASY SETUP AND ROLL CHANGE**
- **RUGGED DESIGN REQUIRES ZERO MAINTENANCE—**
Sealed bearings eliminate need for periodic maintenance.
- **USER FRIENDLY DESIGN—** Pump location is adjustable for operator comfort and safety.
- **EASE OF OPERATION—** High grooving forces obtained through use of larger capability ram requires less pump effort.
- **FOOT SWITCH POWER APPLICATION**
- **OPERATOR SAFE DESIGN**

MODEL 3006 & 3006C

Roll Groovers

The Gruvlok Model 3006 roll groover features a low maintenance quick roll change out design with the capability to groove 2" - 12" steel pipe, as well as 2" - 6" stainless steel. This machine is also compatible with the Gruvlok Advanced Copper Method (IPS Copper) and CTS Copper System for accurate and repeatable grooving of tube as small as 2" in diameter. Standard with each machine is the patented Gruvlok hands free nipple guide system. This one of a kind nipple guide system allows for the shortest nipple grooving in the business and is hands free for increased operator safety. A special hydraulic pump with a reduced height handle and pivoting location allow each operator to customize the machine for maximum comfort while grooving. Low cost, lightweight, user friendly, and reliable, the Model 3006 Roll Groover follows the quality Gruvlok tradition started with 1007/3007 models and takes the future of roll grooving one step further.

- **MODEL 3006C**— Dedicated 2" - 6" Advanced Copper Method (IPS Copper) roll groover sharing the same low maintenance quick roll change features of the 3006. Optional equipment extends the 3006C. A capability to include 2" - 12" steel, 2" - 6" stainless steel, as well as 2" - 8" CTS Copper System.
- **WIDE GROOVING RANGE**—
2" thru 8" schedule 40 (standard wall) steel pipe,
10" (.188" Wall), 12" (.219" wall), and 2" thru 12" Sch. 10
2" thru 6" Schedule 40S Stainless Steel Pipe, and
2" thru 6" copper type K, L, M, and DWV (up to 8" for CTS).
- **PIPE LENGTHS**— 20' random schedule 40 (standard wall) to 5" groove by groove nipples. The shortest roll groove nipple capability in the industry: hands clear
- **HANDS-CLEAR GROOVING OF PIPE AND NIPPLES**—
Enhanced operator safety provided by outboard guide roll assembly
- **ACCURATE, REPEATABLE GROOVE DIAMETER CONTROL**—
Simplified direct action provided positive, repeatable control for grooving carbon and stainless piping. For grooving copper, universal diameter gauge must be utilized.
- **BETTER CONTROL OF PIPE FLARE**— Outboard guide roll assembly registers pipe for proper orientation.
- **QUICK, EASY SETUP AND ROLL CHANGE**
- **RUGGED DESIGN REQUIRES MINIMAL MAINTENANCE**—
Only periodic application of grease via grease fittings required.
- **USER FRIENDLY DESIGN**— Pump has a special reduced height handle and adjustable location for operator comfort and safety.
- **EASE OF OPERATION**— High grooving forces obtained though use of large capacity ram requires less pump effort.



Gruvlok roll grooving technology is protected by U.S. Patents 5450738, 5570603, 5778715 and others pending.

MODEL 3006 & 3006C

Roll Groovers

TECHNICAL DATA – MODEL 3006

STANDARD EQUIPMENT:

Roll Groover complete with Adjustable Support Leg Assembly and roller sets for grooving 2"-6" and 8"-12" steel pipe, Steel/CTS Dual Guide Roll Assembly, hydraulic pump with pressure gauge, and two depth adjustment gauges. This unit is designed for direct attachment to your Ridgid® 300 Power Drive. Complete with comprehensive setup, operating and troubleshooting instructions.

Shipped in a reusable wooden storage crate.

Approximate shipping weight: 225 pounds.

Required Ridgid® 300 Power Drive not included.

OPTIONAL EQUIPMENT:

Advanced Copper Method (IPS Copper) Option:

- Consisting of 2"-6" Advanced Copper Method roll set, Advanced Copper Method Guide Roll Assembly, and a 2"-6" Universal Diameter Gauge.
- 2"-6" Universal Diameter Gauge.

CTS Copper System Option:

- Consisting of 2"-8" roll set, 2"-6" CTS Depth Gauge, and 8" CTS Depth Gauge.

TECHNICAL DATA – MODEL 3006C

STANDARD EQUIPMENT:

Roll Groover complete with Adjustable Support Leg Assembly and Advanced Copper Method (IPS) roller set for grooving 2"-6" copper tube, Advanced Copper Method Guide Roll Assembly, hydraulic pump with pressure gauge, and 2"-6" Universal Diameter Gauge. This unit is designed for direct attachment to your Ridgid® 300 Power Drive. Complete with comprehensive setup, operating and troubleshooting instructions.

Shipped in a reusable wooden storage crate.

Approximate shipping weight: 215 pounds.

Required Ridgid® 300 Power drive not included.

OPTIONAL EQUIPMENT:

Steel Option:

- Consisting of 2"-6" and 8"-12" roll sets, Steel/CTS Dual Guide Roll Assembly, and two depth adjustment gauges.

CTS Copper System Option:

- Consisting of 2"-8" roll set, Steel/CTS Dual Guide Roll Assembly, 2"-6" CTS Depth Gauge, and 8" CTS Depth Gauge.

GROOVER CAPABILITY

GROOVER CAPABILITY									
Pipe Material	Pipe Size/Wall Thickness (Schedule) ^{1,2}								
In.	2	2½	3	4	5	6	8	10	12
DN(mm)	50	65	80	100	125	150	200	250	300
Steel	Schedule 40							0.188"	0.219"
Stainless Steel	Schedule 40S						n/a	n/a	n/a
Advanced Copper Method (IPS Copper)	K, L, M & DWV						n/a	n/a	n/a
CTS Copper System	K, L, M & DWV							n/a	n/a

NOTES:

(1) All wall thickness shown are the maximum wall thickness for the indicated pipe material.

(3) Please contact a Gruvlok Representative for more information on grooving alternate materials & wall thickness.

(2) Minimum wall thickness for each pipe materials and size is:

Steel: All sizes – Sch. 10

Stainless Steel: All sizes – Sch. 40S

Copper: 2", 2½" – Type M

3" - 8" – Type DWV

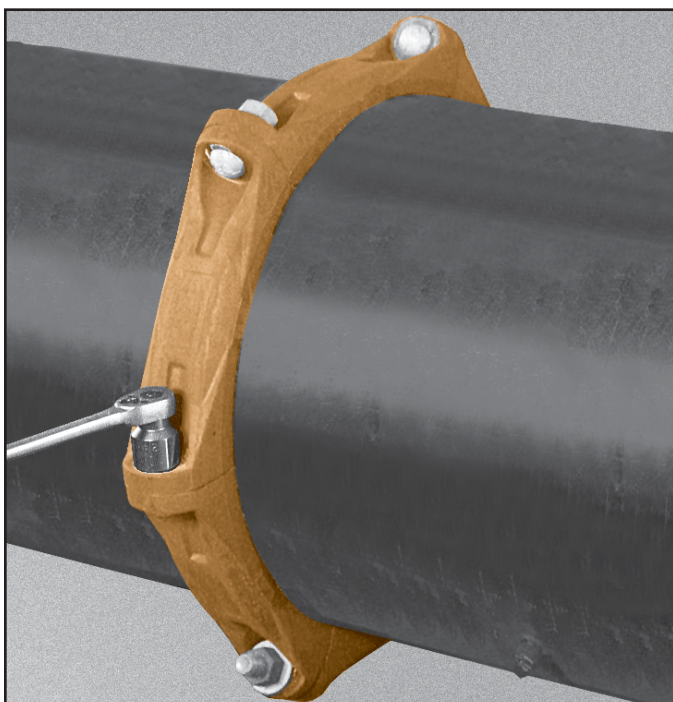
GROOVER TIMES

MODEL 3006 & MODEL 3006C STEEL PIPE GROOVING TIMES (MIN: SEC.)							
Pipe Size (In./DN(mm))/Max Steel Pipe Wall Thickness							
2	2½	3	4	6	8	10	12
50	65	80	100	150	200	250	300
0:20	0:20	0:25	0:30	1:20	1:55	0:40	1:20

GROOVING TIMES: This chart shows approximate grooving times with the groover set-up for the proper size and groove diameter and the pipe properly

positioned on the groover. The times shown are average times from the start of rotation of the pipe in the grooving rolls to completed groove.

COUPLING INSTALLATION & ASSEMBLY



Installation & Assembly

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The instructions are based on pipe grooved in accordance with Gruvlok® grooving specifications. Check pipe ends for proper groove dimensions and to assure that the pipe ends are free of indentations and projections which would prevent proper sealing.

ALWAYS USE A GRUVLOK® LUBRICANT FOR PROPER COUPLING ASSEMBLY. Thorough lubrication of the external surface of the gasket is essential to prevent pinching and possible damage to the gasket. For temperatures above 150° F (65.6° C) use Gruvlok Xtreme™ Lubricant and lubricate all gasket surfaces, internal and external. See Gruvlok Lubricants in the Technical Data section of the Gruvlok catalog for additional important information.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

ANSI SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
In.	In.	Ft.-Lbs
3/8	1 1/16	30-45
1/2	7/8	80-100
5/8	1 1/16	100-130
3/4	1 1/4	130-180
7/8	1 3/8	180-220
1	1 5/8	200-250
1 1/8	1 13/16	225-275
1 1/4	2	250-300

* Non-lubricated bolt torques.

METRIC SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
mm	mm	N-m
M10	16	40-60
M12	22	110-150
M16	24	135-175
M20	30	175-245
M22	34	245-300
M24	36	270-340

* Non-lubricated bolt torques.

NOTE: Specified torques are to be used unless otherwise noted on Product Installation Instructions.

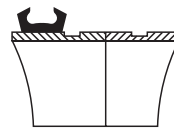
FIG. 7001
Standard Coupling



1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of GUVLOK lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

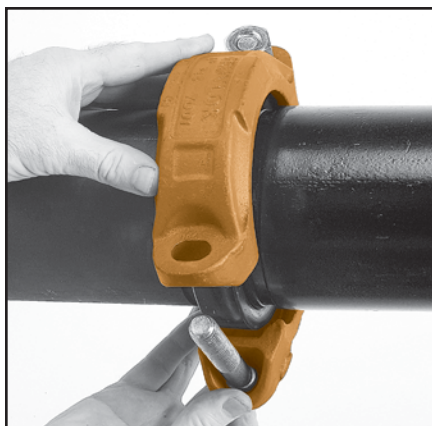
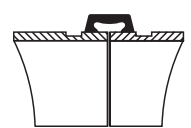


2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end. On couplings 10" and larger it may be easier to turn the gasket inside out then lubricate and slide the gasket over the pipe end as shown.



3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

On couplings 10" and larger, flip or roll the gasket into centered position.

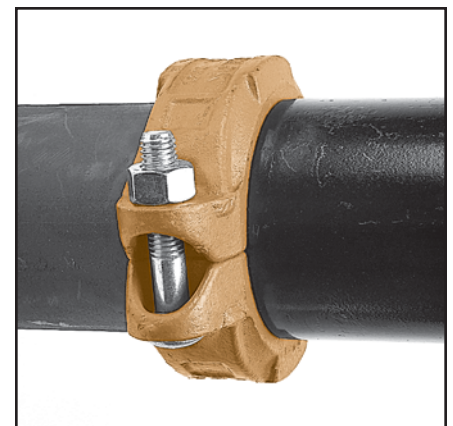


4 HOUSINGS— Place the coupling housing halves over the gasket making sure the housing keys engage the grooves. Insert bolts and turn nuts finger tight.



5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

Uneven tightening may cause the gasket to pinch.



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

NOTE: The housings for sizes 16" and larger are cast in four or more segments.

TO INSTALL: Loosely pre-assemble the segments into two "Housing Halves" making sure that the alignment tang(s) and slot(s) on the bolt pad(s) are properly mated. Install the "Housing Halves" as shown in steps 4 & 5. The coupling is properly installed when all bolt pads are firmly together - Metal-to-Metal.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

FIG. 7011**Standard Coupling**

1 Inspect the pipe ends making sure the criteria, in the Gruzlok Large Diameter Pipe Roll and Cut Groove Specifications, are met.



2 Turn the gasket inside out and slide the gasket completely over one of the pipe ends. Turning the gasket inside out will reduce the stretching necessary to put the gasket into position. Ideally, approximately 75% of the pipe's gasket-sealing surface, (Dimension A) should be visible when the gasket is in proper position. This will aid in step 4.



3 Lubricate the gasket sealing lips. The use of Gruzlok lubricants ensures compatibility between the lubricant and the gasket.

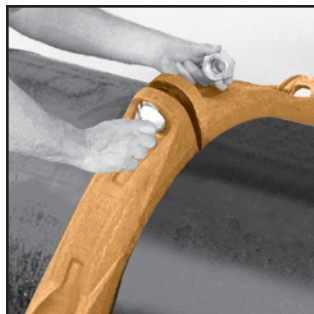


4 Pull the two pipes into contact aligning the pipe ends.

CAUTION: Be careful not to pinch fingers during this step. Working your way around the circumference of the pipe, flip the gasket toward the pipe end so that the proper side is facing out. The end of this procedure will result in the gasket snapping into place. Position the gasket centrally between the grooves of the two pipe ends.



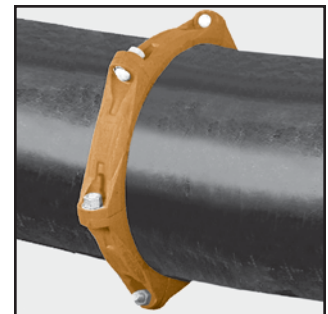
5 Lubricate the exterior surface of the gasket. This helps prevent pinching of the gasket during assembly.



6 Secure the housings about the pipes making sure the coupling keys are engaged in the pipe end grooves. Hint: For horizontal assembly, place housing segment on top of the pipe to support the weight of the housing segment. Secure the adjacent housing with an oval neck track bolt and heavy hex nut and then rotate the secured housings, again balancing the weight of the housings on the top of the pipe. Continue this procedure for all segments.



7 Firmly torque each bolt. The specified minimum torque for each nut is 600 ft.-lbs. The specified maximum torque for each nut is 800 ft.-lbs.



8 Installation of the Figure 7011 Standard Coupling is completed.

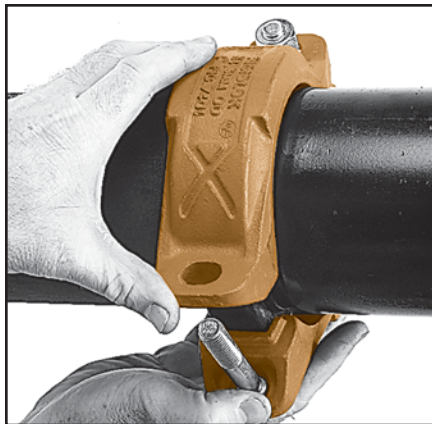
CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7401
Rigidlok® Coupling



1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruzlok lubricant to outside and sealing lips of the gasket. Some applications require lubrication of the entire gasket surface. Be careful that foreign particles do not adhere to lubricated surfaces.

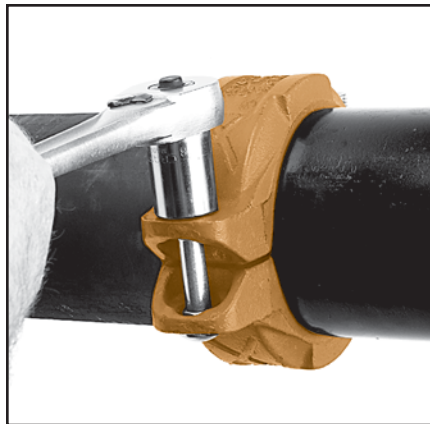


4 HOUSINGS— Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the tube grooves. Swing the other housing over the gasket and into the grooves on both tubes, making sure the tongue and recess of each housing is properly mated. Reinsert the bolt and run-up both nuts finger tight.



2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.

On couplings 10" and larger it may be easier to turn the gasket inside out then lubricate and slide the gasket over the pipe end as shown.



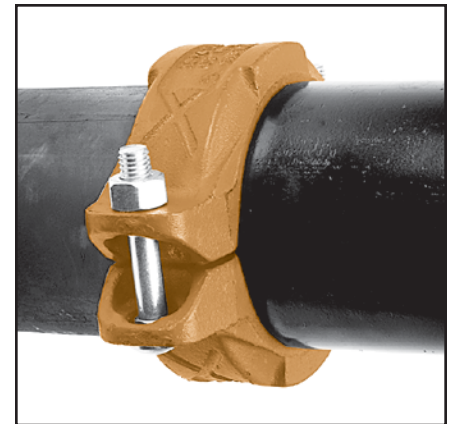
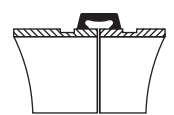
5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced.

CAUTION: Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.



3 ALIGNMENT— After aligning the the pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

On couplings 10" and larger, flip or roll the gasket into centered position.



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

NOTE: Sizes 16" and larger are cast in multiple segments. To install the larger sizes align the tongue and pocket of the couplings appropriately and tighten the nuts alternately to the specified bolt torque. When properly assembled there will be a small equal gap between the adjacent bolt pads.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's web site - www.anvilintl.com

FIG. 7000

Lightweight Flexible Coupling



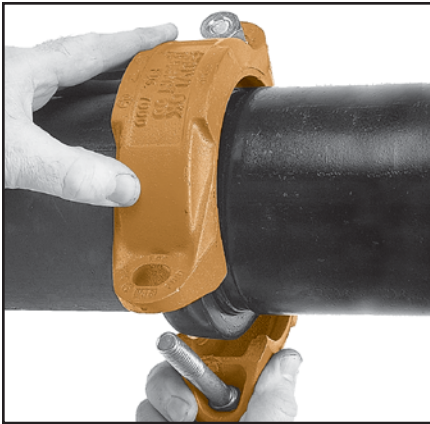
1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



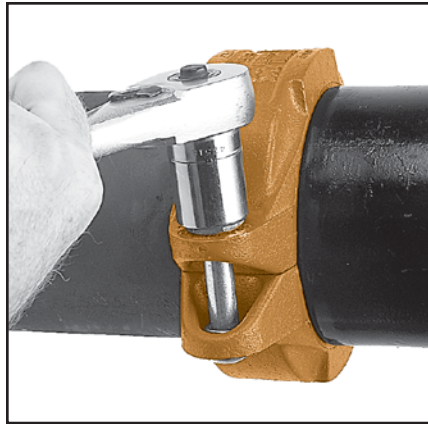
2 GASKET INSTALLATION— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.



3 ALIGNMENT— After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

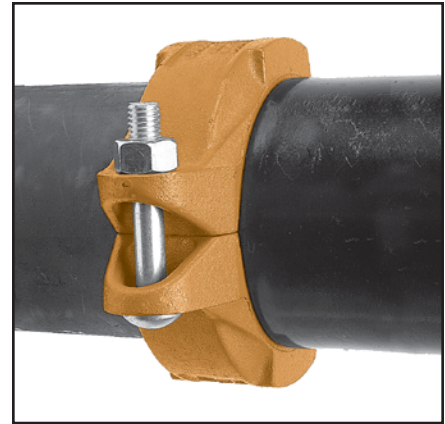


4 HOUSINGS— With one nut unthreaded to the end of the bolt, unthread the other nut completely and swing the coupling housing halves over the gasket, making sure the housing keys engage the grooves. Insert the bolt and turn the nuts finger tight.



5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch.



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

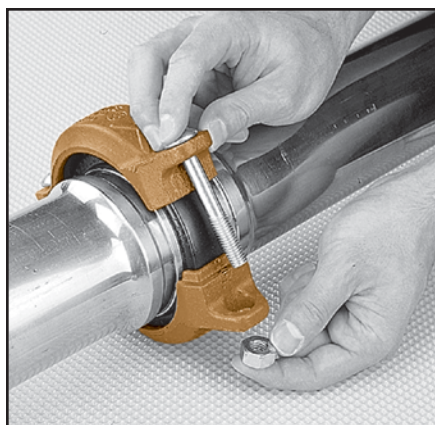
CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's web site - www.anvilintl.com

FIG. 7400
Rigidlite® Coupling



1 CHECK & LUBRICATE GASKET— Check the gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruzlok Xtreme Lubricant to the entire surface, both internal and external, of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

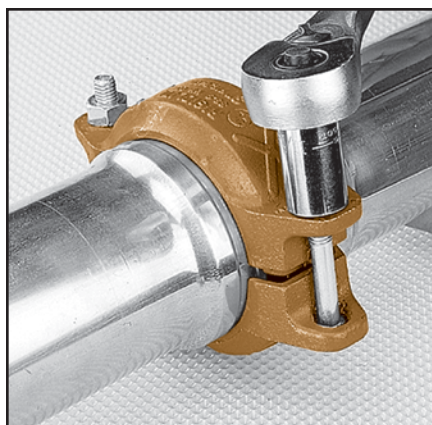


4 HOUSINGS— Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the tube grooves. Swing the other housing over the gasket and into the grooves on both tubes, making sure the tongue and recess of each housing is properly mated. Reinsert the bolt and run-up both nuts finger tight.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.



2 GASKET INSTALLATION— Slip the gasket over the one tube, making sure the gasket lip does not overhang the tube end.



5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced.

CAUTION: Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.



3 ALIGNMENT— After aligning the two tube ends together, pull the gasket into position, centering it between the grooves on each tube. The gasket should not extend into the groove on either tube.

6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's web site - www.anvilintl.com

FIG. 6400

Rigid Coupling

The Fig. 6400 Coupling from Gruvlok is specially designed to provide a rigid pipe connection to meet the specific demands of copper tubing installation. Fast and easy swing-over installation of the rugged lightweight housing produces a secure, rigid pipe joint. Available with the EPDM flush gap style gasket as the standard gasket.

CAUTION: Uneven tightening may cause the gasket to pinch. The gasket should not be visible between segments after the bolts are tightened. Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation.

SPECIFIED BOLT TORQUE

Bolt Size	Wrench Size	Specified Bolt Torque*
<i>In.</i>	<i>In.</i>	<i>Ft.-Lbs</i>
3/8	1 1/16	30-45
1/2	7/8	30-45
5/8	1 1/16	60-90

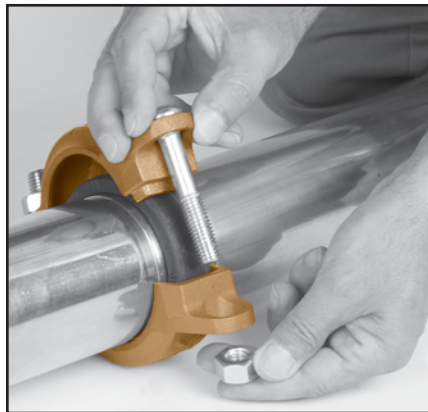
* Non-lubricated bolt torques.



3 ALIGNMENT— After aligning the two tube ends together, pull the gasket into position, centering it between the grooves on each tube. The gasket should not extend into the groove on either tube or between the tube ends.



1 CHECK & LUBRICATE GASKET— Check the gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok® Xtreme Lubricant to the entire surface, both internal and external, of the gasket. Be careful that foreign particles do not adhere to the lubricated surfaces.



4 HOUSINGS— Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the tube grooves. Swing the other housing over the gasket and into the grooves on both tubes, making sure the tongue and recess of each housing is properly mated. Re-insert the bolt and run-up both nuts finger tight.



2 GASKET INSTALLATION— Slip the gasket over one tube, making sure the gasket lip does not overhang the tube end.



5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced. Assembly is complete. Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

NOTE: Copper is a soft material, and in some cases, the bolt pads may come close to metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch. The gasket should not be visible between segments after the bolts are tightened. Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation.

FIG. 7003

Hingelok™ Coupling

NOTE: Remove locking pin from handle before opening coupling.



1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruzlok lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



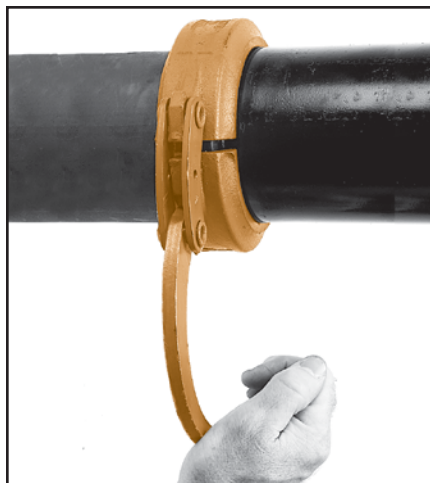
2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.



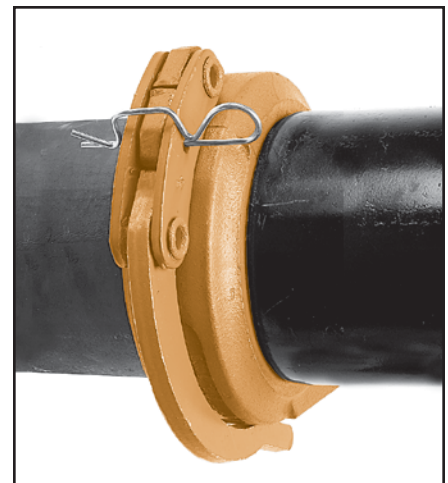
3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



4 HOUSINGS— Put one half of the open coupling over the gasket as the coupling keys fit firmly into the grooves on each pipe end. Swing the other half of the coupling into position around the gasket and into the grooves.



5 LOCK COUPLING— Fit the nose of the locking handle in the notch of the opposite housing. Press firmly down on the handle until it makes contact with the coupling housing. Insert locking pin into handle linkage to secure handle in closed position. (See Caution.)



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

CAUTION:

- 1) Hammering or banging on the handle or coupling housing could cause serious damage to the locking device and coupling assembly. The result may be an unsuitable pipe joint and unusable coupling assembly.
- 2) Care needs to be taken so that fingers do not get caught or pinched when handle is placed in locked position as a result of cam action of handle assembly.
- 3) When re-using coupling and gasket, always inspect gasket for damage and hinge/handle assembly for looseness, distortion or any other damage.

FIG. 7010**Reducing Coupling**

1 CHECK & LUBRICATE GASKET— check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



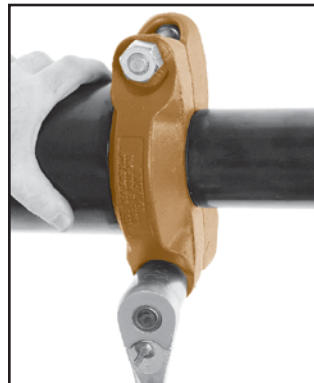
2 GASKET INSTALLATION— Place the smaller opening of the gasket over the smaller pipe. Angle the gasket over the pipe end and pull the gasket lip open around the circumference of the pipe. The center leg of the gasket should make flush contact with the pipe end and will prevent telescoping of the smaller pipe inside the larger.



3 ALIGNMENT— Align the adjoining pipe center lines, and insert the larger pipe end into the gasket. Angle the pipe end slightly to the face of the gasket and tilt the pipe into the gasket to ease assembly.

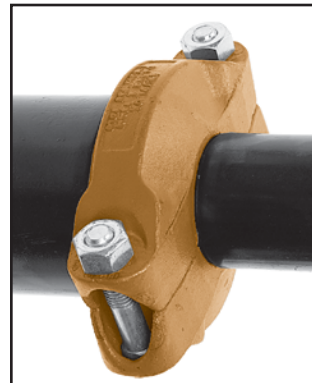


4 HOUSINGS— Place the coupling housing halves over the gasket making sure the housing keys engage the grooves. Insert bolts and turn nuts finger tight.

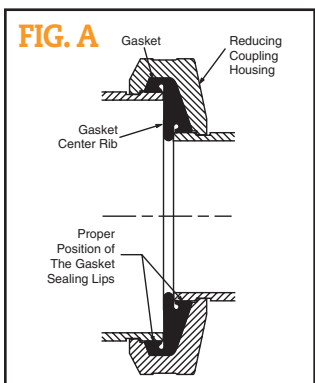


5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch.



6 ASSEMBLY COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.



NOTE: Fig. A illustrates the correct position of the Fig. 7010 Reducing Coupling gasket and housing properly assembled onto adjacent pipe ends.

CAUTION: In vertical installations the pipes must be supported to prevent telescoping during installation.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's web site - www.anvilintl.com

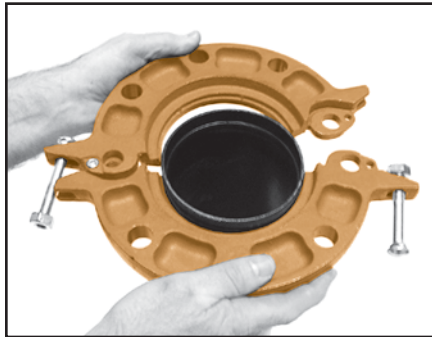
FIG. 7012

Gruvlok Flange (2"-12")

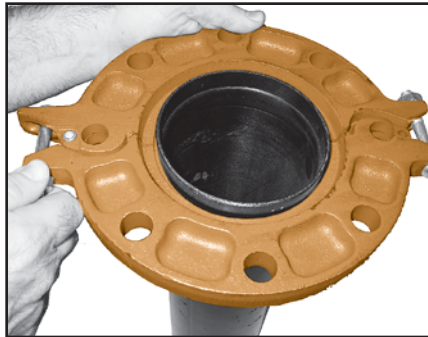
APPLICATIONS WHICH REQUIRE A GRUVLOK® FLANGE ADAPTER INSERT:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok Flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face, and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

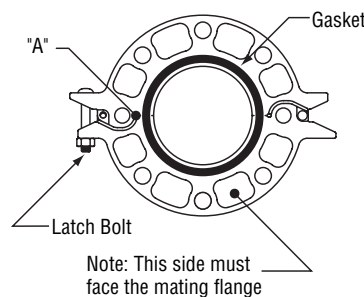
Check pipe end for proper grooved dimensions and to assure that the pipe end is free of indentations and projections that would prevent proper sealing of the Gruvlok flange gasket.



1 On the side without the hinge pin, loosen the latch bolt nut to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruvlok Flange and place around the grooved pipe end with the key section fitting into the groove. The flange gasket cavity must face the pipe end.



2 Place the latch bolt back into the slotted hole. Tighten the nut until there is a $\frac{1}{16}$ " gap between the flange halves at location "A". (See Figure below)



3 Check the gasket to assure that it is properly suited for the intended service. Lubricate the entire exterior surface of the gasket, including the sealing lips, using the proper Gruvlok lubricant.

WARNING

The Gruvlok Flange gasket must be inserted so that the sealing lips face toward the pipe end and the mating flange. The lip of the gasket, sealing on the pipe, should not extend beyond the pipe end. The pipe should extend out beyond the end of the sealing lip by approximately $\frac{1}{8}$ " on the 2"-6" sizes and $\frac{3}{16}$ " on the 8"-12" sizes.

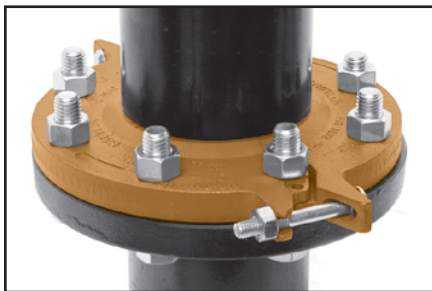
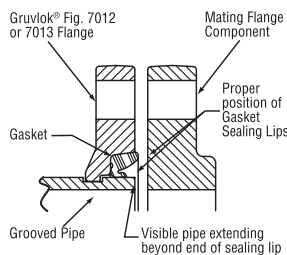
NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/ Installation Instructions section on Anvil's web site - www.anvilintl.com

FIG. 7012

Gruvlok Flange (2"-12")



4 Stretch the Gruvlok gasket around the pipe end and then press the gasket into the cavity between the pipe O.D. and the flange. The gasket must be properly positioned as shown in the figure below.



7 Insert a flange bolt or stud with material properties of SAE J429 Grade 5 or higher through the bolt holes and thread a nut on hand tight. Continue this procedure until all bolt holes have been fitted. Tighten the nuts alternately and evenly so the flange faces remain parallel. All the bolts or studs must be torqued to the mating flange bolts specified torque. The flange faces should have metal-to-metal contact.

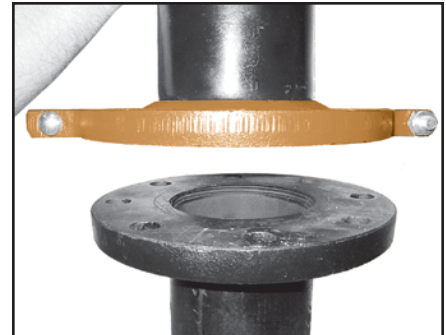


WARNING

It is important to line up the bolt holes before bringing the two flanges together. Sliding the flanges into place will dislodge the gasket and cause leakage to occur. When using a flange insert, it is important that the insert is properly aligned with the gasket prior to tightening the bolts.



5 With the gasket in place apply lubricant to the exposed gasket tip, which will seal on the mating flange. **Tighten the nuts on the latch bolts alternately to the specified bolt torque. The flange housings must be in firm metal-to-metal contact.**



6 Verify that the mating flange face is hard, flat and smooth, free of indentations, which would prevent proper sealing of the Gruvlok Flange gasket. Assure the gasket is still in the proper position and align Gruvlok Flange bolt holes with the mating flange, pump, tank, etc., bolt holes.

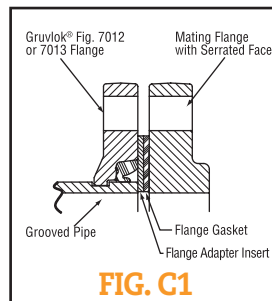


FIG. C1

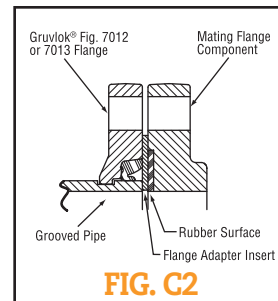


FIG. C2

NOTE: The Gruvlok Fig. 7012 Flange requires the use of a Flange Adapter Insert when used against rubber surfaces (Figure C1), serrated flange surfaces or mating flanges with inserts (Figure C2). The Flange Adapter Insert will be exposed to the fluids in the system. Ensure that the Insert is compatible with the fluids in the systems and with adjacent piping components.



WARNING

Do not use a steel Flange Adapter Insert in copper systems or in systems where galvanic corrosion is possible.

CAUTION: Proper torquing of flange bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

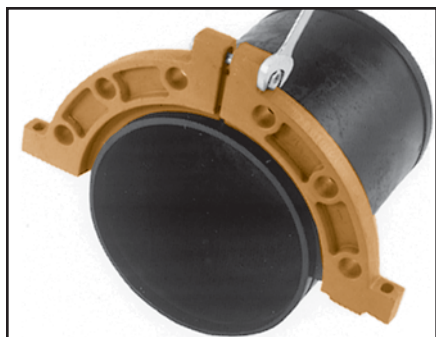
CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's web site - www.anvilintl.com

FIG. 7012

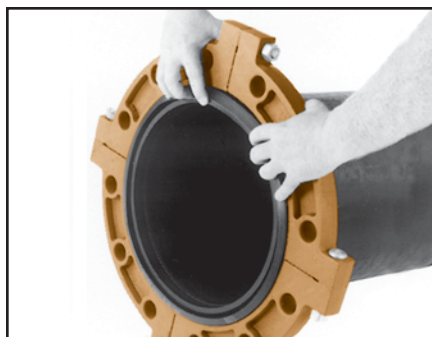
Gruvlok Flange (14"–24")

Gruvlok® Flanges of 14" size and larger are cast in four segments to ease handling during assembly.

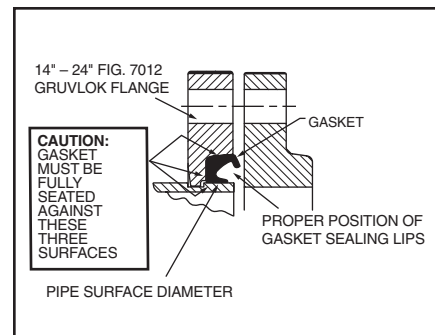


1 Place each Gruvlok Flange segment around the grooved pipe with the key section fitting into the groove and the flange gasket cavity facing the pipe end. Loosely assemble the segments using the four segment-bolts-and-nuts. Alternately and equally tighten the latch bolts and nuts to the specified latch bolt torque. Bring the four flange segments into full, firm metal-to-metal contact.

NOTE: An alternative method of assembly is to loosely preassemble two segments into two equal halves of the flange leaving a small gap (approximately $\frac{1}{8}$ ") between the two segments of each flange-half. Place the flange halves around the pipe and complete the assembly as described in Step 1, above.

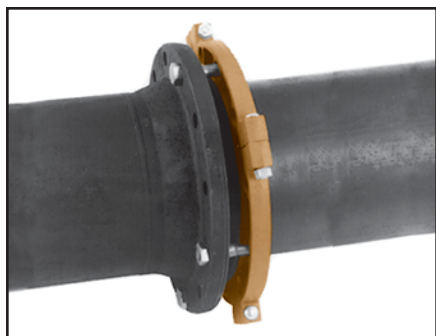


2 Check the gasket grade to verify that it is properly suited for the intended service. Lubricate the entire surface of the gasket and the flange cavity using the appropriate Gruvlok Lubricant. Place the Gruvlok Flange Gasket around the pipe end by pressing the gasket into the cavity between the pipe O.D. and flange recess. Move around the gasket in both directions until the gasket is fully seated in the flange gasket cavity.



3 The correct position and relationship of the components of the Gruvlok Flange assembly is shown in the Figure above. The wide gasket lip must seal on the pipe surface diameter and the narrow gasket lip must face the mating flange. Be careful that foreign particles do not adhere to lubricated surfaces.

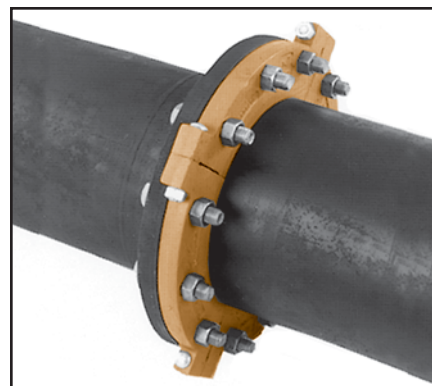
NOTE: Design of the Gruvlok Flange provides sealing only with the special Gruvlok Flange gasket. Only Gruvlok Flange gaskets may be used with Fig. 7012 flanges.



4 Align the Gruvlok Flange bolt holes with mating flange bolt holes. Insert a flange bolt or stud with material properties of SAE J429 Grade 5 or higher through the bolt holes and thread a nut on hand tight. Insert the next bolt or stud opposite the first and

again thread the nut on hand tight. Continue this procedure until all bolt holes have been fitted. Insertion of the flange bolts prior to contact of the flanges will help in the alignment of the flanges. Pull the two flanges into contact using care to assure that the gasket remains fully seated within the gasket cavity during assembly.

NOTE: Take care to assure that the gasket lip is not bent backwards and pinched between the two flanges.



5 Tighten the nuts evenly to the specified mating face bolt torque so that the flange faces remain parallel and make firm even contact around the entire flange.

CAUTION: Proper torquing of flange bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

FIG. 7042

Outlet Coupling

These instructions are based on pipe grooved in accordance with Gruvlok® grooving specifications. Check pipe ends for proper groove dimensions and to assure that the pipe ends are free of indentations and projections which would prevent proper sealing.



1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



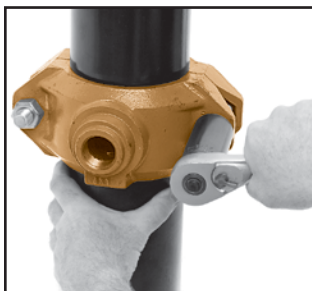
2 GASKET INSTALLATION— Slip the gasket over one pipe end making sure the pipe abuts the gasket's center ribs.



3 ALIGNMENT— Align the pipe ends and pull the pipe into the gasket until the center ribs are in contact with the pipe ends. The gasket should not extend into the groove on either pipe. Rotate the gasket to align the outlet of the gasket to the same direction as the branch outlet.



4 HOUSING ASSEMBLY— With one nut and bolt removed and the other loosened, place one side of the housing over the gasket. Make sure the ribs on the outside of the gasket align with the recesses in the housing and the keys in the housing are in the grooves on both pipes. Swing the other housing over the gasket and into the grooves on both sides of the pipe. Make sure the recess in the outlet of the housing is properly aligned with gasket outlet.



5 TIGHTEN NUTS— Re-insert the bolt and run-up both nuts finger tight. Securely tighten the nuts alternately and equally until they are completely tightened and there is no gap between the bolt pads. Continue tightening the nuts alternately and equally until the specified bolt torque is reached.

CAUTION: Make sure the ribs on the exterior of the gasket are enclosed in the housing recesses.



6 ASSEMBLY IS COMPLETE

FIG. 7042 – SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

ANSI SPECIFIED BOLT TORQUE			
Coupling Size	Bolt Size	Wrench Size	Specified Bolt Torque *
In.	In.	In.	Ft.-Lbs.
1½	¾ x 2½	11/16	30-45
2	¾ x 2½	11/16	30-45
2½	1½ x 2¾	7/8	80-100
3	½ x 3	7/8	80-100
4	¾ x 3½	1½	100-130
6	¾ x 3½	1½	100-130

* Non-lubricated bolt torques.

FIG. 7045 & FIG. 7046

Clamp-T® Branch Outlets

ALWAYS USE A GRUVLOK LUBRICANT FOR PROPER COUPLING ASSEMBLY.

Thorough lubrication of the gasket is essential to assist the gasket into the proper sealing position.

1 PIPE PREPARATION—Cut the appropriate size hole in the pipe and remove any burrs. Be sure to remove the slug from inside the pipe. Clean the gasket sealing surface within $\frac{5}{8}$ " of the hole and visually inspect the sealing surface for defects that may prevent proper sealing of the gasket.

BRANCH SIZE (Inches)	HOLE SAW SIZE (Inches) (+1/8, -0)
$\frac{1}{2}$, $\frac{3}{4}$, 1	$1\frac{1}{2}$
$1\frac{1}{4}$, $1\frac{1}{2}$	2
2	$2\frac{1}{2}$
$2\frac{1}{2}$	$2\frac{3}{4}$
3	$3\frac{1}{2}$
4	$4\frac{1}{2}$



2 CHECK & LUBRICATE GASKET—Check the gasket to be sure it is compatible for the intended service. Apply a thin layer of Gruvlok lubricant to the back surface of the gasket. Be careful that foreign particles do not adhere to the lubricated surfaces. Insert the gasket back into the outlet housing making sure the tabs in the gasket line up with the tab recesses in the housing.



3 GASKET INSTALLATION—Lubricate the exposed surface of the gasket. Align the outlet housing over the pipe hole making sure that the locating collar is in the pipe hole.



4 ALIGNMENT—Align the strap around the pipe, insert the bolts and tighten the nuts finger tight. Some sizes use a U-bolt design.



5 TIGHTEN NUTS—Alternately and evenly tighten the nuts to the specified bolt torque.



6 ASSEMBLY IS COMPLETE

FIGS. 7045 & 7046—SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts and U-bolts used on the Gruvlok® Clamp-T's. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure, battery strength and operational variations.

CAUTION: Proper torquing of the bolts or U-bolts is required to obtain the specified performance. Overtorquing the bolts or U-bolts may result in damage to the bolt, U-bolt and/or casting which could result in lower pressure retention capabilities, lower bend load capabilities, pipe joint leakage and pipe joint separation.

ANSI SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
In.	In.	Ft.-Lbs.
U-Bolt	$\frac{7}{8}$	30-40
$\frac{1}{2}$	$\frac{7}{8}$	60-80
$\frac{5}{8}$	$1\frac{1}{16}$	100-130
$\frac{3}{4}$	$1\frac{1}{4}$	130-180

* Non-lubricated bolt torques

FIG. 7005

Roughneck® Coupling

1 Make certain the pipe ends are free of indentations, projections, weld splatter, or other imperfections which could prevent proper sealing of the gasket.

2 Mark each pipe at a distance from the pipe end according to the pipe run size. See Image 1 and the chart.

3 Check the gasket color code to verify that the gasket grade is properly suited for the intended service. Apply a thin coating of Gruvlok Lubricant to the gasket lips and outside of the gasket and slip the gasket over one pipe. See Image 2. Make sure the gasket does not overhang the pipe end.

Pipe Size In./DN(mm)	Distance from pipe end mark In./mm	Bolt Torque	
		Min.	Max
2 - 2½ 50-65	1 25.4	150 203	190 257
3 - 4 80-100	1 25.4	200 271	250 339
5 - 8 125-200	1¼ 31.8	250 339	300 406
10 250	1¾ 44.5	500 678	600 814
12 300	1¾ 44.5	550 746	700 949
14 - 16 350-400	1¾ 44.5	550 746	700 949

4 Align the second pipe and while holding the pipe in the butted position slide the gasket back over the second pipe end. The gasket should be equally spaced between the lines scribed on each pipe.

5 Place each half of the Roughneck coupling over the gasket, making sure that the tongue on one housing half is aligned with the recess on the other housing half. See Image 3.

6 Tighten the nuts alternately and uniformly until the required bolt torque is reached. See Image 4 and chart for bolt torque.

7 Reinstallation after a disassembly will require that the threads on the bolt and in the nut are clean and lubricated with a light oil.

NOTE: Torque requirements must be met and housing halves must be assembled with equal gaps between bolt pads.

Image 1



Image 2



Image 3

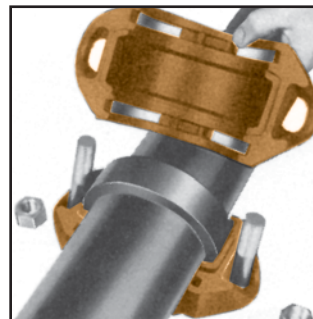
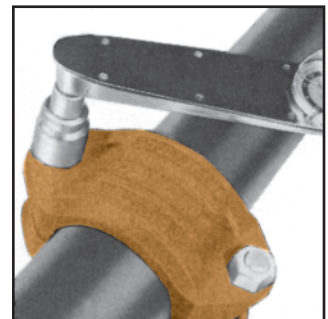


Image 4



Working pressure and end load are based on a properly assembled Roughneck coupling with bolts fully torqued to the above specifications, on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End Fittings.

Roughneck Couplings are designed to be used on plain-end pipe and Gruvlok Plain-End Fittings only. For externally coated pipe applications, contact Gruvlok.

Not recommended for use on steel pipe with a hardness greater than 150 Brinell, plastic, HDPE, cast iron or other brittle pipe.

*Bolt torque ratings shown must be applied at installation.

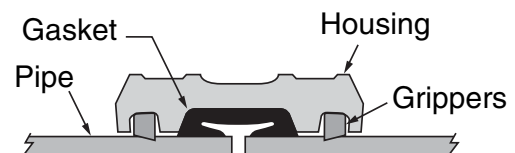
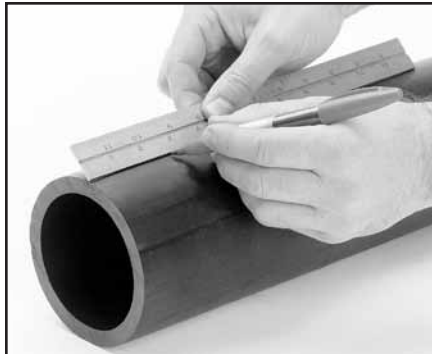


FIG. 7305

HDPE Coupling



1 Make certain the pipe ends are free of indentations, projections or other imperfections, which could prevent proper sealing of the gasket. Mark each pipe at a distance from the end of the pipe according to the pipe size:

Size Inches	Distance to Mark
2-4" (51 - 102 mm)	1" (25.4 mm)
5-8" (127 - 203 mm)	1¼" (31.8 mm)
10 & 12" (254 - 305 mm)	1¾" (44.5 mm)

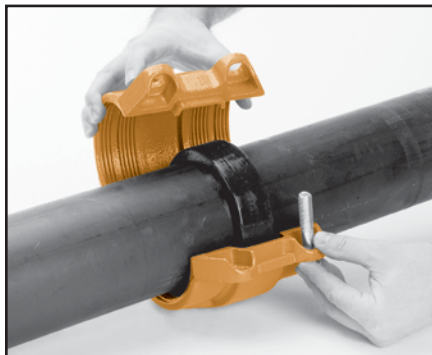
NOTE: Make certain the HDPE pipe end is square cut to 1/8" maximum for the 2" to 4" and 5/32" maximum for the 6" and larger sizes.



2 Check to assure the gasket material is acceptable for the intended service. The Gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Gruvlok Xtreme™ Lubricant. Gruvlok Xtreme™ Lubricant contains silicone. If silicone is unacceptable for the application contact Gruvlok for the lubrication recommendation. Apply a thin coating of Gruvlok Xtreme™ Lubricant to the gasket lip and outside surface of the gasket.



3 Slip the gasket over one of the pipe ends. Make sure the gasket does not overhang the pipe end. Align the second pipe and while keeping the pipes in the butted position slide the gasket back over the second pipe end. The gasket must be positioned centrally between the lines on the pipe ends.



4 Place the Figure 7305 housing casting over the gasket, making sure the tongue on one casting is aligned with the recess of the other casting.



5 Insert the bolts and secure the nuts alternately and uniformly until the bolt pads are in contact. Torque all bolts to the required bolt torque levels. Refer to the Specified Bolt Torque Table. There is no gap between the bolt pads and the bolt torque should be within the range given when the coupling is properly assembled. Alternate and even tightening of the bolts will significantly reduce the torque needed to close the gap at the pipe joint.

