

# ***Fire Sprinkler System Materials Submittal For La Puente - Activity Center***

**PROTECTION  
DESIGN AND  
CONSULTING**

## ***References***

HYD CALCS 2

## ***Sprinklers***

5.6K QR SSP CONCEALED VK462 9

5.6K QR SSU VK300 16

5.6K QR SSP VK302 20

## ***System Pipe and Fittings***

Victaulic Grooved Piping System 26

US Pipe Mechanical Joint Fittings 30

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US Pipe Mechanical Joint Pipe 71

Fire Stop Penetration Hilti FS ONE 79

MegaLug 1100 80

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Listing 0328 0010 170

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All Thread Rod Tolco Fig 98 174

Strap Style Hanger Ring Tolco Fig 200 175

Swivel Attachment Tolco Fig 75 176

Seismic Bracing Lateral Clamp Tolco Fig 1001 177

Seismic Bracing Longitudinal Clamp Tolco Fig 4L 178

Swivel Brace Attachment Tolco Fig 980 179

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[www.protectiondesign.com](http://www.protectiondesign.com)

***All items submitted to establish a minimum standard of compliance and are stipulated to be  
"As shown or approved equal".***

PROTECTION DESIGN AND CONSULTING  
2851 CAMINO DEL RIO SOUTH  
SAN DIEGO CA. 92108

HYDRAULIC CALCULATIONS FOR  
LA PUENTE ACTIVITY CENTER  
15900 MAIN ST.  
LA PUENTE, CA 91744

DRAWING NUMBER: F200                      DATE: APR 8, 2025

-DESIGN DATA-

REMOTE AREA NUMBER: DA-01  
REMOTE AREA LOCATION: ACTIVITY ROOM

OCCUPANCY CLASSIFICATION: LIGHT HAZARD  
DENSITY: 0.10 gpm/sq. ft.  
AREA OF APPLICATION: 1,583 S.F.  
COVERAGE PER SPRINKLER: 225 sq. ft.  
TYPE OF SPRINKLERS CALCULATED: VIKING 5.6 K  
NUMBER OF SPRINKLERS CALCULATED: 10 SPK



TYPE OF SYSTEM: WET

AUTHORITY HAVING JURISDICTION: CITY OF SAN DIEGO

NOTES:

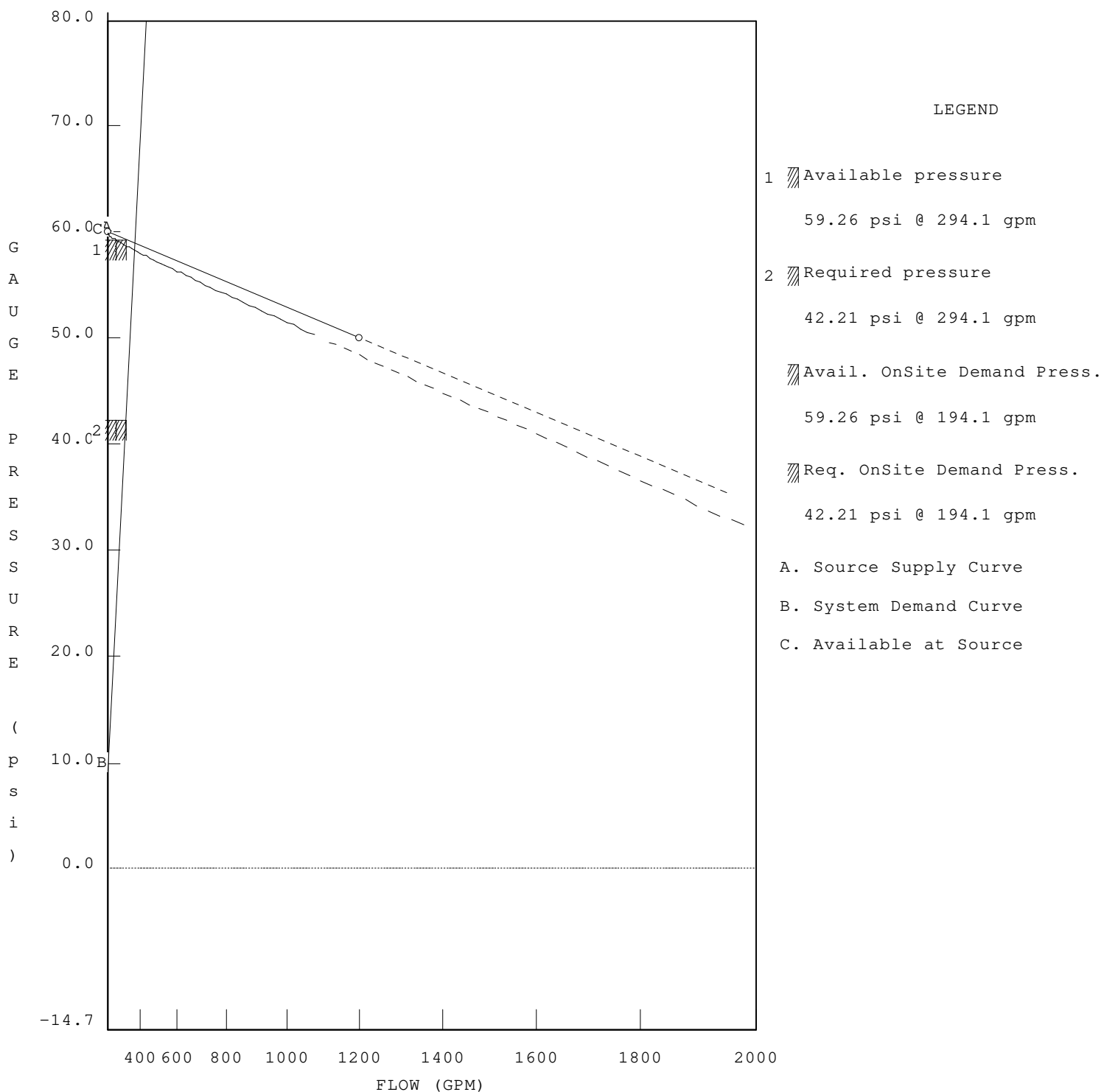
Calculations performed by HASS under license # 64618613 ,  
granted by HRS SYSTEMS, INC.

DATE: 4/8/2025 PUEENTE ACTIVITY CENTER\FIRE\2025-04-07\HYD. CALCS\DA-01.SDF

JOB TITLE:

WATER SUPPLY ANALYSIS

Static: 60.00 psi Resid: 50.00 psi Flow: 1200.0 gpm



Note: (1) Dashed Lines indicate extrapolated values from Test Results

(2) On Site pressures are based on hose stream deduction at the source

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JOB TITLE:

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	60.0	50.0	1200.0	59.3	294.1	42.2

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	294.1 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	100.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	194.1 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	AREA (FT^2)	DENSITY	
						REQ.	ACT.
						(GPM/FT^2)	
UG1	-3.0	- - - -	42.1	- - -	- - -	- - -	- - -
BF1	3.0	- - - -	39.3	- - -	- - -	- - -	- - -
BF2	3.0	- - - -	27.3	- - -	- - -	- - -	- - -
UG2	-3.0	- - - -	29.5	- - -	- - -	- - -	- - -
SS	-3.0	- - - -	29.3	- - -	- - -	- - -	- - -
BOR	1.0	- - - -	27.5	- - -	- - -	- - -	- - -
TOR	10.6	- - - -	22.9	- - -	- - -	- - -	- - -
A	10.5	- - - -	22.6	- - -	- - -	- - -	- - -
B	17.5	- - - -	18.7	- - -	- - -	- - -	- - -
C	17.5	- - - -	18.6	- - -	- - -	- - -	- - -
D	17.5	- - - -	18.6	- - -	- - -	- - -	- - -
S101	18.0	K= 5.60	12.8	20.1	182.0	0.100	0.110
S102	18.0	K= 5.60	10.6	18.3	182.0	0.100	0.100
S103	18.0	K= 5.60	13.7	20.8	182.0	0.100	0.114
S104	18.0	K= 5.60	11.5	19.0	168.0	0.100	0.113
S105	18.0	K= 5.60	12.8	20.0	182.0	0.100	0.110
S106	18.0	K= 5.60	10.6	18.2	182.0	0.100	0.100
S107	18.0	K= 5.60	13.7	20.7	182.0	0.100	0.114
S108	18.0	K= 5.60	11.5	19.0	168.0	0.100	0.113
S109	18.0	K= 5.60	12.7	20.0	182.0	0.100	0.110
S110	18.0	K= 5.60	10.6	18.2	182.0	0.100	0.100
SRC	-3.0	SOURCE	42.2	194.1	- - -	- - -	- - -



DATE: 4/8/2025 PUEENTE ACTIVITY CENTER\FIRE\2025-04-07\HYD. CALCS\DA-01.SDF

JOB TITLE:

NFPA PIPE DATA 5

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)		
To Node	El (ft)	PT	Tot. (Q)	Disch	Act ID	(ft.)	(Pf)		
Pipe: 1	Source	0.0				72.00	150	0.1	
SRC	-3.0	42.2	194.1	BF1	E6.000	----	0.00	-0.0	
UG1	-3.0	42.1	194.1		6.080		72.00	0.001	0.1
Pipe: 2	0.0	0.0				2E:44.0	77.83	150	2.8
UG1	-3.0	42.1	194.2	BF2	E6.000	T:46.0	95.00		2.6
BF1	3.0	39.3	194.2		6.080	G: 5.0	172.83	0.001	0.2
Pipe: 3		0.0		Fixed Pressure Loss Device					
BF1	3.0	39.3	194.2	UG2	12.0 psi, 194.2 gpm				
BF2	3.0	27.3	194.2						
Pipe: 4	0.0	0.0					316.00	150	-2.2
BF2	3.0	27.3	194.2	SS	E6.000	2E:44.0	44.00		-2.6
UG2	-3.0	29.5	194.2		6.080		360.00	0.001	0.4
Pipe: 5	0.0	0.0				3E:66.0	100.00	150	0.2
UG2	-3.0	29.5	194.2	BOR	E6.000	T:46.0	117.00		-0.0
SS	-3.0	29.3	194.2		6.080	G: 5.0	217.00	0.001	0.2
Pipe: 6	0.0	0.0					10.00	140	1.8
SS	-3.0	29.3	194.2	TOR	D6.000	E:22.0	22.00		1.7
BOR	1.0	27.5	194.2		6.280		32.00	0.001	0.0
Pipe: 9	0.0	0.0					9.60	120	4.7
BOR	1.0	27.5	194.2	A	B4.000	C:29.0	45.00		4.2
TOR	10.6	22.9	194.2		4.260	B:16.0	54.60	0.009	0.5
Pipe: 10	0.0	0.0					22.00	120	0.3
TOR	10.6	22.9	194.2	B	B4.000	E:13.0	13.00		-0.0
A	10.5	22.6	194.2		4.260		35.00	0.009	0.3
Pipe: 11	0.0	38.3		S101			39.50	120	3.9
A	10.5	22.6	155.9	C	B4.000	2E:26.0	52.00		3.0
B	17.5	18.7	194.2		4.260	T:26.0	91.50	0.009	0.9
Pipe: 12	0.0	38.2		S105			12.00	120	0.1
B	17.5	18.7	77.9	D	B4.000	----	0.00		-0.0
C	17.5	18.6	155.9		4.260		12.00	0.006	0.1
Pipe: 13	0.0	38.2		S109			14.00	120	0.0
C	17.5	18.6	39.7	S107	B4.000	----	0.00		-0.0
D	17.5	18.6	77.9		4.260		14.00	0.002	0.0
Pipe: 14	5.60	20.1		Disch			8.00	120	5.8
B	17.5	18.7	18.3	S102	A1.000	T: 5.0	5.00		0.2
S101	18.0	12.8	38.3		1.049		13.00	0.433	5.6
Pipe: 15	5.60	18.3		Disch			13.00	120	2.2
S101	18.0	12.8	0.0		A1.000	E: 2.0	7.00		-0.0
S102	18.0	10.6	18.3		1.049	T: 5.0	20.00	0.110	2.2

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JOB TITLE:

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)		
To Node	El (ft)	PT	Tot. (Q)	Disch	Act ID	(ft.)	(Pf)		
Pipe: 16		5.60	20.8	Disch		5.00	120	4.9	
C	17.5	18.6	19.0	S104	A1.000	T: 5.0	5.00	0.2	
S103	18.0	13.7	39.7		1.049		10.00	0.463	4.6
Pipe: 17		5.60	19.0	Disch		12.00	120	2.2	
S103	18.0	13.7	0.0		A1.000	E: 2.0	7.00	-0.0	
S104	18.0	11.5	19.0		1.049	T: 5.0	19.00	0.118	2.2
Pipe: 18		5.60	20.0	Disch		8.00	120	5.8	
C	17.5	18.6	18.2	S106	A1.000	T: 5.0	5.00	0.2	
S105	18.0	12.8	38.2		1.049		13.00	0.431	5.6
Pipe: 19		5.60	18.2	Disch		13.00	120	2.2	
S105	18.0	12.8	0.0		A1.000	E: 2.0	7.00	-0.0	
S106	18.0	10.6	18.2		1.049	T: 5.0	20.00	0.109	2.2
Pipe: 20		5.60	20.7	Disch		5.00	120	4.8	
D	17.5	18.6	19.0	S108	A1.000	T: 5.0	5.00	0.2	
S107	18.0	13.7	39.7		1.049		10.00	0.463	4.6
Pipe: 21		5.60	19.0	Disch		12.00	120	2.2	
S107	18.0	13.7	0.0		A1.000	E: 2.0	7.00	-0.0	
S108	18.0	11.5	19.0		1.049	T: 5.0	19.00	0.118	2.2
Pipe: 22		5.60	20.0	Disch		8.00	120	5.8	
D	17.5	18.6	18.2	S110	A1.000	T: 5.0	5.00	0.2	
S109	18.0	12.7	38.2		1.049		13.00	0.431	5.6
Pipe: 23		5.60	18.2	Disch		13.00	120	2.2	
S109	18.0	12.7	0.0		A1.000	E: 2.0	7.00	-0.0	
S110	18.0	10.6	18.2		1.049	T: 5.0	20.00	0.109	2.2

NOTES (HASS):

- Calculations were performed by the HASS 2023 D computer program in accordance with (2020) under license no. 64618613 granted by HRS Systems, Inc.  
208 Southside Square  
Petersburg, TN 37144  
(931) 659-9760
- The system has been calculated to provide an average imbalance at each node of 0.004 gpm and a maximum imbalance at any node of 0.079 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 14.8 ft/sec at pipe 16.
- Items listed in bold print on the cover sheet are automatically transferred from the calculation report.

DATE: 4/8/2025PUENTE ACTIVITY CENTER\FIRE\2025-04-07\HYD. CALCS\DA-01.SDF

JOB TITLE:

(5) Fullflow calculations are not done for systems with variable speed pumps.

(6) PIPE FITTINGS TABLE

HASS Pipe Table Name: standard

PAGE: A	MATERIAL: S40	HWC: 120							
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	L	C	B	G	A	D	N
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NTee
	-----								
	F								
	F45Ell								
1.049	2.00	5.00	2.00	5.00	6.00	1.00	10.00	2.00	5.00
	1.00								

PAGE: B	MATERIAL: THNWL		HWC: 120						
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	L	C	B	G	A	D	N
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NPTee
	-----								
	F								
	F45Ell								
4.260	13.00	26.00	8.00	29.00	16.00	3.00	26.00	26.00	26.00
	6.50								

PAGE: D	MATERIAL: DIRON		HWC: 140						
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	L	C	B	G	N	F	
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	NPTee	F45Ell	
6.280	22.00	47.00	14.00	51.00	16.00	5.00	47.00	11.00	

PAGE: E	MATERIAL: PVC150		HWC: 150						
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	L	C	B	G	N	F	
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	NPTee	F45Ell	
6.080	22.00	46.00	14.00	49.00	15.00	5.00	46.00	11.00	





## TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

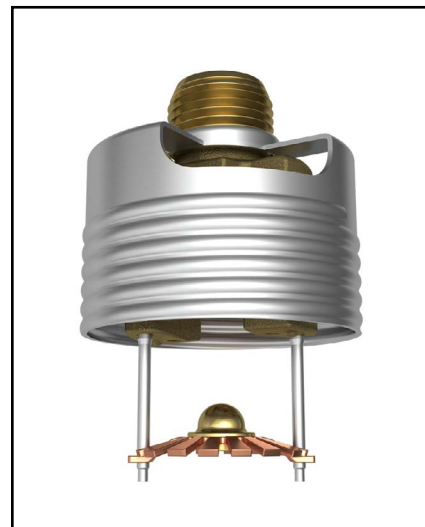
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

### 1. DESCRIPTION

Viking Mirage® Standard and Quick Response Concealed Pendent Sprinkler VK462 and HP Sprinkler VK463 are thermosensitive glass-bulb spray sprinklers designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive environments and is cULus Listed as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



**WARNING:** Cancer and Reproductive Harm-  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### 2. LISTINGS AND APPROVALS



**cULus Listed:** Category VNIV



**FM Approval:** Class 2015

**NYC Approved:** MEA 89-92-E, Volume 32



**VdS Approved:** Certificate G4080021



**LPCB Approved:** Certificate number 096e/12



**CE Certified:** Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40249



**CCCF Approved:** Approved by the China Certification Center for Fire Products (CCCF)



**MED Certified:** Standard EN 12259-1, EC-certificate 0832-MED-1003

Refer to Approval Chart 1 Design Criteria for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page for FM Approval requirements that must be followed.

### 3. TECHNICAL DATA

#### Specifications:

Available since 2006.

Minimum Operating Pressure: 7 psi (0.5 bar)\*

**Maximum Working Pressure:** Sprinkler VK463 is rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17.2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. Sprinkler VK462 is rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 5.6 U.S. (80.6 metric†)

Glass-bulb fluid temperature rated to -65°F (-55°C)

Patents Pending

\*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

†Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

#### Material Standards:

Sprinkler Body: Brass UNS-C84400

Deflector: Copper UNS-C19500 for Sprinkler VK462

Phosphor Bronze UNS-C51000 for Sprinkler VK463

Deflector Pins: Stainless Steel Alloy

Bulb: Glass, nominal 3 mm diameter



## TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Button: Brass UNS-C36000

Screws: 18-8 Stainless Steel

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Yoke: Phosphor Bronze UNS-C51000

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

### Cover Assembly Materials:

Cover: Copper UNS-C11000 or Stainless Steel UNS-S30400

Base: Brass UNS-C26000 or UNS-C26800

Springs: Nickel Alloy

Solder: Eutectic

**Ordering Information:** (Also refer to the current Viking price list.)

Viking Mirage® Standard and Quick Response Concealed Pendent Sprinklers and Cover Plate Assemblies must be ordered separately:

**Sprinkler:** Base Part No. VK462 - 13503A for Brass finish and 13503JN for ENT finish. VK463 - HP Base Part No. 13667A

Specify sprinkler temperature rating by adding the appropriate suffix for the temperature rating to the base part number:

Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E

For example, sprinkler VK463 with a 155 °F (68 °C) temperature rating = 13667AB.

**Standard Cover Plate Assembly:** Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16")

Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:

Finish Suffix: Polished Chrome = F, Brushed Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B

Temperature Suffix: 135 °F (57 °C) UL (139 °F (59 °C) FM and LPCB) = A, 165 °F (74 °C) = C

For example, cover 13504 with a Polished Chrome finish and a 165 °F (74 °C) temperature rating = 13504FC.

**Stainless Steel Cover Plates (not available with any finish or paint):** Base Part No. 21876 (2-3/4" diameter) or Base Part No. 21875 (3-5/16" diameter).

Temperature Suffix: 135 °F (57 °C) UL (139 °F (59 °C) FM and LPCB) = A, 165 °F (74 °C) = C

For example, cover 21876 with a 165 °F (74 °C) temperature rating = 21876C

**NOTE:** The cULus Listings for the square cover plate 15394 are for the 135 °F (57 °C) temperature rated cover plate only. Refer to the Approval Chart.

**Available Finishes And Temperature Ratings:** Refer to Table 1.

**Accessories:** (Also refer to the Viking website.)

### Sprinkler Wrenches\*\*:

A. Heavy Duty Wrench Part No. 14047W/B (available since 2006), or

B. Head Cabinet Wrench Part No. 14031\*\*\* (available since 2006)

C. Optional Concealed Cover Plate Installer Tool Part No. 14412 for cover 13504, or Part No. 14867 for the large diameter cover (available since 2007)

\*\*Requires a 1/2" ratchet (not available from Viking). \*\*\*Optional for removal of the protective cap. Ideal for sprinkler cabinets.

**Sprinkler Cabinet:** Part No. 01731A (available since 1971)

## 4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

## 5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, pip-cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

## 6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

## 7. AVAILABILITY

Viking Sprinklers VK462 and VK463 are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

## 8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



## TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

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 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
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**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Temperature Rating of Cover Assembly (Required)	Cover Plate Base Part Number <sup>3</sup>	Large Cover Plate Base Part Number <sup>3</sup>	Square Cover Plate Base Part Number <sup>3</sup>	Bulb Color
Ordinary	155 °F (68° C)	100 °F (38 °C)	135 °F (57 °C) cULus	13504 or 21876 <sup>5</sup>	13642 or 21875 <sup>5</sup>	15394	Red
			139 °F (59 °C) FM and LPCB				
Intermediate	175 °F (79° C)	150 °F (65° C)	165 °F (74 °C)	13504 or 21876 <sup>5</sup>	13642 or 21875 <sup>5</sup>	15394	Yellow
Intermediate	200 °F (93° C)	150 °F (65° C)	165 °F (74 °C)	13504 or 21876 <sup>5</sup>	13642 or 21875 <sup>5</sup>	15394	Green

**Cover Plate Finishes<sup>5</sup>:** Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

**Sprinkler Finishes:** Brass and ENT

**Corrosion Resistant Coatings<sup>4</sup>:** ENT

### Footnotes

<sup>1</sup> The sprinkler temperature rating is stamped on the sprinkler deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

<sup>3</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

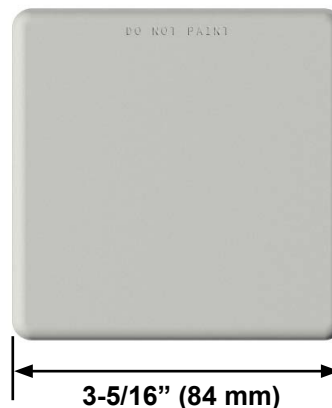
<sup>4</sup> The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway, but the Belleville spring is exposed.

<sup>5</sup> Stainless Steel versions are not available with any finishes or paint.



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

**Figure 1: Identification of Custom Paint for Concealed Covers**



**Figure 2: Square Cover Assembly 15394**



# TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 1 (UL)													
Mirage® Concealed Pendent Sprinklers VK462 and VK463													
<div><div><div>Sprinkler Temperature Rating</div><div>Cover Plate Temperature Rating</div><div>AW14 Cover Plate Finish</div><div>KEY</div></div></div>													
Sprinkler Base Part No. <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Listings and Approvals <sup>4</sup> (Refer also to Design Criteria)						
		Inch	mm	U.S.	metric <sup>2</sup>		cULus <sup>5</sup>	NYC	VdS <sup>7</sup>	LPCB	CE	12	CCC <sup>8</sup>
Standard Response Applications													
13503A	VK462	1/2"	--	5.6	80.6	175 psi (12 bar)	--	--	AY1, CZ1	AY1, BZ1	AY1, CZ1 <sup>8</sup>	AY3	--
19785A	VK462	1/2"	--	5.6	80.6	175 psi (12 bar)	--	--	--	--	--	--	AY2, CZ2
21356A	VK462	--	15	5.6	80.6	175 psi (12 bar)	--	--	--	--	--	--	AY2, CZ2
Quick Response Applications													
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AV1, BX1, AS3, BT3	AV1, BX1 <sup>6</sup>	--	--	--	AY3	--
13503JN <sup>11</sup>	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AV1, BX1, AS3, BT3	AV1, BX1 <sup>6</sup>	--	--	--	--	--
13667A	VK463	1/2"	15	5.6	80.6	250 psi (17.2 bar) <sup>3</sup>	AV1, BX1	AV1, BX1 <sup>6</sup>	--	--	--	--	--
Sprinkler Temperature Ratings		Cover Plate Assembly Temperature Ratings <sup>1,9</sup>						Cover Plate Assembly Finishes <sup>10</sup>					
A - 155 °F (68 °C)		S - 135 °F (57 °C) cover 21876 or 21875 (large diameter)						1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique					
B - 175 °F (79 °C) and 200 °F (93 °C)		T - 165 °F (74 °C) cover 21876 or 21875 (large diameter)						Brass, Brushed Brass, Brushed Copper, Painted White,					
C - 200 °F (93 °C)		V - 135 °F (57 °C) cULus Listed cover 13504, 13642 (large diameter), or 15394 (square cover plate)						Painted Ivory, or Painted Black					
		X - 165 °F (74 °C) cover 13504, or 13642 (large diameter)						2 - Brass					
		Y - 135 °F (57 °C) cover 13504 <i>LPCB Approved as 139 °F (59 °C)</i>						3 - Stainless Steel					
		Z - 165 °F (74 °C) cover 13504											
Footnotes													
<sup>1</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.													
<sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.													
<sup>3</sup> The Water Working Pressure rating is stamped on the deflector.													
<sup>4</sup> This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.													
<sup>5</sup> Listed by Underwriter's Laboratories for use in the U.S. and Canada.													
<sup>6</sup> Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 32.													
<sup>7</sup> VdS Approved, standards VdS 2344:2005-12, VdS 2100-25:2008-01, and EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006, Certificate G4080021.													
<sup>8</sup> CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40249.													
<sup>9</sup> The 135/139 °F cover has an orange label. The 165 °F (74 °C) cover has a white label.													
<sup>10</sup> Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.													
<sup>11</sup> cULus Listed as corrosion resistant.													
<sup>12</sup> MED Certified, Standard 12259-1, EC-certificate 0832-MED-1003.													
<b>NOTE:</b> Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.													





## TECHNICAL DATA

### MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

#### DESIGN CRITERIA - UL

(Also refer to Approval Chart 1)

##### cULus Listing Requirements:

Mirage® Concealed Pendent Sprinklers VK462 and VK463 are cULus Listed as quick response for installation in accordance with the latest edition of NFPA 13 for standard coverage pendent spray sprinklers as indicated below.

- For hazard occupancies up to and including Ordinary Hazard, Group II.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13. Maximum spacing allowed is 15 ft. (4.6 m).
- Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler obstruction rules contained in NFPA 13 for standard coverage pendent spray sprinklers must be followed.

**NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.**

##### VdS Approval Requirements:

- a) The sprinkler can be installed in a concrete ceiling (massive ceiling) or in a false ceiling made of light materials.
- b) This sprinkler is deflector fixed type and can be only activated by heat. The housing is not tight.
- c) Follow installation guidelines of current standards, CEA4001VdS and EN12845. These sprinklers can only be installed in LH and OH occupancies, except in OH4.

**NOTES:** Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which the false ceiling space is protected by a water extinguishing system.

Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which during a fire the pressure above the false ceiling may be assumed to be higher than the pressure below the false ceiling.

The criterion for the dropping of the cover relevant for this approval is heat.

Steps of installation:

1. Prepare the sprinkler key.
2. Remove the plastic cover.
3. Hold the sprinkler with the wrench and fasten it.
4. Replace the plastic cover and do not remove until the cover is installed.

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to Form No. F\_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.**



## TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 2 (FM)							<div><div><div>Sprinkler Temperature Rating</div><div>Cover Plate Temperature Rating</div><div>AW1←Cover Plate Finish</div><div>KEY</div></div></div>
Mirage® Standard Response Concealed Pendent Sprinkler VK462							
Sprinkler Base Part No. <sup>1</sup>	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	FM Approvals <sup>3</sup> (Refer also to Design Criteria below.)
		Inch	mm	U.S.	metric <sup>2</sup>		
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AW1, BX1, AY2, BZ2
Sprinkler Temperature Ratings A - 155 °F (68 °C) B - 175 °F (79 °C) and 200 °F (93 °C)		Cover Plate Assembly Temperature Ratings <sup>1, 4</sup> Y - 139 °F (59 °C) cover 21875 or 21876 Z - 165 °F (74 °C) cover 21875 or 21876 W - 139 °F (59 °C) cover 13504, 13642 (large diameter), or 15394 (square cover plate) X - 165 °F (74 °C) cover 13504, 13642 (large diameter), or 15394 (square cover plate)				Cover Plate Assembly Finishes <sup>5</sup> 1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black 2 - Stainless Steel	
Footnotes							
<sup>1</sup> Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.							
<sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.							
<sup>3</sup> This chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.							
<sup>4</sup> The 139 °F (59 °C) cover has an orange label. The 165 °F (74 °C) cover has a white label.							
<sup>5</sup> Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.							
NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.							

### DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

#### FM Approval Requirements:

Viking Concealed Pendent Sprinkler VK462 is FM Approved as a standard response **Non-Storage** concealed pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

**NOTE:** The FM installation guidelines may differ from cULus and/or NFPA criteria.

**IMPORTANT:** Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to Form No. F\_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



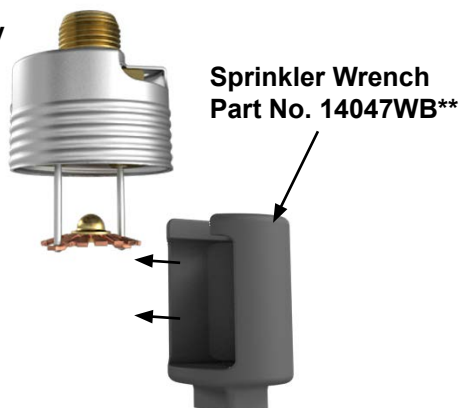
# TECHNICAL DATA

## MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

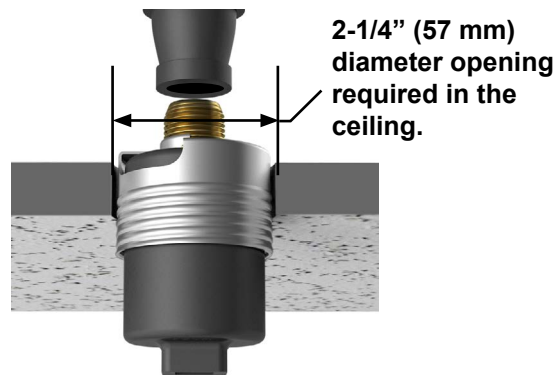
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

### Sprinkler and Adapter Assembly

- Protective cap removed
- Use wrench 14047WB\*\*

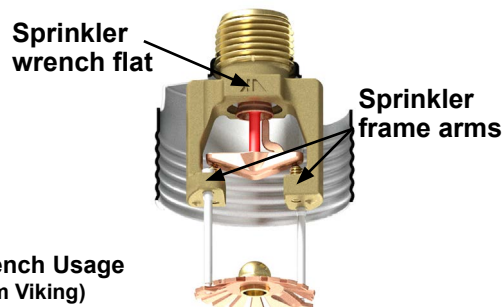


**Step 1:**  
Carefully slide the  
wrench sideways around  
the deflector and pins

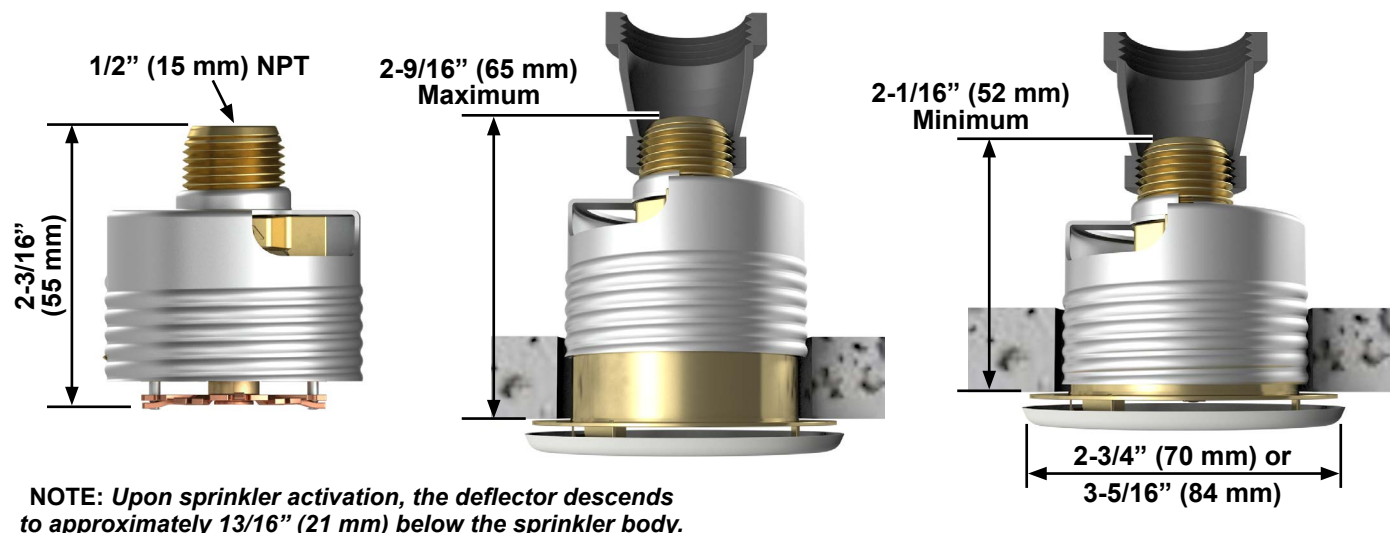


**Step 2:**  
Carefully press the wrench upward and  
turn slightly to ensure engagement with  
the sprinkler wrench flats.

**NEVER** install the sprinkler by applying the installation wrench across the frame arms. **DO NOT** overtighten. Use only the designated sprinkler wrenches, Viking Part Numbers 14047WB\*\* or 14031\*\*. A leak tight seal should be achieved by turning the sprinkler clockwise 1 to 1-1/2 turns beyond finger tight.



**Figure 3: Sprinkler Installation and Proper Wrench Usage**  
 \*\* A 1/2" ratchet is required (Not available from Viking)



**Figure 4: Sprinkler Dimensions and Cover Installation**

	<h1 style="text-align: center;">TECHNICAL DATA</h1>	<h2 style="text-align: center;">MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS</h2>
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## 1. PRODUCT NAME

### MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

†The Sprinkler Identification Number (SIN) is stamped on the sprinkler deflector.

## 2. MANUFACTURER

THE VIKING CORPORATION  
210 N. Industrial Park Road  
Hastings, Michigan 49058, U.S.A.  
Telephone: (269) 945-9501  
**Technical Services:** (877) 384-5464  
Fax: (269) 945-9599  
e-mail: techsvcs@vikingcorp.com



## 3. PRODUCT DESCRIPTION

Viking Microfast® and MicrofastHP® Quick Response Upright and Conventional (Old Style) Sprinklers are small thermosensitive glass bulb spray sprinklers available in various finishes, temperature ratings, and orifice sizes to meet design requirements. The special Poly finishes and Teflon® coatings can be used in decorative applications where colors are desired. In addition, these finishes have been investigated for installation in corrosive atmospheres and are cULus listed as corrosion resistant as indicated in the Approval Chart. (Note: FM Global has no approval classification for Teflon® and Poly finishes as corrosion resistant.)

The pip cap and sealing assembly of the sprinkler are held in place by the glass bulb operating element. During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the bulb to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

## 4. TECHNICAL DATA

### LISTINGS AND APPROVALS

**cULus Listed:** Category VNIV

**FM Approved:** Class 2020

Refer the Approval Chart on page 51 c and Design Criteria on page 51 d for cULus and FM approval requirements that must be followed.

### CHARACTERISTICS

- Minimum Operating Pressure: 7 psi (0,5 bar)
- **Maximum Working Pressure: Sprinklers VK315 and VK340 are rated for use with water working pressures ranging from the minimum 7 psi (0,5 bar) up to 250 psi (17,2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. All other Part Nos. not mentioned above are rated to a maximum 175 psi (12 bar) wwp.**
- Factory tested hydrostatically to 500 psi (34,5 bar)
- Testing: U.S.A. Patent No. 4,831,870
- Thread size: Refer to the Approval Chart
- Nominal K-Factor: Refer to the Approval Chart
- Glass-bulb fluid temperature rated to -65 °F (-55 °C)
- Overall Length: Refer to the Approval Chart

### MATERIALS

Frame Casting: Brass UNS-C84400

Deflector: Copper UNS-C19500 for Sprinklers 06661B, 06665B, 06764B, 07060, and 12281. Brass UNS-C26000 for all other Sprinklers.

Note: Units of measure in parentheses may be approximations.

Form No. F\_080488

Replaces page 51 a-b, dated November 18, 2005 (Reformatted, added 135 °F temperature rating, and added CE approval for sprinklers 06665B and 06768B.)

<b>VIKING®</b>	<b>TECHNICAL DATA</b>	<b>MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS</b>
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**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

**Sprinkler Finishes:** Brass, Chrome-Enloy®, White Polyester (White Poly finish for Sprinklers 06661B, 06665B, 06764B, 07060, and 12281), Black Polyester (Black Poly finish for Sprinkler 06661B), and Black Teflon®

**Corrosion-Resistant Coatings<sup>3</sup>:** White Polyester (White Poly finish for Sprinklers 06661B, 06665B, 06764B, 07060, and 12281), Black Polyester (Black Poly finish for Sprinkler 06661B), and Black Teflon®

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

<sup>3</sup> The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated on page 51 c. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Poly finishes and Teflon® coatings.

Bushing (for Sprinklers 06719B, 06717B, and 12286): Brass UNS-C36000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Teflon® Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-Teflon® Coated

For Poly Coated Sprinklers: Belleville Spring-Exposed

**AVAILABLE FINISHES AND TEMPERATURE RATINGS:** Refer to Table 1 above.

## 5. ORDERING INSTRUCTIONS (Also refer to the current Viking price list.)

Order Microfast® Quick Response Upright and Conventional Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to sprinkler base part number.

Finish Suffix: Brass = A, Chrome-Enloy® = F, White Poly Finish = M-/W, Black Poly Finish = M-/B, and Black Teflon® = N

Temperature Suffix (°F/°C): 135°/68° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, Sprinkler VK300 with a 1/2" thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 06661BAB.

**ACCESSORIES** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

### Sprinkler Wrench:

A. Standard Wrench: Part No. 10896W/B (available since 2000).

### Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

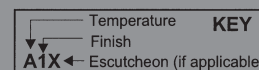


# TECHNICAL DATA

## MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

### Approval Chart

Micromatic® and MicromaticHP® Quick Response  
Upright and Conventional Sprinklers  
Maximum 175 PSI (12,1 bar) WWP



Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 51 d.)							
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	FM <sup>6</sup>	NYC <sup>7</sup>	VdS	LPCB	CE	⚙	
		Upright-Standard Orifice													
06661B	VK300	1/2"	15 mm	5.6	80,6	2-3/16	56	A6	A7	A6	--	--	--	--	
07060	VK345	--	15 mm	5.6	80,6	2-3/16	56	--	A3	--	D1	A7 <sup>11</sup>	B7 <sup>11</sup>	B7 <sup>13</sup>	
Conventional-Standard Orifice															
06766B	VK310	1/2"	15 mm	5.6	80,6	2-3/16	56	A5	--	A5	--	A5 <sup>11</sup>	B5 <sup>11</sup>	B5 <sup>15</sup>	
Upright-Large Orifice															
06665B	VK350	3/4"	15 mm	8.0	115,2	2-5/16	59	A4	A3	A4	D1	--	C5 <sup>11</sup>	--	
06764B	VK350	1/2"	15 mm	8.0	115,2	2-5/16	59	A4	--	A4	--	--	--	--	
Conventional-Large Orifice															
06768B	VK354	3/4"	20 mm	8.0	115,2	2-5/16	59	A5	--	A5	--	--	C5 <sup>11</sup>	--	
Upright-Small Orifice <sup>9</sup>															
06717B <sup>10</sup>	VK325	1/2"	15 mm	2.8	40,3	2-3/16	56	A2	A1	A2	--	--	--	--	
06719B <sup>10</sup>	VK327	1/2"	15 mm	4.2	60,5	2-3/16	56	A2	--	A2	--	--	--	--	
06931B <sup>10</sup>	VK327	--	10 mm	4.2	60.5	2-3/16	56	--	--	--	D1	--	D1 <sup>12</sup>	--	

Maximum 250 PSI (17,2 bar) WWP

#### Upright-Standard Orifice

Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 51 d.)						
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	FM	NYC <sup>8</sup>	VdS	LPCB	CE	⚙
12281	VK315	1/2"	15 mm	5.6	80,6	2-3/16	56	A2	--	A2	--	--	--	--
<b>Upright-Small Orifice<sup>9</sup></b>														
12286 <sup>10</sup>	VK340	1/2"	15 mm	2.8	40,3	2-3/16	56	A2	--	A2	--	--	--	--

#### Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)  
 B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)  
 C - 155 °F (68 °C), 175 °F (79 °C), and 286 °F (141 °C)  
 D - 155 °F (68 °C)

#### Approved Finishes

- 1 - Brass and Chrome-Enloy®
- 2 - Brass, Chrome-Enloy®, White Polyester<sup>5</sup>, Black Polyester<sup>5</sup>, and Black Teflon®<sup>5</sup>
- 3 - Brass, Chrome-Enloy®, and White Poly Finish
- 4 - Brass, Chrome-Enloy®, White Poly Finish<sup>5</sup>, Black Polyester<sup>5</sup>, and Black Teflon®<sup>5</sup>
- 5 - Brass, Chrome-Enloy®, White Polyester<sup>5</sup>, and Black Polyester<sup>5</sup>
- 6 - Brass, Chrome-Enloy®, White Poly Finish<sup>5</sup>, Black Poly Finish<sup>5</sup>, and Black Teflon®<sup>5</sup>
- 7 - Brass, Chrome-Enloy®, White Poly Finish, and Black Poly Finish

#### Footnotes

- <sup>1</sup> Base part number is shown. For complete part number, refer to Viking's current price schedule.
- <sup>2</sup> Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- <sup>3</sup> This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
- <sup>4</sup> Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
- <sup>5</sup> cULus Listed as corrosion resistant.
- <sup>6</sup> FM Approved for use only in wet-pipe sprinkler systems (or preaction systems qualifying as wet systems) for protection of occupancies described in the Factory Mutual Engineering and Research Loss Prevention Data Sheets and Technical Advisory Bulletins
- <sup>7</sup> Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA.
- <sup>8</sup> Accepted for use, City of New York Department of Buildings, MEA 89-92-E, Vol. 16.
- <sup>9</sup> Listings and Approvals limited to Light Hazard Occupancies where allowed by the installation standards being applied, with hydraulically calculated wet systems only.
- <sup>10</sup> The sprinkler orifice is bushed.
- <sup>11</sup> CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003.
- <sup>12</sup> CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40131.
- <sup>13</sup> MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.





## TECHNICAL DATA

### MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

#### DESIGN CRITERIA

(Also refer to the Approval Chart on page 51 c.)