SPECIFIED BOLT TORQUE

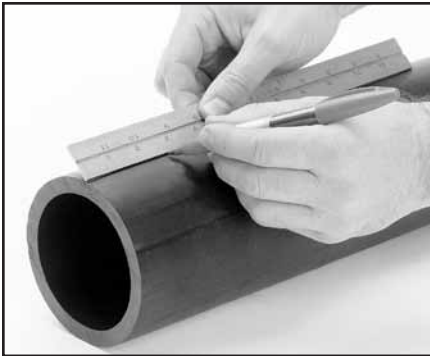
Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7305 SPECIFIED BOLT TORQUE		
Coupling Bolts	Minimum	Maximum
In.	Fl.-Lbs./N-m	Fl.-Lbs./N-m
1/2 x 2 3/8	80 110	100 150
1/2 x 3	80 110	100 150
5/8 x 3 1/2	100 135	130 175
3/4 x 4 3/4	130 175	180 245

FIG. 7307

HDPE Transition Coupling



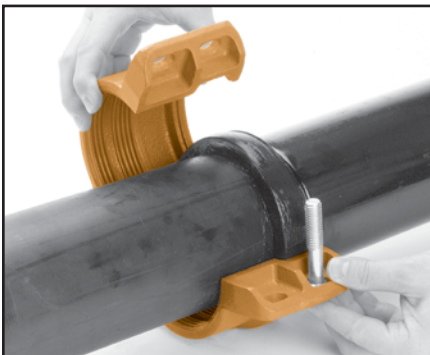
1 Make certain the HDPE pipe end is square cut to $\frac{1}{8}$ " maximum for the 2" to 4" and $\frac{5}{32}$ " maximum for the 6" and larger sizes. The steel pipe must be grooved in accordance with Gruvlok® Grooving Specifications for Steel Pipe. The pipe ends must be free of scratches, indentations, projections or other imperfections, which could prevent proper sealing of the gasket.



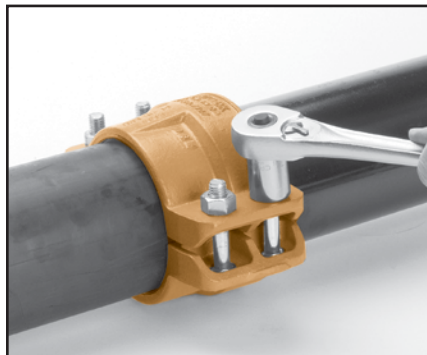
2 Check to assure the gasket material is acceptable for the intended service. The Gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Gruvlok Xtreme™ Lubricant. Gruvlok Xtreme™ Lubricant contains silicone. If silicone is unacceptable for the application contact Gruvlok for the lubrication recommendation. Apply a thin coating of Gruvlok Xtreme™ Lubricant to the gasket lips and outside surface of the gasket.



3 Slip the gasket over one of the pipe ends. Make sure the gasket does not overhang the pipe end. Align the second pipe and while holding it in the butted position, slide the gasket back over the second pipe end. The gasket must be positioned on the gasket seat surface of the grooved steel pipe. Make sure the gasket does not overhang into the pipe groove.



4 Place each half of the coupling housing over the gasket, making sure the housing grooved end is directed into the pipe groove.



5 Insert the bolts and secure the nuts alternately and uniformly until the bolt pads are in contact. Torque all bolts to the required bolt torque levels. Refer to the Specified Bolt Torque Table. There is no gap between the bolt pads and the bolt torque should be within the range given when the coupling is properly assembled. Alternate and even tightening of the bolts will significantly reduce the torque needed to close the gap at the pipe joint.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7307 SPECIFIED BOLT TORQUE

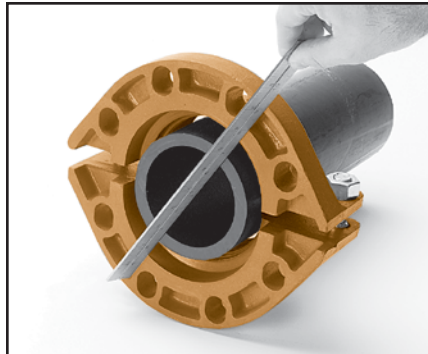
Coupling Bolts	Minimum	Maximum
<i>In.</i>	<i>Ft.-Lbs./N-m</i>	<i>Ft.-Lbs./N-m</i>
$\frac{1}{2} \times 2\frac{3}{8}$	80 110	100 150
$\frac{1}{2} \times 3$	80 110	100 150
$\frac{5}{8} \times 3\frac{1}{2}$	100 135	130 175
$\frac{7}{8} \times 5\frac{1}{2}$	180 245	220 300

FIG. 7312

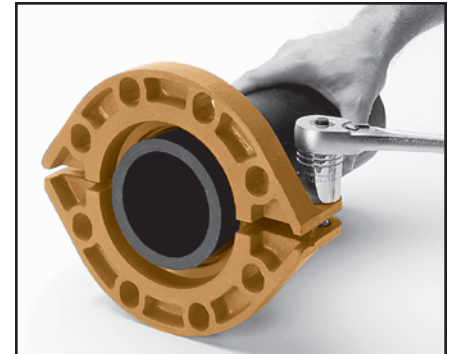
HDPE Flange Adapter

1 Make certain the pipe end is square cut to $\frac{1}{8}$ " maximum for the 4" and $\frac{5}{8}$ " maximum for the 6" and 8" sizes. Inspect the surface of the mating flange to be assured the surface is free of dimensions of the mating flange to be assured that the scratches, indentations, projections, or other imperfections, which could prevent proper sealing of the gasket.

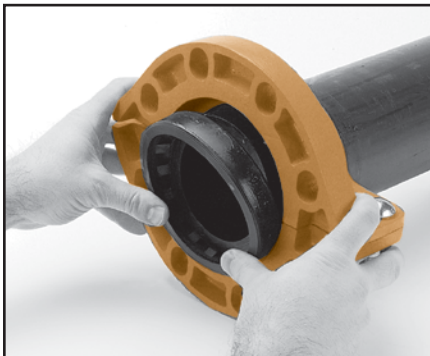
2 Check to assure the gasket material is acceptable for the intended service. The gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Grivlok Xtreme™ Lubricant. Grivlok Xtreme™ Lubricant contains silicone. If Silicone is unacceptable for the application contact Grivlok for the lubrication recommendation. Apply a thin coating of Grivlok Xtreme™ Lubricant to the gasket lips and outside surface of the gasket.



3 Place the housing over the end of the pipe and using a straight edge, align the face and the flange face with the end of the pipe. Do not let the pipe extend beyond the flange face.

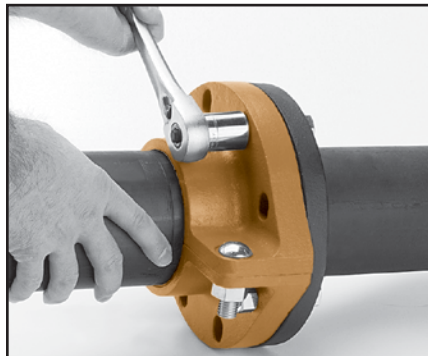


4 Tighten the housing nut until the housing bolt pads make firm metal to metal contact. Torque all bolts to the required latch bolt torque levels. Refer to the Specified Latch Bolt Torque Table.



5 Position the Grivlok Flange gasket around the pipe end and press the gasket into the flange gasket pocket. Be sure the flange sealing lips are facing out.

6 Align the Grivlok Flange bolt holes with the mating flange bolt holes. Insert a standard bolt or stud through one bolt hole and thread the nut on hand tight. Insert the next bolt or stud opposite the first and thread the nut on hand tight. Continue this procedure until all holes have been fitted. Note: Take care to assure the gasket lip is not bent backwards and pinched between the two flanges.



7 Tighten the flange face nuts alternately and evenly so that the flange faces remain parallel and make firm contact around the entire flange. Torque all bolts to the required mating flange joint torque levels. Refer to the Specified Mating Flange Bolt Torque Table.

SPECIFIED BOLT TORQUE FOR LATCH & MATING FLANGE BOLTS

Specified bolt torque is for the latch and mating flange bolts used on Grivlok® flanges. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of latch and mating flange bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

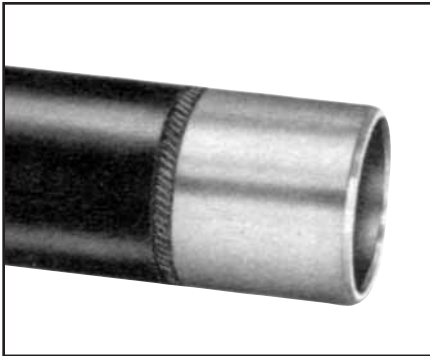
FIG. 7312 LATCH BOLT TORQUE

Latch Bolts	Minimum	Maximum
In.	Ft.-Lbs./N-m	Ft.-Lbs./N-m
$\frac{5}{8} \times 1\frac{5}{8}$	100 135	130 175
$\frac{3}{4} \times 2$	130 175	180 245

FIG. 7312 MATING FLANGE BOLT TORQUE

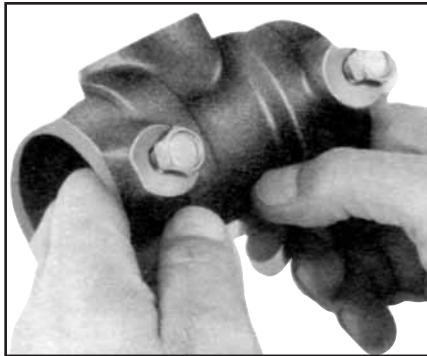
Mating Flange Bolts	Minimum	Maximum
In.	Ft.-Lbs./N-m	Ft.-Lbs./N-m
$\frac{5}{8} \times 3$	110 149	140 190
$\frac{3}{4} \times 3\frac{1}{2}$	220 298	250 339

Gruvlok Sock-It® Fitting

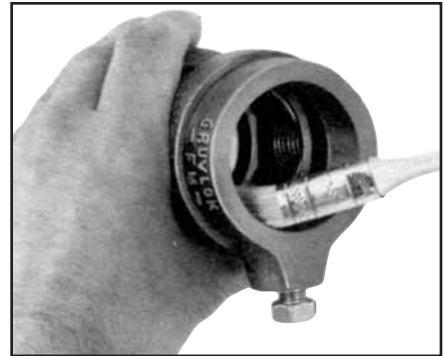


1 Pipe surface shall be cleaned at least 1" from the end of the pipe to remove any coating, indentations, projections, and sharp edges which could affect proper gasket sealing. As a guide for installation, mark the pipe at a distance of 1 1/2" from the end for 1", 1 1/4", and 1 1/2" size fittings and 1 3/4" for the 2" & 2 1/2" size fittings.

NOTE: When Allied XL pipe is used it is necessary only to remove sharp edges and burrs at the end of the pipe. No additional cleaning is required.

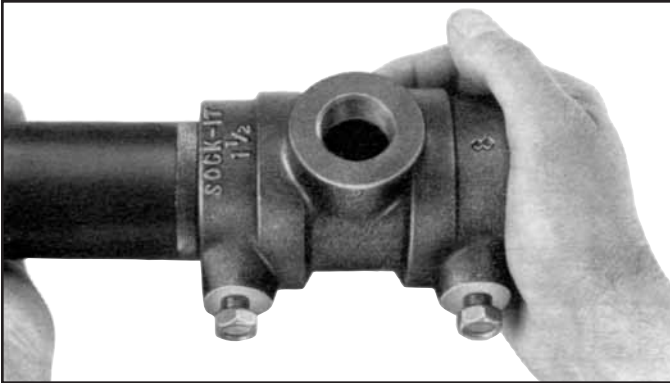


2 Check all lock bolts to be sure they do not extend into the I.D. of the Sock-It Fittings as this would prevent proper insertion of the pipe.



3 Apply a light coating of GRUVLOK Lubricant to the gaskets located in each end of the Sock-It Fitting. Also apply a light coating of lubricant to the pipe ends to further ease insertion of the pipe into the Sock-It Fitting.

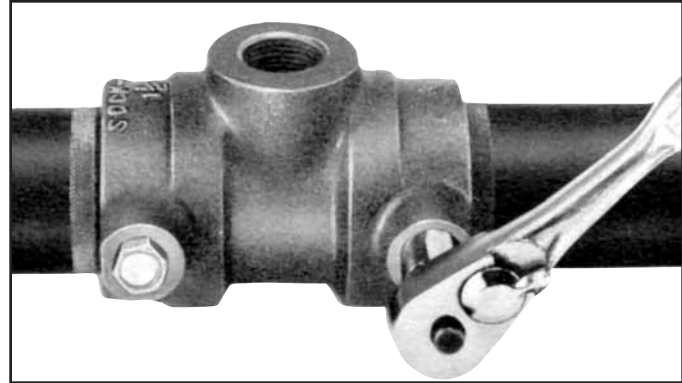
NOTE: Use only Gruvlok Lubricants. Other lubricants may affect gasket performance.



4 Insert the prepped and lubricated pipe end into the Sock-It Fitting until the pipe end makes contact with the internal pipe stop. A slight twist while pushing fitting and pipe together will ease the required insertion force. The end of the Sock-It Fitting should be within 1/16" from the edge of the marking on the pipe. (See Step 1). Rotate the fitting until the desired position is obtained. Tighten the lock bolt until the bolt head bottoms against the threaded boss. (NOTE: The 2 1/2" Sock-It fitting has 2 locking bolts for each pipe end.)

Install the other prepped and lubricated pipe end into the Sock-It fitting in the same manner.

CAUTION: Do NOT hammer fitting on.



5 Sock-It Fittings may be removed by loosening the lock bolts. Reinstallation may be accomplished as described in Steps 1-4.

WARNING: System pressure must be relieved and vented, and the system drained of fluid prior to loosening the lock bolts to remove or reposition the Sock-It Fitting.

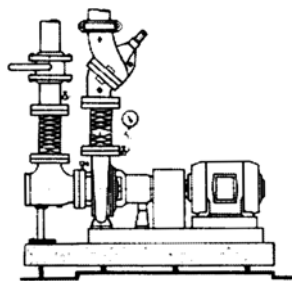
Bolt end must be inspected to assure bolts ability to cut into pipe. Replace bolts in cases where bolt end sharpness has been comprised.

FTV-S (Straight) & FTV-A (Angle Body)

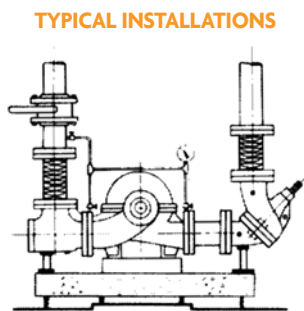
Tri-Service Valve

INSTALLATION:

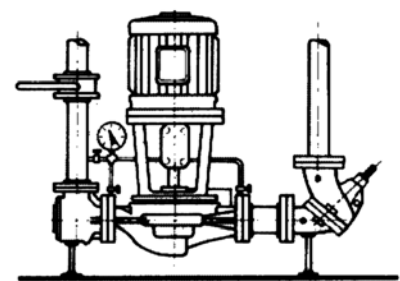
- 1 The valve should be mounted to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12" for pump sizes 2" x 2" to 6" x 6" and 24" for pump sizes 8" x 8" to 12" x 12".
- 2 It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.
- 3 Sufficient clearance around the valve should be left for valve removal or repair.
- 4 Install valve in the direction of the flow arrows on the valve body.
- 5 The valve can be mounted to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
- 6 The Gruvlok Tri-Service valve bodies have anti-rotation lugs on the inlet and outlet. These lugs, combined with the Flange Adapters, provide a ridged rotation free installation.
- 7 The valve body has been designed to handle the weight of the pump on vertical in-line installations. The body is not designed to support the piping weight. It is recommended that the piping be supported by hangers. Pipe supports should be provided under the valve and strainer bodies.



Base-Mounted Single Suction



Base-Mounted Double Suction



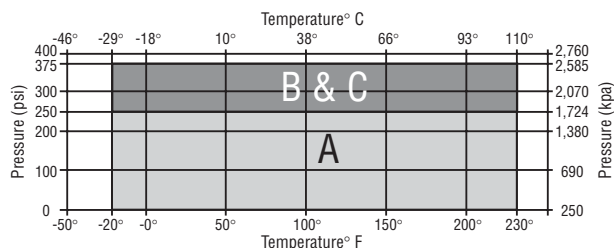
Vertical In-Line

FIELD CONVERSION

(Straight to Angle Pattern Valve)

- 1 Open valve at least one complete turn,
- 2 Remove the body bolts from valve body using Allen Key.
- 3 Rotate one half of the valve body 180° making sure the lower valve seat and "O" Ring stay in position. Inspect the "O" Ring for any cuts or nicks and replace if necessary.
- 4 Replace body bolts and torque evenly to 70 ft./lbs.

PRESSURE - TEMPERATURE LIMITS



Note: for temperatures between 230°F and 300°F (110°C and 149°C) specify Viton Elastomers.

LEGEND	
A	Gruvlok ductile iron flange adapters for ANSI 150# flanges
B	Gruvlok ductile iron flange adapters for ANSI 300# flanges
C	Grooved end with 375 psi rated pipe coupling

FLOW MEASUREMENT

Where approximate indication of flow is acceptable the Gruvlok Tri-Service valve can be used.

FLOW MEASUREMENT VALVE IN WIDE OPEN POSITION

Measure and record the differential pressure across the valve using a Flow Meter with high pressure range transducer or pressure gauges with PMP adapters.

Refer to Tri-Service Performance Curves with valve in full open position (See Determining Flow Rate with Valve in Throttled Position Section on page 165). Locate Pressure Differential on left hand side of chart and extend line horizontally across to valve size being used. Drop line vertically down and read flow rate from bottom of chart.

CAUTION:

Safety glasses should be used and the probe should not be left inserted into fittings for prolonged periods of time (overnight, etc.), as leakage from the PMP may occur when probe is removed.

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

FLANGE ADAPTER INSTALLATION:

1 The Fig. 7012 Gruzlok Flange Adapter can be used with the FTV Tri-Service Valve. Installation is similar to the installation of the Figure 7012 with grooved pipe.



2 Loosen the nut on the latch bolt to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruzlok Flange and place it around the grooved tube with the key section fitting into the groove. The flange gasket cavity must face the tube end.



3 Swing the latch bolt back into the slotted hole. Tighten the nut until the flange halves make solid contact.

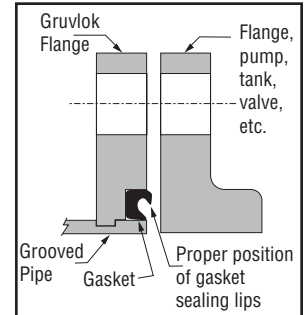


4 Check the gasket grade to verify that it is properly suited for the intended service. Lubricate the entire surface of the gasket and the flange gasket cavity using Gruzlok lubricant. Position the Gruzlok Flange Gasket around the tube end and press the gasket into the cavity between the tube O.D. and the flange recess. The gasket must be properly positioned as shown in Step 5. Be careful that foreign particles do not adhere to lubricated surfaces.



5 The correct positioning and relationship of all components comprising a Gruzlok Flange joint. The Fig. 7012 Gruzlok Flange gasket must be inserted so that the sealing lips face toward the tube end and the mating flange face and away from the Gruzlok Flange itself.

NOTE: Design of the Gruzlok Flange provides sealing only with the special Gruzlok Flange gasket. Only Gruzlok Flange gaskets may be used with Fig. 7012 Gruzlok Flanges.

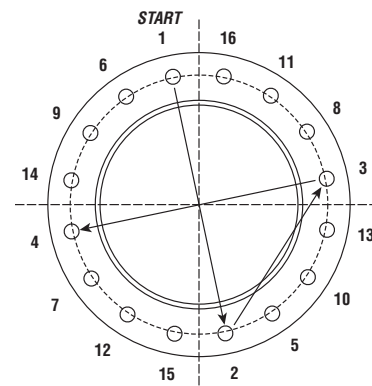


6 Align the Gruzlok Flange bolt holes with the mating flange bolt holes. Insert a standard bolt or stud through the bolt hole, and thread a nut on hand tight. Insert the next bolt or stud opposite the first and again thread the nut on hand tight. Continue this procedure until all holes have been fitted. (See illustration)

NOTE: Take care to assure that the gasket lip is not bent backwards or pinched between the two flanges.



7 Tighten the nuts evenly so that the flange faces remain parallel and make firm even contact around the entire flange. Torque all bolts to required flange joint torque levels.



Recommended Bolt Tightening Sequence

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

DETERMINING FLOW RATE WITH VALVE IN THROTTLED POSITION:

1 Record the size of valve and stem position using the Flow Indicator Scale (See Flow Indicator Section at bottom of page). Calculate percentage of valve opening referring to table below:

VALVE SIZE	2 1/2"	3"	4"	5"	6"	8"	10"	12"
Number of Rings (valve full open)	5	5	6	9	10	12	18	28

2 Measure and record the differential pressure across the valve in the throttled position.

3 Locate percentage of valve opening on the bottom scale of Flow Characteristic Curve. Project line vertically up to intersect with the Valve Characteristic Curve and from this point project line horizontally across to the left of the chart and record the percentage of maximum flow rate.

4 On the Tri-Service Performance Curve locate the differential pressure obtained in Step 2 and project line horizontally across to intercept with Valve Performance Curve. Drop a line vertically down to read the flow rate at the bottom of the chart.

5 To calculate flow rate of valve in the throttled position, multiply the flow rate from Step 4 by the percentage flow rate from Step 2 divided by 100.

Example: Valve size 4 in.

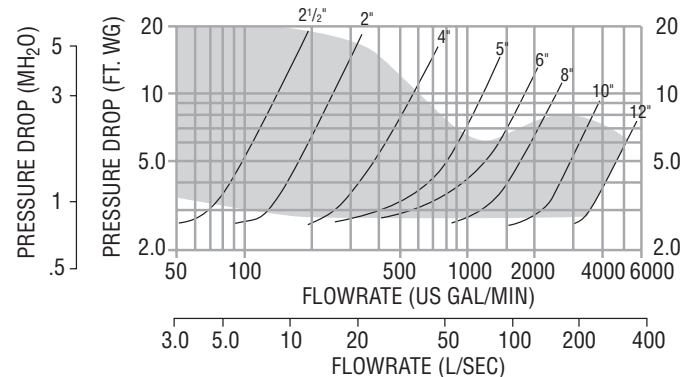
Differential Pressure in 5.4 ft. (1.65 m)

Number of rings open 3, (3 rings / 6 rings X 100) = 50% throttle

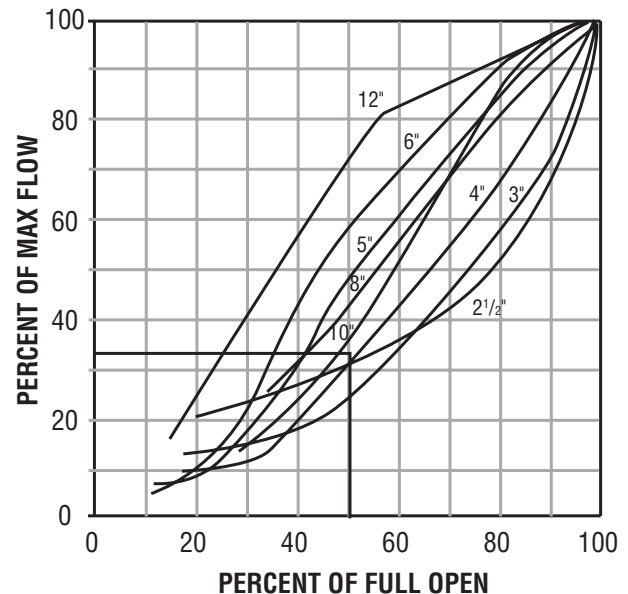
- Solution:**
- From the Tri-Service Performance Curve (fig. 5), a 4 in. valve with 5.4 ft. pressure drop (1.65 m) represents a flow of 400 USgpm (25.2 L/s).
 - From Flow Characteristic Curve (fig. 6), a 4 in. valve, 50% open, represents 34% of maximum flow.
 - Approximate flow of a 4 in. valve, with a 5.4 ft. (1.65 m) pressure drop when 50% throttled is:
 $(400 \times 34) / 100 = 136 \text{ USgpm}$
 $(25.2 \times 34) / 100 = 8.57 \text{ L/sec.}$

Note: To prevent premature valve failure it is not recommended that the valve operate in the throttled position with more than 25 ft. pressure differential. Instead the pump impeller should be trimmed or valves located elsewhere in the system to partially throttle the flow.

**Tri-Service Performance Curve
with Valve in Full Open Position**



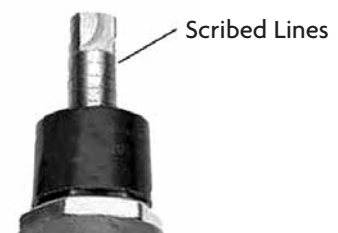
**Inherent Flow Characteristic Curve
with Valve in Throttled Position**



FLOW INDICATOR SCALE

The valve stem with its grooved rings and positioning sleeve indicates the throttled position of the valve. The quarter turn graduations on the sleeve, with the scribed line on the stem, provide for approximate flow measurement.

Note: The valve is shipped in the closed position. The indicator on the plastic sleeve is aligned with the vertical scribed line on the stem.



FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

OPERATION

To assure tight shut off the valve must be closed using a wrench with 25 to 30 ft./lbs of torque.

To assure trouble-free check valve operation and shut off operation, the valve should be periodically opened and closed to keep valve seat and valve disc guide stem free of build up of system contaminants.

REPACKING OF FTV VALVE UNDER FULL SYSTEM PRESSURE

Should it be necessary, stem "O" Ring can be changed under full system pressure.

CAUTION: Safety glasses should be worn.

- 1 Record the valve setting.
- 2 Turn the valve stem counterclockwise until the valve is fully open and will not turn any further. Torque to a maximum force of 45 ft./lbs. This will ensure good metal-to-metal contact and minimum leakage.
- 3 The valve bonnet may now be removed. There may be a slight leakage, as the metal-to-metal backseating does not provide a drip-tight seal.
- 4 Clean exposed portion of valve stem (Do not scratch).
- 5 Remove and replace the "O" Ring and gasket.
- 6 Install the valve bonnet.
- 7 Tightening valve bonnet is necessary to stop any leaks.
- 8 Open valve to balance set point as recorded in Step 1.

MAXIMUM NUMBER OF TURNS FULL OPEN VALVE

On valve sizes 2½" and 3", full open position of valve is 5 turns. However, valve will open to 5½ turns which is just back of seating of valve.

SEAT REPLACEMENT

- 1 Drain system and remove valve from piping.
- 2 Remove the body bolts from the body using an Allen Key.
- 3 Remove seat and "O" Ring. "O" Ring is not used on valves 8" and larger.
- 4 Clean exposed portion of valve stem (Do not scratch).
- 5 Remove and replace the "O" Ring and gasket.
- 6 Inspect and clean "O" Ring cavity and install new "O" Ring and seat. Valve disc stem also should be inspected and replaced if worn. Valve stem "O" Ring should be replaced at this time.

FIG. GBV-S & GBV-T

Five Turn Circuit Balancing Valves

INSTALLATION:

1 Clean the system piping of debris (pipe scale, rust, welding slag) and other contaminants. As with any water system it is important to make provisions to keep the system clean. For optimum operation, air entrapment in the fluid must be removed.

2 The operation of the valve is dependent on the fluid characteristics such as specific gravity and viscosity, which vary with the fluid temperature. For installations using fluids other than 100% water, flow rates must be corrected for the changes created by the fluid medium. See www.anvilintl.com for appropriate correction factors, or call your local Anvil representative.

3 To ensure accuracy of measurement Circuit Balancing Valves (GBV's) should be located at least five pipe diameters downstream from any fitting and at least ten pipe diameters downstream from a pump (as illustrated in Fig. 1).

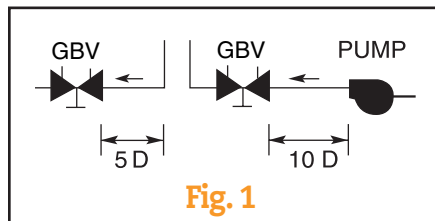


Fig. 1

4 All GBV's are marked with an arrow on the valve body to indicate direction of flow. The arrow must point in the direction of flow for proper operation.

5 GBV's may be installed in horizontal or vertical piping (as illustrated in Fig. 2). Provisions must be made for easy access to the probe metering ports (P.M.P.'s), reading scale, and memory stop.

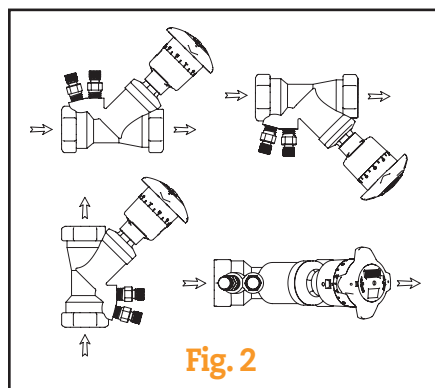


Fig. 2

GBV-S - SWEAT (SOLDER) CONNECTIONS:

6 GBV-S models are supplied with sweat style connections. Caution should be used when sweat style connection valves are installed to prevent overheating the valve.

7 Solder the valve body in line using 95/5 (95% tin, 5% antimony) type solder or equal. Always follow local plumbing codes for installation best practices.

CAUTION:

Before soldering, ensure the valve is opened at least one full turn to avoid damage to the sealing O-ring due to overheating. Anvil recommends that the GBV be protected during installation by wrapping a damp rag around the handle / bonnet assembly prior to soldering the valve into the line.

GBV-T - NPT THREADED CONNECTIONS

6 GBV-T models are tapped with NPT threaded connections. All threaded connections should be sealed using an approved pipe sealant per industry standards. Once the GBV installation has been completed and the system has been filled and purged, each valve loop must be adjusted to the correct flow setting. Employ piping best practice when engaging pipe to threaded valves. Overtightening when installing valves may result in fracturing of the valve body at the threads. (Go to Step 8)

WARNING:

Anvil does NOT recommend leak testing an HVAC system with air due to safety concerns. Testing HVAC systems with pressurized air can be dangerous due to the high compressibility of air, as compared to water.

OPERATION:

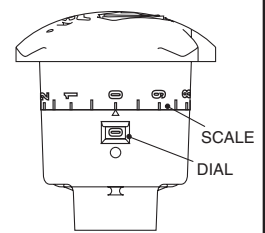
8 Valves are circuit balancing valves that are selected to deliver the correct flow in a piping circuit based on line size and design flow rate.

9 To set the system flow, adjust the handwheel position until the differential pressure reading across the venturi corresponds to the required GPM.

10 The valve operates from fully open to closed by a clockwise rotation of the orange handwheel using five 360° turns. Two indicators describe the position of the valve: the handwheel turns dial and the micrometer scale.

- **"Handwheel Turns" Dial:** This dial is printed on the outer surface of a gearing mechanism located inside the lower half of the handle assembly (Fig. 6). Each complete 360° revolution of the handwheel is visible through a display window and is scaled 0 - 5 to indicate the valve position in terms of the number of full turns. (Fig. 3)
- **Micrometer Scale:** This scale is marked 0 - 9 and is located on the upper half of the handle assembly. Each mark represents 1/10th of a full, 360° turn of opening when lined up with an arrowhead symbol, located above the handwheel turns display window. (Fig. 3)

Fig. 3: GBV setting of 0.0 indicates that the valve is closed. Both the handwheel turns dial and the micrometer scale indicate a valve position reading of 0.



11 The valve is considered "zeroed" when fully closed hand tight. The "0" on the micrometer scale should be within one half of 1/10th of a turn of the arrowhead symbol when the valve is closed hand tight. **DO NOT USE A WRENCH ON THESE VALVES – THEY SHOULD BE OPENED AND CLOSED HAND-TIGHT ONLY!**

Fig. 4: GBV setting of 2.3 indicates that the valve is partially open (2.3 turns open).

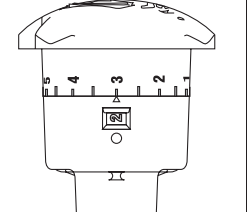
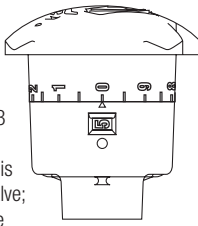


FIG. GBV-S & GBV-T

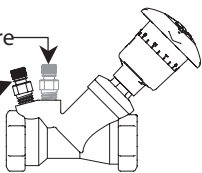
Five Turn Circuit Balancing Valves

Fig. 5: GBV setting of 5.0 indicates that the valve is fully opened. In some cases, the valve may open as much as 5.3 turns, due to the depth of the stem threads. This is not a problem with the valve; however, the performance curves for these GBVs are calibrated only to 5.0 turns.



CAUTION: Hot water leakage can occur from metering ports (P.M.P.s) during probe insertion and hookup of metering device. Wear protective eyewear and clothing to prevent personal injury when measuring pressure.

Low Pressure Port (blue)
High Pressure Port (orange)



12 Connect pressure measuring device to the GBV metering ports as follows:

- Remove protective cap from metering ports (1/4" NPT connection).
- Insert the meter probe into the metering ports. The hose with orange fitting, up stream; the hose with blue fitting downstream.

CAUTION:

When inserting probe, do not bend, as this will cause permanent damage to the probe, adversely affecting the pressure measurement. Do not use any lubrication on the probes when inserting them. If necessary, simply wet the probes with clean water.

The probe should not be left inserted into the fitting for prolonged periods of time, overnight, etc., as leakage of the P.M.P. may occur when the probe is removed.

The locking nut on the probe is designed to hold it in the P.M.P. when taking readings. As sealing is accomplished internally on the probe stem, it is only necessary to tighten the locking nut FINGER-TIGHT. Over-tightening may cause damage to the P.M.P. or locking nut threads.

13 Before taking a measurement reading, set the valve to its fully open position (5.0) or at a preset position. Read the pressure drop across the venturi with a digital meter. Determine flow rate by use of venturi Cv performance curves on page 4 or the Anvil Balancing Slide Rule.

14 The handle of the GBV is not designed to be removable. Do not try to take it off the valve, or it may become damaged. If for any reason, the handle is damaged, replace the entire handle/stem assembly with the appropriate replacement part indicated in the table below.

PART NUMBER	SIZE
871158-010	1/2"
871158-011	3/4"
871158-012	1"
871158-013	1 1/4"
871158-014	1 1/2"
871158-015	2"

MEMORY SETTING:

15 After valve has been properly adjusted and without moving the handwheel, the locking memory stop should be set. The memory stop will allow the valve to be fully closed for isolation and then reopened to the preset flow position.

16 Insert a 2.5 mm (or 3/32") Allen key through the hole provided in the valve's handle cap. (Fig. 6)

17 Turn the setscrew in a clockwise direction until it stops. It is not necessary to tighten. The memory has now been set. This establishes the maximum opening position for this particular valve.

18 The valve may now be closed tightly, as needed, for isolating the piping during system maintenance. To return the valve to its preset "balanced" position, simply open the valve by turning the handwheel counter-clockwise until the handle stops turning (the valve stem inside the handle has hit the memory setscrew). **DO NOT APPLY EXCESSIVE FORCE WHEN REOPENING THE VALVE – OPEN ONLY UNTIL THE VALVE STOPS TURNING UNDER "HAND TIGHT" CONDITIONS. DO NOT USE A WRENCH TO OPEN, CLOSE, OR TIGHTEN VALVES.**

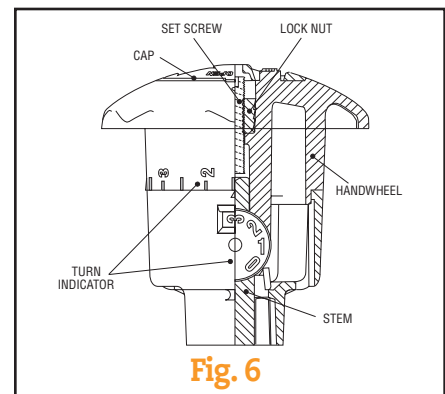
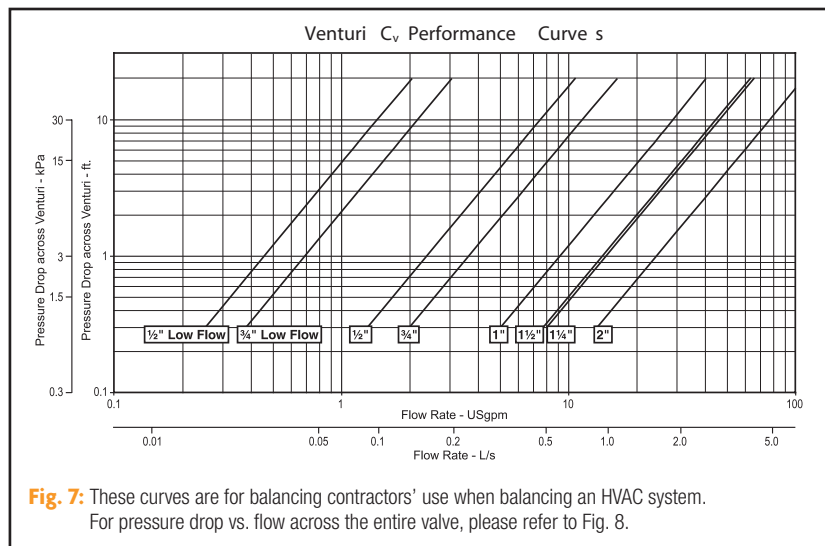


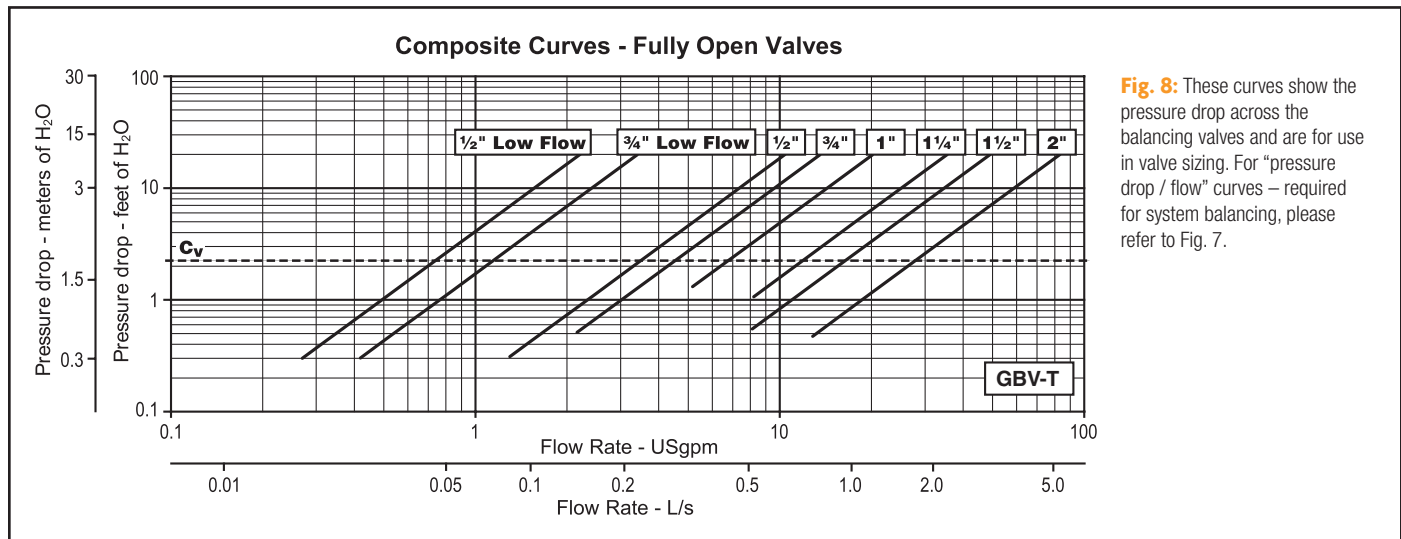
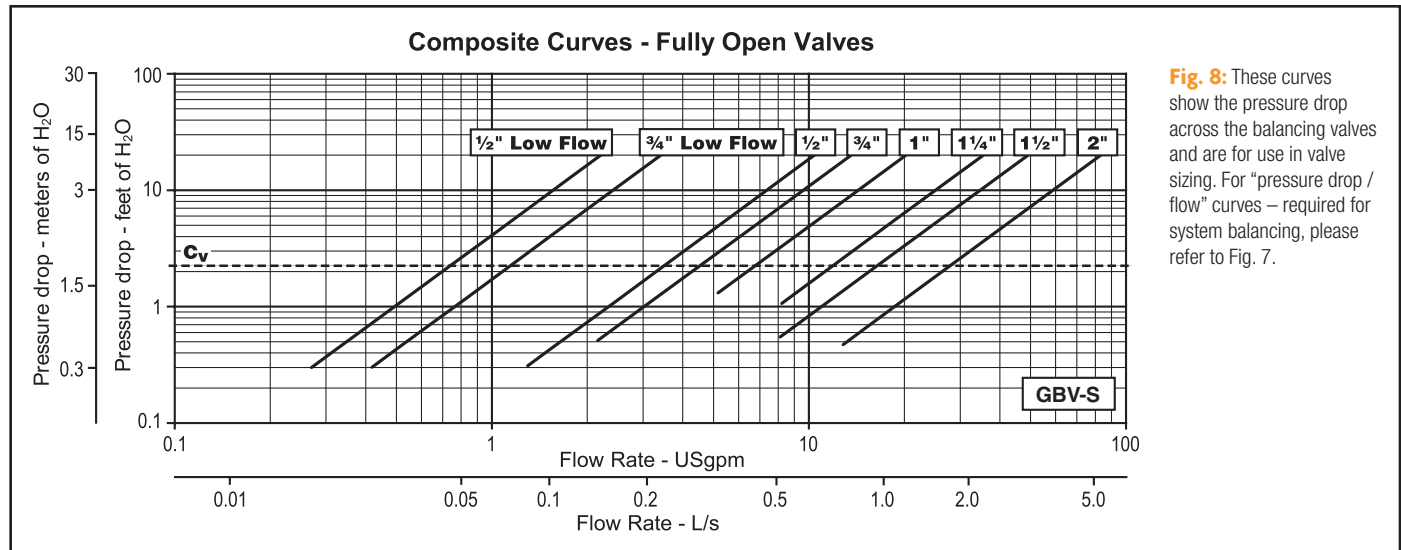
Fig. 6



See next page for Fig. 8 for both the GBV-S & GBV-T and a troubleshooting chart

FIG. GBV-S & GBV-T

Five Turn Circuit Balancing Valves



TROUBLESHOOTING:

Symptom	Likely Cause	Solution
1. Valve is leaking:		
• At the bonnet / body joint	Bonnet O Ring has been damaged.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.
• At the pipe connection	If solder joint - the joint has failed, or was not soldered properly.	Re-solder the connection and recheck for leakage.
	If threaded - the connection is not sufficiently tight, or the valve was over-tightened during installation and the valve body has cracked (fractured).	Tighten and recheck for leakage. Remove and reinstall a new valve, being careful not to over-tighten.
2. Valve does not shut off completely when closed (hand tight).	The seat O ring has been deformed due to overheating during soldering.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.

ANVILFLEX™ FIG. AF21-GG, -GF & -FF

Flex Connectors

Installation

1 Avoid torque. Do not twist the hose assembly during installation when aligning the bolt holes in a flange or in making up pipe threads. The utilization of lap joint flanges or pipe unions will minimize this condition.

2 To install a thread end braided metal hose assembly unions must be used. Do not place wrenches on the braided portion or the collar of the braided metal hose assembly. Use care not to torque the braided metal hose assembly while tightening the union. It is recommended that two wrenches be used in making the union connection; one to prevent the hose from twisting and the other to tighten the coupling.

3 Install the braided metal hose assembly with neutral face-to-face dimension as shown on the submittal drawing. Do not install a braided metal hose assembly compressed (bagged braid). The corrugated inner hose contains the fluid, the braid is designed to take the stress of system pressurization and contain the core.

4 If the braided metal hose assembly must be installed with an initial offset then the maximum allowable movement is reduced by the amount of the initial deflection.

5 Avoid over bending. The repetitive bending of a hose assembly to a radius smaller than the radius specified will result in early hose failure. Always provide sufficient length to prevent over bending and to eliminate strain on the hose assembly. Utilize sound geometric configurations that avoid sharp bends, especially near the end fittings of the assembly.

6 Verify that the movements of the system are within the design parameters of the braided metal hose assembly being installed.

7 Prevent out-of-plane flexing in an installation. Always install the hose assembly so that the flexing takes place in only one plane—this being the plane in which the bending occurs.

8 The maximum system test pressure must not exceed 150% of the maximum rated working pressure as shown.

9 Check system pressure and temperature and do not exceed recommended performance limits. Operation beyond design limits will result in premature failure.

10 The corrugated metal hose alloy must be chemically compatible with the media in the piping system. If in doubt as to suitability, refer to a Chemical Resistance Data table or contact your Gruvlok rep. for guidance.

11 The flanges on a concentric increasing braided metal hose assembly have the bolt holes straddling the hose centerline. The mating flanges should also straddle the centerline to avoid torque on the braided metal hose assembly.

12 When installing weld end, or sweat end, braided metal hose assemblies, or when welding in the area of a braided metal hose assembly, extreme care is necessary to ensure no weld spatter comes in contact with the braided hose sections.

13 A piping system, which utilizes braided metal hose to absorb movement, must be properly anchored and/or guided. Always support the piping to prevent excessive weight from compressing the hose and relaxing the braid tension.

14 Use care when handling the braided metal hose assembly during transportation, storage, and installation. The braided hose sections must not be allowed to bend, deflect, sag, or otherwise extend beyond their rated capabilities.

15 The shipping sticks, on flanged units, are to keep the braided metal hose assembly in its neutral end-to-end dimension during shipping and installation. After installation, the shipping sticks should be removed.

Maintenance

1 The braided metal hose assembly should be inspected during routine maintenance to ensure there are no signs of external damage. Inspect for frayed or broken braid wires. Also inspect to ensure there is no damage to the hose. In the event that such damage is found, the braided metal hose assembly should be replaced.

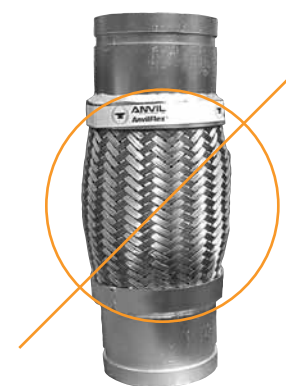
2 During system shutdown braided metal hose assembly should be examined to verify no thermal axial motion has occurred causing compression of the assembly.



Groove x Groove
Proper Installation



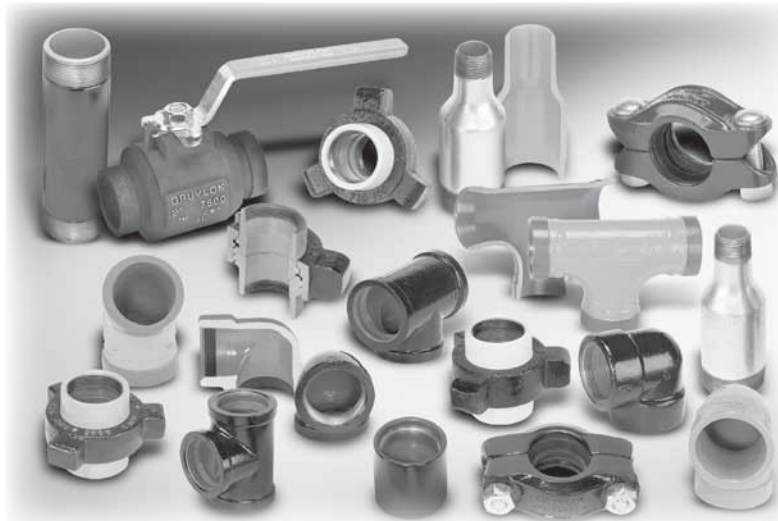
Groove x Groove
Improper Installation
Parallel



Groove x Groove
Improper Installation
Compressed

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- **Scotchcote 134** — A fusion bonded epoxy coating designed to resist wastewater, corrosive soils, hydrocarbons, harsh chemicals, brine and saltwater.
- **Corvel 1660** — Specially designed to protect the inside diameter of tubular goods from corrosive conditions such as H₂S, CO₂, harsh chemicals, brine and saltwater.
- **Additional Coatings** — We offer other coatings as well, including: *Nickel, Chrome, Teflon, Nap-Guard, Powder* and many more.

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- Natural Gas
- Petroleum
- Water and Sewage
- Refineries
- Petrochemical Plants
- Power Plants
- Paper Mills

ANVIL DESIGN SERVICES

offers both Basic and Extended Services...

Contact your Anvil representative for more information.

BASIC SERVICES

Anvil Design Services produces fabrication drawings of mechanical room piping 2½" and larger including chillers, heat exchangers, boilers, and pumps from contractor supplied flow diagrams, mechanical drawings, and approved submittals and specifications.

The drawings include a Bill of Materials with tags referencing the components in the mechanical room. The piping is color coded by service and is represented in 3-D with plan, isometric, and elevation views.

Initially, Anvil personnel meet with you to determine your piping preferences. The project scope and fee is agreed upon in a Design Services contract.

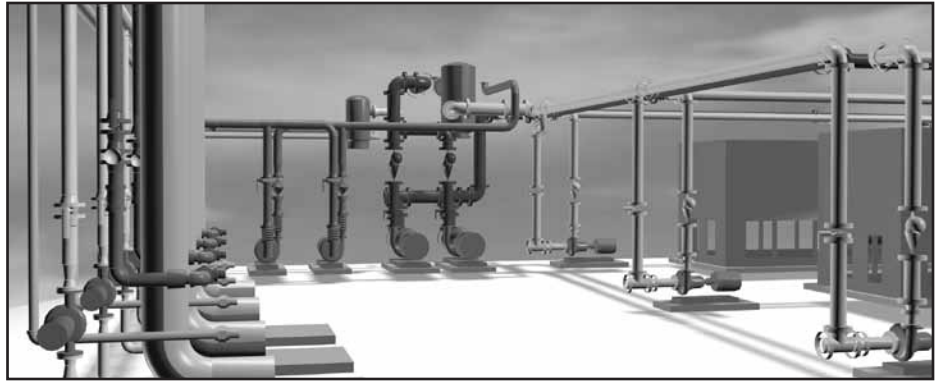
The plans and specifications are then interpreted in terms of economy, accuracy, and compliance. We may suggest modifications in arrangement, construction, equipment location, or product to attain the desired results. Piping layouts are carefully analyzed to determine whether further economies can be attained in the piping system.

Piping drawings are then prepared to determine the most efficient pipe routing, taking equipment location and any interferences into consideration. Preliminary prints are sent to you for revision or approval.

Upon approval, (4) sets of drawings with tags and Bills of Materials of the included system components are sent to you. Copies of the electronic data file of the project drawings are available at no extra charge. This brochure is an example of the finished product.

With Basic Services, you can plan the mechanical room. The preliminary drawings can be taken to coordination meetings with other trades to "reserve" space by "getting in" first. Also, your field supervisor can spend more time supervising and not calculating pipe lengths and pipe routing. The components can be grouped from the finished drawings for better workflow planning.