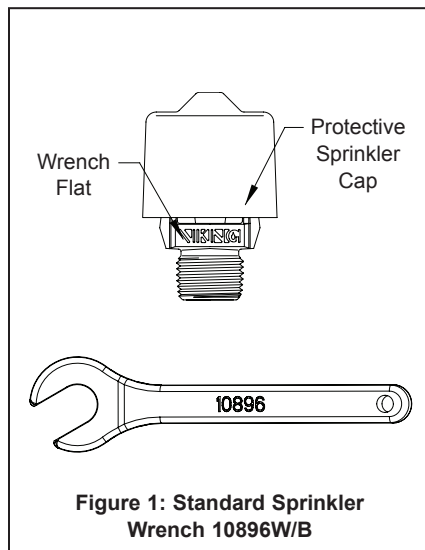
**cULus Listing Requirements:** Quick Response Upright and Conventional Sprinklers are cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers, or old style (conventional) sprinklers..

- Designed for use in Light and Ordinary Hazard occupancies (*exception: small orifice sprinklers are limited to Light Hazard where allowed by the installation standards being applied, with hydraulically calculated wet systems only*).
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed. For conventional sprinklers, refer to the installation guidelines for old style (conventional) sprinklers.

**FM Approval Requirements:** Quick Response Upright Sprinklers are FM Approved as indicated in the Approval Chart for use only in wet-pipe sprinkler systems (or preaction systems qualifying as wet systems). For installation in accordance with the latest applicable FM Loss Prevention Data Sheets and Technical Advisory Bulletins. FM Global Loss Prevention Data Sheets and Technical Advisory Bulletins contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

**NOTE:** The FM installation guidelines may differ from cULus and/or NFPA criteria.

**IMPORTANT:** Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to page QR1-2 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, Assemblée Plénier, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



	<h1>TECHNICAL DATA</h1>	<h2>MICROFAST® AND MicrofastHP® QUICK RESPONSE PENDENT SPRINKLERS</h2>
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## 1. PRODUCT NAME

### MICROFAST® AND MicrofastHP® QUICK RESPONSE PENDENT SPRINKLERS

†The Sprinkler Identification Number (SIN) is stamped on the sprinkler deflector.

## 2. MANUFACTURER

THE VIKING CORPORATION  
210 N. Industrial Park Road  
Hastings, Michigan 49058, U.S.A.  
Telephone: (269) 945-9501  
**Technical Services:** (877) 384-5464  
Fax: (269) 945-9599  
e-mail: techsvcs@vikingcorp.com



## 3. PRODUCT DESCRIPTION

Viking Microfast® and MicrofastHP® Quick Response Pendent Sprinklers are small thermosensitive glass bulb spray sprinklers available in various finishes, temperature ratings, and orifice sizes to meet design requirements. The special Poly finishes and Teflon® coatings can be used in decorative applications where colors are desired. In addition, these finishes have been investigated for installation in corrosive atmospheres and are cULus listed as corrosion resistant as indicated in the Approval Chart. (Note: FM Global has no approval classification for Teflon® and Poly finishes as corrosion resistant.)

The pip cap and sealing assembly of the sprinkler are held in place by the glass bulb operating element. During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the bulb to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

## 4. TECHNICAL DATA

### LISTINGS AND APPROVALS

**cULus Listed:** Category VNIV

**FM Approved:** Class 2020

Refer the Approval Chart on page 41 c and Design Criteria on page 41 d for cULus and FM approval requirements that must be followed.

### CHARACTERISTICS

- Minimum Operating Pressure: 7 psi (0,5 bar)
- **Maximum Working Pressure: Sprinklers 12282 and 12290 are rated for use with water working pressures ranging from the minimum 7 psi (0,5 bar) up to 250 psi (17,2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. All other Part Nos. not mentioned above are rated to a maximum 175 psi (12 bar) wwp.**
- Factory tested hydrostatically to 500 psi (34,5 bar)
- Testing: U.S.A. Patent No. 4,831,870
- Thread size: Refer to the Approval Chart
- Nominal K-Factor: Refer to the Approval Chart
- Glass-bulb fluid temperature rated to -65 °F (-55 °C)
- Overall Length: Refer to the Approval Chart

### MATERIALS

Frame Casting: Brass UNS-C84400

Deflector: Brass UNS-C51000 or Copper UNS-C19500 for Sprinklers 06662B, 06666B, 06765B, and 12104. Copper UNS-C19500 for Sprinkler 12282. Brass UNS-C26000 for all other Sprinklers.

Bushing (for Sprinklers 06718B, 06720B, and 12290): Brass UNS-C36000



	<b>TECHNICAL DATA</b>	<b>MICROFAST® AND MicrofastHP® QUICK RESPONSE PENDENT SPRINKLERS</b>
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**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

**Sprinkler Finishes:** Brass, Chrome-Enloy®, White Polyester (White Poly finish for Sprinkler 06662B), Black Polyester (Black Poly finish for Sprinkler 06662B), and Black Teflon®

**Corrosion-Resistant Coatings<sup>3</sup>:** White Polyester (White Poly finish for Sprinkler 06662B only), Black Polyester (Black Poly finish for Sprinkler 06662B), and Black Teflon®

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

<sup>3</sup> The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated on page 41 c. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Poly finishes and Teflon® coatings.

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Pip Cap Attachment: Brass UNS-C36000

Ejector Spring (for Sprinkler 12104): Stainless Steel

For Teflon® Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-Teflon® Coated

For Poly Coated Sprinklers: Belleville Spring-Exposed

**AVAILABLE FINISHES AND TEMPERATURE RATINGS:** Refer to Table 1 above.

## 5. ORDERING INSTRUCTIONS (Also refer to the current Viking price list.)

Order Microfast® Quick Response Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to sprinkler base part number.

Finish Suffix: Brass = A, Chrome-Enloy® = F, White Poly Finish = M-/W, Black Poly Finish = M-/B, and Black Teflon® = N

Temperature Suffix (°F/°C): 135°/68° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, Sprinkler VK302 with a 1/2" thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 06662BAB.

**ACCESSORIES** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

### Sprinkler Wrenches:

A. Standard Wrench: Part No. 10896W/B (available since 2000).

B. Wrench for coated and/or recessed sprinklers: Part No. 12144W/B\*\* (available since 2003)

**NOTE: Recessed pendent sprinklers with protective caps must use wrench 12144W/B.**

\*\*A ½" ratchet is required (not available from Viking).

### Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

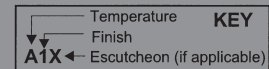



## TECHNICAL DATA

**MICROFAST® AND  
MicrofastHP®  
QUICK RESPONSE  
PENDENT SPRINKLERS**

## Approval Chart

**Microfast® and MicrofastHP® Quick Response Pendent Sprinklers**  
**Maximum 175 PSI (12,1 bar) WWP**



Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 41 d.)							
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	FM <sup>5</sup>	NYC <sup>6</sup>	VdS	LPCB	CE		
Standard Orifice															
06662B	VK302	1/2"	15 mm	5.6	80,6	2-1/4	58	A1X, B1Y	A4X, B4Y	A1X, B1Y	F2	A4X	C4X, D4Y <sup>12</sup>	C4X, D4Y <sup>14</sup>	
Large Orifice															
06666B	VK352	3/4"	20 mm	8.0	115,2	2-3/8	60	A3X, B3Y	A2X, B2Y	A3X, B3Y	--	--	E4 <sup>12</sup>	--	
12104	VK352	3/4"	20 mm	8.0	115,2	2-1/4	58	--	--	--	F2	--	--	--	
06765B	VK352	1/2"	15 mm	8.0	115,2	2-3/8	60	A3X, B3Y	--	A3X, B3Y	--	--	--	--	
Small Orifice <sup>8</sup>															
06718B <sup>9</sup>	VK329	1/2"	15 mm	2.8	40,3	2-3/16	56	A3X, B3Y	A2X	A3X, B3Y	--	--	--	--	
06720B <sup>9</sup>	VK331	1/2"	15 mm	4.2	60,5	2-1/4	58	A3X, B3Y	--	A3X, B3Y	--	--	--	--	
06932B	VK331	--	10 mm	4.2	60,5	2-3/8	60	--	--	--	F2	--	F2 <sup>13</sup>	--	

**Maximum 250 PSI (17,2 bar) WWP**

### Standard Orifice

Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup> (Refer also to Design Criteria on page 41 d.)						
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	FM	NYC <sup>10</sup>	VdS	LPCB	CE	UL
12282	VK317	1/2"	15 mm	5.6	80.6	2-1/4	58	A3X, B3Y	--	A3X	--	--	--	--

**Maximum 250 PSI (17,2 bar) WWP**

### Small Orifice<sup>8</sup>

12290 <sup>9</sup>	VK342	1/2"	15 mm	2.8	40,3	2-3/16	56	A3X, B3Y	--	A3X	--	--	--	--
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## Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)  
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)  
 C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)  
 D - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)  
 E - 155 °F (68 °C), 175 °F (79 °C), and 286 °F (141 °C)  
 F - 155 °F (68 °C)

### Approved Finishes



- 1 - Brass, Chrome-Enloy®<sup>7</sup>, White Poly Finish<sup>7</sup>, Black Poly Finish<sup>7</sup>, and Black Teflon®<sup>7</sup>
- 2 - Brass and Chrome-Enloy®
- 3 - Brass, Chrome-Enloy®<sup>7</sup>, White Polyester<sup>7</sup>, Black Polyester<sup>7</sup>, and Black Teflon®<sup>7</sup>
- 4 - Brass, Chrome-Enloy®<sup>7</sup>, White Poly Finish, and Black Poly Finish

### Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon<sup>11</sup>

Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon<sup>11</sup> **or** recessed with the Viking Micro-matic® Model E-1 or E-2 Recessed Escutcheon

## Footnotes

- <sup>1</sup> Base part number is shown. For complete part number, refer to Viking's current price schedule.
- <sup>2</sup> Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- <sup>3</sup> This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
- <sup>4</sup> Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
- <sup>5</sup> FM Approved for use only in wet-pipe sprinkler systems (or preaction systems qualifying as wet systems) for protection of occupancies described in the Factory Mutual Engineering and Research Loss Prevention Data Sheets and Technical Advisory Bulletins.
- <sup>6</sup> Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA.
- <sup>7</sup> cULus Listed as corrosion resistant.
- <sup>8</sup> Listings and Approvals limited to Light Hazard Occupancies where allowed by the installation standards being applied, with hydraulically calculated wet systems only.
- <sup>9</sup> The sprinkler orifice is bushed.
- <sup>10</sup> Accepted for use, City of New York Department of Buildings, MEA 89-92-E, Vol XVI.
- <sup>11</sup> The Viking Microfast® Model F-1 Adjustable Escutcheon is considered a surface-mounted escutcheon because it does not allow the fusible element of the sprinkler to be recessed behind the face of the wall or ceiling.
- <sup>12</sup>  Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003.
- <sup>13</sup>  Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40130.
- <sup>14</sup>  MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.



## TECHNICAL DATA

### MICROFAST® AND MicrofastHP® QUICK RESPONSE PENDENT SPRINKLERS

#### DESIGN CRITERIA

(Also refer to the Approval Chart on page 41 c.)

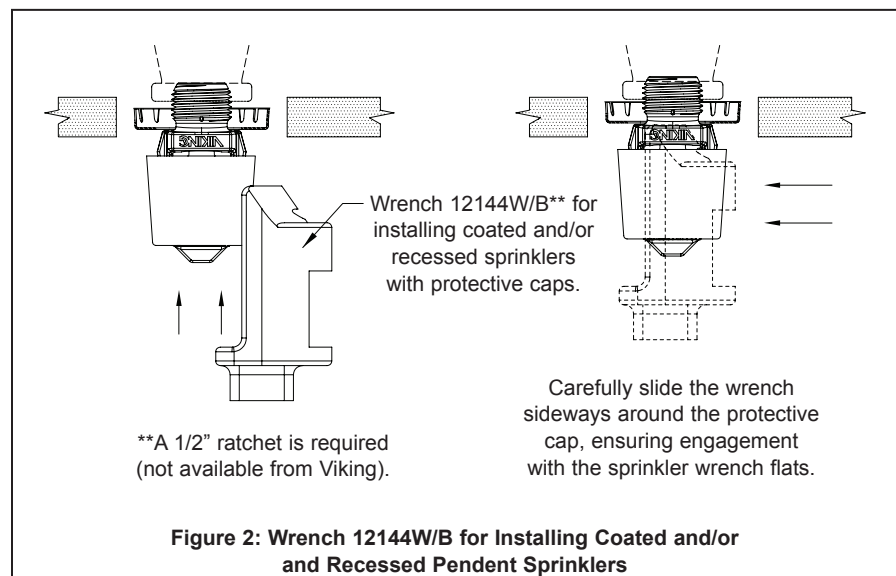
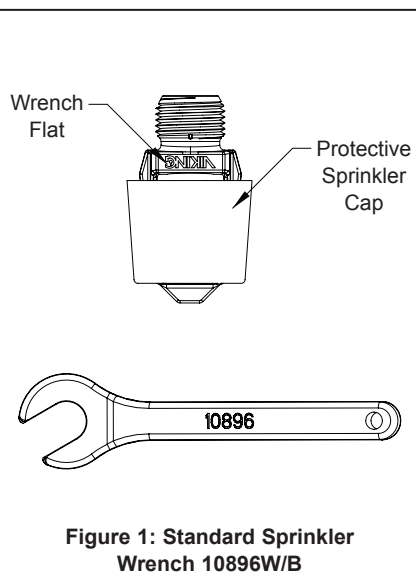
**cULus Listing Requirements:** Quick Response Pendent Sprinklers are cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies (*exception: small orifice sprinklers are limited to Light Hazard where allowed by the installation standards being applied, with hydraulically calculated wet systems only*).
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

**FM Approval Requirements:** Quick Response Pendent Sprinklers are FM Approved as indicated in the Approval Chart for use only in wet-pipe sprinkler systems (or preaction systems qualifying as wet systems). For installation in accordance with the latest applicable FM Loss Prevention Data Sheets and Technical Advisory Bulletins. FM Global Loss Prevention Data Sheets and Technical Advisory Bulletins contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

**NOTE:** The FM installation guidelines may differ from cULus and/or NFPA criteria.

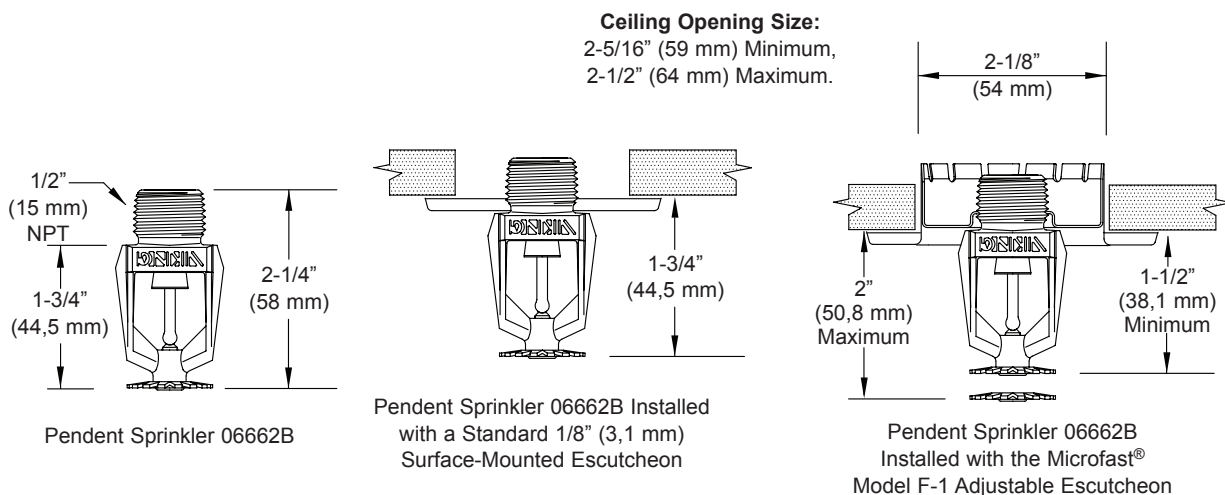
**IMPORTANT:** Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to page QR1-2 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, Assemblée Plénière, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



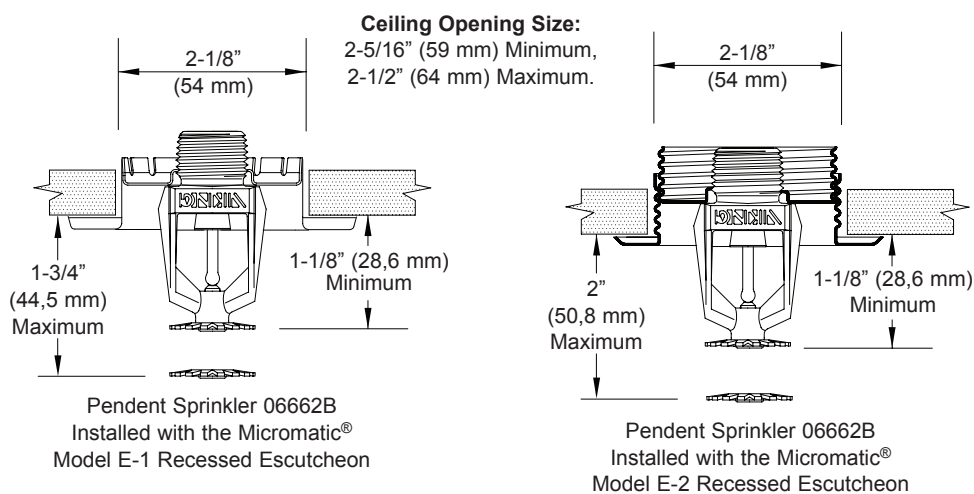


# TECHNICAL DATA

## MICROFAST® AND MicrofastHP® QUICK RESPONSE PENDENT SPRINKLERS



**Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon**



**Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons**

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# Grooved Piping System

The only system that provides the option of rigidity or flexibility

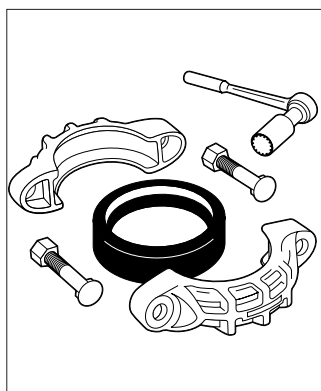
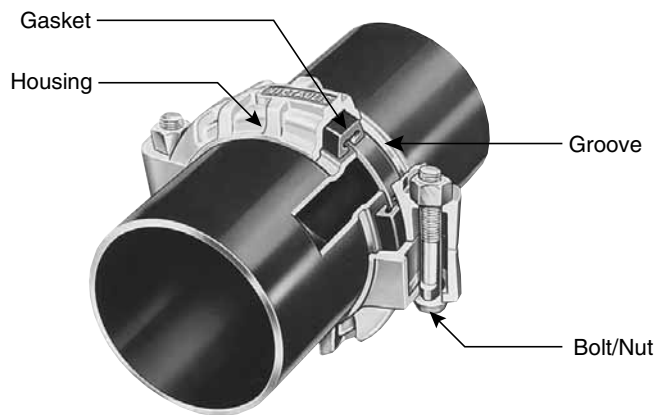
## PRODUCT DESCRIPTION

The Victaulic grooved piping system is the most versatile, economical and reliable piping system available. It is up to three times faster to install than welding, easier and more reliable than threading or flanging, resulting in lowest total installed cost.

The system is designed for roll grooved or cut grooved standard pipe or roll grooved light wall pipe. Pipe end preparation is fast and easy either in the shop or on the job site with a variety of Victaulic grooving tools available.

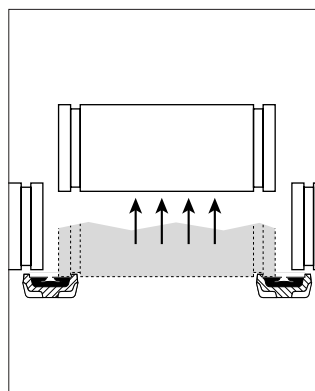
In addition to speed and ease of assembly, the Victaulic system offers varied mechanical benefits to the designer, installer and owner. With the introduction of Zero-Flex® rigid couplings, the option of flexibility or rigidity adds to the design versatility. Flexible and rigid couplings can be incorporated as needed in any system to take full advantage of the characteristics of each.

Victaulic also offers the Advanced Groove System (AGS) for 14 – 24" (350 – 600 mm) sizes.



### Installed cost savings from 10% to 30%

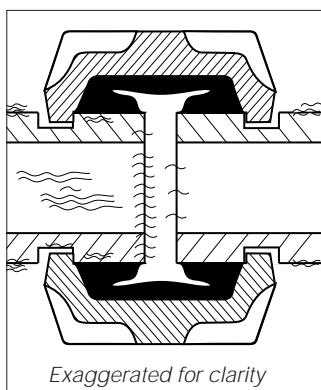
- Minimal equipment investment
- Fast assembly in tight places
- Clean system. . . no pipe dope or welding slag to contaminate pipes
- Costs are more predictable. . . estimates more accurate



### Each joint is a union

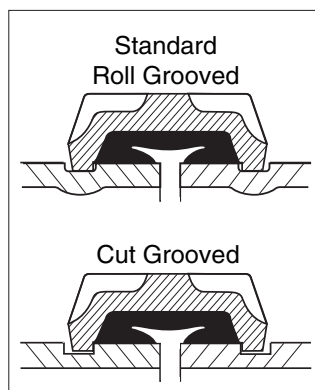
- Removal of two couplings permits removal of pipe section for cleaning or servicing
- Easy future add-on, change or renovation of pipe to distribute internal wear from abrasives or slurries

**• WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.**



### Proven joint reliability

- Full circumferential engagement of housing into groove provides end pull strength
- Couplings available for working pressures to 2,500 psi (17,235 kPa). . . vacuum services to 29.9" Hg



### For roll or cut grooved pipe

- Victaulic tools permit roll grooving standard steel pipe up to 42" (1050 mm) in 0.375" (9.5 mm) wall thicknesses
- Couplings fit either roll or cut grooved pipe
- Roll grooving permits use on pipe from Schedule 5 to Schedule 40
- Pipe of different wall thickness and material can be connected directly and intermixed

## RIGID SYSTEMS

Zero-Flex Style 07 and Transition Style 307 Rigid Couplings have a unique, patented angle pad design which constricts the housing keys into the groove around the full circumference to grip the pipe rigidly. The housings slide on the angled pads rather than mating squarely.

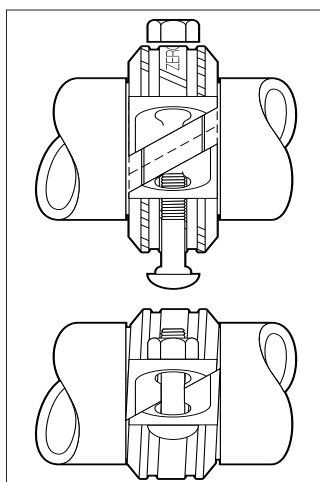
This sliding adjustment also forces the key sections into opposed contact on the inside and the outside groove edges, pushing the joint to its maximum pipe end separation (see chart below) during assembly.

These rigid couplings provide a rigid joint allowing no expansion/contraction or linear movement. Couplings will push the pipe ends to their maximum allowable separation which must be considered during assembly.

Rigid couplings (Styles 07, W07, 89, 489, 307, HP-70, 741, W741 and others) create a rigid joint, useful for risers, mechanical rooms and other areas where flexibility is not desired. Zero-Flex Style 07 and Style W07 AGS couplings are designed to provide rigidity to permit hanging to ASME B31.1 Power Piping Code and ASME B31.9 Building Services Piping Code.

### RIGID COUPLING PERFORMANCE (Angle Bolt Pad Design)

Pipe Size			Pipe Size		
Nominal Diameter Inches/mm	Actual Outside Diameter Inches/mm	Allowable Pipe End Sep. Inches/mm	Nominal Diameter Inches/mm	Actual Outside Diameter Inches/mm	Allowable Pipe End Sep. Inches/mm
3/4 20	1.050 26,7	0.05 1,2	133,0 mm	5.250 133,0	0.16 4,1
1 25	1.315 33,7	0.05 1,2	139,7 mm	5.500 139,7	0.16 4,1
1 1/4 32	1.660 42,4	0.05 1,2	5 125	5.563 141,3	0.16 4,1
1 1/2 40	1.900 48,3	0.05 1,2	159,0 mm	6.250 159,0	0.16 4,1
2 50	2.375 60,3	0.07 1,7	165,1 mm	6.500 165,1	0.16 4,1
2 1/2 65	2.875 73,0	0.07 1,7	6 150	6.625 168,3	0.16 4,1
76,1 mm	3.000 76,1	0.07 1,7	8 200	8.625 219,1	0.19 4,8
3 80	3.500 88,9	0.07 1,7	10 250	10.750 273,0	0.13 3,3
4 100	4.500 114,3	0.16 4,1	12 300	12.750 323,9	0.13 3,3
108,0 mm	4.250 108,0	0.16 4,1			



#### Provides rigidity

- Zero-Flex Style 07 unique (patented) angled-pad design adjusts to standard pipe tolerances
- Provides positive clamping of the pipe to resist flexural and torsional loads
- Support and hanging requirements correspond to ASME B31.1 Power Piping Code, ASME B31.9 Building Services Code and NFPA 13 Sprinkler Systems



#### Easy swing-over assembly

- Bolt-pad design permits assembly by removing one nut/bolt and scissoring housing over gasket
- Reduces the number of components to handle during assembly
- Speeds and eases installation



## FLEXIBLE SYSTEMS

Flexible grooved-type couplings (such as Styles 77, W77, 75, 72, 750, 78 and 791) allow controlled angular, linear and rotational movement at each joint to accommodate expansion, contraction, setting, vibration, noise and other piping system movement. These features provide advantages in designing piping systems but must be considered when determining hanger and support spacing and location.

Victaulic couplings offer superior vibration attenuation characteristics to both flexible metal and elastomeric flexible arch-type connectors. Independent vibration testing data (request Section 26.04) verifies that three Victaulic couplings in close proximity to a vibration source (pump, equipment, etc.) provide superior vibration attenuation in piping systems.

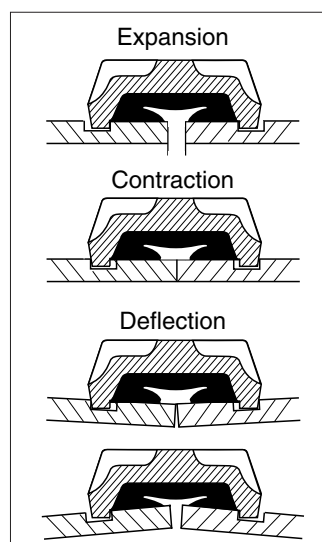
Both type couplings offer installed cost savings from 10 to 30% and higher, plus the convenience of a union at every joint and the proven pressure-responsive "C" shaped Victaulic gasket. Both type products fit into standard roll or cut grooved pipe and provide the security of full circumferential engagement of the coupling housing into the groove for high pressure and end load service.

## FLEXIBLE COUPLING PERFORMANCE†

Pipe Size		Allow. Pipe End Sep. † In./mm	Deflect. Fr. C <sub>u</sub> †		Pipe Size		Allow. Pipe End Sep. † In./mm	Deflect. Fr. C <sub>u</sub> †		Pipe Size		Allow. Pipe End Sep. † In./mm	Deflect. Fr. C <sub>u</sub> †	
Nominal Diameter In./mm	Actual Outside Dia. In./mm		Degrees per Cplg.	Pipe In./ft. mm/m	Nominal Diameter In./mm	Actual Outside Dia. In./mm		Degrees per Cplg.	Pipe In./ft. mm/m	Nominal Diameter In./mm	Actual Outside Dia. In./mm		Degrees per Cplg.	Pipe In./ft. mm/m
3/4 20	1.050 26,7	0 - 0.06 0 - 1,6	3° 24'	0.72 60	4 100	4.500 114,3	0 - 0.13 0 - 3,2	1° 36'	0.34 28	165,1 mm	6.500 165,1	0 - 0.13 0 - 3,2	1° 6'	0.23 19
1 25	1.315 33,7	0 - 0.06 0 - 1,6	2° 43'	0.57 48	108,0 mm	4.250 108,0	0 - 0.13 0 - 3,2	1° 41'	0.35 29	6 150	6.625 168,3	0 - 0.13 0 - 3,2	1° 5'	0.23 19
1 1/4 32	1.660 42,4	0 - 0.06 0 - 1,6	2° 10'	0.45 38	4 1/2 120	5.000 127,0	0 - 0.13 0 - 3,2	1° 26'	0.25 21	203,2 mm	8.000 203,2	0 - 0.13 0 - 3,2	0° 54'	0.16 13
1 1/2 40	1.900 48,3	0 - 0.06 0 - 1,6	1° 56'	0.40 33	133,0 mm	5.250 133,0	0 - 0.13 0 - 3,2	1° 21'	0.28 23	8 200	8.625 219,1	0 - 0.13 0 - 3,2	0° 50'	0.18 15
2 50	2.375 60,3	0 - 0.06 0 - 1,6	1° 31'	0.32 27	139,7 mm	5.500 139,7	0 - 0.13 0 - 3,2	1° 18'	0.28 23	254,0 mm	10.000 254,0	0 - 0.13 0 - 3,2	0° 43'	0.15 13
2 1/2 65	2.875 73,0	0 - 0.06 0 - 1,6	1° 15'	0.26 22	5 125	5.563 141,3	0 - 0.13 0 - 3,2	1° 18'	0.27 22	10 250	10.750 273,0	0 - 0.13 0 - 3,2	0° 40'	0.14 12
76,1 mm.	3.000 76,1	0 - 0.06 0 - 1,6	1° 12'	0.26 22	152,4 mm	6.000 152,4	0 - 0.13 0 - 3,2	1° 12'	0.21 17	304,8 mm	12.000 304,8	0 - 0.13 0 - 3,2	0° 36'	0.13 11
3 80	3.500 88,9	0 - 0.06 0 - 1,6	1° 2'	0.22 18	159,0 mm	6.250 159,0	0 - 0.13 0 - 3,2	1° 9'	0.24 20	12 300	12.750 323,9	0 - 0.13 0 - 3,2	0° 34'	0.12 10
3 1/2 90	4.000 101,6	0 - 0.06 0 - 1,6	0° 54'	0.19 16										

Refer to notes on page 4.

† NOTE: These values are based on standard roll grooved pipe. Figures for standard cut grooved pipe may be doubled. See notes on page 4.



### Minimizes noise and vibration transmission

- Isolates noise and vibration
- Resilient gasket helps absorb noise and vibration
- Permits elimination of noise suppression devices
- Provides superior vibration attenuation better than flexible metal or elastomeric arch-type connectors (refer to 26.04)

### Provides expansion and contraction

- Up to 0.250" (6,35 mm) linear movement at each joint
- Minimizes or eliminates costly expansion joints and loops (refer to 26.02)

### Minimizes system stresses

- Flexible joints provide virtually a stress free system (refer to 26.03)
- Reduces or eliminates stresses from settlement of buried pipe
- Absorbs temporary stresses induced by seismic tremors (refer to 26.12)



## COUPLING MAXIMUM WORKING PRESSURE (Standard Wall Steel Pipe)

Pipe Size		Pipe Wall Thick. Sched.	Coupling Style – Working Pressure – PSI/kPa											
Nominal Diameter In./mm	Actual Outside Dia. In./mm		Style 07 Rigid	Style W07 AGS Rigid	Style 77 Flexible	Style W77 AGS Flexible	Style 75 Flexible	Style 78 Snap-Joint®	Style 791 Boltless	Style 741 Flange Adpt.	Style W741 AGS Flange Adapter	Style 743 Flange Adpt.	HP-70 Rigid	HP-70ES EndSeal®
3/4 20	1.050 26,7	40	–	–	1000 6900	–	–	–	–	–	–	–	–	–
1 25	1.315 33,7	40	750 5175	–	1000 6900	–	–	300 2065	–	–	–	–	–	–
1 1/4 32	1.660 42,4	40	750 5175	–	1000 6900	–	–	300 2065	–	–	–	–	–	–
1 1/2 40	1.900 48,3	40	750 5175	–	1000 6900	–	500 3450	300 2065	–	–	–	–	–	–
2 50	2.375 60,3	40	750 5175	–	1000 6900	–	500 3450	300 2065	700 4825	300 2065	–	720 4965	1000 6900	2500 17235
2 1/2 65	2.875 73,0	40	750 5175	–	1000 6900	–	500 3450	300 2065	700 4825	300 2065	–	720 4965	1000 6900	2500 17235
76,1 mm	3.000 76,1	40	750 5175	–	1000 6900	–	500 3450	–	–	–	–	–	–	–
3 80	3.500 88,9	40	750 5175	–	1000 6900	–	500 3450	300 2065	700 4825	300 2065	–	720 4965	1000 6900	2500 17235
3 1/2 90	4.000 101,6	40	–	–	1000 6900	–	500 3450	–	–	–	–	–	–	–
4 100	4.500 114,3	40	750 5175	–	1000 6900	–	500 3450	300 2065	700 4825	300 2065	–	720 4965	1000 6900	2500 17235
108,0 mm	4.250 108,0	40	750 5175	–	1000 6900	–	450 3100	–	–	–	–	–	–	–
4 1/2 120	5.000 127,0	40	–	–	–	–	450 3100	–	–	–	–	–	–	–
133,0 mm	5.250 133,0	40	700 4825	–	1000 6900	–	450 3100	–	–	–	–	–	–	–
139,7 mm	5.500 139,7	40	700 4825	–	1000 6900	–	450 3100	–	–	–	–	–	–	–
5 125	5.563 141,3	40	700 4825	–	1000 6900	–	450 3100	300 2065	700 4825	300 2065	–	720 4965	–	–
159,0 mm	6.250 159,0	40	700 4825	–	1000 6900	–	450 3100	–	–	–	–	–	–	–
165,1 mm	6.500 165,1	40	700 4825	–	1000 6900	–	450 3100	–	–	300 2065	–	–	–	–
6 150	6.625 168,3	40	700 4825	–	1000 6900	–	450 3100	300 2065	600 4135	300 2065	–	720 4965	1000 6900	2000 13790
8 200	8.625 219,1	40	600 4130	–	800 5500	–	450 3100	300 2065	500 3450	300 2065	–	720 4965	800 5500	1500 10350
10 250	10.750 273,0	40	500 3450	–	800 5500	–	–	–	–	300 2065	–	720 4965	800 5500	1250 8625
12 300	12.750 323,9	30	400 2750	–	800 5500	–	–	–	–	300 2065	–	720 4965	800 5500	1250 8625
14 350	14.000 355,6	30	–	350 2410	300 ‡ 2065	350 2410	–	–	–	300 2065	300 2065	–	600 4135	–
15 375	15.000 381,0	0.375	–	–	300 ‡ 2065	–	–	–	–	–	–	–	–	–
16 400	16.000 406,4	30	–	350 2410	300 ‡ 2065	350 2410	–	–	–	300 2065	300 2065	–	600 4135	–
18 450	18.000 457,0	STD	–	350 2410	300 ‡ 2065	350 2410	–	–	–	300 2065	300 2065	–	–	–
20 500	20.000 508,0	20	–	350 2410	300 ‡ 2065	350 2410	–	–	–	300 2065	300 2065	–	–	–
22 550	22.000 559,0	20	–	–	300 ‡ 2065	–	–	–	–	–	–	–	–	–
24 600	24.000 610,0	20	–	350 2410	250 ‡ 1725	350 2410	–	–	–	300 2065	300 2065	–	–	–

### NOTES

\* Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard **roll** or **cut** grooved in accordance with Victaulic specifications. Coupling style numberings beginning with "W" are AGS products for use only on roll grooved standard weight steel pipe. Contact Victaulic for performance on other pipe.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 1/2 times the figures shown.

‡ Available only for cut groove systems.

† Allowable Pipe End Separation and Deflection figures show the maximum nominal range of movement available at each joint for standard **roll** grooved pipe.

Figures for standard **cut** grooved pipe may be doubled. These figures are maximums; for design and installation purposes these figures should be reduced by: 50% for 3/4 - 3 1/2" (20 - 90 mm); 25% for 4" (100 mm) and larger.

Number of bolts required equals number of housing segments.

Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.

WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.

This product shall be manufactured by Victaulic or to Victaulic specifications. All products shall be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

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3"-48"

# MECHANICAL JOINT FITTINGS

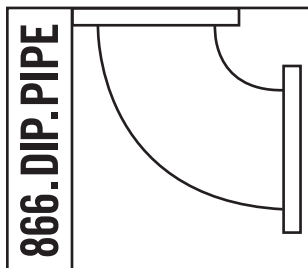
DUCTILE IRON



FOR WATER & WASTEWATER, FIRE PROTECTION & INDUSTRIAL APPLICATIONS

MORE  
THAN  
JUST  
PIPE.

**U.S.**  
**PIPE**



# MECHANICAL JOINT FITTINGS

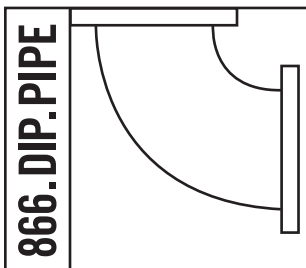


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# MECHANICAL JOINT FITTINGS



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## Mechanical Joint Fittings

Mechanical Joint Fittings and accessories are full body fittings as compared to U.S. Pipe's TRIM TYTE® Mechanical Joint Compact Fittings, available in 3" through 48" sizes. Wye branches, dual purpose solid sleeves and hydrant fittings, not covered by C110/A21.10, are made to U.S. Pipe Standards and meet all applicable wall thickness and strength requirement of ANSI/AWWA C110/A21.10.

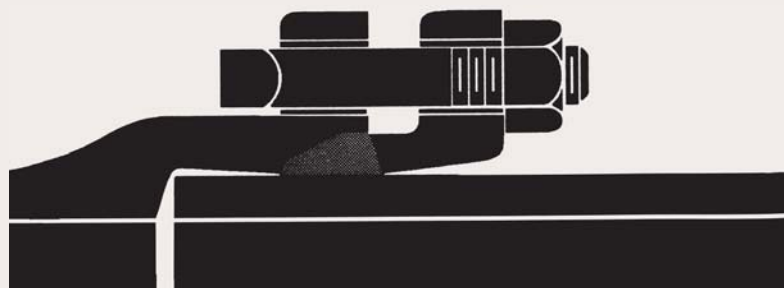
Caps, plugs and sleeves are not furnished with cement-mortar linings. For special conditions, Mechanical Joint Fittings with special coatings and/or linings can be supplied.

Glands, bolts and gaskets are required in sufficient quantities for each socket opening. The weights of these accessories are not included in the fittings weights shown herein.

Where a fitting in this section will not fill a customer's special laying requirements and a special fitting may be required, a combination of standard fittings can many times be assembled to accomplish the same purpose. Combinations of standard fittings that may be used in place of special fittings can be found on page 32.

For 3" through 48" Ductile Iron Mechanical Joint Fittings that conform to the requirements of ANSI/AWWA C153/A21.53 Ductile Iron Compact Fittings For Water Service, see U.S. Pipe's brochure covering TRIM TYTE® Ductile Iron Mechanical Joint Fittings.

U.S. Pipe Mechanical Joint Fittings are approved by Factory Mutual and listed by Underwriters Laboratories Inc. (extinguisher card EX 2234) in various configurations and pressure ratings in sizes 4" through 12". They also conform to the requirements of ANSI/NSF 61.



### ANSI/AWWA Standards

**ANSI/AWWA C116/A21.16, Standard for Protective Fusion-Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.**

Fittings in the 3" through 24" sizes are furnished with PERMAFUSE® Epoxy coating on the interior and exterior surfaces in accordance with ANSI/AWWA C116/A21.16.

**ANSI/AWWA C104/A.21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.**

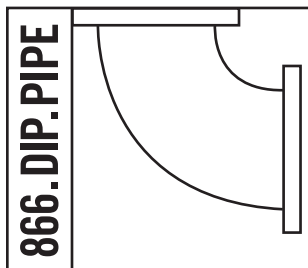
Larger fittings are cement-mortar lined and coated with an asphaltic material, inside and outside, in accordance with ANSI/AWWA C104/A21.4.

**ANSI/AWWA C110/A21.10, Ductile-Iron and Gray-Iron Fittings for Water**

**ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.**

Mechanical Joint Fittings and accessories are made to meet all applicable requirements of ANSI/AWWA C110/A21.10, 3" through 48" and ANSI/AWWA C111/A21.11.

**NOTE:** If specifiers and users believe that corrosive soils will be encountered where our products are to be installed, please refer to ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Pipe Systems for proper external protection procedures.



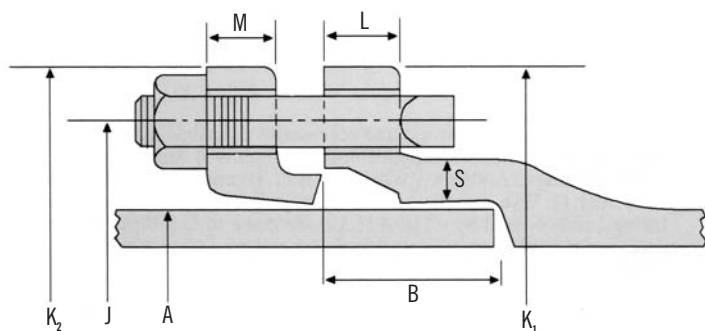
# MECHANICAL JOINT FITTINGS



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## Standard Mechanical Joint Dimensions



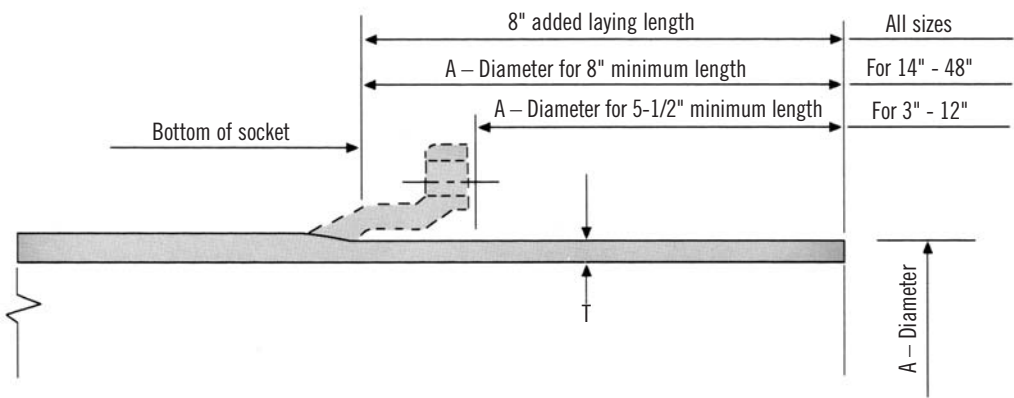
SIZE Inches	PLAIN END		DIMENSIONS Inches						BOLTS			WEIGHT Pounds	
	A	B	J	K <sub>1</sub>	K <sub>2</sub>	L	M	S	QTY.	SIZE	LENGTH	BELL	GLAND BOLTS GASKET
3	3.96	2.50	6.19	7.69	7.69	.94	.62	.52	4	5/8	3	11	7
4	4.80	2.50	7.50	9.12	9.12	1.00	.75	.65	4	3/4	3-1/2	16	10
6	6.90	2.50	9.50	11.12	11.12	1.06	.88	.70	6	3/4	3-1/2	23	16
8	9.05	2.50	11.75	13.37	13.37	1.12	1.00	.75	6	3/4	4	31	25
10	11.10	2.50	14.00	15.69	15.62	1.19	1.00	.80	8	3/4	4	41	30
12	13.20	2.50	16.25	17.94	17.88	1.25	1.00	.85	8	3/4	4	51	40
14	15.30	3.50	18.75	20.31	20.25	1.31	1.25	.89	10	3/4	4 1/2	79	45
16	17.40	3.50	21.00	22.56	22.50	1.38	1.31	.97	12	3/4	4 1/2	97	55
18	19.50	3.50	23.25	24.83	24.75	1.44	1.38	1.05	12	3/4	4 1/2	117	65
20	21.60	3.50	25.50	27.08	27.00	1.50	1.44	1.12	14	3/4	4 1/2	140	85
24	25.80	3.50	30.00	31.58	31.50	1.62	1.56	1.22	16	3/4	5	185	105
*30	32.00	4.00	36.88	39.12	39.12	1.81	1.31	1.50	20	1	6	315	165
*36	38.30	4.00	43.75	46.00	46.00	2.00	1.55	1.80	24	1	6	445	235
**42	44.50	4.00	50.62	53.12	53.12	2.00	2.00	1.95	28	1-1/4	6	570	400
**48	50.80	4.00	57.50	60.00	60.00	2.00	2.00	2.20	32	1-1/4	6	725	475

The bolt holes in the fitting flanges straddle the vertical center line when the fitting is positioned to change the fluid flow in a horizontal direction.