We usually reduce fitting counts by 10%-15% by moving equipment whenever possible, usually less than a foot. The more movement that is allowed, the more savings can be realized.



EXTENDED SERVICES:

Extended Services include any scope beyond Basic Services. There are many different types of services offered as extended:

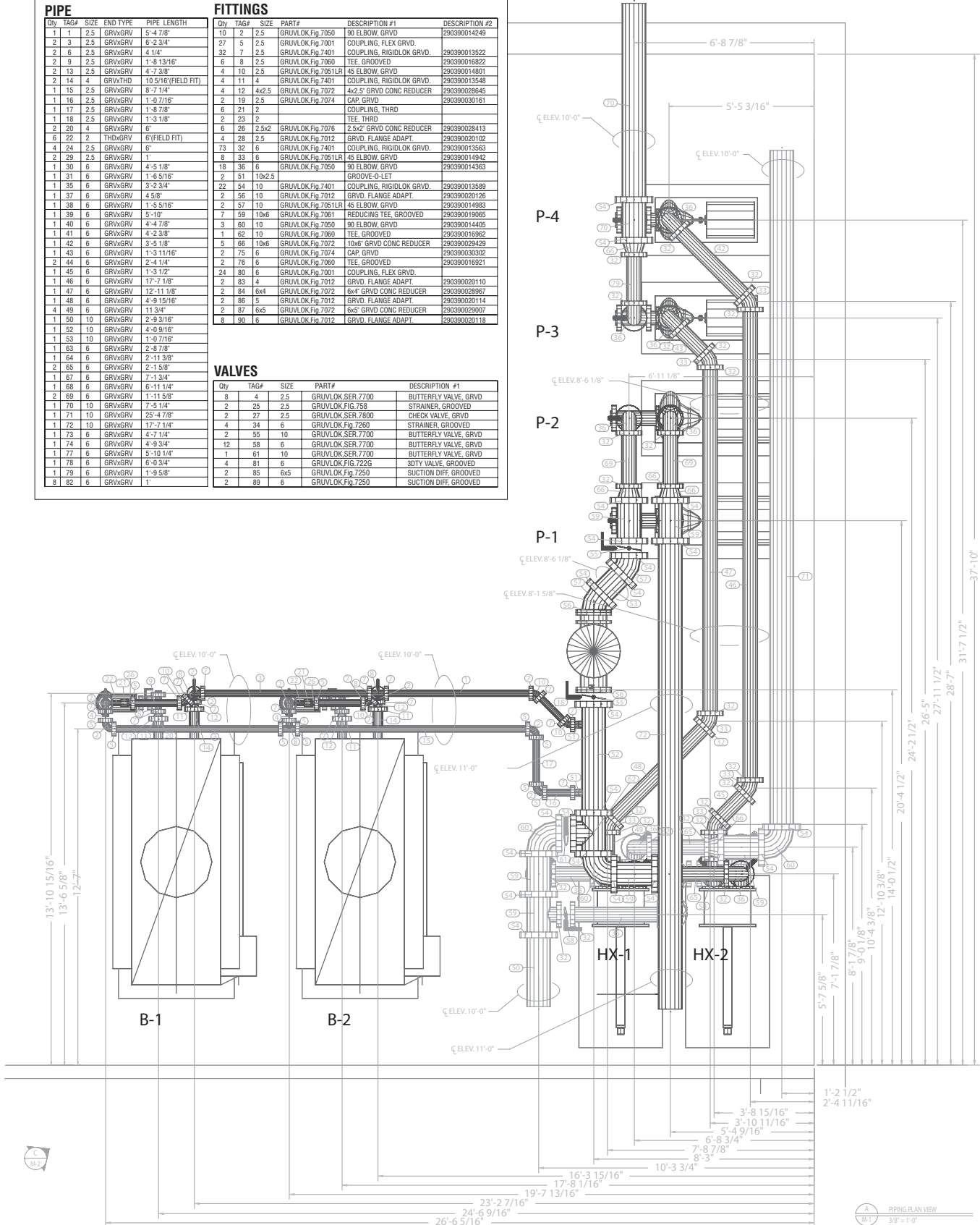
- BOM by component (pump, chiller) or by system
- Unique Tagging – adding unique tags to individual components
- Air Handling Units – with associated ductwork
- Single Line Routing – non-dimensional
- Distribution Piping
- Dimensioned Floor Penetrations
- AWWA Piping - Total Scope
- Commercial Piping
- Oil Field Piping
- Retrofit Projects - Field Survey
- Hybrid Systems
- Anything Else

Contact your Anvil representative for more information.

For a full-size printed brochure with systems coded by color contact your local Anvil representative and ask for Item #105 or visit http://www.anvilintl.com/SharedContent/Pdf/Literature_ProductBrochures/design_brochure.pdf

PIPE				FITTINGS			
Qty	TAG#	SIZE	END TYPE	PIPE LENGTH	Qty	TAG#	SIZE
1	1	2.5	GRVGRV	5'-4 7/8"	10	2	2.5
2	3	2.5	GRVGRV	6'-2 3/4"	27	5	2.5
2	6	2.5	GRVGRV	4'-1 1/4"	32	7	2.5
2	9	2.5	GRVGRV	1'-8 13/16"	6	8	2.5
2	13	2.5	GRVGRV	4'-7 3/8"	4	10	2.5
2	14	4	GRVTHD	10'-5 1/16" (FIELD FIT)	4	11	4
1	15	2.5	GRVGRV	8'-7 1/4"	4	12	4x2.5
1	16	2.5	GRVGRV	1'-0 7/16"	2	19	2.5
1	17	2.5	GRVGRV	1'-8 7/8"	6	21	2
1	18	2.5	GRVGRV	1'-3 1/8"	2	23	2
2	20	4	GRVGRV	6"	6	26	2.5x2
6	22	2	THDGRV	6" (FIELD FIT)	4	28	2.5
4	24	2.5	GRVGRV	8"	73	32	6
2	29	2.5	GRVGRV	1"	8	33	6
1	30	6	GRVGRV	4'-5 1/8"	18	36	6
1	31	6	GRVGRV	1'-6 5/16"	2	51	10x2.5
1	35	6	GRVGRV	3'-2 3/4"	22	54	10
1	37	6	GRVGRV	4'-5 8"	2	56	10
1	38	6	GRVGRV	1'-5 5/16"	2	57	10
1	39	6	GRVGRV	5'-10"	7	59	10x6
1	40	6	GRVGRV	4'-4 7/8"	3	60	10
1	41	6	GRVGRV	4'-2 3/8"	1	62	10
1	42	6	GRVGRV	3'-5 1/8"	5	66	10x6
1	43	6	GRVGRV	1'-3 11/16"	2	75	6
2	44	6	GRVGRV	2'-4 1/4"	2	76	6
1	45	6	GRVGRV	1'-3 1/2"	24	80	6
1	46	6	GRVGRV	17'-7 1/8"	2	83	4
1	47	6	GRVGRV	12'-11 1/8"	2	84	6x4
1	48	6	GRVGRV	4'-9 15/16"	2	86	5
4	49	6	GRVGRV	11'-3/4"	2	87	6x5
1	50	10	GRVGRV	2'-0 3/16"	8	90	6
1	52	10	GRVGRV	4'-0 9/16"			
1	53	10	GRVGRV	1'-0 7/16"			
1	63	6	GRVGRV	2'-8 7/8"			
1	64	6	GRVGRV	2'-11 3/8"			
2	65	6	GRVGRV	2'-1 5/8"			
1	67	6	GRVGRV	7'-1 3/4"			
1	68	6	GRVGRV	6'-11 1/4"			
2	69	6	GRVGRV	1'-11 5/8"			
1	70	10	GRVGRV	7'-5 1/4"			
1	71	10	GRVGRV	25'-4 7/8"			
1	72	10	GRVGRV	17'-7 1/4"			
1	73	6	GRVGRV	4'-7 1/4"			
1	74	6	GRVGRV	4'-9 3/4"			
1	77	6	GRVGRV	5'-10 1/4"			
1	78	6	GRVGRV	6'-0 3/4"			
1	79	6	GRVGRV	1'-9 5/8"			
8	82	6	GRVGRV	1"			

VALVES			
Qty	TAG#	SIZE	PART#
8	4	2.5	GRUVLOK.SER.7700
2	25	2.5	GRUVLOK.FIG.758
2	27	2.5	GRUVLOK.SER.7800
1	72	10	GRUVLOK.FIG.7260
1	73	6	GRUVLOK.SER.7700
1	74	6	GRUVLOK.SER.7700
1	77	6	GRUVLOK.SER.7700
1	78	6	GRUVLOK.FIG.722G
1	79	6	GRUVLOK.FIG.7250
8	82	6	GRUVLOK.FIG.7250



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PIPE

Qty	TAG#	SIZE	END TYPE	PIPE LENGTH
1	1	2.5	GRVxGRV	5'-4 7/8"
2	3	2.5	GRVxGRV	6'-2 3/4"
2	6	2.5	GRVxGRV	4 1/4"
2	9	2.5	GRVxGRV	1'-8 13/16"
2	13	2.5	GRVxGRV	4'-7 3/8"
2	14	4	GRVxTHD	10 5/16"(FIELD FIT)
1	15	2.5	GRVxGRV	8'-7 1/4"
1	16	2.5	GRVxGRV	1'-0 7/16"
1	17	2.5	GRVxGRV	1'-8 7/8"
1	18	2.5	GRVxGRV	1'-3 1/8"
2	20	4	GRVxGRV	6"
6	22	2	THDxGRV	6"(FIELD FIT)
4	24	2.5	GRVxGRV	6"
2	29	2.5	GRVxGRV	1'
1	30	6	GRVxGRV	4'-5 1/8"
1	31	6	GRVxGRV	1'-6 5/16"
1	35	6	GRVxGRV	3'-2 3/4"
1	37	6	GRVxGRV	4 5/8"
1	38	6	GRVxGRV	1'-5 5/16"
1	39	6	GRVxGRV	5'-10"
1	40	6	GRVxGRV	4'-4 7/8"
1	41	6	GRVxGRV	4'-2 3/8"
1	42	6	GRVxGRV	3'-5 1/8"
1	43	6	GRVxGRV	1'-3 11/16"

PIPE

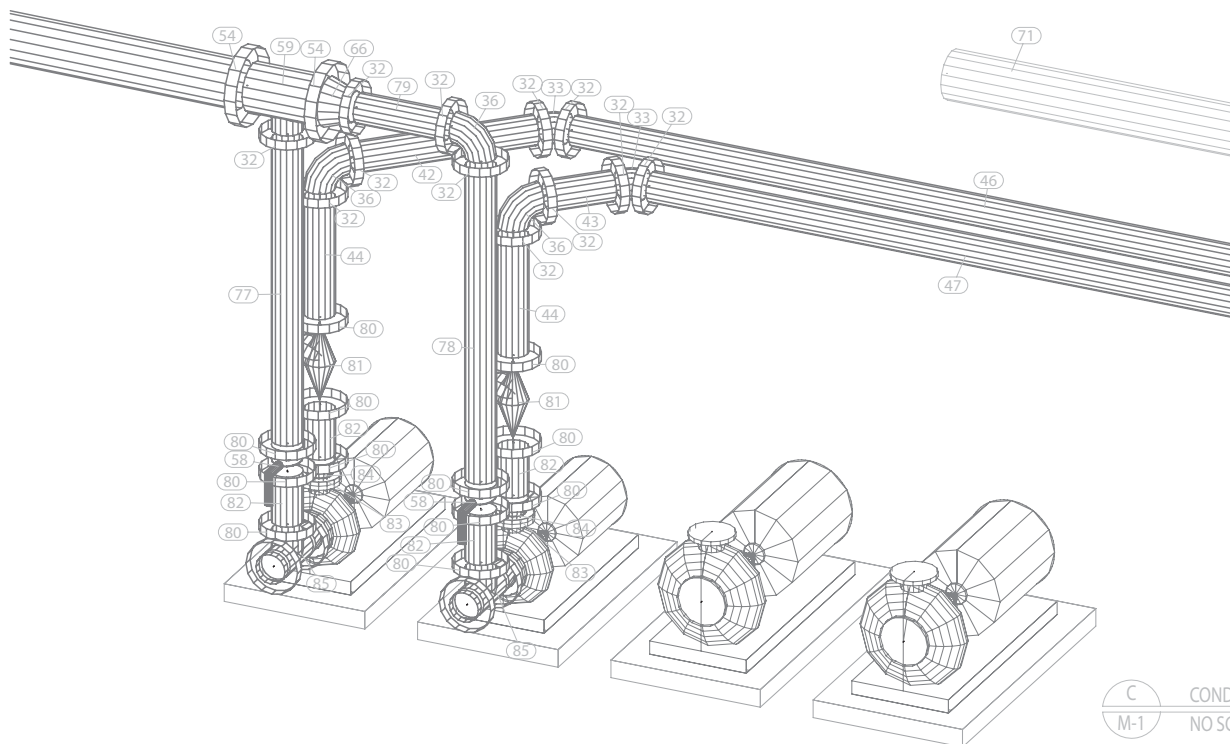
Qty	TAG#	SIZE	END TYPE	PIPE LENGTH
2	44	6	GRVxGRV	2'-4 1/4"
1	45	6	GRVxGRV	1'-3 1/2"
1	46	6	GRVxGRV	17'-7 1/8"
1	47	6	GRVxGRV	12'-11 1/8"
1	48	6	GRVxGRV	4'-9 15/16"
4	49	6	GRVxGRV	11 3/4"
1	50	10	GRVxGRV	2'-9 3/16"
1	52	10	GRVxGRV	4'-0 9/16"
1	53	10	GRVxGRV	1'-0 7/16"
1	63	6	GRVxGRV	2'-8 7/8"
1	64	6	GRVxGRV	2'-11 3/8"
2	65	6	GRVxGRV	2'-1 5/8"
1	67	6	GRVxGRV	7'-1 3/4"
1	68	6	GRVxGRV	6'-11 1/4"
2	69	6	GRVxGRV	1'-11 5/8"
1	70	10	GRVxGRV	7'-5 1/4"
1	71	10	GRVxGRV	25'-4 7/8"
1	72	10	GRVxGRV	17'-7 1/4"
1	73	6	GRVxGRV	4'-7 1/4"
1	74	6	GRVxGRV	4'-9 3/4"
1	77	6	GRVxGRV	5'-10 1/4"
1	78	6	GRVxGRV	6'-0 3/4"
1	79	6	GRVxGRV	1'-9 5/8"
8	82	6	GRVxGRV	1'

FITTINGS

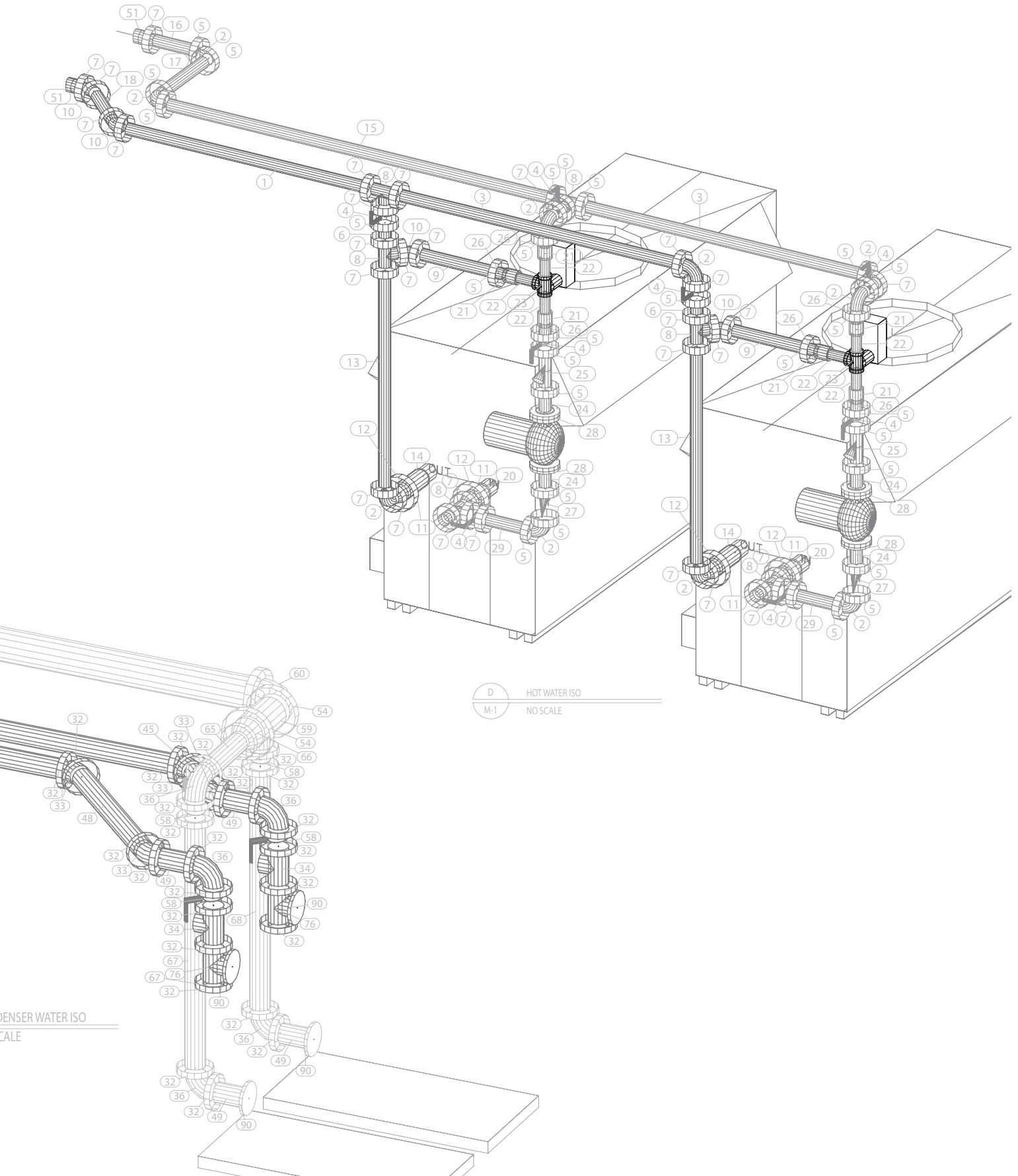
Qty	TAG#	SIZE	PART#	DESCRIPTION #1	DESCRIPTION #2
10	2	2.5	GRUVLOK, Fig.7050	90 ELBOW, GRVD	290390014249
27	5	2.5	GRUVLOK, Fig.7001	COUPLING, FLEX GRVD.	
32	7	2.5	GRUVLOK, Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013522
6	8	2.5	GRUVLOK, Fig.7060	TEE, GROOVED	290390016822
4	10	2.5	GRUVLOK, Fig.7051LR	45 ELBOW, GRVD	290390014801
4	11	4	GRUVLOK, Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013548
4	12	4x2.5	GRUVLOK, Fig.7072	4x2.5" GRVD CONC REDUCER	290390028645
2	19	2.5	GRUVLOK, Fig.7074	CAP, GRVD	290390030161
6	21	2		COUPLING, THRD	
2	23	2		TEE, THRD	
6	26	2.5x2	GRUVLOK, Fig.7076	2.5x2" GRVD CONC REDUCER	290390028413
4	28	2.5	GRUVLOK, Fig.7012	GRVD. FLANGE ADAPT.	290390020102
73	32	6	GRUVLOK, Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013563
8	33	6	GRUVLOK, Fig.7051LR	45 ELBOW, GRVD	290390014942
18	36	6	GRUVLOK, Fig.7050	90 ELBOW, GRVD	290390014363
2	51	10x2.5		GROOVE-O-LET	
22	54	10	GRUVLOK, Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013589
2	56	10	GRUVLOK, Fig.7012	GRVD. FLANGE ADAPT.	290390020126
2	57	10	GRUVLOK, Fig.7051LR	45 ELBOW, GRVD	290390014983
7	59	10x6	GRUVLOK, Fig.7061	REDUCING TEE, GROOVED	290390019065
3	60	10	GRUVLOK, Fig.7050	90 ELBOW, GRVD	290390014405
1	62	10	GRUVLOK, Fig.7060	TEE, GROOVED	290390016962
5	66	10x6	GRUVLOK, Fig.7072	10x6" GRVD CONC REDUCER	290390029429
2	75	6	GRUVLOK, Fig.7074	CAP, GRVD	290390030302
2	76	6	GRUVLOK, Fig.7060	TEE, GROOVED	290390016921
24	80	6	GRUVLOK, Fig.7001	COUPLING, FLEX GRVD.	
2	83	4	GRUVLOK, Fig.7012	GRVD. FLANGE ADAPT.	290390020110
2	84	6x4	GRUVLOK, Fig.7072	6x4" GRVD CONC REDUCER	290390028967
2	86	5	GRUVLOK, Fig.7012	GRVD. FLANGE ADAPT.	290390020114
2	87	6x5	GRUVLOK, Fig.7072	6x5" GRVD CONC REDUCER	290390029007
8	90	6	GRUVLOK, Fig.7012	GRVD. FLANGE ADAPT.	290390020118

VALVES

Qty	TAG#	SIZE	PART#	DESCRIPTION #1
8	4	2.5	GRUVLOK, SER.7700	BUTTERFLY VALVE, GRVD
2	25	2.5	GRUVLOK, FIG.758	STRAINER, GROOVED
2	27	2.5	GRUVLOK, SER.7800	CHECK VALVE, GRVD
4	34	6	GRUVLOK, Fig.7260	STRAINER, GROOVED
2	55	10	GRUVLOK, SER.7700	BUTTERFLY VALVE, GRVD
12	58	6	GRUVLOK, SER.7700	BUTTERFLY VALVE, GRVD
1	61	10	GRUVLOK, SER.7700	BUTTERFLY VALVE, GRVD
4	81	6	GRUVLOK, FIG.722G	3DTY VALVE, GROOVED
2	85	6x5	GRUVLOK, FIG.7250	SUCTION DIFF, GROOVED
2	89	6	GRUVLOK, FIG.7250	SUCTION DIFF, GROOVED



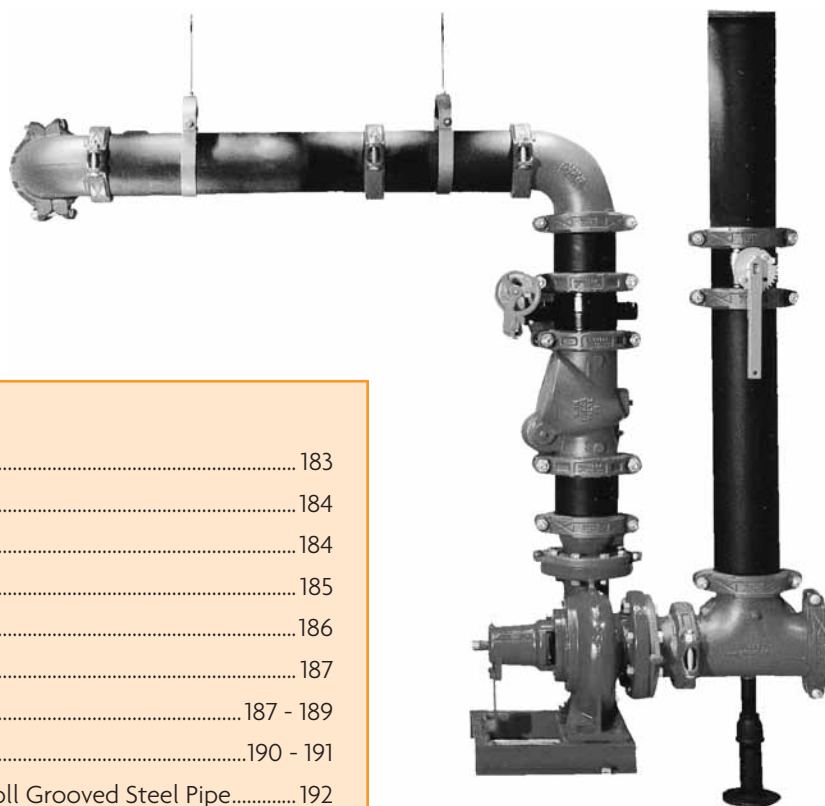
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GRUVLOK® LUBRICANTS

GRUVLOK® XTREME™ LUBRICANT

Gruvlok® Xtreme™ Lubricant has been developed for use with Gruvlok couplings in services where improved lubrication is beneficial. This lubricant has an operating temperature range from -65°F to 400°F (-53.8°C to 204°C), well exceeding the temperature range of Gruvlok gaskets. This lubricant is waterproof, thereby eliminating water wash-out and it will not dry out in the absence of water. There are five primary applications where the Xtreme Lubricant will provide increased benefits: low temperature applications below -20°F (-28.0°C), high temperature applications above 150°F (65.6°C), applications where increased pipe joint flexibility is needed, lubrication of gaskets in copper systems, and for the lubrication of gaskets on HDPE couplings. Since it is formulated from a non-hydro carbon base, it can be used with EPDM, Nitrile and Fluoroelastomer gasket materials. **It is not to be used with Silicone gaskets.**

- In low temperature applications the gasket will shrink, thereby lowering the sealing force on the gasket sealing lips. The temperature change will also force the gasket to slightly reposition itself. This will cause pipe end sealing surfaces, with small cuts or damage, to become more susceptible to leakage. Gruvlok Xtreme Lubricant will maintain it's lubricating properties at lower temperatures allowing a properly lubricated pipe end and gasket (assembly) to reposition itself during temperature cycles.
- For high temperature service and copper systems, it is required that the gasket be lubricated not only on the outside, as with the normal installation of a Gruvlok gasket, but also on the inside. Lubrication on the inside of the gasket is easily accomplished by turning the gasket inside out and applying the lubricant. Gruvlok Xtreme Lubricant will maintain it's lubricating properties at higher temperatures, allowing a properly lubricated pipe end and gasket assembly to re-position itself during temperature cycles. Lubrication of the pipe end and gasket will help the gasket to adjust into the proper sealing position during temperature cycles. The lubricant on the interior of the gasket will act to improve the chemical resistance of the gasket material by providing a thin lubricant barrier between the piping system fluid and the gasket surface. This is particularly important at higher temperatures where oxidizing agents in the piping system become more aggressive. **However, gasket chemical compatibility must still be considered.**
- The Gruvlok Xtreme Lubricant has been formulated from low viscosity, non-petroleum based oils to ease spreading of the lubricant. In applications where pipe movement is expected, proper lubrication of the gasket's exterior assists the gasket into the proper sealing position as pipe system movement occurs. This lubricating film enhances our flexible coupling gasket's ability to compensate for axial, transverse and rotational pipe movements.



- Gruvlok Xtreme Lubricant is the only Gruvlok lubricant that is to be used with Gruvlok couplings and gaskets in HDPE and copper piping systems. It's low temperature capability and lubricity ensure a highly reliable connection.

Gruvlok® Xtreme™ Lubricant is a Teflon® fortified white, tasteless and odorless grease made from Silicone Oil and other ingredients that are safe to ingest. It is sanctioned by the FDA under C.F.R. 21.172.878 & 21.177.1550 (Incidental Food Contact). It is NSF approved for use with potable water.

CAUTION: Silicone based lubricants are not allowed in some facilities. ®Teflon is a registered trademark of Dupont.

GRUVLOK® QUICK DRY LUBRICANT

Gruvlok® Quick Dry Lubricant is a fast drying lubricant that has been developed for applications where the piping system is exposed. The service temperature range for this lubricant is from 0° F to 150° F (-17.8°C to 65.6°C) and may be used with all Gruvlok gasket material grades. The lubricant is made from a water emulsion that is non-toxic, it will not impart taste or odor, and does not support bacterial growth. Gruvlok Quick Dry Lubricant is non-corrosive, non-flammable, and is NSF approved for use with potable water.

This lubricant is easy to apply by brush or hand, and it quickly dries to a thin film when in contact with air. It is water-soluble. The quick drying quality of the lubricant eliminates lubricant drips caused by over lubrication. If necessary, reapply lubricant prior to assembly. Do not thin or mix with solvents.

GRUVLOK® LUBRICANT

Gruvlok® Lubricant is the standard lubricant that has been provided for use with Gruvlok products for years. Gruvlok Lubricant is water soluble, non-toxic, non-corrosive, non-flammable, and will not impart taste or odor. It is NSF approved for use with potable water. This lubricant is acceptable for most applications, however, the Gruvlok Xtreme Lubricant and Gruvlok Quick Dry Lubricant are now available to improve the performance of the couplings and flanges in certain applications.

CAUTION: HDPE pipe requires the use of Gruvlok Xtreme Lubricant and should not be used with Gruvlok Lubricant.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an Impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: Use specified bolt torque unless otherwise indicated on product installation pages.

ANSI SPECIFIED BOLT TORQUE			METRIC SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *	Bolt Size	Wrench Size	Specified Bolt Torque *
<i>In.</i>	<i>In.</i>	<i>Ft.-Lbs.</i>	<i>mm</i>	<i>mm</i>	<i>N-m</i>
3/8	11/16	30-45	M10	16	40-60
1/2	7/8	80-100	M12	22	110-150
5/8	1 1/16	100-130	M16	24	135-175
3/4	1 1/4	130-180	M20	30	175-245
7/8	1 7/16	180-220	M22	34	245-300
1	1 5/8	200-250	M24	36	270-340
1 1/8	1 13/16	225-275			
1 1/4	2	250-300			

* Non-lubricated bolt torques

* Non-lubricated bolt torques

DESIGN FACTORS

MOVEMENT:

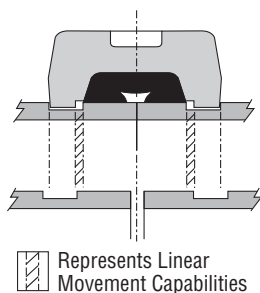
Each flexible design Gruvlok coupling can provide for pipe system movement up to the design maximum for the specific size and type coupling being utilized. Movement is possible in the Gruvlok coupling due

to two factors: (1) designed-in clearance between the key of the coupling and the groove diameter and groove width, and (2) the gap between pipe ends joined by the coupling.

LINEAR MOVEMENT:

FLEXIBLE COUPLING LINEAR MOVEMENT

Linear movement is accommodated within the coupling by allowing the pipe ends to move together or apart in response to pressure thrusts and temperature changes. The available linear movement provided by Standard Gruvlok couplings is shown below:



LINEAR MOVEMENT		
Sizes	Roll Groove Pipe	Cut Groove Pipe
1" through 3 1/2"	1/16"	1/16"
4" through 24"	3/32"	3/16"

RIGID COUPLINGS

Gruvlok rigid couplings Fig. 7400, Fig. 7401 and Fig. 7004 HPR are designed to provide a joint with the attributes of a welded or flanged connection. Therefore, these joints would remain in strict alignment and would resist deflection and linear movement during service.

ANGULAR MOVEMENT:

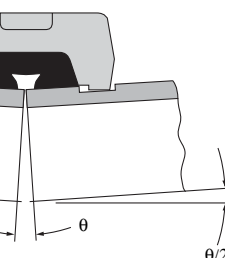
FLEXIBLE COUPLING ANGULAR MOVEMENT

Designed-in clearances allow limited deflection of the pipe joint within the coupling, without introducing eccentric loads into the coupling joint.

The maximum available angular movement of Gruvlok coupling

joints is shown in the performance data for each coupling type. The amount of angular flexibility varies for each coupling size and type. For design purposes the published figures should be reduced by the below

ANGULAR MOVEMENT		
Sizes	Design Factor	
	Roll Groove	Cut Groove
1" through 3 1/2"	Reduce 50%	Reduce 50%
4" through 24"	Reduce 50%	Reduce 25%



listed factors to account for pipe, groove and coupling tolerances.

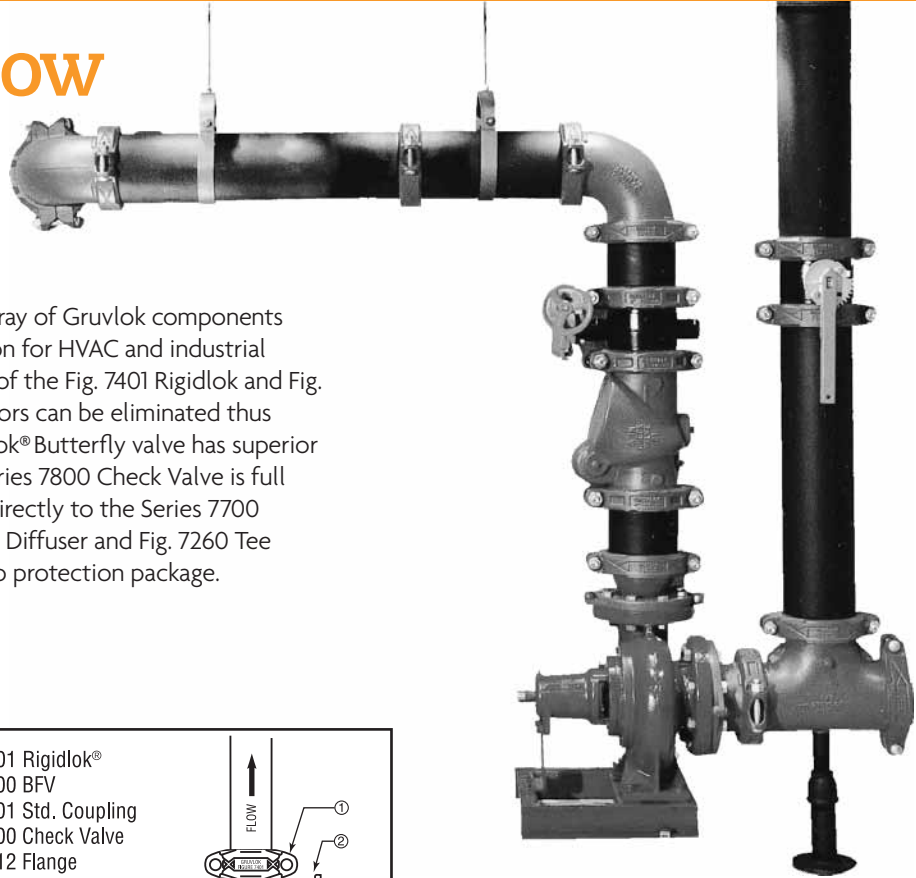
FLEXIBLE COUPLINGS

Figs. 7000, 7001, 7003, 7010 are the flexible couplings provided in the Gruvlok product line. The following information on movement applies to these flexible couplings.

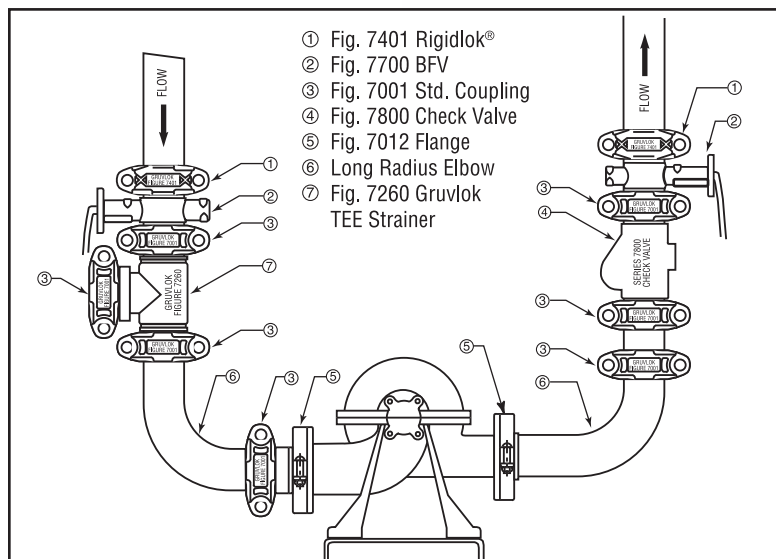
GRUVLOK® FLOW CONTROL

Components

Anvil has put together a complete array of Gruvlok components necessary to provide pump protection for HVAC and industrial piping needs. With the combination of the Fig. 7401 Rigidlok and Fig. 7001 Standard coupling, flex connectors can be eliminated thus reducing cost. The Series 7700 Gruvlok® Butterfly valve has superior flow characteristics. The Gruvlok® Series 7800 Check Valve is full waterway valve and can be stacked directly to the Series 7700 Butterfly Valve. The Fig. 7250 Suction Diffuser and Fig. 7260 Tee Strainer complete the Gruvlok® pump protection package.

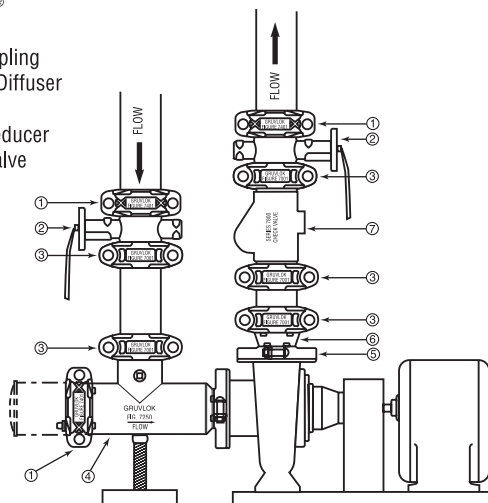


HORIZONTAL SPLIT CASE PUMP

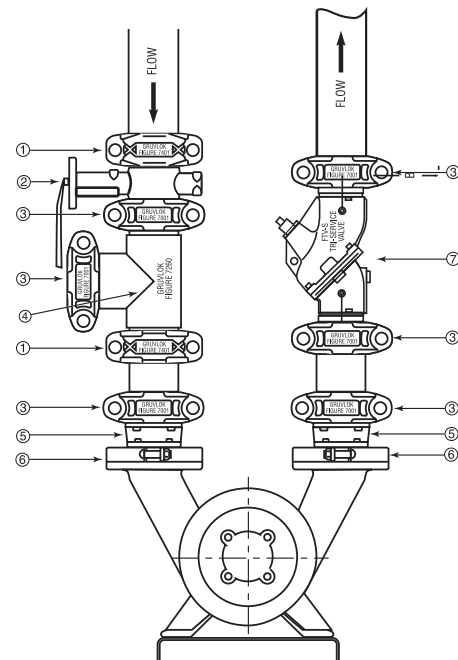


- ① Fig. 7401 Rigidlok®
- ② Fig. 7700 BFV
- ③ Fig. 7001 Std. Coupling
- ④ Fig. 7250 Suction Diffuser
- ⑤ Fig. 7012 Flange
- ⑥ Fig. 7072 Conc. Reducer
- ⑦ Fig. 7800 Check Valve

END SUCTION PUMP



VERTICAL SPLIT CASE PUMP



- ① Fig. 7401 Rigidlok®
- ② Fig. 7700 BFV
- ③ Fig. 7001 Std. Coupling
- ④ Fig. 7260 TEE Strainer
- ⑤ Fig. 7072 Conc. Reducer
- ⑥ Fig. 7012 Flange
- ⑦ FTV-S Tri Service Valve

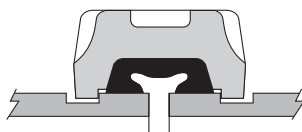
GRUVLOK GASKET-STYLES

Gruvlok offers a variety of pressure responsive gasket styles. Each serves a specific function while utilizing the same basic sealing concept. Proper installation of the gasket compresses the inclined gasket lips on the pipe O.D., forming a leaktight seal. This sealing action is reinforced when the gasket is encompassed and compressed by the coupling housings. The application of internal line pressure energizes the elastometric gasket and further enhances the gasket sealing action.



"C" STYLE

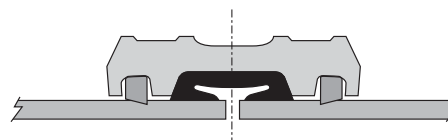
The "C" Style cross section configuration is the most widely used gasket. It is the gasket style provided as standard in many Gruvlok Couplings (Fig. 7000, 7001, 7003, 7004HPR, 7307, 7400 and 7401). Grade "E" and "T" are standard grades while other grades are available for special applications.



ROUGHNECK®

This "C" style gasket is similar in appearance and design to the Standard gasket but is only used with Fig. 7005

Roughneck Couplings and Fig. 7305 HDPE Couplings. The Roughneck gasket is wider, which allows for minor pipe end separation as line pressure sets the grippers into the plain end pipe.

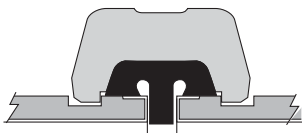


END GUARD®

The projecting rib fits between the ends of lined pipe to prevent damage to unprotected pipe ends during coupling joint assembly.

The E.G. gasket is provided as standard with the Fig. 7004 E.G. Coupling.

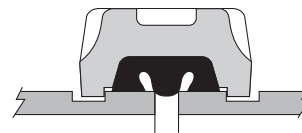
Grade "E" and "T" gaskets are available.



FLUSH GAP®

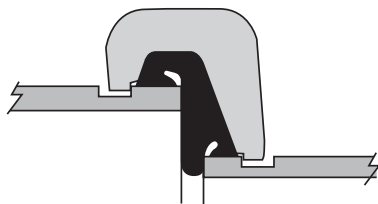
Designed to prohibit contaminants from building up in the gasket cavity.

The centering rib fits flush over the gap between the two pipe ends thus closing off the gasket cavity. It can be used with Fig. 7000, 7001, 7003, 7004, 7400 and 7401 Couplings for many applications. Recommended for use in dry fire protection systems. Not recommended for use at temperatures above 160°F.



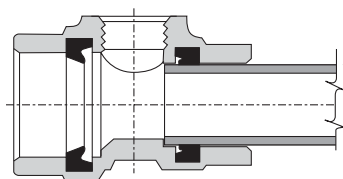
REDUCING COUPLING

The centering rib allows for pipe positioning and serves to keep the smaller pipe from telescoping during installation. Used only with the Fig. 7010 Reducing Coupling.



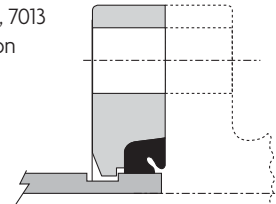
SOCK-IT®

Used in Sock-It fittings only, this pressure energized gasket provides a leak-tight seal on plain end seal pipe. Available in Grade "E" material only.



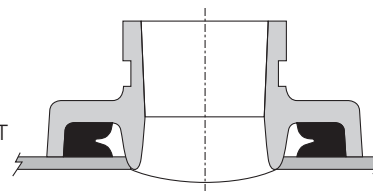
FLANGE

A specially designed gasket for the Fig. 7012, 7013 and 7312 Flange provides for a reliable seal on both the pipe and the mating flange.



CLAMP-T®

These gaskets conform to the curved exterior of the pipe to provide a pressure responsive seal. This unique design is only used with Fig. 7045, 7046 Clamp-T and Fig. 7047, 7048, and 7049 Clamp-T Crosses.

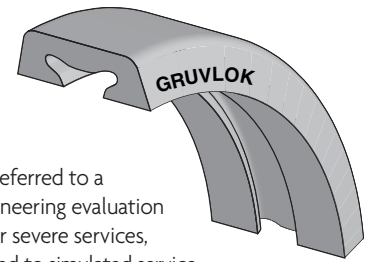


GASKET GRADE INDEX & GASKET RECOMMENDATION

The lists are provided as an aid in selecting the optimum gasket grade for a specific application to assure the maximum service life.

The recommendations have been developed from current information supplied by manufacturers of the elastomers, technical publications, and industry applications. The information supplied should be considered as a basis for evaluation but not as a guarantee.

Selection of the optimum gasket grade for a specific service requires the consideration of many factors; primarily temperature, fluid concentration, and continuity of service. Unless otherwise noted, all gasket recommendations are based on 100°F (38°C) maximum temperature service condition. Where more than one gasket grade is shown, the preferred grade is listed first.



Combinations of fluids should be referred to a Gruvlok Representative for an engineering evaluation and recommendation. In unusual or severe services, gasket materials should be subjected to simulated service conditions to determine the most suitable gasket grade.

Gasket recommendations apply only to Gruvlok gaskets. Contact a Gruvlok Representative for recommendations for services not listed. These listings do not apply to Gruvlok Butterfly Valves.

All Gruvlok products marked with UL/ULC Listed, FM approved VdS and/or LPC symbols are Listed/Approved with EPDM material. For other Listed/Approved materials, please contact a Gruvlok Representative for more information.

GASKET GRADE INDEX

STANDARD GASKETS				
Grade	Temp. Range	Compound	Color Code	General Service Applications
E	-40°F to +230°F (-40°C to 110°C)	EPDM	Green	Water, dilute acids, alkalies, salts, and many chemical services not involving hydrocarbons, oils, or gases. Excellent oxidation resistance. NOT FOR USE WITH HYDROCARBONS
T	-20°F to +180°F (-29°C to 82°C)	Nitrile (Buna-N)	Orange	Petroleum products, vegetable oils, mineral oils, and air contaminated with petroleum oils. NOT FOR USE IN HOT WATER SERVICES

SPECIAL GASKETS				
Grade	Temp. Range	Compound	Color Code	General Service Applications
O	+20°F to +300°F (-20°C to 149°C)	Fluoro Elastomer	Blue	High temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated, hydrocarbons and lubricants
L	-40°F to +350°F (-40°C to 177°C)	Silicone	Red Gasket	Dry, hot air and some high temperature chemical services.
E Type A	-40°F to +150°F (-40°C to 66°C)	Pre-Lubricated	Violet	Wet & Dry (oil free air) Pipe in Fire Protection Systems. For dry pipe systems, Gruvlok Xtreme™ Temperature Lubricant is required

GASKET RECOMMENDATION LISTING

WATER & AIR	
Service	Gasket Grade
Air, (no oil vapors) Temp. -40°F to 230°F (-40°C to 110°C)	E
Air, (no oil vapors) Temp. -40°F to 350°F (-40°C to 177°C)	L
Air, Oil vapor Temp. -20°F to 150°F (-29°C to 66°C)	T
Air, Oil vapor Temp. 20°F to 300°F (-7°C to 149°C)	O
Water, Temp to 150°F (66°C)	E/T
Water, Temp to 230°F (110°C)	E
Water, Acid Mine	E/T
Water, Chlorine	(E/O)
Water, Deionized	E/T
Water, Seawater	E/T
Water, Waste	E/T
Water, Lime	E/T

Where more than one gasket grade is shown the preferred gasket grade is listed first. Where the gasket grade is shown in parentheses, Contact a Gruvlok Representative for an engineering evaluation and recommendation. Specify gasket grade when ordering. Use Gruvlok lubricant on gasket. Check gasket color code to be certain it is recommended for the service intended.

PETROLEUM PRODUCTS	
Service	Gasket Grade
Crude Oil - Sour	T
Diesel Oil	T
Fuel Oil	T
Gasoline, Leaded	T
Gasoline, Unleaded*	(O)
Hydraulic Oil	T
JP-3, JP-4 and JP-5	T/O
JP-6, 100°F (38°C) Maximum Temp.	O
Kerosene	T
Lube Oil, to 150°F (66°C)	T
Motor Oil	T
Tar and Tar Oil	T
Transmission Fluid —Type A	O
Turbo Oil #15 Diester Lubricant	O

Unless otherwise noted, all gasket listings are based upon 100°F (38°C) maximum temperature service conditions.

For services not listed, contact a Gruvlok Representative for recommendation.

*Contact a Gruvlok Representative for service evaluation.

VACUUM SERVICE

VACUUM SERVICE		
Size	Vacuum Level	Gasket Recommendation
1" - 6" (25 - 150mm)	0" - 29.92" Hg	Standard or Flush Gap
8" - 12" (200 - 300mm)	0" - 15 Hg	Standard or Flush Gap
1½" - 12" (40 - 200mm)	0" - 29.92 Hg	Flush Gap

LARGER SIZES: Contact a Gruvlok Representative for more information.

GRUVLOK GASKET-RECOMMENDATIONS

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Acetic Acid 50%	E
Acetic Acid Glacial	L/E
Acetone	E
Acethylene	E/T
Alkalis	T/E
Alums	E/T/O
Aluminum Chloride	E/T
Aluminum Fluoride	E/T/O
Aluminum Hydroxide	E/O
Aluminum Nitrate	E/T
Aluminum Salts	E
Ammonia Gas, Cold	E
Ammonia Liquid	E
Ammonium Chloride	T/E
Ammonium Fluoride	E
Ammonium Hydroxide	E
Ammonium Nitrate	T/E
Amyl Acetate	E
Amyl Alcohol	E
Aniline	E
Animal Fats	T
Argon-Gas	L
Arsenic Acid, to 75%	T/E/O
Barium Carbonate	E/T
Barium Chloride	E/T
Barium Hydroxide	E/T
Barium Nitrate	E/O
Barium Sulphide	E/T
Beet Sugar Liquors	T
Benzene	O
Benzene Sulfonic (Aromatic Acid)	(E)
Benzoic Acid	O
Benzyl Alcohol	E
Benzyl Chloride	E
Black Sulphate Liquor	T
Bleach, 5% Active Cl ₂	E/O
Borax	E/O
Boric Acid	E/T
Bromine	O
Butyl Alcohol	E/T
Butyl Stearate	E
Butylene	T/O
Calcium Bisulfate	T/O
Calcium Bisulphide	T/O
Calcium Bisulphite	T/O
Calcium Carbonate	E/T
Calcium Chloride	E/T
Calcium Hydroxide (Lime)	E/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Calcium Sulfate	E/T
Calcium Sulfide	E/T
Caliche Liquors	E/T
Cane Sugar Liquors	T
Carbitol	E/T
Carbon Dioxide, Dry	E/T
Carbon Dioxide, Wet	E/T
Carbon Monoxide	E
Carbon Tetrachloride	O
Castor Oil	T
Caustic Potash	E
Caustic Soda	E
Cellosolve	E
Chlorine Dry	(O)
Chlorinate Solvents	(O)
Chlorobenzene	O
Chlorobenzene Chloride	O
Chlorobromomethane	O
Chloroform	O
Chrome Alum	E/T
Chrome Plating Solutions	O
Chromic Acid, to 50%	O
Citric Acid	E/T
Coconut Oil	T
Cod Liver Oil	T
Coke Oven Gas	T/O
Copper Carbonate	E/T
Copper Chloride	E/T
Copper Cyanide	E/T
Copper Sulphate	E/T
Corn Oil	T
Cotton Seed Oil	T
Cresole, Cresylic Acid	T/O
Creosote, Coal Tar	(T/O)
Creosote, Wood	T/O
Cupric Chloride	E/T
Cupric Fluoride	E/T
Cupric Sulphate	E/T
Cychohexanol	O
Diacetone Alcohol	E
Dichlorobenzene	O
Dichloroethylene	O
Dioctyl Phthalate	(E)
Epson-Salt	E/T
Ethane	E
Ethanolamine	E
Ethyl Acetate	(E)
Ethyl Alcohol	E/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Ethyl-Chloride	E/T
Ethyl Ether	(T)
Ethylene Chloride	E
Ethylene Chlorohydrin	E
Ethylene Diamine	E/T
Ethylene Dichloride (Dichloroethane)	O
Ethylene Glycol	E/T
Ethylene Oxide	(E)
Ferric Chloride, to 35%	E/T
Ferric Nitrate	E/T
Ferric Sulphate	E/T
Ferrous Chloride	E/T
Fish Oils	T
Fluoroboric Acid	E
Fluorosilicic Acid	E
Fly-Ash	E
Formaldehyde	E/T
Formamide	E/T
Formic Acid	E/O
Freon 11, 130°F (54°C) Max.	T
Freon 12, 113, 114, 115, 130°F (54°C) Max.	T
Fructose	T
Furfuryl Alcohol	(E)
Glucose	E/T
Glue	T
Glycerin	E/T
Glycerol	E/T
Glycol	E/T
Heptane	T
Hexaldehyde	E
Hexane	T
Hexylene Glycol	T
Hydrochloric Acid, to 36%, 75°F (24°C)-Max.	E
Hydrochloric Acid, to 36%, 158°F (70°C)-Max.	(O)
Hydrofluoric Acid, to 75%, 158°F (70°C)-Max.	(O)
Hydrofluosilicic Acid	T/E
Hydrogen Peroxide, to 50%	E/T/O
Hydrogen Peroxide, to 90%	(L/O)
Hydroquinone	T/O
Iodine, -Wet	E
Isoamyl Alcohol	E
Isooctane	T
Isobutyl Alcohol	E
Isopropyl Alcohol	E
Lacquer	(O)
Lacquer Solvent	(O)
Lactic Acid	T
Lard Oil	T

Where more than one gasket grade is shown the preferred gasket grade is listed first.

Where the gasket grade is shown in parentheses, Contact a Gruvlok Representative for an engineering evaluation and recommendation.

Check gasket grade when ordering. Use Gruvlok lubricant on gasket.

Unless otherwise noted, all gasket listings are based upon 100°F (38°C) maximum temperature service conditions. For services not listed, Contact a Gruvlok Representative for recommendation. Check gasket color code to be certain it is recommended for the service intended.

GRUVLOK GASKET-RECOMMENDATIONS (CONT.)

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Latex (1% Styrene &-Butadiene)	O
Lead Acetate	E/T
Linseed Oil	T
Lithium Bromide	T/O
Magnesium Chloride	E/T
Magnesium Hydroxide	E/T
Magnesium Nitrate	E
Magnesium Sulphate	E/T
Malonyl Nitrile	E/T
Mercuric Chloride	E/T
Mercuric Cyanide	E/T
Mercury	E/T
Methyl Acetate	(E)
Methyl Alcohol, Methanol	E/T
Methyl Cellosolve (Ether)	E
Methyl Chloride	(O)
Methyl Ethyl Ketone	(E)
Methyl Formate	E
Methyl Isobutyl Carbinol	E/T
Methyl Isobutyl Ketone	(E)
Mineral Oils	T
Naphtha, 160°F (71°C)-Max.	O
Naphthalene 176°F	O
Nickel Chloride	E/T
Nickel Nitrate	E
Nickel Plating Solution 125°F (52°C)-Max.	E
Nitric Acid, to 10%, 75°F-(24°C)-Max.	E
Nitric Acid, 10-50%, 75°F-(24°C)-Max.	O
Nitric Acid, 50-86%, 75°F (24°C)-Max.	(O)
Nitric Acid, Red Fuming	(O)
Nitro Benzene	(O)
Nitrous Oxide	E
Octyl Alcohol	T
Olive Oil	T
Oxalic Acid	E
Ozone	E
Phenol (Carbolic acid) 300°F (149°C)-Max.	O
Phenylhydrazine	(O)
Phosphate Ester	E
Phosphoric Acid, to 75% & 70°F (21°C)-Max.	E/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Phosphoric Acid, to 85% & 150°F (66°C) Max.	O
Photographic Solutions	T
Potassium Bromide	E/T
Potassium Carbonate	E/T
Potassium Chloride	E/T
Plating Solutions (gold, brass cadmium, copper, lead, silver, tin, zinc)	E
Potassium Chromate	T
Potassium Cyanide	E/T
Potassium Ferricyanide	E/T
Potassium Ferrocyanide	E/T
Potassium Hydroxide	T
Potassium Iodide	E/T
Potassium Nitrate	E/T
Potassium Permanganate, saturated, to 25%	E
Potassium Sulphate	E/T
Propanol	E
Propyl Alcohol	E/T
Propylene Glycol	E/T
Pydraul 312C	O
Pyroguard "C" &-D"	T
Pyroguard 55	E
Pyrrrole	E
Salicylic Acid	E/T
Silver Cyanide	E
Silver Nitrate	E
Skydrol, 200°F (93°C)-Max.	L
Skydrol 500 Phosphate Ester	(L/E)
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/T
Sodium Chloride	E/T
Sodium Cyanide	E/T
Sodium Hydroxide, to 50%	E
Sodium Hypochlorite, to 20%	E
Sodium Metaphosphate	E/T
Sodium Nitrate	E/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Sodium Peroxide	E
Sodium Phosphate	E/T
Sodium Silicate	E/T
Sodium Sulphide	E/T
Sodium Sulphite Solution, to 20%	E/T
Sodium Thiosulphate, "Hypo"	E/T
Soybean Oil	T
Stannous Chloride, to 15%	E/T/O
Starch	E/T
Stearic Acid	T
Styrene	O
Sucrose Solutions	T
Sulphur	E
Sulphuric Acid, to 25%, 150°F (66°C)-Max.	E
Sulphuric Acid, 25-50%, 200°F (93°C) Max.	O
Sulphuric Acid, 50-95%, 150°F-(66°C)-Max.	O
Sulphuric Acid, Fuming	(O)
Sulphuric Acid, Oleum	(O)
Sulphurous Acid	(O)
Tetrachloroethylene	O
Toluene	O
Tributyl Phosphate	(E)
Trichloroethylene, 200°F-(93°C)-Max	O
Triethanolamine	E/T
Trisodium Phosphate	(E/T)
Turpentine 158°F-(70°C)-Max.	T/O
Urea	E/T
Vegetable Oils	T
Vinegar	T
Vinyl Acetate	(E)
White Liquor	E
Xylene (Xylol)-158°F (70°C)-Max.	O
Zinc Sulphate	E/T

Where more than one gasket grade is shown the preferred gasket grade is listed first.
Where the gasket grade is shown in parentheses, Contact a Gruvlok Representative for an engineering evaluation and recommendation.
Check gasket grade when ordering. Use Gruvlok lubricant on gasket.

Unless otherwise noted, all gasket listings are based upon 100°F (38°C) maximum temperature service conditions. For services not listed, Contact a Gruvlok Representative for recommendation. Check gasket color code to be certain it is recommended for the service intended.

MOVEMENT-APPLICATIONS

THERMAL MOVEMENT

A sufficient amount of coupling joints must be provided to accommodate the calculated movement (expansion or contraction) in a pipe run or segment thereof.

EXAMPLE:

A 200 foot long straight run of 4" steel cut grooved pipe between anchor points. Minimum Temperature: 40° F (4.4° C). (at time of installation).

Maximum Oper. Temperature: 160° F (71.1° C).



Thermal expansion tables show this system will expand a total of 1.80" due to the temperature change.

DESIGN QUESTION:

How many couplings are required to account for the thermal growth?

AVAILABLE LINEAR MOVEMENT PER FLEXIBLE COUPLING:

Using the table on page 171, we see that there is 0.188" linear movement per coupling (4" Flexible Coupling)

COUPLINGS REQUIRED

As indicated above, the total movement is 1.80". Thus, the number of couplings is determined as follows:

No. of Couplings = Tot. Movement / Avail. Movement per Coupling

FOR OUR EXAMPLE:

No. of Couplings = (1.80") / (0.187") = 9.6,

Therefore 10 couplings are needed

POSITION OF COUPLINGS

In order for the couplings to provide for the movement indicated by the above example, it would be necessary to install all couplings with the maximum gap between pipe ends. Conversely, if the thermal movement was contraction due to a reduction of system temperature, the coupling joints would have to be installed with the pipe ends butted, thus accommodating the "shrink" of the pipe system.

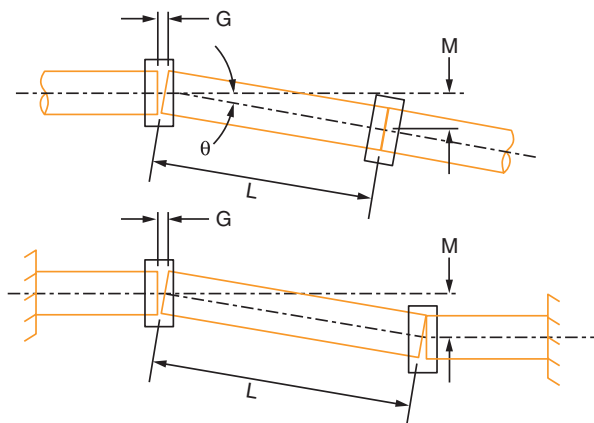
In either case the pipe run in question would have to be anchored at the proper locations to direct pipe system expansion or contraction into the coupling joints.

As can be seen from the above example, the pipe end gap within the coupling joint must be considered when designing a groovedend pipe system to accommodate thermal movement. The couplings do not automatically provide for expansion and contraction of piping.

MISALIGNMENT & DEFLECTION

The angular movement capability of the Gruvlok coupling permits the assembly of pipe joints where the piping is not properly aligned. At least two couplings are required to provide for lateral pipe misalignment. Deflection (longitudinal misalignment) may be accommodated within a single coupling as long as the angle of deflection does not exceed the value shown in the coupling performance data for the particular size and coupling type.

A pipe joint that utilizes the angular deflection capability of the Gruvlok coupling will react to pressure and thermal forces dependent upon the manner in which it is restrained. An unrestrained joint will react to these forces by straightening, thus reducing, if not eliminating, the deflection at the joint. If joint deflection has been designed into the pipe layout and must be maintained, then sufficient anchors must be provided to resist the lateral forces and hold the joint in the deflected condition.



The amount of deflection from pipe run centerline can be calculated utilizing the following equations:

$$M = L (\sin \theta)$$

$$\theta = \text{ArcSin} (G/D)$$

$$M = (G \times L)/D$$

WHERE:

M = Misalignment (inches)

G = Maximum Allowable Pipe End Movement (Inches) as shown under "Performance Data" (Value to be reduced by Design Factor)

θ = Maximum Deflection (Degrees) from centerline as shown under "Performance Data" (Value to be reduced by Design Factor)

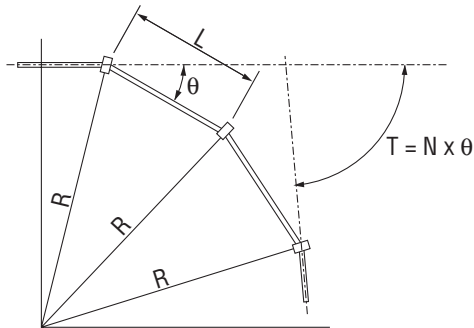
D = Pipe Outside Diameter (Inches)

L = Pipe Length (Inches)

MOVEMENT-APPLICATIONS (CONT.)

CURVE LAYOUT:

Utilizing the angular deflection at each coupling joint curves may be laid out using straight pipe lengths and Gruvlok Couplings.



This example shows how to calculate the curve radius, required pipe lengths, and number of required couplings.

$$R = L / (2 \times \sin(\theta/2))$$

$$L = 2 \times R \times \sin(\theta/2)$$

$$N = T / \theta$$

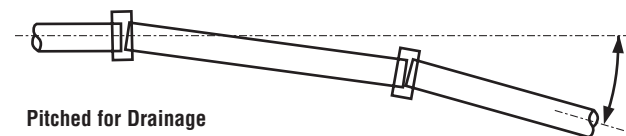
WHERE:

- N = Number of Couplings
- R = Radius of Curve (feet)
- L = Pipe Length (feet)
- θ = Deflection from centerline (Degrees) of each Coupling
(See coupling performance data, value to be reduced by Design Factor)
- T = Total Angular Deflection of all Couplings.

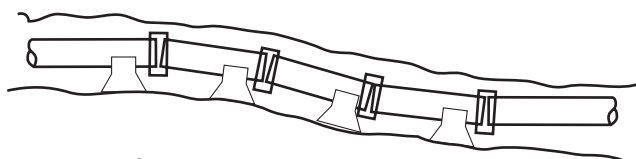
DRAINAGE, BURIED SYSTEMS, ETC.:

The flexible design of the Gruvlok coupling makes it ideal for use in a wide variety of systems in which random changes of the pipe direction can be accommodated by the Gruvlok coupling's angular deflection capability rather than requiring the use of special fittings.

Pitched drainage systems, buried pipe systems where pipe laying conditions are subject to settlement, and exposed pipe systems laid on rough ground are but a few of the many types of pipe installations that present conditions where the functional capability of the Gruvlok coupling are useful.



Pitched for Drainage

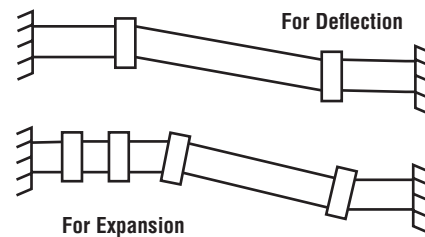


Buried Pipe Systems

COMBINED LINEAR & ANGULAR MOVEMENT:

The clearance in the grooved coupling joint, will allow a limited capability for combined linear and angular movement. A partially deflected joint will not provide full linear movement capability. A fully deflected coupling joint provides no linear movement capability. The Gruvlok coupling will not allow for both maximum linear and maximum angular movement simultaneously.

In systems where both are expected, additional joints may be required.



NOTE: Fully Deflected Joint Will Not Allow For Linear Expansion.

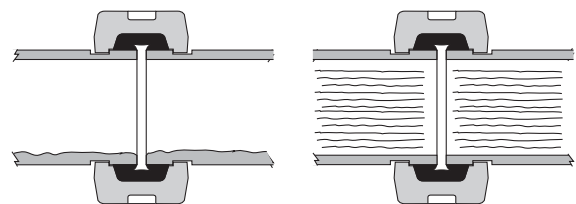
In the example above, two couplings were added to account for thermal expansion and the other couplings accommodate only the misalignment.

The additional stress from the combined movement is therefore relieved.

ROTATIONAL MOVEMENT:

Piping systems designed with Gruvlok Couplings can accommodate minor rotational movement from thermal expansion, settlement, vibration, or other similar movements. However, Gruvlok Couplings **should never be used as a continuous swivel joint.**

EXAMPLE:



Before Pipe Rotation

After Pipe Rotation

Utilizing the rotational capability of the Gruvlok Coupling, the pipe life of a slurry or similar coarse material piping system can be extended.

For pipe rotation, the system must be shut down and internal pressure relieved.

The pipe may then be rotated one-quarter turn, the couplings retightened, and service resumed. If performed on a regular basis, pipe rotation will evenly distribute wear over the entire inner surface of the pipe.

COUPLING WORKING PRESSURE RATING

on Light Wall Roll Grooved Steel Pipe

GRUVLOK COUPLING WORKING PRESSURE RATING (PSI) ON LIGHT WALL ROLL GROOVED STEEL PIPE

Nominal Size	O.D.	Nom. Wall Thickness	Pipe Schedule	Maximum Working Pressure (PSI*)								
				Fig. 7000	Fig. 7001	Fig. 7003	Fig. 7004	Fig. 7010*	Fig. 7012	Fig. 7013	Fig. 7400	Fig. 7401
In./DN(mm)	In./mm	In.	Number	Lightweight	Standard	Hingelok	HPR	Reducing	Flange	Flange	Rigidlite	Rigidlok
1 25	1.315 33.4	0.065	5	300	500	—	—	—	—	—	175	—
		0.085	XL	300	300	—	—	—	—	—	300	—
		0.109	10	600	750	—	—	—	—	—	300	—
1¼ 32	1.660 42.2	0.065	5	300	500	—	—	—	—	—	175	—
		0.085	XL	300	300	—	—	—	—	—	300	—
		0.109	10	600	750	—	—	—	—	—	300	—
1½ 40	1.900 48.3	0.065	5	300	500	200	—	—	—	—	175	500
		0.090	XL	300	300	250	—	—	—	—	300	300
		0.109	10	600	750	300	—	—	—	—	300	750
2 50	2.375 60.3	0.065	5	300	500	200	500	250	200	500	175	500
		0.090	XL	300	300	250	300	300	300	300	300	300
		0.109	10	600	750	300	800	350	300	720	300	750
2½ 65	2.875 73.0	0.083	5	300	500	200	500	250	200	500	175	500
		0.130	XL	300	300	250	300	300	300	300	300	300
		0.120	10	600	750	300	800	350	300	720	300	750
3 80	3.500 88.9	0.083	5	300	500	200	500	250	200	500	175	500
		0.130	XL	300	300	250	300	300	300	300	300	300
		0.120	10	600	750	300	800	350	300	720	300	750
3½ 90	4.000 101.6	0.083	5	300	500	—	—	—	—	—	—	—
		0.120	10	600	750	—	—	—	—	—	—	—
4 100	4.500 114.3	0.083	5	300	500	200	400	200	200	500	175	500
		0.120	10	600	750	300	600	300	300	720	300	750
5 125	5.563 141.3	0.109	5	250	400	200	400	200	200	400	175	400
		0.134	10	500	500	250	600	300	300	500	300	500
6 150	6.625 168.3	0.109	5	250	350	150	400	200	200	350	175	350
		0.134	10	400	500	200	500	300	300	500	300	500
		0.188	—	400	500	200	700	350	300	500	300	500
8 200	8.625 219.1	0.109	5	250	300	150	300	150	200	300	175	300
		0.148	10	350	400	200	400	250	300	400	175	400
		0.188	—	350	400	200	500	300	300	400	300	400
		0.250	20	350	500	250	600	300	300	500	300	500
10 250	10.750 273.1	0.134	5	—	250	—	300	—	200	250	—	250
		0.165	10	—	350	—	400	—	200	350	—	350
		0.188	—	—	350	—	400	—	300	350	—	350
		0.250	20	—	400	—	500	—	300	400	—	400
12 300	12.750 323.9	0.156	5	—	200	—	200	—	200	200	—	200
		0.180	10	—	350	—	300	—	200	350	—	350
		0.188	—	—	350	—	300	—	300	350	—	350
		0.250	20	—	400	—	400	—	300	400	—	400
14 350	14.000 355.6	0.156	5	—	125	—	—	—	125	—	—	125
		0.250	10	—	250	—	—	—	250	—	—	250
		0.312	20	—	275	—	—	—	250	—	—	275
16 400	16.000 406.4	0.165	5	—	125	—	—	—	100	—	—	100
		0.250	10	—	175	—	—	—	175	—	—	175
		0.312	20	—	275	—	—	—	250	—	—	275
18 450	18.000 457.2	0.250	10	—	100	—	—	—	100	—	—	100
		0.312	20	—	175	—	—	—	175	—	—	175
20 500	20.000 508.0	0.250	10	—	100	—	—	—	100	—	—	100
		0.375	20	—	300	—	—	—	250	—	—	250
24 600	24.000 609.6	0.250	10	—	75	—	—	—	75	—	—	75
		0.375	20	—	300	—	—	—	250	—	—	250

Maximum line pressure, including surge, to which a joint should be subjected on pipe roll grooved to standard roll grooving specification with coupling properly assembled. For coupling performance on standard wall steel pipe, refer to individual Gruvlok Coupling performance listing.

* Rating based on larger pipe size.

COUPLING WORKING PRESSURE RATING

on Roll Grooved ISO Size Steel Pipe

GRUVLOK COUPLING WORKING PRESSURE RATING (BAR) ON ROLL GROOVED ISO SIZE STEEL PIPE											
Nominal Size	O.D.	Nom. Wall Thickness	Maximum Working Pressure (bar)								
			Fig. 7000	Fig. 7001	Fig. 7003	Fig. 7004	Fig. 7010*	Fig. 7012	Fig. 7013	Fig. 7400	Fig. 7401
In./DN(mm)	In./mm	mm	Lightweight	Standard	Hingelok	HPR	Reducing	Flange	Flange	Rigidlite	Rigidlok
1 25	1.315 33.4	1.8 3.2	20.7 41.4	34.5 51.7	— —	— —	— —	— —	— —	12.1 20.7	— —
1¼ 32	1.660 42.2	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	— — —	— — —	— — —	— — —	— — —	12.1 20.7 20.7	— — —
1½ 40	1.900 48.3	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	— — —	— — —	— — —	— — —	12.1 20.7 20.7	34.5 51.7 51.7
2 50	2.375 60.3	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
2½ 65	2.875 73.0	2.0 3.2 5.0	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
3 O.D. 76.1	2.996 76.1	2.0 3.2 5.0	20.7 41.4 41.4	34.5 51.7 69.0	— — —	— — —	— — —	13.8 20.7 20.7	— — —	12.1 20.7 20.7	34.5 51.7 51.7
3 80	3.500 88.9	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
3½ 90	4.000 101.6	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	— — —	— — —	— — —	— — —	— — —	— — —	— — —
4 100	4.500 114.3	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	27.6 41.4 82.3	13.8 20.7 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
4¼ O.D. 108.0	4.250 108.0	2.0 3.2 5.6	20.7 41.4 41.4	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —
5 125	5.563 141.3	2.9 3.6 6.3	17.2 34.5 34.5	27.6 34.5 69.0	10.3 13.8 20.7	27.6 41.4 82.3	13.8 20.7 24.1	13.8 20.7 20.7	27.6 34.5 69.0	12.1 20.7 20.7	27.6 34.5 51.7
5¼ O.D. 133.0	5.236 133.0	2.9 3.6 6.3	17.2 34.5 34.5	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —
5½ O.D. 139.7	5.500 139.7	2.9 3.6 6.3	17.2 34.5 34.5	— — —	— — —	— — —	— — —	13.8 20.7 20.7	— — —	12.1 20.7 20.7	— — —
6 150	6.625 168.3	2.9 3.6 7.1	17.2 27.6 27.6	24.1 34.5 69.0	10.3 13.8 20.7	27.6 34.5 82.3	13.8 20.7 24.1	13.8 20.7 20.7	24.1 34.5 69	12.1 20.7 20.7	24.1 34.5 51.7
6¼ O.D. 159.0	6.259 159.0	2.9 3.6 7.1	17.2 27.6 27.6	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —
6½ O.D. 165.1	6.500 165.1	2.9 3.6 7.1	17.2 27.6 27.6	24.1 34.5 69.0	— — —	— — —	— — —	13.8 20.7 20.7	— — —	12.1 20.7 20.7	24.1 34.5 51.7
8 200	8.625 219.1	2.9 5.0 8.0	17.2 24.1 24.1	20.7 34.5 55.2	10.3 13.8 20.7	20.7 35.4 69	10.3 24.1 24.1	13.8 20.7 20.7	20.7 34.5 55.2	12.1 20.7 20.7	20.7 34.5 51.7
10 250	10.750 273.1	3.6 5.0 8.0	— — —	17.2 24.1 55.2	— — —	20.7 27.6 55.2	— — —	13.8 20.7 20.7	17.2 24.1 55.2	— — —	17.2 24.1 51.7
12 300	12.750 323.9	4.0 5.0 8.0	— — —	17.2 24.1 55.2	— — —	13.8 20.7 55.2	— — —	13.8 20.7 20.7	17.2 24.1 55.2	— — —	17.2 24.1 51.7
14 350	14.000 355.6	4.0 6.3 8.8	— — —	8.6 17.2 20.7	— — —	— — —	— — —	8.6 17.2 20.7	— — —	— — —	8.6 17.2 20.7
16 400	16.000 406.4	4.0 6.3 8.8	— — —	6.9 12.1 20.7	— — —	— — —	— — —	6.9 12.1 20.7	— — —	— — —	6.9 12.1 20.7
18 450	18.000 457.2	5.0 6.3 8.8	— — —	5.2 6.9 17.2	— — —	— — —	— — —	5.2 6.9 17.2	— — —	— — —	5.2 6.9 17.2
20 500	20.000 508.0	5.0 6.3 8.8	— — —	3.4 6.9 17.2	— — —	— — —	— — —	3.4 6.9 17.2	— — —	— — —	3.4 6.9 17.2
24 600	24.000 609.6	5.0 6.3 8.8	— — —	1.7 5.2 17.2	— — —	— — —	— — —	1.7 5.2 17.2	— — —	— — —	1.7 5.2 17.2

Maximum line pressure, including surge, to which a joint should be subjected on pipe roll grooved to standard roll grooving specification with coupling properly assembled. For coupling performance on standard wall steel pipe, refer to individual Gruvlok Coupling performance listing.

* Rating based on larger pipe size.

COUPLING & FLANGE WORKING PRESSURE RATING

on 304 and 316 Stainless Steel Roll Grooved Pipe

The following are pressure ratings for Gruvlok Stainless Steel Piping Systems. The ratings for Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10 Stainless Steel pipe. Using roll sets that were designed for roll grooving standard wall pipe may

significantly reduce the pressure ratings that can be obtained. The Model 1007/3007 roll groovers require the use of the optional Schedule 10 roll set to groove Schedule 5S and 10S. For grooving Schedule 40S on the Model 1007/3007 roll groovers, the standard steel roll grooving set should be used.

**GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI)
ON 304 AND 316 STAINLESS STEEL ROLL GROOVED PIPE**

Nominal Pipe Size	Pipe O.D.	Nominal Wall Thickness	Pipe Schedule Number	Coupling and Flanges									
				Fig. 7000 Lightweight	Fig. 7001 Standard	Fig. 7003 Hingelok	Fig. 7004 HPR	Fig. 7010* Reducing	Fig. 7012 Flange	Fig. 7013 Flange	Fig. 7400 Rigidlite	Fig. 7401 Rigidlok	Fig. 7400SS Coupling
In./DN(mm)	In./mm	Inches	—	PSI									
1 25	1.315 33.4	0.065	5S	400	400	—	—	—	—	—	300	—	—
		0.109	10S	400	500	—	—	—	—	—	300	—	—
		0.133	40	500	750	—	—	—	—	—	300	—	—
1¼ 32	1.660 42.4	0.065	5S	400	400	—	—	—	—	—	300	—	275
		0.109	10S	500	500	—	—	—	—	—	300	—	300
		0.140	40	500	750	—	—	—	—	—	300	—	300
1½ 40	1.900 48.3	0.065	5S	400	400	275	—	—	—	—	300	400	275
		0.109	10S	500	500	300	—	—	—	—	300	500	300
		0.145	40	500	750	300	—	—	—	—	300	750	300
2 50	2.375 60.3	0.065	5S	250	325	250	325	250	250	275	250	325	275
		0.109	10S	500	500	300	500	500	300	300	300	500	300
		0.154	40	500	750	300	750	500	300	300	300	750	300
2½ 65	2.875 73.0	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.203	40	500	750	300	750	500	300	300	300	750	300
3 80	3.500 88.9	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.216	40	500	750	300	750	500	300	300	300	750	300
4 100	4.500 114.3	0.083	5S	200	250	200	250	200	200	250	200	250	200
		0.120	10S	300	400	300	400	300	300	300	300	400	300
		0.237	40	500	750	300	750	500	300	300	300	750	300
5 125	5.563 141.3	0.109	5S	125	200	125	200	125	125	200	125	200	—
		0.134	10S	200	300	200	300	200	200	300	200	300	—
		0.258	40	300	500	300	500	300	300	300	300	500	—
6 150	6.625 168.3	0.109	5S	75	125	75	125	75	75	125	75	125	125
		0.134	10S	200	200	200	200	200	200	200	200	200	250
		0.280	40	300	500	300	500	300	300	300	300	500	275
8 200	8.625 219.1	0.109	5S	50	75	50	75	50	50	75	50	75	75
		0.148	10S	150	200	150	200	150	150	200	150	200	150
		0.322	40	300	400	300	400	300	300	300	300	400	275
10 250	10.750 273.0	0.134	5S	—	50	—	50	—	50	50	—	50	—
		0.165	10S	—	100	—	100	—	100	100	—	100	—
		0.365	40	—	400	—	400	—	300	300	—	400	—
12 300	12.750 323.9	0.156	5S	—	75	—	75	—	50	75	—	75	—
		0.180	10S	—	125	—	125	—	100	125	—	125	—
		0.375	40	—	400	—	400	—	300	300	—	400	—

- Notes:**
- 1) Pressure ratings based on ASTM A312 Type 304 stainless steel pipe or equivalent.
 - 2) Failure to use Rollers specifically designed for Stainless Steel Pipe may significantly reduce pressure retention capabilities.
 - 3) Pressure ratings on cut grooved pipe meet or exceed the schedule 40 pressure ratings listed above. For information regarding higher ratings contact Anvil.
 - 4) * For pressure ratings on Figure 7010 Reducing Couplings use larger pipe size.
 - 5) For pressure ratings for the reducing tees, concentric reducers and eccentric reducers, use the rating of the weakest end.
 - 6) Pressure ratings on schedule 10 stainless steel pipe may be increased by using Anvil's 1007/3007 roll groovers with the schedule 10 roller set. Contact Anvil for details.

PIPE SUPPORT

When designing the hangers, supports and anchors for a grooved end pipe system, the piping designer must consider certain unique characteristics of the grooved type coupling in addition to many universal pipe hanger and support design factors. As with any pipe system, the hanger or support system must provide for

- 1) the weight of the pipe, couplings, fluid and pipe system components;
- 2) reduce stresses at pipe joints; and
- 3) permit required pipe system movement to relieve stress.

The following factors should be considered when designing hangers and supports for a grooved-end pipe system.

PIPE HANGER SPACING:

The following charts show the maximum span between pipe hangers for straight runs of standard weight steel pipe filled with water or other similar fluids.

Do not use these values where critical span calculations are made or where there are concentrated loads between supports.

HANGER SPACING LINEAR MOVEMENT NOT REQ'D	
Nominal Pipe Size Range	Maximum Span Between Supports
In./DNmm	Feet/meters
1 25	7 2.1
1¼-2 32-50	10 3.0
2½-4 65-100	12 3.7
5-8 125-200	14 4.3
10-12 250-300	16 4.9
14-16 350-400	18 5.5
18-24 450-600	20 6.1

For straight runs without concentrated loads and where full linear movement is **NOT** required use the table on right.

For straight runs without concentrated loads and where full linear movement **IS** required use the following tables.

HANGER SPACING - FLEXIBLE SYSTEM, STEEL PIPE FULL LINEAR MOVEMENT IS REQ'D AVERAGE HANGERS PER PIPE LENGTH EVENLY SPACED										
Nominal Pipe Size Range	Pipe Length in Feet/Meters									
	In.	7	10	12	15	20	22	25	30	40
1-2 25-50	DNmm	2.1	3.3	3.7	4.6	6.1	6.7	7.6	9.1	12.2
1-2 25-50	1	2	2	2	3	3	4	4	5	6
2½-4 65-100	1	1	2	2	2	2	2	3	4	4
5-24 125-600	1	1	1	2	2	2	2	3	3	3

HANGER SPACING - RIGID SYSTEMS SUGGESTED MAXIMUM SPAN BETWEEN SUPPORTS								
Nominal Size	Steel Pipe Suggested Maximum Span Between Supports-Feet/Meters						Copper Tube	
	Water Service			Air Service			Water Service	Gas & Air Service
In./DNmm	*	**	***	*	**	***	**	**
1 25	7 2.1	9 2.7	12 3.7	9 2.7	10 3.0	12 3.7	—	—
1¼ 32	7 2.1	11 3.4	12 3.7	9 2.7	12 3.6	12 3.7	—	—
1½ 40	7 2.1	12 3.7	15 4.6	9 2.7	13 4	15 4.6	—	—
2 50	10 3	13 4	15 4.6	13 4	15 4.6	15 4.6	9 2.7	12 3.6
2½ 65	11 3.4	15 4.6	15 4.6	14 4.3	17 5.1	15 4.6	9 2.7	12 3.6
3 O.D. 76.1	11 3.4	15 4.6	15 4.6	14 4.3	17 5.1	15 4.6	—	—
3 80	12 3.7	16 4.8	15 4.6	15 4.6	19 5.7	15 4.6	10 3	14 4.2
3½ 90	13 4	18 5.4	15 4.6	15 4.6	21 6.3	15 4.6	—	—
4 100	14 4.3	18 5.4	15 4.6	17 5.2	21 6.4	15 4.6	12 3.7	17 5.1
4¼ O.D. 108.0	14 4.3	18 5.4	15 4.6	17 5.2	19 5.7	15 4.6	—	—
5 125	16 4.9	20 6.0	15 4.6	20 6.1	24 7.3	15 4.6	13 4	18 5.7
5¼ O.D. 133.0	15 4.6	18 5.5	15 4.6	19 5.2	22 6.6	15 4.6	—	—
5½ O.D. 139.7	16 4.9	19 5.8	15 4.6	20 6.1	24 7.3	15 4.6	—	—
6 150	17 5.2	21 6.3	15 4.6	21 6.4	26 7.8	15 4.6	14 4.2	21 6.3
6¼ O.D. 159.0	16 4.9	20 6.0	15 4.6	20 6.1	24 7.3	15 4.6	—	—
6½ O.D. 165.1	17 5.2	21 6.3	15 4.6	21 6.4	25 7.6	15 4.6	—	—
8 200	19 5.8	23 6.9	15 4.6	24 7.3	29 8.7	15 4.6	—	—
10 250	19 5.8	25 7.5	15 4.6	24 7.3	33 9.9	15 4.6	—	—
12 300	23 7	26 7.8	15 4.6	30 9.1	36 10.8	15 4.6	—	—
14 350	23 7	26 7.8	15 4.6	30 9.1	37 11.1	15 4.6	—	—
16 400	27 8.2	26 7.8	15 4.6	35 10.7	40 12.0	15 4.6	—	—
18 450	27 8.2	27 8.1	15 4.6	35 10.7	42 12.6	15 4.6	—	—
20 500	30 9.1	27 8.1	15 4.6	39 11.9	45 13.5	15 4.6	—	—
24 600	32 9.8	26 7.8	15 4.6	42 12.8	48 14.7	15 4.6	—	—

* Spacing by ANSI-B31.1 Power Piping Code.

** Spacing by ANSI-B31.9 Building Service Piping Code, (1996 Edition), Fig. 921.1.3c, Table a, 250 psi and Fig. 921.1.3D, table a

*** Spacing by NFPA-13 Installation of Sprinkler Systems, (1999 Edition), Table 6-2.2.

PIPE SUPPORT

Considerations for the Hanging or Supporting of Grooved Piping Systems

Grooved piping products have a very good maintenance track record out in the field. Whenever there is a “perceived” problem with installed grooved product, a high percentage are often related to the hanging or supporting method or application chosen. Although supported very similarly to welded piping systems, a few considerations should be given to assure the proper selection and application of hangers and supports used on a grooved piping system such as Anvil’s Gruvlok® brand.

REVIEW REQUIREMENTS AND LOGISTICS

A variety of hangers and supports are typically used on grooved piping systems, ranging from a simple band hanger, clevis hanger, and trapeze supports to more intricate rack designs using structural steel or a mechanical framing/strut system. All of these are acceptable hanging or supporting methods but they are dependent on the project’s type, design and specification requirements. With this in mind, a vital first step is to refer to the project and code requirements when choosing the proper hanging or supporting method.

Project logistics is another consideration regardless of system type. Quite often hangers and supports are an after thought on a project simply because the big-ticket items, such as labor, major equipment and schedule, are the focus of the project team. However, hangers and supports are one of the first components needed on a project since you cannot hang pipe without them.

In nearly every hanger or support assembly there are three components that make up the assembly. These components are an upper attachment (beam or structural attachment), intermediate attachment (rod, couplings, eye nuts, etc.) and the lower attachment (pipe clamps, U-bolts, trapezes). See accompanying illustrations for examples of typical assemblies. All three components should arrive on the project site together and early. To save costly field labor hours, consideration might be given to having the hangers or supports pre-assembled by the manufacturer or fabricated in the contractor’s shop. Components can also be bundled and tagged by system or area of the project so they can be easily assembled and located on-site.

MAKE A MATCH

The type of grooved coupling used on a project is the next consideration to choosing the correct hanger or support method. The proper maximum spacing allowables governed by project specifications, the applicable code and/or the hanger manufacturer’s recommendations all must also be reviewed. Flexible couplings used on horizontal runs of pipe need to be supported at every coupling and usually require intermediate supports to satisfy the maximum spacing allowable requirements. Rigid couplings, on the other hand, can be hung or supported based on the maximum spacing requirements only. In addition, wherever there is a change in direction of the piping system a hanger or support is usually required immediately following that change in direction and then the system is hung or supported accordingly.

PRESSURE POINT

System pressurization should also be reviewed when choosing the proper hanging or support method. As the couplings are installed, the pipe ends can either be butted up tight to one another or a gap can exist. Once the system is pressurized, those areas or joints where the pipe ends are butted up tight and held by a grooved coupling can “pop” or grow to the maximum gap depending on the coupling chosen. The joint at a flexible grooved coupling can expand about $\frac{1}{4}$ " at each coupling whereas the joint at a rigid grooved coupling can grow about $\frac{3}{32}$ ". If there is a long run of horizontal or vertical pipe with multiple joints the overall length of the system will grow depending upon which grooved coupling you have chosen.

For example, if you have a grooved piping system that is 400 ft. long there will be roughly 19 grooved joints (assuming 21 ft. lengths of pipe are used). If you multiply the number of joints by the growth of each joint you can determine the overall growth of the system due to pressurization. If it is a flexible system, 19 joints x .25" = 4.75" of overall growth. A rigid system would be 19 joints x .0938" = 1.78" of overall growth.

As one can see, this growth due to pressurization can have a significant impact on the hangers or supports used on a project. One way to avoid this growth is to install the grooved joints at full gap so that pressurization has no impact at testing or start up. If this is not possible, then periodic air pressurization as the system is installed will expand the grooved joints to full gap and the hangers or supports can be adjusted accordingly.

HOT AND COLD

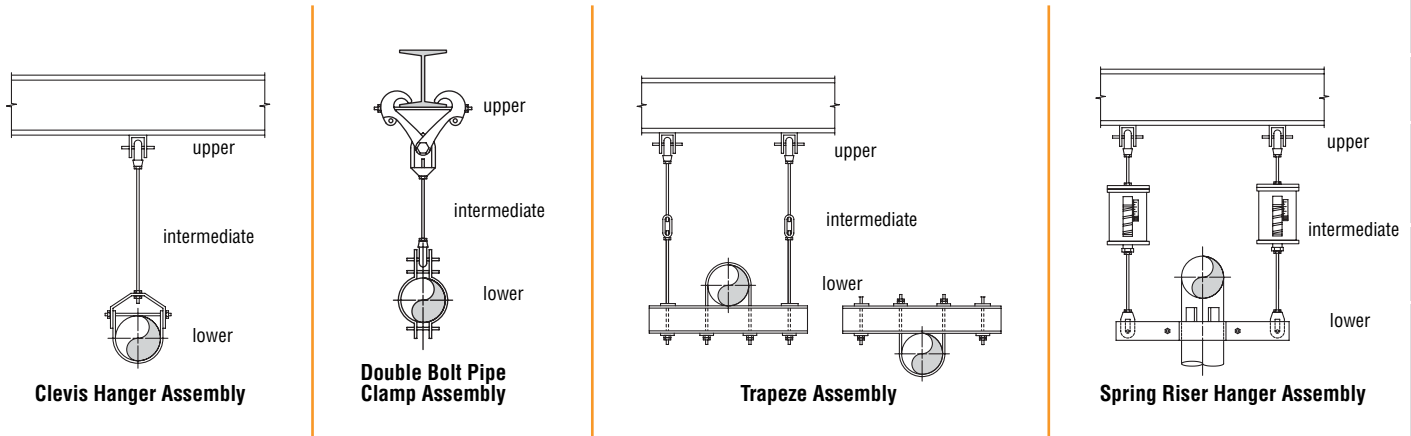
Thermal expansion is another important consideration when choosing hangers or supports for a grooved system. This is especially important on hot systems versus chilled systems since the amount of thermal expansion will be greater on hot systems as opposed to the thermal contraction that will occur on chilled systems. This is all due to the temperature variation from ambient conditions when the pipe is installed to operating conditions.

For example, if you again take 400 ft. of grooved piping, let us assume the system is heating hot water that will operate at 170°F. The pipe is installed under ambient conditions assumed to be at 70°F so you have a 100°F variation in temperature. At 70°F the pipe has a coefficient of thermal expansion of 0.0 in/ft but at 170°F the pipe has a coefficient of thermal expansion of 0.0076 in/ft. To determine the total thermal expansion of the pipe from ambient temperature to operating temperature you multiply the length of pipe by the coefficient of thermal expansion. In this case 400 ft. x 0.0076 in/ft. = 3.04 in. In other words the pipe has grown in length over 3 inches because of the thermal expansion.

This is significant growth especially if there is a change of direction at the end of the 400 ft. pipe run or there are branch lines coming off the main run. If this thermal growth exceeds the allowable deflection of a grooved joint, especially where a change of direction or a branch line connects, then problems could occur.

PIPE SUPPORT

Considerations for the Hanging or Supporting of Grooved Piping Systems



Thermal growth cannot be stopped. It can only be controlled by the use of anchors and expansion joints or expansion loops.

It is also important to hang or support the pipe with rolls or slides and use guides to control the thermal expansion of the pipe into an expansion joint or expansion loop. The use of static hangers, such as clevis hangers, should not be considered on pipe that is thermally expanding. When using trapeze hangers for multiple systems it is important to have “like” systems on the trapeze, that is, systems that are operating near the same temperature. If you combine hot systems with cold systems on a trapeze, the thermal expansion of the hot system can cause the trapeze to possibly twist and fail or excessive stress could be induced on the grooved joints on all of the systems on the trapeze. Hot systems should be hung or supported independently of cold or ambient systems or a means should be provided, such as pipe rolls or pipe slides, to allow the hot systems to thermally expand on the trapeze.

If the pipe is a vertical riser then consideration must be given to the use of spring hangers to allow the pipe to grow vertically up or down depending upon how the pipe is anchored while still supporting the pipe. Vertical pipe thermally expands the same amount as horizontal pipe and this has to be taken into consideration relating to supports, expansion joints or expansion loops. If the vertical pipe is supported by friction/riser clamps only and the pipe expands vertically upward, the clamps will grow with the pipe off the penetration or supporting structure and no longer provide support. If the growth is downward, the friction clamps resting on the penetration or supporting structure can either fail or the pipe may overcome the friction force and push it's way through the clamp as the pipe thermally expands downward. In either case the clamps are no longer supporting the pipe as intended and this may induce excessive stress on the grooved joints.

Whether it is horizontal or vertical grooved pipe, growth of the piping system due to pressurization and thermal expansion must be considered. On hot systems, both must be taken into account and added together to determine the overall growth of the system and the effect on the hangers or supports that are used. In the previous examples, pressurization expansion on the 400 ft. run of pipe was 4.75" for a flexible joint system and 1.78" for a rigid joint system and the thermal expansion was 3.04". Adding these combinations together would result in a total pipe growth of 7.79" for a flexible system or 4.82" for a rigid system, regardless of the horizontal or vertical orientation of the pipe. Again, this is a significant amount of growth relating to hangers and supports and the resulting stresses induced on grooved joints.

CONSIDER SOME RESTRAINT

Although grooved systems in seismic zones perform extremely well, consideration should be given to how a grooved system is seismically restrained. If you have growth due to pressurization and/or thermal expansion consideration should be given on how to restrain the system while still allowing growth to occur. Seismic restraints in the longitudinal direction of a long pipe run may restrict the growth of the pipe inducing stresses into the grooved couplings. Seismic restraints in the lateral direction should have little impact on expansion except where the system has a change in direction. If the seismic restraints are placed laterally after a change in direction at the end of a long run of pipe, the expansion of the long pipe run may be restricted and this could induce excessive stress into the grooved joints.

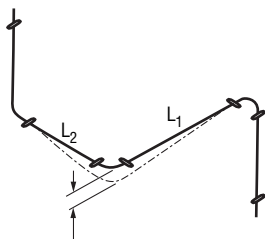
By reviewing the couplings to be used on a project, pressurization, thermal expansion and seismic restraints, one can best determine the proper selection and application of hangers and supports for a grooved piping system. This will, in turn, help ensure that grooved piping systems will continue to enjoy a solid reputation in the areas of maintenance and downtime.

COUPLING FLEXIBILITY:

The grooved coupling's capability to allow angular and rotational movement within the coupling joint must be considered when deciding hanger and support locations. Spring hangers and supports providing for movement in more than one plane are often used to allow the pipe system to move without introducing additional stress into the pipe system.

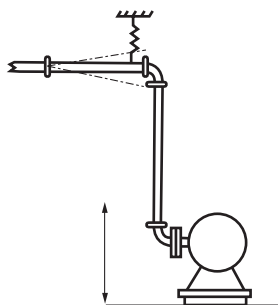
EXAMPLE 1

This example demonstrates the need for each pipe length in a grooved system to be supported. The sag due to the flexibility of the Gruvlok joint could be eliminated with the proper positioning of hangers on both pipe segments "L1" and "L2".



EXAMPLE 2

This illustrates the effect of pump oscillation on a piping system. A spring hanger should be used to support the pipe section and also respond to the induced vibrations. The couplings in the horizontal run above the riser, should accommodate the deflection without transmitting bending stresses through the pipe system.



PRESSURE THRUSTS:

Gruvlok couplings react to the application of system pressure and restrain the pipe ends from separation due to the pressure force. However, the coupling joint may not be in the self-restraining configuration prior to the application of system pressure. The Gruvlok coupling does not restrain adjacent pipe sections from separation due to pressure forces until the coupling key sections engage the groove walls.

Random flexible coupling joint installation will produce installed coupling conditions ranging from pipe ends full butted to fully separated to the maximum available gap. Thus, only after system pressurization will the self-restraining function of the coupling be in effect.

The designer must account for the movement to be encountered when the system is pressurized and the joints are fully separated. Anchor and guide positions must be defined to direct the pipe joint movement that it is not detrimental to the pipe system.

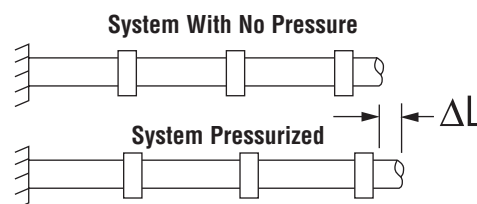
Examples of the effect of pressure thrust are shown in the following illustrations.

EXAMPLE 1

The coupling joints have been installed butted or partially open. When pressurized the pipe ends in the coupling joints will separate to the maximum amount permitted by the coupling design.

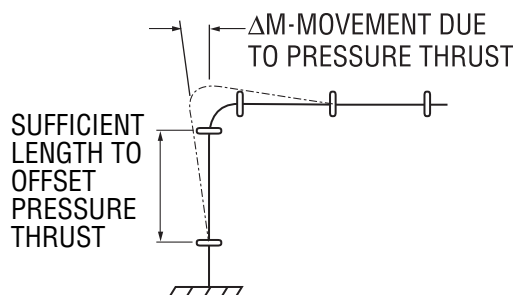
The coupling key sections will make contact with the groove walls and restrain the pipe from further separation.

The movement at each coupling joint will add with all other joints and produce ΔL .



EXAMPLE 2

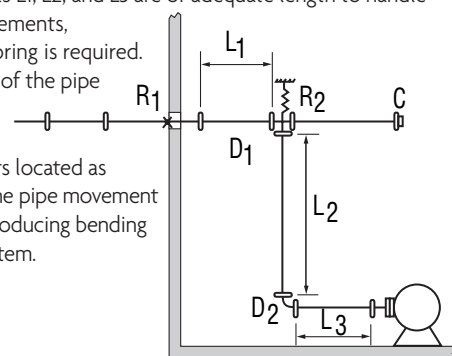
In the system shown here, the pipe will move and deflect at the elbow joint due to pressure thrust.



The pipe designer must assure himself that the system has the capability of deflecting sufficiently to absorb this movement without introducing additional stresses into the pipe system. In the deflected condition shown, temperature increases would produce further expansion of the pipe system thus increasing the deflection.

EXAMPLE 3

To restrain this system provide a pressure thrust anchor at "R1" to resist the pressure thrust acting through the tee "D1" at the cap "C". Provide a hanger at Point "R2", or a base support at Point "D2" to support the vertical column. If the offsets L1, L2, and L3 are of adequate length to handle expected pipe movements, no additional anchoring is required. Thermal movement of the pipe system should also be considered, and intermediate anchors located as required, to direct the pipe movement so as to prevent introducing bending stresses into the system.

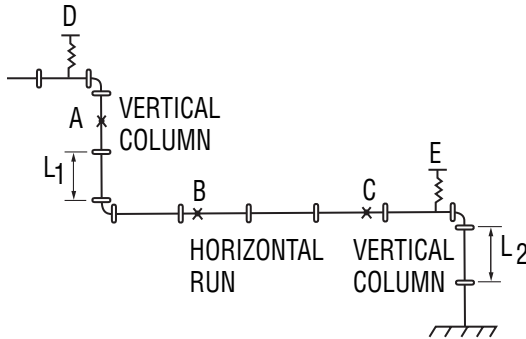


COUPLING FLEXIBILITY (CONT.)

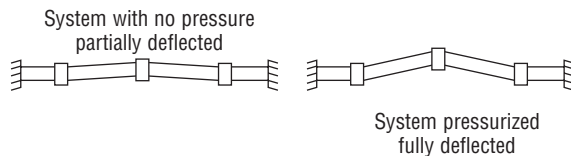
EXAMPLE 4

Anchor at "A" to support weight of vertical water column. Use spring hanger at "D" and "E" to allow movement of vertical piping.

Anchors at "B" and "C" if offsets at L1 and L2 are insufficiently long to handle expected pipe movements.