\*30" and 36" Mechanical Joint glands are furnished Ductile Iron only. The bolts used with these glands are shorter than the standard 6" length bolts of ANSI/AWWA C110/A21.10. If 30" and 36" glands or plugs with standard A21.10 gasket thicknesses are used, 6" length bolts will be required.

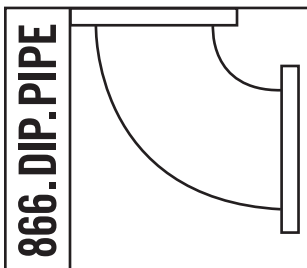
\*\*42" and 48" Mechanical Joint glands are furnished Ductile Iron only.

## Plain End Dimensions



SIZES Inches	DIMENSIONS Inches		WEIGHT Pounds
	A	T	
			PLAIN END
3	3.96	.48	11
4	4.80	.47	13
6	6.90	.50	21
8	9.05	.54	30
10	11.10	.60	41
12	13.20	.68	56
14	15.30	.66	63
16	17.40	.70	76
18	19.50	.75	92
20	21.60	.80	109
24	25.80	.89	145
30	32.00	1.03	208
36	38.30	1.15	279
42	44.50	1.28	361
48	50.80	1.42	458

**NOTE:** Bell contour shown indicates bottom of socket in a standard all bell fitting.



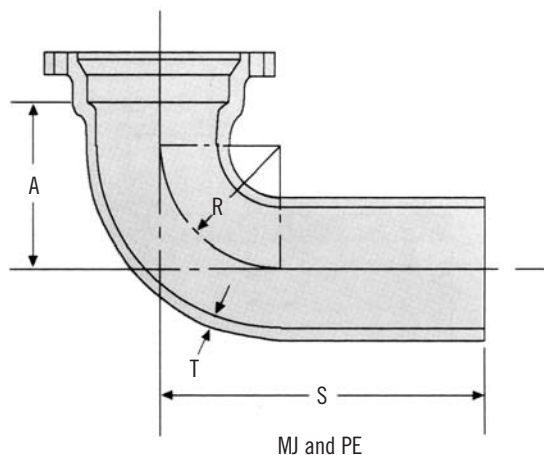
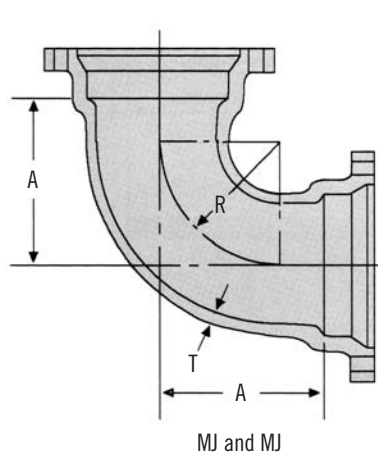
# MECHANICAL JOINT FITTINGS



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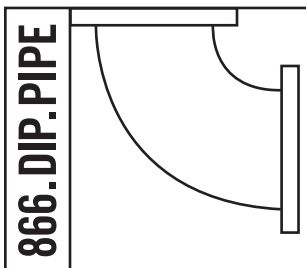
## 90° Bends



SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
		T	A	S	R	MJ & MJ	MJ & PE
3	350	.48	5.5	13.5	4.0	35	35
4	350	.52	6.5	14.5	4.5	55	50
6	350	.55	8.0	16.0	6.0	85	80
8	350	.60	9.0	17.0	7.0	125	120
10	350	.68	11.0	19.0	9.0	190	190
12	350	.75	12.0	20.0	10.0	255	255
14	350	.66	14.0	22.0	11.5	340	325
16	350	.70	15.0	23.0	12.5	430	410
18	350	.75	16.5	24.5	14.0	545	520
20	350	.80	18.0	26.0	15.5	680	650
24	350	.89	22.0	30.0	18.5	1025	985
30	250	1.03	25.0	33.0	21.5	1690	1585
36	250	1.15	28.0	36.0	24.5	2475	2310
42	250	1.28	31.0	39.0	27.5	3410	3200
48	250	1.42	34.0	42.0	30.5	4595	4330

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.



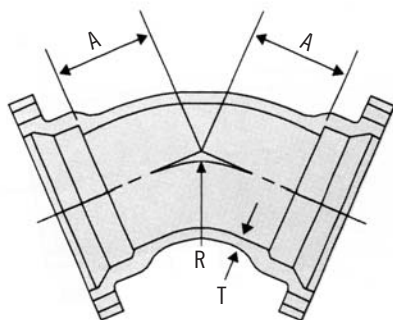
# MECHANICAL JOINT FITTINGS



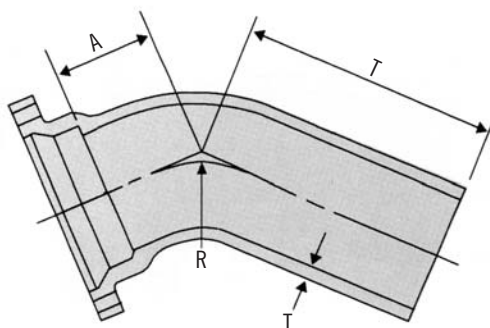
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## 45° Bends



MJ and MJ



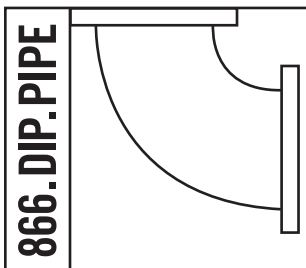
MJ and PE

SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
		T	A	S	R	MJ & MJ	MJ & PE
3	350	.48	3.0	11.0	3.62	30	30
4	350	.52	4.0	12.0	4.81	50	45
6	350	.55	5.0	13.0	7.25	75	70
8	350	.60	5.5	13.5	8.44	110	105
10	350	.68	6.5	14.5	10.88	155	155
12	350	.75	7.5	15.5	13.25	215	215
14	350	.66	7.5	15.5	12.06	270	255
16	350	.70	8.0	16.0	13.25	340	320
18	350	.75	8.5	16.5	14.50	420	395
20	350	.80	9.5	17.5	16.88	530	500
24	350	.89	11.0	19.0	18.12	755	715
30	250	1.03	15.0	23.0	27.75	1380	1275
36	250	1.15	18.0	26.0	35.00	2095	1930
42	250	1.28	21.0	29.0	42.25	2955	2745
48	250	1.42	24.0	32.0	49.50	4080	3815

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.





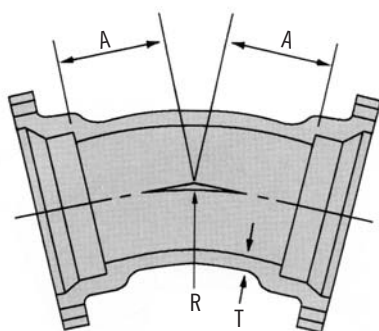
# MECHANICAL JOINT FITTINGS



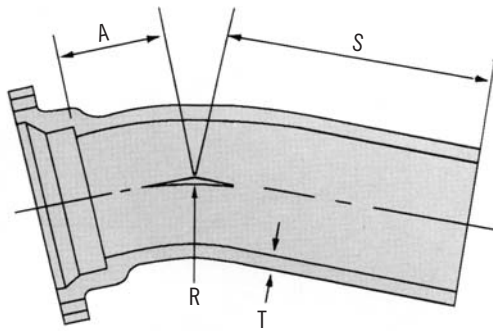
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## 22.5° Bends



MJ and MJ

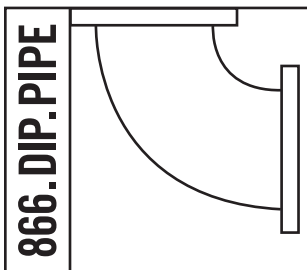


MJ and PE

SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
		T	A	S	R	MJ & MJ	MJ & PE
3	350	.48	3.0	11.0	7.56	30	30
4	350	.52	4.0	12.0	10.06	50	45
6	350	.55	5.0	13.0	15.06	75	70
8	350	.60	5.5	13.5	17.62	110	105
10	350	.68	6.5	14.5	22.62	160	160
12	350	.75	7.5	15.5	27.62	220	220
14	350	.66	7.5	15.5	25.12	275	260
16	350	.70	8.0	16.0	27.62	345	325
18	350	.75	8.5	16.5	30.19	430	405
20	350	.80	9.5	17.5	35.19	535	505
24	350	.89	11.0	19.0	37.69	765	725
30	250	1.03	15.0	23.0	57.81	1400	1295
36	250	1.15	18.0	26.0	72.88	2135	1970
42	250	1.28	21.0	29.0	88.00	3020	2810
48	250	1.42	24.0	32.0	103.06	4170	3905

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.



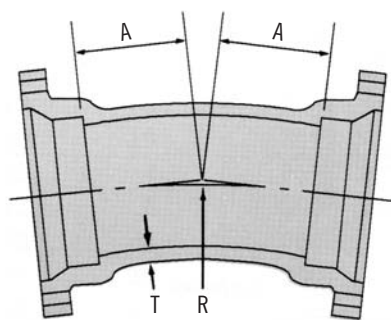
# MECHANICAL JOINT FITTINGS



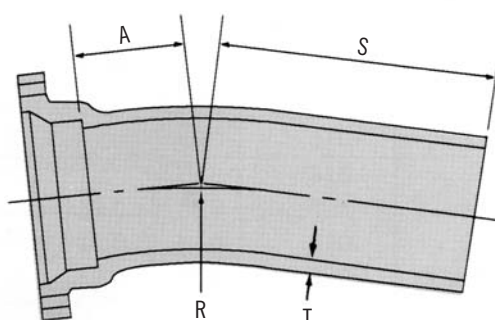
2005 EDITION

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## 11.25° Bends



MJ and MJ



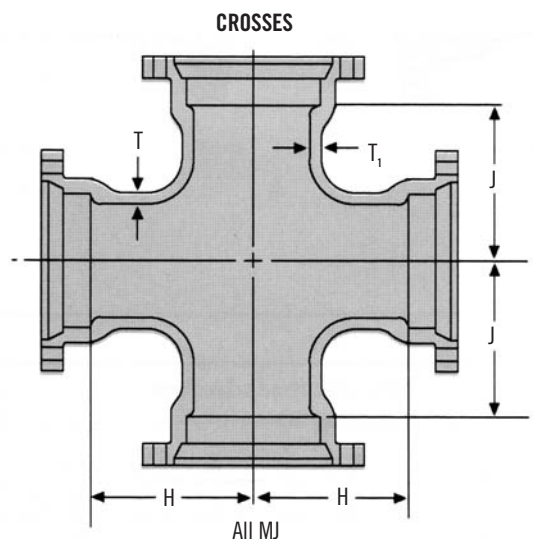
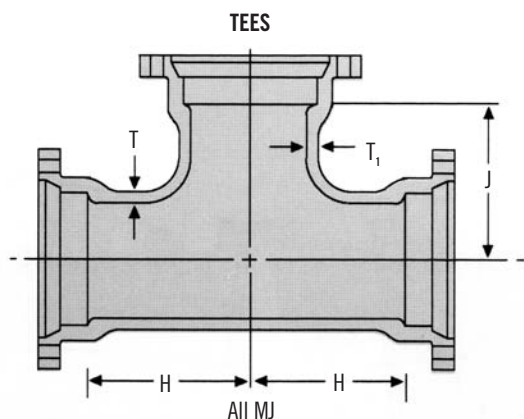
MJ and PE

SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
		T	A	S	R	MJ & MJ	MJ & PE
3	350	.48	3.0	11.0	15.25	30	30
4	350	.52	4.0	12.0	20.31	50	45
6	350	.55	5.0	13.0	30.50	75	70
8	350	.60	5.5	13.5	35.50	110	105
10	350	.68	6.5	14.5	45.69	160	160
12	350	.75	7.5	15.5	55.81	220	220
14	350	.66	7.5	15.5	50.75	275	260
16	350	.70	8.0	16.0	55.81	345	325
18	350	.75	8.5	16.5	60.94	430	405
20	350	.80	9.5	17.5	71.06	540	510
24	350	.89	11.0	19.0	76.12	770	730
30	250	1.03	15.0	23.0	116.75	1410	1305
36	250	1.15	18.0	26.0	147.25	2145	1980
42	250	1.28	21.0	29.0	177.69	3035	2825
48	250	1.42	24.0	32.0	208.12	4190	3925

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

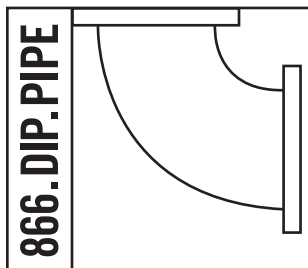
## Tees and Crosses



SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
RUN	BRANCH		T	T <sub>1</sub>	H	J	TEES ALL MJ	CROSSES ALL MJ
3	3	350	.48	.48	5.5	5.5	55	70
4	3	350	.52	.48	6.5	6.5	75	90
4	4	350	.52	.52	6.5	6.5	80	105
6	3	350	.55	.48	8.0	8.0	110	125
6	4	350	.55	.52	8.0	8.0	115	140
6	6	350	.55	.55	8.0	8.0	125	160
8	4	350	.60	.52	9.0	9.0	165	185
8	6	350	.60	.55	9.0	9.0	175	205
8	8	350	.60	.60	9.0	9.0	185	235
10	4	350	.68	.52	11.0	11.0	235	260
10	6	350	.68	.55	11.0	11.0	250	285
10	8	350	.68	.60	11.0	11.0	260	310
10	10	350	.80	.80	11.0	11.0	310	380
12	4	350	.75	.52	12.0	12.0	315	340
12	6	350	.75	.55	12.0	12.0	325	360
12	8	350	.75	.60	12.0	12.0	340	385
12	10	350	.87	.80	12.0	12.0	390	460
12	12	350	.87	.87	12.0	12.0	410	495

**NOTE:** Flanged outlets can be furnished on a variety of Mechanical Joint Tees.

For dimensions of Mechanical Joints see page 4.



# MECHANICAL JOINT FITTINGS



2005 EDITION

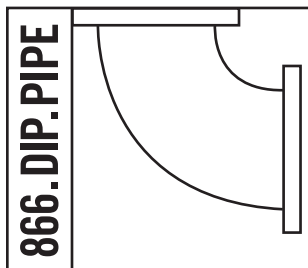
P 11

## Tees and Crosses (cont.)

SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
RUN	BRANCH		T	T <sub>1</sub>	H	J	TEES ALL MJ	CROSSES ALL MJ
14	6	350	.66	.55	14.0	14.0	435	475
14	8	350	.66	.60	14.0	14.0	450	500
14	10	350	.66	.68	14.0	14.0	465	540
14	12	350	.66	.75	14.0	14.0	495	585
14	14	350	.66	.66	14.0	14.0	520	635
16	6	350	.70	.55	15.0	15.0	540	575
16	8	350	.70	.60	15.0	15.0	550	605
16	10	350	.70	.68	15.0	15.0	570	645
16	12	350	.70	.75	15.0	15.0	590	685
16	14	350	.70	.66	15.0	15.0	620	735
16	16	350	.70	.70	15.0	15.0	650	790
18	6	350	.75	.55	13.0	15.5	590	625
18	8	350	.75	.60	13.0	15.5	605	655
18	10	350	.75	.68	13.0	15.5	620	685
18	12	350	.75	.75	13.0	15.5	640	725
18	14	350	.75	.66	16.5	16.5	755	870
18	16	350	.75	.70	16.5	16.5	785	930
18	18	350	.75	.75	16.5	16.5	820	995
20	6	350	.80	.55	14.0	17.0	725	760
20	8	350	.80	.60	14.0	17.0	735	790
20	10	350	.80	.68	14.0	17.0	755	820
20	12	350	.80	.75	14.0	17.0	775	860
20	14	350	.80	.66	14.0	17.0	795	905
20	16	350	.80	.70	18.0	18.0	945	1085
20	18	350	.80	.75	18.0	18.0	985	1155
20	20	350	.80	.80	18.0	18.0	1020	1230

**NOTE:** Flanged outlets can be furnished on a variety of Mechanical Joint Tees.

For dimensions of Mechanical Joints see page 4.



# MECHANICAL JOINT FITTINGS



2005 EDITION

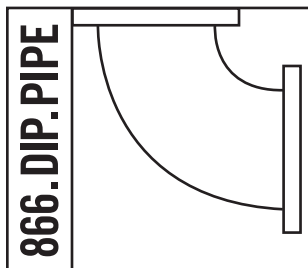
P 12

## Tees and Crosses (cont.)

SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
RUN	BRANCH		T	T <sub>1</sub>	H	J	TEES ALL MJ	CROSSES ALL MJ
24	6	350	.89	.55	15.0	19.0	985	1025
24	8	350	.89	.60	15.0	19.0	1000	1045
24	10	350	.89	.68	15.0	19.0	1020	1085
24	12	350	.89	.75	15.0	19.0	1030	1110
24	14	350	.89	.66	15.0	19.0	1055	1155
24	16	350	.89	.70	15.0	19.0	1075	1200
24	18	350	.89	.75	22.0	22.0	1400	1590
24	20	350	.89	.80	22.0	22.0	1450	1675
24	24	350	.89	.89	22.0	22.0	1535	1835
30	6	250	1.03	.55	18.0	23.0	1730	1770
30	8	250	1.03	.60	18.0	23.0	1745	1795
30	10	250	1.03	.68	18.0	23.0	1760	1830
30	12	250	1.03	.75	18.0	23.0	1780	1865
30	14	250	1.03	.66	18.0	23.0	1800	1905
30	16	250	1.03	.70	18.0	23.0	1820	1950
30	18	250	1.03	.75	18.0	23.0	1845	2000
30	20	250	1.03	.80	18.0	23.0	1875	2060
30	24	250	1.03	.89	25.0	25.0	2400	2675
30	30	250	1.03	1.03	25.0	25.0	2595	3075
36	8	250	1.15	.60	20.0	26.0	2520	2565
36	10	250	1.15	.68	20.0	26.0	2535	2600
36	12	250	1.15	.75	20.0	26.0	2550	2630
36	14	250	1.15	.66	20.0	26.0	2570	2665
36	16	250	1.15	.70	20.0	26.0	2585	2705
36	18	250	1.15	.75	20.0	26.0	2610	2750
36	20	250	1.15	.80	20.0	26.0	2635	2805
36	24	250	1.15	.89	20.0	26.0	2690	2910
36	30	250	1.15	1.03	28.0	28.0	3545	3965
36	36	250	1.15	1.15	28.0	28.0	3745	4370

**NOTE:** Flanged outlets can be furnished on a variety of Mechanical Joint Tees.

For dimensions of Mechanical Joints see page 4.



# MECHANICAL JOINT FITTINGS



2005 EDITION

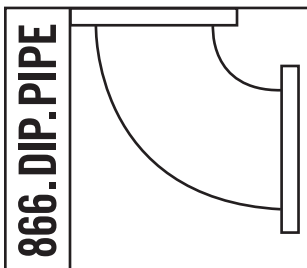
P 13

## Tees and Crosses (cont.)

SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
RUN	BRANCH		T	T <sub>1</sub>	H	J	TEES ALL MJ	CROSSES ALL MJ
42	12	250	1.28	.75	23.0	30.0	3555	3640
42	14	250	1.28	.66	23.0	30.0	3575	3675
42	16	250	1.28	.70	23.0	30.0	3595	3715
42	18	250	1.28	.75	23.0	30.0	3615	3755
42	20	250	1.28	.80	23.0	30.0	3640	3810
42	24	250	1.28	.89	23.0	30.0	3690	3910
42	30	250	1.28	1.03	31.0	31.0	4650	5040
42	36	150	1.28	1.15	31.0	31.0	4880	5425
42	36	250	1.78	1.58	31.0	31.0	6075	6655
42	42	150	1.28	1.28	31.0	31.0	5085	5840
42	42	250	1.78	1.78	31.0	31.0	6320	7145
48	12	250	1.42	.75	26.0	34.0	4870	4955
48	14	250	1.42	.66	26.0	34.0	4885	4985
48	16	250	1.42	.70	26.0	34.0	4905	5025
48	18	250	1.42	.75	26.0	34.0	4925	5065
48	20	250	1.42	.80	26.0	34.0	4950	5115
48	24	250	1.42	.89	26.0	34.0	4995	5210
48	30	250	1.42	1.03	26.0	34.0	5140	5495
48	36	250	1.42	1.15	34.0	34.0	6280	6790
48	42	150	1.42	1.28	34.0	34.0	6510	7150
48	42	250	1.96	1.78	34.0	34.0	8130	8815
48	48	150	1.42	1.42	34.0	34.0	6765	7655
48	48	250	1.96	1.96	34.0	34.0	8420	9380

**NOTE:** Flanged outlets can be furnished on a variety of Mechanical Joint Tees.

For dimensions of Mechanical Joints see page 4.



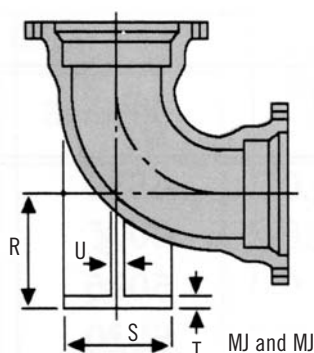
# MECHANICAL JOINT FITTINGS



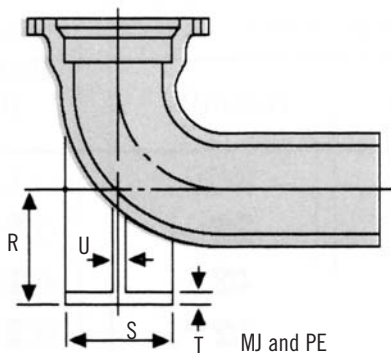
2005 EDITION

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## Base Bends



MJ and MJ



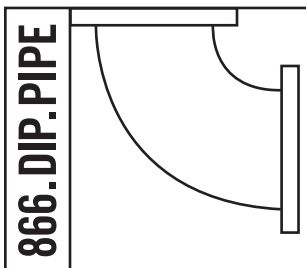
MJ and PE

SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds		
		R	S DIAMETER	T	U	MJ & MJ	MJ & PE	BASE ONLY
3	350	4.88	5.00	.56	.50	45	45	10
4	350	5.50	6.00	.62	.50	65	60	10
6	350	7.00	7.00	.69	.62	105	100	20
8	350	8.38	9.00	.94	.88	165	160	40
10	350	9.75	9.00	.94	.88	235	235	45
12	350	11.25	11.00	1.00	1.00	320	320	65
14	350	12.50	11.00	1.00	1.00	410	395	70
16	350	13.75	11.00	1.00	1.00	505	485	75
18	350	15.00	13.50	1.12	1.12	660	635	115
20	350	16.00	13.50	1.12	1.12	800	770	120
24	350	18.50	13.50	1.12	1.12	1155	1115	130
30	250	23.00	16.00	1.19	1.15	1880	1775	190
36	250	26.00	19.00	1.25	1.15	2725	2560	250
42	250	30.00	23.50	1.44	1.28	3820	3610	410
48	250	34.00	25.00	1.56	1.42	5110	4845	515

Dimension "R" is a finished dimension; unfinished bases will be 1/8" longer.

For base drilling see page 16.

For other dimensions see table of Mechanical Joint 90° bends on page 6.



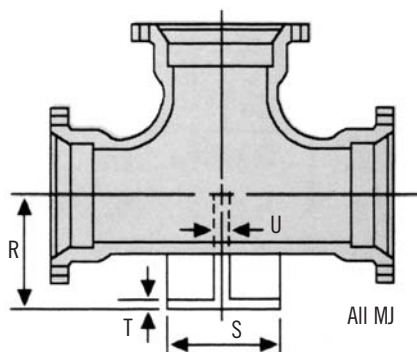
# MECHANICAL JOINT FITTINGS



2005 EDITION

P 15

## Base Tees



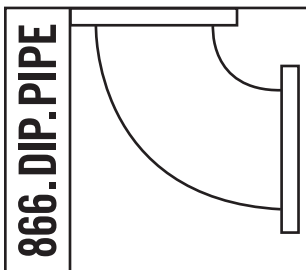
SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches				WEIGHT Pounds	
		R	S DIAMETER	T	U	MJ & MJ	BASE ONLY
3	350	4.88	5.00	.56	.50	60	5
4	350	5.50	6.00	.62	.50	90	10
6	350	7.00	7.00	.69	.62	140	15
8	350	8.38	9.00	.94	.88	215	30
10	350	9.75	9.00	.94	.88	340	30
12	350	11.25	11.00	1.00	1.00	455	45
14	350	12.50	11.00	1.00	1.00	570	50
16	350	13.75	11.00	1.00	1.00	700	50
18	350	15.00	13.50	1.12	1.12	895	75
20	350	16.00	13.50	1.12	1.12	1095	75
24	350	18.50	13.50	1.12	1.12	1615	80
30	250	23.00	16.00	1.19	1.15	2715	120
36	250	26.00	19.00	1.25	1.15	3905	160
42	250	30.00	23.50	1.44	1.28	6590	270
48	250	34.00	25.00	1.56	1.42	8755	335

Dimension "R" is a finished dimension; unfinished bases will be 1/8" longer.

For base drilling see page 16.

For other dimensions see table of Mechanical Joint Tees and Crosses starting on page 10.





# MECHANICAL JOINT FITTINGS

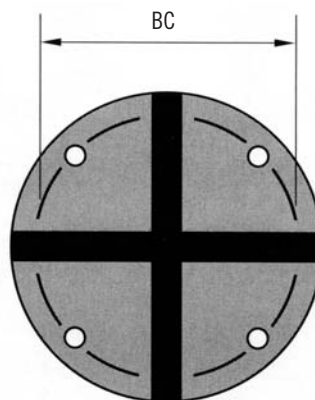


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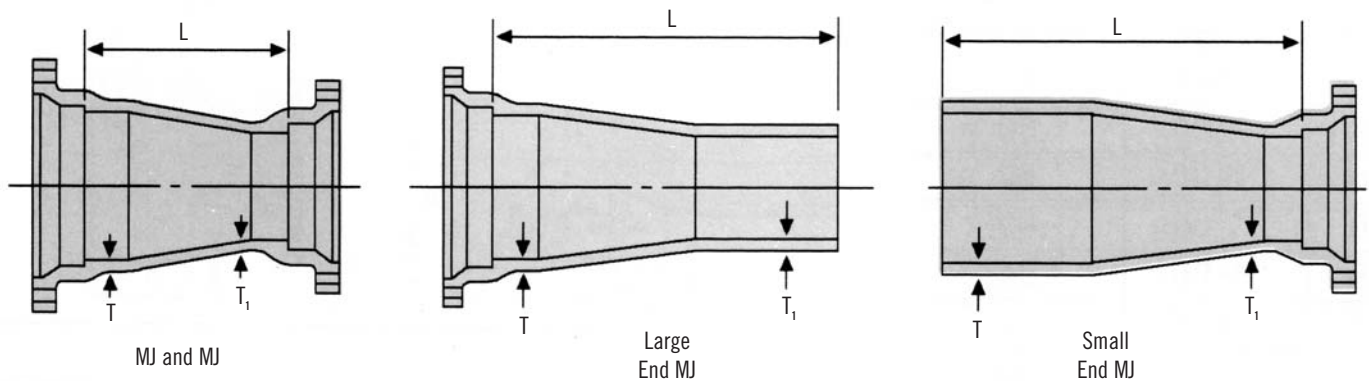
P 16

## Base Drilling Details for Base Bends and Base Tees

SIZE FITTING Inches	DIMENSIONS Inches		
	BOLT CIRCLE	BOLT HOLE	NUMBER
3	3.38	5/8	4
4	4.75	3/4	4
6	5.50	3/4	4
8	7.50	3/4	4
10	7.50	3/4	4
12	9.50	7/8	4
14	9.50	7/8	4
16	9.50	7/8	4
18	11.75	7/8	4
20	11.75	7/8	4
24	11.75	7/8	4
30	14.25	1	4
36	17.00	1	4
42	21.25	1-1/8	4
48	21.75	1-1/4	4
54	25.00	1-1/4	4
60	29.50	1-3/8	4
64	36.00	1-3/8	4



## Reducers

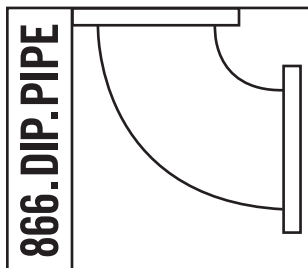


SIZE Inches		PRESSURE RATING psi	THICKNESS Inches		MJ AND MJ		SMALL END MJ		LARGE END MJ	
LARGE	SMALL		T	T <sub>1</sub>	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds
4	3	350	.52	.48	7	40	15	35	15	40
6	3	350	.55	.48	9	55	17	50	17	55
6	4	350	.55	.52	9	60	17	60	17	60
8	4	350	.60	.52	11	80	19	80	19	80
8	6	350	.60	.55	11	95	19	90	19	90
10	4	350	.68	.52	12	105	20	100	20	100
10	6	350	.68	.55	12	115	20	115	20	115
10	8	350	.68	.60	12	135	20	130	20	130
12	4	350	.75	.52	14	135	22	130	22	130
12	6	350	.75	.55	14	150	22	150	22	145
12	8	350	.75	.60	14	165	22	165	22	165
12	10	350	.75	.68	14	190	22	190	22	185

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

Eccentric reducers with the same dimensions and weights given for concentric reducers are available when specified on the purchase order.



# MECHANICAL JOINT FITTINGS



2005 EDITION

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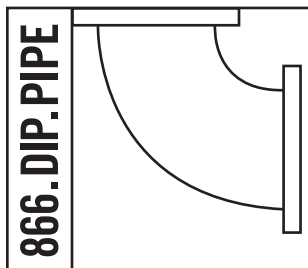
## Reducers (cont.)

SIZE Inches		PRESSURE RATING psi	THICKNESS Inches		MJ AND MJ		SMALL END MJ		LARGE END MJ	
LARGE	SMALL		T	T <sub>1</sub>	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds
14	8	350	.66	.55	16	190	24	175	24	185
14	8	350	.66	.60	16	210	24	190	24	205
14	10	350	.66	.68	16	230	24	215	24	230
14	12	350	.66	.75	16	255	24	240	24	255
16	6	350	.70	.55	18	230	26	210	26	230
16	8	350	.70	.60	18	250	26	230	26	250
16	10	350	.70	.68	18	280	26	255	26	275
16	12	350	.70	.75	18	305	26	285	26	305
16	14	350	.70	.66	18	335	26	310	26	315
18	8	350	.75	.60	19	295	27	270	27	295
18	10	350	.75	.68	19	325	27	300	27	320
18	12	350	.75	.75	19	350	27	325	27	350
18	14	350	.75	.66	19	380	27	355	27	365
18	16	350	.75	.70	19	415	27	390	27	395
20	10	350	.80	.68	20	375	28	245	28	375
20	12	350	.80	.75	20	405	28	375	28	405
20	14	350	.80	.66	20	430	28	400	28	415
20	16	350	.80	.70	20	470	28	435	28	445
20	18	350	.80	.75	20	510	28	475	28	485

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

Eccentric reducers with the same dimensions and weights given for concentric reducers are available when specified on the purchase order.



# MECHANICAL JOINT FITTINGS



2005 EDITION

P 19

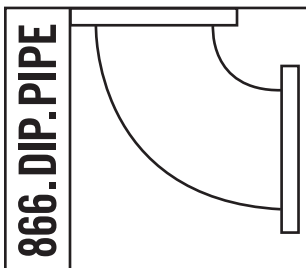
## Reducers (cont.)

SIZE Inches		PRESSURE RATING psi	THICKNESS Inches		MJ AND MJ		SMALL END MJ		LARGE END MJ	
LARGE	SMALL		T	T <sub>1</sub>	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds	L Inches	WEIGHT Pounds
24	12	350	.89	.75	24	550	32	510	32	550
24	14	350	.89	.66	24	575	32	535	32	560
24	16	350	.89	.70	24	615	32	575	32	595
24	18	350	.89	.75	24	660	32	620	32	635
24	20	350	.89	.80	24	705	32	665	32	675
30	18	250	1.03	.75	30	990	38	885	38	965
30	20	250	1.03	.80	30	1050	38	945	38	1020
30	24	250	1.03	.89	30	1165	38	1060	38	1125
36	20	250	1.15	.80	36	1450	44	1285	44	1420
36	24	250	1.15	.89	36	1580	44	1410	44	1535
36	30	250	1.15	1.03	36	1855	44	1690	44	1750
42	20	250	1.28	.80	42	1915	50	1705	50	1880
42	24	250	1.28	.89	42	2060	50	1855	50	2020
42	30	250	1.28	1.03	42	2370	50	2165	50	2265
42	36	250	1.28	1.15	42	2695	50	2485	50	2530
48	30	250	1.42	1.03	48	3005	56	2740	56	2900
48	36	250	1.42	1.15	48	3370	56	3100	56	3205
48	42	250	1.42	1.28	48	3750	56	3480	56	3540

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

Eccentric reducers with the same dimensions and weights given for concentric reducers are available when specified on the purchase order.



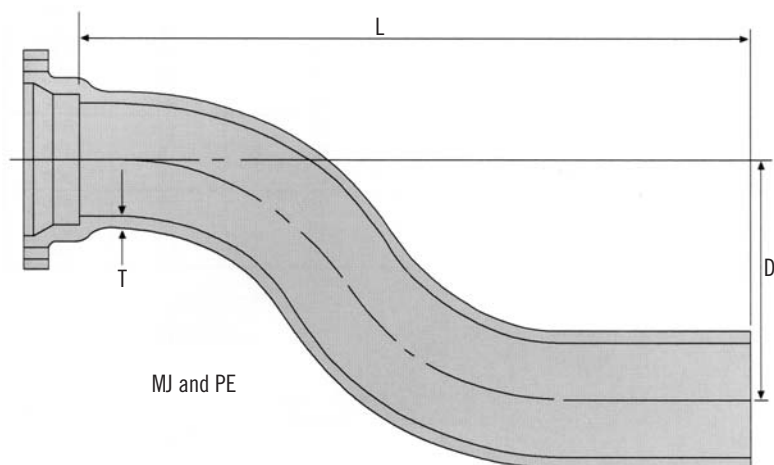
# MECHANICAL JOINT FITTINGS



2005 EDITION

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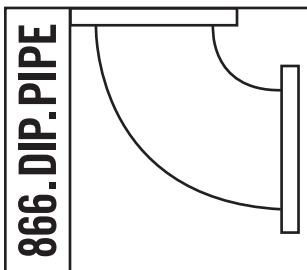
## Offsets



SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches		MJ & PE	
		D	T	L Inches	WEIGHT Inches
4	350	6	.52	27	70
4	350	12	.52	30	80
6	350	6	.55	28	105
6	350	12	.55	34	130
6	350	18	.55	41	160
8	350	6	.60	29	155
8	350	12	.60	36	195
8	350	18	.60	43	240
10	350	6	.68	30	220
10	350	12	.68	38	280
10	350	18	.68	46	340
12	350	6	.75	34	320
12	350	12	.75	43	420
12	350	18	.75	56	520
14	350	6	.66	35	365
14	350	12	.66	46	465
14	350	18	.66	57	570
16	350	6	.70	35	440
16	350	12	.70	48	580
16	350	18	.70	58	690

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.



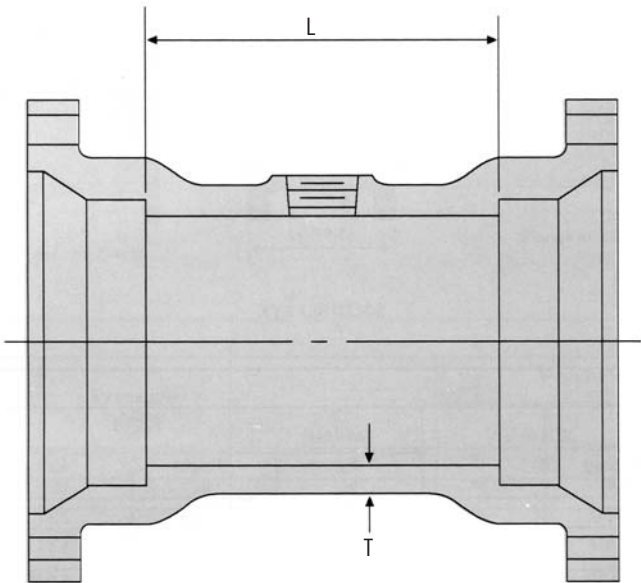
# MECHANICAL JOINT FITTINGS



2005 EDITION

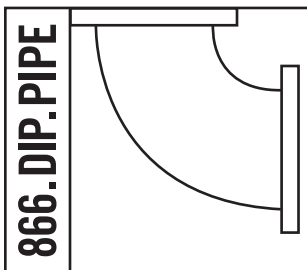
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## Tapped Tees



SIZE Inches	PRESSURE RATING psi	DIMENSIONS Inches		MAXIMUM TAP IN BOSS	WEIGHT Pounds
		T	L		
3	350	.48	8	2-1/2	35
4	350	.52	8	2-1/2	45
6	350	.55	8	2-1/2	70
8	350	.60	8	2-1/2	95
10	350	.68	8	2-1/2	130
12	350	.75	8	2-1/2	165

Two bosses can be used to make a tapped cross.  
 For dimensions of Mechanical Joints see page 4.



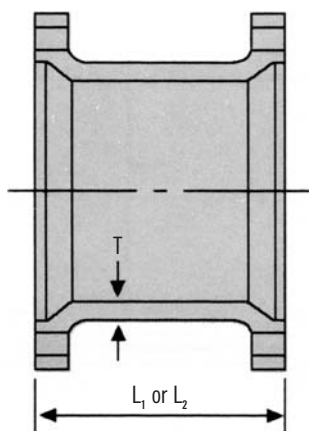
# MECHANICAL JOINT FITTINGS



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## Solid Sleeves

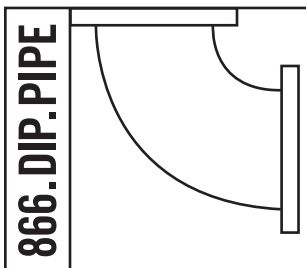


SIZE Inches	PRESSURE RATING psi	T Inches	SOLID			
			L <sub>1</sub> Inches	WEIGHT Pounds	L <sub>2</sub> Inches	WEIGHT Pounds
3	350	.48	7.5	25	12	30
4	350	.52	7.5	35	12	45
6	350	.55	7.5	45	12	65
8	350	.60	7.5	65	12	85
10	350	.68	7.5	85	12	115
12	350	.75	7.5	110	12	145
14	350	.82	9.5	165	15	225
16	350	.89	9.5	200	15	275
18	350	.96	9.5	240	15	330
20	350	1.03	9.5	275	15	380
24	350	1.16	9.5	360	15	505
30	250	1.37	15.0	745	24	1085
36	250	1.58	15.0	1030	24	1495
42	250	1.78	15.0	1330	24	1940
48	250	1.96	15.0	1645	24	2405

For Dual Purpose Mechanical Joint Solid Sleeves see page 26.

For dimensions of Mechanical Joints see page 4.

We do not manufacture Split Sleeves. Our local sales office can obtain dimensions and prices for Split Sleeves produced by other manufacturers.



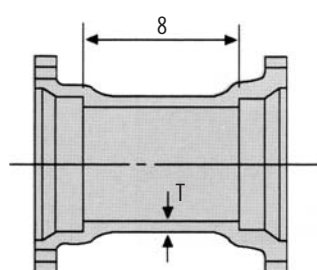
# MECHANICAL JOINT FITTINGS



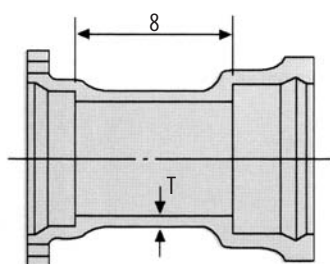
2005 EDITION

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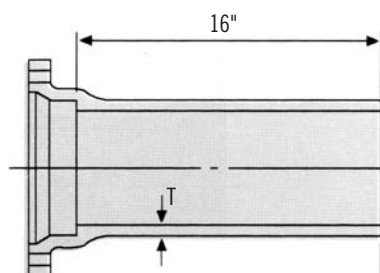
## Connecting Pieces



MJ and MJ



MJ and Bell\*



MJ and PE

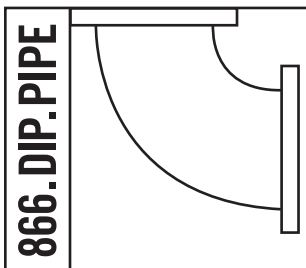
SIZE Inches	PRESSURE RATING psi	T Inches	WEIGHT Pounds		
			MJ & MJ	MJ & BELL	MJ & PE
3	350	.48	35	40	35
4	350	.52	45	55	45
6	350	.55	70	80	65
8	350	.60	95	115	95
10	350	.68	130	150	125
12	350	.75	165	190	165
14	350	.66	220	230	205
16	350	.70	270	290	250
18	350	.75	325	340	300
20	350	.80	390	405	360
24	350	.89	515	530	475
30	250	1.03	840	820	730
36	250	1.15	1170	1170	1005
42	250	1.28	1500	1515	1295
48	250	1.42	1910	1930	1640

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

MJ and PE connecting pieces may be furnished from centrifugally cast pipe. Please contact your U.S. Pipe Representative.





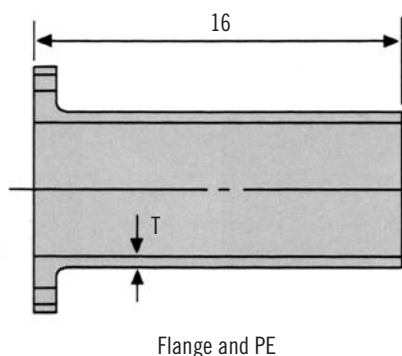
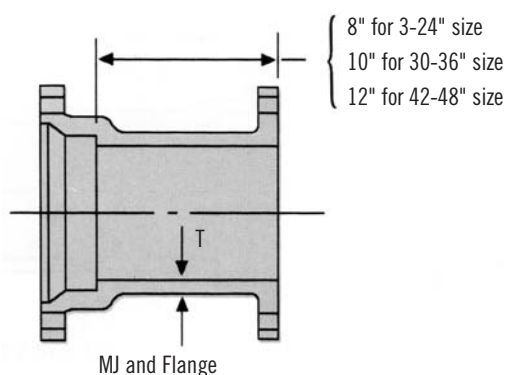
# MECHANICAL JOINT FITTINGS



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## Connecting Pieces, One End Flanged



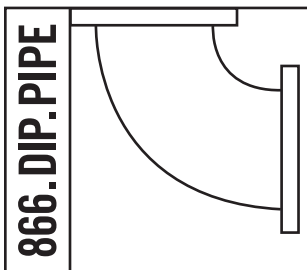
SIZE Inches	PRESSURE RATING psi	T Inches	WEIGHT Pounds	
			MJ & FLANGE	FLANGE & PE
3	250	.48	30	30
4	250	.52	40	40
6	250	.55	60	55
8	250	.60	85	85
10	250	.68	115	115
12	250	.75	155	155
14	250	.66	195	180
16	250	.70	240	220
18	250	.75	280	255
20	250	.80	340	305
24	250	.89	455	415
30	250	1.03	760	600
36	250	1.15	1070	830
42	250	1.28	1505	1115
48	250	1.42	1885	1390

For dimensions of Mechanical Joints see page 4.

For dimensions of plain ends see page 5.

For dimensions of flanges see page 4 in the Flanged Fittings brochure.

MJ and Flange and PE connecting pieces may be furnished from centrifugally cast pipe.



# MECHANICAL JOINT FITTINGS

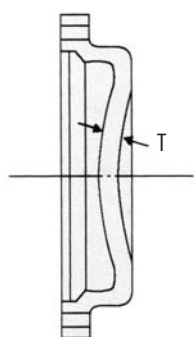


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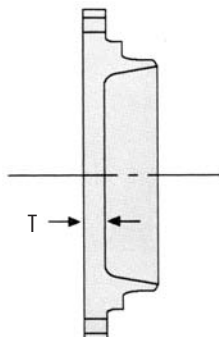
P 25

## Caps and Plugs

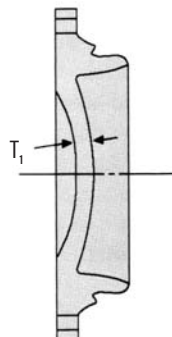
CAP



PLUGS

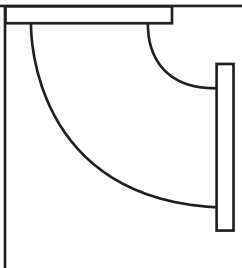


3" - 24"



30" - 48"

SIZE Inches	PRESSURE RATING psi	CAPS		PLUGS		
		T Inches	WEIGHT Pounds	DIMENSIONS Inches		WEIGHT Pounds
				T	T <sub>1</sub>	
3	350	.48	12	.50	••	12
4	350	.52	20	.60	••	20
6	350	.55	30	.65	••	35
8	350	.60	45	.70	••	50
10	350	.68	60	.75	••	65
12	350	.75	80	.75	••	85
14	250	.82	115	.82	••	115
16	250	.89	155	.89	••	145
18	250	.96	215	.96	••	185
20	250	1.03	250	1.03	••	225
24	250	1.16	370	1.16	••	335
30	250	1.37	680	••	1.37	660
36	250	1.58	1005	••	1.58	975
42	250	1.78	1535	••	1.78	1355
48	250	1.96	1950	••	1.96	1810



# MECHANICAL JOINT FITTINGS



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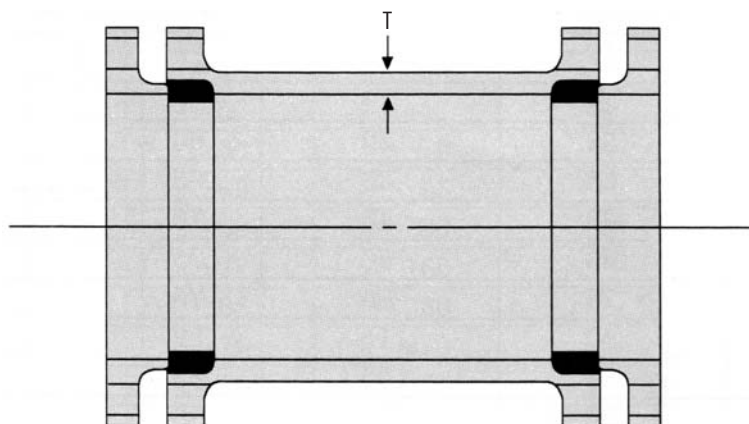
P 26

## Dual Purpose Mechanical Joint Sleeves

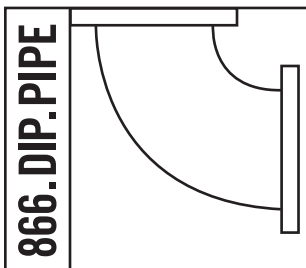
The joining of cast iron pipe of the same nominal size but with different outside diameters can be accomplished with the use of a dual purpose mechanical joint sleeve. The dual sleeve is made in sizes 4" through 12". It is a modified mechanical joint solid sleeve with the gasket, gasket seat and gland so designed that a joint can be made with either "AB" or "CD" diameter pipe. The sleeve employs an identical gasket on each end, which can adapt itself to either "AB" or "CD" diameter pipe, either pit cast or centrifugal pipe.

The glands and the gaskets are not the same as the glands and gaskets used with a standard mechanical joint. However, the tee-head bolts are the same as those used with a standardized mechanical joint.

Dual purpose sleeves are furnished complete with gaskets, glands, nuts and bolts.



SIZE Inches	THICKNESS T Inches	OVERALL LENGTH Inches	TOTAL WEIGHT WITH ACCESSORIES Pounds	WEIGHT WITHOUT ACCESSORIES Pounds
4	.52	12	84	48
6	.55	12	114	68
8	.60	12	143	87
10	.63	12	193	113
12	.68	12	254	144



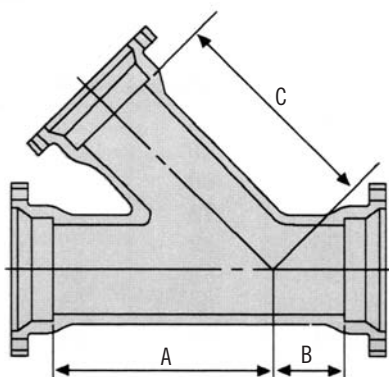
# MECHANICAL JOINT FITTINGS



2005 EDITION

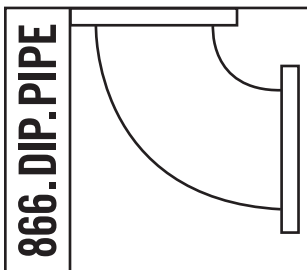
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## Wye Branches



SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches					WEIGHT Pounds
RUN	BRANCH		WALL THICKNESS		A	B	C	
			RUN	BRANCH				
3	3	350	.48	.48	10	3	10	60
4	3	350	.52	.48	12	3	12	85
4	4	350	.52	.52	12	3	12	95
6	3	350	.55	.48	14.5	3.5	14.5	125
6	4	350	.55	.52	14.5	3.5	14.5	135
6	6	350	.55	.55	14.5	3.5	14.5	150
8	4	350	.60	.52	17.5	4.5	17.5	190
8	6	350	.60	.55	17.5	4.5	17.5	205
8	8	350	.60	.60	17.5	4.5	17.5	225
10	4	350	.68	.52	20.5	5	20.5	270
10	6	350	.68	.55	20.5	5	20.5	285
10	8	350	.68	.60	20.5	5	20.5	305
10	10	350	.80	.80	20.5	5	20.5	375
12	4	350	.75	.52	24.5	5.5	24.5	375
12	6	350	.75	.55	24.5	5.5	24.5	390
12	8	350	.75	.60	24.5	5.5	24.5	415
12	10	350	.87	.80	24.5	5.5	24.5	500
12	12	350	.87	.87	24.5	5.5	24.5	535
14	6	350	.82	.55	27	6	27	540
14	8	350	.82	.60	27	6	27	565
14	10	350	.82	.68	27	6	27	595
14	12	350	.82	.75	27	6	27	630
14	14	350	.82	.82	27	6	27	690

For dimensions of Mechanical Joints see page 4.



# MECHANICAL JOINT FITTINGS



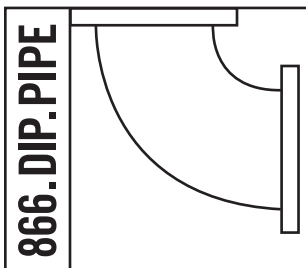
2005 EDITION

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## Wye Branches (cont.)

SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches					WEIGHT Pounds
RUN	BRANCH		WALL THICKNESS		A	B	C	
			RUN	BRANCH				
16	6	350	.89	.55	30	6.5	30	700
16	8	350	.89	.60	30	6.5	30	720
16	10	350	.89	.68	30	6.5	30	755
16	12	350	.89	.75	30	6.5	30	790
16	14	350	.89	.82	30	6.5	30	850
16	16	350	.89	.89	30	6.5	30	905
18	6	350	.96	.55	32	7	32	865
18	8	350	.96	.60	32	7	32	890
18	10	350	.96	.68	32	7	32	925
18	12	350	.96	.75	32	7	32	960
18	14	350	.96	.82	32	7	32	1015
18	16	350	.96	.89	32	7	32	1070
18	18	350	.96	.96	32	7	32	1135
20	8	350	1.03	.60	35	8	35	1115
20	10	350	1.03	.68	35	8	35	1150
20	12	350	1.03	.75	35	8	35	1190
20	14	350	1.03	.82	35	8	35	1250
20	16	350	1.03	.89	35	8	35	1300
20	18	350	1.03	.96	35	8	35	1365
20	20	350	1.03	1.03	35	8	35	1435

For dimensions of Mechanical Joints see page 4.



# MECHANICAL JOINT FITTINGS



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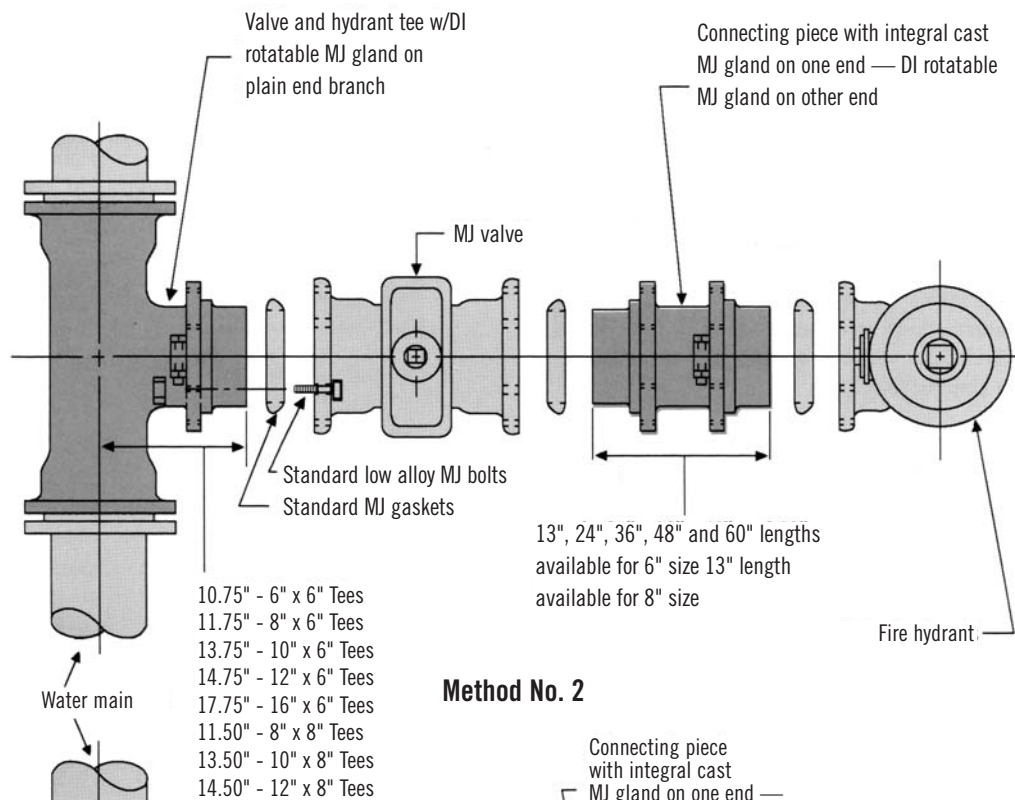
## Wye Branches (cont.)

SIZE Inches		PRESSURE RATING psi	DIMENSIONS Inches					WEIGHT Pounds
RUN	BRANCH		WALL THICKNESS		A	B	C	
			RUN	BRANCH				
24	8	350	1.16	.60	40.5	9	40.5	1625
24	10	350	1.16	.68	40.5	9	40.5	1660
24	12	350	1.16	.75	40.5	9	40.5	1700
24	14	350	1.16	.82	40.5	9	40.5	1760
24	16	350	1.16	.89	40.5	9	40.5	1815
24	18	350	1.16	.96	40.5	9	40.5	1880
24	20	350	1.16	1.03	40.5	9	40.5	1950
24	24	350	1.16	1.16	40.5	9	40.5	2115
30	12	250	1.37	.75	49	10	49	2850
30	14	250	1.37	.82	49	10	49	2915
30	16	250	1.37	.89	49	10	49	2975
30	18	250	1.37	.96	49	10	49	3040
30	20	250	1.37	1.03	49	10	49	3115
30	24	250	1.37	1.16	49	10	49	3280
30	30	250	1.37	1.37	49	10	49	3670
36	12	250	1.58	.75	60	19.5	60	4895
36	14	250	1.58	.82	60	19.5	60	4970
36	16	250	1.58	.89	60	19.5	60	5040
36	18	250	1.58	.96	60	19.5	60	5120
36	20	250	1.58	1.03	60	19.5	60	5205
36	24	250	1.58	1.16	60	19.5	60	5390
36	30	250	1.58	1.37	60	19.5	60	5805
36	36	250	1.58	1.58	60	19.5	60	6335

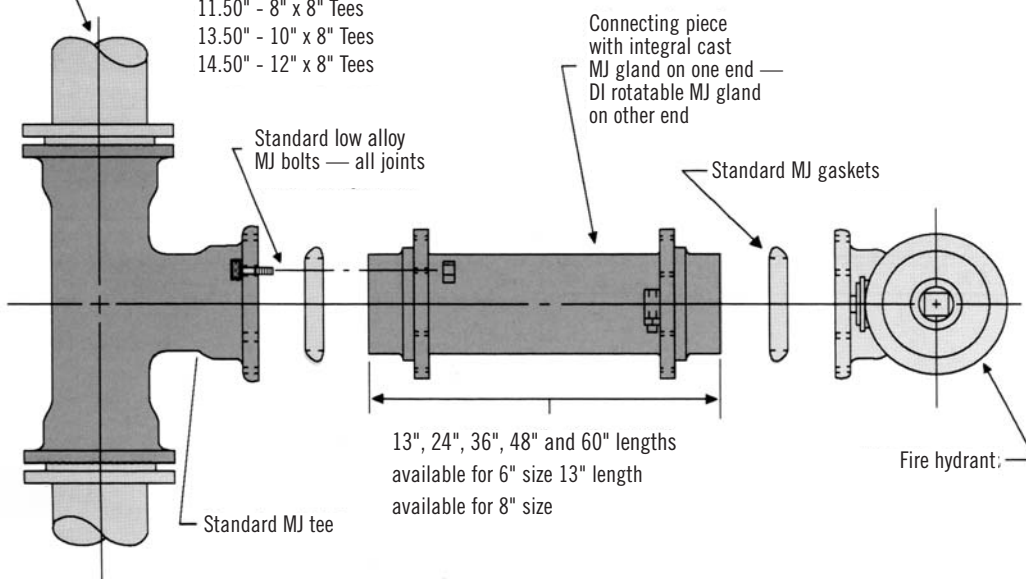
For dimensions of Mechanical Joints see page 4.

## Valve and Hydrant Tees Valve and Hydrant Connecting Pieces

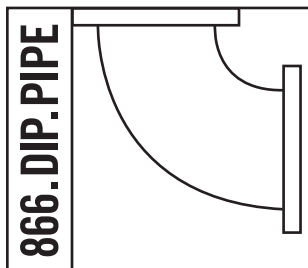
### Method No. 1



### Method No. 2



For other dimensions see table of Mechanical Joint tees and crosses.



# MECHANICAL JOINT FITTINGS



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## Valve and Hydrant Tees Valve and Hydrant Connecting Pieces (cont.)

Mechanical joint valve and hydrant tees and connecting pieces are used for anchoring mechanical joint valves and hydrants to the pipe main. Hydrant fittings also provide convenient anchoring in other installations where valves or caps are used at termination points. These hydrant fittings are made with attached glands; therefore after bolting to the adjoining fittings the joints are effectively restrained from separation. Joint connections are made with standard mechanical joint bolts and gaskets. There is no need for tie rods or external blocking. Glands are rotatable on tee branches and on one end of connecting pieces to facilitate vertical setting of valves and hydrants in sloping terrain.

Use of the valve and hydrant tee permits installation of the valve and testing of the main prior to installation of the hydrant. With the valve anchored to the main, replacement of damaged fire hydrants can be more easily accomplished.

Rotatable glands are made of Ductile Iron.

All valve and hydrant tees and connecting pieces are Ductile Iron, with a pressure rating of 350 psi.

Valve and Hydrant Tees

SIZE Inches	WEIGHT Pounds
6 x 6	110
8 x 6	160
10 x 6	235
12 x 6	310
16 x 6	525
8 x 8	210
10 x 8	286
12 x 8	370

Valve and Hydrant Connecting Pieces

SIZE Inches	LENGTH Inches	WEIGHT Pounds
6	13	55
6	24	90
6	36	125
6	48	160
6	60	195
8	13	130

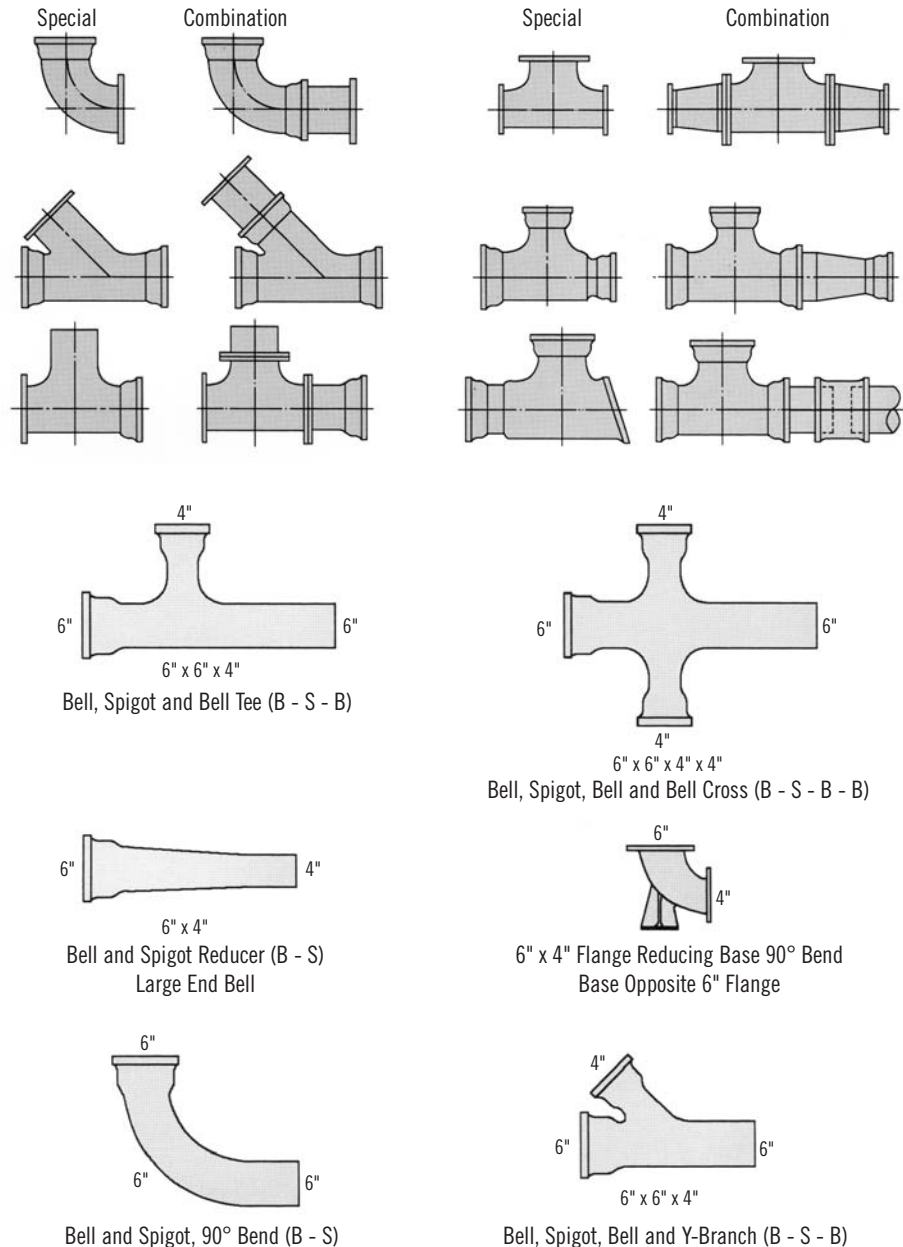


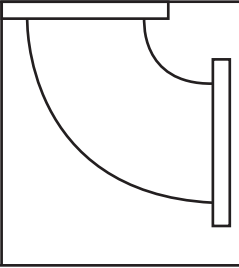
## Combinations of Standard Fittings That May be Used in Place of Special Fittings

The illustrations in the "SPECIAL" columns on this page indicate typical fittings that are often required with a combination of bell, spigot, and flange outlets. The laying dimensions of these fittings are not covered by any standard and they are therefore usually named "SPECIAL", inasmuch as they are made in order to suit specific conditions in piping installations.

To the right of each "SPECIAL" fitting is shown a combination of Standard fittings that can be used to obtain the same outlet effects as the Specials. The laying dimensions may not be interchangeable since the dimensions of the Standard fittings are fixed whereas the Specials can be made to any desired length.

The use of Standard fittings wherever possible is always recommended as the most economical; such fittings can usually be shipped out of stock. In sending inquiries for fittings of dimensions deviating from the Standard, state specifically the type of outlets wanted, reading, size, etc., as shown on this page, and give exact dimension from the center line to outlet.





# MECHANICAL JOINT FITTINGS



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## Products for Water, Wastewater and Fire Protection

Ductile Iron Pipe	SIZE RANGE
TYTON JOINT® Pipe	4"-64" Ductile Iron
Mechanical Joint Pipe	4"-12" Ductile Iron
TR FLEX® Pipe	4"-64" Ductile Iron
Flanged Pipe	3"-64" Ductile Iron
USIFLEX® Boltless Flexible Joint Pipe — for Subaqueous Installations	4"-48" Ductile Iron
<b>Restrained Joints</b>	
TR FLEX® Pipe	4"-64" Ductile Iron
MJ FIELD LOK® Gaskets	4"-24"
FIELD LOK 350® Gaskets	4"-24"
FIELD LOK® Gasket	30" & 36"
TR FLEX GRIPPER® Rings	4"-36" Ductile Iron
TR TELE FLEX® Assemblies	4"-24" Ductile Iron
HP LOK™ Restrained Joint	30"-42"
<b>Ductile Iron Fittings</b>	
TYTON® Fittings	14"-64" Ductile Iron
TRIM TYTON® Fittings	4"-12" Ductile Iron
TR FLEX® Fittings and TR FLEX® Telescoping Sleeves	4"-64" Ductile Iron
Mechanical Joint Fittings	3"-48" Ductile Iron
TRIM TYTE® MJ Fittings	3"-48" Ductile Iron
Flanged Fittings	3"-64" Ductile Iron
XTRA FLEX® Couplings	4"-24" Ductile Iron
<b>Miscellaneous Products</b>	
PROTECTO 401™ Lined Ductile Iron Pipe for Domestic Sewage and Industrial Wastes	4"-64" Ductile Iron
FLANGE-TYTE® Gaskets	4"-64"
Saddle Outlets	Various Ductile Iron
Welded Outlets	Various Ductile Iron
Polyethylene Encasement	4"-64"

*Our products are manufactured in conformance with National Standards so that our customers may be assured of getting the performance and longevity they expect. Use of accessories or other appurtenances that do not comply with recognized standards may jeopardize the performance and longevity of the project.*

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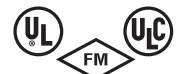
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**For Fire Protection &  
Other Low Pressure Piping Systems****Submittal Sheet**

Merit Weld-Miser™ Tee-Let® Welding Branch Outlet Fittings offer the user a high strength, low cost forged threaded and grooved line of fittings specifically designed and manufactured to be installed on Schedules 5 thru 10, proprietary thin wall flow pipe and standard wall pipe.

Merit Tee-Lets are forged steel welding outlet fittings. The material used in manufacture meets the chemical and physical requirements of ASTM A 53, Grades A or B, Type E, A-135, A-795, Tee-Lets employ a low weld volume design to provide for either a partial or full penetration weld employing a single pass with minimum burn-through and pipe distortion. Weld Miser Tee-Lets are recommended for use on proprietary thin wall, Schedules 5, 10 and 40 pipe. Threads comply with ANSI B1.20.1 or ISO7/1. They are UL Listed and FM Approved for use conforming to the requirements of Bulletin 13 1999 of the National Fire Protection Association. When used in fire sprinkler systems, Tee-Lets are rated for 300 psi. When used in mechanical systems, maximum pressures are calculated using criteria developed for ASME B31 piping code.

**APPROVED**

For Listing / Approval  
details contact your  
AnvilStar™ Representative.

**TEE-LET WELDED OUTLET FITTING  
(UL VIZU — EX6032, FM Approval Guide Chapter 1 – Pipe Fittings)**

Outlet Model	Outlet Pipe Size	Header Pipe Size	Rated Pressure
	In.	In.	psig
Tee-Let Type A (F-Threaded End)	1/2, 3/4, 1	1/2 - 8 (Sch.10, 40)	300
	1 1/4, 1 1/2, 2, 2 1/2, 3, 4	1/2 - 4 (Sch. 5, DynaFlow)	
	2	4 (EZ-Flow)	
	2, 4	6 (EZ-Flow)	
Tee-Let Type C (Grooved End)	1 1/4 - 8	1 1/4 - 8 (Sch.10, 40)	300
	2 1/2 - 8	1/2 - 4 (Sch. 5, DynaFlow)	
Tee-Let Type C/R (Roll Grooved End)	1 1/4 - 6	1 1/4 - 8 (All Schedules)	300

**PROJECT INFORMATION:****APPROVAL STAMP:****Project:****Date:****Phone:****Architect / Engineer:****Contractor:****Address:****Notes 1:****Notes 2:**

PAGE 1 OF 5

**UNIFIED DESIGN™ SERIES**

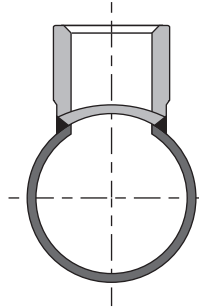
Merit's Unified Design Series carries all important design considerations into its entire line of welding branch outlet fittings.

Merit® Weld-Miser™ Tee-Lets® are designed and Manufactured to reduce the amount of weld required to install the Tee-Lets on thin wall or proprietary flow pipe. Typically only one weld-pass completes the installation. Merit Tee-Lets install with less weld volume than any other brand of welding outlet fittings for fire sprinkler applications. To accomplish this:

- The contoured end of the fittings employs a reduced outside diameter. Two major advantages are immediately apparent:
- The thinner wall on the contoured end permits welding temperatures to be matched to the thickness of the branch line or main thereby insuring complete penetration without cold welds, weld roll-off, burn-through or excessive distortion.
- On smaller sizes a heavier section is maintained on the threaded end of the fitting. This protects the threads from damage during shipping and handling prior to installation as well as from weld distortion.
- Each outlet size 1 1/2" and larger, whether male or female threaded, cut grooved or beveled requires the same hole size in the header pipe. This simplifies the installation process.

**GENERAL SPECIFICATIONS**

- Tee-Let welding outlet fittings are manufactured from highly weldable steel which conforms to the chemical and physical requirements of ASTM A-53, Grades A or B, Type E. Ease of installation is assured when automatic welding equipment is used to install Merit Tee-Lets.



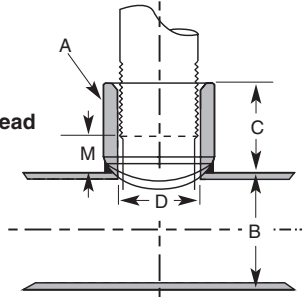
- Threads are cut in accordance with the requirements of ANSI B1.20.1, national standard for tapered pipe threads, or ISO-7-1 threads are available.
- Tee-Let threaded and grooved welding outlet fittings are UL/ULC Listed and FM Approved for use in the fire sprinkler systems installed in accordance with the requirements of NFPA Bulletin 13. They are rated for 300 PSI operation in fire sprinkler systems, and higher pressures in other non-critical piping systems.
- Tee-Lets are offered in a wide variety of header sizes. The consolidated header sizes shown in the following charts allow the fittings to be installed on more than one header size, permitting the first size listed to fit the header perfectly, while a small gap along the longitudinal center line of the header will appear for the second size listed.
- Merit® Weld-Miser™ Tee-Lets® are identified by a lot number that provides full traceability per ISO 9000 specifications.

**FOR YOUR PIPING SYSTEMS SPECIFY  
WELD-MISER™ TEE-LET®**

Branch Outlet Fittings shall be Merit Weld-Miser Tee-Let, Lightweight forged steel, employing low weld volume profile to provide for full penetration welds with minimum burn through and pipe distortion on Schedule 5 thru 10, proprietary thin wall, and standard wall pipe. Threads are to be ANSI B1.20.1, or ISO-7-1, and the bore of the fittings calculated to improve flow. Welding outlets to be UL Listed, FM Approved for use conforming to NFPA, Bulletin 13 and pressure rated for 300 PSI maximum.



Type A  
Female Thread

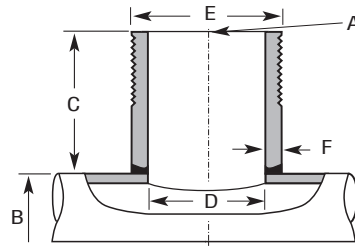
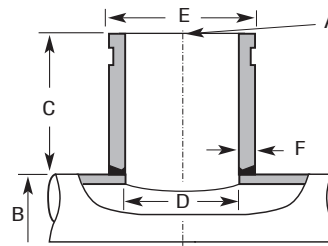


WELD-MISER™ TEE-LET® DIMENSIONS & PART NUMBERS						
Part Number	Nominal Outlet A	Nominal Header B	Outlet Length C	Inside Diameter D	Make Up M	Weight Each
NPT (BSPT)	In (mm)	In (mm)	In (mm)	In (mm)	In (mm)	Lb. (kg)
1002002	1/4 x	1 1/4 - 8				0.080
—	6 x	6 - 200				0.04
1005012	1/2 x	1 1/4 - 1 1/2	1.063	0.700	0.500	0.171
—		32 - 40	27.0	17.8	12.7	0.08
1005015		1 1/2 - 2	1.063	0.700	0.500	0.171
—		40 - 50	27.0	17.8	12.7	0.08
1005020		2 - 2 1/2	1.063	0.700	0.500	0.171
—	13 x	50 - 65	27.0	17.8	12.7	0.08
1005025	3/4 x	2 1/2 - 8	1.063	0.700	0.500	0.169
—		65 - 200	27.0	17.8	12.7	0.08
1007012		1 1/4 - 1 1/2	1.125	0.900	0.500	0.260
—		32 - 40	28.6	22.9	12.7	0.12
1007015		1 1/2 - 2	1.125	0.900	0.500	0.260
—	19 x	40 - 50	28.6	22.9	12.7	0.12
1007020	1 x	2 - 2 1/2	1.125	0.900	0.500	0.260
—		50 - 65	28.6	22.9	12.7	0.12
1007025		2 1/2 - 8	1.125	0.900	0.500	0.256
—		65 - 200	28.6	22.9	12.7	0.12
1010012		1 1/4 - 1 1/2	1.250	1.145	0.500	0.331
1110012	25 x	32 - 40	31.8	29.1	12.7	0.15
1010015		1 1/2 - 2	1.250	1.145	0.500	0.331
1110015		40 - 50	31.8	29.1	12.7	0.15
1010020		2 - 2 1/2	1.250	1.145	0.500	0.320
1110020		50 - 65	31.8	29.1	12.7	0.15
1010025		2 1/2 - 3	1.250	1.145	0.500	0.314
1110025		65 - 80	31.8	29.1	12.7	0.14
1010030		3 - 4	1.250	1.145	0.500	0.309
1110030		80 - 100	31.8	29.1	12.7	0.14
1010050		5 - 8	1.250	1.145	0.500	0.291
1110050	32 x	125 - 200	31.8	29.1	12.7	0.13
1012012		1 1/4 - 1 1/2	1.375	1.490	0.500	0.432
1112012		32 - 40	34.9	37.8	12.7	0.19
1012015		1 1/2 - 2	1.375	1.490	0.500	0.421
1112015		40 - 50	34.9	37.8	12.7	0.19
1012020		2 - 2 1/2	1.375	1.490	0.500	0.421
1112020		50 - 65	34.9	37.8	12.7	0.19
1012025		2 1/2 - 3	1.375	1.490	0.500	0.411
1112025		65 - 80	34.9	37.8	12.7	0.19
1012030		3 - 4	1.375	1.490	0.500	0.389
1112030	40 x	80 - 100	34.9	37.8	12.7	0.18
1012050		5 - 8	1.375	1.490	0.500	0.389
1112050		125 - 200	34.9	37.8	12.7	0.18
1015015		1 1/2	1.625	1.610	0.875	0.477
1115015		40	41.3	40.9	22.2	0.22
1015020		2	1.625	1.610	0.875	0.477
1115020		50	41.3	40.9	22.2	0.22
1015025		2 1/2	1.625	1.610	0.875	0.477
1115025		65	41.3	40.9	22.2	0.22
1015030		3 - 4	1.625	1.610	0.875	0.477
1115030	100 x	80 - 100	41.3	40.9	22.2	0.22
1015040		4	1.625	1.610	0.875	0.477
1115040		100	41.3	40.9	22.2	0.22
1015050		5 - 8	1.625	1.610	0.875	0.477
1115050		125 - 200	41.3	40.9	22.2	0.22

WELD-MISER™ TEE-LET® DIMENSIONS & PART NUMBERS						
Part Number	Nominal Outlet A	Nominal Header B	Outlet Length C	Inside Diameter D	Make Up M	Weight Each
NPT (BSPT)	In (mm)	In (mm)	In (mm)	In (mm)	In (mm)	Lb. (kg)
1020020	2 x	2	1.750	2.067	0.875	0.857
1120020		50	44.5	52.5	22.2	0.38
1020025		2 1/2	1.750	2.067	0.875	0.829
1120025		65	44.5	52.5	22.2	0.38
1020030		3	1.750	2.067	0.875	0.829
1120030		80	44.5	52.5	22.2	0.39
1020040		4	1.750	2.067	0.875	0.800
1120040		100	44.5	52.5	22.2	0.36
1020050		5	1.750	2.067	0.875	0.743
1120050		125	44.5	52.5	22.2	0.34
1020060	2 1/2 x	6	1.750	2.067	0.875	0.743
1120060		150	44.5	52.5	22.2	0.34
1020080		8	1.750	2.067	0.875	0.743
1120080		200	44.5	52.5	22.2	0.34
1025025		2 1/2	2.215	2.469	1.125	1.250
1125025		65	54.0	62.7	28.6	0.55
1025030		3	2.215	2.469	1.125	1.200
1125030		80	54.0	62.7	28.6	0.55
1025040		4	2.215	2.469	1.125	1.150
1125040		100	54.0	62.7	28.6	0.52
1025050	3 x	5	2.215	2.469	1.125	1.150
1125050		125	54.0	62.7	28.6	0.52
1025060		6	2.215	2.469	1.125	1.150
1125060		150	54.0	62.7	28.6	0.52
1025080		8	2.215	2.469	1.125	1.150
1125080		200	54.0	62.7	28.6	0.52
1030030		3	2.500	3.068	1.500	1.750
1130030		80	63.5	77.9	38.1	0.79
1030040		4	2.500	3.068	1.500	1.700
1130040		100	63.5	77.9	38.1	0.77
1030050	3 x	5	2.500	3.068	1.500	1.700
1130050		125	63.5	77.9	38.1	0.77
1030060		6	2.500	3.068	1.500	1.650
1130060		150	63.5	77.9	38.1	0.75
1030080		8	2.500	3.068	1.500	1.650
1130080		200	63.5	77.9	38.1	0.75
1040040		4	3.000	4.026	2.000	3.000
1140040		100	76.2	102.3	50.8	1.36
1040050		5	3.000	4.026	2.000	2.900
1140050		125	76.2	102.3	50.8	1.32
1040060	4 x	6	3.000	4.026	2.000	2.800
1140060		150	76.2	102.3	50.8	1.27
1040080		8	3.000	4.026	2.000	2.800
1140080		200	76.2	102.3	50.8	1.27

NOTE: Part #1002002 is not UL Listed or FM Approved.

All size-on-size (i.e. 2 x 2) Tee-Lets are not FM Approved.

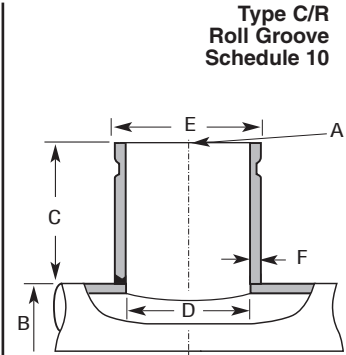
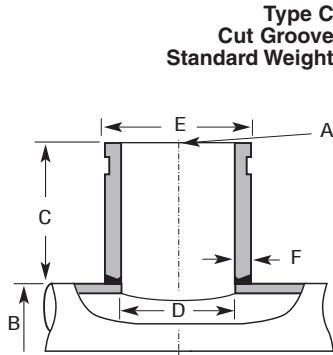
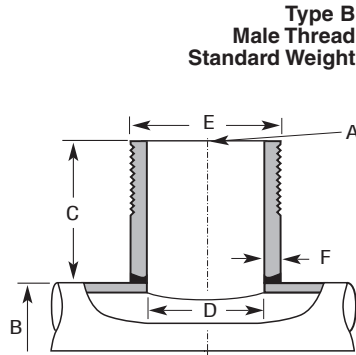

**Type B  
Male Thread  
Standard Weight**

**Type C  
Cut Groove  
Standard Weight**

**WELD-MISER™ TEE-LET® - DIMENSIONS (NOMINAL SIZES 1" THRU 2")**

Male Thread Std. Wt.	Cut Groove Std. Wt.	Nominal Outlet A	Nominal Header B	Outlet Length C	Inside Diameter D	Outside Diameter E	Wall Thickness F
<i>NPT (BSPT)</i>	<i>NPT (BSPT)</i>	<i>ln.(mm)</i>	<i>ln.(mm)</i>	<i>ln.(mm)</i>	<i>ln.(mm)</i>	<i>ln.(mm)</i>	<i>ln.(mm)</i>
1310012	2010012	1 x 25 x	1¼ - 1½ 32 - 40	3 80	1.049 26.6	1.315 33.4	0.133 3.4
1310015	2010015		1½ - 2 40 - 50	3 80	1.049 26.6	1.315 33.4	0.133 3.4
1310020	2010020		2 - 2½ 50 - 65	3 80	1.049 26.6	1.315 33.4	0.133 3.4
1310025	2010025		2½ - 4 65 - 100	3 80	1.049 26.6	1.315 33.4	0.133 3.4
1310050	2010050		5 - 8 125 - 200	3 80	1.049 26.6	1.315 33.4	0.133 3.4
1312012	2012012	1¼ x 32 x	1¼ 32	3 80	1.368 34.7	1.660 42.2	0.140 3.6
1312015	2012015		1½ 40	3 80	1.368 34.7	1.660 42.2	0.140 3.6
1312020	2012020		2 - 2½ 50 - 65	3 80	1.368 34.7	1.660 42.2	0.140 3.6
1312025	2012025		3 - 4 80 - 100	3 80	1.368 34.7	1.660 42.2	0.140 3.6
1312050	2012050		5 - 8 125 - 200	3 80	1.368 34.7	1.660 42.2	0.140 3.6
1315015	2015015	1½ x 40 x	1½ 40	3 80	1.610 40.9	1.900 48.3	0.145 3.7
1315020	2015020		2 50	3 80	1.610 40.9	1.900 48.3	0.145 3.7
1315025	2015025		2½ 65	3 80	1.610 40.9	1.900 48.3	0.145 3.7
1315030	2015030		3 - 4 80 - 100	3 80	1.610 40.9	1.900 48.3	0.145 3.7
1315050	2015050		5 - 8 125 - 200	3 80	1.610 40.9	1.900 48.3	0.145 3.7
1320020	2020020	2 x 50 x	2 50	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320025	2020025		2½ 65	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320030	2020030		3 80	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320035	2020035		4 100	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320050	2020050		5 125	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320060	2020060		6 150	3 80	2.067 52.5	2.375 60.3	0.154 3.9
1320080	2020080		8 200	3 80	2.067 52.5	2.375 60.3	0.154 3.9

**NOTE:** Tee-Lets are manufactured to fit size-on-size, that is the contoured shape on a given Tee-Let is made to fit perfectly on the first listed header size. If installed on the second header size marked on the fitting, a slight gap of approximately 1/32" will appear along the longitudinal centerline of the header. For example, a 1" x 2 - 2½" Tee-Let, is a 1" outlet fitting manufactured to fit perfectly on the 2" header size listed, while leaving a 1/32" gap along the longitudinal centerline of the 2½" size. If a perfect fit is required for a 2½" header pipe, then a 1" x 2½ - 3" Tee-Let would be ordered. Size consolidations are employed to reduce inventory and provide for greater flexibility.