LATERAL RESTRAINT



EXAMPLE 5

A grooved coupling joint installed in a partially deflected condition between anchor locations will deflect to its fully deflected condition when pressurized. Hangers and supports must be selected with consideration of the hanger's capability to provide lateral restraint.

Light duty hangers, while acceptable in many installations, may deflect against the application of lateral forces and result in "snaking" conditions of the pipe system.

RISER DESIGN:

Risers assembled with Gruvlok Flexible couplings are generally installed in either of two ways. In the most common method, the pipe ends are butted together within the coupling joint. Note that when installing risers, the gasket is first placed onto the lower pipe and rolled back away from the pipe end prior to positioning the upper pipe. Anchoring of the riser may be done prior to pressurization with the pipe ends butted or while pressurized, when, due to pressure thrust, the pipe ends will be fully separated.

An alternative method of riser installation is to place a metal spacer of a predetermined thickness, between the pipe ends when an additional length of pipe is added to the riser stack. The upper pipe length is anchored, the spacer removed and the coupling is then installed. This method creates a predetermined gap at each pipe joint which can be utilized in pipe systems where thermal movement is anticipated and in systems with rigid (threaded, welded, flanged) branch connections where shear forces due to pressure thrust could damage the rigid connections.

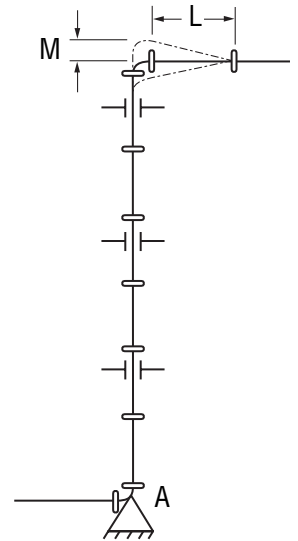
The following examples illustrate methods of installing commonly encountered riser designs.

RISERS WITHOUT BRANCH CONNECTIONS

Install the riser with the pipe ends butted.

Locate an anchor at the base of the riser (A) to support the total weight of the pipe, couplings and fluid. Provide pipe guides on every other pipe length, as a minimum, to prevent possible deflection of the pipe line at the coupling joints as the riser expands due to pressure thrust or thermal growth. Note that no intermediate anchors are required.

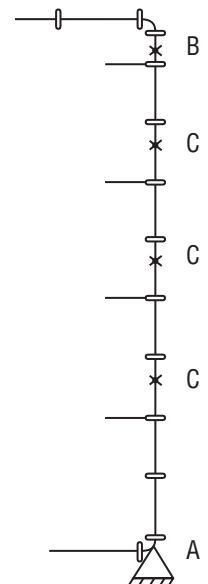
When the system is pressurized the pipe stack will "grow" due to pressure thrust which causes maximum separation of pipe ends within the couplings. The maximum amount of stack growth can be predetermined (see Linear Movement). In this example the pipe length "L" at the top of the riser must be long enough to permit sufficient deflection (see Angular Movement) to accommodate the total movement "M" from both pressure thrust and thermal gradients.



RISERS WITH BRANCH CONNECTIONS

Install the riser with the predetermined gap method. Anchor the pipe at or near the base with a pressure thrust anchor "A" capable of supporting the full pressure thrust, weight of pipe and the fluid column. Anchor at "B" with an anchor capable of withstanding full pressure thrust at the top of the riser plus weight of pipe column. Place intermediate anchors "C" as shown, between anchors "A" and "B". Also place intermediate clamps at every other pipe length as a minimum.

When this system is pressurized, the pipe movement due to pressure thrust will be strained and there will be no shear forces acting at the branch connections.



DRAFTING SYMBOLS FOR GRUVLOK® PIPING SYSTEMS

COMPONENT	FIG. NO.	SYMBOL
BULL-PLUG	7075	
CAP	7074	
CLAMP-T		
GROOVED OUTLET	7046	
FEMALE THREADED OUTLET	7044 7045	
CLAMP-T-CROSS		
GROOVED OUTLETS	7048	
FEMALE THREADED OUTLETS	7047	
COUPLINGS		
STRAIGHT	7000 7001 7003 7004 7011 7400 7401	
REDUCING	7010	
CROSS	7068	
ELBOW		
90°	7050	
45°	7051	
TURNED-DOWN	-	
TURNED-UP	-	

COMPONENT	FIG. NO.	SYMBOL
ELBOW 90° ADAPTER	7055	
45° ADAPTER	7056	
EXPANSION JOINT	7092	
GRUVLOK FLANGE	7012 7013	
LATERAL 45°		
STRAIGHT	7069	
REDUCING	7070	
REDUCER		
CONCENTRIC	7072	
ECCENTRIC	7073	
TEE		
STRAIGHT	7060	
REDUCING	7061	
TURNED-DOWN	-	
TURNED-UP	-	
TRUE-WYE	7071	
GRUVLOK BUTTERFLY BALL VALVE CHECK VALVE	SERIES 7700 7500 7800	

All fittings are shown with couplings attached at the grooved-ends.

PIPE-PREPARATION:

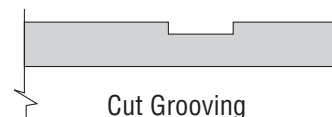
To create a Gruvlok pipe joint, all pipe must be prepared to receive Gruvlok coupling or other Gruvlok pipe system components. The required pipe preparation may be grooving or cleaning the pipe ends, or cutting a hole in the pipe wall.

For grooved-end joints, pipe may be grooved by either of two methods; cut or roll grooving. Branch outlet connections require a properly sized and correctly located hole to be cut into the pipe. Sock-it connections require cleaning of the pipe end. Gruvlok plain-end pipe couplings require that the pipe be free of burrs and other sharp projections which could damage the gasket; grooving is not required.

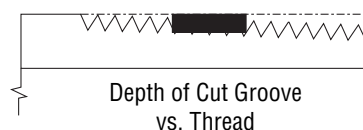
Gruvlok pipe grooving and hole cutting machines are available in a wide variety of designs to meet specific or general requirements. Gruvlok roll grooving machines produce a groove to proper dimensional tolerances, concentric with the pipe O.D., even on out-of-round pipe. Gruvlok hole cutting tools properly center holes for correct assembly of Gruvlok branch outlet components.

CUT GROOVING:

Cut grooving is intended for use with standard and heavier wall pipe. Cut grooving produces a groove in the pipe wall by removing metal from the pipe O.D. The groove removes less than one half of the pipe wall and does not cut as deeply into the pipe wall as do standard pipe threads. The square cut edge of the groove allows for the full expansion, contraction, and deflection capabilities of the Gruvlok coupling.



Cut Grooving



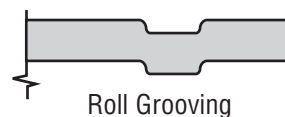
Depth of Cut Groove vs. Thread



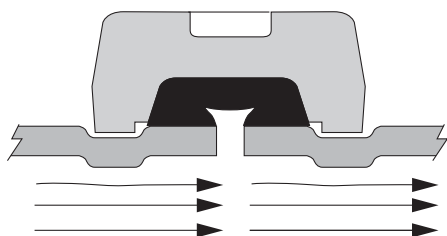
Volume of Metal Removed Cut Groove vs. Threaded

ROLL GROOVING:

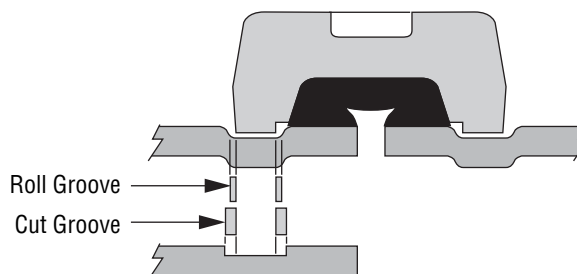
Roll grooving does not remove metal. Instead, metal is displaced while a groove is formed into the outer surface of the pipe wall. The groove configuration has slightly rounded edges resulting in a less flexible joint than a cut groove joint. This reduces available pipe joint movement by 50% over cut grooved coupling joints. Roll grooving is commonly used on a wide range of pipe thicknesses up to 0.375" wall steel pipe and sizes to 24" O.D.



Roll Grooving



The I.D. "dimple" formed from roll grooving reduces the I.D. (on an average) less than 2%.



Roll Groove
Cut Groove

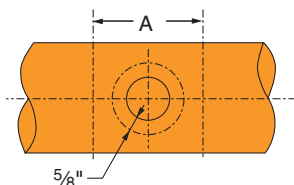
Available Movement
Roll Groove vs. Cut Groove

PIPE-PREPARATION:

BRANCH OUTLET PIPE: CLAMP-T®

Clamp-T installations require the cutting of a hole through the pipe wall. The hole must be properly sized and located on the centerline of the pipe to assure reliable performance of the Clamp-T gaskets.

After the hole has been cut into the pipe wall, any burrs and sharp or rough edges must be removed from the hole. The outside pipe surfaces within $\frac{5}{8}$ " of the hole must be clean and smooth. Any scale, projections or indentation which might effect the gasket sealing on the pipe must be removed. The surface around the entire circumference of the pipe within the "A" dimension in the charts must be free from dirt, scale, or projections which might effect the proper assembly of the Clamp-T.



CLAMP-T INSTALLATION

Branch Size	Hole Dimensions		Surface Prep. "A"
	Hole Saw Size	Max. Perm. Diameter	
DN/mm	In./mm	In./mm	In./mm
$\frac{1}{2}$, $\frac{3}{4}$, 1 15, 20, 25	$1\frac{1}{2}$ 38.1	$1\frac{5}{8}$ 41.3	$3\frac{1}{2}$ 88.9
$1\frac{1}{4}$, $1\frac{1}{2}$ 32, 40	2 50.8	$2\frac{1}{8}$ 54.0	4 101.6
2 50	$2\frac{1}{2}$ 63.5	$2\frac{5}{8}$ 66.7	$4\frac{1}{2}$ 114.3
$2\frac{1}{2}$ 65	$2\frac{3}{4}$ 69.9	$2\frac{7}{8}$ 73.0	$4\frac{3}{4}$ 120.7
3 80	$3\frac{1}{2}$ 88.9	3" 92.1	$5\frac{1}{2}$ 139.7
4 100	$4\frac{1}{2}$ 114.3	4" 117.5	$6\frac{1}{2}$ 165.1

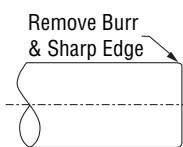
SOCK-IT®

For Sock-It Fittings, the pipe ends must be square cut as measured from a true square line.

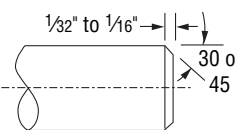
The maximum allowable tolerance is 0.030" (0.76mm) for all sizes. Any sharp edges, burrs, etc. left on the pipe from cutting must be removed. If these are not removed, they may damage the gasket as the pipe is inserted into the Sock-It Fitting.

After cutting, pipe ends must be completely cleaned a minimum of 1" (25.4mm) back from the pipe end to remove all pipe coating, weld beads, rust, sharp projections, etc., which might effect gasket sealing integrity.

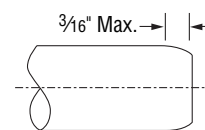
ACCEPTABLE PIPE END CONFIGURATION



Square cut pipe with O.D. burr & sharp edge removed is preferred configuration.



Beveled pipe. Bevel not to exceed $\frac{1}{16}$ ".

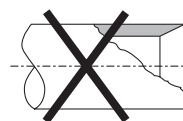


Soft pipe when roll cut may be swaged inward. Swaged portion not to exceed $\frac{3}{16}$ ".

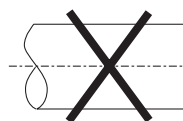
PIPE TOLERANCES				
Size	Schedule 10 & 40		Min. O.D.	XL Min. O.D.
	Nom O.D.	Max. O.D.		
DN/mm	In./mm	In./mm	In./mm	In./mm
1 25	1.315 33.4	1.325 33.6	1.295 32.9	1.285 32.6
$1\frac{1}{4}$ 32	1.660 42.2	1.670 42.4	1.642 41.7	1.630 41.4
$1\frac{1}{2}$ 40	1.900 48.3	1.910 48.5	1.882 47.8	1.875 47.6
2 50	2.375 60.3	2.385 60.6	2.357 59.9	2.352 59.7
$2\frac{1}{2}$ 65	2.875 73.0	2.904 73.8	2.846 72.3	2.837 72.1

NOTE: When Allied XL pipe is used it is necessary only to remove sharp edges and burrs at the end of the pipe. No additional cleaning is required.

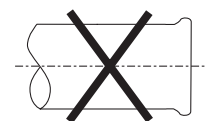
UNACCEPTABLE



Excessive chamfer on I.D. will tend to cut gasket during assembly.



Abrasive wheels & saws leave edge burrs especially pronounced on one side.



Dull wheel cutter produces a raised ridge at the pipe O.D. giving an oversize diameter.

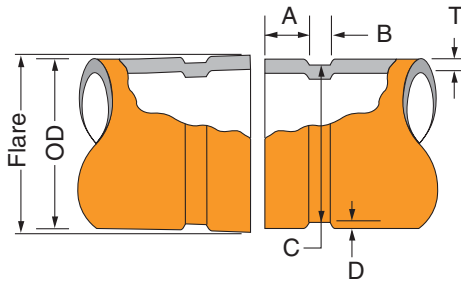
The sharp O.D. edge left by different methods of cutting pipe **must be removed**. If this sharp edge is not removed, it may damage the gasket as the pipe is inserted into the Sock-It Fitting.

ROUGHNECK®

Plain-End pipe for use with Fig. 7005 Roughneck Couplings must be free of any notches, bumps, weld bead, score marks, etc. for at least $1\frac{1}{2}$ " (38 mm) back from the pipe end to provide a smooth sealing surface for the gasket. Pipe ends (plain or beveled end) must be square cut as measured from a true square line with the maximum allowable tolerance as follows: 0.030" (0.7 mm) for 2" through 3"; 0.045 (1.1 mm) for 4" through 6"; and 0.060"

(1.5 mm) for 8" sizes. The nominal outside diameter of pipe should not vary more than $\pm 1\%$ for sizes up to $2\frac{1}{2}$ "; $\pm 1\frac{1}{2}\%$ for sizes 3"-5"; $\pm \frac{1}{16}\%$ for sizes 6" and larger. Pipe ends must be marked a distance of 1" from the pipe end for Sizes 2"-4" and $1\frac{1}{4}$ " from the pipe end for Sizes 5"-8" as a guide for centering of the gasket on the pipe ends.

ROLL GROOVE SPECIFICATIONS



COLUMN 1 - Nominal IPS Pipe size. Nominal ISO Pipe size.

COLUMN 2 - IPS outside diameter. ISO outside diameter.

COLUMN 3 - Gasket seat must be free from scores, seams, chips, rust or scale which may interfere with proper sealing of the gasket. Gasket seat width (Dimension A) is to be measured from the pipe end to the vertical flank in the groove wall.

COLUMN 4 - Groove width (Dimension B) is to be measured between vertical flank of the groove size walls.

COLUMN 5 - The groove must be of uniform depth around the entire pipe circumference. (See column 6).

COLUMN 6 - Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 5.

COLUMN 7 - Minimum allowable wall thickness which may be roll grooved.

COLUMN 8 - Maximum allowable pipe end flare diameter. Measured at the most extreme pipe end diameter of the gasket seat area.

Out of roundness: Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed (reference column 2).

For IPS pipe, the maximum allowable tolerance from square cut ends is 0.03" for 1" thru 3½"; 0.045" for 4" thru 6"; and 0.060" for sizes 8" and above measured from a true square line.

For ISO size pipe, the maximum allowable tolerance from square cut ends is 0.75mm for sizes 25mm-80mm; 1.15mm for sizes 100mm-150mm; and 1.50mm for sizes 200mm and above, measured from a true square line.

Beveled-End Pipe in conformance with ANSI B16.25 (37½°) is acceptable, however square cut is preferred. Seams must be ground flush with the pipe O.D. and ID prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

Weld Seams must be ground flush with the pipe O.D. and ID prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

▼ "A" tolerance +0.030" / -0.060" (+0.77 / -1.54 mm)

GRUVLOK STANDARD ROLL GROOVE SPECIFICATION FOR STEEL & OTHER IPS OR ISO SIZE PIPE

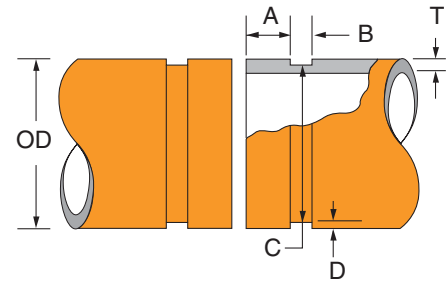
-1-	-2-		-3-	-4-	-5-		-6-	-7-	-8-
Nominal Pipe Size	O.D.		"A"	"B"	"C"	"C" Tol.	"D"	"T" Min.	Max.
	Actual	Tolerance	±0.030/ ±0.76	±0.030/ ±0.76	Actual	+0.000	(Ref. Only)	Allow. Wall Thick	Flare Dia.
In./DN(mm)	In./mm	+In./mm -In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm	In./mm
1	1.315	+0.028 -0.015	0.625	0.281	1.190	-0.015	0.063	0.065	1.430
25	33.4	+0.71 -0.38	15.88	7.14	30.23	-0.38	1.60	1.7	36.3
1¼	1.660	+0.029 -0.016	0.625	0.281	1.535	-0.015	0.063	0.065	1.770
32	42.2	+0.74 -0.41	15.88	7.14	38.99	-0.38	1.60	1.7	45.0
1½	1.900	+0.019 -0.019	0.625	0.281	1.775	-0.015	0.063	0.065	2.010
40	48.3	+0.48 -0.48	15.88	7.14	45.09	-0.38	1.60	1.7	51.1
2	2.375	+0.024 -0.024	0.625	0.344	2.250	-0.015	0.063	0.065	2.480
50	60.3	+0.61 -0.61	15.88	8.74	57.15	-0.38	1.60	1.7	63.0
2½	2.875	+0.029 -0.029	0.625	0.344	2.720	-0.018	0.078	0.083	2.980
65	73.0	+0.74 -0.74	15.88	8.74	69.09	-0.46	1.98	2.1	75.7
3 O.D.	2.996	+0.030 -0.030	0.625	0.344	2.845	-0.018	0.076	0.083	3.100
76.1	76.1	+0.76 -0.76	15.88	8.74	72.26	-0.46	1.93	2.1	78.7
3	3.500	+0.035 -0.031	0.625	0.344	3.344	-0.018	0.078	0.083	3.600
80	88.9	+0.89 -0.79	15.88	8.74	84.94	-0.46	1.98	2.1	91.4
3½	4.000	+0.040 -0.031	0.625	0.344	3.834	-0.020	0.083	0.083	4.100
90	101.6	+1.02 -0.79	15.88	8.74	97.38	-0.51	2.11	2.1	104.1
4¼ O.D.	4.250	+0.042 -0.031	0.625	0.344	4.084	-0.020	0.083	0.083	4.350
108.0	108.0	+1.07 -0.79	15.88	8.74	103.73	-0.51	2.11	2.1	110.5
4	4.500	+0.045 -0.031	0.625	0.344	4.334	-0.020	0.083	0.083	4.600
100	114.3	+1.14 -0.79	15.88	8.74	110.08	-0.51	2.11	2.1	116.8
5¼ O.D.	5.236	+0.052 -0.031	0.625	0.344	5.084	-0.020	0.076	0.109	5.350
133.0	133.0	+1.32 -0.79	15.88	8.74	129.13	-0.51	1.93	2.8	135.9
5½ O.D.	5.500	+0.055 -0.031	0.625	0.344	5.334	-0.020	0.083	0.109	5.600
139.7	139.7	+1.40 -0.79	15.88	8.74	135.48	-0.51	2.11	2.8	142.2
5	5.563	+0.056 -0.031	0.625	0.344	5.395	-0.022	0.084	0.109	5.660
125	141.3	+1.42 -0.79	15.88	8.74	137.03	-0.56	2.13	2.8	143.8
6¼ O.D.	6.259	+0.063 -0.031	0.625	0.344	6.084	-0.022	0.088	0.109	6.350
159.0	159.0	+1.60 -0.79	15.88	8.74	154.53	-0.56	2.24	2.8	161.3
6½ O.D.	6.500	+0.063 -0.031	0.625	0.344	6.334	-0.022	0.085	0.109	6.600
165.1	165.1	+1.60 -0.79	15.88	8.74	160.88	-0.56	2.16	2.8	167.6
6	6.625	+0.063 -0.031	0.625	0.344	6.455	-0.022	0.085	0.109	6.730
150	168.3	+1.60 -0.79	15.88	8.74	163.96	-0.56	2.16	2.8	170.9
8	8.625	+0.063 -0.031	0.750	0.469	8.441	-0.025	0.092	0.109	8.800
200	219.1	+1.60 -0.79	19.05	11.91	214.40	-0.64	2.34	2.8	223.5
10	10.750	+0.063 -0.031	0.750	0.469	10.562	-0.027	0.094	0.134	10.920
250	273.1	+1.60 -0.79	19.05	11.91	268.27	-0.69	2.39	3.4	277.4
12	12.750	+0.063 -0.031	0.750	0.469	12.531	-0.030	0.109	0.156	12.920
300	323.9	+1.60 -0.79	19.05	11.91	318.29	-0.76	2.77	4.0	328.2
14 O.D.	14.000	+0.063 -0.031	0.938	0.469	13.781	-0.030	0.109	0.156	14.100
355.6	355.6	+1.60 -0.79	23.83	11.91	350.04	-0.76	2.77	4.0	358.1
16 O.D.	16.000	+0.063 -0.031	0.938	0.469	15.781	-0.030	0.109	0.165	16.100
406.4	406.4	+1.60 -0.79	23.83	11.91	400.84	-0.76	2.77	4.2	408.9
18 O.D.	18.000	+0.063 -0.031	1.000	0.469	17.781	-0.030	0.109	0.165	18.160
457.2	457.2	+1.60 -0.79	25.40	11.91	451.64	-0.76	2.77	4.2	461.3
20 O.D.	20.000	+0.063 -0.031	1.000	0.469	19.781	-0.030	0.109	0.188	20.160
508.0	508.0	+1.60 -0.79	25.40	11.91	502.44	-0.76	2.77	4.8	512.1
24 O.D.	24.000	+0.063 -0.031	1.000	0.500	23.656	-0.030	0.172	0.218	24.200
609.6	609.6	+1.60 -0.79	25.40	12.70	600.86	-0.76	4.37	5.5	614.7
30 O.D.	30.000	+0.093 -0.031	1.750 ▼	0.625	29.500	-0.063	0.250	0.250	30.200
762.0	762.0	2.36 0.79	44.45	15.88	749.30	1.60	6.35	6.35	761.1

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Install Instructions section on Anvil's web site - www.anvilintl.com

CUT GROOVE SPECIFICATIONS

**GRUVLOK STANDARD CUT GROOVE SPECIFICATION
FOR STEEL & OTHER IPS OR ISO SIZE PIPE**

-1-	-2-			-3-	-4-	-5-		-6-	-7-
Nominal IPS Pipe Size	O.D.			Gasket Seat "A" ±0.030 ±0.76	Groove Width "B" ±0.030 ±0.76	Groove Diameter "C"		Actual Groove Depth "D" (Ref. Only)	Min. Allow. Wall Thick. "T"
	Actual	Tolerance				Actual	Tol. +0.000		
In./DN(mm)	In./mm	+In./mm	-In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm
1	1.315	+0.028	-0.015	0.625	0.312	1.190	-0.015	0.062	0.133
25	33.4	+0.71	-0.38	15.88	7.92	30.23	-0.38	1.6	3.4
1¼	1.660	+0.029	-0.016	0.625	0.312	1.535	-0.015	0.062	0.140
32	42.2	+0.74	-0.41	15.88	7.92	38.99	-0.38	1.6	3.6
1½	1.900	+0.019	-0.019	0.625	0.312	1.775	-0.015	0.062	0.145
40	48.3	+0.48	-0.48	15.88	7.92	45.09	-0.38	1.6	3.7
2	2.375	+0.024	-0.024	0.625	0.312	2.250	-0.015	0.062	0.154
50	60.3	+0.61	-0.61	15.88	7.92	57.15	-0.38	1.6	3.9
2½	2.875	+0.029	-0.029	0.625	0.312	2.720	-0.018	0.078	0.187
65	73.0	+0.74	-0.74	15.88	7.92	69.09	-0.46	2.0	4.8
3 O.D.	2.996	+0.030	-0.030	0.625	0.312	2.845	-0.018	0.076	0.188
76.1	76.1	+0.76	-0.76	15.88	7.92	72.26	-0.46	1.9	4.8
3	3.500	+0.035	-0.031	0.625	0.312	3.344	-0.018	0.078	0.188
80	88.9	+0.89	-0.79	15.88	7.92	84.94	-0.46	2.0	4.8
3½	4.000	+0.040	-0.031	0.625	0.312	3.834	-0.020	0.083	0.188
90	101.6	+1.02	-0.79	15.88	7.92	97.38	-0.51	2.1	4.8
4¼ O.D.	4.250	+0.042	-0.031	0.625	0.375	4.084	-0.020	0.083	0.203
108.0	108.0	+1.07	-0.79	15.88	9.53	103.73	-0.51	2.1	5.2
4	4.500	+0.045	-0.031	0.625	0.375	4.334	-0.020	0.083	0.203
100	114.3	+1.14	-0.79	15.88	9.53	110.08	-0.51	2.1	5.2
5¼ O.D.	5.236	+0.052	-0.031	0.625	0.375	5.084	-0.020	0.076	0.203
133.0	133.0	+1.32	-0.79	15.88	9.53	129.13	-0.51	1.9	5.2
5½ O.D.	5.500	+0.055	-0.031	0.625	0.375	5.334	-0.020	0.083	0.203
139.7	139.7	+1.40	-0.79	15.88	9.53	135.48	-0.51	2.1	5.2
5	5.563	+0.056	-0.031	0.625	0.375	5.395	-0.022	0.084	0.203
125	141.3	+1.42	-0.79	15.88	9.53	137.03	-0.56	2.1	5.2
6¼ O.D.	6.259	+0.063	-0.031	0.625	0.375	6.084	-0.022	0.088	0.249
159.0	159.0	+1.60	-0.79	15.88	9.53	154.53	-0.56	2.2	6.3
6½ O.D.	6.500	+0.063	-0.031	0.625	0.375	6.334	-0.022	0.085	0.219
165.1	165.1	+1.60	-0.79	15.88	9.53	160.88	-0.56	2.2	5.6
6	6.625	+0.063	-0.031	0.625	0.375	6.455	-0.022	0.085	0.219
150	168.3	+1.60	-0.79	15.88	9.53	163.96	-0.56	2.2	5.6
8	8.625	+0.063	-0.031	0.750	0.437	8.441	-0.025	0.092	0.238
200	219.1	+1.60	-0.79	19.05	11.10	214.40	-0.64	2.3	6.1
10	10.750	+0.063	-0.031	0.750	0.500	10.562	-0.027	0.094	0.250
250	273.1	+1.60	-0.79	19.05	12.70	268.27	-0.69	2.4	6.4
12	12.750	+0.063	-0.031	0.750	0.500	12.531	-0.030	0.109	0.279
300	323.9	+1.60	-0.79	19.05	12.70	318.29	-0.76	2.8	7.1
14 O.D.	14.000	+0.063	-0.031	0.938	0.500	13.781	-0.030	0.109	0.281
355.6	355.6	+1.60	-0.79	23.83	12.70	350.04	-0.76	2.8	7.1
16 O.D.	16.000	+0.063	-0.031	0.938	0.500	15.781	-0.030	0.109	0.312
406.4	406.4	+1.60	-0.79	23.83	12.70	400.84	-0.76	2.8	7.9
18 O.D.	18.000	+0.063	-0.031	1.000	0.500	17.781	-0.030	0.109	0.312
457.2	457.2	+1.60	-0.79	25.40	12.70	451.64	-0.76	2.8	7.9
20 O.D.	20.000	+0.063	-0.031	1.000	0.500	19.781	-0.030	0.109	0.312
508.0	508.0	+1.60	-0.79	25.40	12.70	502.44	-0.76	2.8	7.9
24 O.D.	24.000	+0.063	-0.031	1.000	0.563	23.656	-0.030	0.172	0.375
609.6	609.6	+1.60	-0.79	25.40	14.30	600.86	-0.76	4.4	9.5
28 I.D.	28.875	+0.063	-0.031	1.000	0.563	28.531	-0.030	0.172	0.437
733.4	733.4	+1.60	-0.79	25.40	14.30	724.69	-0.76	4.4	11.1
30 I.D.	31.000	+0.063	-0.031	1.250	0.625	30.594	-0.030	0.203	0.500
787.4	787.4	+1.60	-0.79	31.75	15.88	777.09	-0.76	5.2	12.7
30 O.D.	30.000	0.093	0.031	1.750▼	0.625	29.500	0.063	0.250	0.625
762.0	762.0	2.36	0.79	44.45	15.88	749.30	1.60	6.35	15.88



COLUMN 1 -

Nominal IPS Pipe size.
Nominal ISO Pipe size.

COLUMN 2 -

IPS outside diameter.
ISO outside diameter.

COLUMN 3 & 4 -

Gasket seat must be free from scores, seams, chips, rust or scale which may interfere with proper coupling assembly.

COLUMN 5 -

The groove must be of uniform depth around the entire pipe circumference. (See column 6).

COLUMN 6 -

Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 5.

COLUMN 7 -

Minimum allowable wall thickness which may be cut grooved.

Out of roundness: Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed.

For IPS pipe, the maximum allowable tolerance from square cut ends is 0.03" for 1" thru 3 1/2"; 0.045" for 4" thru 6"; and 0.060" for sizes 8" and above measured from a true square line.

For ISO size pipe, the maximum allowable tolerance from square cut ends is 0.75mm for sizes 25mm-80mm; 1.15mm for sizes 100mm-150mm; and 1.50mm for sizes 200mm and above, measured from a true square line.

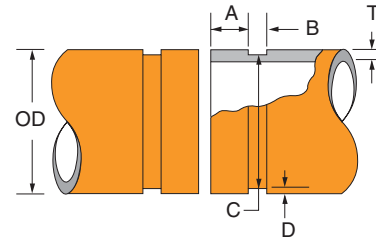
Beveled-End Pipe in conformance with ANSI B16.25 (37°/2") is acceptable, however square cut is preferred.

Not to be used with End Guard gaskets.

▼ "A" tolerance +0.030" / -0.060" (+0.77 / -1.54 mm)

CUT GROOVE END GUARD® SPECIFICATION

End Guard (EG) cut groove is designed for standard or heavier wall thickness pipe to be joined by HPR 7004 EG couplings. Gruvlok EG fittings are grooved in accordance with these dimensions



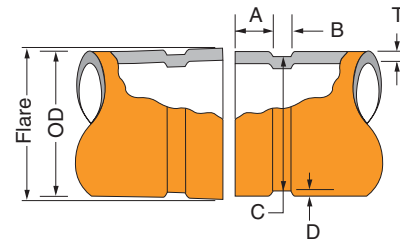
END GUARD (EG) CUT GROOVE SPECIFICATIONS*

Nominal IPS Pipe Size	Pipe Outside Diameter			Gasket Seat "A"		Groove Width "B"		Groove Diameter "C"		Groove Depth (Ref. Only) "D"	Min. Allow. Wall Thick. "T"
	Actual	Tolerance		Actual	Tol. +/-	Actual	Tol. (+0.010)	Actual	Tol.		
In./DN(mm)	In./mm	+In./mm	-In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm	In./mm	In./mm
2	2.375	+0.024	-0.024	0.562	+0.010	0.255	-0.005	2.250	-0.015	0.062	0.154
50	60.3	+0.61	-0.61	14.27	0.25	6.48	-0.13	57.15	-0.38	1.6	4.0
2½	2.875	+0.029	-0.029	0.562	+0.010	0.255	-0.005	2.720	-0.018	0.078	0.188
65	73.0	+0.74	-0.74	14.27	0.25	6.48	-0.13	69.09	-0.46	2.0	4.8
3	3.500	+0.035	-0.031	0.562	+0.010	0.255	-0.005	3.344	-0.018	0.078	0.188
80	88.9	+0.89	-0.79	14.27	0.25	6.48	-0.13	84.94	-0.46	2.0	4.8
4	4.500	+0.045	-0.031	0.605	+0.015	0.305	-0.005	4.334	-0.020	0.083	0.203
100	114.3	+1.14	-0.79	15.37	0.38	7.75	-0.13	110.08	-0.51	2.1	5.2
5	5.563	+0.056	-0.031	0.605	+0.015	0.305	-0.005	5.395	-0.022	0.084	0.203
125	141.3	+1.42	-0.79	15.37	0.38	7.75	-0.13	137.03	-0.56	2.1	5.2
6	6.625	+0.063	-0.031	0.605	+0.015	0.305	-0.005	6.455	-0.022	0.085	0.219
150	168.3	+1.60	-0.79	15.37	0.38	7.75	-0.13	163.96	-0.56	2.2	5.6
8	8.625	+0.063	-0.031	0.714	+0.015	0.400	-0.010	8.441	-0.025	0.092	0.238
200	219.1	+1.60	-0.79	18.14	0.16	10.16	-0.254	214.40	-0.64	2.3	6.1
10	10.750	+0.063	-0.031	0.714	+0.015	0.400	-0.010	10.562	-0.027	0.094	0.250
250	273.1	+1.60	-0.79	18.14	0.38	10.16	-0.25	268.27	-0.69	2.4	6.4
12	12.750	+0.063	-0.031	0.714	+0.015	0.400	-0.010	12.531	-0.030	0.109	0.279
300	323.9	+1.60	-0.79	18.14	0.38	10.16	-0.25	318.29	-0.76	2.8	7.1

*Refer to additional notes on previous page.

ROLL GROOVE END GUARD® SPECIFICATION

End Guard (EG) roll groove is designed for lightwall pipe to be joined by HPR 7004 EG couplings.



END GUARD (EG) ROLL GROOVE SPECIFICATIONS*

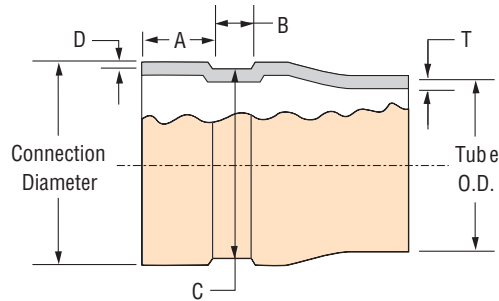
Nominal IPS Pipe Size	Pipe Outside Diameter			Gasket Seat "A"		Groove Width "B"		Groove Diameter "C"		Groove Depth (Ref. Only) "D"	Min. Allow Wall Thick. "T"
	Actual	Tolerance		Actual	Tol. +/-	Actual	Tol. (+0.010)	Actual	Tol.		
In./DN(mm)	In./mm	+In./mm	-In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm	In./mm	In./mm
2	2.375	+0.024	-0.024	0.572	-0.020	0.250	+0.015	2.250	-0.015	0.062	0.065
50	60.3	+0.61	-0.61	+14.53	-0.51	6.35	0.38	57.15	-0.38	1.6	1.7
2½	2.875	+0.029	-0.029	0.572	-0.020	0.250	+0.015	2.720	-0.018	0.078	0.083
65	73.0	+0.74	-0.74	+14.53	-0.51	6.35	0.38	69.09	-0.46	2.0	2.1
3	3.500	+0.035	-0.031	0.572	-0.020	0.250	+0.015	3.344	-0.018	0.078	0.083
80	88.9	+0.89	-0.79	+14.53	-0.51	6.35	0.38	84.94	-0.46	2.0	2.1
4	4.500	+0.045	-0.031	0.610	-0.020	0.300	+0.020	4.334	-0.020	0.083	0.083
100	114.3	+1.14	-0.79	+15.49	-0.51	7.62	0.51	110.08	-0.51	2.1	2.1
5	5.563	+0.056	-0.031	0.610	-0.020	0.300	+0.020	5.395	-0.022	0.084	0.109
125	141.3	+1.42	-0.79	+15.49	-0.51	7.62	0.51	137.03	-0.56	2.1	2.8
6	6.625	+0.063	-0.031	0.610	-0.020	0.300	+0.020	6.455	-0.022	0.085	0.109
150	168.3	+1.60	-0.79	+15.49	-0.51	7.62	0.51	163.96	-0.56	2.2	2.8
8	8.625	+0.063	-0.031	0.719	-0.020	0.390	+0.020	8.441	-0.025	0.092	0.109
200	219.1	+1.60	-0.79	+18.26	-0.51	9.91	0.51	214.40	-0.64	2.3	2.8
10	10.750	+0.063	-0.031	0.719	-0.020	0.390	+0.020	10.562	-0.027	0.094	0.134
250	273.1	+1.60	-0.79	+18.26	-0.51	9.91	0.51	268.27	-0.69	2.4	3.4
12	12.750	+0.063	-0.031	0.719	-0.020	0.390	+0.020	12.531	-0.030	0.109	0.156
300	323.9	+1.60	-0.79	+18.26	-0.51	9.91	0.51	318.29	-0.76	2.8	4.0

*Refer to additional notes on previous page.

GRUVLOK ADVANCED COPPER-METHOD (IPS)

Copper Prep Specifications

Gruvlok copper prep roll groove specifications for Types K, L, M and DWV copper tubing



GRUVLOK COPPER PREP SPECIFICATIONS

-1-	-2-			-3-			-4-	-5-	-6-		-7-	-8-	-9-
Nominal Tubing Size	Tubing Outside Diameter			Tube End Connection Diameter			Gasket Seat A ± .030 ± .77	Groove Width B ± .030 ± .77	Groove Diameter “C”		Groove Depth D (Ref. Only)	Allow Wall Thick T	Max. Flare Dia.
	Actual	Tolerance		Actual	Tolerance				Actual	Tol. +0.000			
In./DN(mm)	In./mm	+In./mm	-In./mm	In./mm	+In./mm	-In./mm	In./mm	In./mm	In./mm	-In./mm	In./mm	In./mm	In./mm
2	2.125	0.002	0.002	2.375	0.045	0.024	0.625	0.344	2.250	-0.015	0.063	0.059	2.447
50	54.0	0.05	0.05	60.33	1.14	0.61	15.88	8.74	57.15	-0.381	1.60	1.50	62.15
2½	2.625	0.002	0.002	2.875	0.029	0.029	0.625	0.344	2.720	-0.018	0.077	0.065	2.962
65	66.7	0.05	0.05	73.03	0.74	0.74	15.88	8.74	69.09	-0.46	1.96	1.65	75.23
3	3.125	0.002	0.002	3.500	0.035	0.031	0.625	0.344	3.344	-0.018	0.078	DWV	3.566
80	79.4	0.05	0.05	88.90	0.89	0.79	15.88	8.74	84.94	-0.46	1.98		90.58
4	4.125	0.002	0.002	4.500	0.045	0.031	0.625	0.344	4.334	-0.020	0.083	DWV	4.576
100	104.8	0.05	0.05	114.30	1.14	0.79	15.88	8.74	110.08	-0.51	2.11		116.23
5	5.125	0.002	0.002	5.562	0.056	0.031	0.625	0.344	5.395	-0.022	0.084	DWV	5.650
125	130.2	0.05	0.05	141.27	1.42	0.79	15.88	8.74	137.03	-0.56	2.13		143.51
6	6.125	0.002	0.002	6.625	0.063	0.031	0.625	0.344	6.455	-0.022	0.085	DWV	6.719
150	155.6	0.05	0.05	168.28	1.60	0.79	15.88	8.74	163.96	-0.56	2.16		170.66
8	8.125	0.002	0.004	8.625	0.063	0.031	0.750	0.469	8.441	-0.025	0.092	DWV	8.719
200	206.4	0.05	0.10	219.08	1.60	0.79	19.05	11.91	214.40	-0.64	2.34		221.46

NOTES:

Out of roundness: Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed tolerance listed.

The maximum allowable tolerance from square cut ends is 0.030" for 2" thru 3"; 0.045" for 4" thru 6"; and 0.060" for 8" measured from a true square line.

COLUMN 1

Nominal ASTM B 88 copper tubing size.

COLUMN 2

Outside diameter of copper tubing in accordance with ASTM B 88.

COLUMN 3

Outside diameter of Copper Prep roll grooved copper tubing.

COLUMN 4

Gasket seat and groove must be free from scores, seams, chips, rust or scale which may interfere with proper coupling assembly.

COLUMN 5

Groove width is to be measured between vertical flank of the groove size walls.

COLUMN 6

The groove must be of uniform depth around the entire tubing circumference. (See column 7).

COLUMN 7

Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 6.

COLUMN 8

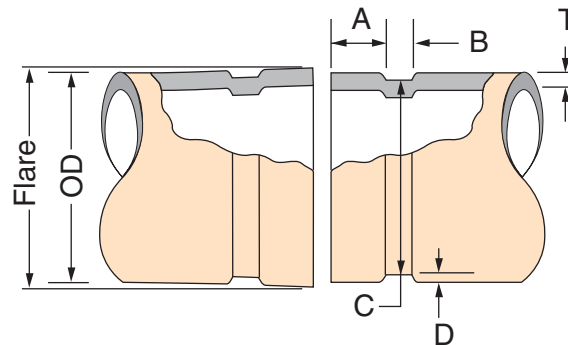
Minimum allowable copper tube wall thickness which may be prepared to Gruvlok Copper-Prep specifications.

COLUMN 9

Maximum allowable end flare diameter. Measured at the most extreme tubing end diameter of the gasket seat area.

GRUVLOK CTS COPPER SYSTEM

Roll Groove Specifications



GRUVLOK CTS COPPER SYSTEM – ROLL GROOVE SPECIFICATIONS

-1-	-2- Tubing Outside Diameter			-3- Gasket Seat "A" +/- 0.03 in. +/- 0.76mm	-4- Groove Width "B" +0.03/-0.00 in. +0.76/-0.00mm	-5- Groove Diameter "C"		-6- Nominal Groove Depth "D"	-7- Min. Wall "T"	-8- Max. Flare Diam.
Nominal Size	Actual	Tolerance				Actual	Tolerance +0.000			
In.	In./mm	+ In./mm	- In./mm	In./mm	In./mm	In./mm	- In./mm	In./mm	In./mm	In./mm
2	2.125 54.0	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	2.029 51.54	-0.020 -0.51	0.048 1.2	0.058 1.6	2.220 56.4
2½	2.625 66.7	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	2.525 64.14	-0.020 -0.51	0.050 1.3	0.065 1.7	2.720 69.1
3	3.125 79.4	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	3.025 76.84	-0.020 -0.51	0.050 1.3	DWV	3.220 81.8
4	4.125 104.8	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	4.019 102.08	-0.020 -0.51	0.053 1.3	DWV	4.220 107.2
5	5.125 130.2	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	4.999 126.97	-0.020 -0.51	0.053 1.3	DWV	5.220 132.6
6	6.125 155.6	0.002 0.05	0.002 0.05	0.610 15.5	0.300 7.6	5.999 152.37	-0.020 -0.51	0.063 1.6	DWV	6.220 158.0
8	8.125 206.4	0.002 0.05	0.004 0.10	0.610 15.5	0.300 7.6	7.959 202.16	-0.020 -0.51	0.083 2.1	DWV	8.220 208.8

COLUMN 1

Nominal tubing size ASTM B88

COLUMN 2

Outside diameter of copper tubing per ASTM B88. Allowable tolerance from square cut ends is 0.030"/0.76mm for sizes 2"-3"; 0.045"/1.14mm for sizes 4-8"

COLUMN 3

Gasket seat must be free from scores, roll marks, indentations, grease and dirt which may interfere with gasket sealing.

COLUMN 4

Groove width is to be free from chips, dirt, etc. which may interfere with proper coupling assembly.

COLUMN 5

Groove diameter must be of uniform depth for the entire circumference of the tubing. See column 6.

COLUMN 6

Groove depth is for reference only; the groove diameter must conform to column 5.

COLUMN 7

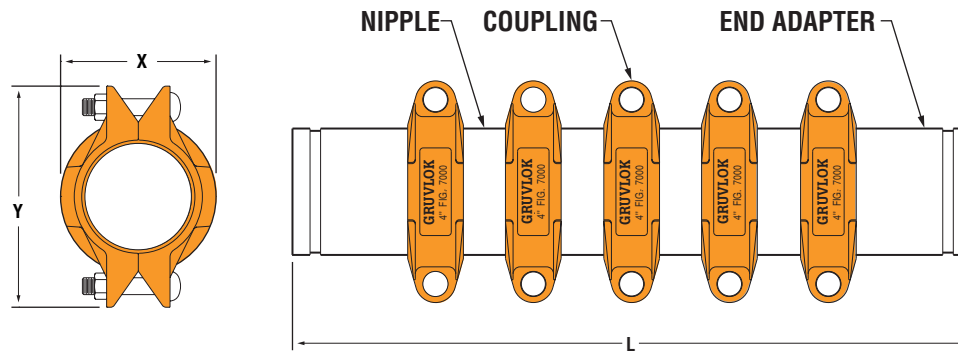
DWV (Drain, Waste and Vent Piping) per ASTM B306.

COLUMN 8

Maximum flare diameter is the OD at the most extreme tubing diameter.

FIG. 7240 ORDER FORM

Expansion Joints



PERFORMANCE DATA

Nominal Size	O.D.	Coupling Figure	Dimensions		Compressed Length L	Expanded Length L	Coupling Movement Capability	Number of Couplings	Total Movement Capability
			X	Y					
<i>In./mm</i>	<i>In./mm</i>		<i>In./mm</i>	<i>In./mm</i>	<i>In./mm</i>	<i>In./mm</i>	<i>In./mm</i>		<i>In./mm</i>
2 50	2.375 60.3	7000	3½ 88.9	5½ 125	30 762	31¼ 793.8	⅛ 3.2	10	1¼ 31.8
2½ 65	2.875 73.0	7000	4 101.6	5¾ 146.1	30 762	31¼ 793.8	⅛ 3.2	10	1¼ 31.8
3 80	3.500 88.9	7000	4⅞ 117.5	6¾ 171.5	30 762	31¼ 793.8	⅛ 3.2	10	1¼ 31.8
4 100	4.500 114.3	7000	5⅞ 149.2	8⅞ 206.4	17½ 444.5	18¾ 476.3	¼ 6.4	5	1¼ 31.8
5 125	5.562 141.3	7000	7 177.8	9⅞ 244.5	19 482.6	20⅞ 514.4	¼ 6.4	5	1¼ 31.8
6 150	6.625 168.3	7000	8 203.2	11 279.4	19 482.6	20⅞ 514.4	¼ 6.4	5	1¼ 31.8
8 200	8.625 219.1	7000	10⅞ 263.5	13¾ 336.6	22½ 571.5	23¾ 603.3	¼ 6.4	5	1¼ 31.8
10 250	10.750 273.1	7001	12⅞ 327.0	17⅞ 444.5	23½ 596.9	24¾ 628.7	¼ 6.4	5	1¼ 31.8
12 300	12.750 323.9	7001	15 381.0	19½ 495.3	23½ 596.9	24¾ 628.7	¼ 6.4	5	1¼ 31.8

FIG. 7240 – ORDER FORM

When requesting a quotation or placing an order, please complete the following form and fax a copy to 717-684-2131 to the attention of Customer Service:

- 1) Size and material of pipe to which the Expansion Joint will be connected _____
- 2) Factory to preset the Expansion Joint to: _____ Full Expansion _____ Full Contraction _____ Intermediate
- 3) Total overall movement while in service: _____ inches
- 4) Pipe material for Expansion Joint (standard is sch. 40 steel): _____
- 5) Finish on pipe (standard is black): _____
- 6) Finish on couplings (standard is painted): _____
- 7) Gasket material (standard is Grade E EPDM): _____
- 8) Connecting pipe ends if different than standard roll or cut groove: _____
- 9) Are there any silicone restrictions for the application? _____ Yes _____ No

SECTION 15050

Basic Mechanical Methods and Materials

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping, couplings, fittings and valves for piped building systems.

1.2 RELATED SECTIONS

- A. Section 15060 - Hangers and Supports.
- B. Section 15300 - Pipes, Valves and Fittings for Fire Protection Systems.
- C. Section 15400 - Pipes, Valves and Fittings for Plumbing Systems.
- D. Section 15500 - Piping Specialties.
- E. Section 15600 - Pipes Valves and Fittings for HVAC Heating and Cooling.

1.3 REFERENCES

- A. American Society of Mechanical Engineers (ASME) B31.1 - Power Piping (SI Edition).
- B. American Society of Mechanical Engineers (ASME) B31.3 - Chemical Plant and Petroleum Refinery Piping.
- C. American Society of Mechanical Engineers (ASME) B31.9 - Building Services Piping.
- D. ASTM International (ASTM) A36 - Standard Specification for Carbon Structural Steel.
- E. ASTM International (ASTM) A47 - Standard Specification for Ferritic Malleable Iron Castings.
- F. ASTM International (ASTM) A48 - Standard Specification for Gray Iron Castings.
- G. ASTM International (ASTM) A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- H. ASTM International (ASTM) A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- I. ASTM International (ASTM) A153 - Specification for Zinc Coating (Hot Dip) on Iron & Steel Hardware.
- J. ASTM International (ASTM) A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- K. ASTM International (ASTM) A387 - Standard Specification for Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum.
- L. ASTM International (ASTM) A515 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate-and Higher-Temperature Service.
- M. ASTM International (ASTM) A536 - Standard Specification for Ductile Iron Castings.
- N. ASTM International (ASTM) A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
- O. ASTM International (ASTM) A668 - Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
- P. ASTM International (ASTM) A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- Q. ASTM International (ASTM) B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- R. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-58 Pipe Hangers and Supports - Materials, Design and Manufacture.
- S. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-69 Pipe Hangers and Supports - Selection and Application.
- T. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-77 Guidelines for Pipe Support Contractual Relationships.
- U. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-89 Pipe Hangers and Supports - Fabrication and Installation Practices.
- V. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-90 Guidelines on Terminology for Pipe Hangers and Supports.
- W. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

- A. Grooved Mechanical Products: Couplings, fittings, valves and grooved components shall be used as the piping method.
 - 1. Product: Gruvlok as manufactured by Anvil International.
- B. System Design Requirements:
 - 1. Grooved products shall meet National and Local Piping and/or Building Codes. Mechanical commercial and industrial piping products shall have a minimum 300-psi (2.4 MPa) working pressure with 3 to 1 or greater safety working pressure with the exception of plain-end end fittings, which shall have a minimum of 175-psi (1.2MPa) working pressure.
 - 2. Fire Protection UL/ULC listed and FM approved products shall conform to NFPA working pressures.