### Submission Sheet



### WELD-MISER™ TEE-LET® - DIMENSIONS (NOMINAL SIZES 2½" THRU 8")

Male Thread Std. Wt.	Cut Groove Std. Wt.	Roll Groove Sch. 10	Nominal Outlet A	Nominal Header B	Outlet Length C	Inside Diameter - D		Outside Diameter E	Wall Thickness - F	
						Standard Weight	Schedule 10		Standard Weight	Schedule 10
NPT (ISO-7-1)	NPT (ISO-7-1)	NPT (ISO-7-1)	In.(mm)	In.(mm)	In.(mm)	In.(mm)	In.(mm)	In.(mm)	In.(mm)	In.(mm)
1325025	2025025	2225025	2½ x 65 x	2½	3	2.469	2.635	2.875	0.203	0.120
	2125025			65	80	62.7	67.0	76.2	5.0	3.0
1325030	2025030	2225030		3	3	2.469	2.635	2.875	0.203	0.120
	2125030			80	80	62.7	67.0	76.2	5.0	3.0
1325035	2025035	2225035		4	3	2.469	2.635	2.875	0.203	0.120
	2125035			100	80	62.7	67.0	76.2	5.0	3.0
1325050	2025050	2225050	3 x 80 x	5	3	2.469	2.635	2.875	0.203	0.120
	2125050			125	80	62.7	67.0	76.2	5.0	3.0
1325060	2025060	2225060		6	3	2.469	2.635	2.875	0.203	0.120
	2125060			175	80	62.7	67.0	76.2	5.0	3.0
1325080	2025080	2225080		8	3	2.469	2.635	2.875	0.203	0.120
	2125080			200	80	62.7	67.0	76.2	5.0	3.0
1330030	2030030	2230030	4 x 100 x	3	3	3.068	3.260	3.500	0.216	0.120
				80	80	78.0	83.0	88.0	5.0	3.0
1330035	2030035	2230035		3½	3	3.068	3.260	3.500	0.216	0.120
				85	80	78.0	83.0	88.0	5.0	3.0
1330040	2030040	2230040		4	3	3.068	3.260	3.500	0.216	0.120
				100	80	78.0	83.0	88.0	5.0	3.0
1330050	2030050	2230050	6 x 150 x	5	3	3.068	3.260	3.500	0.216	0.120
				125	80	78.0	83.0	88.0	5.0	3.0
1330060	2030060	2230060		6	3	3.068	3.260	3.500	0.216	0.120
				150	80	78.0	83.0	88.0	5.0	3.0
1330080	2030080	2230080		8	3	3.068	3.260	3.500	0.216	0.120
				200	80	78.0	83.0	88.0	5.0	3.0
1340040	2040040	2240040	8 x 200 x	4	4	4.026	4.260	4.500	0.237	0.120
				100	100	102.0	108.0	114.0	6.0	3.0
1340050	2040050	2240050		5	4	4.026	4.260	4.500	0.237	0.120
				125	100	102.0	108.0	114.0	6.0	3.0
1340060	2040060	2240060	-	6	4	4.026	4.260	4.500	0.237	0.120
				150	100	102.0	108.0	114.0	6.0	3.0
1340080	2040080	2240080		8	4	4.026	4.260	4.500	0.237	0.120
				200	100	102.0	108.0	114.0	6.0	3.0
-	2060060	2260060	-	6	4	6.065	6.357	6.625	0.280	0.134
				150	100	155.0	161.5	168.3	7.1	3.0
-	2060080	2260080	-	8	4	6.065	6.357	6.625	0.280	0.134
				200	100	155.0	161.5	168.3	7.1	3.0
-	2080080	-	-	8	4	7.981	8.329	8.625	0.322	0.148
				200	100	203.0	212.0	213.0	8.0	3.0

**NOTE:** Tee-Lets are manufactured to fit size-on-size, that is the contoured shape on a given Tee-Let is made to fit perfectly on the first listed header size. If installed on the second header size marked on the fitting, a slight gap of approximately 1/32" will appear along the longitudinal centerline of the header. For example, a 1" x 2 - 2½" Tee-Let, is a 1" outlet fitting manufactured to fit perfectly on the 2" header size listed, while leaving a 1/32" gap along the longitudinal centerline of the 2½" size. If a perfect fit is required for a 2½" header pipe, then a 1" x 2½ - 3" Tee-Let would be ordered. Size consolidations are employed to reduce inventory and provide for greater flexibility.



## For Fire Protection Applications

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Approval \_\_\_\_\_

Engineer \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Approval \_\_\_\_\_

Representative \_\_\_\_\_

# Series TR Transition Risers

## Sizes: 4" – 10" (100-250mm)

Series TR Transition Risers are used to connect the main fire supply to the building overhead fire system. The fitting passes under the foundation without joints and extends up through the floor. Provided with installation tabs, the unit has a CIPS (Cast Iron Pipe Size) coupler for easy connection to the underground supply (AWWA C900 PVC and Ductile Iron Pipe) and industry standard grooved-end connection (AWWA C606) on the building side for easy connection to the overhead fire sprinkler system.

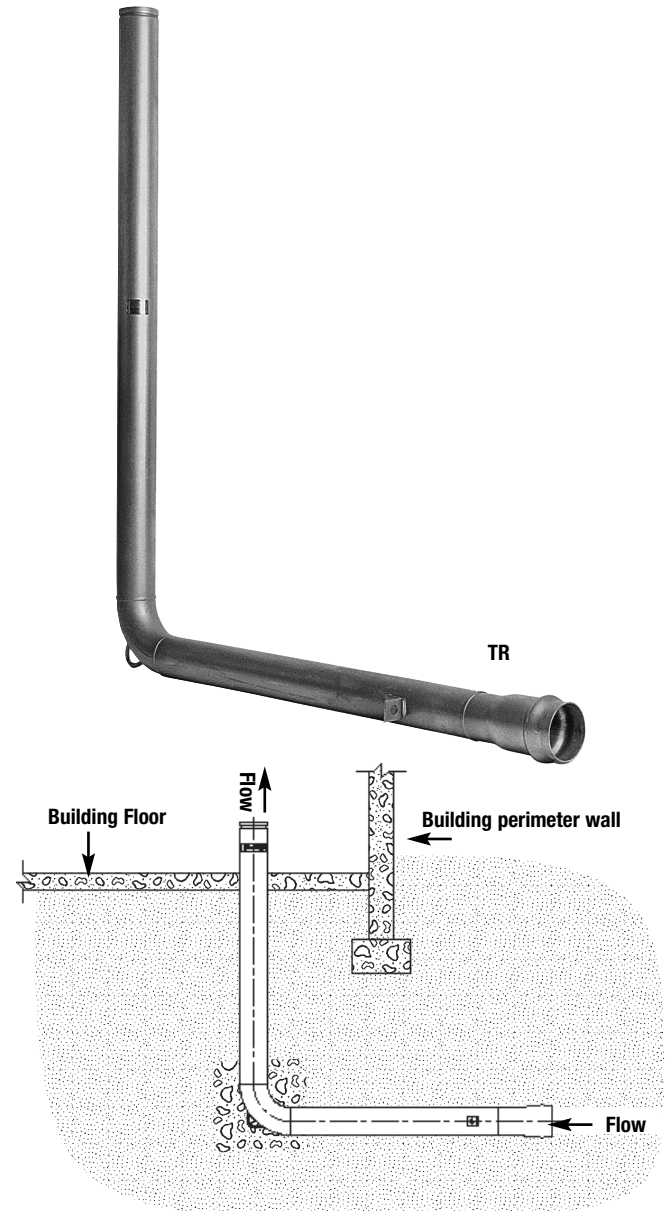
Watts Transition Risers are precision engineered and manufactured to provide exceptional reliability and reduce installation time & labor costs associated with field assembly. In accordance with NFPA 24-2007, the UL/FM approved Transition Risers replace numerous fittings, elbows & spools and reduces the possibility of leaks or failure in comparison to traditional installation methods and materials. Factory tested integrity ensures the highest quality installation. The use of stainless steel significantly increases the reliability and life of the riser.

## Features

- Cost savings
- Corrosion resistant stainless steel construction, type 304
- Ease of installation and lightweight allow one person to position and handle the riser
- Minimal site preparation; joint restraint one-piece construction reduces time and labor; no missing parts, no leaks; easily identifiable for approvals
- UL/FM approved
- Sizes: available in 4" – 10" (100-250mm) with various lengths to meet all local requirements
- Designed to meet NFPA 24-2007 Section 10.6.5
- AWWA C900 Inlet/DIP
- AWWA C606 Outlet

## Specification

Transition Riser shall be installed as indicated on the plans. Riser shall be composed of a single extended 90 degree fitting of fabricated 304 stainless steel tubing, maximum working pressure 200psi (14 bar). The fitting shall have a grooved-end connection on the outlet (building) side and a CIPS coupler on the inlet (underground) side. The Transition Riser shall be a Watts Regulator Company Series TR.



**IMPORTANT: INQUIRE WITH GOVERNING AUTHORITIES  
FOR LOCAL INSTALLATION REQUIREMENTS**

## Standards

**NFPA** — Designed to allow the contractor to conform to NFPA 24-2007 Section 10.6.5

Where a riser is close to building foundations, underground fittings of proper design and type shall be used to avoid pipe joints being located under the foundations.

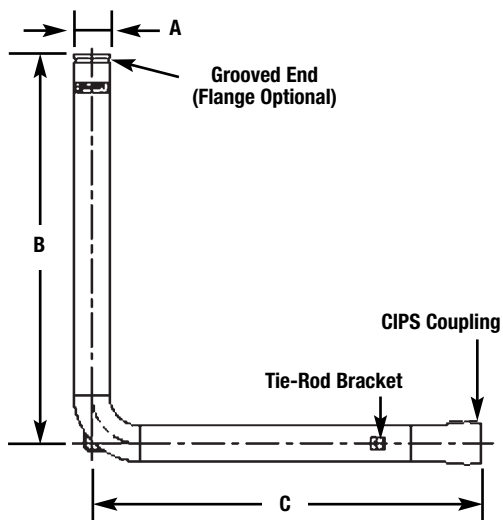
**NFPA** — 24-2007 — 10.1.1, 10.6.7

## Approvals

**Fittings** FM class 1920  
UL HKQA (4"-10")



## Dimensions – Weights



SIZE (DN)				WEIGHT			
<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>ft.</i>	<i>cm</i>	<i>ft.</i>	<i>cm</i>
4	100	4½	114	6	183	6	183
6	150	6⅝	168	6	183	6	183
8	200	8⅝	219	6	183	6	183
10	250	10¾	273	6	183	6	183
						<i>lbs.</i>	<i>kg</i>
						71	32
						98	44
						129	59
						202	92

Consult factory for custom leg dimensions.

## End Connections:

**Horizontal End:** Mates with Ductile Iron Pipe and AWWA C900 Pipe (PVC Pipe with Ductile Iron Pipe Equivalent OD's)

**Utilizes Gasket conforming to UL 157 with "Lock in" gasket configuration**

SIZE (DN)		MATING PIPE OD	
<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>
4	100	4.8	122
6	150	6.9	175
8	200	9.1	230
10	250	11.1	282

## Vertical End:

Meets AWWA C-606 dimensions for roll grooved pipe  
Meets AWWA C-207 class D for flanges

## Ratings

Meets AWWA C-900 pressure class 200, DR 14 Pipe

## Testing

Welds are 100% leak tested at the factory

SIZE		DESIGN PROOF PRESSURE	
<i>in.</i>	<i>mm</i>	<i>psi</i>	<i>bar</i>
4	100	1000	70
6	150	1000	70
8	200	800	56
10	250	800	56



Water Safety & Flow Control Products



**USA:** 815 Chestnut St., No. Andover, MA 01845-6098; [www.watts.com](http://www.watts.com)

**Canada:** 5435 North Service Rd., Burlington, ONT. L7L 5H7; [www.wattscanada.ca](http://www.wattscanada.ca)

2009 EDITION

4"-12"

# MECHANICAL JOINT PIPE

DUCTILE IRON



FOR WATER & WASTEWATER, FIRE PROTECTION & INDUSTRIAL APPLICATIONS

**MORE  
THAN  
JUST  
PIPE.**

**US  
PIPE**

866.DIP.PIP



# MECHANICAL JOINT PIPE

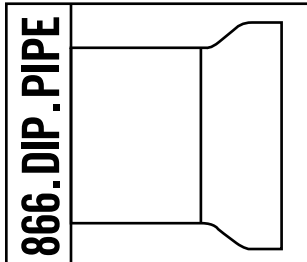


2009 EDITION

P 2

## Table of Contents

Mechanical Joint Pipe	3
Assembly of Mechanical Joint Pipe	4
Technical Information	5



866.DIP.PIPE

# MECHANICAL JOINT PIPE



2009 EDITION

P 3

## Mechanical Joint Pipe

Mechanical joint pipe is a time-tested Ductile Iron product with joint dimensions conforming to the standardized dimensions in AWWA C111. Mechanical joint pipe is UL Listed and FM Approved.

The mechanical joint is based on the stuffing box principle and consists of a bell with a flange cast integrally with it; a cast or ductile iron gland; a rubber gasket and the necessary bolts and nuts. Its design permits considerable deflection as well as longitudinal expansion and contraction in the line.

### Gaskets, Glands and Bolts for Mechanical Joint Pipe and Fittings

All gaskets furnished for mechanical joints are made to accurate dimensions under rigid controls and inspection. Plain tipped rubber gaskets are normally furnished; however, gaskets for special applications can be furnished upon request.

Glands are made of special high quality gray or ductile iron under rigid metallurgical controls and inspections.

Alloy bolts normally furnished for the mechanical joint are low alloy, high strength steel bolts having a minimum yield strength of 45,000 psi. In this use these bolts are cathodic to the pipe, which minimizes any corrosive tendencies. Other types of bolts and bolts for unusual requirements are furnished to meet purchasers' specifications.

Gaskets, glands and bolts are furnished in sufficient quantities to provide for each socket opening on pipe and fittings.

### ANSI / AWWA Standards

#### **ANSI/AWWA C151/A21.51, Standard for Ductile Iron Pipe, Centrifugally Cast for Water.**

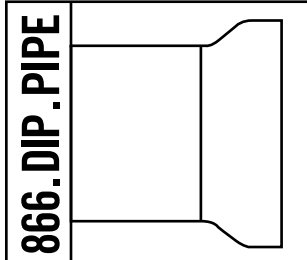
Ductile Iron mechanical joint pipe are centrifugally cast in metal molds in sizes 4" through 12" in accordance with applicable requirements of ANSI/AWWA C151/A21.51.

#### **ANSI/AWWA C111/A21.11, Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.**

Accessories conform to applicable requirements of ANSI/AWWA C111/A21.11.

**NOTE:** U.S. Pipe neither manufactures nor recommends the use of mechanical joint retainer glands. As an accommodation to our customers and consulting engineers we do provide retainer glands for use where specified. Any warranties for those glands sold by U.S. Pipe shall be those warranties given by the particular manufacturer of the gland involved. U.S. PIPE MAKES NO WARRANTIES, EXPRESS OR IMPLIED CONCERNING THOSE GLANDS, AND U.S. PIPE WILL ASSUME NO LIABILITY FOR THEIR USE. We continue to offer other restrained joint products, TR FLEX® Pipe and Fittings, and the FIELD LOK 350® Gasket for use with TYTON JOINT® Pipe and Fittings.

If specifiers and users believe that corrosive soils will be encountered where our products are to be installed, please refer to ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Pipe Systems for proper protection procedures.



# MECHANICAL JOINT PIPE



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## Assembly of Mechanical Joint Pipe

These photographs show each of the five progressive steps in assembling mechanical joint pipe.

Figure 1.

Brush socket, plain end and gasket with soapy water, then slip gland and gasket over plain end. The small side of the gasket and the lip side of the gland face the socket.

Figure 2.

Insert plain end into socket. Push gasket into position with fingers, making sure it is evenly seated.

Figure 3.

Slide gland into position, insert bolts and tighten nuts by hand.

Figure 4.

With ordinary ratchet wrench, tighten bolts alternatively (bottom then top, and so on, all around) to a torque range of 75-90 ft-lb.

Figure 5.

The completed mechanical joint.

**NOTE:** Installation of mechanical joint pipe should be made following the instructions in ANSI/APWA C600 and ANSI/APWA C111/A21.11.

1.



2.



3.



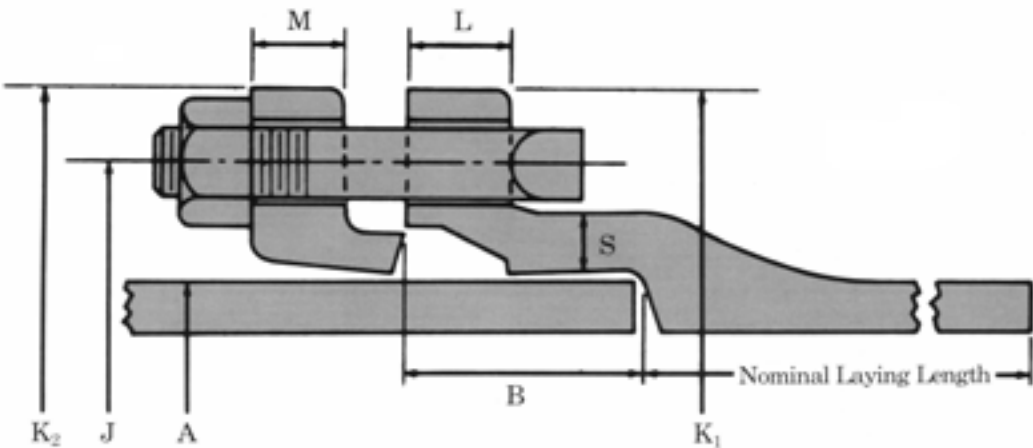
4.



5.



Technical Information

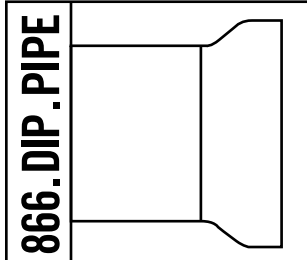


DIMENSIONS  
Inches

Table 1. 4"-12" Mechanical Joint Pipe

									BOLTS			BOLTS BELL Pounds	GLAND MAX GASKET Pounds	DEFLECTION Degrees
SIZE	A	B	J	K <sub>1</sub>	K <sub>2</sub>	L	M	S	QUANTITY	SIZE Inches	LENGTH Inches			
4	4.80	2.50	7.50	9.06	9.12	.91	.75	.41	4	3/4	3-1/2	13	10	8°
6	6.90	2.50	9.50	11.06	11.12	.94	.88	.43	6	3/4	3-1/2	18	16	7°
8	9.05	2.50	11.75	13.31	13.37	.98	1.00	.45	6	3/4	4	24	25	5°
10	11.10	2.50	14.00	15.62	15.62	.98	1.00	.47	8	3/4	4	31	30	5°
12	13.20	2.50	16.25	17.88	17.88	.98	1.00	.49	8	3/4	4	37	40	5°

NOTE: Ductile Iron glands are furnished with 4"-12" mechanical joint pipe.



# MECHANICAL JOINT PIPE



2009 EDITION

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## Technical Information (cont.)

Table 2. Nominal thicknesses, dimensions and weights of 4"-12" mechanical joint pipe conforming to ANSI/AWWA C151/A21.51.

SIZE Inches	THICKNESS CLASS	THICKNESS Inches	OUTSIDE DIAMETER Inches	WEIGHT BARREL PER FOOT Pounds	WEIGHTS† MJ PIPE	
					PER LENGTH* Pounds	AVERAGE WEIGHT PER FOOT** Pounds
4	53	0.32	4.80	13.8	260	14.5
6	53	0.34	6.90	21.4	405	22.4
8	53	0.36	9.05	30.1	565	31.4
10	53	0.38	11.10	39.2	735	40.9
12	53	0.40	13.20	49.2	925	51.3
4	54	0.35	4.80	15.0	285	15.7
6	54	0.37	6.90	23.2	435	24.2
8	54	0.39	9.05	32.5	610	33.8
10	54	0.41	11.10	42.1	790	43.8
12	54	0.43	13.20	52.8	990	54.8
4	55	0.38	4.80	16.1	305	16.9
6	55	0.40	6.90	25.0	470	26.0
8	55	0.42	9.05	34.8	650	36.2
10	55	0.44	11.10	45.1	845	46.8
12	55	0.46	13.20	56.3	1050	58.4
4	56	0.41	4.80	17.3	325	18.0
6	56	0.43	6.90	26.7	500	27.7
8	56	0.45	9.05	37.2	695	38.6
10	56	0.47	11.10	48.0	895	49.8
12	56	0.49	13.20	59.9	1115	61.9

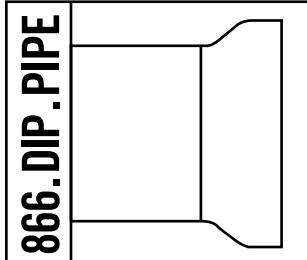
Tolerances of OD of Spigot End: 4"-12"  $\pm .06"$

†4"-12" - Nominal 18' laying lengths.

\*Including bell calculated weight of pipe rounded off to nearest 5 lbs.

\*\*Including bell average weight of pipe per foot, based on calculated weight of pipe before rounding.





# MECHANICAL JOINT PIPE



2009 EDITION

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## Products for Water, Wastewater and Fire Protection

Ductile Iron Pipe	SIZE RANGE
TYTON JOINT® Pipe	4"-64" Ductile Iron
Mechanical Joint Pipe	4"-12" Ductile Iron
TR FLEX® Pipe	4"-64" Ductile Iron
Flanged Pipe	3"-64" Ductile Iron
USIFLEX® Boltless Flexible Joint Pipe — for Subaqueous Installations	4"-48" Ductile Iron
Restrained Joints	
TR FLEX® Pipe	4"-64" Ductile Iron
MJ FIELD LOK® Gaskets	4"-24"
FIELD LOK 350® Gaskets	4"-24"
FIELD LOK® Gasket	30" & 36"
TR FLEX GRIPPER® Rings	4"-36" Ductile Iron
TR TELE FLEX® Assemblies	4"-24" Ductile Iron
HP LOK™ Restrained Joint	30"-42"
Ductile Iron Fittings	
TYTON® Fittings	14"-64" Ductile Iron
TRIM TYTON® Fittings	4"-12" Ductile Iron
TR FLEX® Fittings and TR FLEX® Telescoping Sleeves	4"-64" Ductile Iron
Mechanical Joint Fittings	3"-48" Ductile Iron
TRIM TYTE® MJ Fittings	3"-48" Ductile Iron
Flanged Fittings	3"-64" Ductile Iron
XTRA FLEX® Couplings	4"-24" Ductile Iron
Miscellaneous Products	
PROTECTO 401™ Lined Ductile Iron Pipe for Domestic Sewage and Industrial Wastes	4"-64" Ductile Iron
FLANGE-TYTE® Gaskets	4"-64"
Polymeric Linings	For all pipe sizes
Saddle Outlets	Various Ductile Iron
Welded Outlets	Various Ductile Iron
Polyethylene Encasement	4"-64"

*Our products are manufactured in conformance with National Standards so that our customers may be assured of getting the performance and longevity they expect. Use of accessories or other appurtenances that do not comply with recognized standards may jeopardize the performance and longevity of the project.*

#### REGIONAL SALES OFFICES

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## FS-ONE High Performance Intumescent Firestop Sealant

### Product description

- Intumescent (expands when exposed to fire) firestop sealant that helps protect combustible and non-combustible penetrations for up to 4 hours fire rating

### Product features

- Smoke, gas and water resistant after material has cured
- Contains no halogen, solvents or asbestos
- High fire rating properties
- Water based, easy to clean
- Protects most typical firestop penetration applications
- Paintable
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

### Areas of application

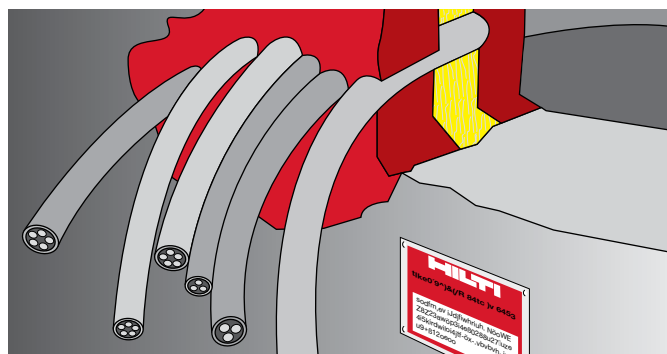
- Steel, copper and EMT pipes
- Insulated steel and copper pipes
- Cable bundles
- Closed or vented plastic pipes
- HVAC penetrations

### For use with

- Concrete, masonry, drywall and wood floor assemblies
- Wall and floor assemblies rated up to 4 hours

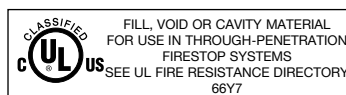
### Examples

- Sealing around combustible pipe penetrations in fire rated construction
- Sealing around non-combustible penetrations in fire rated construction



Technical Data*	FS-ONE
<b>Chemical basis</b>	Water-based intumescent acrylic dispersion
<b>Color</b>	Red
<b>Application temperature</b>	40°F to 104°F (5°C to 40°C)
<b>Skin forming time</b>	Approx. 20-30 min.
<b>Curing time</b>	Approx. 2 mm / 3 days
<b>Average volume shrinkage (ASTM C1241)</b>	24.1%
<b>Movement capability</b>	Approx. 5%
<b>Expansion rate (unrestricted)</b>	Up to 3-5 times original volume
<b>Temperature resistance (cured)</b>	-40°F to 212°F (-40°C to 100°C)
<b>Surface burning characteristics (ASTM E 84-96)</b>	Flame Spread: 0 Smoke Development: 5
<b>Sound transmission classification (ASTM E 90-99)</b>	56 (Relates to specific construction)
<b>Tested in accordance with</b>	• UL 1479 • ASTM E 814 • ASTM E 84 • ASTM G21

\*At 73°F (23°C) and 50% relative humidity



## Installation instructions for FS-ONE

### Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

### Opening

- Clean the opening. Surfaces to which FS-ONE will be applied should be cleaned of loose debris, dirt, oil, moisture, frost and wax. Structures supporting penetrating items must be installed in compliance with local building and electrical standards.

### Application of firestop sealant

- Install the prescribed backfilling material type and depth to obtain the desired rating (if required). Leave sufficient depth for applying FS-ONE.
- Application of firestop sealant: Apply FS-ONE to the required depth in order to obtain the desired fire rating. Make sure FS-ONE contacts all surfaces to provide maximum adhesion. For application of FS-ONE use a standard caulking gun, foil pack gun, bulk loader and bulk gun. With FS-ONE buckets, Graco type sealant pumps may be used. (Contact pump manufacturer for proper selection).

- Smoothing of firestop sealant: To complete the seal, tool immediately to give a smooth appearance. Excess sealant, prior to curing, can be cleaned away from adjacent surfaces and tools with water.
- Leave completed seal undisturbed for 48 hours.
- For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

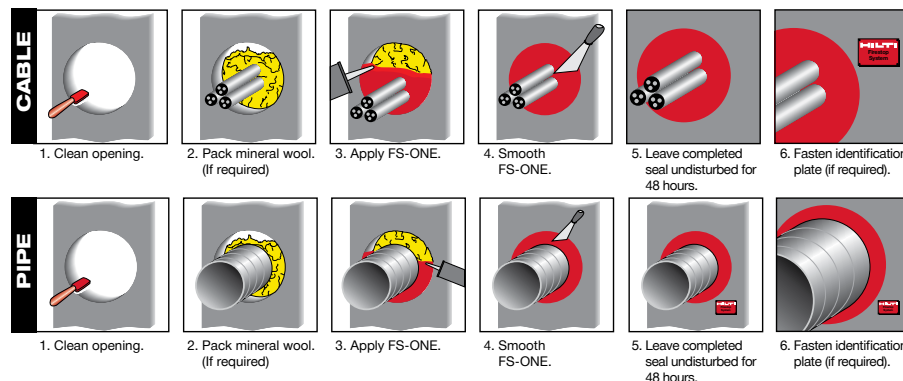
### Not for use

- High movement expansion joints
- Underwater

- On materials where oil, plasticizers or solvents may bleed i.e. impregnated wood, oil based seals, green or partially vulcanized rubber
- In any penetration other than those specifically described in this manual or the test reports

### Storage

- Store only in the original packaging in a location protected from moisture at temperatures between 40°F (5°C) and 86°F (30°C)
- Observe expiration date on the package



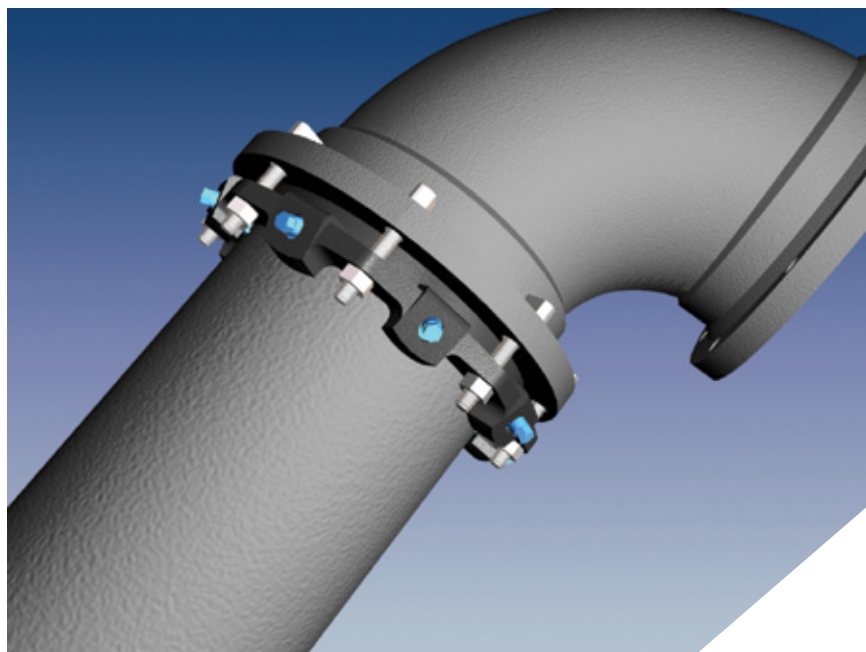
**Hilti. Outperform. Outlast.**

Hilti, Inc. (U.S.) 1-800-879-8000 • [www.us.hilti.com](http://www.us.hilti.com) • en español 1-800-879-5000 • Hilti Firestop Systems Guide

# MEGALUG®

## Series 1100

Mechanical Joint Restraint for Ductile Iron Pipe



### Features and Applications:

- Sizes 3 inch through 48 inch
- Constructed of ASTM A536 Ductile Iron
- Torque Limiting Twist-Off Nuts
- MEGA-BOND®  
Restraint Coating System  
For more information on MEGA-BOND,  
refer to [www.ebaa.com](http://www.ebaa.com)
- The Mechanical Joint Follower Gland is  
incorporated into the restraint
- Heavy Duty thick wall design
- Support Products Available:  
Split repair style available 3 inch  
through 48 inch.  
EBAA Series 1100SD  
  
Solid restraint harness available for  
push-on pipe bells.  
EBAA Series 1700  
  
Split restraint harness available for  
existing push-on bells.  
EBAA Series 1100HD
- All MEGALUG and related restraint  
products can be furnished as packaged  
accessories complete with appropriate  
restraint, gasket, lubrication, and bolt-  
ing hardware
- For use on water or wastewater pipe-  
lines subject to hydrostatic pressure  
and tested in accordance with either  
AWWA C600 or ASTM D2774

Nominal Pipe Size	Series Number	Shipping Weights	Post Assembly Deflection	Pressure Rating (PSI)
3	1103	6.1	3°	350
4	1104	7.7	3°	350
6	1106	11.9	3°	350
8	1108	14.8	3°	350
10	1110	23.9	3°	350
12	1112	31.2	3°	350
14	1114	48.5	2°	350
16	1116	56.4	2°	350
18	1118	63.1	1½°	250
20	1120	72.3	1½°	250
24	1124	133.1	1½°	250
30	1130	194.6	1°	250
36	1136	234.0	1°	250
42	1142	536.0	1°	250
48	1148	653.0	1°	250

NOTE: For applications or pressures other than those shown please  
contact EBAA for assistance.



U.S. Patent Nos.

4092036, 4627774, 4779900, 4896903, 5544922





## MEGALUG: THE PRODUCT OF PREFERENCE SINCE 1984

Since 1984, engineers and contractors designing and installing water and wastewater pipelines and systems have come to rely on the EBAA Series 1100 MEGALUG Mechanical Joint Restraint as the “Product of Preference” for effectively and economically restraining ductile iron pipe connections above or below ground.

MEGALUG Mechanical Joint Restraints replace external restraints such as cumbersome concrete thrust blocks and corrodible metal tie rods creating a quicker, safer and more economical installation.

Major testing laboratories agree as the 3” through 24” sizes are Underwriters Laboratories (UL) listed, and the 3” through 12” sizes are Factory Mutual (FM) approved.

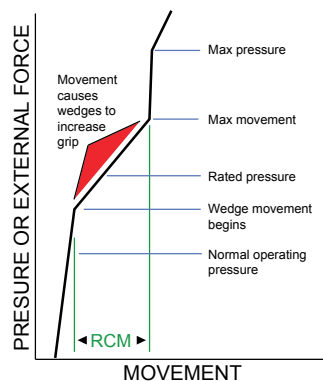
For use on all classes of ductile iron pipe (PC350 through PC150 and CL56 through CL50), for practically any application including valves, hydrants and pipe, the MEGALUG Mechanical Joint Restraint effectively and safely performs without damage to the pipe or cement linings.

## THE MEGALUG GRIPPING WEDGE... PERFORMANCE PROVEN

The wedge style MEGALUG design reacts to the amount of force acting on the joint. When each wedge is set, the wedge teeth penetrate the pipe’s outer surface, and the wedge does not move on the pipe. There is very little change in this interface until the wedge movement begins inside the pocket of the main casting. Once the wedge starts moving, the formation of the buttress begins.

This “dam” of material (the wedge impression) is cold formed as the wedging action continues. If the force of pressure acting on the joint is released, the wedge moves back to near its original position. This engages the reserve-controlled movement or “RCM”. The wedge is then ready for another round.

After the wedge has moved to the back



of the pocket at the maximum pressure or load, the wedge buttress are in shear. The maximum movement is about 0.3 inch through the thirty-six inch size and 0.4 inch for forty-two and forty-eight inch.

The RCM is available even with severe

cyclic loads. This has been tested to very high-pressure differentials and the wedge impressions look the same as if a single test had been performed.

Typically, the depth of pipe wall penetration, or wedge impression at around 25,000 pounds of force per wedge (200 PSI on a six inch and 150 PSI on a twelve inch) is 0.03”. Finally, at roughly twice that force the penetration is around 0.05”. At these high pressures, there is no affect on the design thickness of ductile iron pipe made according to AWWA C150. The lack of damage to the cement lining clearly indicates that the thrust load is primarily longitudinal.

This ability to move in the pocket allows for angular flexibility as well as longitudinal flexibility.

## THE ORIGINAL PATENTED GRIPPING WEDGES

Since 1964 EBAA Iron has responded aggressively to the needs of the water industry for better solutions to joint restraint problems - thus the development of the family of self actuating MEGALUG wedge action restraints.

### TOOLS

MEGALUGS install using an ordinary wrench (box, ratchet, or air-driven), because the torque-limiting, twist-off nuts automatically shear during tightening when the proper torque is reached. The same 1¼ wrench used to tighten the T-bolts on the 4" through 24" sizes can be used to tighten and shear the twist off nuts in all sizes. If removal becomes necessary, a 5/8 hex head remains so the screws can be loosened, and retightened with a torque-indicating wrench. During removal, the wedges are held in place by retainer clips.

### DEFLECTION

The MEGALUG gripping wedges provide resiliency to your pipeline design. In addition to deflecting as

much as allowed by the mechanical joint during installation, it can also deflect after assembly:

Sizes of 12" and below are capable of up to 3 degrees of deflection after installation (depending on the preset deflection.)

The 14" and 16" sizes are capable of 2 degrees deflection.

The 18" through 24" sizes are capable of 1.5 degrees deflection.

The 30" through 48" sizes are capable of 1 degree deflection.

### STEEL PIPE

The 1100 Series MEGALUG can be used to restrain 3" - 8" SCH 40 or 80 steel pipe when joining to mechanical appurtenances. It can also be used on steel pipe in all sizes if the pipe's outside diameter is the same as the ductile iron pipe and its thickness is equal to or greater than PC350 ductile iron pipe in sizes of 16 inch and below and PC250 ductile iron pipe 18 inches and above.

### CAST IRON PIPE

Grey iron pipe diameters are often larger than ductile iron pipe diameters. The Series 1100 MEGALUG restraint may be used with grey iron pipe having standardized cast iron O.D. per AWWA C150 and C151, and with pit cast Classes "A" and "B" without modification. Use of the Series 1100 with pit cast grey iron Classes "C" and "D" will require over sizing the MEGALUG. More information on this is explained in detail in "Connections Bulletin DI-1".

## MEGALUG Takes the Load

On April 11, 1997 EBAA Iron performed a remarkable force demonstration of their series 1100 MEGALUG Joint Restraint. With the use of EBAA's Series 1100 MEGALUG using a standard mechanical joint installation on 12 inch Ductile Iron Pipe, and a 80 Ton motor crane, EBAA Iron lifted a D7 Caterpillar Track Type Tractor weighing in at 50,350 lbs. Along with this, the Series 1100 MEGALUG has been tested to over 700 PSI. Concluding that EBAA's MEGALUGS can take the load.





# Mechanical Joint Restraint Sample Specifications

(The text of the specifications below can be copied/pasted from [www.ebaa.com/download/1100Spec.DOC](http://www.ebaa.com/download/1100Spec.DOC))

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

## Design

Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

## Material

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

For applications requiring restraint 30 inch and greater, an alternate grade of iron meeting the material requirements of ASTM A536 is acceptable, providing the device meets all end product performance requirements.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) Specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

## Traceability

An identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.

All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

## Installation

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

Proper actuation of the gripping wedges

shall be ensured with torque limiting twist off nuts.

## Approvals

Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" inch size) and Approved by Factory Mutual (3" through 12" inch size).

Mechanical joint restraint for ductile Iron pipe shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal.

## MEGA-BOND® Restraint Coating System

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

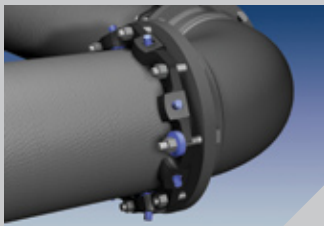
All casting bodies shall be surface pre-treated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review prior to bid.

*For more information regarding MEGA-BOND, refer to the MEGA-BOND brochure or visit [www.ebaa.com](http://www.ebaa.com).*

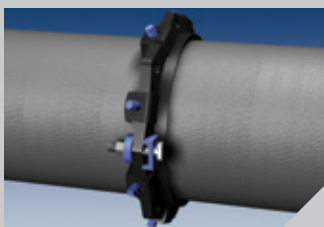
## Support Products

*for more information concerning these products please consult the catalog or [www.ebaa.com](http://www.ebaa.com)*



### Series 1100SD

Split MEGALUG Restraint  
For Existing Mechanical Joints



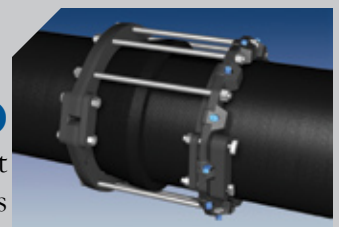
### Series 1100SDB

Split MEGALUG Restraint  
For Mid-Span Applications



### Series 1700

MEGALUG Restraint Harness  
For Push-On Bell Joints

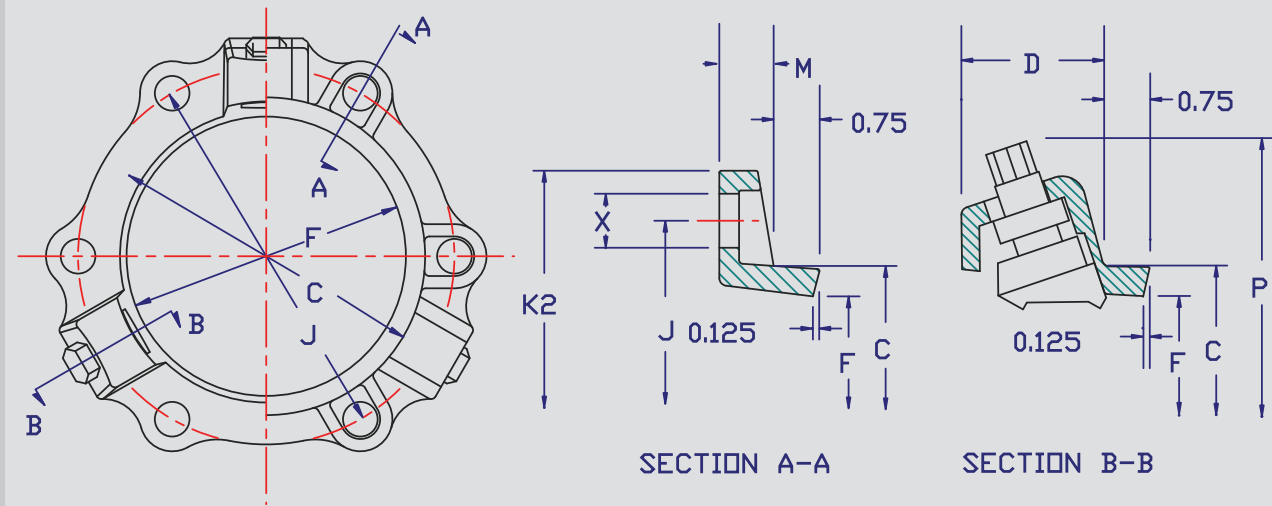


### Series 1100HD

Split MEGALUG Restraint  
Harness for Existing Push-On Bells

## Series 1100 Submittal Reference Drawing

EBAA IRON



MADE IN USA

		C	D	F	M	P*	X	J	K2	Wedge QTY.	Bolt QTY.	Weight (LBS.)	Pressure Rating (PSI)
Nominal Pipe Size	Series Number												
3	1103	4.48	2.27	4.06	0.62	9.06	0.750	6.19	7.69	2	4	6.1	350
4	1104	5.92	2.27	4.90	0.75	9.90	0.875	7.50	9.12	2	4	7.6	350
6	1106	8.02	2.27	7.00	0.88	12.00	0.875	9.50	11.12	3	6	11.8	350
8	1108	10.17	2.31	9.15	1.00	14.15	0.875	11.75	13.37	4	6	14.9	350
10	1110	12.22	2.37	11.20	1.00	16.20	0.875	14.00	15.62	6	8	23.9	350
12	1112	14.32	2.37	13.30	1.25	18.30	0.875	16.25	17.88	8	8	31.2	350
14	1114	16.40	2.69	15.44	1.50	20.94	0.875	18.75	20.25	10	10	49.7	350
16	1116	18.50	2.69	17.54	1.56	22.90	0.875	21.00	22.50	12	12	56.4	350
18	1118	20.60	2.69	19.64	1.63	25.00	0.875	23.25	24.75	12	12	63.6	250
20	1120	22.70	2.69	21.74	1.69	27.10	0.875	25.50	27.00	14	14	71.0	250
24	1124	26.90	3.20	25.94	1.81	32.64	0.875	30.00	31.50	16	16	128.7	250
30	1130	33.29	3.20	32.17	2.25	38.87	1.125	36.88	39.12	20	20	190.7	250
36	1136	39.59	3.20	38.47	2.25	45.17	1.125	43.75	46.00	24	24	226.5	250
42	1142	45.79	4.56	44.67	3.88	55.57	1.375	50.62	53.48	28	28	518.9	250
48	1148	52.09	4.56	50.97	3.88	61.87	1.375	57.50	60.36	32	32	608.3	250

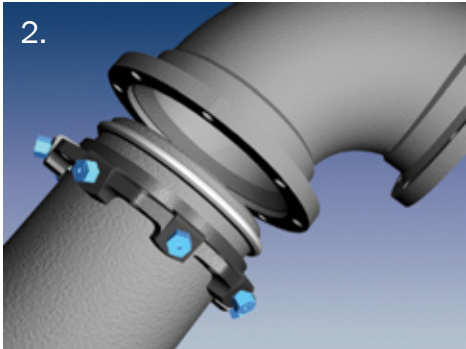
\* With Twist-Off Nuts twisted off.