SECTION 15050

Basic Mechanical Methods and Materials

3. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies. Grooved piping installation shall meet ANSI B-31.1 - ANSI B-31.9 standards for horizontal and vertical pipe support design criteria.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Installation methods.
- C. Certifications:
 1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Closeout Submittals:
 1. Warranty: Warranty documents.
 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 1. Manufacturing facilities shall be registered to ISO 9001:2000 and assessed to ISO 9000:2000 standard. A copy of the current certificate shall be available upon request.
- B. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights. Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: nwright-ross@anvilintl.com; Web: www.anvilintl.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURERS

- A. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Grooving shall conform to Gruvlok published grooving specifications.
- B. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-135 or A-795. Grooving shall conform to Gruvlok published grooving specifications.

SECTION 15050

Basic Mechanical Methods and Materials

- C. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Standard schedule 40 pipe shall be roll or cut grooved. Grooving shall conform to Gruitlok published grooving specifications.
- D. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Schedule 10 pipe and below shall be roll grooved. Grooving shall conform to Gruitlok published grooving specifications.
- E. Copper Tubing: Copper tube to comply with ASTM B-88.
 - 1. Types K, L, M, and DWV shall be used in conjunction with the Gruitlok Copper roll grooved method.

2.3 FITTINGS

- A. Material:
 - 1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
 - 2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
 - 3. Hex nuts shall conform to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
 - 4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
 - 5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
 - 6. Segmental welded fittings shall conform to ASTM A-53.
 - 7. Coatings shall be (Orange) Alkyd-enamel rust inhibiting lead free paint.
 - 8. Coating shall be hot dipped galvanized fittings shall conform to ASTM A-153.
 - 9. Standard coupling gaskets for building services shall be Grade "E" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).
- B. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
 - 1. Copper Systems: Gruitlok Xtreme Lubricant.
 - 2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruitlok Xtreme Lubricant.
 - 3. Systems Subject to Thermal Cycling: Gruitlok Xtreme Lubricant.
 - 4. DRI-SEAL Fire Protection Gaskets: Standard Gruitlok lubricants.
- C. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
 - 1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruitlok Style 7401 Rigidlok couplings shall be used including style 7012 flange adapters.
 - 2. Gruitlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
 - 3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
 - 4. Clamp type couplings shall be used for branch outlets.
 - 5. Grade "E" EPDM gaskets shall be used for water service applications with temperature ranges between - 40 degree F and +230 degree F (-40 degree C and 110 degree C).
 - 6. Use other gasket materials as recommended for petroleum service and other applications.
 - 7. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.
- D. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
 - 1. Gruitlok style 7400 Rigidlite and style 7012 coupling flange adapters.
 - 2. Grade "E" EPDM gasket.
 - 3. Gruitlok Xtreme Lubricant.
- E. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruitlok Fig 7012 or Figure 7013:
 - 1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation tines and are designated as a rigid connection.
 - 2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
 - 3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).
 - a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).
 - b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).
 - 4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).
- F. Grooved Fittings for Steel Piping Systems - Shall be Gruitlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
 - 1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
 - a. Cast ductile conforms to ASTM A-536 or ASTM A-47.
 - b. Forged steel conforms to ASTM A-234.
 - c. Segmental welded conforms to ASTM A-53.
 - 2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.
 - 3. Zinc electroplated fittings conform to ASTM B-633.
 - 4. Hot Dip Galvanized fittings conform to ASTM A-153.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or light wall as scheduled.
- G. Grooved Copper Fittings: Gruvlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
 1. Wrought Copper fittings size 2 inches to 8 inches (51 mm to 203 mm) diameter shall be schedule 10 or standard wall 304 or 316 stainless steel. Copper fittings shall be 99.9 percent lead free.
 2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.
- H. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7088 or 7089 grooved by grooved or grooved by thread insulating nipples.
 1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
 2. Housing: Steel tube to comply with ASTM A513.
 3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
 4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
 5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.
- I. Branch Outlets: Shall be Gruvlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
 1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
 2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
 3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.
- J. Outlet Couplings: Shall be Gruvlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500-psig minimum.
 1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
 2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.
- K. Plain End Couplings and Fittings: Gruvlok Roughneck coupling Style 7005 and plain-end fittings to match.
 1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536 and A-47. Fittings are cast or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End fittings. Fittings match coupling working pressure.
 2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Gruvlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.
- L. Gaskets for Industrial and Other Piping Systems: Systems with different media products shall be provided with industrial grade gaskets as scheduled.
- M. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat-treated; oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.4 GROOVED CONNECTION FLOW CONTROL VALVES

- A. Gruvlok Tri-Service Valves - Model FTV-S.
- B. Gruvlok Tri-Service Valves - Model FTV-A.
 1. Size: As indicated on drawings.
 2. Body and Yoke: Ductile iron; comply with ASTM A395 or ASTM A536.
 3. Disc: Cast iron, comply with ASTM A126.
 4. Stem: Bronze, comply with ASTM B21.
 5. Seat-Guide: Bronze, comply with ASTM B584.
 6. Disc Guide: Cast iron, comply with ASTM A126.
 7. Seat: Bronze.
 8. Flanged Gland: Cast iron, comply with ASTM A126.
 9. Packing: Graphited, non-asbestos packing.
 10. Spring: 302 stainless steel.
 11. Stem Guide: Ductile iron; comply with ASTM A395 or ASTM A536.
- C. Gruvlok Balancing Valves - Model GBV-S (Soldered).
- D. Gruvlok Balancing Valves - Model GBV-T (Threaded).
 1. Size: As indicated on drawings.
 2. Material: Cast bronze.
 3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type handwheel adjustment. Provide tamperproof memory stop.
- E. Gruvlok Balancing Valves - Model GBV-G (Grooved-End Straight).
- F. Gruvlok Balancing Valves - Model GBV-A (Grooved-End Angle).
 1. Size: As indicated on drawings.
 2. Body: Ductile iron, comply with ASTM A536.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

3. Disc: Bronze, comply with ASTM B584.
4. Seat: Ultra-high strength engineered resin.
5. Trim: Brass C-37700.
6. O-ring: Nitrile.
- G. Gruvlok Butterfly Valves - Series 7700:
 1. Size: As indicated on drawings.
 2. Body: Ductile iron; comply with ASTM A536, Grade 65-42-12.
 3. Body Coating: Epoxy.
 4. Body Coating: Nylon.
 5. Disc: Ductile iron; comply with ASTM A536, Grade 65-42-12.
 6. Grade: Grade E - EPDM.
 7. Grade: Grade T - Nitrile.
 8. Grade: Grade O - Fluoroelastomer.
 9. Upper and Lower Shaft: Type 416 stainless steel.

2.5 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. General: Grooved piping installation shall meet ANSI B-31.1 - ANSI B-31.9 Codes for Pressure Piping.
- B. Install in accordance with manufacturer's instructions.
- C. Pipe ends shall be clean and free from indentations, burrs, rust or damage.
- D. Field grooving or pipe cutting of galvanized pipe may require repair of possible damaged galvanized pipe ends. Two coats of spray-on "liquid-galvanize" are recommended.
- E. Install rigid couplings with tongue-and-groove housing for precise coupling alignment and engagement. Install tines in the housing key section to provide a rigid-like pipe connection.
- F. Companion or mating flanges shall have a flat hard surface and shall be free from gouges, undulations or deformities. Use flange gasket sealing rings if mating surfaces are not uniform.
- G. Plain-end coupling and fitting installation shall comply with specific torque and installation requirements. Consult current manufacturer's product installation data.
- H. Gasket lubricant shall be used to assure proper coupling gasket seating, and conformance with gasket service usage.

3.4 VALVE INSTALLATION

- A. Tri-Service Valves - Models FTV-S, FTV-A:
 1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 x 305 mm).
 2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
 3. Leave sufficient clearance around valve for valve removal or repair.
 4. Install valve in the direction of flow arrows on valve body.
 5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
 6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

- B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
 - 1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
 - 2. Install no fittings within 2 pipe diameters downstream of valve.
 - 3. Install valves with flow in the direction of the arrow on the valve body.
 - 4. Provide easy access to probe metering ports (PMPs), drain ports and handwheel.
 - 5. For solder applications, solder valve body in line using 95/5 solder.
 - 6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
 - 7. Install valves in horizontal or vertical piping as indicated.
 - 8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
 - 9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

END OF SECTION

SECTION 15300

Pipes, Valves and Fittings for Fire Protection Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Scope of work:
 - 1. All areas as indicated on the drawings are to be protected by an automatic suppression system, of type as indicated.
 - 2. Wet pipe.
 - 3. Dry-pipe.
 - 4. Wet standpipe.
 - 5. Dry-standpipe.
- B. Contractor shall be responsible for designing the distribution systems and sizing of the systems by hydraulic calculation; and shall provide the necessary engineering drawings and calculations to obtain acceptance of all authorities having jurisdiction.

1.2 SECTION INCLUDES

- A. Section 07840 - Firestopping.
- B. Section 08310 - Access Doors and Panels.
- C. Section 15050 - Basic Mechanical Methods and Materials.
- D. Section 15060 - Hangers and Supports.
- E. Section 15500 - Piping Specialties.

1.3 REFERENCES

- A. ASTM International (ASTM) A536 - Standard Specification for Ductile Iron Castings.
- B. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.
- C. NFPA 13 - Installation of sprinkler systems.
- D. NFPA 72 - Installation, maintenance and use of protective signaling devices.

1.4 SYSTEM DESCRIPTION

- A. System components to be UL listed/FM approved and labeled.
- B. System components to be to be rated for minimum operating pressure of 175 psig.
- C. Pipe, Valves, and Fittings - Grooved products for steel and copper fire protection systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties.
- D. Products shall be UL/ULC listed and FM approved. Materials shall be installed in accordance with current NFPA Standards, local Rating Bureau and/or local Fire Marshall requirements.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

- E. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies. Refer to Section 15060 - Hangers and Supports.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Installation methods.
- C. Certifications:
 - 1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Shop Drawings:
 - 1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- E. Closeout Submittals:
 - 1. Warranty: Warranty documents.
 - 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Fire Protection Contractor shall be licensed by the State in which the project is located authorized to furnish and install fire protection systems.
 - 2. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.
- B. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

- A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.
- B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.
- C. "Exposed" means not installed underground or "concealed" as defined above.
- D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.
- E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.
- F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.
- G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.
- B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: nwright-ross@anvilintl.com; Web: www.anvilintl.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURED UNITS

- A. Grooved Butterfly Valve: Gruvlok Figure AE-7722-3A, 2 to 10 inches (51 mm to 254 mm). 300 PSI (2.1 MPa) rated UL/FM approved grooved-end with two (2) switches; one is a supervisory switch and the other is an auxiliary switch. Tamper resistant screws shall be provided to attach the cover of the actuator.
- B. Check Valves: Gruvlok Figure 78FP, 2 to 12 inches (51 to 305 mm): 300 PSI (2.1 MPa) rated, UL/ULC listed and FM approved grooved-end.
- C. Couplings for Fire Protections Systems - Gruvlok UL/ULC listed and/or FM approved. Figure 7000 (Flexible) and 7400 (Rigidlok) Grade "E" EPDM Type A, "C" Style Gaskets (DRI-SEAL), Type E EPDM, or Flush Gap Gasket.
- D. Grooved Fittings for Fire Protection Piping Systems: Gruvlok Fire-Rite short pattern fittings, 90 degree elbows and tees in 2 to 8 inches (51 mm to 203 mm) or Gruvlok standard pattern fittings, 2 to 12 inches (51 to 305 mm). Cast ductile conforms to ASTM A-536 Ductile Iron to Grade 65-45-12. Fittings are painted to industry specification and are available galvanized. Fire-RiteSYMBOL 212 fittings are UL/ULC listed and FM approved.
- E. Expansion Compensation Loop:
 - 1. A flexible pipe loop that absorbs and compensates for multi-plane movements simultaneously while reduce piping stress.
 - 2. Anvil Star Tri-Flex Loop as manufactured by Anvil Star Fire Products Div. of Anvil International, or pre-approved equal.
 - a. Model ANVL2 (+/-2 inches (51 mm) movement).
 - b. Model ANVL4 (+/-4 inches (102 mm) movement).
 - c. Model ANVL8 (+/-8 inches (203 mm) movement).
 - 3. Construction shall be 3 equal length sections of annular corrugated stainless steel close-pitch hose (made in USA) with stainless steel over braid (made in USA) that will absorb or compensate for pipe movements in all 6 degrees of freedom (3 coordinate axes, plus rotation about those axes) simultaneously.
 - a. The corrugated metal hose, braid(s), and a stainless steel ring-ferrule/band (material gauge not less than .048 inch (1.2 mm) shall be integrally seal-welded using a 100 percent circumferential, full penetration TIG welds. End fittings shall be selected per application.
 - b. Design for pressure testing to 1.5 times their maximum rated working pressure and a minimum 4:1 (burst to working) safety factor.
 - c. Individually leak tested by the manufacturer using air-under-water or hydrostatic pressure.
 - d. In fire protection systems provide pipe loop that is Factory Mutual tested and approved for use in fire protection piping systems. Sizes 2 inches to 3 inches (51 mm to 76 mm) ID shall be FM Approved for 300 psi (2.1 MPa) working pressure at ambient temperature, and sizes 4 inches to 12 inches (102 mm to 305 mm) ID shall be FM Approved for 175 psi (1.2 MPa) working pressure at ambient temperature.
 - 4. Warranty: Provide a 3-year product warranty when installed in accordance with all specifications and installation instructions as described in the Anvil Star Tri-Flex Loop Installation and Maintenance Instructions.

2.3 SPRINKLER HEADS

- A. Manufacturer:
 - 1. Viking, Central, Reliable or equal.
 - 2. Type: Refer to schedule on drawings for head type required for different building areas.

2.4 PIPING

- A. Steel Piping:
 - 1. Refer to Section 15050 for fire protection piping material.
- B. Copper Piping:
 - 1. Refer to Section 15050 for fire protection piping material.

2.5 ACCESS PANELS

- A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.6 FIRESTOPPING MATERIALS

- A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.7 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Contractor shall verify and obtain fire flow test data required for design.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.
- D. Provide sleeves for piping penetrating floor and masonry walls.
- E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.
- F. All patching shall match adjacent surfaces.
- G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.
- H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide access panels for access to equipment, valves, or other specialties installed behind wall or above ceiling surfaces.
- C. Lay-in acoustical tee bar ceilings and snap-in removable metal pan ceilings shall be considered adequate for access.
- D. Fire Protection Contractor shall sublet installation work to subcontractors specifically skilled in the construction of the surfaces involved.
- E. Contractor shall confer with the other Project Contractors with respect to access panel locations and shall, wherever practicable, group devices in such a manner so as to eliminate as many panels as possible.
- F. Contractor shall remove all markings and labels from access panels.
- G. Cutting or drilling thru structural beams or joists is not permitted.
- H. Provide all openings and set all sleeves in cooperation with Contractors whose work is affected thereby.
- I. Caulk opening between pipe and sleeve with fire barrier sealant.
- J. In event holes must be provided through reinforced concrete, they shall be carefully drilled so as to avoid spalling and unnecessary damage of weakening of any structural member; chopping or breaking out will not be permitted.
- K. Obtain Architect's approval before providing openings through concrete or masonry in place and then proceed as directed.
- L. Contractor shall be responsible for damage to finished work resulting from cutting or drilling required because of neglect of Contractor to provide accurate and sufficient information.
- M. Penetrations through fire and/or smoke rated construction shall be sealed to maintain the rating of the construction in which they occur.
- N. Comply with the manufacturer's requirements for proper installation of fire stop materials to obtain the required fire and/or smoke rating.

3.4 COMPENSATION LOOPS

- A. Compensation loops shall be prepared for shipment using a cut-to-length metal shipping bar, tacked securely between the elbows of the two parallel legs, to maintain the manufactured length during shipping. Shipping bar must be removed prior to system start-up.
- B. Compensation loop hanger assembly kit shall be used to support and hang the loop. The FM Approved and UL Listed Seismic Wire/Cable assemblies conform to the requirements of the ASCE (American Society of Civil Engineers) guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the break strength of the cable with a safety factor of two.

3.5 SPRINKLER HEADS

- A. Locate sprinkler heads, main piping and valves as indicated on the drawings.
- B. Install sprinkler heads to coordinate with all lights, grilles and any other obstructions in ceiling.

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- C. Center sprinkler heads in ceiling tile and provide piping offsets as required.
- D. Where ceiling is to be painted or sprayed, apply paper cover over sprinkler heads to ensure the head and escutcheons do not get coated. Remove protective paper cover after painting or spraying is completed.
- E. Provide mountable metal box of spare heads with proper wrench for head replacement.

3.6 TESTS AND INSPECTIONS

- A. Contractor shall be responsible for testing and certification of systems and ordering inspections as required by authorities having jurisdiction.
- B. All tests shall be conducted in the presence of and to the satisfaction of the Owner or an authorized representative.
- C. Inspections shall be made by the Owner's authorized representative and inspectors having jurisdiction.

3.7 PROTECTION

- A. After all tests have been made and the systems pronounced to be satisfactory, the Contractor shall go over all work and clean equipment, fixtures, and related appurtenances and piping, and leave them clean and in complete working order at final completion of the project.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15400

Pipes, Valves and Fittings for Plumbing Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plumbing requirements.

1.2 RELATED SECTIONS

- A. Section 07840 - Firestopping.
- B. Section 08310 - Access Doors and Panels.
- C. Section 15050 - Basic Mechanical Methods and Materials.
- D. Section 15060 - Hangers and Supports.
- E. Section 15500 - Piping Specialties.

1.3 RELATED SECTIONS

- A. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

- A. Grooved products for steel and copper plumbing systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties for related materials.
 - 1. Galvanized fittings to be used with galvanized pipe.
 - 2. Schedule 10 Type 304 or 316 grooved stainless steel pipe and grooved stainless steel fittings shall be used in conjunction with copper systems 8 inch (203 mm) diameter and above.
 - 3. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
 - 4. Copper fittings shall be 99.9 percent lead free.
- B. Contractor Design Requirements:
 - 1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Installation methods.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

- C. Certifications:
 - 1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Shop Drawings:
 - 1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Closeout Submittals:
 - 1. Warranty: Warranty documents.
 - 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturing facilities shall be registered to ISO 9001:2000 and assessed ISO 9000:2000 standard. A copy of the current certificate shall be available upon request.
- B. Installer Qualifications:
 - 1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.
- C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

- A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.
- B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.
- C. "Exposed" means not installed underground or "concealed" as defined above.
- D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.
- E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.
- F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.
- G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.
- B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

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PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: nwright-ross@anvilintl.com; Web: www.anvilintl.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 FITTINGS

- A. Material:
 1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
 2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
 3. Hex nuts shall confirm to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
 4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
 5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
 6. Segmental welded fittings shall conform to ASTM A-53.
 7. Coatings shall be Standard (Orange) Alkyd-enamel rust inhibiting lead free paint.
 8. Hot dipped galvanized fittings shall conform to ASTM A-153.
 9. Standard coupling gaskets for building services shall be Grade "E" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).
- B. Gaskets: Grivlok Product Grade "E" EPDM pressure responsive design for all water and oil free air service. EPDM gaskets are color coded green.
 1. Material conformance to grooved industrial standards ASTM D-2000.
 2. Temperature operating range is -40 degrees to +230 degrees F (-40 degrees C to 110 degrees C).
 3. Gruvlok Xtreme Lubricant shall be used to insure proper gasket installation.
 4. Gruvlok Xtreme Lubricant shall be used for all copper system installations, installations below - 20 degrees F (-28 degrees C), installations above 150 degrees F (66 degrees C) and installations that are subject to temperature cycles.
- C. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
 1. Copper Systems: Gruvlok Xtreme Lubricant.
 2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruvlok Xtreme Lubricant.
 3. DRI-SEAL Fire Protection Gaskets: Standard Gruvlok lubricants.
- D. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
 1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruvlok Style 7401 (Rigidlok) couplings shall be used including style 7012 flange adapters.
 2. Gruvlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
 3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
 4. Clamp type couplings shall be used for branch outlets. Grade "E" EPDM gaskets are standard, but other gasket materials are available. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.
- E. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
 1. Gruvlok style 7400 Rigidlite and style 7012 coupling flange adapters.
 2. Grade "E" EPDM gasket.
 3. Gruvlok Xtreme Lubricant.
- F. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruvlok Fig 7012 or Figure 7013:
 1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation "tines" and are designated as a rigid connection.
 2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
 3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).
 - a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).
 - b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).
 4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).
- G. Grooved Fittings for Steel Piping Systems - Shall be Gruvlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
 1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
 - a. Cast ductile conforms to ASTM A-536 or ASTM A-47.
 - b. Forged steel conforms to ASTM A-234.
 - c. Segmental welded conforms to ASTM A-53.
 2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

3. Zinc electroplated fittings conform to ASTM B-633.
4. Hot Dip Galvanized fittings conform to ASTM A-153.
5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or lightwall as scheduled.
- H. Grooved Copper Fittings: Grivlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
 1. Wrought Copper fittings size 2 inches to 8 inches (51 mm to 203 mm) diameter shall be schedule 10 or standard wall 304 or 316 stainless steel. Copper fittings shall be 99.9 percent lead free.
 2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.
- I. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7088 or 7089 grooved by grooved or grooved by thread insulating nipples.
 1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
 2. Housing: Steel tube to comply with ASTM A513.
 3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
 4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
 5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.
- J. Branch Outlets: Shall be Grivlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
 1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
 2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
 3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.
- K. Outlet Couplings: Shall be Grivlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500 psig minimum.
 1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
 2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.
- L. Plain End Couplings and Fittings: Grivlok Roughneck coupling Style 7005 and plain-end fittings to match.
 1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536 and A-47. Fittings are cast or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Grivlok Plain-End fittings. Fittings match coupling working pressure.
 2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Grivlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.
- M. Gaskets for Industrial and Other Piping Systems: Gaskets with different media products shall be provided with industrial grade gaskets as scheduled.
- N. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat treated, oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.3 GROOVED CONNECTION FLOW CONTROL VALVES

- A. Grivlok Tri-Service Valves - Model FTV-S.
- B. Grivlok Tri-Service Valves - Model FTV-A.
 1. Size: As indicated on drawings.
 2. Body and Yoke: Ductile iron, comply with ASTM A395 or ASTM A536.
 3. Disc: Cast iron, comply with ASTM A126.
 4. Stem: Bronze, comply with ASTM B21.
 5. Seat-Guide: Bronze, comply with ASTM B584.
 6. Disc Guide: Cast iron, comply with ASTM A126.
 7. Seat: Bronze.
 8. Flanged Gland: Cast iron, comply with ASTM A126.
 9. Packing: Graphited, non-asbestos packing.
 10. Spring: 302 stainless steel.
 11. Stem Guide: Ductile iron, comply with ASTM A395 or ASTM A536.
- C. Grivlok Balancing Valves - Model GBV-S (Soldered).
- D. Grivlok Balancing Valves - Model GBV-T (Threaded).
 1. Size: As indicated on drawings.
 2. Material: Cast bronze.
 3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type handwheel adjustment. Provide tamperproof memory stop.
- E. Grivlok Balancing Valves - Model GBV-G (Grooved-End Straight).
- F. Grivlok Balancing Valves - Model GBV-A (Grooved-End Angle).
 1. Size: As indicated on drawings.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

2. Body: Ductile iron, comply with ASTM A536.
3. Body Coating: Epoxy.
4. Body Coating: Nylon.
5. Disc: Ductile iron, comply with ASTM A536, Grade 65-42-12.
6. Grade: Grade E - EPDM.
7. Grade: Grade T - Nitrile.
8. Grade: Grade O - Fluoroelastomer.
9. Upper and Lower Shaft: Type 416 stainless steel.

2.4 PIPING

- A. Steel Piping:
 1. Refer to Section 15050 for piping material.
- B. Copper Piping:
 1. Refer to Section 15050 for piping material.
- C. Stainless Steel Piping:
 1. Refer to Section 15050 for piping material.
- D. Aluminum Piping:
 1. Refer to Section 15050 for piping material.
- E. Steel Piping:
 1. Refer to Section 15050 for piping material.
- F. Plastic Piping:
 1. Refer to Section 15050 for piping material.

2.5 ACCESS PANELS

- A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.6 FIRESTOPPING MATERIALS

- A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.7 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.
- D. Provide sleeves for piping penetrating floor and masonry walls.
- E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.
- F. All patching shall match adjacent surfaces.
- G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.
- H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

3.4 VALVE INSTALLATION

- A. Tri-Service Valves - Models FTV-S, FTV-A:
 1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 by 305 mm).
 2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
 3. Leave sufficient clearance around valve for valve removal or repair.
 4. Install valve in the direction of flow arrows on valve body.
 5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
 6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.
- B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
 1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
 2. Install no fittings within 2 pipe diameters downstream of valve.
 3. Install valves with flow in the direction of the arrow on the valve body.
 4. Provide easy access to probe metering ports (PMPs), drain ports and handwheel.
 5. For solder applications, solder valve body in line using 95/5 solder.
 6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
 7. Install valves in horizontal or vertical piping as indicated.
 8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
 9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15500

Piping Specialties

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specialty piped systems.

1.2 RELATED SECTIONS

- A. Section 07840 - Firestopping.
- B. Section 08310 - Access Doors and Panels.
- C. Section 15050 - Basic Mechanical Methods and Materials.
- D. Section 15060 - Hangers and Supports.

1.3 REFERENCES

- A. American Society of Mechanical Engineers (ASME) B31.1 - Power Piping (SI Edition).
- B. American Society of Mechanical Engineers (ASME) B31.3 - Chemical Plant and Petroleum Refinery Piping.
- C. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

- A. Grooved products for steel and copper piping specialty systems shall be used. Refer to Section 15050 - Basic Materials and Methods for related materials.

SECTION 15500 (CONT.)

Piping Specialties

1. Galvanized fittings to be used with galvanized pipe.
 2. Schedule 10 Type 304 or 316 grooved stainless steel pipe and grooved stainless steel fittings shall be used in conjunction with copper systems 8 inch (203 mm) diameter and above.
 3. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
 4. Copper fittings shall be 99.9 percent lead free.
- B. Contractor Design Requirements:
1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
 2. Installation methods.
- C. Certifications:
1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Shop Drawings:
1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Closeout Submittals:
1. Warranty: Warranty documents.
 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
1. Manufacturing facilities shall be registered to ISO 9001:2000 and assessed to ISO 9000:2000 standard. A copy of the current certificate shall be available upon request.
- B. Installer Qualifications:
1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.
- C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

- A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.
- B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.
- C. "Exposed" means not installed underground or "concealed" as defined above.
- D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.
- E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.
- F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.
- G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

SECTION 15500 (CONT.)

Piping Specialties

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.
- B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: nwright-ross@anvilintl.com; Web: www.anvilintl.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURED UNITS

- A. Grooved Butterfly Valve: Gruvlok Series 7700 and Series 8000GR grooved butterfly valves. Service usage for Balancing and On/Off service.
1. Series 7700: Butterfly Valve - Sizes 2 inches to 12 inches (51 mm to 305 mm). Listed in accordance with MSS SP-67. Bubble tight at 300 psig (2.1 MPa). Body - Ductile Iron, available with standard nylon body coating or epoxy body coated. Disc- Ductile Iron with EPDM encapsulation. Operating temperature -40 degrees FSYMBOL 176 to +230 degrees F (-40 degrees C to 110 degrees C). (Optional - Nitrile Disc encapsulation) Operating temperature up to +180 degrees F (82 degrees C) and Grade O Fluoroelastomer. Operating Temperature up to 230 degrees F (110 degrees C). Trim - 416 s/s. Bronze upper and lower shaft bearings conforming to ASTM B438, Grade 1 - type 1 for sizes 8 inches to 12 inches (203 mm to 305 mm) only. Low Torque. Rated for "Dead-end" service.
 - a. Disc-to-stem attachment shall be made with splined stainless steel stems attached to disc by cold fusion process. Disc/stem seals shall be triple redundant as follows: 1. Disc-to-valve body; 2. EPDM seat-to-stem; 3. EPDM O-rings in upper and lower shaft.
 2. Series 8000GR: Butterfly Valve - Size range 14 inches to 24 inches (356 mm to 610 mm). Bubble tight to 200-psig (1.4 MPa). Body: Cast Iron to ASTM A-126 CL.B. Disc- Nickel-Plated Ductile, Aluminum Bronze or Stainless Steel. Liner- Standard EPDM or Buna N. Operating temperature same as 7700 series. Bearings: Upper and lower bearings Teflon reinforced. Trim - 316 and 416 s/s. Low Torque. Rated for "Dead-end" service.
 3. BFV Operators/Handles - Series 7700 and 8000GR available in 2 position, 10 position latch lock, Infinite position with memory stop for sizes 2 inches through 8 inches (51 mm through 203 mm), Double "D" with gear operators, chain wheel, and pneumatic or electric actuated for sizes 2 inches through 12 inches (51 mm through 305 mm).
- B. Grooved Ball Valve - Shall be Gruvlok Series 7500. Sizes 2 inches to 6 inches. Standard port design rated for 740 psig (5.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydro pressure tested. The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified. Bi-directional flow. Low torque operation. Body and End Caps - Ductile Iron ASTM 395 and Stainless Steel ASTM A351 CF8M. Ball and Stem - chrome plated carbon steel and 316 Stainless Steel. RPTFE and Nylon Seats and fluorocarbon stem and body seals. Two position handle standard.
1. Grooved Three Way Diverter Valve - Shall be Gruvlok Series FS7500 Stainless Steel body or FC7500 Carbon Steel Body 3-Way Diverter Valve. Full port design rated for 600 psig (4.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydrostatic pressure tested.
 2. Grooved Bronze Ball Valve- Shall be Gruvlok Series 7500B. Sizes 1-1/2 inches to 4 inches (38 mm to 102 mm) are rated 300 psi (1.9 KPa) WOG. Full port sizes 1-1/2 inches to 3 inches (38 mm to 76 mm) and standard port in the 4 inches (102 mm) version. Cast bonze body with stainless 316 ball and PTFE Seats and Seals. Valve shall comply with extraction requirements of NSF/ANSI 6.
- C. Grooved (Non- Slam) Check Valve: Shall be Gruvlok Series 7800. Sizes 2 inches to- 12 inches (51 mm to 305 mm). 300-psig (1.9 KPa). Body-Ductile. Exterior body coated with rust Inhibiting paint. (Optional body coat is Nickel Zn Electroplated) Clapper- sizes 2 inches to 5 inches (51 mm to 127 mm) -- Type 304 or 302 s/s to ASTM A-167. Clapper- sizes 6 inches to 12 inches (152 mm to 305 mm) - Ductile Iron. Clapper facing- EPDM or Nitrile. Seat ring, spring, and hinge pin: - Type 302 or 304 s/s. Bronze hinge pin bushings. Iron hinge pin plugs and drain. Service from 300 psi (1.9 KPa) to a low 1 psi (28 inch water head) (6895 Pa). Replaceable clapper. Horizontal or vertical service usage. MSS SP-71 & SP-80. 100 percent Shell Test & Hydro Seat test pressure 100 percent.
- D. Grooved (Globe Type) Silent Check Valve: Shall be Gruvlok Series 400 G. Sizes 2 inches to 10 inches. Rated for 200-psi (1.3 KPa) maximum working pressure. Operating temperature to 200 degrees F (93 degrees C). Body- Ductile. Bronze Seat, Plug and Bushing. Durlon Gasket. Trim-

SECTION 15500 (CONT.)

Piping Specialties

Metal on Metal. Optional Trim- Bronze w/ Buna Seat, s/s and s/s w Buna Seat. Center-guided plug. (Positive noiseless opening and closing) Plug activated at 1/4 to 1/2 psi (1723 Pa to 3448 Pa).

1. Di-Electric Insulated Pipe Connections: Shall be Di-Lok Figure 7088 or 7089 grooved by grooved or grooved by thread insulating nipples. Inhibits the formation of a galvanic cell between dissimilar metals. Housing- Steel Tube to ASTM A513. Liner- Polypropylene to ASTM D4140. 300 psig (1.9 KPa). Operating temperature -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).
- E. Grooved Strainers: Shall be Gruvlok Series 7260-T ("Tee" Type) or 758-G or 768-GF ("Wye" Type) strainers.
 1. Tee Strainer Series 7260: Sizes 2 inches to 24 inches (51 mm to 610 mm). Strainer in-line, twin-fold basket provides 100 percent of the projected pipe area for open flow. Body- Ductile 2 inches to 12 inches (51 mm to 305 mm) Malleable Iron ASTM A47 or Ductile Iron ASTM A536, Size 14 inches (356 mm) and larger: Carbon Steel Pipe ASTM A53. Basket- Stainless steel Type 304-basket standard #12 mesh (1/16 inch perf.) (1.6 mm perf.) Through 3 inches (76 mm). Sizes 4 inches and larger standard with #6 mesh (1/8 inch perf.) (3.2 mm perf.). Monel or other alloy baskets, magnets, and various mesh sizes optional. Horizontal or vertical service usage.
 2. Wye Strainers 758-G & 768GF: Size range 2 inches to 12 inches (305 mm). Body- Ductile iron. 300 psig (1.9 KPa). Baskets- Same as Tee Series.
- F. Grooved Suction Diffusers: Shall be Gruvlok Series 7250. Sizes 2-1/2 inches to 16 inches (64 mm to 406 mm). Body- Carbon steel to ASTM A-53 body for all sizes. 300 psig (1.9 KPa). Strainer Basket- Stainless steel (3/16 inch perf.) (4.76 mm perf.) With start-up #16 mesh pre-filter removable screen. Blow-down and gage plug standard.
- G. Flexible Connectors: Sizes 2 inches to 12 inches (51 mm to 305 mm). Stainless steel tube and braid design. Carbon steel grooved, threaded & flanged end. Rated working pressure 150 to 300 psi (1.0 to 2.0 KPa).
- H. Triple Duty Combination Valves: Shall be Gruvlok "Tri-Service" (FTV-A/FTV-S) service valves. Sizes 2-1/2 inches to 12 inches (64 mm to 305 mm). Services- Combination shut-off, non-slam silent check and full throttling. Throttling flow indicator is standard. Horizontal or vertical service usage. Flow measurement ports on either side of valve body. Fixed or portable meters available for differential pressure measurement.
- I. Calibrated Circuit (Setter) Balancing Valves: Shall be GBV-Gruvlok "Circuit Balancing" Valve. Sizes 1/2 inch to 12 inches (13 mm to 305 mm). Multi-turn adjustment. Positive shut-off. Tamper-proof memory stop. Pressure differential read-out ports. Differential Pressure Meter- Provide CBV differential pressure meter/transducer as required. Direct Flow readout. Proportional balancing.
- J. Automatic Air Vents - Gruvlok Models GAV-15 rated 150 psig and GAV-30 rated 300 psig.

2.3 PIPING

- A. Steel Piping:
 1. Refer to Section 15050 for piping material.
- B. Copper Piping:
 1. Refer to Section 15050 for piping material.
- C. Stainless Steel Piping:
 1. Refer to Section 15050 for piping material.
- D. Aluminum Piping:
 1. Refer to Section 15050 for piping material.
- E. Steel Piping:
 1. Refer to Section 15050 for piping material.
- F. Plastic Piping:
 1. Refer to Section 15050 for piping material.

2.4 ACCESS PANELS

- A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.5 FIRESTOPPING MATERIALS

- A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.6 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.7 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

SECTION 15500 (CONT.)

Piping Specialties

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.
- D. Provide sleeves for piping penetrating floor and masonry walls.
- E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.
- F. All patching shall match adjacent surfaces.
- G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.
- H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15600

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. HVAC requirements.

1.2 RELATED SECTIONS

- A. Section 07840 - Firestopping.
- B. Section 08310 - Access Doors and Panels.
- C. Section 15050 - Basic Mechanical Methods and Materials.
- D. Section 15060 - Hangers and Supports.
- E. Section 15500 - Piping Specialties.

1.3 REFERENCES

- A. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

- A. Grooved products for steel and copper heating and cooling systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties for related materials.
 - 1. Galvanized fittings shall be used with galvanized pipe.

Introduction

Couplings

Outlets

Fittings

Valves &
AccessoriesHigh
PressureAdvanced Copper
Method (IPS)CTS Copper
SystemDI-LOK®
NipplesPlain-End
FittingsHDPE
CouplingsSock-It®
FittingsStainless
Steel MethodRoll
GrooversInstallation
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SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

2. Schedule 10 Type 304 or 316 grooved stainless steel pipe and grooved stainless steel fittings shall be used in conjunction with copper systems 8 inch (203 mm) diameter and above.
3. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
4. Copper fittings shall be 99.9 percent lead free.
- B. Contractor Design Requirements:
 1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Installation methods.
- C. Certifications:
 1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.
- D. Shop Drawings:
 1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- E. Closeout Submittals:
 1. Warranty: Warranty documents.
 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 1. Manufacturing facilities shall be registered to ISO 9001:2000 and assessed to ISO 9000:2000 standard. A copy of the current certificate shall be available upon request.
- B. Installer Qualifications:
 1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.
- C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

- A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.
- B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.
- C. "Exposed" means not installed underground or "concealed" as defined above.
- D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.
- E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.
- F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.
- G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

1.10 WARRANTY

- A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.
- B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: nwright-ross@anvilintl.com; Web: www.anvilintl.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 FITTINGS

- A. Material:
 1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
 2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
 3. Hex nuts shall confirm to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
 4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
 5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
 6. Segmental welded fittings shall conform to ASTM A-53.
 7. Coatings shall be Standard (Orange) Alkyd-enamel rust inhibiting lead free paint.
 8. Hot dipped galvanized fittings shall conform to ASTM A-153.
 9. Standard coupling gaskets for building services shall be Grade "E" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).
- B. Gaskets: Gruvlok Product Grade "E" EPDM pressure responsive design for all water and oil free air service. EPDM gaskets are color coded green.
 1. Material conformance to grooved industrial standards ASTM D-2000.
 2. Temperature operating range is -40 degrees to +230 degrees F (-40 degrees C to 110 degrees C).
 3. Gruvlok Xtreme lubricant shall be used to insure proper gasket installation.
 4. Gruvlok Xtreme Lubricant shall be used for all copper system installations, installations below - 20 degrees F (-28 degrees C), installations above 150 degrees F (66 degrees C) and installations that are subject to temperature cycles.
- C. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
 1. Copper Systems: Gruvlok Xtreme Lubricant.
 2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruvlok Xtreme Lubricant.
 3. DRI-SEAL Fire Protection Gaskets: Standard Gruvlok lubricants.
- D. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
 1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruvlok Style 7401 (Rigidlok) couplings shall be used including style 7012 flange adapters.
 2. Gruvlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
 3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
 4. Clamp type couplings shall be used for branch outlets. Grade "E" EPDM gaskets are standard, but other gasket materials are available. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.
- E. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
 1. Gruvlok style 7400 Rigidlite and style 7012 coupling flange adapters.
 2. Grade "E" EPDM gasket.
 3. Gruvlok Xtreme Lubricant.
- F. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruvlok Fig 7012 or Figure 7013:
 1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation "tines" and are designated as a rigid connection.
 2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
 3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

- a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).
 - b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).
4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).
- G. Grooved Fittings for Steel Piping Systems - Shall be Gruvlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
 1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
 - a. Cast ductile conforms to ASTM A-536 or ASTM A-47.
 - b. Forged steel conforms to ASTM A-234.
 - c. Segmental welded conforms to ASTM A-53.
 2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.
 3. Zinc electroplated fittings conform to ASTM B-633.
 4. Hot Dip Galvanized fittings conform to ASTM A-153.
 5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or lightwall as scheduled.
- H. Grooved Copper Fittings: Gruvlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
 1. Wrought Copper fittings size 2 inches to 8 inches (51 mm to 203 mm) diameter shall be schedule 10 or standard wall 304 or 316 stainless steel. Copper fittings shall be 99.9 percent lead free.
 2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.
- I. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7088 or 7089 grooved by grooved or grooved by thread insulating nipples.
 1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
 2. Housing: Steel tube to comply with ASTM A513.
 3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
 4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
 5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.
- J. Branch Outlets: Shall be Gruvlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
 1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
 2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
 3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.
- K. Outlet Couplings: Shall be Gruvlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500-psig minimum.
 1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
 2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.
- L. Plain End Couplings and Fittings: Gruvlok Roughneck coupling Style 7005 and plain-end fittings to match.
 1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536 and A-47. Fittings are cast or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End fittings. Fittings match coupling working pressure.
 2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Gruvlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.
- M. Gaskets for Industrial and Other Piping Systems: Gaskets with different media products shall be provided with industrial grade gaskets as scheduled.
- N. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat-treated; oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.3 GROOVED CONNECTION FLOW CONTROL VALVES

- A. Grooved Butterfly Valve: Gruvlok Series 7700 and Series 8000GR grooved butterfly valves. Service usage for Balancing and On/Off service.
 1. Series 7700: Butterfly Valve - Sizes 2 inches to 12 inches (51 mm to 305 mm). Listed in accordance with MSS SP-67. Bubble tight at 300 psig (2.1 MPa). Body - Ductile Iron, available with standard nylon body coating or epoxy body coated. Disc- Ductile Iron with EPDM encapsulation. Operating temperature -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C). (Optional - Nitrile Disc encapsulation) Operating temperature up to +180 degrees F (82 degrees C) and Grade O Fluoroelastomer. Operating Temperature up to 230 degrees F (110 degrees C). Trim - 416 s/s. Bronze upper and lower shaft bearings conforming to ASTM B438, Grade 1 - type 1 for sizes 8 inches to 12 inches (203 mm to 305 mm) only. Low Torque. Rated for "Dead-end" service.
 2. Disc-to-stem attachment shall be made with splined stainless steel stems attached to disc by cold fusion process.
 - a. Disc/stem seals shall be triple redundant as follows: 1. Disc-to-valve body; 2. EPDM seat-to-stem; 3. EPDM O-rings in upper and lower shaft.
 3. Series 8000GR: Butterfly Valve - Size range 14 inches to 24 inches (356 mm to 610 mm). Bubble tight to 200-psig (1.4 MPa). Body: Cast Iron to ASTM A-126 CL.B. Disc- Nickel-Plated Ductile, Aluminum Bronze or Stainless Steel. Liner- Standard EPDM or Nitrile. Operating temperature same as 7700 series. Bearings: Upper and lower bearings Teflon reinforced. Trim - 316 and 416 s/s. Low Torque. Rated for "Dead-end" service.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

4. BFV Operators/Handles - Series 7700 and 8000GR available in 2 position, 10 position latch lock, Infinite position with memory stop for sizes 2 inches through 8 inches (51 mm through 203 mm), Double "D" with gear operators, chain wheel, and pneumatic or electric actuated for sizes 2 inches through 12 inches (51 mm through 305 mm).
- B. Grooved Ball Valve - Shall be Gruvlok Series 7500. Sizes 2 inches to 6 inches. Standard port design rated for 740 psig (5.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydro pressure tested. The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified. Bi-directional flow. Low torque operation. Body and End Caps - Ductile Iron ASTM 395 and Stainless Steel ASTM A351 CF8M. Ball and Stem - chrome plated carbon steel and 316 Stainless Steel. RPTFE and Nylon Seats and fluorocarbon stem and body seals. Two position handle standard.
 1. Grooved Three Way Diverter Valve - Shall be Gruvlok Series FS7500 Stainless Steel body or FC7500 Carbon Steel Body 3-Way Diverter Valve. Full port design rated for 600 psig (4.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydrostatic pressure tested.
 2. Grooved Bronze Ball Valve- Shall be Gruvlok Series 7500B. Sizes 1-1/2 inches to 4 inches (38 mm to 102 mm) are rated 300 psi (1.9 KPa) WOG. Full port sizes 1-1/2 inches to 3 inches (38 mm to 76 mm) and standard port in the 4 inches (102 mm) version. Cast bonze body with stainless 316 ball and PTFE Seats and Seals. Valve shall comply with extraction requirements of NSF/ANSI 6.
- C. Gruvlok Tri-Service Valves - Model FTV-S.
- D. Gruvlok Tri-Service Valves - Model FTV-A.
 1. Size: As indicated on drawings.
 2. Body and Yoke: Ductile iron; comply with ASTM A395 or ASTM A536.
 3. Disc: Cast iron, comply with ASTM A126.
 4. Stem: Bronze, comply with ASTM B21.
 5. Seat-Guide: Bronze, comply with ASTM B584.
 6. Disc Guide: Cast iron, comply with ASTM A126.
 7. Seat: Bronze.
 8. Flanged Gland: Cast iron, comply with ASTM A126.
 9. Packing: Graphited, non-asbestos packing.
 10. Spring: 302 stainless steel.
 11. Stem Guide: Ductile iron; comply with ASTM A395 or ASTM A536.
- E. Gruvlok Balancing Valves - Model GBV-S (Soldered).
- F. Gruvlok Balancing Valves - Model GBV-T (Threaded).
 1. Size: As indicated on drawings.
 2. Material: Cast bronze.
 3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type hand wheel adjustment. Provide tamperproof memory stop.
- G. Gruvlok Balancing Valves - Model GBV-G (Grooved-End Straight).
- H. Gruvlok Balancing Valves - Model GBV-A (Grooved-End Angle).
 1. Size: As indicated on drawings.
 2. Body: Ductile iron, comply with ASTM A536.
 3. Disc: Bronze, comply with ASTM B584.
 4. Seat: Ultra-high strength engineered resin.
 5. Trim: Brass C-37700.
 6. O-ring: Nitrile.

2.4 MANUFACTURED UNITS

- A. Grooved (Non- Slam) Check Valve: Shall be Gruvlok Series 7800. Sizes 2 inches to- 12 inches (51 mm to 305 mm). 300-psig (1.9 KPa). . Body- Ductile. Exterior body coated with rust Inhibiting paint. (Optional body coat is Nickel Zn Electroplated) Clapper- sizes 2 inches to 5 inches (51 mm to 127 mm) -- Type 304 or 302 s/s to ASTM A-167. Clapper- sizes 6 inches to 12 inches (152 mm to 305 mm). - Ductile Iron. Clapper facing- EPDM or Nitrile. Seat ring, spring, and hinge pin: - Type 302 or 304 s/s. Bronze hinge pin bushings. Iron hinge pin plugs and drain. Service from 300 psi (1.9 KPa) to a low 1 psi (28 inch water head) (6895 Pa). Replaceable clapper. Horizontal or vertical service usage. MSS SP-71 & SP-80. 100 percent Shell Test & Hydro Seat test pressure 100 percent.
- B. Grooved (Globe Type) Silent Check Valve: Shall be Gruvlok Series 400 G. Sizes 2 inches to 10 inches. Rated for 200-psi (1.3 KPa) maximum working pressure. Operating temperature to 200 degrees F (93 degrees C). Body- Ductile. Bronze Seat, Plug and Bushing. Durlon Gasket. Trim- Metal on Metal. Optional Trim- Bronze w/ Nitrile Seat, s/s and s/s w Nitrile Seat. Center-guided plug. (Positive noiseless opening and closing) Plug activated at 1/4 to 1/2 psi (1723 Pa to 3448 Pa).
 1. Di-Electric Insulated Pipe Connections: Shall be Di-Lok Figure 7088 or 7089 grooved by grooved or grooved by thread insulating nipples. Inhibits the formation of a galvanic cell between dissimilar metals. Housing- Steel Tube to ASTM A513. Liner- Polypropylene to ASTM

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

D4140. 300 psig (1.9 KPa). Operating temperature -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).

- C. Grooved Strainers: Shall be Gruvlok Series 7260-T ("Tee" Type) or 758-G or 768-GF ("Wye" Type) strainers.
 - 1. Tee Strainer Series 7260: Sizes 2 inches to 24 inches (51 mm to 610 mm). Strainer in-line, twin-fold basket provides 100 percent of the projected pipe area for open flow. Body- Ductile 2 inches to 12 inches (51 mm to 305 mm) Malleable Iron ASTM A47 or Ductile Iron ASTM A536, Size 14 inches (356 mm) and larger: Carbon Steel Pipe ASTM A53. Basket- Stainless steel Type 304-basket standard #12 mesh (1/16 inch perf.) (1.6 mm perf.) through 3 inches (76 mm). Sizes 4 inches and larger standard with #6 mesh (1/8 inch perf.) (3.2 mm perf.). Monel or other alloy baskets, magnets, and various mesh sizes optional. Horizontal or vertical service usage.
 - 2. Wye Strainers 758-G & 768GF: Size range 2 inches to 12 inches (305 mm). Body- Ductile iron. 300 psig (1.9 KPa). Baskets- Same as Tee Series.
- D. Grooved Suction Diffusers: Shall be Gruvlok Series 7250. Sizes 2-1/2 inches to 16 inches (64 mm to 406 mm). Body- Carbon steel to ASTM A-53 body for all sizes. 300 psig (1.9 KPa). Strainer Basket- Stainless steel (3/16 inch perf.) (4.76 mm perf.) With start-up #16 mesh pre-filter removable screen. Blow-down and gage plug standard.
- E. Flexible Connectors: Sizes 2 inches to 12 inches (51 mm to 305 mm). Stainless steel tube and braid design. Carbon steel grooved, threaded & flanged end. Rated working pressure 150 to 300 psi (1.0 to 2.0 KPa).
- F. Triple Duty Combination Valves: Shall be Gruvlok "Tri-Service" (FTV-A/FTV-S) service valves. Sizes 2-1/2 inches to 12 inches (64 mm to 305 mm). Services- Combination shut-off, non-slam silent check and full throttling. Throttling flow indicator is standard. Horizontal or vertical service usage. Flow measurement ports on either side of valve body. Fixed or portable meters available for differential pressure measurement.
- G. Calibrated Circuit (Setter) Balancing Valves: Shall be GBV-Gruvlok "Circuit Balancing" Valve. Sizes 1/2 inch to 12 inches (13 mm to 305 mm). Multi-turn adjustment. Positive shut-off. Tamper-proof memory stop. Pressure differential read-out ports. Differential Pressure Meter- Provide CBV differential pressure meter/transducer as required. Direct Flow readout. Proportional balancing.
- H. Automatic Air Vents - Gruvlok Models GAV-15 rated 150 psig and GAV-30 rated 300 psig.

2.5 PIPING

- A. Steel Piping:
 - 1. Refer to Section 15050 for piping material.
- B. Copper Piping:
 - 1. Refer to Section 15050 for piping material.
- C. Stainless Steel Piping:
 - 1. Refer to Section 15050 for piping material.
- D. Aluminum Piping:
 - 1. Refer to Section 15050 for piping material.
- E. Steel Piping:
 - 1. Refer to Section 15050 for piping material.
- F. Plastic Piping:
 - 1. Refer to Section 15050 for piping material.

2.6 ACCESS PANELS

- A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.7 FIRESTOPPING MATERIALS

- A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.8 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.9 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- A. Provide templates to ensure accurate location of anchor bolts.

SECTION 15600 (CONT.)**Pipes, Valves and Fittings for HVAC Heating and Cooling Systems****PART 3 EXECUTION****3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.
- D. Provide sleeves for piping penetrating floor and masonry walls.
- E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.
- F. All patching shall match adjacent surfaces.
- G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.
- H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.4 VALVE INSTALLATION

- A. Tri-Service Valves - Models FTV-S, FTV-A:
 - 1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 x 305 mm).
 - 2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
 - 3. Leave sufficient clearance around valve for valve removal or repair.
 - 4. Install valve in the direction of flow arrows on valve body.
 - 5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
 - 6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.
- B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
 - 1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
 - 2. Install no fittings within 2 pipe diameters downstream of valve.
 - 3. Install valves with flow in the direction of the arrow on the valve body.
 - 4. Provide easy access to probe metering ports (PMPs), drain ports and hand wheel.
 - 5. For solder applications, solder valve body in line using 95/5 solder.
 - 6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
 - 7. Install valves in horizontal or vertical piping as indicated.
 - 8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
 - 9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Introduction

Couplings

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Fittings

Valves & Accessories

High Pressure

Advanced Copper Method (IPS)

CTS Copper System

DI-LOK® Nipples

Plain-End Fittings

HDPE Couplings

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Roll Groovers

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Design Services

Technical Data

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Pictorial Index

PIPE FITTINGS

MALLEABLE IRON FITTINGS

Malleable Iron Threaded Fittings – Class 150 (Standard)

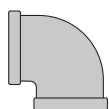


Fig. 1101 – 90° Elbow
Size Range: 1/8" - 6" NPS

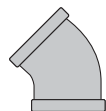


Fig. 1102 – 45° Elbow
Size Range: 1/8" - 6" NPS

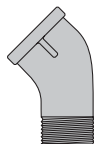


Fig. 1104 – 45° Street Elbow
Size Range: 1/8" - 2" NPS

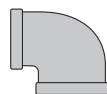


Fig. 1101R – Reducing Elbow
Size Range: 1/4" x 1/8" thru 4" x 3" NPS



Fig. 1103 – Straight 90° Street Elbow
Size Range
Fig. 1103: 1/8" - 4"
Fig. 1103R: 1/2" x 3/8" thru 2" x 1 1/2"

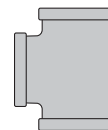


Fig. 1105 – Straight Reducing
Size Range
Fig. 1105: 1/8" - 6" NPS
Fig. 1105R: 1/8" x 1/8" x 1/4" thru 4" x 3" x 4" NPS

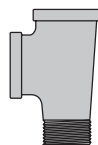


Fig. 1106 – Straight Reducing Street or Service Tee
Size Range
Fig. 1106: 1/4" - 2" NPS
Fig. 1106R: 1 1/4" x 1" x 1 1/4"

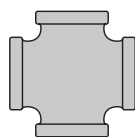


Fig. 1107 – Cross
Size Range: 1/8" - 4" NPS

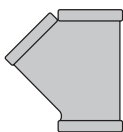


Fig. 1108 – 45° Y-Branch or Lateral
Size Range: 3/8" - 4" NPS



Fig. 1121 – Coupling - Right Hand
Size Range: 1/8" - 4" NPS

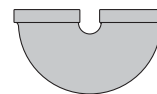


Fig. 1119 – Return Bends
Open Pattern – Right Hand
Size Range: 1/2" - 2" NPS



Fig. 1190 – Floor Flange
Size Range: 1/4" - 2" NPS



Fig. 1125 – Coupling
Size Range: 1/4" x 1/8" thru 6" x 4" NPS



Fig. 1124 – Cap
Size Range: 1/2" - 6" NPS



Fig. 1134 – Hex Locknut
Size Range: 1/8" - 2" NPS



Fig. 1133 – Waste Nut
Sizes: 1/2" & 3/4" NPS



Fig. 1138 – Extension Piece
Size Range: 1/2" - 1" NPS

Malleable Iron Plain Fittings

NOTE: Not to be used for pressure service.

Malleable Iron Threaded Fittings – Class 300 (XS/XH)

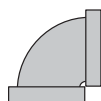


Fig. 1161 – Straight 90° Elbow
Size Range
Fig. 1161: 1/4" - 4" NPS
Fig. 1161R: 3/8" x 1/4" thru 2" x 1 1/2" NPS

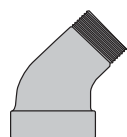


Fig. 1160 – 45° Street Elbow
Size Range: 1/2" - 2" NPS

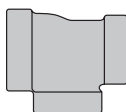


Fig. 1164R – Reducing Tee
Size Range: 3/8" x 3/8" x 1/4" thru 3" x 3" x 2" NPS

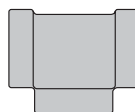


Fig. 1164 – Straight Tee
Size Range: 1/4" - 4" NPS

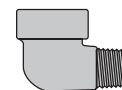


Fig. 1170 – 90° Street Elbow
Size Range: 1/4" - 3" NPS

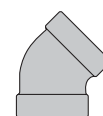


Fig. 1162 – 45° Elbow
Size Range: 1/4" - 4" NPS

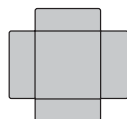


Fig. 1165 – Cross
Size Range: 1/4" - 2" NPS



Fig. 1167 – Reducer
Size Range: 3/8" x 1/4" thru 4" x 2" NPS

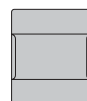


Fig. 1166 – Coupling
Size Range: 1/4" - 3" NPS



Fig. 1163 – Cap
Size Range: 1/4" - 3" NPS

PIPE FITTINGS (Continued)

MALLEABLE IRON UNIONS – Class 150; 250; 300

Copper or Copper Alloy to Iron

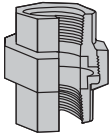


Fig. 463 – Class 150 Union
150 Lb. WSP; 300 Lb. WOG, Non-Shock
Size Range: 1/8" - 3" NPS

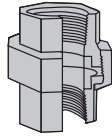


Fig. 554 – Class 250 Union
250 Lb. WSP; 500 Lb. WOG, Non-Shock
Size Range: 1/8" - 4" NPS

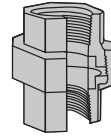


Fig. 459 – Class 300 Union
300 Lb. WSP; 600 Lb. WOG, Non-Shock
Size Range: 1/8" - 4" NPS

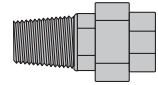


Fig. 551 – Class 300 Union
(Male/Female)
300 Lb. WSP; 600 Lb. WOG, Non-Shock
Size Range: 1/2" - 2" NPS

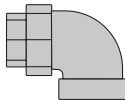


Fig. 552 – Class 300 90° Elbow
Female Union
300 Lb. WSP
Size Range: 3/8" - 1" NPS

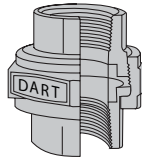


Fig. 832 – Dart Union
Bronze to Bronze Seat Union
Size Range: 3/8" - 2" NPS

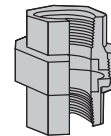


Fig. J-3300 – Class 300 All Iron Union
Size Range: 1/4" - 3" NPS

CAST IRON FITTINGS

Cast Iron Threaded Fittings – Class 125 (Standard)

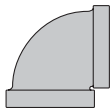


Fig. 351 – 90° Elbow
Size Range: 1/4" - 8" NPS

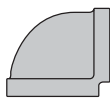


Fig. 352
90° Reducing Elbow
Size Range: 1/2" x 1/4" thru
8" x 6"

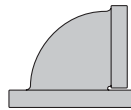


Fig. 371 – 90° Elbow
Flanged & Threaded
Size Range: 2 1/2" - 6" NPS

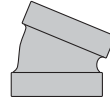


Fig. 356A – 22 1/2° Elbow
Size Range: 3/4" - 2 1/2" NPS

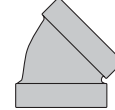


Fig. 356 – 45° Elbow
Size Range: 1/4" - 8" NPS

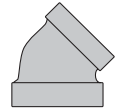


Fig. 356R
45° Reducing Elbow
Size: 1" x 1/2" NPS

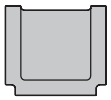


Fig. 358
Straight Tee
Size Range: 1/4" - 8" NPS

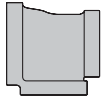


Fig. 359
Reducing Tee
Size Range: 1/2" x 1/2" x 1/4"
thru 6" x 6" x 5" NPS

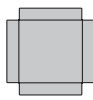


Fig. 360
Straight Cross
Size Range: 1/2" - 6" NPS

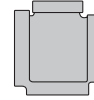


Fig. 361
Reducing Cross
Size Range
1" x 1" x 3/4" x 3/4" thru
4" x 4" x 2" x 2" NPS

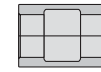


Fig. 366
Screwed Hex Coupling
Size: 1" NPS

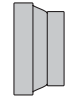


Fig. 367
Concentric Reducer
Size Range: 3/4" x 1/2" thru
8" x 6" NPS

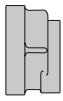


Fig. 368
Eccentric Reducer
Size Range: 3/4" x 1/2" thru
6" x 4" NPS



Fig. 383 – Hex Bushing
Size Range: 1 1/2" x 1/4" thru
10" x 8" NPS



Fig. 385 – Face Bushing
Size Range: 3" x 2" thru
4" x 3" NPS



Fig. 387 – Square
Head Plug (Cored)
Size Range: 3/4" - 4" NPS



Fig. 380 – Solid
Fig. 389 – Cored
Bar Plugs
Size Range: 4" - 8" NPS

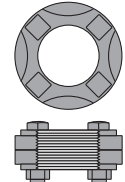


Fig. 487 – Flange Union
Gasket Type
(Assembled with Gaskets)
Size Range: 1/2" - 8" NPS



Fig. 388 – Square
Head Plug (Solid)
Size Range: 1/2" - 3 1/2" NPS



Fig. 390
Countersunk Plugs
Size Range: 1" - 4" NPS



Fig. 381 – Cap
Size Range: 2 1/2" - 8" NPS



Fig. 370 – Locknut
Size Range: 2 1/2" - 4" NPS

PIPE FITTINGS (Continued)

CAST IRON FITTINGS (Continued)

Cast Iron Threaded Fittings – Class 250 (Extra Heavy)

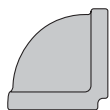


Fig. 421 – 90° Elbow
Size Range: 1/4" - 3" NPS

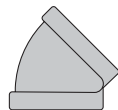


Fig. 424 – 45° Elbow
Size Range: 1/2" - 2 1/2" NPS



Fig. 425 – Tee
Size Range: 1/4" - 4" NPS

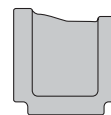


Fig. 426 – Reducing Tee
Size Range: 3/4" x 3/4" x 1/2" thru
2" x 2" x 1 1/2"

Cast Iron Threaded – Safety Valve Discharge Elbow

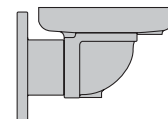


Fig. 1538 – Screwed Cast Iron
Size Range: 2 1/2" - 6" NPS

Cast Iron Drainage Fittings

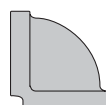


Fig. 701
90° Short Turn Elbow
Size Range: 1 1/2" - 4" NPS



Fig. 701R – 90° Reducing
Short Turn Elbow
Sizes: 1 1/2" x 1 1/4" & 2" x 1 1/2" NPS

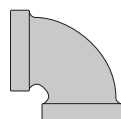


Fig. 702
90° Long Turn Elbow
Size Range: 1 1/2" - 4" NPS

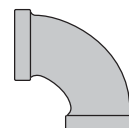


Fig. 702A
90° Extra Long Turn Elbow
Sizes: 1 1/2" & 2" NPS

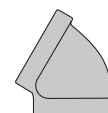


Fig. 703
60° Short Turn Elbow
Size: 1 1/2" NPS



Fig. 705
45° Short Turn Elbow
Size Range: 1 1/2" - 4" NPS

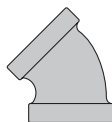


Fig. 706
45° Long Turn Elbow
Size: 1 1/2" NPS



Fig. 707 – 22 1/2° Elbow
Sizes: 1 1/2" & 2" NPS



Fig. 708 – 11 1/4° Elbow
Sizes: 1 1/2" & 2" NPS

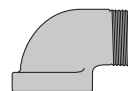


Fig. 718 – 90° Street Elbow
Sizes: 1 1/2" & 2" NPS

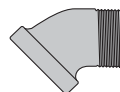


Fig. 719 – 45° Street Elbow
Sizes: 1 1/2" & 2" NPS

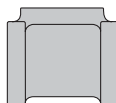


Fig. 722 – Tee
Sizes: 1 1/2" & 2" NPS



Fig. 723 – Reducing Tee
Size: 2" x 2" x 1 1/2" NPS

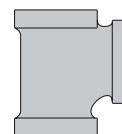


Fig. 726 – Sanitary Tee
90° Short Turn
Size Range: 1 1/2" - 4" NPS

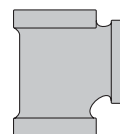


Fig. 727 – Sanitary Tee
90° Reducing Short Turn
Sizes:
2" x 2" x 1 1/2" & 2" x 1 1/2" x 1 1/2"

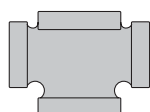


Fig. 729 – Sanitary Tee
90° Reducing Double Short Turn
Size: 2" x 1 1/2" NPS

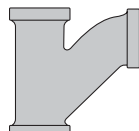


Fig. 730 – Y-Branch
90° Long Turn
Sizes: 1 1/2" & 2" NPS

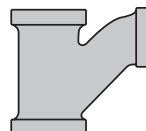


Fig. 731 – Y-Branch
90° Reducing Long Turn
Size: 2" x 2" x 1 1/2" NPS

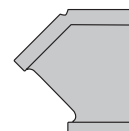


Fig. 734 – 45° Y-Branch
Sizes: 1 1/2" - 4" NPS

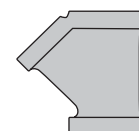


Fig. 735 – 45° Reducing
Y-Branch
Sizes: 2" x 2" x 1 1/2" & 4" x 4" x 3"

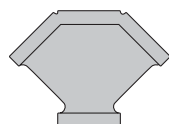


Fig. 736 – 45° Double
Y-Branch
Size: 1 1/2" NPS

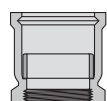


Fig. 744 – Tucker Connection
Size Range: 1 1/2" - 4" NPS



Fig. 753 – Coupling
Size: 1 1/2" NPS

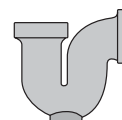


Fig. 752 – P-Trap
Size Range: 1 1/2" - 3" NPS

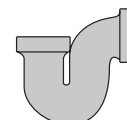


Fig. 754 – Bath P-Trap
Sizes: 1 1/2" & 2" NPS

PIPE FITTINGS (Continued)

CAST IRON FITTINGS (Continued)

Cast Iron Flanged Fittings – Class 125 (Standard)

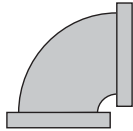


Fig. 801
90° Straight Elbow
Size Range: 1/2" - 12" NPS

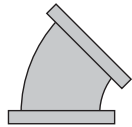


Fig. 802
45° Straight Elbow
Size Range: 1/2" - 12" NPS

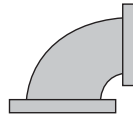


Fig. 803
90° Taper Reducing Elbow
Size Range:
2 1/2" x 2" thru 12" x 10" NPS

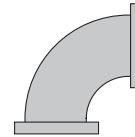


Fig. 804 – Straight Elbow
Fig. 804R – Reducing Long Radius Elbow
Size Range:
Fig. 804: 2" - 12" NPS
Fig. 804R: 4" x 3" thru 10" x 8"

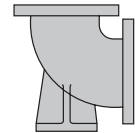


Fig. 805 – Base Elbow
Size Range: 3" - 12" NPS

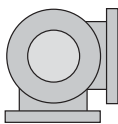


Fig. 808 – Side Outlet Elbow
Size Range: 4" - 8" NPS

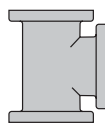


Fig. 811 – Straight Tee
Size Range: 1 1/2" - 12" NPS

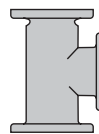


Fig. 812 – Reducing Tee
Size Range:
3" x 2" x 3" thru 12" x 12" x 10"

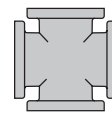


Fig. 821 – Cross
Size Range: 2" - 10" NPS

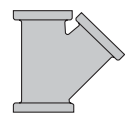


Fig. 823 – Lateral
Size Range: 2" - 8" NPS



Fig. 825
Concentric Reducer
Size Range: 2" x 1 1/2" thru
12" x 10" NPS



Fig. 826
Eccentric Reducer
Size Range: 3" x 2" thru
12" x 10" NPS

Iron Flanges – Class 125 (Standard)



Fig. 1010T – Cast Iron Flange Threaded
Size Range: 3" x 7 1/2" thru
12" x 19" NPS

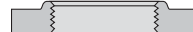


Fig. 1011 – Cast Iron Companion Flange
Size Range:
Fig. 1011: 3/4" x 3 3/8" thru
12" x 19" NPS



Fig. 1016 – Reducing Companion Flange
Size Range:
1" x 5" thru 8" x 19" NPS



Fig. 1018 – Cast Iron Blind Flange
Size Range:
1" x 4 1/4" thru 12" x 19" NPS

Cast Iron Flanged Fittings – Class 250 (Extra Heavy)

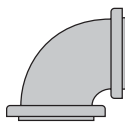


Fig. 831
90° Straight Elbow
Size Range: 2" - 8" NPS

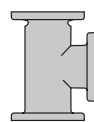


Fig. 841 – Straight Tee
Size Range: 2 1/2" - 8" NPS

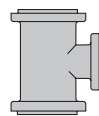


Fig. 842 – Reducing Tee
Sizes: 6" x 6" x 4" and
8" x 8" x 6" NPS

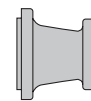


Fig. 855
Concentric Reducer
Size Range:
3" x 2" thru 10" x 8" NPS

Iron Flanges – Class 250 (Extra Heavy)



Fig. 1021 – Cast Iron Blind Flange
Size Range:
1 1/2" x 6 1/8" thru 8" x 15" NPS



Fig. 1025 – Cast Iron Companion Flange
Size Range:
1 1/4" x 5 1/4" thru 8" x 15" NPS



Fig. 1030 – Cast Iron Companion Flange
Size Range:
2" x 8 1/4" thru 4" x 11" NPS

PIPE FITTINGS (Continued)

PIPE NIPPLES

Seamless/Welded – Black & Galvanized



Seamless Pipe Nipples
Std. Sch. 40, XH Sch. 80, Sch. 160, XXH
Size Range: 1/8" thru 6"



Welded Pipe Nipples
Std. Sch. 40, XH Sch. 80
Size Range: 1/8" thru 6"

STEEL FITTINGS

Steel Pipe Couplings



Fig. 336
Standard, Full & Half
Size Range: 1/8" - 6" NPS



Fig. 337
Extra Strong (XS), Full & Half
Size Range: 1/8" - 3" NPS



Fig. 346
Standard, Right & Left
Size Range: 1/2" - 2" NPS



Fig. 347
Extra Strong (XS), Right & Left
Size Range: 1/2" - 2" NPS



Fig. 348
API Line Pipe Coupling
Size Range: 1/8" - 12" NPS



Fig. 379
Shallow Well Coupling
Size Range: 1 1/4" - 2" NPS



Fig. 380
Water Well Reamed and
Drifted Coupling
Size Range: 1 1/4" - 12" NPS



Fig. 381
#9 Drive Coupling
Size Range: 1 1/4" - 12" NPS

Merchant Steel Bushings, Caps & Plugs



Hex Bushing
Size Range: 1/4" x 1/8" thru 1" x
3/4" NPS



Countersunk Plug (Square
& Hex Socket)
Size Range: 1/8" - 2" NPS



Flush Bushing
Size Range: 1/4" x 1/8" thru 1/2" x
3/8" NPS



Cap
Size Range: 1/8" - 3/4" NPS



Solid Square Head Plug
Size Range: 1/8" - 2" NPS

Steel Hose Fittings

For fast, economical hose connections & repairs
Combination Nipples



Combination Nipples
Nominal Pipe Sizes: 1/2" - 6"
Size Range: 1/2" - 2"



Hose Menders
Nominal Pipe Sizes: 1/2" - 6"
Size Range: 1/2" - 2"

PIPE FITTINGS (Continued)

FORGED STEEL FITTINGS

Class 2000 Threaded

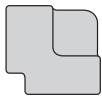


Fig. 2101 – 90° Elbow
Size Range: 1/4" - 4" NPS



Fig. 2102 – 45° Elbow
Size Range: 1/4" - 3" NPS

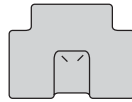


Fig. 2103 – Tee
Size Range: 1/4" - 4" NPS

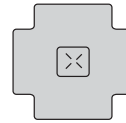


Fig. 2104 – Cross
Size Range: 1/4" - 3" NPS

Class 3000 Threaded

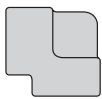


Fig. 2111 – 90° Elbow
Size Range: 1/8" - 4" NPS



Fig. 2112 – 45° Elbow
Size Range: 1/8" - 4" NPS

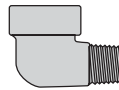


Fig. 2113 – 90° Street Elbow
Size Range: 1/8" - 2" NPS

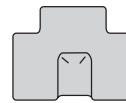


Fig. 2114 – Tee
Size Range: 1/8" - 4" NPS

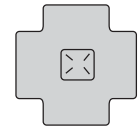


Fig. 2115 – Cross
Size Range: 1/8" - 4" NPS

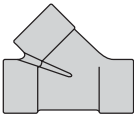


Fig. 2116 – Lateral
Size Range: 1/2" - 2" NPS

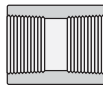


Fig. 2117 – Coupling
Size Range: 1/8" - 4" NPS

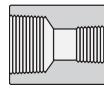


Fig. 2118 – Reducing Coupling
Size Range: 1/4" - 4" NPS



Fig. 2119 – Half Coupling
Size Range: 1/8" - 4" NPS



Fig. 2120 – Pipe Cap
Size Range: 1/8" - 4" NPS

Class 6000 Threaded

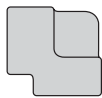


Fig. 2131 – 90° Elbow
Size Range: 1/8" - 4" NPS



Fig. 2132 – 45° Elbow
Size Range: 1/8" - 4" NPS

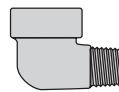


Fig. 2133 – 90° Street Elbow
Size Range: 1/8" - 1 1/2" NPS

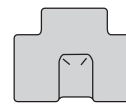


Fig. 2134 – Tee
Size Range: 1/8" - 4" NPS

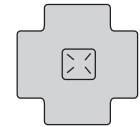


Fig. 2135 – Cross
Size Range: 1/8" - 4" NPS

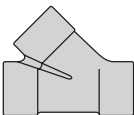


Fig. 2136 – Lateral
Size Range: 1/2" - 1 1/2" NPS

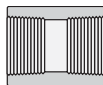


Fig. 2137 – Coupling
Size Range: 1/8" - 4" NPS

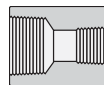


Fig. 2138 – Reducing Coupling
Size Range: 1/8" - 4" NPS



Fig. 2141 – Half Coupling
Size Range: 1/8" - 4" NPS



Fig. 2143 – Pipe Cap
Size Range: 1/8" - 4" NPS

Class 3000 Socket-Weld

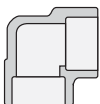


Fig. 2150 – 90° Elbow
Size Range: 1/8" - 4" NPS

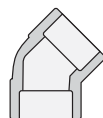


Fig. 2151 – 45° Elbow
Size Range: 1/8" - 4" NPS

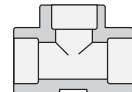


Fig. 2152 – Tee
Size Range: 1/8" - 4" NPS

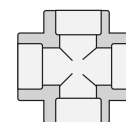


Fig. 2153 – Cross
Size Range: 1/8" - 4" NPS

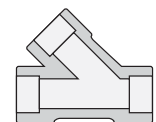


Fig. 2158 – Lateral
Size Range: 1/2" - 2" NPS

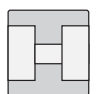


Fig. 2154 – Couplings
Size Range: 1/8" - 4" NPS

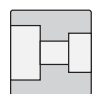


Fig. 2156 – Reducing Coupling
Size Range: 1/8" - 4" NPS



Fig. 2155 – Half Coupling
Size Range: 1/8" - 4" NPS



Fig. 2157 – Pipe Cap
Size Range: 1/8" - 4" NPS

PIPE FITTINGS (Continued)

FORGED STEEL FITTINGS (Continued)

Class 6000 Socket-Weld

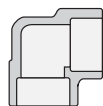


Fig. 2170 – 90° Elbow
Size Range: 1/2" - 4" NPS

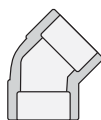


Fig. 2171 – 45° Elbow
Size Range: 1/2" - 4" NPS

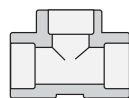


Fig. 2172 – Tee
Size Range: 1/2" - 4" NPS

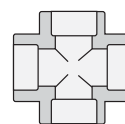


Fig. 2173 – Cross
Size Range: 1/2" - 2" NPS

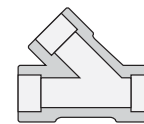


Fig. 2178 – Lateral
Size Range: 1/2" - 1 1/2" NPS



Fig. 2174 – Couplings
Size Range: 1/2" - 4" NPS



Fig. 2176 – Reducing Coupling
Size Range: 1/4" - 4" NPS



Fig. 2175 – Half Couplings
Size Range: 1/2" - 4" NPS



Fig. 2177 – Pipe Caps
Size Range: 1/2" - 4" NPS

High Pressure Plugs & Bushings

Anvil High Pressure Plugs and Bushings satisfy the requirement of ASME B16.11 Class 2000, 3000, and 6000.

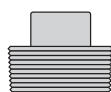


Fig. 2122 – Plugs
Square Head
Size Range: 1/8" - 4" NPS

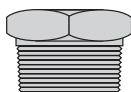


Fig. 2142 – Plugs
Hex Head
Size Range: 1/8" - 4" NPS

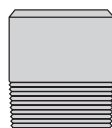


Fig. 2121 – Plugs
Round Head
Size Range: 1/8" - 4" NPS

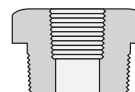


Fig. 2139 – Bushings
Hex Head
Size Range: 1/4" - 4" NPS



Fig. 2140 – Bushings
Flush
Size Range: 1/4" - 2" NPS

Socket-Weld Reducer Inserts

Reducer inserts comply with MSS Standard SP-79. They enable standard socket-weld fittings to be used for making any combination of pipe line reductions quickly and economically. Socket-weld reducer inserts serve the same purpose as threaded reducing bushings with threaded fittings.

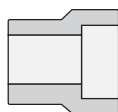


Fig. 2159 (Type 1)

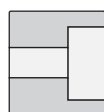


Fig. 2179 (Type 2)

CLASS 3000

For use with Schedule 40 & 80 Pipe

Type 1 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 1" NPS

Type 2 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 1" NPS

CLASS 6000

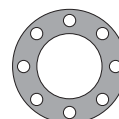
For use with Schedule 160 Pipe

Type 1 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 2 1/2" NPS

Type 2 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 2 1/2" NPS

MISCELLANEOUS

All Purpose Asbestos Gaskets



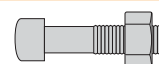
Full Face



Ring

Compressed Sheet Packing is a single-formula material suitable for a wide range of temperature-pressure combinations. It is used for sealing water, steam, all oils, gases, alkalies, acids, refrigerants & hydrocarbons.

Available in Eight Gauges: 1/100", 1/64", 1/32", 1/16", 3/32", 1/8", 3/16", & 1/4" (.2, .4, .8, 1.6, 3.1, 4.7 and 6.3 mm)



When ordering, specify bolt size & length required.

Bolts are furnished in sizes:

1/4", 5/16", 3/8", 7/16", 1", 1 1/8", 1 1/4" (6.3, 7.9, 9.5, 11, 25, 29 and 32 mm) in varying lengths.

Length of bolts are measured from under head to extreme point.

Floor & Ceiling Plates

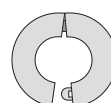


Fig. 1 – with Springs
Fig. 2 – with Set Screw
Stamped Steel for Copper Tube
Size Range: 1/4" - 6" NPS

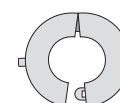


Fig. 10 – with Springs
Fig. 13 – with Set Screw
Stamped Steel for Pipe
Size Range: 1/4" - 6" NPS



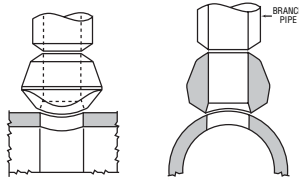
Fig. 20 – with Springs &
exposed Rivet Hinge
Stamped Steel for Pipe
Size Range: 1/4" - 6" NPS

PIPE FITTINGS (Continued)

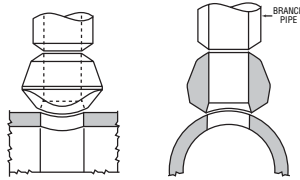
ANVIL UNIVERSAL ANVILETS

Universal Butt-weld Anvilets

Full & Reducing Sizes Class 3000 & 6000

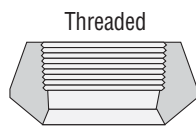


Schedule 160 & XXS
Size Range: 1/2" - 4" NPS

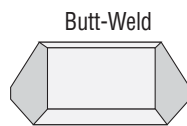


Standard Weight XS/XH
For Outlet Sizes: 1/2" - 24" NPS
Size Range: 1/2" - 24" NPS

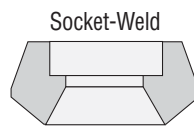
Universal Flat Anvilets



Threaded



Butt-Weld

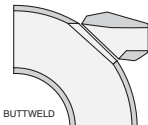


Socket-Weld

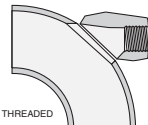
Class 3000 Threaded, Butt-weld & Socket-Weld
Size Range: 1/4" - 3" NPS

Universal Elbow Anvilets

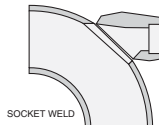
Class 3000 & 6000 Butt-Weld, Threaded, and Socket-Weld



BUTT WELD



THREADED

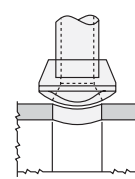


SOCKET WELD

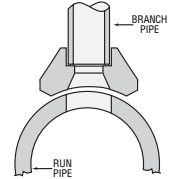
Class 3000
Threaded & Socket-Weld/Standard & XS/XH Butt-weld
Size Range: 1/2" - 2" NPS

Class 6000
Threaded & Socket-Weld
Size Range: 1/2" - 1 1/2" NPS

Universal Socket-Weld Anvilets



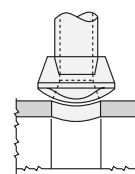
Class 3000
For Outlet Sizes: 1/8" - 4" NPS



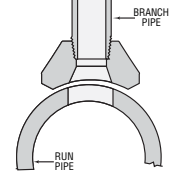
Class 6000
For Outlet Sizes: 1/2" - 2" NPS

Universal Threaded Anvilets

Full & Reducing Sizes Class 3000 & 6000



Class 3000
For Outlet Sizes: 1/8" - 4" NPS

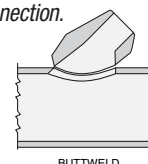


Class 6000
For Outlet Sizes: 1/2" - 2" NPS

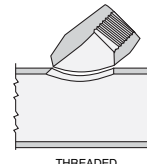
Universal Lateral Anvilets

Class 3000 & 6000 Butt-weld and Threaded

Lateral Anvilets provide a strong, readily attached 45° lateral outlet connection.



BUTT WELD



THREADED

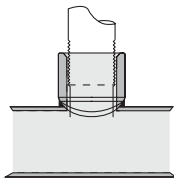
Class 3000
Standard/XS Butt-weld
Size Range: 1/2" - 2" NPS

Class 3000
Threaded/Standard
Size Range: 1/2" - 2" NPS

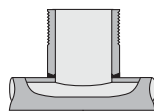
MERIT® OUTLET FITTINGS

Weld-Miser™ Tee-Let®

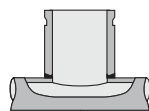
Welding Outlet Fittings



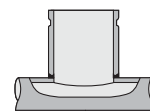
Type A - Female Thread
Size Range: 1/2" - 4"



Type B - Male Thread
Standard Weight
Size Range: 1" - 8"



Type C - Cut Groove
Standard Weight
Size Range: 1 1/4" - 8"



Type C/R - Roll Groove
Schedule 10
Size Range: 1 1/4" - 6"

Flanges

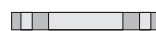
Steel Welding Flanges



Blind Flange
Sizes: 2, 2 1/2, 3, 4, 5, 6, 8, 10 & 12



Slip-On Flange (Ring Type)
Sizes: 2, 2 1/2, 3, 4, 5, 6, 8, 10 & 12



Reducing Flange
Sizes: 4 x 2, 4 x 2 1/2, 4 x 3, 6 x 3, 6 x 4, 8 x 4, 8 x 6

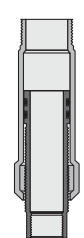
Longneck™

Manufactured Drop Nipples
Size Range: 1"x 1/2" x 6"
thru 1"x 3/4" x 36"

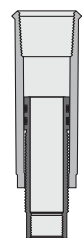


Eliminator

Adjustable Drop Nipples
Size Range: 1"x 1/2" thru 1"x 3/4"



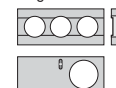
Type M



Type F

Hole Templates

Hand Held Hole Templates
Size Range: 1 1/2" - 2 1/2"



PIPE FITTINGS (Continued)

JB SMITH OIL COUNTRY

Carbon Steel – Swage Nipples



Concentric Swage Nipples

Size Range:
1/4" x 1/8" thru 1" x 3/4"
1 1/4" x 1/4" thru 8" x 6"



Eccentric Swage Nipples

Size Range: 1/4" x 1/8" thru 4" x 3 1/2"

Stainless Steel – Swage Nipples



Stainless & Alloy Steel Swage Nipples

Size Range: 1/4" x 1/8" thru 4" x 3 1/2"

Carbon Steel – Bull Plugs



Carbon Steel Bull Plugs

Size Range: 1/8" - 8"



**Solid Refinery Plugs
Black (Non-Plated)
Carbon Steel**

Size Range: 1/8" - 2"

Oil Country Fittings – Tubing Swages & Casing Swages



**Large End Upset
Reduced to Regular or Upset**

Size Range: 1" x 3/4" thru 4" x 3 1/2"



**Large End Non-Upset
Reduced to Upset**

Size Range: 1" x 3/4" thru 4" x 3"



**Swage Nipples Oil Country
Tubing & Casing Non EUE Ends**

Size Range: 1" - 4"

Oil Country Fittings – Adapter Nipples



**Tubing Nipples
Standard Weight**

Size Range: 1" - 4"



**Tubing Nipples
Extra Heavy Weight**

Size Range: 1" - 4"

Oil Country Couplings – Casing Couplings



**API Casing Couplings
Short Thread**

Size Range: 4 1/2" - 20"



**API Casing Couplings
Long Thread**

Size Range: 4 1/2" - 13 3/8"



Combination Couplings J-55

Size Range: 2" - 4"

Oil Country Fittings – Casing Nipples



Bell Nipple

Size Range: 4 1/2" - 8 5/8"



**Adapter Nipples
Seamless Sch. 40**

Size Range: 3/4" - 12"

Oil Country Couplings – Tubing Couplings



API Tubing Couplings

Size Range: 2" - 4"



**Special Clearance
Tubing Couplings**

Size Range: 2" - 3"



Sub Tubing Couplings J-55

Size Range: 2" EUE x 2" Reg thru
4" EUE x 4" Reg

Oil Country Fittings – Chamber Vessels



Oil Country Casing Nipples

Size Range: 4 1/2" - 16"



Chambers/Pressure Vessels

Size Range: 2" - 8"

Oil Country Fittings – Bull Plugs



Tubing Bull Plugs

Size Range: 3/4" EUE - 3" EUE



Casing Bull Plugs

Size Range: 4 1/2" - 10 3/4" API



API Bull Plug Female

Size Range: 3/4" EUE - 4" EUE

PIPE FITTINGS (Continued)

CATAWISSA UNIONS

Wing Unions



Fig. 100
Threaded Ends
1,000 psi cwp - 1,500 psi test
Size Range: 2" - 8"



Fig. 100C
Threaded Ends - Lug Union
1,000 psi cwp - 1,500 psi test
Size: 2"



Fig. 200
Threaded Ends
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 6"

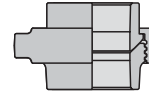


Fig. 200
Butt Weld Ends - Sch. 40
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 6"



Fig. 200C
Threaded Ends - Lug Union
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 2"



Fig. 206
Threaded Ends
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 6"



Fig. 206
Butt Weld Ends - Sch. 40
2,000 psi cwp - 3,000 psi test
Size Range: 2" - 6"



Fig. 211
Threaded Ends
Insulating Union
2,000 psi cwp - 3,000 psi test
Sizes: 1" & 2"



Fig. 300
Flat-Face Union
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 4"



Fig. 301
Steam Service Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 3"



Fig. 400
Threaded Ends
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 2"

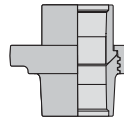


Fig. 400
Butt Weld Ends - Sch. 80
4,000 psi cwp - 6,000 psi test
Size: 2"



Fig. 600
Threaded Ends
6,000 psi cwp - 9,000 psi test
Size Range: 1" thru 4"



Fig. 602
Threaded Ends
6,000 psi cwp - 9,000 psi test
Size Range: 1" thru 4"

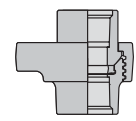


Fig. 602
Butt Weld Ends - Sch. 80
6,000 psi cwp - 9,000 psi test
Size Range: 2" thru 4"



Fig. 607
Threaded Ends
Well Service Union
2,000 psi cwp - 3,000 psi test
Sizes: 1 1/2" & 2"



Fig. 1002
Threaded Ends
10,000 psi cwp - 15,000 psi test
Size Range: 1" - 4"

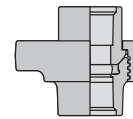


Fig. 1002
Butt Weld Ends - Sch. 160
10,000 psi cwp - 15,000 psi test
Size Range: 2" - 4"

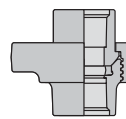


Fig. 1002
Butt Weld Ends - Sch. XXH
10,000 psi cwp - 15,000 psi test
Size Range: 2" - 4"



Fig. 1502
Threaded Ends
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"

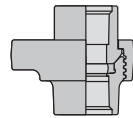


Fig. 1502
Butt Weld Ends - Sch. XXH
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"

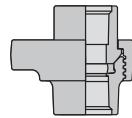


Fig. 1502
Butt Weld Ends - Sch. 160
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"



Fig. 202
Blanking Cap Only
with O-Ring
Size: 4"



Fig. S1A
High Speed Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 3"



Fig. 3L S1A
Tri-Lug High Speed Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 2"

Forged Steel Unions

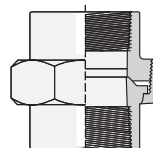
Manufactured to MSS Standard Practice SP83 (Class 6000 by method of MSS SP83).

CLASS 3000

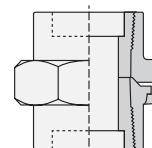
Fig. 2125 - Threaded
Fig. 2126 - Socket-Weld
Size Range: 1/8" - 3" NPS

CLASS 6000

Fig. 2127 - Threaded
Fig. 2128 - Socket-Weld
Size Range: 1/8" - 3" NPS



THREADED



SOCKET WELD

PIPE HANGERS

Copper Tubing Hangers



Fig. CT-69
Adjustable Swivel Ring
Size Range: 1/2" - 4"



Fig. CT-65
Light Weight Adjustable Clevis
Size Range: 1/2" - 4"



Fig. CT-121
Copper Tubing Riser Clamp
Size Range: 1/2" - 4"



Fig. CT-128R
Rod Threaded Ceiling Flange
Sizes: 3/8" and 1/2"



Fig. CT-138R
Extensions Split Tubing Clamp
Size Range: 1/2" - 2"



Fig. CT-255
Copper Tubing
Alignment Guide
Size Range: 1" - 4"

Steel Pipe Clamps



Fig. 261
Extension Pipe or
Riser Clamp
Size Range: 3/4" - 24"



Fig. 40
Riser Clamp Standard
Size Range: 2" - 24"



Fig. 103
Offset Pipe Clamp
Size Range: 3/4" - 8"



Fig. 100
Extended Pipe Clamp
Size Range: 1/2" - 8"



Fig. 212
Medium Pipe Clamp
Size Range: 1/2" - 30"



Fig. 212FP
Earthquake Bracing Clamp
Size Range: 2 1/2" - 12"



Fig. 216
Heavy Pipe Clamp
Size Range: 3" - 42"



Fig. 295
Double Bolt Pipe Clamp
Size Range: 3/4" - 36"



Fig. 295A
Alloy Double Bolt Pipe Clamp
Size Range: 1 1/2" - 24"



Fig. 295H
Heavy Duty Double Bolt
Pipe Clamp
Size Range: 6" - 36"



Fig. 224
Alloy Steel Pipe Clamp
Size Range: 4" - 16"



Fig. 246
Heavy Duty Alloy Steel
Pipe Clamp
Size Range: 10" - 24"

CPVC Pipe Hangers



Fig. 185
One Hole Pipe Strap
Size Range: 3/4" - 2"



Fig. 186
Two Hole Pipe Strap
Size Range: 3/4" - 2"



Fig. 187
Two Hole 90° Side
Mount Strap
Size Range: 3/4" - 2"



Fig. 188
Two Hole Stand Off Strap
Size Range: 3/4" - 2"

Clevis



Fig. 67
Pipe or Conduit
Hanger
Size Range: 1/2" - 6"



Fig. 65
Light Duty
Adjustable Clevis
Size Range: 3/8" - 4"



Fig. 260
Adjustable Clevis
Hanger
Size Range: 1/2" - 30"



Fig. 260 ISS
Clevis Hanger
with Insulation
Saddle System
Size Range: 2" - 16"



Fig. 300
Adjustable Clevis
for Insulated Lines
Size Range: 3/4" - 12"



Fig. 590
Adjustable Clevis
for Ductile or
Cast Iron
Size Range: 4" - 24"

Pipe Shields & Saddles

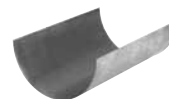


Fig. 167
Insulation Protection Shield
Size Range: 1/2" thru 24" pipe with
up to 2" thick insulation.



Fig. 168
Rib-Lok Shield
Size Range: 1/2" thru 8" pipe or copper
tube with up to 2" thick insulation.



Fig. 160 to 166A
Pipe Covering Protection Saddle
Size Range: 3/4" thru 36"

PIPE HANGERS (Continued)

Beam Clamps



Fig. 86, 87 & 88
C-Clamp with Set
Screw and Lock Nut
Size Range: $\frac{3}{8}$ " - $\frac{3}{4}$ "



Fig. 95
C-Clamp with Lock Nut
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 89
Retaining Clip
Size Range: $\frac{3}{8}$ " - $\frac{1}{2}$ "



Fig. 89X
Retaining Clip
Size Range: $\frac{3}{8}$ " - $\frac{3}{4}$ "



Fig. 92
Universal C-Type Clamp
Standard Throat
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 93
Universal C-Type Clamp
Wide Throat
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 94
Wide Throat Top Beam
C-Clamp
Sizes: $\frac{5}{8}$ " and $\frac{3}{4}$ "



Fig. 227
Top Beam Clamp



Fig. 217
Adjustable Side
Beam Clamp
Size Range: 3" - $7\frac{5}{8}$ "



Fig. 14
Adjustable Side
Beam Clamp
Sizes: $\frac{3}{8}$ " - $\frac{5}{8}$ "



Fig. 133
Standard Duty Beam
Clamp
Size Range: 4" - 12"



Fig. 134
Heavy Duty Beam
Clamp
Size Range: 4" - 12"



Fig. 218
Malleable Beam Clamp
without Extension Piece



Fig. 228
Universal Forged Steel
Beam Clamp



Fig. 292 & 292L
Beam Clamp with
Weldless Eye Nut

Socket Clamps



Fig. 595 & Fig. 594
Socket Clamp
For Ductile Iron or Cast Iron Pipe
& Socket Clamp Washer
Size Range: 4" - 24"



Fig. 600 & Fig. 599
Socket Clamp
For Ductile Iron or Cast Iron Pipe
& Socket Clamp Washer
Size Range: 3" - 24"

Ceiling Plates & Flanges



Fig. 395
Cast Iron Ceiling Plate
Size Range: $\frac{1}{2}$ " - 8"



Fig. 127
Plastic Ceiling Plate
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 128R
Rod Threaded,
Ceiling Flange
Sizes: $\frac{3}{8}$ " & $\frac{1}{2}$ "



Fig. 153
Pipe Hanger Flange
Size Range: $\frac{3}{8}$ " - $\frac{3}{4}$ "

Structural Attachments



Fig. 55 & Fig. 55L
Structural Welding Lug
Size Range:
Fig. 55: $\frac{1}{2}$ " - $\frac{3}{4}$ "
Fig. 55L: $\frac{1}{2}$ " - 2"



Fig. 54
Two Hole Welding
Beam Lug
Size Range: $\frac{1}{2}$ " - $2\frac{1}{4}$ "

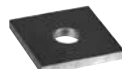


Fig. 60
Steel Washer Plate
Size Range: $\frac{3}{8}$ " - $3\frac{3}{4}$ "



Fig. 66
Welded Beam Attachment
Size Range: $\frac{3}{8}$ " - $3\frac{1}{2}$ "



Fig. 112 & 113
Brace Fitting Compete
Sizes: 1" and $1\frac{1}{4}$ "

Brackets



Fig. 202
Iron Side Beam Bracket
Size Range: $\frac{3}{8}$ " - $\frac{5}{8}$ "



Fig. 206
Steel Side Beam Bracket
Size Range: $\frac{3}{8}$ " - $\frac{5}{8}$ "



Fig. 207
Threaded Steel Side
Beam Bracket
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 194
Light Welded
Steel Bracket



Fig. 195
Medium Welded
Steel Bracket



Fig. 199
Heavy Welded
Steel Bracket

U-Bolts



Fig. 137 & 137S
Standard U-Bolt
Size Range: $\frac{1}{2}$ " - 36"



Fig. 137C
Plastic Coated U-Bolt
Size Range: $\frac{1}{2}$ " - 8"



Fig. 120
Light Weight U-Bolt
Size Range: $\frac{1}{2}$ " - 10"

Trapeze



Fig. 46
Universal Trapeze
Assembly



Fig. 45
Channel Assembly



Fig. 50
Equal Leg Angle for
Trapeze Assembly

PIPE HANGERS (Continued)

Concrete Inserts & Attachments



Fig. 152
Screw Concrete Insert
Size Range: $\frac{3}{8}$ " - $\frac{7}{8}$ "



Fig. 282
Universal
Concrete Insert
Size Range: $\frac{3}{8}$ " - $\frac{7}{8}$ "



Fig. 281
Wedge Type
Concrete Insert
Size Range: $\frac{1}{4}$ " - $\frac{7}{8}$ "



Fig. 285
Light Weight Concrete
Insert
Size Range: $\frac{1}{4}$ " - $\frac{5}{8}$ "



Fig. 286
Iron Cross Design
Size Range: $\frac{3}{4}$ " - $1\frac{1}{2}$ "



Fig. 284
Metal Deck Hanger
Size Range: $\frac{3}{8}$ " - $\frac{3}{4}$ "



Fig. 52
Concrete Rod
Attachment Plate
Size Range: $\frac{3}{8}$ " - $1\frac{1}{4}$ "



Fig. 47
Concrete Single Lug
Plate
Size Range: $\frac{1}{2}$ " - 2"



Fig. 49
Concrete Clevis Plate
Size Range: $\frac{3}{8}$ " - $1\frac{3}{4}$ "

Pipe Supports



Fig. 62
Type A, B & C
Pipe Stanchion
Size Range: 2" - 18"



Fig. 63
Type A, B & C
Pipe Stanchion
Size Range: 2 $\frac{1}{2}$ " - 42"



Fig. 192
Adjustable Pipe
Saddle Support
Size Range: 2" - 12"



Fig. 191
Adjustable Pipe
Saddle with U-Bolt
Size Range: 2" - 12"



Fig. 264
Adjustable Pipe
Saddle Support
Size Range: 2 $\frac{1}{2}$ " - 36"



Fig. 265
Adjustable Pipe
Saddle Support
Size Range: 4" - 36"



Fig. 258
Stanchion Pipe
Saddle Support
Size Range: 4" - 36"



Fig. 259
Adjustable Pipe
Saddle Support
Size Range: 4" - 36"

Pipe Rings



Fig. 108
Split Pipe Ring
Size Range: $\frac{3}{8}$ " - 8"



Fig. 138R
Extension Split Pipe Clamp
Size Range: $\frac{3}{8}$ " - 3"



Fig. 104
Adjustable Swivel Ring, Split Ring Type
Size Range: $\frac{3}{8}$ " - 8"



Fig. 69
Adjustable Swivel Ring
Size Range: $\frac{1}{2}$ " - 8"

Hanger Rods & Accessories



Fig. 142
Coach Screw Rods
Machine Threaded on
Opposite End
Sizes: $\frac{3}{8}$ " and $\frac{1}{2}$ "



Fig. 146
Continuous Thread
Sizes: $\frac{1}{4}$ " - $1\frac{1}{2}$ "
Stocked in six, ten and twelve foot lengths. Other even foot lengths can be furnished to order.