## Important Notes

NOTE: Dimensions are in inches and are subject to change without notice.

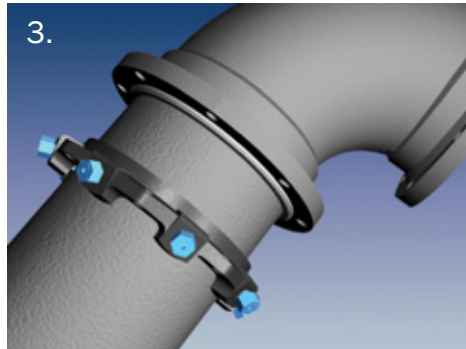
- The Series 1100 MEGALUG should not be used on plain end fittings.
- If encased in concrete, polyethylene wrap must be used to prevent concrete intrusion into the wedge pocket.
- For test pressures above the rated pressures shown, contact EBAA for recommendations, such as tandem restraint for high pressure applications.
- If you experience the need to install the Series 1100 MEGALUG in an unconventional manner please consult our engineering department.
- The Series 1100 MEGALUG is intended for use on ductile iron pipe. The restraint can be used on grey iron pipe if the pipe is not severely corroded and is in sound condition and has an outside diameter that can be accommodated. For more information on the use of the MEGALUG restraint on grey iron pipe ask for Connections Bulletin DI-1.
- EBAA-Seal™ Mechanical Joint Gaskets are provided with 30 inch through 48 inch MEGALUG restraints. These are required on the above referenced sizes to accommodate the pressure ratings and safety factors shown.
- Extra length T-bolts are provided with the 42 inch and 48 inch sizes to facilitate easier assembly of the mechanical joint.
- All Series 1100 MEGALUG components are made of ductile iron conforming to ASTM A536. The wedges are heat treated to a hardness range of 370 to 470 BHN.
- LISTINGS AND APPROVALS: Sizes 3 inch through 24 inch are listed by Underwriters Laboratories, Inc. Category HJKF "Fittings, Retainer Type" with a deflection angle of 5 degrees (3 inch through 12 inch) and 2½ degrees (14 inch through 24 inch). The listing file number is EX2836, Sizes 3 inch through 12 inch are Factory Mutual approved.





1. The Series 1100 MEGALUG joint restraint is designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 (all thickness classes) when restraining mechanical joint pipe fittings.

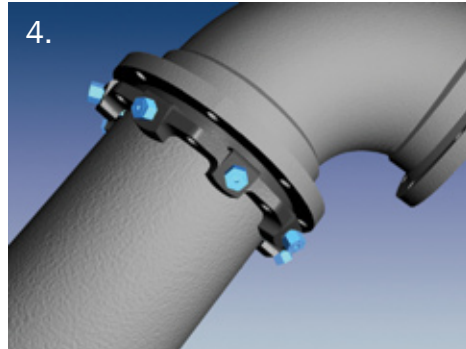
2.\* Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubrication meeting the requirement of ANSI/AWWA C111/A21.11,



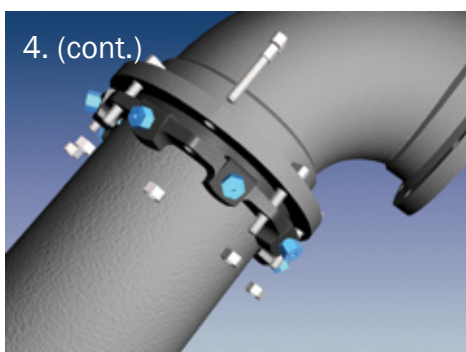
just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with lip extension toward the plain end, followed by the gasket.

NOTE: In cold weather it is preferable to warm the gasket to facilitate assembly of the joint.

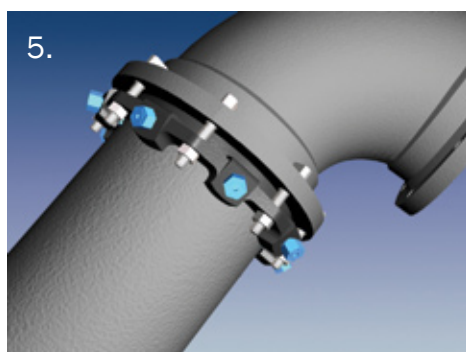
3.\* Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.



4.\* Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening bolts.

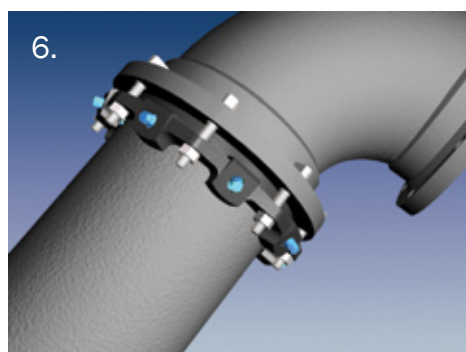


5.\* Tighten the bolts to the normal range of torque as indicated [3 inch 45-60 ft-lbs., 4-24 inch 75-90 ft-lbs., 30-36 inch 100-120 ft-lbs., and 42-48 inch 120-150 ft-lbs.] While at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque.



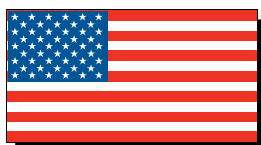
In large sizes (30-48 inch), five or more repetitions may be required. The use of a torque-indicating wrench will facilitate this procedure.

6. Tighten the torque limiting twist-off nuts in a clockwise direction (direction indicated by arrow on top of nut) until all wedges are in firm contact with the pipe surface. Continue tightening in an alternating manner until all of the nuts have been twisted off.



7. If removal is necessary, utilize the  $\frac{5}{8}$  inch hex heads provided. If reassembly is required, assemble the joint in the same manner as above, by tightening the wedge bolts to 90 ft-lbs. If the series 1100 restraint is removed from the pipe, be sure that all the collar bolts and wedges are in place before the restraint is reassembled.

\* These steps are requirements of AWWA. AWWA Standard C600



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#### For More Information

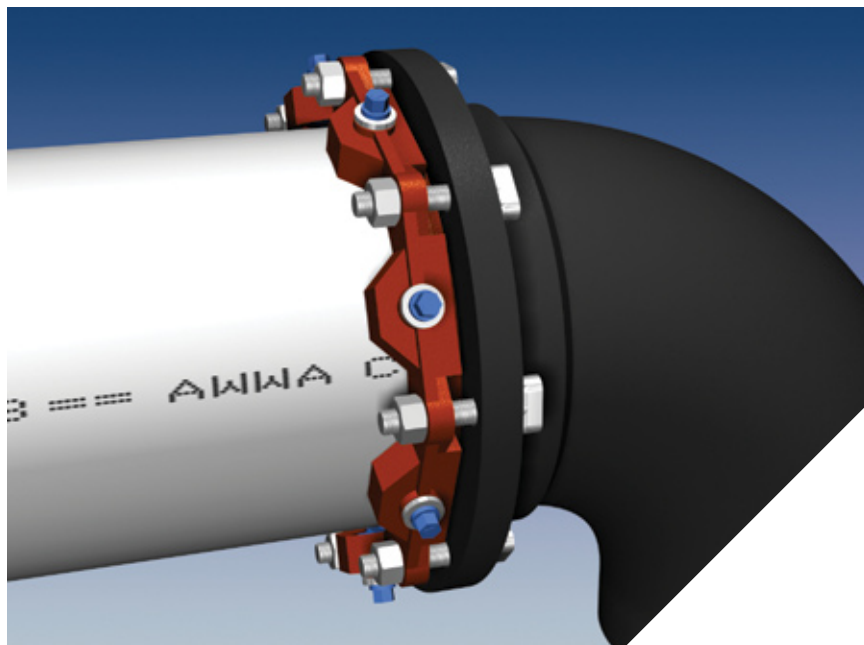
For more information about MEGALUG restraints call EBAA today and request

"EBAA Connections Bulletin DI-1" concerning use of the MEGALUG restraint on grey iron pipe, or "EBAA Connections Bulletin DI-2" covering the background and operation of the MEGALUG system of restraint.

"Restraint Length Calculation" Software is available for PC/Windows applications. Support documentation about the software can be found in "EBAA Connections Bulletin PD-1 through PD-5".

# Series 2000PV

Mechanical Joint Restraint for PVC Pipe



Series 2012PV on 12inch C900 PVC pipe at a ductile iron fitting.

## Features and Applications:

- For restraining plain end PVC pipe at mechanical joint fittings and appurtenances
- Sizes 3 inch through 36 inch  
Sizes 42 inch through 48 inch accommodated by Series 2200
- MEGA-BOND® Restraint Coating System  
For more information on MEGA-BOND, refer to [www.ebaa.com](http://www.ebaa.com)
- Constructed of ASTM A536 Ductile Iron
- The mechanical joint follower gland is incorporated into the restraint
- Heavy duty thick wall design
- Support Products Available:
  - Split mechanical Joint style available for 3 inch through 12 inch EBA Series 2000SV
  - Solid restraint ring harness available for C905 PVC pipe bells EBA Series 2800
  - Split restraint ring harness available for C900 and C905 PVC pipe bells and PVC fittings EBA Series 1500, 1600 and 2500
- All 2000PV and related restraint products can be furnished as packaged accessories complete with appropriate restraint, gasket, lubrication and bolting hardware

Nominal Pipe Size	Series Number	Shipping Weight
3	2003PV	7.0
4	2004PV	8.8
6	2006PV	12.1
8	2008PV	16.3
10	2010PV	26.0
12	2012PV	31.4
14	2014PV	47.6
16	2016PV	52.8
18	2018PV	61.8
20	2020PV	70.9
24	2024PV	92.9
30	2030PV	128.5
36	2036PV	161.3
42	2242*	652.0
48	2248*	711.1

\*Restraint for pipe size 42 inch and greater, please refer to Series 2200 Brochure found at [www.ebaa.com](http://www.ebaa.com).

U.S. Patent No.  
4627775 4896903 5071175

For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600 or ASTM D2774.





**Series 2000PV:**  
**Mechanical Joint Restraint Gland for use With AWWA C900 or IPS Outside Diameter PVC Pipe**

The 2000PV MEGALUG Mechanical Joint Restraint is the fastest and most economical method of restraining PVC pipe to mechanical joints. Now the need for costly concrete thrust blocks and corrodible steel tie rods is eliminated. It can be used in straight alignment or at the preset deflection recommended for mechanical joints.

The 2000PV was the first PVC joint restraint to be tested to UNI-B-13, Underwriters Laboratories, and Factory Mutual.

Tested to and meets the requirements of ASTM F 1674-96 ‘Standard’ Test Method for joint restraint products use with PVC pipe through 24 inch size.

UL Listed in the four through twelve inch sizes for joining UL Listed ductile iron fittings to UL Listed, Class 150 PVC pressure pipe. The maximum allowable joint deflection is five degrees.

Factory Mutual approved for use on DR18 PVC pipe in four through twelve inch sizes.



**The 2000PV MEGALUG Concept**  
 EBAA Iron started manufacturing joint restraint products for PVC pipe in the early 1980s. The testing of early prototypes of various configurations of restraints on large diameter PVC pipe indicated that a restraint device must be capable of consistently and reliably gripping the pipe. If not, the restraint can slip under pressure, resulting in a sudden impact, and cause the pipe to burst. Armed with this background knowledge and an appreciation for the capabilities of PVC pipe, EBAA purposefully deviated from what many in the industry once considered to be the ‘only’ way to grip PVC pipe. This led to development of the Series

2000PV MEGALUG Mechanical Joint Restraint for PVC pipe.

The design of the 2000PV incorporates the gripping mechanism into the design of the mechanical joint gland and utilizes a simple two part assembly process. The first step involves assembling the joint the same as any standard mechanical joint. The assembly procedure we recommend is that established in AWWA C600. The second is the actuation of the restraint.

## Three Testing Methods

The design philosophy behind the 2000PV joint restraint is that the pipe with the restraint should be capable of being tested to the same minimum requirements of the pipe alone. In doing so, the restraint is shown to have no detrimental effect on the pipe and will have the same pressure rating and safety factor as the pipe on which it is used. To that end the 2000PV has been subjected to hundreds of static and cyclic pressure tests to demonstrate the performance and reliability of the restraint.

One of the primary tests of PVC is its quick burst strength. For pipe meeting the requirements of AWWA C900, AWWA C905 and ASTM 2241, the minimum quick burst requirement for the hoop stress is 6,400 PSI. For DR18, pipe pressure is 755 PSI.

The second test is sustained pressure test at a hoop stress of 4,200 PSI. For DR18 pipe, that pressure is 500 PSI.

Third, a conservative cyclic pressure surge design for the pipe exists in the form of Vinson Equation.

The 2000PV restraint has been tested to over one million cycles to the peak pressures predicted by the Vinson Equation for that number of cycles.



## Series 2000PV Takes the Load

On April 11, 1997 EBAA Iron performed a remarkable force demonstration of their Series 2000PV joint restraint. With the use of EBAA's Series 2000PV using standard mechanical joint installation on 12 inch PVC pipe, and a 80 Ton Motor Crane, EBAA Iron lifted a D7 Caterpillar Track Type Tractor weighing in at 50,350 lbs. Along with this, the Series 2000PV has been tested to over 700 PSI. Concluding that EBAA's Series 2000PV MEGALUG can take the load.



# Mechanical Joint Restraint for AWWA PVC Pipe Sample Specification

(The text of the specification below can be downloaded as a Microsoft® Word Doc from our website [www.ebaa.com](http://www.ebaa.com))

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A2153, shall conform to the follow:

## Design

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating equal to that found in the most current product brochure. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

## Material

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.)

Specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

## Traceability

An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can

be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

## Installation

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

## Approvals

Mechanical Joint Restraints shall be Listed by Underwriters Laboratories in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints shall be Factory Mutual Approved in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints, 4 inch

through 24 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.

Mechanical joint restraint shall be Series 2000PV produced by EBAA Iron Inc. or approved equal.

## MEGA-BOND® Restraint Coating System

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review prior to bid.

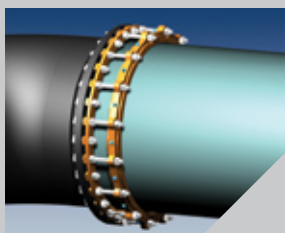
For more information regarding MEGA-BOND, refer to the MEGA-BOND brochure or visit [www.ebaa.com](http://www.ebaa.com).

## Support Products

for more information concerning these products, please consult the catalog or [www.ebaa.com](http://www.ebaa.com)

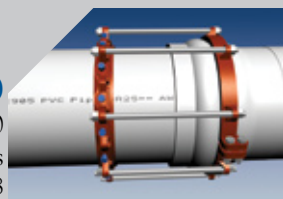
### Series 2200

MEGALUG® Restraint for C905 PVC Pipe at Mechanical Joint Fittings  
Sizes 42 and 48 inch



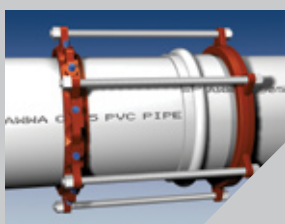
### Series 2500

MEGALUG® Restraint for C900 and C905 PVC Pipe at PVC Fittings  
Sizes 4 inch through 48



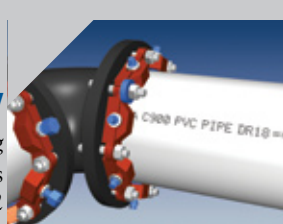
### Series 2800

MEGALUG® Restraint Harness for C905 PVC Pipe  
Sizes 14 inch through 48  
Sizes 4 through 12 accommodated by either Series 1500 or 1600



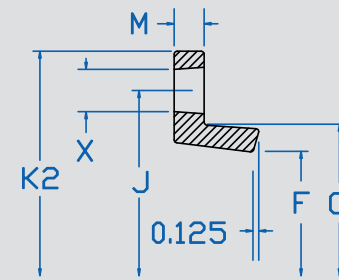
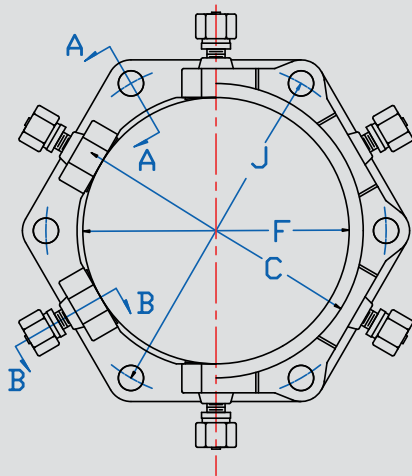
### Series 2000SV

Split MEGALUG® Restraint for existing C900 PVC Pipe at Ductile Iron Fittings  
Sizes 4 inch through 12

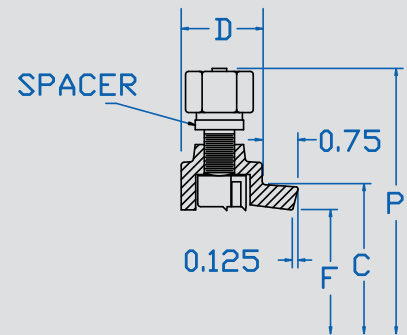


# Series 2000PV Submittal Reference Drawing

EBAA IRON



SECTION A-A



SECTION B-B

MADE IN USA

Nominal Pipe Size	Series Number	C	D	F	M	P	P*	X	J	K2	Wedge Qty	Bolt Qty	Weight (lbs.)
3	2003PV	4.84	1.55	3.60	0.50	9.8	8.6	3/4	6.19	7.69	4	4	7.0
4	2004PV	5.92	1.68	4.90	0.50	10.5	9.5	7/8	7.50	9.13	4	4	8.8
6	2006PV	8.02	1.68	7.00	0.50	13.0	12.1	7/8	9.50	11.13	6	6	12.1
8	2008PV	10.17	1.68	9.15	0.62	14.5	13.6	7/8	11.75	13.38	6	6	16.3
10	2010PV	12.22	2.10	11.20	0.62	17.0	16.0	7/8	14.00	15.63	8	8	26.0
12	2012PV	14.32	2.10	13.30	0.75	19.0	18.1	7/8	16.25	17.88	8	8	31.4
14	2014PV	16.40	2.25	15.49	0.88	21.7	20.9	7/8	18.75	20.38	10	10	47.6
16	2016PV	18.50	2.25	17.58	0.88	23.8	23.0	7/8	21.00	22.63	12	12	52.8
18	2018PV	20.60	2.25	19.68	1.13	25.9	25.1	7/8	23.25	24.88	12	12	61.8
20	2020PV	22.70	2.25	21.79	1.25	28.0	27.2	7/8	25.50	27.13	14	14	70.9
24	2024PV	26.90	2.75	25.99	1.42	32.3	31.5	7/8	30.00	31.63	16	16	92.9
30	2030PV	33.29	2.70	32.22	1.50	38.5	37.7	1 1/8	36.88	39.12	20	20	128.5
36	2036PV	39.59	2.70	38.52	1.50	44.8	44.0	1 1/8	43.75	46.00	24	24	161.3
42	2242	Submittal information for pipe sizes 42 inch and greater can be found in the Series 2200 Brochure.											
48	2248	Submittal information for pipe sizes 42 inch and greater can be found in the Series 2200 Brochure.											

NOTE: Dimensions are in inches and are subject to change without notice.  
For applications or pressures other than those shown, please contact EBAA for assistance.

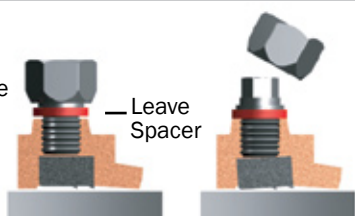
Nominal Pipe Size	Series Number	Ratings for Ordinary Water Works w/Transient surges only						Ratings for Peak Pressures used in Sewage Force Mains and other installations designed for Cyclic Surges of 1-Mill. Cycles						C905 PVC Pipe			
		DR14	DR18	DR25	SDR17	SDR21	SDR26	DR14	DR18	DR25	SDR17	SDR21	SDR26	DR18	DR25	DR32.5	DR41
3	2003PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
4	2004PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
6	2006PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
8	2008PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
10	2010PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
12	2012PV	305	235	165	250	200	160	244	188	132	200	160	120	-	-	-	-
14	2014PV	-	-	-	-	-	-	-	-	-	-	-	-	235	165	125	80
16	2016PV	-	-	-	-	-	-	-	-	-	-	-	-	235	165	125	100
18	2018PV	-	-	-	-	-	-	-	-	-	-	-	-	200	165	-	-
20	2020PV	-	-	-	-	-	-	-	-	-	-	-	-	200	165	-	-
24	2024PV	-	-	-	-	-	-	-	-	-	-	-	-	165	165	125	100
30	2030PV	-	-	-	-	-	-	-	-	-	-	-	-	-	165	125	100*
36	2036PV	-	-	-	-	-	-	-	-	-	-	-	-	-	125	125	100*

\* Refer to Series 2200 to achieve rated pressure on DR41 in stated pipe size.

# Spacer Instructions

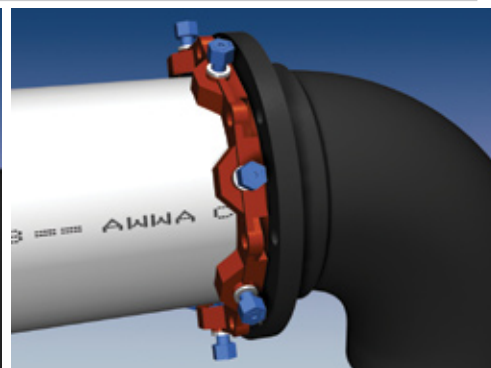
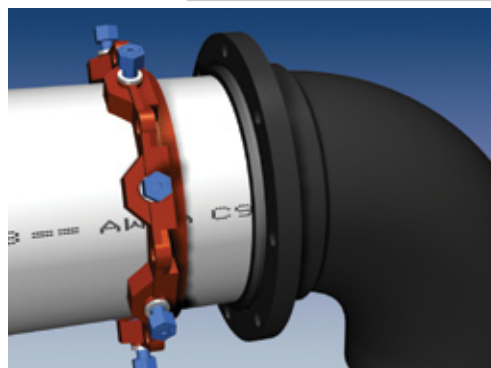
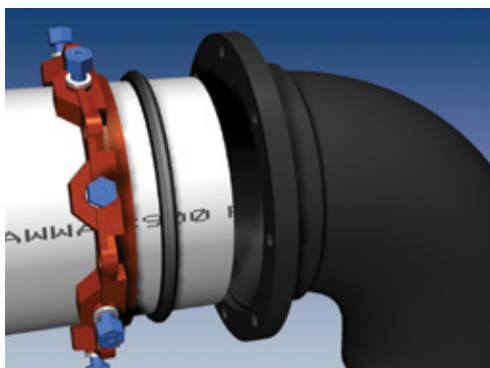
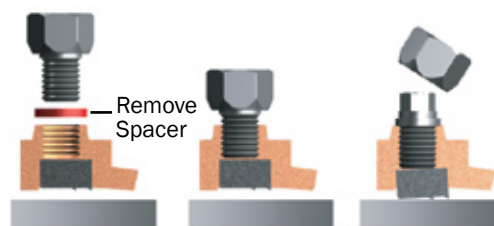
## Ductile Iron or C900 PVC Pipe Sizes

For installation on **C900 PVC** pipe, use as received and install per instructions.



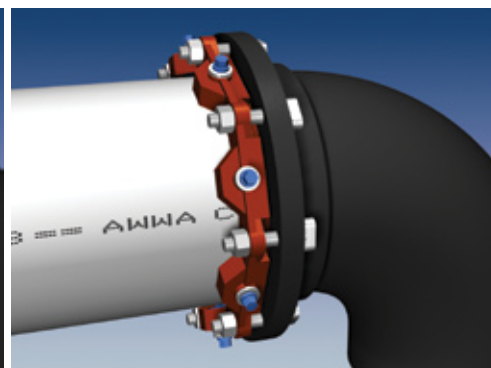
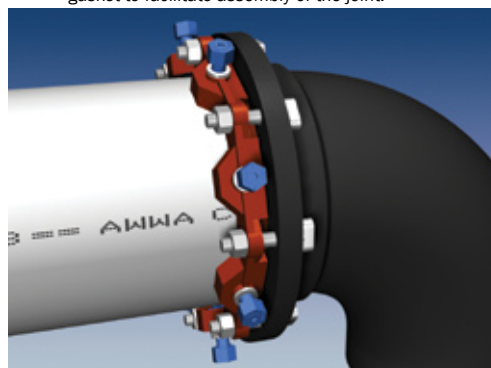
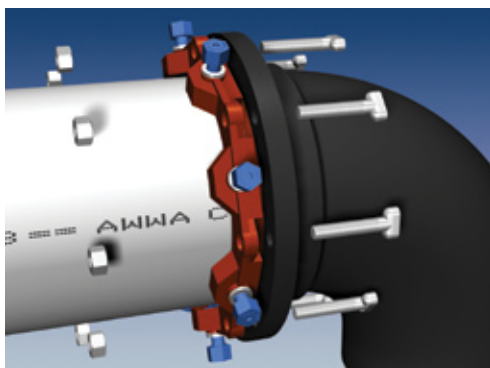
## ASTM 2241 PVC Pipe Sizes (IPS O.D.)

For installation on **ASTM 2241** sized pipe, remove spacers and replace screws. Install per instructions.



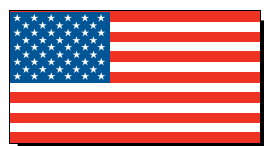
1. Identify the pipe. The 2000PV is for use with PVC and HDPE pipe. The 4 inch through 12 inch size may be used on C900, and IPS PVC pipe as well as C906 HDPE pipe. Check to see if the spacers under the screws are in place. If the pipe is C900 or is ductile iron O.D., proceed with spacers in place. If the pipe is IPS O.D., remove the spacers. Since 3 inch and 14 inch through 24 inch restraints are only used with one pipe diameter, no spacers are used.
2. Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and plain end with soapy water or an approved pipe lubricate meeting the requirements of ANSI/AWWA C111/A12.11 just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with the lip extension toward the plain end; follow by the gasket with the narrow edge of the gasket toward the plain end [The gasket provided may be the EBAA-Seal™ Improved Mechanical Joint Gasket for C900 PVC Pipe. This gasket is bi-directional having no front or back. For ASTM 2241 PVC Pipe Sizes (IPS O.D.) a Transition Gasket must be used. The use of a pipe wall stiffening insert is required on High Density Polyethylene pipe.].
3. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
4. Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand-tighten nuts. Make deflection after joint assembly but before tightening bolts.

NOTE: In cold weather it is preferable to warm the gasket to facilitate assembly of the joint.



5. Tighten the bolts to the normal range of bolt torque [45-60 ft-lbs for 3 inch, 75-90 ft-lbs for 4 inch through 24 inch, 100-120 ft-lbs for 30 inch and 36 inch, and 120-150 ft-lbs for 42 inch and 48 inch.] while at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. In large sizes (30-48 inch), five or more repetitions may be required. The use of a torque-indicating wrench will facilitate the procedure.
6. Tighten the torque limiting twist-off nuts in a clockwise direction (direction indicated by arrow on top of nut) until all wedges are in firm contact with the pipe surface. Continue tightening in an alternating manner until all of the nuts have been twisted off.
7. If removal is necessary, utilize the 5/8 inch hex heads provided. If reassembly is required, assemble the joint in the same manner as above; tighten the screws to 60 to 80 ft-lbs. If the Series 2000PV restraint is removed from the pipe, be sure that all of the screws, spacers (if required), and wedges are in place before the restraint is reassembled.

\*These steps are requirements of AWWA C600.



**EBAA IRON Sales, Inc.**

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Members of...



# 175 PSI WWP Iron Body Check Valves

Fire Protection Valve • Bolted Bonnet • Horizontal Swing • Renewable Seat and Disc •  
Drilled and Tapped for Ball Drip Outlet

**175 PSI/12.1 Bar Non-Shock Cold Water**

CONFORMS TO MSS SP-71 •  
UL/ULC LISTED\* • FM APPROVED •  
APPROVED BY THE NEW YORK CITY B.S.A. 143-69-SA

## MATERIAL LIST

PART	SPECIFICATION
1. Pipe Plug	Cast Iron or Steel
2. Bonnet	Cast Iron ASTM A126 Class B
3. Bonnet Gasket	Non Asbestos
4. Bonnet Bolt and Nut	Steel ASTM A307
5. Hinge Plug	Cast Bronze B584 Alloy C84400 (not shown)
6. Hinge Pin	Brass ASTM B16
7. Disc Hanger Nut	Cast Bronze B584 Alloy C84400
8. Disc Stud Bolt	Brass ASTM B16 Alloy C36000
9. Disc Cage	Cast Iron ASTM A126 Class B or Malleable Iron ASTM A 47 (not shown)
10. Disc Plate	Cast Bronze B584 Alloy C84400
11. Disc Hanger	Cast Bronze B584 Alloy C84400
12. Disc Nut	Brass ASTM B16 Alloy C36000
13. Seat Ring	Cast Bronze B584 Alloy C84400
14. Disc	Rubber (W)
15. Body	Cast Iron ASTM A126 Class B

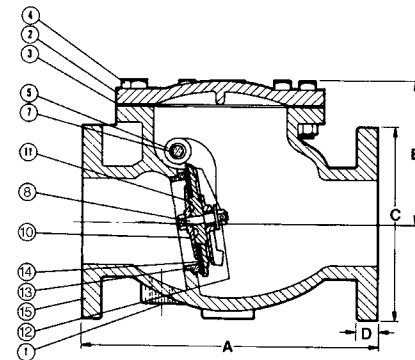
**NOTE:** Sizes 2½, 3, 5, & 10 are manufactured, listed and approved by Kennedy Valve and distributed by NIBCO.

Material list applies to sizes 4", 6", 8", 12" only.

All sizes are drilled and tapped ¾" at Boss "C" for ball drip.



**F-908-W**  
Flanged



**F-908-W**  
Fig x Fig

## DIMENSIONS—WEIGHTS—QUANTITIES

Size		Dimensions								Weight	
		A		B		C		D			
In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.
2½	65	10.00	254	6.44	164	7.00	178	.69	17	53	24
3	80	10.25	260	6.63	168	7.50	191	.75	19	62	28
4	100	13.00	330	8.00	203	9.00	229	.94	24	103	47
5	125	15.00	381	9.19	233	10.00	254	1.00	25	145	66
6	150	16.25	413	10.31	262	11.00	279	1.00	25	174	79
8	200	19.50	495	11.50	292	13.50	343	1.13	29	290	132
10	250	22.00	559	13.31	338	16.00	406	1.19	30	490	223
12	300	27.50	699	15.56	395	19.00	483	1.25	32	683	310

NIBCO Iron Body check valves may be installed in both horizontal and vertical lines with upward flow.



Ball Drip

An automatic ball drip is available for NIBCO Underwriter's check valves. The ball drip is installed at boss location "C" on the check valve of the fire department connection. It will close against pressure, but will open when pressure is off allowing water to drain from the fire department connection.

\* Compliance with the Canadian Requirements per ULC Subject 312 and the Standard for Check Valves, UL 312.

¾" Ball Drip # RG 22100  
90° Street Elbow #T046227 PP







**UNITED BRASS WORKS, INC.**  
 714 S. Main St. Randleman, N.C. 27317  
 Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com



## Model 68 Threaded Check Valve

**Male NPT x Female NPT**

**UL Listed • FM Approved**

*\*As anti-water hammer check valve for fire pump service only!*

**250 WOG @ 180 ° Max**

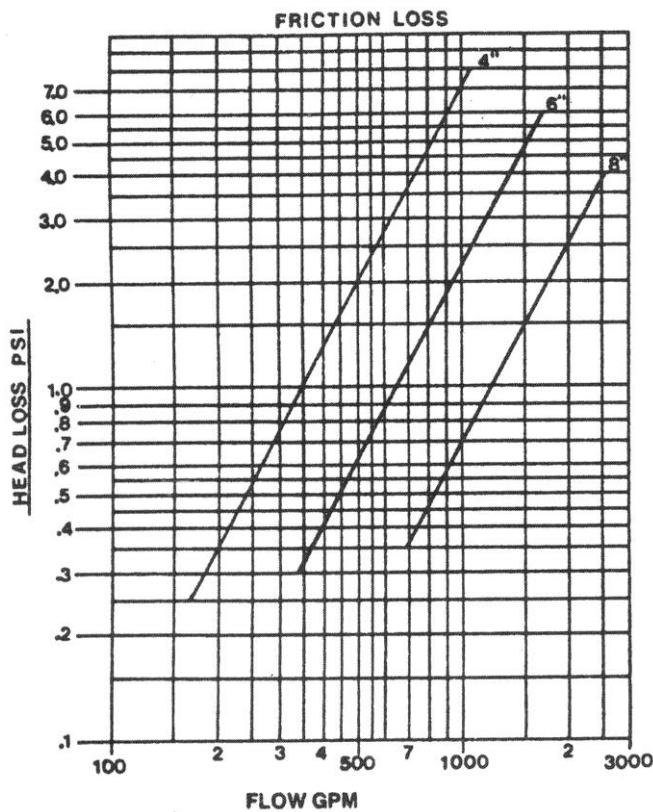
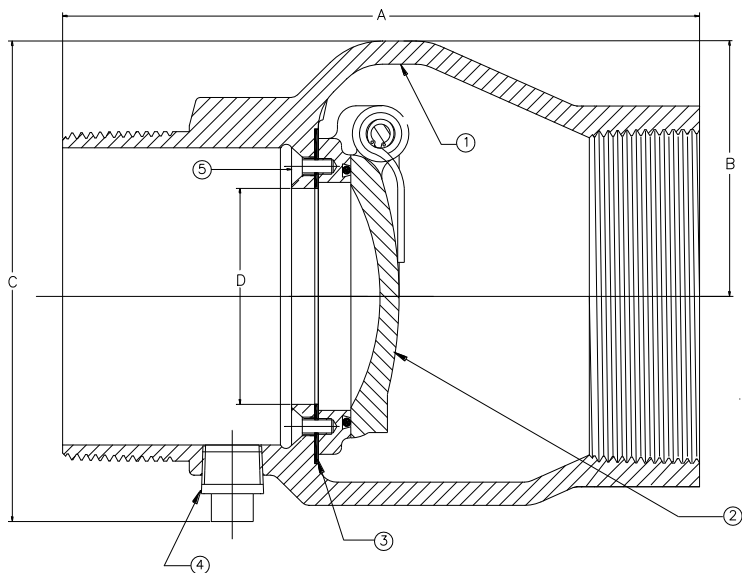
**100% Pressure Tested**

**Threaded Ends**

*\*Contains Lead. Not For Use in Water Systems Intended For Human Consumption\**

### MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Body	Ductile Iron
2	Seat Ring Assembly	Bronze
3	Seat Ring Gasket	Buna
4	Pipe Plug	Steel
5	Screw	Stainless Steel



Size	A	B	C	D
4"	8.56	3.44	6.25	3.00

Ship Wgt. (lbs.)	Qty. Per Ctn.
17.0	1



# 4"-12" A-2362-E381 RESILIENT WEDGE GATE VALVES - SL. x FL.

- ☐ Catalog number—  
**A-2362-41** Slip-on† end (with gasket) x flange end  
**A-2362-43** Slip-on† end (less gasket) x flange end
- ☐ Sizes – 4", 6", 8", 10", 12"
- ☐ Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard, UL Listed, FM Approved, and certified to ANSI/NSF 61.
- ☐ Slip-on ends fit plain end of classes 150, 200 and 250 cast iron, ductile iron and classes 150 and 200 cast iron O.D. PVC
- ☐ Flange end dimensions and drilling comply with ANSI B16.1, class 125
- ☐ Iron body with nominal 10 mils MUELLER® Pro-Gard™ Epoxy Fusion Coated interior and exterior surfaces
- ☐ Epoxy coating meets or exceeds all applicable requirements of ANSI/AWWA C550 Standard and is certified to ANSI/NSF 61
- ☐ Iron wedge, symmetrical & fully encapsulated with molded rubber;  
no exposed iron
- ☐ Non-rising stem (NRS)
- ☐ Triple O-ring seal stuffing box (2 upper & 1 lower O-rings), with fourth O-ring serving as dirt seal
- ☐ 2" square wrench nut (optional handwheel available) – open left or open right
- ☐ 250 psig (1723 kPa) maximum working pressure,  
500 psig (3447 kPa) static test pressure
- ☐ UL Listed, FM Approved: 200 psig (1379 kPa)



**A-2362-41**

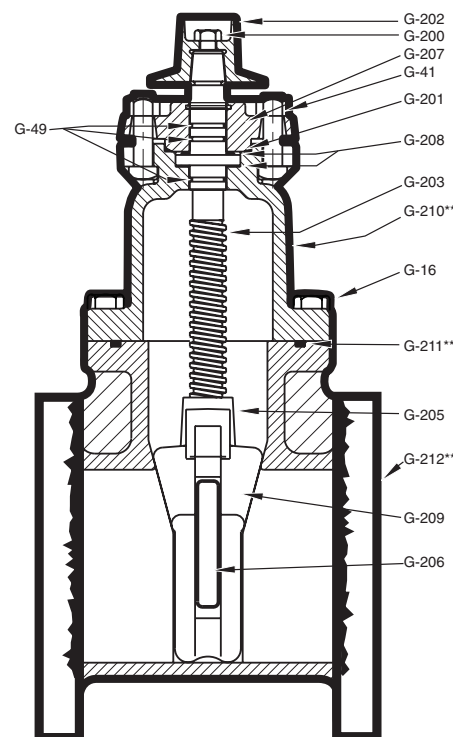
†Design and dimensions of the joint are manufactured under license of U.S. Pipe and Foundry Company.

## Options

- ☐ Position indicators
- ☐ Handwheel

## Resilient wedge gate valve parts

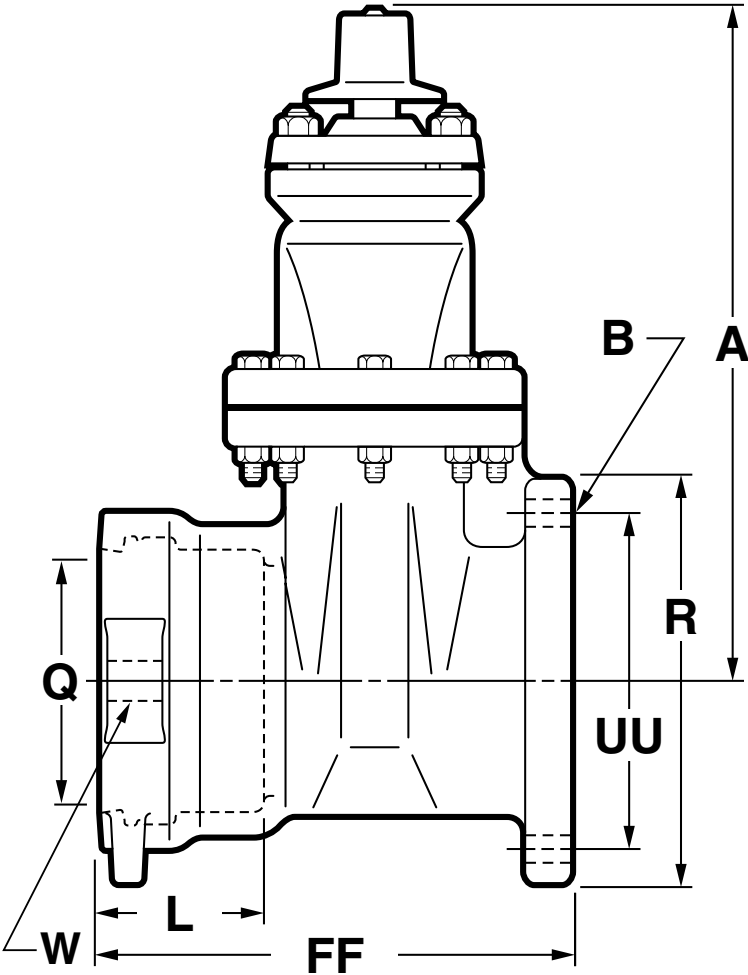
Catalog Part No.	Description	Material	Material standard
G-16	Bonnet Bolts & Nuts	Stainless Steel	Type 316
G-41	Stuffing Box Bolts & Nuts	Stainless Steel	Type 316
G-49	Stem O-rings (3)	EPDM	
G-200	Wrench Nut Cap Screw	Stainless Steel	Type 316
G-201	Stuffing Box Seal	EPDM	
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Everdur	ASTM B98
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box with dirt seal	Cast iron Rubber	ASTM A126 CL.B --
G-208	Anti-friction Washers (2)	Celcon	
G-209	Wedge, Rubber Encapsulation	Cast Iron* EPDM	ASTM A126 CL.B --
G-210**	Bonnet	Ductile Iron	ASTM A536 Grade 65-45-12
G-211**	Bonnet O-ring	EPDM	
G-212**	Body	Ductile Iron	ASTM A536 Grade 65-45-12



\* Fully encapsulated in molded rubber with no iron exposed

# 4"-12" A-2362-E381 RESILIENT WEDGE GATE VALVE - SL. x FL.

Mueller Co.



## Dimensions

Dimension*	Nominal size				
	4"	6"	8"	10"	12"
A	14.19	18.00	21.50	25.50	28.62
Q (bore)	4.30	6.30	8.30	10.30	12.30
L	4.12	4.38	5.62	5.62	5.62
R	9.00	11.00	13.50	16.00	19.00
UU (bolt circle diameter for FL)	7.50	9.50	11.75	14.25	17.00
B (number and size of holes for FL)	8--.75	8--.88	8--.88	12--1.00	12--1.00
W (distance between strapping lug holes across face of valve ends)	8.62	10.62	13.12	16.38	18.12
FF	10.91	12.66	14.69	15.72	16.31
Turns to open	14	20.5	26.5	33	38.5
Weight*	90	165	260	400	565

\*All dimensions are in inches. All weights are in pounds and are approximate.

# BLUE BRUTE™

MEETS AWWA C900



*Building essentials  
for a better tomorrow™*



# BLUE BRUTE™

**PVC C.I.O.D. Distribution Pipe**  
**DR 25/DR18/DR14**

*Pressure Class 165, 235 and 305 psi*  
*Ring-Tite™ Joints 4"-12"*



# BLUE BRUTE™

## CONTENTS

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## PRODUCT DESCRIPTION

### AWWA C900 BLUE BRUTE™

FOR USE IN DISTRIBUTION, MUNICIPAL WATER SYSTEMS AND OTHER SERVICES

#### DESCRIPTION

JM Eagle's Blue Brute™ pipe, produced in blue or white, conforms to the AWWA C900 specification, with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139. Blue Brute™ water pipe has the long-term hydrostatic strength to meet the high safety requirements commonly needed by municipal water systems. This pipe conforms to AWWA C900-07 Pressure Class 165 psi (DR 25), 235 psi (DR 18), 305 psi (DR 14); for sizes 4"-12" in diameter.

#### LONG LAYING LENGTHS

The standard laying length of Blue Brute™ PVC pipe is 20 feet. This means that more ground can be covered during installation while eliminating the cost of unnecessary joints.

#### LISTING STANDARDS ANSI/NSF STANDARD 61, UL 1285, FM APPROVAL

See Short Form Specification.



#### APPLICATIONS

These products are typically used for distribution pipelines of potable water. However, this pipe may be used for gravity sewer, force main, and water reclamation projects.



#### PURPLE RECLAIM AND GREEN SEWER FORCE MAIN

JM Eagle™ also manufactures this pipe in purple, specifically for reclaimed water systems and green for sewer force main applications. This pipe is made to the same requirements as our standard products. The only difference is that the pigment used is purple or green. These products will not be marked with UL or NSF listing marks. Additionally, the purple pipe will be marked: "Reclaimed Water... Do Not Drink" and the green pipe will be marked "Forced Sewer."

\* For lengths of 14 feet, Non-Hydrotested DR 18 Sewer Pipe is available upon request.

#### QUALITY CONTROL

Without exception, each length of pipe is hydrostatically tested and subject to inspection by our quality control inspectors throughout every step of the manufacturing process. JM Eagle's Quality Management System is ISO 9001:2000 registered.\* Copies of the registration certificates are available on our website at [www.jmeagle.com](http://www.jmeagle.com).

\* JM Eagle™ is in the process of obtaining the ISO 9001-2000 registration of Quality Management System for all locations.



### CORROSION RESISTANCE

Blue Brute™ PVC pipe is unaffected by electrolytic or galvanic corrosion, or any known corrosive soil or water conditions. You don't have to worry about tuberculation, or the need for costly lining, wrapping, coating, or cathodic protection.

### FLOW CAPACITY

This PVC water pipe has a smooth interior that stays smooth over long years of service with virtually no loss in carrying capacity. Its coefficient of flow is  $C = 150$  (Hazen & Williams) the best available in common use water systems. This capacity often allows savings in pumping costs as well as savings on the size of pipe required.

### SAVE IN HANDLING COSTS

Blue Brute™ PVC pipe is designed for installed-cost savings. Most sizes can be handled manually, so there is no need for costly installation equipment. Use the backhoe for excavating and backfilling only. Dig more trench, lay pipe faster, and save more in cost per foot installed.

### FIELD CUTTING AND BEVELING

Blue Brute™ pipe can be field cut with a power saw or ordinary handsaw. This eliminates the need to invest in costly cutting equipment. The pipe can also be beveled without the use of any expensive or complicated machinery.

### LIGHT WEIGHT

A 20 foot length of 8" DR 18 Blue Brute™ water pipe weighs approximately 184 pounds. Installers prefer it because it goes into the ground quickly - thus saving on installation costs.

### SERVICE LIFE

Because it is nonmetallic, the pipe does not lose strength due to either potable water corrosion or external galvanic soil conditions.

### INSTALLATION

This product should be installed in accordance with JM Eagle™ Publication JME-03B, "Blue Brute™, Big Blue™ and Ultra Blue™ (C900/C905/C909) Installation Guide" and "Pressure Pipe Tapping Guide."





# PRODUCT DESCRIPTION

## AWWA C900 BLUE BRUTE™

(CONTINUED)

### CAST IRON O.D.

Available in 4", 6", 8", 10", and 12" trade sizes, this pipe can be connected directly into cast/ductile iron fittings and pipe. Connections to products with other O.D. regimens can be done using commonly available adapters or transition gaskets. Dimensions should be checked for use with butterfly valves.



### RING-TITE™ JOINTS WITH LOCKED-IN GASKETS

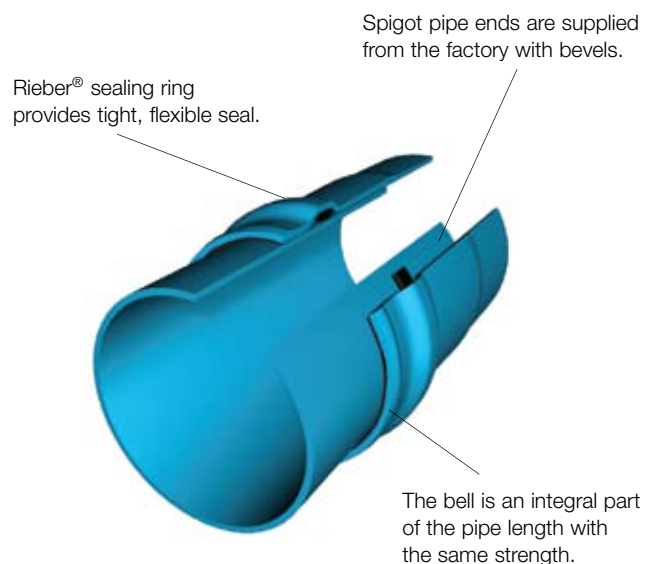
JM Eagle's Ring-Tite™ joint can be assembled quickly. Seated in a deep groove, the flexible elastomeric Rieber® gasket provides a tight seal that protects the line from shock, vibration, earth movement and compensates for expansion and contraction of pipe lengths. There's no field mixing or application of cement. It's a simple push-together joint that remains tight under normal operating conditions.

The factory installed Rieber® gaskets provide a tight, flexible seal that resists rolling during installation. Special gasket types are available for use with certain chemical and petroleum products. Spigot pipe ends are supplied from the factory with bevels. The bell is an integral part of the pipe length with the same strength. Joints meet or exceed ASTM D3139 for joint tightness, including a 22 in. Hg vacuum for one hour, under deflection with no leakage.

**Note:** Other types of gaskets may be provided. JM Eagle™ is in the process of converting all gasketed products to the Rieber® ring gasket.

\* Rieber® is a registered trademark of TI Specialty Polymer Products Inc.

### RING-TITE™ JOINT



### ACCESSORIES

JM Eagle's Blue Brute™ PVC pipe is compatible with all the items required for smooth installation of distribution pipelines.



## SURGE DESIGN

It is important to note that for the same conditions of interrupted flow, the surge pressures generated in pipe with high tensile moduli will be greater than the surges in low moduli (PVC) pipe of similar dimensions.

As the modulus of tensile elasticity for a piping material increases, the resultant pressure surge, or “water hammer”, caused by a change in flow velocity also increases. For example, an instantaneous 2 fps (0.6 mps) flow velocity change in an 8” water main will create surge pressures as shown in **Table 1** for different pipe materials. For all system designs, surge pressures should be examined with the pipe material in use.

**TABLE 1**

### PRESSURE SURGES IN 8 IN. WATER MAIN

In Response to 2 fps (0.6 mps) Instantaneous Flow Velocity Change.

PIPE PRODUCT	PRESSURE SURGE	
	psi	kPa
Class 50 DI Pipe	100.0	689
Class 150 AC Pipe	88.7	611
165 psi (DR 25) PVC Pipe	29.4	202

Pressure surges in PVC pipe of different dimension ratios in response to a 1 fps (0.3 mps) instantaneous flow velocity change are shown in **Table 2**.

**TABLE 2**

### DESIGN TABLE FOR PVC PIPE-PRESSURE SURGE VS. DIMENSION RATIO

In Response to 1 fps (0.3 mps) Instantaneous Flow Velocity Change.

DIMENSION RATIO	PRESSURE SURGE	
	psi	kPa
14	19.8	137
18	17.4	120
25	14.7	101

# SHORT FORM SPECIFICATION

## AWWA C900 BLUE BRUTE™

### SCOPE

This specification designates general requirements for 4" through 12" C.I.O.D.'s pipe produced in blue or white unplasticized polyvinyl chloride (PVC) plastic pressure pipe with integral bell and spigot joints for the conveyance of water and other fluids. This pipe shall meet the requirements of AWWA Standard C900, "Polyvinyl Chloride (PVC) Water Distribution Pipe."

### MATERIALS

All pipe shall be made from quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 as defined in ASTM D1784.

### HYDROSTATIC PROOF TESTING

Each standard length of pipe is tested up to 400 psi for Pressure Class 165; 600 psi for Pressure Class 235; 800 psi for Pressure Class 305 for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

### STANDARD LAYING LENGTHS

Standard laying lengths are 20 feet for all sizes. Other lengths of 14 feet, Non-Hydrotested pipe is available upon request.

### PIPE

Where specified as such, all pipe shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric gasket. The bell shall consist of an integral wall section with a factory installed, solid cross section Rieber® or other elastomeric gasket, which meets the requirements of ASTM F477. The bell section shall be designed to be at least as hydrostatically strong as the pipe barrel and meet the requirements of AWWA C900. The joint design shall meet the requirements of ASTM D3139 under both pressure and 22 in. Hg vacuum. Sizes and dimensions shall be as shown in this specification.

Pipe installation and usage shall be in compliance with JM Eagle™ Publication JME-03B, "Blue Brute™, Big Blue™ and Ultra Blue™ C900/C905/C909 Installation Guide" and Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."

### QUICK BURST TEST

Randomly selected samples tested in accordance with AWWA C900 and UL 1285 shall withstand, without failure, the pressures listed below when applied for 60-70 seconds.

DR	PRESSURE CLASS (psi)		MINIMUM BURST PRESSURE AT 73°F (psi)
	AWWA C900-97/FM 1612	AWWA C900-07	
25	100	165	535
18	150	235	755
14	200	305	985

### DROP IMPACT TEST

Pipe shall withstand, without failure using Tup "B" and Flat Rate Holder "B", at 73°F, a tup impact energy of 100 ft-lbf for all Pressure Class of 4" - 12" trade sizes. There shall be no visible evidence of shattering or splitting when the energy is imposed.



## TESTING REQUIREMENTS PER AWWA C900

TEST	PRESSURE CLASS C900-07		
	165 psi	235 psi	305 psi
<b>LONG TERM PRESSURE TEST</b> 1000 hours (psi)	350	500	650
<b>EXTRUSION QUALITY OF PVC PIPE BY ACETONE IMMERSION TEST METHOD ASTM D2152</b>	20 min	20 min	20 min
<b>FLATTENING TEST</b> Tests extrusion quality and ductility under slow loading conditions. (Flattening Capability)	40% of OD between the plates within 2-5 min	40% of OD between the plates within 2-5 min	40% of OD between the plates within 2-5 min
<b>HYDROSTATIC PROOF TEST</b> (each piece) (psi)	330	470	610

## TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	AWWA C900 BLUE BRUTE™ PVC PIPE	ASTM TEST METHOD
<b>Fiber Hoop Stress at 73°F</b> Minimum Short Term Bursting Strength (psi) 1,000 Hour Strength (psi) min	6400 4200	D1599 D1598
<b>Working Pressure Rating</b> 73°F (% of rating at 73°F) 80°F (% of rating at 73°F) 100°F (% of rating at 73°F)	100% 88% 62%	
<b>Chemical Resistance at 73°F</b> Acids Salts - Bases	Excellent Excellent	
<b>Physical Properties of Compound Std. Test Specimens</b> Minimum Tensile Strength (psi) at 73°F	7000	D638
<b>Thermal Expansion</b> (in/100ft/50°F Change)	2"	
<b>Fire Resistance</b>	Self Extinguishing	
<b>Flame Spread</b>	10	E162
<b>Smoke Development</b>	330	E84
<b>Coefficient of Flow</b> Hazen & Williams	C=150	
<b>Mannings N Value</b>	N=0.009	

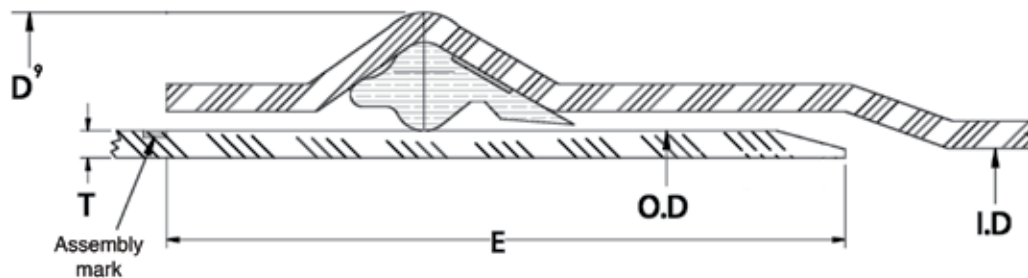
# DIMENSIONS AND WEIGHTS

## SUBMITTAL AND DATA SHEET

PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	MIN. E (IN)	APPROX. D <sup>9</sup> (IN)	APPROX. WEIGHT (LBS/FT)
PRESSURE CLASS 165 psi (DR 25)						
4	4.80	4.39	0.192	5.25	5.57	1.9
6	6.90	6.31	0.276	6.40	8.00	3.9
8	9.05	8.28	0.362	7.05	10.50	6.7
10	11.10	10.16	0.444	8.20	12.88	10.1
12	13.20	12.08	0.528	8.80	15.31	14.4
PRESSURE CLASS 235 psi (DR 18)*						
4	4.80	4.23	0.267	5.25	5.87	2.6
6	6.90	6.09	0.383	6.40	8.43	5.3
8	9.05	7.98	0.503	7.05	11.06	9.2
10	11.10	9.79	0.617	8.20	13.57	13.9
12	13.20	11.65	0.733	8.80	16.13	19.7
PRESSURE CLASS 305 psi (DR 14)*						
4	4.80	4.07	0.343	5.25	6.17	3.2
6	6.90	5.86	0.493	6.40	8.87	6.7
8	9.05	7.68	0.646	7.05	11.63	11.6
10	11.10	9.42	0.793	8.20	14.27	17.6
12	13.20	11.20	0.943	8.80	16.97	25.1

Consult JM Eagle™ for CSA and other listing availability prior to shipment.

Note: \*FM Approvals Pressure Class 150 psi for DR 18 and 200 psi for DR 14.



I.D. : Inside Diameter

O.D. : Outside Diameter

T. : Wall Thickness

D<sup>9</sup> : Bell Outside Diameter

E : Distance between Assembly Mark to the end of spigot.

# FLOW/FRICTION CHARTS

## FLOW/FRICTION LOSS, BLUE BRUTE™ PVC PIPE

4" C.I.O.D. (AWWA C900) ACTUAL O.D. 4.80 INCH

FLOW (GAL/MIN)	DR 25 (165 psi)		DR 18 (235 psi)		DR 14 (305 psi)	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
20	0.424	0.008	0.456	0.010	0.493	0.012
25	0.530	0.012	0.570	0.015	0.616	0.018
30	0.636	0.017	0.684	0.021	0.739	0.025
35	0.742	0.023	0.798	0.028	0.863	0.033
40	0.847	0.029	0.912	0.035	0.986	0.043
45	0.953	0.037	1.026	0.044	1.109	0.053
50	1.059	0.045	1.140	0.053	1.232	0.064
60	1.271	0.062	1.368	0.075	1.479	0.090
70	1.483	0.083	1.597	0.099	1.725	0.120
75	1.589	0.094	1.711	0.113	1.849	0.136
80	1.695	0.106	1.825	0.127	1.972	0.154
90	1.907	0.132	2.053	0.158	2.218	0.191
100	2.119	0.161	2.281	0.192	2.465	0.232
125	2.648	0.243	2.851	0.291	3.081	0.351
150	3.178	0.341	3.421	0.408	3.697	0.492
175	3.708	0.453	3.991	0.542	4.313	0.655
200	4.237	0.580	4.562	0.694	4.930	0.839
250	5.297	0.877	5.702	1.050	6.162	1.268
300	6.356	1.230	6.842	1.471	7.394	1.777
350	7.415	1.636	7.983	1.957	8.627	2.364
400	8.475	2.095	9.123	2.506	9.859	3.027
450	9.534	2.606	10.264	3.117	11.092	3.765
500	10.593	3.167	11.404	3.789	12.324	4.576
600	12.712	4.439	13.685	5.311	14.789	6.415
700	14.831	5.906	15.965	7.066	17.254	8.534

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."

# FLOW/FRICTION CHARTS

(CONTINUED)

## FLOW/FRICTION LOSS, BLUE BRUTE™ PVC PIPE

6" C.I.O.D. (AWWA C900) ACTUAL O.D. 6.90 INCH

FLOW (GAL/MIN)	DR 25 (165 psi)		DR 18 (235psi)		DR 14 (305 psi)	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
50	0.513	0.008	0.552	0.009	0.596	0.011
60	0.615	0.011	0.662	0.013	0.716	0.015
70	0.718	0.014	0.772	0.017	0.835	0.021
75	0.769	0.016	0.827	0.019	0.895	0.023
80	0.820	0.018	0.882	0.022	0.954	0.026
90	0.923	0.023	0.993	0.027	1.073	0.033
100	1.025	0.027	1.103	0.033	1.193	0.040
125	1.282	0.042	1.379	0.050	1.491	0.060
150	1.538	0.058	1.655	0.070	1.789	0.084
175	1.794	0.078	1.930	0.093	2.087	0.112
200	2.051	0.099	2.206	0.119	2.385	0.143
250	2.563	0.150	2.758	0.179	2.982	0.217
300	3.076	0.210	3.309	0.251	3.578	0.304
350	3.589	0.280	3.861	0.334	4.175	0.404
400	4.101	0.358	4.412	0.428	4.771	0.518
450	4.614	0.446	4.964	0.533	5.367	0.644
500	5.126	0.542	5.516	0.647	5.964	0.783
600	6.152	0.759	6.619	0.907	7.156	1.097
700	7.177	1.010	7.722	1.207	8.349	1.460
800	8.202	1.294	8.825	1.546	9.542	1.869
1000	10.253	1.956	11.031	2.337	11.927	2.826

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."





## FLOW/FRICTION LOSS, BLUE BRUTE™ PVC PIPE

8" C.I.O.D. (AWWA C900) ACTUAL O.D. 9.05 INCH

FLOW (GAL/MIN)	DR 25 (165 psi)		DR 18 (235 psi)		DR 14 (305 psi)	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
100	0.596	0.007	0.641	0.009	0.693	0.011
125	0.745	0.011	0.802	0.013	0.866	0.016
150	0.894	0.016	0.962	0.019	1.040	0.022
200	1.192	0.027	1.283	0.032	1.386	0.038
250	1.490	0.040	1.604	0.048	1.733	0.058
300	1.788	0.056	1.924	0.067	2.079	0.081
350	2.086	0.075	2.245	0.089	2.426	0.108
400	2.384	0.096	2.566	0.115	2.772	0.138
450	2.682	0.119	2.887	0.142	3.119	0.172
500	2.980	0.145	3.207	0.173	3.466	0.209
600	3.576	0.203	3.849	0.243	4.159	0.293
700	4.172	0.270	4.490	0.323	4.852	0.390
800	4.768	0.346	5.132	0.413	5.545	0.499
1000	5.960	0.523	6.415	0.625	6.931	0.754
1200	7.152	0.732	7.698	0.876	8.317	1.057
1400	8.344	0.975	8.981	1.165	9.704	1.407
1600	9.536	1.248	10.264	1.492	11.090	1.802
2000	11.920	1.887	12.829	2.256	13.862	2.724

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."



# FLOW/FRICTION CHARTS

(CONTINUED)

## FLOW/FRICTION LOSS, BLUE BRUTE™ PVC PIPE

10" C.I.O.D. (AWWA C900) ACTUAL O.D. 11.10 INCH

FLOW (GAL/MIN)	DR 25 (165 psi)		DR 18 (235 psi)		DR 14 (305 psi)	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
175	0.693	0.008	0.746	0.009	0.807	0.011
200	0.792	0.010	0.853	0.012	0.922	0.014
250	0.990	0.015	1.066	0.018	1.152	0.021
300	1.189	0.021	1.279	0.025	1.383	0.030
350	1.387	0.028	1.492	0.033	1.613	0.040
400	1.585	0.035	1.706	0.042	1.843	0.051
450	1.783	0.044	1.919	0.053	2.074	0.064
500	1.981	0.054	2.132	0.064	2.304	0.077
600	2.377	0.075	2.559	0.090	2.765	0.109
700	2.773	0.100	2.985	0.120	3.226	0.144
800	3.169	0.128	3.411	0.153	3.687	0.185
1000	3.962	0.194	4.264	0.231	4.609	0.280
1200	4.754	0.271	5.117	0.324	5.530	0.392
1400	5.547	0.361	5.970	0.432	6.452	0.521
1600	6.339	0.462	6.823	0.553	7.374	0.668
2000	7.924	0.699	8.528	0.835	9.217	1.009
2500	9.905	1.056	10.661	1.263	11.522	1.526
3000	11.886	1.480	12.793	1.770	13.826	2.139

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."



## FLOW/FRICTION LOSS, BLUE BRUTE™ PVC PIPE

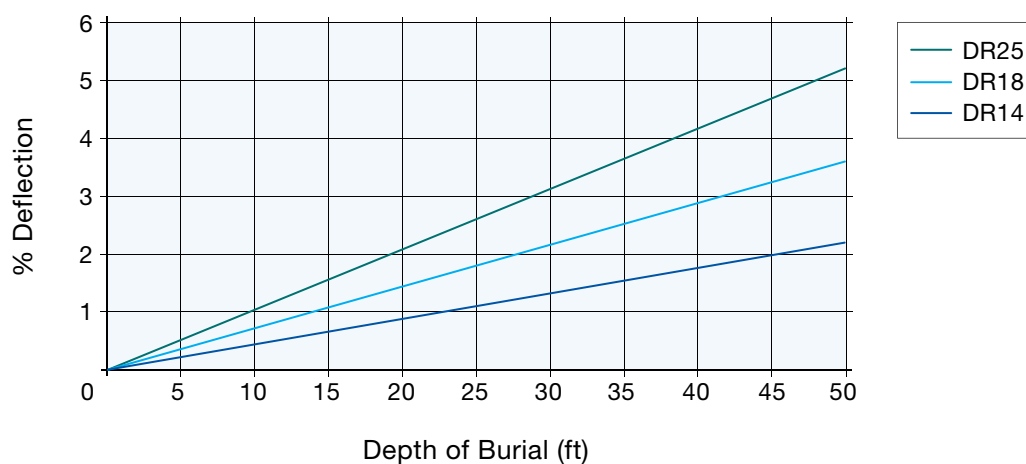
12" C.I.O.D. (AWWA C900) ACTUAL O.D. 13.20 INCH

FLOW (GAL/MIN)	DR 25 (165 psi)		DR 18 (235 psi)		DR 14 (305 psi)	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
300	0.840	0.009	0.904	0.011	0.978	0.013
350	0.981	0.012	1.055	0.014	1.141	0.017
400	1.121	0.015	1.206	0.018	1.304	0.022
450	1.261	0.019	1.357	0.023	1.467	0.027
500	1.401	0.023	1.507	0.028	1.629	0.033
600	1.681	0.032	1.809	0.039	1.955	0.047
700	1.961	0.043	2.110	0.051	2.281	0.062
800	2.241	0.055	2.412	0.066	2.607	0.080
1000	2.802	0.083	3.015	0.100	3.259	0.120
1200	3.362	0.117	3.617	0.140	3.911	0.169
1400	3.922	0.155	4.220	0.186	4.563	0.224
1600	4.482	0.199	4.823	0.238	5.214	0.287
2000	5.603	0.301	6.029	0.359	6.518	0.434
2500	7.004	0.455	7.536	0.543	8.147	0.657
3000	8.405	0.637	9.044	0.761	9.777	0.920
3500	9.805	0.848	10.551	1.013	11.406	1.225
4000	11.206	1.085	12.058	1.297	13.036	1.568
4500	12.607	1.350	13.565	1.613	14.665	1.950

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."

## DEFLECTION CHART

### Blue Brute™ Deflection By Depth of Burial : : †



: : Deflections computed using a unit weight of backfill at 120 lbs/cft and assume no internal pressure or live load.

: : Pipe embedment used in calculations is Class 1, 2, 3, or 4, as defined in ASTM D2321 with appropriate compaction to achieve an  $E' = 1000$  psi.

† Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, "Handbook of PVC Pipe Design and Construction."

# SHORT FORM INSTALLATION GUIDE/ WARNING

*This information is furnished in order to provide a brief review of the installation requirements for JM Eagle™ Blue Brute™ PVC pipe. It is not intended to serve as or replace the function of the FULL VERSION product installation guide available upon request.*

1. Check to see that the gasket is properly seated in the bell groove, and that the bell and spigot are clean before assembly.
2. Apply the approved lubricant supplied with the pipe to the spigot end of the pipe, paying particular attention to the bevel. The coating should be equivalent to a brush coat of enamel paint.
3. Assemble the joint only to and not over the assembly mark provided on the spigot end.
4. If undue resistance to insertion of the spigot is encountered, or the assembly mark does not reach the flush position, disassemble the joint and check the position of the rubber gasket, and remove any debris.
5. Curvature of the pipe shall be accomplished through longitudinal bending of the pipe barrel in accordance with the following table. Deflection of the joint is not allowed and may cause leakage.

PIPE SIZE (IN)	RADIUS (FT)
4	100
6	150
8	200
10	250
12	300

6. Prior to backfilling, check to see that the assembly mark is flush with the end of the bell.
7. All taps performed on JM Eagle's pressure products, shall be in accordance with Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."

## WARNING: RUPTURE HAZARD

**IMPROPER INSTALLATION OR MISUSE OF TAPPING TOOLS MAY CAUSE PIPES UNDER HIGH PRESSURE TO RUPTURE AND RESULT IN HIGH VELOCITY AIRBORNE FRAGMENTATION LEADING TO SERIOUS INJURIES AND/OR DEATH.**

### BEFORE AND DURING INSTALLATION, ALWAYS:

- Consult and follow the FULL VERSION of the product installation guide
- Closely follow job specifications
- Use protective gear and equipment

### BEFORE AND DURING TAPPING, ALWAYS:

- Consult and follow Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."
- Use the correct tapping tools
- Bleed air from pipes at high spot before tapping
- Use protective gear and equipment

Please contact JM Eagle™ Product Assurance at (800) 621-4404 to obtain FULL VERSION of the appropriate installation guide or for further assistance.

## WARRANTY

### JM EAGLE™ PRODUCTS LIMITED WARRANTY

J-M Manufacturing Co., Inc. (JM Eagle™) warrants that its standard polyvinyl chloride (PVC), polyethylene (PE), conduit/plumbing/solvent weld and Acrylonitrile-Butadiene-Styrene (ABS) pipe Products ("Products") are manufactured in accordance with applicable industry specifications referenced on the Product and are free from defects in workmanship and materials. Every claim under this warranty shall be void unless in writing and received by JM Eagle™ within thirty (30) days of the date the defect was discovered, and within one (1) year of the date of shipment from the JM Eagle™ plant. Claims for Product appearance defects, such as sun-bleached pipe etc., however, must be made within thirty (30) days of the date of the shipment from the JM Eagle™ plant. This warranty specifically excludes any Products allowed to become sun-bleached after shipment from the JM Eagle™ plant. Proof of purchase with the date thereof must be presented to the satisfaction of JM Eagle™, with any claim made pursuant to this warranty. JM Eagle™ must first be given an opportunity to inspect the alleged defective Products in order to determine if it meets applicable industry standards, if the handling and installation have been satisfactorily performed in accordance with JM Eagle™ recommended practices and if operating conditions are within standards. Written permission and/or a Return Goods Authorization (RGA) must be obtained along with instructions for return shipment to JM Eagle™ of any Products claimed to be defective.

The limited and exclusive remedy for breach of this Limited Warranty shall be, at JM Eagle's sole discretion, the replacement of the same type, size and like quantity of non-defective Product, or credits, offsets, or combination of thereof, for the wholesale purchase price of the defective unit.

This Limited Warranty does not apply for any Product failures caused by user's flawed designs or specifications, unsatisfactory applications, improper installations, use in conjunction with incompatible materials, contact with aggressive chemical agents, freezing or overheating of liquids in the product and any other misuse causes not listed here. This Limited Warranty also excludes failure or damage caused by fire stopping materials, tread sealants, plasticized vinyl Products or damage caused by the fault or negligence of anyone other than JM Eagle™, or any other act or event beyond the control of JM Eagle™.

JM Eagle's liability shall not, at any time, exceed the actual wholesale purchase price of the Product. The warranties in this document are the only warranties applicable to the Product and there are no other warranties, expressed or implied. This Limited Warranty specifically excludes any liability for general damages, consequential or incidental damages, including without limitation, costs incurred from removal, reinstallation, or other expenses resulting from any defect. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE'S ACTUAL KNOWLEDGE THE PRODUCT'S INTENDED USE.

JM Eagle's Products should be used in accordance with standards set forth by local plumbing and building laws, codes, or regulations and the applicable standards. Failure to adhere to these standards shall void this Limited Warranty. Products sold by JM Eagle™ that are manufactured by others are warranted only to the extent and limits of the warranty of the manufacturer. No statement, conduct or description by JM Eagle™ or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of JM Eagle™.



# PLANT LOCATIONS

## ADEL

2101 J-M Drive  
Adel, Georgia 31620

## BATCHELOR

2894 Marion Monk Road  
Batchelor, Louisiana 70715

## BUCKHANNON

Old Drop 33, Mudlick Road  
Buckhannon, West Virginia 26201

## BUTNER

2602 West Lyon Station Road  
Creedmoor, North Carolina 27522

## CAMERON PARK

3500 Robin Lane  
Cameron Park, California 95682

## COLUMBIA

6500 North Brown Station Road  
Columbia, Missouri 65202

## CONROE

101 East Avenue M  
Conroe, Texas 77301

## FONTANA

10990 Hemlock Avenue  
Fontana, California 92337

## HASTINGS

146 North Maple Avenue  
Hastings, Nebraska 68901

## KINGMAN

4620 Olympic Way  
Kingman, Arizona 86401

## MAGNOLIA

2220 Duracrete Drive  
Magnolia, Arkansas 71753

## M McNARY

31240 Roxbury Road  
Umatilla, Oregon 97882

## MEADVILLE

15661 Delano Road  
Cochran, Pennsylvania 16314

## PERRIS

23711 Rider Street  
Perris, California 92570

## PUEBLO

1742 E. Platteville Boulevard  
Pueblo West, Colorado 81007

## STOCKTON

1051 Sperry Road  
Stockton, California 95206

## SUNNYSIDE

1820 South First Street  
Sunnyside, Washington 98944

## TACOMA

2330 Port of Tacoma Road  
Tacoma, Washington 98421

## TULSA

4501 West 49th Street  
Tulsa, Oklahoma 74107

## VISALIA

8875 Avenue 304  
Visalia, California 93291

## WHARTON

10807 US 59 RD  
Wharton, Texas 77488

## WILTON

1314 W. Third Street  
Wilton, Iowa 52778

## MEXICO

PLASTICS TECHNOLOGY  
DE MÉXICO S DE R.L. DE S.A.  
Av. Montes Urales No. 8 y 10  
Parque Industrial Opción, Carretera  
57 Qro. -S.L.P. Km. 57.8  
C.P. 37980 San José Iturbide,  
Guanajuato México

*\* Our Mexico location is a joint venture  
between JM Eagle™ and Plastics Technology*

## HEADQUARTERS

Nine Peach Tree Hill Road  
Livingston, New Jersey 07039

5200 West Century Boulevard  
Los Angeles, California 90045

**J-M Manufacturing Co., Inc. and PW Eagle, Inc. are doing business as JM Eagle™.**



# PLANT LOCATIONS



Revised May 2008  
JME-01A  
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*Building essentials  
for a better tomorrow™*

## JM EAGLE™ HEADQUARTERS:

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Livingston, NJ 07039  
T: 973.535.1633  
F: 973.533.4185

[www.JMEagle.com](http://www.JMEagle.com)

5200 West Century Blvd  
Los Angeles, CA 90045  
T: 800.621.4404  
F: 800.451.4170





**SCHEDULE-10/40**

# Schedule-10®/Schedule-40®

## Fully Listed and FM Approved Sprinkler Pipe

When you specify Schedule-10/Schedule-40 sprinkler pipe you get a UL listed and FM approved product. Although these products do not require separate approvals, Schedule-10/Schedule-40 gives you the extra quality assurance you demand. Our Sch-10 (1¼"– 8") pipe and Sch-40 (1"– 2½") pipe have passed the same thorough lab testing as our other listed pipe products, and receive periodic mill inspections from both UL and FM agents to ensure consistent quality.

### Galvanized Pipe

Schedule-10/Schedule-40 product can be "hot-dip" galvanized to meet FM requirements for dry systems in accordance with the zinc coating specifications of ASTM A-123.

### Superior Coating

Our advanced formula mill coating offers a clean, durable surface. It is also paint-ready for custom color applications without special preparation.

The internal surface of all black Allied Tube & Conduit Fire Sprinkler pipe products up to 4.5000" in diameter is coated with our new Antibacterial Formula, "ABF". In scientific laboratory test, ABS proved to have superior resistance to microbial colonization of pipe walls, thereby delaying or possibly preventing the onset of Microbiologically Influenced corrosion (MIC) when the First Sprinkler System is first installed.

### American Made

Meets "Buy American" requirement and is available through distributors in the USA, Canada and Mexico.

### Specifications & Approvals

Schedule-10/Schedule-40 pipe are in compliance with the following:

ASTM A-135, and NFPA 13. Both pipe products have a working pressure rating of 300 psi maximum and also meet the stringent requirement for the following tests:

- Welded Outlets
- Hydrostatic Pressure
- Side Wall Rupture
- Vibration Test

### Sch-40 Specifications

NPS In; mm	Nominal I.D. In; mm	Wt. Lbs/Ft; Kg/m	Wt. (H2O Filled) Lbs/Ft; Kg/m	Pcs/ Lift	Wt/Lift (21') Lbs; Kg	Wt/Lift (24') Lbs; Kg	Wt/Lift (25') Lbs; Kg
1"	1.049	1.680	2.05	70	2,470	2,822	2,940
25	26.6	2.5	3.05	70	1,120	1,280	1,334
1¼"	1.380	2.270	2.93	51	2,431	2,778	2,894
32	35.1	4.36	4.36	51	1,103	1,260	1,313
1½"	1.610	2.720	3.61	44	2,513	2,872	2,992
40	40.9	4.0	5.37	44	1,140	1,303	1,357
2"	2.067	3.650	5.13	30	2,300	2,628	2,738
50	52.5	5.4	7.63	30	1,043	1,192	1,242
2½"	2.469	5.790	7.86	19	2,310	2,640	2,750
65	62.7	8.6	11.73	19	1,048	1,197	1,247

### Sch-10 Specifications

NPS In; mm	Nominal I.D. In; mm	Wt. Lbs/Ft; Kg/m	Wt. (H2O Filled) Lbs/Ft; Kg/m	Pcs/ Lift	Wt/Lift (21') Lbs; Kg	Wt/Lift (24') Lbs; Kg	Wt/Lift (25') Lbs; Kg
1"	1.097	1.400	1.81	91	2,675	3,053	3,185
25	27.9	2.1	2.70	91	1,213	1,385	1,445
1¼"	1.442	1.810	2.52	61	2,319	2,664	2,760
32	36.6	2.7	3.75	61	1,052	1,208	1,252
1½"	1.682	2.080	3.04	61	2,664	3,045	3,172
40	42.7	3.1	4.52	61	1,208	1,381	1,439
2"	2.157	2.640	4.22	37	2,051	2,344	2,442
50	54.8	3.9	6.28	37	930	1,063	1,108
2½"	2.635	3.530	5.89	30	2,224	2,542	2,648
65	66.9	5.3	8.77	30	1,009	1,153	1,201
3"	3.260	4.330	7.94	19	1,728	1,975	2,057
80	82.8	6.4	11.82	19	784	896	933
4"	4.260	5.610	11.78	19	2,238	2,558	2,665
90	108.2	8.3	17.53	19	1,015	1,160	1,209
5"	5.295	7.77	17.33	10	1,632	1,865	1,943
125	134.5	11.56	25.80	10	740	846	881
6"	6.357	9.290	23.03	10	1,951	2,230	2,322
150	161.5	13.8	34.27	10	885	1,012	1,053
8"	8.249	16.490	40.15	7	2,424	2,770	2,885
200	209.5	24.5	59.75	7	1,100	1,256	1,309



Listed



Approved



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(800) 882-5543  
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# C.I. THREADED FITTINGS



LISTED



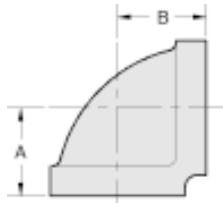
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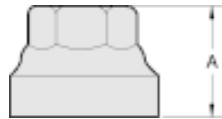
For fire protection services request submittal GRS 1.3

Cast iron threaded fittings are UL, ULC listed and factory mutual approved for 300 psi service. Gray iron per ASTM A126 class B. Dimensions conform to ANSI B16.4 class 125 except plugs conform to ASME B16.14. Threads are NPT per ANSI/ASME B1.20.1.



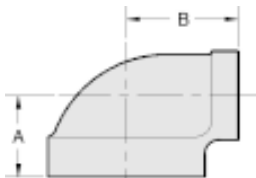
## CAST IRON 90 DEGREE ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1	CB90033	300	1.50	1.50	0.95
1 1/4	CB90044	300	1.75	1.75	1.34
1 1/2	CB90055	300	1.94	1.94	1.80
2	CB90066	300	2.25	2.25	2.90
2 1/2	CB90077	300	2.70	2.70	4.75



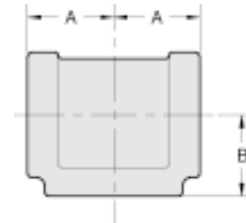
## CAST IRON RED. COUPLING

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSION	WEIGHT EACH PIECE
			A	
1X1/2	CRC031	300	1.70	0.62
1X3/4	CRC032	300	1.70	0.80



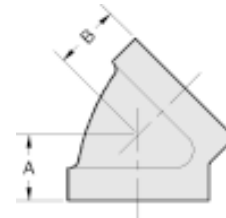
## CAST IRON RED. 90 DEG. ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1X1/2	CB90031	300	1.26	1.36	0.64
1X3/4	CB90032	300	1.37	1.45	0.87
1 1/4X1/2	CB90041	300	1.34	1.53	0.96
1 1/4X3/4	CB90042	300	1.45	1.62	1.13
1 1/4X1	CB90043	300	1.58	1.67	1.16
1 1/2x1 1/2	CB90051	300	1.41	1.66	1.17
1 1/2x3/4	CB90052	300	1.52	1.75	1.28
1 1/2X1	CB90053	300	1.65	1.80	1.51
1 1/2X1 1/4	CB90054	300	1.82	1.88	1.62
2X1/2	CB90061	300	1.49	1.88	2.00
2X3/4	CB90062	300	1.60	1.97	2.05
2X1	CB90063	300	1.73	2.02	2.10
2X1 1/4	CB90064	300	1.90	2.10	2.30
2X1 1/2	CB90065	300	2.02	2.16	2.60



## CAST IRON STRAIGHT TEE

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1	CT333	300	1.50	1.50	1.21
1 1/4	CT444	300	1.75	1.75	1.87
1 1/2	CT555	300	1.94	1.94	2.51
2	CT666	300	2.25	2.25	3.96
2 1/2	CT777	300	2.70	2.70	6.45



## CAST IRON 45 DEGREE ELBOW

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1	CB45033	300	1.12	1.12	0.84
1 1/4	CB45044	300	1.29	1.29	1.40
1 1/2	CB45055	300	1.43	1.43	1.80
2	CB45066	300	1.68	1.68	2.79



## CAST IRON PLUGS

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSION	WEIGHT EACH PIECE
			A	
1/2	CPL001	300	0.94	0.10
3/4	CPL002	300	1.07	0.17
1	CPL003	300	1.25	0.28
1 1/4	CPL004	300	1.36	0.44
1 1/2	CPL005	300	1.45	0.62
2	CPL006	300	1.56	0.91



# C.I. THREADED FITTINGS

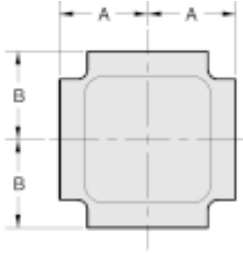


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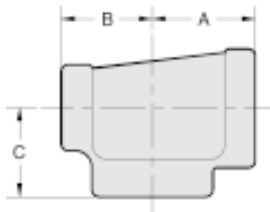
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For fire protection services request submittal GRS 1.3



## CAST IRON CROSS

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS		WEIGHT EACH PIECE
			A	B	
1	CX033	300	1.50	1.50	1.54
1 1/4	CX044	300	1.75	1.75	2.40
1 1/2	CX055	300	1.94	1.94	3.10
2	CX066	300	2.25	2.25	4.00
1 1/4X1	CX043	300	1.58	1.67	2.05
1 1/2X1	CX053	300	1.65	1.80	2.40
2X1	CX063	300	1.73	2.02	2.75



## CAST IRON REDUCING TEE

NOMINAL SIZE (INCH)	ITEM CODE #	MAX. WORKING P.S.I.	DIMENSIONS			WEIGHT EACH PIECE
			A	B	C	
1X1X1/2	CT331	300	1.26	1.26	1.36	0.95
1X1X3/4	CT332	300	1.37	1.37	1.45	1.10
1X1/2X1	CT313	300	1.50	1.36	1.50	1.08
1X3/4X1	CT323	300	1.50	1.45	1.50	1.18
1X1X1 1/4	CT334	300	1.67	1.67	1.58	1.52
1X1X1 1/2	CT335	300	1.80	1.80	1.65	1.73
1 1/4X1X1/2	CT431	300	1.34	1.26	1.53	1.17
1 1/4X1X3/4	CT432	300	1.45	1.37	1.62	1.38
1 1/4X1X1	CT433	300	1.58	1.50	1.57	1.47
1 1/4X1X1 1/4	CT434	300	1.75	1.67	1.75	1.80
1 1/4X1X1 1/2	CT435	300	1.88	1.80	1.82	2.05
1 1/4X1 1/4X1/2	CT441	300	1.34	1.34	1.53	1.37
1 1/4X1 1/4X3/4	CT442	300	1.45	1.45	1.62	1.54
1 1/4X1 1/4X1	CT443	300	1.58	1.58	1.67	1.65
1 1/4X1 1/4X1 1/2	CT445	300	1.88	1.88	1.82	2.21
1 1/4X1 1/4X2	CT446	300	2.10	2.10	1.90	2.55
1 1/2X1X1/2	CT531	300	1.41	1.34	1.66	1.41
1 1/2X1X3/4	CT532	300	1.52	1.37	1.75	1.65
1 1/2X1X1	CT533	300	1.65	1.50	1.80	1.65
1 1/2X1X1 1/4	CT534	300	1.82	1.67	1.88	2.00
1 1/2X1X1 1/2	CT535	300	1.94	1.80	1.94	2.30
1 1/2X1 1/4X1/2	CT541	300	1.41	1.34	1.66	1.58
1 1/2X1 1/4X3/4	CT542	300	1.52	1.45	1.75	1.72
1 1/2X1 1/4X1	CT543	300	1.65	1.58	1.80	1.85
1 1/2x1 1/4x1 1/4	CT544	300	1.82	1.75	1.88	2.22
1 1/2x1 1/4x1 1/2	CT545	300	1.94	1.88	1.94	2.45
1 1/2X1 1/4X2	CT546	300	2.16	2.10	2.02	2.80
1 1/2X1 1/2X1/2	CT551	300	1.41	1.41	1.66	1.76
1 1/2X1 1/2X3/4	CT552	300	1.52	1.52	1.75	1.87
1 1/2X1 1/2X1	CT553	300	1.65	1.65	1.80	1.94
1 1/2X1 1/2X1 1/4	CT554	300	1.82	1.82	1.88	2.29
1 1/2X1 1/2X2	CT556	300	2.16	2.16	2.02	3.28
2X1X2	CT636	300	2.25	2.02	2.25	3.40
2X1 1/4X2	CT646	300	2.25	2.10	2.25	2.80
2X1 1/2X1/2	CT651	300	1.49	1.41	1.88	2.09
2X1 1/2X3/4	CT652	300	1.60	1.52	1.97	2.40
2X1 1/2X1	CT653	300	1.73	1.65	2.02	2.54
2X1 1/2X1 1/4	CT654	300	1.90	1.82	2.10	2.85
2X1 1/2X1 1/2	CT655	300	1.49	1.41	1.88	2.24
2X1 1/2X2	CT656	300	2.25	2.16	2.25	3.75
2X2X1/2	CT661	300	1.49	1.49	1.88	2.60
2X2X3/4	CT662	300	1.60	1.60	1.97	2.71
2X2X1	CT663	300	1.73	1.73	2.02	2.97
2X2X1 1/4	CT664	300	1.90	1.90	2.10	3.32
2X2X1 1/2	CT665	300	2.02	2.02	2.16	3.72
2x2x2 1/2	CT667	300	2.60	2.60	2.39	5.10

## Grooved End Fittings

Victaulic offers a broad line of fittings in sizes through 48"/1200mm in a variety of straight and reducing styles. Most standard fittings are cast of durable ductile iron to precise tolerances. Victaulic standard fittings pressure ratings conform to the ratings of Victaulic Style 77 couplings.