Fig. 140 & 253
Machine Threaded Rods
Threaded Both Ends
Sizes: $\frac{3}{8}$ " - 5"



Fig. 248 & 248L
Eye Rod Not Welded
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 278 & 278L
Eye Rod Welded
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 248X
Linked Eye Rods
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 278X
Linked Eye Rods
Welded



Fig. 148
Rod with Eye End
Size Range: 2 $\frac{3}{4}$ " - 5"



Fig. 135, 135E & 135R
Rod Coupling
Size Range:
Fig. 135: $\frac{3}{8}$ " - 1"
Fig. 135E: $\frac{1}{4}$ " - 1"
Fig. 135R: $\frac{3}{8}$ " x $\frac{1}{4}$ " - $\frac{7}{8}$ " x $\frac{3}{4}$ "



Fig. 136 & 136R
Straight Rod Coupling
Size Range: $\frac{1}{4}$ " - 1"



Fig. 114
Turnbuckle Adjuster
Size Range: $\frac{1}{4}$ " - $\frac{3}{4}$ "



Fig. 110R
Socket, Rod Threaded
Size Range: $\frac{1}{4}$ " - $\frac{7}{8}$ "



Fig. 157
Extension Piece
Size Range: $\frac{3}{8}$ " - $\frac{7}{8}$ "



Fig. 299
Forged Steel Clevis
Size Range: $\frac{3}{8}$ " - 4"



Fig. 233
Turnbuckle
Size Range: $\frac{1}{4}$ " - 5"



Fig. 230
Turnbuckle
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 290 & 290L
Weldless Eye Nut
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 291
Clevis Pin with Cotters
Size Range: $\frac{1}{2}$ " - 4"

PIPE HANGERS (Continued)

Straps



Fig. 126
One-Hole Clamp
Size Range: $\frac{3}{8}$ " - 4"



Fig. 262
Strap Short
Size Range: $\frac{1}{2}$ " - 4"



Fig. 243
Pipe Strap
Size Range: $\frac{1}{2}$ " - 6" pipe



Fig. 244
Pipe Strap
Size Range: $\frac{1}{2}$ " - 6" pipe

Pipe Rolls



Fig. 177
Adjustable Pipe
Roll Support
Size Range: 1" - 30"



Fig. 171
Single Pipe Roll
Size Range: 1" - 30"



Fig. 178
Spring Cushion Hanger



Fig. 181
Adjustable Steel Yoke
Pipe Roll
Size Range: 2 $\frac{1}{2}$ " - 24"



Fig. 175
Roller Chair
Size Range: 2" - 30" pipe



Fig. 277 & 277S
Pipe Roll & Base Plate
Size Range: 2" - 24"



Fig. 271
Pipe Roll Stand
Size Range: 2" - 42"



Fig. 274, 274P & 275
Adjustable Pipe
Roll Stand
Size Range: 2" - 42"

Pipe Guides & Slides



Fig. 255
Pipe Alignment Guide
Size Range: 1" - 24" and
Insulation Thickness of 1" thru 4" (Also available in
copper tube sizes)



Fig. 256
Pipe Alignment Guide
Size Range: 1" - 24" Pipe
and Insulation Thickness of
1" thru 4"



Fig. 257 & 257A
Structural Tee
Slide Assembly
Size Range: All Sizes within
Maximum Load Rating



Fig. 436 & 436A
Fabricated Tee
Slide Assembly
Size Range: All Sizes within
Maximum Load Rating



Fig. 439 & 439A
Structural "H"
Slide Assembly
Size Range: 6" - 36"



Fig. 432
Special Clamp
Size Range: 2" - 24"



Fig. 212
Medium Pipe Clamp
Size Range: 2" - 30"

Snubbers



Fig. 3306 & 3307
Hydraulic Shock & Sway
Suppressor (Snubber)
Size Range: Six Standard Sizes
with Load Ratings from 350 to
50,000 (LBS).



Fig. 312
Tapered Pin
Size Range: $\frac{3}{8}$ " - 2 $\frac{1}{2}$ "



Fig. 200 & C-200 / Fig. 201 & C-201
Hydraulic Shock & Sway Suppressor (Snubber)
Size Range: Seven standard sizes with cylinder bores of $\frac{1}{2}$ " to 8" with
normal load ratings from 3,000 (LBS) to 128,000 (LBS). All are
available with 5", 10", 15" or 20" strokes except the $\frac{1}{2}$ " size which is
offered with 5" and 10" strokes only. Snubbers are available with
integral or remote reservoirs.

Sway Strut Assembly



Fig. 211, C-211,
640, C-640
Sway Strut Assembly



Fig. 222 & C-222
Mini-Sway Strut
Assembly

Spring Hangers



Fig. 82 & C-82
Short Spring



Fig. B-268 & C-268
Standard Spring



Fig. 98 & C-98
Double Spring

Triple Spring,
Triple Spring-CR

Quadruple Spring,
Quadruple Spring-CR

Constant Supports



Model R 80-V
Vertical Constant
Support



Model R 81-H
Horizontal Constant
Support

Size Range: Anvil Model R constant support hangers are made in two basic designs, 80-V & 81-H constant supports are made in nine different frame sizes & 110 spring sizes to accommodate travels from 1 $\frac{1}{2}$ " to 20" & loads from 27 lbs to 87,500 lbs.

Horizontal Traveler & Sway Brace



Fig. 170
Horizontal Traveler
Size Range: Available in Four
Sizes to Take Loads to 20,700
(LBS). All sizes provide for
12" of Horizontal Travel.



Fig. 296, C-296, 297,
C-297, 298, C-298, 299,
301, 302, C-302, 303
& C-303 Sway Brace
Size Range: Pre Loads from
50 to 1,800 Pounds &
maximum forces from 200
to 7,200 Pounds.



Channels



AS 100
Channel

Size: 1⁵/₈" x 3¹/₄" x 12 GA.



AS 100EH
Channel with
Elongated Holes

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
9⁹/₁₆" x 1¹/₈" Elongated Holes
on 2" Centers.



AS 100KO
Channel with
Knock Outs

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
7⁷/₈" Knock Outs on 6" Centers.



AS 100H
Channel with Holes

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
9⁹/₁₆" Holes on 1⁷/₈" Centers.



AS 100S
Channel with Long Slots

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
1³/₃₂" x 3" Slots on 4" Centers



AS 100BTB
Welded Channel

Size: 1⁵/₈" x 6¹/₂" x 12 GA.
Two Pcs. AS 100 Welded
Back-to-Back.



AS 150
Channel

Size: 1⁵/₈" x 2⁷/₁₆" x 12 GA.



AS 150EH
Channel with
Elongated Holes

Size: 1⁵/₈" x 2⁷/₁₆" x 12 GA.
9⁹/₁₆" x 1¹/₈" Elongated Holes
on 2" Centers.



AS 150KO
Channel with
Knock Outs

Size: 1⁵/₈" x 2⁷/₁₆" x 12 GA.
7⁷/₈" Knock Outs on 6" Centers.



AS 150H
Channel with Holes

Size: 1⁵/₈" x 2⁷/₁₆" x 12 GA.
9⁹/₁₆" Holes on 1⁷/₈" Centers.



AS 150S
Channel with Long Slots

Size: 1⁵/₈" x 2⁷/₁₆" x 12 GA.
1³/₃₂" x 3" Slots on 4" Centers.



AS 150BTB
Welded Channel

Size: 1⁵/₈" x 4⁷/₈" x 12 GA.
Two Pcs. AS 150 Welded
Back-to-Back.



AS 200
Channel

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.



AS 200EH
Channel with
Elongated Holes

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.
9⁹/₁₆" x 1¹/₈" Elongated Holes
on 2" Centers.



AS 200KO
Channel with
Knock Outs

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.
7⁷/₈" Knock Outs on 6" Centers.



AS 200H
Channel with Holes

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.
9⁹/₁₆" Holes on 1⁷/₈" Centers.



AS 200S
Channel with Long Slots

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.
1³/₃₂" x 3" Slots on 4" Centers.



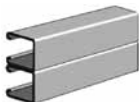
AS 200H3
Channel with Holes
on all Three Sides

Size: 1⁵/₈" x 1⁵/₈" x 12 GA.
9⁹/₁₆" Holes on all three sides
are on 1⁷/₈" Centers.



AS 200BTB
Welded Channel

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
Two Pcs. AS 200 Welded
Back-to-Back.



AS 200STS
Welded Channel

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
Two Pcs. AS 200 Welded
Back-to-Back.



AS 200BTS
Welded Channel

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
Two Pcs. AS 200 Welded
Side-to-Back.



AS 200STSR
Welded Channel

Size: 1⁵/₈" x 3¹/₄" x 12 GA.
Two Pcs. AS 200 Welded
Side-to-Opposite Side.



AS 210
Channel

Size: 1⁵/₈" x 1⁵/₈" x 14 GA.



AS 210EH
Channel with
Elongated Holes

Size: 1⁵/₈" x 1⁵/₈" x 14 GA.
9⁹/₁₆" x 1¹/₈" Elongated Holes
on 2" Centers.



AS 210KO
Channel with
Knock Outs

Size: 1⁵/₈" x 1⁵/₈" x 14 GA.
7⁷/₈" Knock Outs on 6" Centers.



AS 210H
Channel with Holes

Size: 1⁵/₈" x 1⁵/₈" x 14 GA.
9⁹/₁₆" Holes on 1⁷/₈" Centers.



AS 210S
Channel with Long Slots

Size: 1⁵/₈" x 1⁵/₈" x 14 GA.
1³/₃₂" x 3" Slots on 4" Centers.



AS 210BTB
Welded Channel

Size: 1⁵/₈" x 3¹/₄" x 14 GA.
Two Pcs. AS 210 Welded
Back-to-Back.



AS 300
Channel

Size: 1⁵/₈" x 1³/₈" x 12 GA.



AS 300EH
Channel with
Elongated Holes

Size: 1⁵/₈" x 1³/₈" x 12 GA.
9⁹/₁₆" x 1¹/₈" Elongated Holes
on 2" Centers.



AS 300KO
Channel with
Knock Outs

Size: 1⁵/₈" x 1³/₈" x 12 GA.
7⁷/₈" Knock Outs on 6" Centers.



AS 300H
Channel with Holes

Size: 1⁵/₈" x 1³/₈" x 12 GA.
9⁹/₁₆" Holes on 1⁷/₈" Centers.



AS 300S
Channel with Long Slots

Size: 1⁵/₈" x 1³/₈" x 12 GA.
1³/₃₂" x 3" Slots on 4" Centers.



AS 300BTB
Welded Channel

Size: 1⁵/₈" x 2³/₄" x 12 GA.
Two Pcs. AS 300 Welded
Back-to-Back.

ANVIL-STRUT™ (Continued)

Channels (continued)



AS 400
Channel
Size: 1 5/8" x 1" x 12 GA.



AS 400EH
Channel with
Elongated Holes
Size: 1 5/8" x 1" x 12 GA.
9/16" x 1 1/8" Elongated Holes
on 2" Centers.



AS 400KO
Channel with
Knock Outs
Size: 1 5/8" x 1" x 12 GA.
7/8" Knock Outs on 6" Centers.



AS 400H
Channel with Holes
Size: 1 5/8" x 1" x 12 GA.
9/16" Holes on 1 7/8" Centers.



AS 400S
Channel with Long Slots
Size: 1 5/8" x 1" x 12 GA.
1 3/32" x 3" Slots on 4" Centers.



AS 400BTB
Welded Channel
Size: 1 5/8" x 2" x 12 GA.
Two Pcs. AS 400 Welded
Back-to-Back.



AS 500
Channel
Size: 1 5/8" x 1 3/16" x 14 GA.



AS 500EH
Channel with
Elongated Holes
Size: 1 5/8" x 1 3/16" x 14 GA.
9/16" x 1 1/8" Elongated Holes
on 2" Centers.



AS 500H
Channel with Holes
Size: 1 5/8" x 1 3/16" x 14 GA.
9/16" Holes on 1 7/8" Centers.



AS 500S
Channel with Long Slots
Size: 1 5/8" x 1 3/16" x 14 GA.
1 3/32" x 3" Slots on 4" Centers.



AS 500BTB
Welded Channel
Size: 1 5/8" x 1 5/8" x 14 GA.
Two Pcs. AS 500 Welded
Back-to-Back.



AS 520
Channel
Size: 1 5/8" x 1 3/16" x 12 GA.



AS 520EH
Channel with
Elongated Holes
Size: 1 5/8" x 1 3/16" x 12 GA.
9/16" x 1 1/8" Elongated Holes
on 2" Centers.



AS 520H
Channel with Holes
Size: 1 5/8" x 1 3/16" x 12 GA.
9/16" Holes on 1 7/8" Centers.



AS 520S
Channel with Long Slots
Size: 1 5/8" x 1 3/16" x 12 GA.
1 3/32" x 3" Slots on 4" Centers.



AS 520BTB
Welded Channel
Size: 1 5/8" x 1 5/8" x 12 GA.
Two Pcs. AS 520 Welded
Back-to-Back.



AS 560
Channel
Size: 1 5/8" x 1 3/16" x 16 GA.



AS 560EH
Channel with
Elongated Holes
Size: 1 5/8" x 1 3/16" x 16 GA.
9/16" x 1 1/8" Elongated Holes
on 2" Centers.

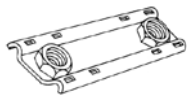


AS 707
Metal Raceway
Closure Strip
For All 1 5/8" Width Channels.
(10' Length)



AS 707P
Metal Painted
Closure Strip
For All 1 5/8" Width Channels.
(10' Length)

Channel Hardware



AS 3281
Double Conveyor
Adjusting Nut
Use with all 1 5/8" wide channel



AS 83
Hexagon Nut



Fig. 135
Rod Coupling



Fig. 146
Continuous Threaded Rod



AS 209
Flat Washer



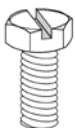
AS 203
Linked Eyelet with Stud



AS 211
Lock Washer



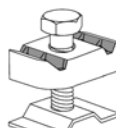
AS 230
Fender Washer



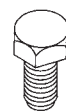
AS 6075
Slotted Hex Head
Machine Screw



AS 6108
Square Nut



AS 3500
Seismic Rod Stiffener



AS 6024
Hex Head Cap Screw

Channel Nuts



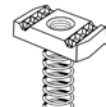
AS NS - Clamping Nut
without Spring
Use with all 1 5/8" wide channel



AS SS - Clamping Nut
with Short Spring
Use with AS 400 and AS 500



AS RS - Clamping Nut
with Regular Spring
Use with AS 200, AS 210
and AS 300



AS LS - Clamping Nut
with Long Spring
Use with AS 100 & AS 150



AS TG - Top Grip Nut
with Spring on Top
Use with all 1 5/8" wide channel



AS 517
Stud Nut with RS Spring

ANVIL-STRUT™ (Continued)

Clamps & Accessories



AS 85
Rod or Insulator Support



Fig. 86
Clamp with Lock Nut



Fig. 93
Top Beam "C" Clamp
Size Range: $\frac{3}{8}$ " - $\frac{1}{2}$ "



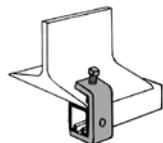
Fig. 94
Top Beam "C" Clamp
Size Range: $\frac{5}{8}$ " - $\frac{3}{4}$ "



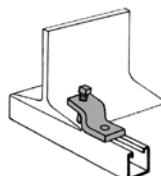
Fig. 95
Clamp with Lock Nut



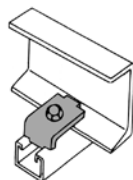
AS 135X
Light Duty Beam Clamp



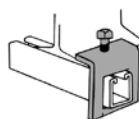
AS 684
Beam Clamp



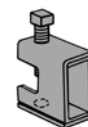
AS 685
Beam Clamp



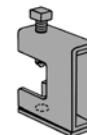
AS 686
Beam Clamp



AS 855
Angular "C" Beam Clamp
AS 855 1 - Use with AS 200
and AS 210.
AS 855 2 - Use with AS 500.



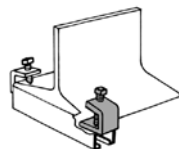
AS 858
Heavy Duty Suspension
Rod Beam Clamp
Safety Anchor Strap AS 871
sold separately.



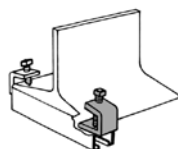
AS 865
Wide Throat Heavy Duty
Beam Clamp
Safety Anchor Strap AS 871
sold separately.



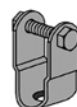
AS 871
Safety Anchor Strap
(For Heavy Duty Beam Clamps)



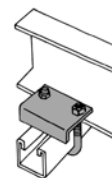
AS 907
"I" Beam Clamp
Includes Cup Point Set Screw.



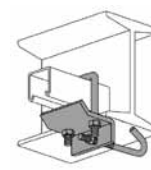
AS 998
"I" Beam Clamp
Includes Set Screw.



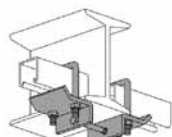
AS 2623
Swivel Adapter
Use with AS 2622 Beam
Clamp.



AS 2651
Beam Clamp

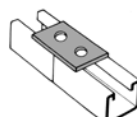


AS 2656
"U" Bolt Beam Clamp
with Hook

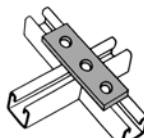


AS 2657
Double "U" Bolt
Beam Clamp

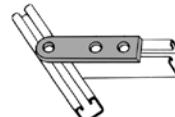
Plates



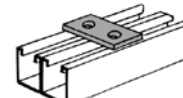
AS 601
Two Hole Splice Plate



AS 602
Three Hole Splice Plate



AS 617
Three Hole Swivel Plate



AS 620
Two Hole Connecting Plate



AS 631
Two Hole Splice Clevis
Use with AS 200 & AS 210.



AS 644
Two Hole Splice Clevis
Use with AS 500 & AS 520.



AS 629
Three Hole Splice Clevis
Use with AS 200 & AS 210.



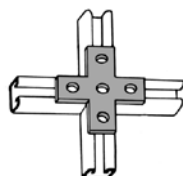
AS 645
Three Hole Splice Clevis
Use with AS 500 & AS 520.



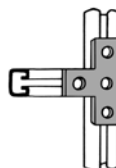
AS 616
Four Hole Splice Clevis
Use with AS 200 & AS 210.



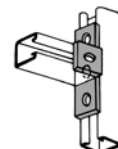
AS 646
Four Hole Splice Clevis
Use with AS 500.



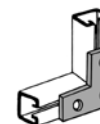
AS 712
Cross Plate



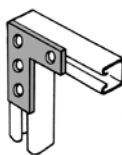
AS 714
"T" Plate



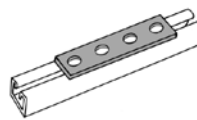
AS 715
"T" Plate - 90°



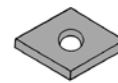
AS 718
Flat Angle Plate



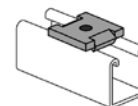
AS 719
Four Hole Corner Plate



AS 888
Four Hole Splice Plate



AS 619
Square Washer

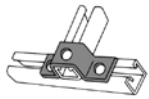


AS 2504
Square Washer with
Channel Guide

Splice Clevis

ANVIL-STRUT™ (Continued)

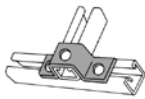
"U" Supports



AS 613

"U" Support

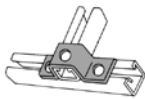
Use with AS 200, AS 210
and AS 500BTB.



AS 679

"U" Support

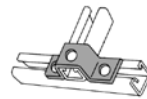
Use with AS 100, AS 200BTB
and AS 210BTB.



AS 710

"U" Support

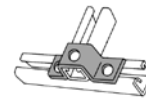
Use with AS 300.



AS 929

"U" Support

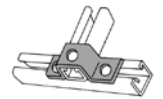
Use with AS 500 & AS 520.



AS 978

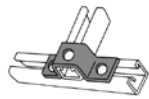
"U" Support

Use with AS 400.



AS 2119

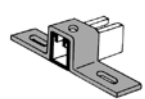
"U" Connector



AS 2648

"U" Support

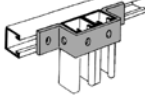
Use with AS 150.



AS 687

Slotted "U" Support

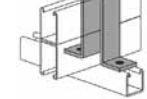
Use with AS 200 & AS 210.



AS 721

"U" Support

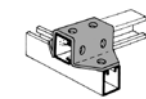
Use with AS 100, AS 200BTB
and AS 210BTB.



AS 678

Three Hole "U" Support

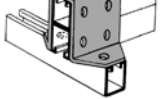
Use with AS 150BTB.



AS 733

Six Hole "U" Support

Use with AS 200 & AS 210.

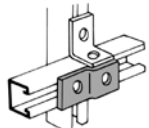


AS 735

Eight Hole "U" Support

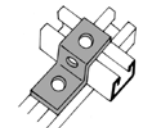
Use with AS 200BTB.

"Z" Supports



AS 609

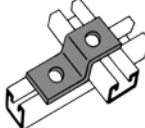
Two Hole Offset
"Z" Support



AS 611

"Z" Support

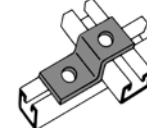
Use with AS 200, AS 210
and AS 500BTB.



AS 612

"Z" Support

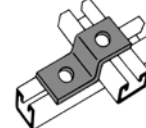
Use with AS 400.



AS 711

"Z" Support

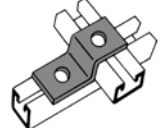
Use with AS 300.



AS 928

"Z" Support

Use with AS 500 & AS 520.

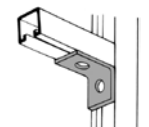


AS 2601

"Z" Support

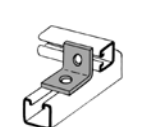
Use with AS 150.

Angle Fittings and Connectors



AS 603

Two Hole End Angle



AS 604

Two Hole Corner Angle



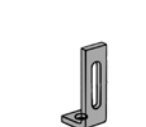
AS 624

Two Hole Closed Angle
Connector



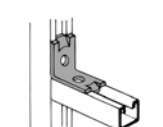
AS 633

Two Hole Open Angle
Connector



AS 763, AS 764

Slotted Adjustment
Corner Angle



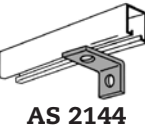
AS 806

Two Hole Angle with
Impressions on Both Legs



AS 921

One Hole Angle



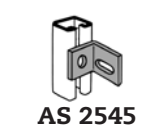
AS 2144

Corner Angle



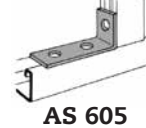
AS 2520

Two Hole Adjustment Angle



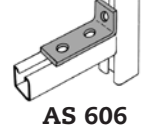
AS 2545

Slotted 90° Angle



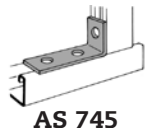
AS 605

Three Hole Corner Angle



AS 606

Three Hole Corner Angle



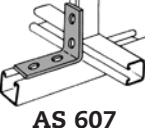
AS 745

Three Hole Corner Angle



AS 3049

Two Hole Slotted 90°
Corner Connector



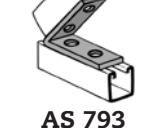
AS 607

Four Hole Corner Angle



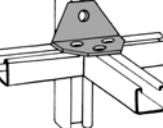
AS 781

Four Hole Open Angle
Connector



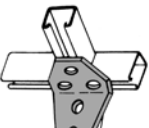
AS 793

Four Hole Closed Angle
Connector



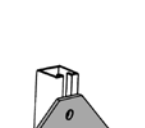
AS 614

Four Hole Joint Corner
Connector



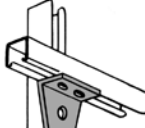
AS 615

Four Hole Shelf Joint
Angle Connector



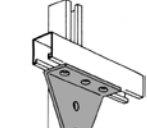
AS 689

Adjustable Double
Slotted Corner Connector



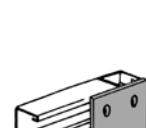
AS 748

Four Hole Corner Joint
Connector



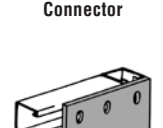
AS 927

Five Hole Corner Connector



AS 744

Flat Corner Connector

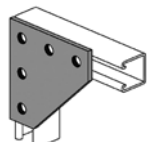


AS 750

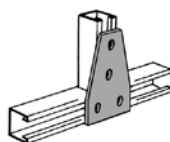
Four Hole Corner Connector

ANVIL-STRUT™ (Continued)

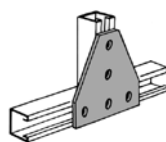
Angle Fittings and Connectors (continued)



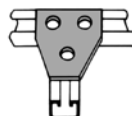
AS 2190
Flat Corner Connector



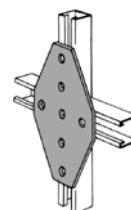
AS 747
Symmetrical Four Hole Connector



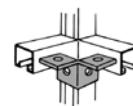
AS 854
Flat Connector



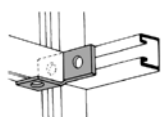
AS 925
Symmetrical Three Hole Joint Connector



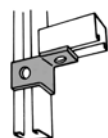
AS 2112
Cross Connector



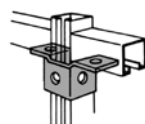
AS 665
Four Hole Double Corner Connector



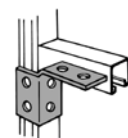
AS 720
RH & LH Angle Plate Connector



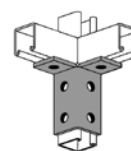
AS 922 RH & LH
Two Hole Single Corner Angle Connector



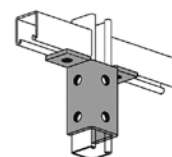
AS 923
Five Hole Two Angle Connector



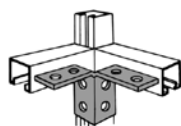
AS 2128 RH & LH
Six Hole Corner Connector



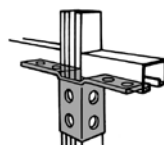
AS 666
Six Hole Double Corner Connector



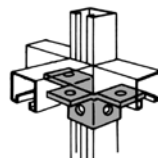
AS 821
Eight Hole Double Angle Connector



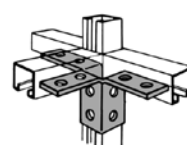
AS 667
Eight Hole Double Corner Connector



AS 913
Ten Hole Two Angle Clevis Connector



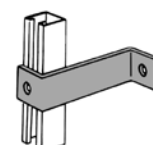
AS 668
Six Hole Three Angle Connector



AS 669
Twelve Hole Three Angle Clevis Connector



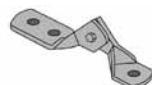
AS 2560 & AS 2651
Conduit Connector Fitting Assembly



AS 3060
Offset Connector



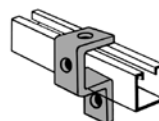
AS 9402
Two Hole Hinge Connector



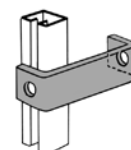
AS 9403
Three Hole Hinge Connector



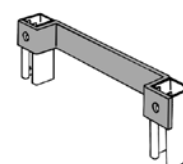
AS 9404
Four Hole Hinge Connector



AS 677
Cup Support for Standard Single Strut
Use with AS 200 and AS 210.

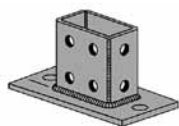


AS 993
Inside Clevis

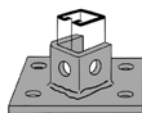


AS 2401 thru AS 2403
Ladder Rung

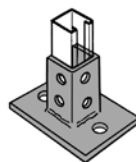
Post Bases



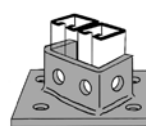
AS 2064
Double Column Post Base
Use with AS 100, AS 200BTB, AS 200STS, AS 200BTS and AS 200STR Channel



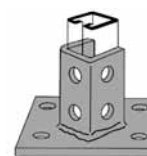
AS 3013
Single Column Post Base
Use with AS 200 and AS 210 Channel.



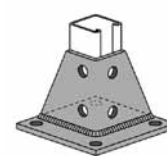
AS 3025
Post Base
Use with AS 200 and AS 210 Channel.



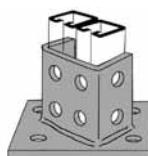
AS 3029
Double Column Post Base
Use with all 3/4" Channels.



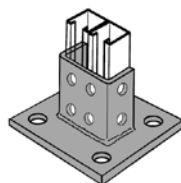
AS 3033
Post Base
Use with AS 200 and AS 210 Channel.



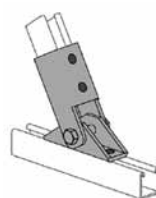
AS 3040
Post Base
Use with AS 200 and AS 210 Channel.



AS 3064
Double Column Post Base
Use with all 3/4" Channels.



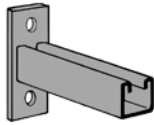
AS 3064 SQ
Double Column Post Base
Use with all 3/4" Channels.



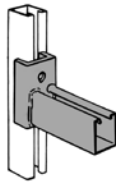
AS 9400
Adjustable Base

ANVIL-STRUT™ (Continued)

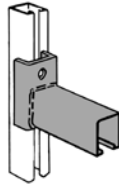
Brackets



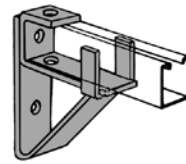
AS 651
Reversible Strut Bracket



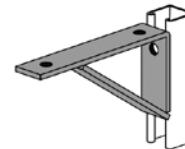
AS 661 T1
Strut Bracket
(Slot Up)



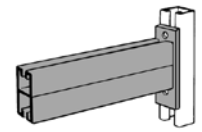
AS 661 T2
Strut Bracket
(Slot Down)



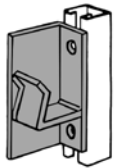
AS 708
Single Channel
Bracket Support
Use with AS 200, AS 210
and AS 500BTB.



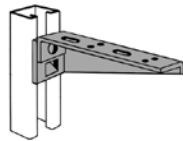
AS 732
Shelf Bracket



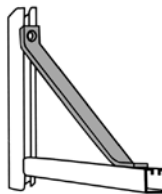
AS 809
Double Channel Bracket



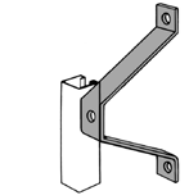
AS 825 RH/LH
Pipe Axle Support



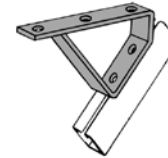
AS 838 RH/LH
6" thru 30" Shelf Bracket



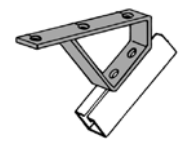
AS 926
Strut Brace



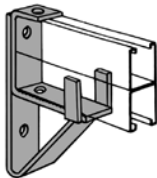
AS 2404 thru AS 2408
Wall Ladder Bracket



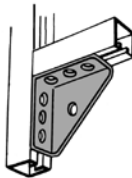
AS 2421
45° Stair Tread Support



AS 2422
34 1/2° Stair Tread Support



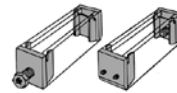
AS 3164
Double Channel
Bracket Support
Use with all 3 1/4" Channels.



AS 3373
Universal Angle Bracket



AS 2627
Spacer Clevis



AS 2654 & AS 2654A
Column Attachment

Pipe and Conduit Supports



AS 51
Right Angle Pipe or
Conduit Clamp



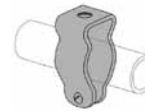
Fig. 67
Pipe or Conduit Hanger



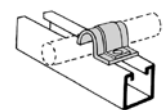
Fig. 69
Swivel Ring Hanger



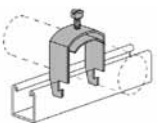
Fig. 137
"U" Bolt with Nuts
Long Tangent



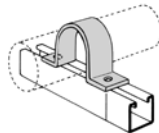
AS 270
Conduit Clamp



AS 1450
One Hole Clamp for
O.D. Tubing



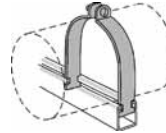
AS 3101 thru AS 3115
One Piece Cable and
Conduit Clamp



AS 3126
Hold Down Clamp



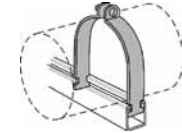
AS 1000AS
EMT Conduit Clamps
Offered in Pre-Assembled only.



AS 1100AS
Rigid Steel Conduit Clamps
Offered in Pre-Assembled only.



AS 1200AS
O.D. Tubing Clamp
Offered in Pre-Assembled only.



AS 1300AS
Universal Pipe Clamp
Offered in Pre-Assembled only.

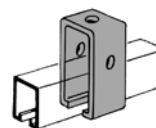
Trolleys & Accessories



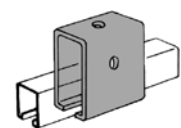
AS 2521
Two Wheel Trolley
Use with AS 200 Channel.



AS 2522
Four Wheel Trolley
Use with AS 200 Channel.



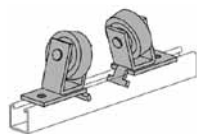
AS 2528
Trolley Beam Standard Support
Use with AS 200 and AS 210 Channel.



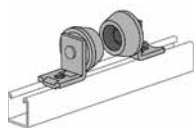
AS 2528-1
Trolley Beam Joint Support
Use with AS 200 and AS 210 Channel.

ANVIL-STRUT™ (Continued)

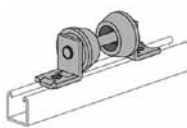
Pipe and Conduit Supports (continued)



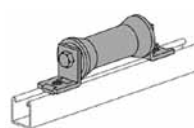
AS 815
(6" to 18" Pipe)
Double Roller Pipe Support



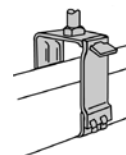
AS 1901
(1" to 8" Pipe)
Pipe Roller Support



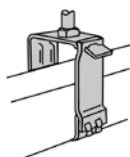
AS 1902
Pipe Roller Support



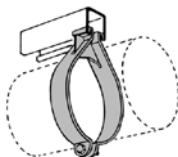
AS 1911
Pipe Roller Support



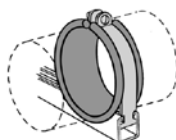
AS 2631
Swing Gate Fixture Hanger
Use with AS 200, AS 210, AS 300,
AS 400 and AS 500 Channels.



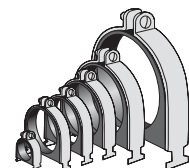
AS 2631D
Swing Gate Fixture Hanger
Use with AS 100, AS 150, AS
200BTB and AS 210BTB Channels.



AS 3138
Parallel Pipe Clamp



AS 3792
Cushion Strip



AS 0040D thru AS 106P
Cushion Clamp Assembly



Klo-Shure®
Strut-Mounted
Insulation Couplings with Strut
Clamp

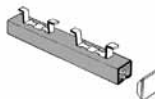
Concrete Inserts



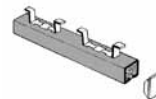
Fig. 152
Screw Concrete Insert



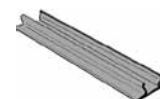
Fig. 285
Light Weight Concrete Insert



AS 349
Continuous Concrete Insert
with or without Closure Strip and
End Cap Installed.



AS 449
Continuous Concrete Insert
with or without Closure Strip and
End Cap Installed.



AS 6151
Plastic Closure Strip

End Caps



AS 653
Type "B" End Cap Anchor
Use with AS 349 Insert.



AS 654
Type "B" End Cap Anchor
Use with AS 449 Insert.



AS 655 & AS 656
Type "A" End Cap
Use with AS 200 Channel.
Use with AS 300 Channel
and AS 349 Insert.



AS 901 & AS 902
Type "A" End Cap
Use with AS 100 and
AS 400 Channel.



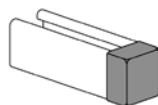
AS 930
Type "A" End Cap
Use with AS 500 Channel.



AS 2580
Type "A" End Cap
Use with AS 150 Channel.



AS 2511
End Cap with Knockout
AS 2511 1 — Use with AS 100.
AS 2511 2 — Use with AS 200
and AS 210.
AS 2511 3 — Use with AS 300.



AS 6153
Safety End Cap
AS 6153 1 — Use with AS 100.
AS 6153 2 — Use with AS 200
and AS 210.
AS 6153 3 — Use with AS 300.
AS 6153 5 — Use with AS 500.

Fig./Model	Description.....	Page	Fig./Model	Description.....	Page	Fig./Model	Description.....	Page
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400G	Grooved-End Silent Check Valve.....	79	7052-5D	22 $\frac{1}{2}$ " Long Radius Elbow.....	64	7084P	Flange Nipples (Plain x #150 FL).....	127
758G	Grooved-End "Wye" Strainer.....	90	7052-6D	22 $\frac{1}{2}$ " Long Radius Elbow.....	65	7084SS	Stainless Steel Flange Adapter.....	143
768G	Grooved-End "Wye" Strainer.....	91	7053	11 $\frac{1}{4}$ " Elbow.....	49	7085	Flange Nipples (GR x #300 FL).....	58
1007	Roll Groovers.....	146-147	7053-3D	11 $\frac{1}{4}$ " Long Radius Elbow.....	63	7085P	Flange Nipples (Plain x #300 FL).....	127
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3006C	Roll Groovers.....	148-149	7053-6D	11 $\frac{1}{4}$ " Long Radius Elbow.....	65	7087	Female Thread Adapter (GR x FPT).....	57
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6051	CTS Copper 45° Elbow.....	118	7057-3D	60° Long Radius Elbow.....	63	7090	DI-LOK® Nipple (THD x THD).....	123
6060	CTS Copper Tee.....	118	7057-5D	60° Long Radius Elbow.....	64	7097	Eccentric Reducers.....	53
6061	CTS Copper Reducing Tee (GR x GR x GR).....	119	7057-6D	60° Long Radius Elbow.....	65	7100	90° Elbow.....	135, 168
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These terms and conditions shall control with respect to any purchase order or sale of Seller's products. No waiver, alteration or modification of these terms and conditions whether on Buyer's purchase order or otherwise shall be valid unless the waiver, alteration or modification is specifically accepted in writing and signed by an authorized representative of Seller.

2. DELIVERY:

Seller will make every effort to complete delivery of products as indicated on Seller's acceptance of an order, but Seller assumes no responsibility or liability, and will accept no backcharge, for loss or damage due to delay or inability to deliver caused by acts of God, war, labor difficulties, accident, delays of carriers, by contractors or suppliers, inability to obtain materials, shortages of fuel and energy, or any other causes of any kind whatever beyond the control of Seller. Seller may terminate any contract of sale of its products without liability of any nature, by written notice to Buyer, in the event that the delay in delivery or performance resulting from any of the aforesaid causes shall continue for a period of sixty (60) days. Under no circumstances shall Seller be liable for any special or consequential damages or for loss, damage, or expense (whether or not based on negligence) directly or indirectly arising from delays or failure to give notice of delay.

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4. SELLER'S LIABILITY:

Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty" above), contract or negligence, arising in connection with the design, manufacture, sale, use or repair of the products or of the engineering designs supplied to Buyer.

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Seller cannot accept return of any products unless its written permission has been first obtained, in which case same will be credited subject to the following (a) All material returned must, on its arrival at Seller's Plant, be found to be in first-class condition; if not, cost of putting in saleable condition will be deducted from credit memoranda; (b) A handling charge deduction of twenty percent (20%) will be made from all credit memoranda issued for material returned; (c) Transportation charges, if not prepaid will be deducted from credit memoranda.

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All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless made in writing within ten (10) days of receipt of a shipment.

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Orders covering special or nonstandard products are not subject to cancellation except on such terms as Seller may specify on application.

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Prices and designs are subject to change without notice. All prices are F.O.B. Point of shipment, unless otherwise stated.

9. TAXES:

The amount of any sales, excise or other taxes, if any, applicable to the products covered by this order, shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptance to the taxing authorities.

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Domestic: \$100 plus transportation.
International: \$500 plus transportation.

12. TERMS:

Cash, net 30 days unless otherwise specified.

NOTE: All orders are accepted on the basis of prices in effect at the time of shipment.

NOTICE: The prices and terms quoted, there will be added any manufacturers or sales tax payable on the transaction under any effective statute.

FREIGHT ALLOWANCE: All prices are F.O.B. point of shipment. On shipments weighing 2,500 pounds or more, rail freight or motor freight at the lowest published rate, is allowed to all continental U.S. rail points or all U.S. highway points listed in published tariffs (Alaska and Hawaii excluded). In no case will more than actual freight be allowed. Shipments (weighing less than 2,500 pounds) will be shipped prepaid. The buyer will be invoiced for freight costs at the applicable published class, exception or commodity rate(s) or charge(s). Anvil reserves the right to select the carrier for all shipments.

Victaulic® Gruvlok®	Couplings & Gaskets
07/107 7400	Rigidlite® Coupling
07/107 7401	Rigidlok® Coupling
45/46 7084/7085	Flg x Grv Adapter-150/300#
72 7042FF	Outlet Coupling fnpt
75 7000	Lt. Wt. Flexible Coupling
77 7001	Flexible Coupling
78 7003	Hinge Coupling
99 7005	Rough Neck Coupling
741/743 7012/7013	Grooved Flange-150/300#
995/997 7305/7307	HDPE Coupling
ES EG	End Guard Gasket
FS FG	Flush Gap Gasket
Grade E Grade E	Gasket EPDM
Grade L Grade L	Gasket Silicone
Grade O Grade O	Gasket Viton
Grade T Grade T	Gasket Nitrile
HP-70 7004HPR	HPR Coupling
HP-70ES 7004EG	End Guard Coupling
NA 7400	300 p.s.i Rigid Coupling

Victaulic® Gruvlok®	Mechanical
47 7088/7089	Di-Electric Nipple
155 7240	Expansion Joint
300 7700	Butterfly Valves
416 400G	Large Silent Check Valve
700 7600	Butterfly Valve
709 8000	Large Butterfly Valve
716 7811	Check Valve
721 7500	Ball Valve
730 7260	Tee Strainer
731 7250	Suction Diffuser
732 758, 768	Wye Strainer
733 Available	Venturi - Grooved
789 GBV-G	Balancing Valve
NA 722	Triple Service Valve
NA SF21-GF	Flex Connector, F x G
R-10F 7050RF	Base Ell Reducing, F x G
VE272 3006/C	Grooving Tools
VE416 3007	Grooving Tools

Copper	Victaulic® Gruvlok®	CTS Copper Product
606/607 6400		Rigid Coupling - Copper
608 7721		Copper Butterfly Valve
610 6050		Copper 90° Ell
611 6051		Copper 45° Ell
620 6060		Copper Tee
625 6061		Copper Reducing Tee, G x G
626 6064		Copper Reducing Tee, G x C
641 6084		Flange - Copper
650 6072		Copper Conc. Reducer, G x G
652 6075		Copper Conc. Reducer, G x C
660 6074		Copper Cap
NA 7500B		Copper Ball Valve

Victaulic® Gruvlok®	Fittings
10 7050	90° Ell
10-P 7050P	Plain-End 90° Ell
11 7051	45° Ell
12 7052	22 1/2° Ell
13 7053	11 1/4° Ell
20 7060	Tee
25 7061	Reducing Tee
29M 7063	Tee with Threaded Branch
29T 7064	Reducing Tee with Threaded Branch
30 7069	Lateral 45°
30R 7070	Reducing Lateral 45°
32 7066	True Wye
32R 7067	Reducing Tee Wye
33 7071	True Wye
43/40 7080/7081	Nipples, G x G / G x T
50 7072	Concentric Reducer
51 7073	Eccentric Reducer
52 7076	Reducer Groove x Thread
53 7077	Swaged Reducer Nipple
60 7074	Cap
80 7087	Female Threaded Adapter
100 7050LR	Long Radius 90° Ell
110 7051LR	Long Radius 45° Ell

Victaulic® Gruvlok®	Fire Protection
001 7450	90° Ell (Short Pattern)
002 7460	Tee (Short Pattern)
75 7000A	Lt. Wt. Flexible Coupling
005 7400A	Lt. Wt. Rigid Sprinkler Coupling
27 7065	Standpipe Tee
61 7075	Bull Plug
96 7105	Sock-It Reducing Tee
705W 7722-3D	UL/FM Butterfly Valve w/s
717 78FP	UL/FM Valve
750 7010	Reducing Coupling
920 7045	Clamp Tee Fnpt Outlet
920 7046	Clamp Tee Grooved Outlet
920 7048	Clamp Cross
925 7044	Econ. Clamp Tee Fnpt
961 7100	Sock-It 90° Ell

Victaulic® Gruvlok®	Stainless Steel
489 7400SS	Rigid Coupling - 316SS
89 7401	Rigid Coupling - Ductile Iron
20-SS 7060-SS04	Sch. 10 Tee 304L
25-SS-SW 7061-SS04	Sch. 10 Reducing Tee 304L
50-SSLT 7072-SS04	Sch. 10 Conc. Reducer 304L
51-SSLT 7073-SS04	Sch. 10 Ecc. Reducer 304L
60-SS 7074-SS04	Sch. 10 Cap 304L
100-SS 7050-SS04	Sch. 10 90° Ell 304L
110-SS 7051-SS04	Sch. 10 45° Ell 304L
721S 7500SS	SS Ball Valve

Today Anvil® International is the largest and most complete fitting and hanger manufacturer in the world.

2004 Anvil® International acquires Star Pipe Products, Building and Construction Divisions (SPF) and forms AnvilStar™ Fire Products Division.

2001 Anvil® International acquires Merit® Manufacturing and Beck Manufacturing.

2000 The industry's trusted manufacturer of pipe fittings, hangers and grooved fittings is renamed Anvil® International, Inc.

1999 Tyco sells the distribution and manufacturing operations known up to this point as "Grinnell Supply Sales", but keeps the Grinnell® trademark.

1994 J.B. Smith™ and Catawissa™ join the Grinnell Supply Sales and Manufacturing division.

1969 Grinnell Co. acquired by International Telephone and Telegraph. Two years later, ITT divests the Fire Protection Division, but keeps the manufacturing and sales divisions that will become known as Anvil® International.

1960 Gruvlok® line of grooved fittings is introduced.

1919 General Fire Extinguisher Co. becomes Grinnell Co.

1909 Frederick Grinnell opens a foundry in Cranston, RI. Companies express interest in buying its piping products, laying the groundwork for what would become the Grinnell Supply Sales Division. It would be these manufacturing and sales operations that eventually become Anvil® International.

1850 Providence Steam & Gas Pipe Co. is formed, and Frederick Grinnell purchases a controlling interest.

Grinnell® is a registered trademark of Grinnell Corporation, a Tyco International Ltd. company.

TRUSTED FOR 150 YEARS

We built our reputation from the ground up.

Anvil's history stretches back to the mid 1800s, when a company named Grinnell® began providing its customers with the finest quality pipe products. Since 2000, those quality products and services—and the people who provide them—have been known as Anvil® International. Anvil® customers receive the quality and integrity that have been building strong connections in both products and business relationships for over 150 years.

Focused Product Line:

Anvil® Malleable and Cast Iron Fittings

Anvil® Hangers, Supports and Struts

Beck Welded Pipe Nipples

Anvil® Seamless Pipe Nipples

Anvil® Steel Pipe Couplings and Small Steel Fittings

Merit® Tee-Lets and Drop Nipples

Gruvlok® Couplings, Fittings and Valves

SPF™ Malleable and Cast and Ductile Iron Fittings

SPF™ Grooved Fittings and O'Lets

J.B. Smith Swage Nipples and Bull Plugs

Catawissa® Wing Unions and Check Valves



BUILDING CONNECTIONS THAT LAST



ANVIL
BRANDS:



Catawissa
PERFORMANCE UNDER PRESSURE



ANVIL EPS
ENGINEERED PIPE SUPPORTS



CANVIL



ANVIL-STRUT
ENGINEERED & BUILT

SEMINOLE
Tubular Products

BRANDS OF ANVIL INTERNATIONAL



Anvil® product lines include malleable and cast iron fittings, unions and flanges; seamless steel pipe nipples; steel pipe couplings; universal anvilets; forged steel fittings and unions; pipe hangers and supports; threaded rod; and engineered hangers.



The Gruvlok® product line consists of couplings for grooved and plain-end fittings, butterfly valves and check valves; flanges; pump protection components; pipe grooving tools; as well as copper and stainless steel system components.



Anvil-Strut™ products include a complete line of channel in stock lengths of 10 and 20 feet, with custom lengths available upon request. A variety of fittings and accessories are also offered. All products can be ordered in an assortment of finishes and material choices including SupR-Green™, Zinc Trivalent Chromium, pre-galvanized, hot-dipped galvanized, electro-galvanized, aluminum, plain, and stainless steel.



JB Smith™ is the leading manufacturer of oil country tubular fittings, swages and bull plugs – all meeting API specifications. Offering tubing nipples, casing nipples as well as a full line of traditional line pipe and oil country threads in every schedule, JB Smith is the resource for all your oilfield needs.



Catawissa™ NACE and API approved wing unions for Standard Service are offered in non-pressure seal ends as well as threaded and butt weld, and are interchangeable with most leading union manufacturers. Fully traceable and available with complete mill certifications, Catawissa's oilfield wing union product line includes the standard ball-and-cone design plus our unique Figure 300 Flat Face design, where space and pipe line separation are a consideration.



The SPF/Anvil™ product line includes a variety of internationally sourced products such as grooved couplings, fittings and flanges, cast iron, malleable iron and ductile iron threaded fittings, steel pipe nipples, as well as o'lets.



The Merit® product line includes a variety of tee-lets, drop nipples, and steel welding flanges for fire protection applications. Most Merit products are UL/ULC Listed, FM Approved, and rated from 175 to 300 psi.



Beck steel pipe nipples and steel pipe couplings are manufactured in accordance with the ASTM A733 Standard Specification for Welded and Seamless Carbon Steel and Stainless Steel Pipe Nipples. Steel pipe couplings are manufactured in accordance with the ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints. Beck API couplings are manufactured in accordance with the API Specification for line pipe.



Canvil® manufactures low pressure hexagon reducer bushings, as well as plugs and hex caps up to 1" in diameter in various finishes including Oil Treat, Phosphate and Electro Galvanized. In addition, Canvil manufactures A105 hex or round material in class 3000 and 6000 pound, forged steel couplings and bar stock products offered as either as normalized (A105N) or non-normalized (A105) that are fully traceable for mechanicals and chemistry through our MTR program.



Anvil EPS-Engineered Pipe Supports are products used to support piping systems under thermal, seismic, and other dynamic loading conditions. The product line encompasses variable spring hangers, constant supports, sway struts and snubbers as well as standard and special design clamps. Anvil EPS brings the highest quality products and innovative engineering solutions to common and uncommon piping system problems.



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BUILDING CONNECTIONS THAT LAST