All fittings are supplied with grooves or shoulders to permit fast installation without field preparation. The grooved design permits flexibility for easy alignment. *These fittings are not intended for use with Victaulic couplings for plain end pipe (refer to Section 14.04 for fittings available for plain end applications).*

Fittings are provided in various materials including ductile iron, steel or segmentally welded steel depending on styles and size. Fittings are painted orange enamel with a galvanized finish available as an option, contact Victaulic for details.

Victaulic fittings are designed specifically for use in grooved piping systems. Fittings are provided grooved or with shoulders conforming to standard steel pipe outside diameters. When connecting wafer or lug-type butterfly valves directly to Victaulic fittings with 741 or 743 Vic-Flange® adapters, check disc clearance dimensions with I.D. dimension of fitting.



NO. 20 TEE



NO. 10 ELBOW



AGS – ADVANCED GROOVE SYSTEM

**Advanced Groove System** – For 14 – 24"/350 – 600mm piping systems, Victaulic now offers the Advanced Groove System (AGS). Refer to Section 20.05 for AGS fitting details.

**Stainless Steel** – Grooved end fittings are available in Schedule 10 Type 316 stainless steel (Schedule 5, 40 and Type 304 available as an option) in various sizes. Fitting center-to-end dimensions will vary depending upon type and schedule. Refer to Section 17.04 and 17.16 for details.

**Aluminum** – Grooved end fittings are available in aluminum alloy 356 T6, in sizes from 1 – 8"/25 – 200mm. Refer to Section 21.03 or contact Victaulic for details.

### ALTERNATE STYLES



**Extra Heavy EndSeal® "ES" Fittings** – EndSeal fittings are available in 2 – 12"/50 – 300mm for use with "ES" grooved pipe and HP-70ES EndSeal couplings. "ES" fittings are painted black for easy identification. EndSeal (and standard) fittings may be easily internally coated (by others) for severe service requirements. Always specify "ES EndSeal fittings" when ordering. See Section 07.03 for information on EndSeal fittings.

**Fittings Machined for Rubber or Urethane Lining (MRL)** – For severe abrasive services, Victaulic fittings may be rubber or urethane lined (by others). Lining may be inside diameter/end (abrasion resistance) or wrap-around (corrosion and/or abrasion) machined. Refer to Section 25.03 or contact Victaulic for specific details.

#### JOB/OWNER

System No. \_\_\_\_\_

Location \_\_\_\_\_

#### CONTRACTOR

Submitted By \_\_\_\_\_

Date \_\_\_\_\_

#### ENGINEER

Spec Sect \_\_\_\_\_ Para \_\_\_\_\_

Approved \_\_\_\_\_

Date \_\_\_\_\_

## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### FLOW DATA

(Frictional Resistance)

The chart expresses the frictional resistance of various Victaulic fittings as equivalent feet of straight pipe. Fittings not listed can be estimated from the data given, for example, a 22½° elbow is approximately one-half the resistance of a 45° elbow. Values of mid-sizes can be interpolated.

Size		Dimension – Feet/meters					
Nominal Size In./mm	Actual Outside Dia. In./mm	Elbows				Tees	
		90° Elbows		45° Elbows		Branch	Run
		No. 10 Std. Radius	No. 100 1½ D Long Radius	No. 11 Std. Radius	No. 110 1½ D Long Radius		
1 25	1.315 33.7	1.7 0.5	—	0.8 0.2	—	4.2 1.3	1.7 0.5
2 50	2.375 60.3	3.5 1.1	2.5 0.8	1.8 0.5	1.1 0.3	8.5 2.6	3.5 1.1
76.1 mm	3.000 76.1	4.3 1.3	—	2.1 0.7	—	10.8 3.3	4.3 1.3
3 80	3.500 88.9	5.0 1.5	3.8 1.2	2.6 0.8	1.6 0.5	13.0 4.0	5.0 1.5
108.0 mm	4.250 108.0	6.4 2.0	—	3.2 0.9	—	15.3 4.7	6.4 2.0
4 100	4.500 114.3	6.8 2.1	5.0 1.5	3.4 1.0	2.1 0.6	16.0 4.9	6.8 2.1
133.0 mm	5.250 133.0	8.1 2.5	—	4.1 1.2	—	20.0 6.2	8.1 2.5
139.7 mm	5.500 139.7	8.5 2.6	—	4.2 1.3	—	21.0 6.4	8.5 2.6
5 125	5.563 141.3	8.5 2.6	—	4.2 1.3	—	21.0 6.4	8.5 2.6
159.0 mm	6.250 159.0	9.4 2.9	—	4.9 1.5	—	25.0 7.6	9.6 2.9
165.1 mm	6.500 165.1	9.6 2.9	—	5.0 1.5	—	25.0 7.6	10.0 3.0
6 150	6.625 168.3	10.0 3.0	7.5 2.3	5.0 1.5	3.0 0.9	25.0 7.6	10.0 3.0
8 200	8.625 219.1	13.0 4.0	9.8 3.0	6.5 2.0	4.0 1.2	33.0 10.1	13.0 4.0
10 250	10.750 273.0	17.0 5.2	12.0 3.7	8.3 2.5	5.0 1.5	41.0 12.5	17.0 5.2
12 300	12.750 323.9	20.0 6.1	14.5 4.4	10.0 3.0	6.0 1.8	50.0 15.2	20.0 6.1
14 350	14.000 355.6	#	15.8 4.8	#	11.0 3.4	70.0 21.3	23.0 7.0
16 400	16.000 406.4	#	18.0 5.5	#	13.0 4.0	80.0 24.4	27.0 8.2
18 450	18.000 457.0	#	20.0 6.1	#	14.0 4.3	90.0 27.4	30.0 9.1
20 800	20.000 508.0	#	22.5 6.9	#	16.0 4.9	100.0 30.5	33.0 10.1
24 600	24.000 610.0	#	27.0 8.2	#	19.0 5.8	120.0 36.6	40.0 12.2
26 650	26.000 660.4	#	28.0 8.5	#	20.5 6.3	130.0 39.6	43.0 13.1
30 750	30.000 762.0	#	34.0 10.4	#	24.0 7.3	150.0 45.7	50.0 15.2
36 900	36.000 914.0	#	40.5 12.3	#	28.5 8.7	180.0 54.9	60.0 18.3
42 1050	42.000 1067.0	#	47.0 14.3	#	33.0 10.1	210.0 64.0	70.0 21.3

## Grooved End Fittings



NO. 10 ELBOW

NO. 20 TEE

### MATERIAL SPECIFICATIONS

**Fitting:** Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

- **Or:** Segmentally welded steel as shown under nipples

**Nipples:** (adapter, swaged & hose)

- $\frac{3}{4}$  – 4"/20 – 100mm: Carbon steel, Schedule 40, conforming to ASTM A-53, Type F
- 5 – 6"/125 – 150mm: Carbon steel, Schedule 40, conforming to ASTM A-53, Type E or S, Gr. B
- 8 – 12"/200 – 300mm: Carbon steel, Schedule 30 or 40, conforming to ASTM A-53, Type E or S, Gr. B

**Flanged Adapter Nipples:** (Nipple – see above)

- Class 125 Flange: Cast iron conforming to ANSI B-16.1
- Class 150 Flange: Carbon steel conforming to ANSI B-16.5, raised or flat face
- Class 300 Flange: Carbon steel conforming to ANSI B-16.5, raised or flat face

**Fitting Coatings:** Orange enamel

- **Optional:** Hot dip galvanized and others. Some fittings supplied electroplated as standard – see product specifications.

**Flanged Adapter Nipple Coating:** None (Unfinished)

- **Optional:** Orange enamel, hot dip galvanized and others.



## Grooved End Fittings



NO. 10 ELBOW

NO. 20 TEE

### DIMENSIONS

#### Elbows

**NO. 10** 90° Elbow

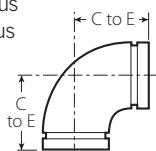
**NO. 11** 45° Elbow

**NO. 12** 22½° Elbow

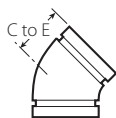
**NO. 13** 11¼° Elbow

**NO. 100** 90° Long Radius

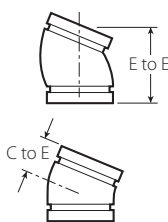
**NO. 110** 45° Long Radius  
(Ductile Iron \*)



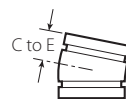
NO. 10



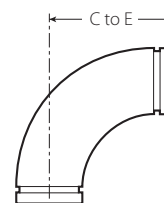
NO. 11



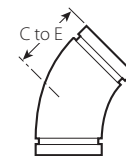
NO. 12



NO. 13



NO. 100



NO. 110

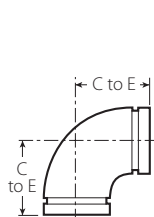
Size		No. 10 90° Elbow		No. 11 45° Elbow		No. 12 22½° Elbow (sw)		No. 13 11¼° Elbow (sw)		No. 100† 90° Long Radius Elbow (S)		No. 110† 45° Long Radius Elbow (S)	
Nominal Size Inches mm	Actual Outside Dia. Inches mm	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg
¾ 20	1.050 26.9	2.25 57	0.5 0.2	1.50 38	0.5 0.2	1.63 sw 41	—	1.38 sw 35	—	—	—	—	—
1 25	1.315 33.7	2.25 57	0.6 0.3	1.75 44	0.6 0.3	3.25 @ 83	0.6 0.3	1.38 sw 35	0.3 0.1	—	—	—	—
1¼ 32	1.660 42.4	2.75 70	1.0 0.5	1.75 44	0.9 0.4	1.75 44	0.8 0.4	1.38 sw 35	0.5 0.2	—	—	—	—
1½ 40	1.900 48.3	2.75 70	1.2 0.5	1.75 44	0.9 0.4	1.75 44	0.8 0.4	1.38 sw 35	0.5 0.2	—	—	—	—
2 50	2.375 60.3	3.25 83	1.8 0.8	2.00 51	1.3 0.6	3.75 @ 95	1.4 0.6	1.38 35	1.0 0.5	4.38 111	2.5 1.1	2.75 70	1.8 0.8
2½ 65	2.875 73.0	3.75 95	3.2 1.5	2.25 57	2.2 1.0	4.00 @ 102	2.3 1.0	1.50 38	1.1 0.5	5.00 127	4.1 1.9	3.00 76	2.8 1.3
76.1 mm	3.000 76.1	3.75 95	3.7 1.7	2.25 57	3.4 1.5	—	—	—	—	—	—	—	—
3 80	3.500 88.9	4.25 108	4.5 2.0	2.50 64	3.1 1.4	4.50 @ 114	3.1 1.4	1.50 38	2.1 1.0	5.88 149	6.0 2.7	3.38 86	4.9 2.2
3½ 90	4.000 101.6	4.50 114	5.6 2.5	2.75 70	4.3 2.0	2.50 sw 64	4.0 1.8	1.75 sw 44	2.7 1.2	—	—	—	—
4 100	4.500 114.3	5.00 127	7.1 3.2	3.00 76	5.6 2.5	2.88 73	5.6 2.5	1.75 44	3.6 1.6	7.50 191	12.3 5.6	4.00 102	7.3 3.3
108.0 mm	4.250 108.0	5.00 127	11.0 5.0	3.00 76	5.6 2.5	—	—	—	—	—	—	—	—
4½ 120	5.000 127.0	5.25 sw 133	10.0 4.5	3.13 sw 79	6.0 2.7	3.50 89	6.6 3.0	1.88 sw 48	4.2 1.9	—	—	—	—
5 125	5.563 141.3	5.50 140	11.7 5.3	3.25 83	8.3 3.8	2.88 sw 73	7.8 3.5	2.00 sw 51	5.0 2.2	+	18.2 8.3	+	14.8 6.7
133.0 mm	5.250 133.0	5.50 140	11.7 5.3	3.25 83	8.3 3.8	—	—	—	—	—	—	—	—
139.7 mm	5.500 139.7	5.50 140	11.7 5.3	3.25 83	8.3 3.8	—	—	—	—	—	—	—	—
6 150	6.625 168.3	6.50 165	17.2 7.8	3.50 89	10.8 4.9	6.25 @ 159	12.2 5.5	2.00 51	7.0 3.2	10.75 273	30.4 13.8	5.50 140	17.4 7.9
159.0 mm	6.250 159.0	6.50 165	18.6 8.4	3.50 89	10.8 4.9	—	—	—	—	—	—	—	—
165.1 mm	6.500 165.1	6.50 165	15.5 7.0	3.50 89	9.8 4.4	3.13 79	11.4 5.2	2.00 51	7.4 3.4	10.75 273	29.0 13.2	5.50 140	19.0 8.6

## Grooved End Fittings

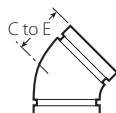


NO. 10 ELBOW

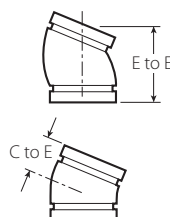
NO. 20 TEE



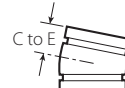
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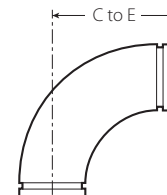
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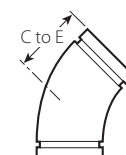
NO. 12



NO. 13



NO. 100



NO. 110

Size		No. 10 90° Elbow		No. 11 45° Elbow		No. 12 22½° Elbow (sw)		No. 13 11¼° Elbow (sw)		No. 100† 90° Long Radius Elbow (S)		No. 110† 45° Long Radius Elbow (S)	
Nominal Size Inches mm	Actual Outside Dia. Inches mm	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg	C to E Inches mm	Approx. Wgt. Each Lbs. kg
8 200	8.625 219.1	7.75 197	29.9 13.6	4.25 108	20.4 9.3	7.75 @ 197	20.0 9.1	2.00 51	10.1 4.6	14.25 362	66.0 30.0	7.25 184	36.0 16.3
10 250	10.750 273.0	9.00 229	63.3 28.7	4.75 121	37.5 17.0	4.38 sw 111	30.0 13.6	2.13 sw 54	11.8 5.3	15.00 381	107.0 48.5	6.25 159	57.0 25.9
12 300	12.750 323.9	10.00 254	74.0 33.6	5.25 133	66.7 30.3	4.88 sw 124	40.0 18.1	2.25 sw 57	29.3 13.3	18.00 457	156.0 70.8	7.50 191	90.0 40.8
14 # 350	14.000 355.6	14.00 355.6	136.0 61.7	5.75 146	65.0 29.5	5.00 sw 127	46.0 20.9	3.50 sw 89	32.0 14.5	21.00 s 533	164.0 74.4	8.75 s 222	82.0 37.2
377.0mm †	14.843 377.0	14.84 376.9	149.3 67.7	6.15 156.2	82.0 37.2	—	—	—	—	—	—	—	—
16 # 400	16.000 406.4	16.00 406.4	171.0 77.6	6.63 168	88.0 39.9	5.00 sw 127	58.0 26.3	4.00 sw 102	42.0 19.1	24.00 s 610	210.0 95.3	10.00 s 254	100.0 45.4
426.0mm †	16.772 426.0	16.77 426.0	198.6 90.1	6.95 176.5	101.3 45.9	—	—	—	—	—	—	—	—
18 # 450	18.000 457.0	18.00 457.2	228.0 103.4	7.46 189	108.0 50.0	5.50 sw 140	65.0 29.5	4.50 sw 114	53.2 24.1	27.00 s 686	273.0 123.8	11.25 s 286	135.0 61.2
480.0mm †	18.898 480.0	18.90 480.0	291.0 132.0	7.83 198.8	141.7 64.3	—	—	—	—	—	—	—	—
20 # 500	20.000 508.0	20.00 508.0	298.0 135.2	8.28 210	138.0 62.6	6.00 sw 152	78.6 36.0	5.00 sw 127	65.0 29.5	30.00 s 762	343.0 155.6	12.50 s 318	174.0 78.9
530.0mm †	20.866 530.0	20.87 530.0	355.0 161.0	8.64 219.4	179.0 81.2	—	—	—	—	—	—	—	—
24 # 550	24.000 610.0	24.00 609.6	438.0 198.7	9.94 252	221.0 100.2	7.00 sw 178	140.0 63.5	6.00 sw 152	60.0 27.2	36.00 s 914	516.0 234.1	15.00 s 381	251.0 113.9
630.0mm †	24.803 630.0	24.80 630.0	545.0 247.2	10.27 261.0	255.2 115.7	—	—	—	—	—	—	—	—
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05												

@ Gooseneck design, end-to-end dimension

\* (sw) Segmentally welded steel

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

† Chinese standard sizes

## Grooved End Fittings



NO. 10 ELBOW



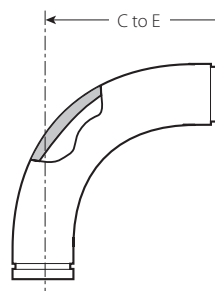
NO. 20 TEE

### Long Radius Elbow 3D

With added wall thickness  
at bend for abrasive services.

**NO. 100-3D** 90° Long Radius Elbow 3D

**NO. 110-3D** 45° Long Radius Elbow 3D  
(Ductile Iron)



NO. 100-3D



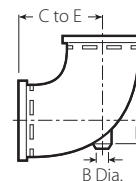
NO. 110-3D

Size		Wall Thickness – Inches/mm			No. 100-3D 90° Long Radius Elbow		No. 110-3D 45° Long Radius Elbow	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	In Non-critical Area	At Back Wear Area	Extra	C to E Inches mm	Approx. Weight Each Lbs. kg	C to E Inches mm	Approx. Weight Each Lbs. kg
2 50	2.375 60.3	0.184 4.67	0.309 7.85	0.125 3.18	10.00 254	5.0 2.3	6.50 165	4.7 2.1
3 80	3.500 88.9	0.246 6.25	0.371 9.42	0.125 3.18	13.00 330	16.0 7.3	7.75 197	10.4 4.7
4 100	4.500 114.3	0.267 6.78	0.455 11.56	0.188 4.78	16.00 406	25.5 11.6	9.00 229	17.2 7.8
6 150	6.625 168.3	0.310 7.87	0.560 14.22	0.250 6.35	24.00 610	70.0 31.8	13.50 343	45.0 20.4

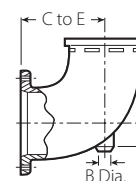
### Reducing Base Support Elbow

**NO. R-10G** Grv. × Grv.

**NO. R-10F** Grv. × Flange  
(Ductile Iron)



NO. R-10G



NO. R-10F

Size		No. R-10 Reducing Base Support Elbow			Approx. Weight Each	
Nominal Size Inches mm		C to E Inches mm	H Inches mm	B Diameter Inches mm	Grv. × Grv. Lbs. kg	Grv. × Flange Lbs. kg
6 150	× 4 100	9.00 229	1.25 32	1.50 38	19.0 8.6	33.0 15.0
	× 5 125	9.00 229	1.50 38	1.50 38	23.0 10.4	38.0 17.2
8 200	× 6 150	10.50 267	2.13 54	1.50 38	33.0 15.0	52.0 23.6
10 250	× 8 200	12.00 305	2.40 61	1.50 38	61.0 27.7	88.0 39.9

## Grooved End Fittings



NO. 10 ELBOW

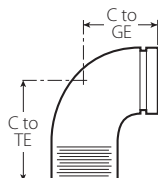


NO. 20 TEE

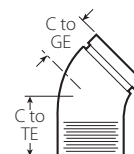
### Adapter Elbow

**NO. 18** 90° Adapter Elbow

**NO. 19** 45° Adapter Elbow  
(Ductile Iron)



NO. 18



NO. 19

Size		No. 18 90° Adapter Elbow @			No. 19 45° Adapter Elbow @		
Nominal Size Inches mm	Actual Outside Diameter Inches mm	C to GE Inches mm	C to TE Inches mm	Approx. Weight Each Lbs. kg	C to GE Inches mm	C to TE Inches mm	Approx. Weight Each Lbs. kg
¾ 20	1.050 26.9	2.25 57	2.25 57	0.5 0.2	1.50 38	1.50 38	0.5 0.2
1 25	1.315 33.7	2.25 57	2.25 57	0.5 0.2	1.75 44	1.75 44	0.6 0.3
1 ¼ 32	1.660 42.4	2.75 70	2.75 70	0.9 0.4	1.75 44	1.75 44	0.6 0.3
1 ½ 40	1.900 48.3	2.75 70	2.75 70	1.1 0.5	1.75 44	1.75 44	0.9 0.4
2 50	2.375 60.3	3.25 83	4.25 108	2.5 1.1	2.00 51	3.00 76	1.9 0.9
2 ½ 65	2.875 73.0	3.75 95	3.75 95	3.0 1.4	2.25 57	2.25 57	2.3 1.0
3 80	3.500 88.9	4.25 108	6.00 152	5.8 2.6	2.50 64	4.25 108	5.0 2.3
3 ½ 90	4.000 101.6	4.50 114	6.25 159	8.0 3.6	5.25 133	5.25 133	8.8 4.0
4 100	4.500 114.3	5.00 127	7.25 184	12.0 5.4	3.00 76	5.25 133	8.8 4.0
6 150	6.625 168.3	6.50 165	6.50 165	17.6 8.0	3.50 89	3.50 89	12.7 5.8

@ Available with British Standard Pipe Threads: specify "BSP" clearly on order

+ Contact Victaulic for details

## Grooved End Fittings



NO. 10 ELBOW



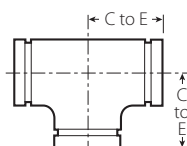
NO. 20 TEE

### Tees, Crosses and True Wyes

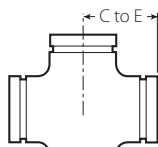
NO. 20 Tee

NO. 35 Cross

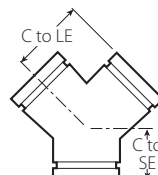
NO. 33 True Wye

NO. 29M Tee with  
Threaded Branch  
(Ductile Iron \*)

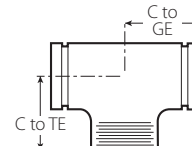
NO. 20



NO. 35



NO. 33



NO. 29M

Size		No. 20 Tee		No. 35 Cross (sw)		No. 33 True Wye (sw)			No. 29M Tee with Threaded Branch		
Nominal Size Inches mm	Actual Outside Dia. Inches mm	C to E Inches mm	Approx. Weight Each Lbs. kg	C to E Inches mm	Approx. Weight Each Lbs. kg	C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg	C to GE Inches mm	C to TE Inches mm	Approx. Weight Each Lbs. kg
¾ 20	1.050 26.9	2.25 57	0.6 0.3	2.25 57	0.9 0.4	—	—	—	2.25 57	2.25 57	0.6 0.3
1 25	1.315 33.7	2.25 57	1.0 0.5	2.25 57	1.3 0.6	2.25 57	2.25 57	1.1 0.5	2.25 57	2.25 57	1.0 0.5
1 ¼ 32	1.660 42.4	2.75 70	1.5 0.7	2.75 70	2.1 1.0	2.75 70	2.50 64	1.5 0.7	2.75 70	2.75 70	1.5 0.7
1 ½ 40	1.900 48.3	2.75 70	2.0 0.9	2.75 70	2.5 1.1	2.75 70	2.75 70	1.8 0.8	2.75 70	2.75 70	2.0 0.9
2 50	2.375 60.3	3.25 83	3.0 1.4	3.25 83	3.8 1.7	3.25 83	2.75 70	2.5 1.1	3.25 83	4.25 108	3.00 1.4
2 ½ 65	2.875 73.0	3.75 95	4.3 2.0	3.75 95	6.1 2.8	3.75 95	3.00 76	4.3 2.0	3.75 95	3.75 95	4.3 2.0
76.1 mm	3.000 76.1	3.75 95	5.2 2.4	—	—	—	—	—	3.75 95	3.75 95	5.2 (sw) 2.4
3 80	3.500 88.9	4.25 108	6.8 3.0	4.25 108	10.5 4.8	4.25 108	3.25 83	6.1 2.8	4.25 108	6.00 152	6.8 3.1
3 ½ 90	4.000 101.6	4.50 (sw) 114	7.9 3.6	4.50 114	11.5 5.2	4.50 114	3.50 89	9.6 4.4	4.50 114	4.50 114	7.9 (sw) 3.6
108.0 mm	4.250 108.0	5.00 127	15.5 7.0	—	—	—	—	—	5.00 127	5.00 127	15.5 7.0
4 100	4.500 114.3	5.00 127	11.9 5.4	5.00 127	15.8 7.2	5.00 127	3.75 95	10.0 4.5	5.00 127	7.25 184	11.9 5.4
4 ½ 120	5.000 127.0	5.25 (sw) 133	15.0 6.8	5.25 133	18.5 8.4	—	—	—	5.25 133	5.25 133	15.0 (sw) 6.8
133.0 mm	5.250 133.0	5.50 140	17.8 8.1	—	—	—	—	—	5.50 140	5.50 140	17.8 8.1
139.7 mm	5.500 139.7	5.50 140	17.8 8.1	—	—	—	—	—	5.50 140	5.50 140	17.8 8.1
5 125	5.563 141.3	5.50 140	17.8 8.1	5.50 140	20.0 9.1	5.50 140	4.00 102	15.0 6.8	5.50 140	5.50 140	17.8 (sw) 8.1
159.0 mm	6.250 159.0	6.50 165	27.1 12.3	—	—	—	—	—	6.50 165	6.50 165	27.1 12.3
165.1 mm	6.500 165.1	6.50 165	22.0 10.0	6.50 165	28.0 12.7	—	—	—	6.50 165	6.50 165	22.0 10.0
6 150	6.625 168.3	6.50 165	25.7 11.7	6.50 165	28.0 12.7	6.50 165	4.50 114	22.3 10.1	6.50 165	6.50 165	25.7 (sw) 11.7
8 200	8.625 219.1	7.75 197	47.6 21.6	7.75 197	48.0 21.8	7.75 197	6.00 152	36.0 16.3	7.75 197	7.75 197	47.6 (sw) 21.6
10 250	10.750 273.0	9.00 229	99.0 44.9	9.00 229	121.5 55.1	9.00 229	6.50 155	69.9 31.7	9.00 229	9.00 229	73.0 33.1
12 300	12.750 323.9	10.00 254	133.0 60.3	10.00 254	110.0 49.9	10.00 254	7.00 178	80.0 36.3	10.00 254	10.00 254	99.0 44.9

## Grooved End Fittings



NO. 10 ELBOW



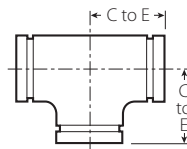
NO. 20 TEE

### Tees, Crosses and True Wyes

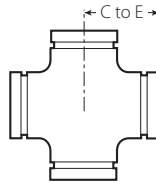
NO. 20 Tee

NO. 35 Cross

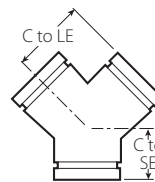
NO. 33 True Wye

NO. 29M Tee with  
Threaded Branch  
(Ductile Iron \*)

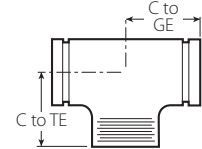
NO. 20




NO. 35



NO. 33



NO. 29M

Size		No. 20 Tee		No. 35 Cross (sw)		No. 33 True Wye (sw)			No. 29M Tee with Threaded Branch		
Nominal Size Inches mm	Actual Outside Dia. Inches mm	C to E Inches mm	Approx. Weight Each Lbs. kg	C to E Inches mm	Approx. Weight Each Lbs. kg	C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg	C to GE Inches mm	C to TE Inches mm	Approx. Weight Each Lbs. kg
14 # 350	14.000 355.6	11.00 279	145.0 65.8	11.00 279	198.0 89.8	11.00 279	7.50 191	134.2 60.8	—	—	—
377.0mm	14.000 355.6	11.00 279	145.0 65.8	—	—	—	—	—	—	—	—
16 # 400	16.000 406.4	12.00 305	186.0 84.4	12.00 305	250.0 113.4	12.00 305	8.00 203	167.0 75.7	—	—	—
426.0mm †	16.000 406.4	12.00 305	186.0 84.4	—	—	—	—	—	—	—	—
18 # 450	18.000 457.0	14.00 356	256.0 116.1	15.50 394	350.0 158.8	15.50 394	8.50 216	234.0 106.1	—	—	—
480.0mm †	18.000 457.0	14.00 356	256.0 116.1	—	—	—	—	—	—	—	—
20 # 500	20.000 508.0	15.00 381	339.0 153.8	17.25 438	452.0 205.0	17.25 438	9.00 229	281.0 127.5	—	—	—
530.0mm †	20.000 508.0	15.00 381	339.0 153.8	—	—	—	—	—	—	—	—
24 # 550	24.000 610.0	17.00 432	473.0 214.5	20.00 508	795.0 360.6	20.00 508	10.00 254	523.0 237.2	—	—	—
630.0mm †	24.000 610.0	17.00 432	473.0 214.5	—	—	—	—	—	—	—	—
14 – 24 350 – 600	 For AGS fitting information, see publication 20.05										

\* (sw) Segmentally welded steel

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

† Chinese standard sizes

#### IMPORTANT NOTE:

Fittings size 26 – 48"/650 – 1050mm are available roll grooved for installation with Style 770 large diameter pipe couplings, Contact Victaulic for details.

## Grooved End Fittings



NO. 10 ELBOW

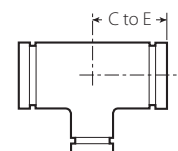


NO. 20 TEE

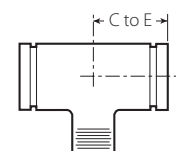
### Reducing Tee

**NO. 25** Grooved Branch

**NO. 29** Threaded Branch  
(Ductile Iron\*)



NO. 25



NO. 29

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
1 25 × 1 × 3/4 20	+	+	1.0 0.5
1 1/4 32 × 1 1/4 32 × 1 25	+	+	1.3 0.6
1 1/2 40 × 1 1/2 40 × 3/4 20	+	+	1.5 0.7
	1 25	+	1.5 0.7
	1 1/4 32	+	1.7 0.8
2 50 × 2 50 × 3/4 20	3.25 83	3.25 83	2.5 1.1
	1 25	3.25 83	2.7 1.2
	1 1/4 32	+	1.8 0.8
	1 1/2 40	3.25 83	3.0 1.4
2 1/2 65 × 2 1/2 65 × 3/4 20	+	+	3.9 1.8
	1 25	3.75 95	3.8 1.7
	1 1/4 32	+	4.2 1.7
	1 1/2 40	3.75 95	3.9 1.8
	2 50	3.75 95	4.5 2.0
3 80 × 3 80 × 3/4 20	+	+	5.7 2.6
	1 25	4.25 108	6.1 2.8
	1 1/4 32	+	8.0 3.6
	1 1/2 40	4.25 108	6.5 2.9
	2 50	4.25 108	6.2 2.8
	2 1/2 65	4.25 108	6.4 2.9
4 100 × 4 100 × 3/4 20	+	+	8.0 3.6
	1 25	5.00 127	7.8 3.5

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
4 100 × 4 100 × 1 1/4 32	+	+	9.6 4.4
	1 1/2 40	5.00 127	10.2 4.6
	2 50	5.00 127	11.2 5.1
	2 1/2 65	5.00 127	11.4 5.2
	3 80	5.00 127	11.6 5.3
5 125 × 5 125 × 1 25	+	+	14.0 6.4
	1 1/2 40	+	14.3 6.5
	2 50	5.50 (sw) 140	14.5 6.6
	2 1/2 65	5.50 (sw) 140	15.2 6.9
	3 80	5.50 (sw) 140	16.6 7.5
	4 100	5.50 (sw) 140	16.7 7.6
6 150 × 6 150 × 1 25	+	+	23.0 10.4
	1 1/2 40	+	24.0 10.9
	2 50	6.50 165	21.6 9.8
	2 1/2 65	6.50 165	21.4 11.7
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05		

+ Contact Victaulic for details.

\* Ductile iron except those that are marked (sw), which are segmentally welded steel.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

#### IMPORTANT NOTE:

No. 29 Threaded Outlet Reducing Tees are supplied NPT and are available with British Standard threads. For British Standard specify "BSP" clearly on order.



## Grooved End Fittings



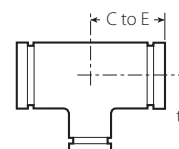
NO. 10 ELBOW



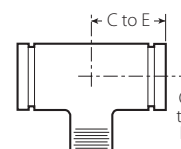
NO. 20 TEE

### Reducing Tee

**NO. 25** Grooved Branch  
**NO. 29** Threaded Branch  
 (Ductile Iron \*)



NO. 25



NO. 29

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
6 150	3 80	6.50 165	26.5 12.0
	4 100	6.50 165	25.0 11.3
	5 125	6.50 165	23.2 10.5
6½ 165.1	3 80	6.50 (sw) 165	24.0 10.9
	4 100	6.50 (sw) 165	25.0 11.3
8 200	1½ 40	+	33.0 15.0
	2 50	7.75 (sw) 197	33.5 15.2
	2½ 65	+	39.0 17.7
	3 80	7.75 (sw) 197	33.6 15.2
	4 100	7.75 197	41.8 19.0
	5 125	7.75 (sw) 197	34.0 15.4
	6 150	7.75 197	42.3 19.2
	6.5 165.1	7.75 (sw) 197	48.0 21.8
10 250	1½ 40	+	62.0 28.1
	2 50	9.00 (sw) 229	62.0 28.1
	2½ 65	+	62.4 28.3
	3 80	+	60.0 27.2
	4 100	9.00 (sw) 229	61.0 27.7
	5 125	9.00 (sw) 229	52.0 23.6
	6 150	9.00 (sw) 229	59.0 26.8
	8 200	9.00 (sw) 229	64.7 29.3

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
12 300	1 25	+	77.0 34.9
	2 50	+	80.0 36.3
	2½ 65	+	78.0 35.4
	3 80	10.00 (sw) 254	82.0 37.2
	4 100	10.00 (sw) 254	80.0 36.3
	5 125	10.00 (sw) 254	75.0 34.0
	6 150	10.00 (sw) 254	75.0 34.0
	8 200	10.00 (sw) 254	80.0 36.3
	10 250	10.00 (sw) 254	84.0 38.1
# 14 350	4 100	+	102.0 46.3
	6 150	+	108.2 49.1
	8 200	11.00 279	112.0 50.8
	10 300	11.00 279	120.0 54.4
	12 300	11.00 279	129.1 58.6
# 16 400	4 100	+	130.0 59.0
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05		

+ Contact Victaulic for details.

\* Ductile iron except those that are marked (sw), which are segmentally welded steel.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

#### IMPORTANT NOTE:

No. 29 Threaded Outlet Reducing Tees are supplied NPT and are available with British Standard threads. For British Standard specify "BSP" clearly on order.

## Grooved End Fittings



NO. 10 ELBOW



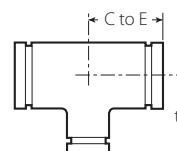
NO. 20 TEE

### Reducing Tee

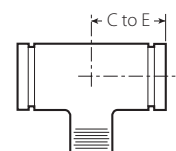
**NO. 25** Grooved Branch

**NO. 29** Threaded Branch

(Ductile Iron \*)



NO. 25



NO. 29

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
# 16 400 × 16 400 × 6 150	+	+	133.5 60.6
	8 200	12.00 305	145.0 65.8
	10 250	12.00 305	149.5 67.8
	12 300	12.00 305	154.0 69.9
	14 350	+	167.0 75.8
# 18 450 × 18 450 × 4 100	+	+	194.0 88.0
	6 150	+	200.0 90.7
	8 200	+	202.0 91.6
	10 250	15.50 394	212.0 96.2
	12 300	15.50 394	222.6 101.0
	14 350	15.50 394	230.1 104.4
	16 400	15.50 394	247.6 112.3
# 20 500 × 20 500 × 6 150	+	+	240.0 108.9
	8 200	+	244.0 110.7
	10 250	+	256.0 116.1
	12 300	+	264.0 119.8
	14 350	17.25 438	275.0 124.7

Size	No. 25 Std.	No. 29 w/ Thd. Branch	Approx. Weight Each
Nominal Size Inches mm	C to E Inches mm	C to E Inches mm	Lbs. kg
# 20 500 × 20 500 × 16 400	17.25 438	—	288.6 130.9
	18 450	—	297.0 134.7
# 24 600 × 24 600 × 8 200	20.00 508	20.00 508	340.0 154.2
	10 250	20.00 508	343.9 156.0
	12 300	20.00 508	352.8 160.0
	14 § 350	20.00 508	360.0 163.3
	16 400	20.00 508	378.0 171.5
	18 § 450	20.00 508	380.0 172.4
	20 500	20.00 508	373.0 169.2
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05		

+ Contact Victaulic for details.

\* Ductile iron except those that are marked (sw), which are segmentally welded steel.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

#### IMPORTANT NOTE:

No. 29 Threaded Outlet Reducing Tees are supplied NPT and are available with British Standard threads. For British Standard specify "BSP" clearly on order.

§ Cast fitting available. Contact Victaulic for details.

## Grooved End Fittings



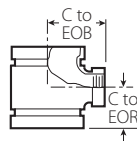
NO. 10 ELBOW



NO. 20 TEE

### Standpipe Tee

**NO. 27**  
(Ductile iron)



NO. 27

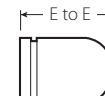
Size				No. 27 Standpipe Tee		
Nominal Size Inches mm				C to EOR Inches mm	C to EOB Inches mm	Approx. Weight Each Lbs. kg
4	×	4	×	2½	3.25	4.00
100		100		65	83	102
6	×	6	×	2½	3.25	5.13
150		150		65	83	130
						14.8
						6.7

**IMPORTANT NOTE:**

Available with British Standard Pipe Threads, specify "BSP" clearly on order.

### Bull Plug

**NO. 61**  
(Steel)



NO. 61

Size		No. 61 Bull Plug	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg
2	2.375	4.00	2.5
50	60.3	102	1.1
2 ½	2.875	5.00	3.0
65	73.0	127	1.4
3	3.500	6.00	4.5
80	88.9	152	2.0
4	4.500	7.00	7.5
100	114.3	178	3.4
5	5.563	8.00	12.0
125	141.3	203	5.4
6	6.625	10.00	17.0
150	168.3	254	7.7

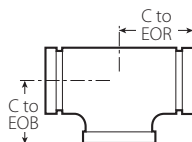
**IMPORTANT NOTES:**

Steel dish caps available through 24"/600mm, contact Victaulic.

No. 61 Bull Plugs should be used in vacuum service with Style 72 or 750 couplings

### Bullhead Tee

**NO. 21**  
(Ductile Iron)



NO. 21

Size				No. 21 Bullhead Tee		
Nominal Size Inches mm				C to EOR Inches mm	C to EOB Inches mm	Approx. Weight Each Lbs. kg
5	×	5	×	8	7.75	5.50
125		125		200	197	140
6	×	6	×	8	7.75	6.50
150		150		200	197	165
						37.5
						17.0

## Grooved End Fittings



NO. 10 ELBOW

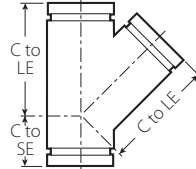


NO. 20 TEE

### 45° Lateral

#### NO. 30

(Segmentally Welded Steel)



NO. 30

Size		No. 30 45° Lateral		
Nominal Size Inches mm	Actual Outside Diameter Inches mm	C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg
¾ 20	1.050 26.9	4.50 114	2.00 51	1.0 0.5
1 25	1.315 33.7	5.00 127	2.25 57	1.7 0.8
1 ¼ 32	1.660 42.4	5.75 146	2.50 64	2.5 (d) 1.1
1 ½ 40	1.900 48.3	6.25 159	2.75 70	3.5 1.6
2 50	2.375 60.3	7.00 178	2.75 70	4.6 (d) 2.1
2 ½ 65	2.875 73.0	7.75 197	3.00 76	9.0 94.1
76.1 mm	3.000 76.1	8.50 216	3.25 83	11.0 5.0
3 80	3.500 88.9	8.50 216	3.25 83	11.7 (d) 5.4
3 ½ 90	4.000 101.6	10.00 254	3.50 89	17.8 8.1
4 100	4.500 114.3	10.50 267	3.75 95	22.2 (d) 10.1
5 125	5.563 141.3	12.50 318	4.00 102	21.8 9.9
165.1 mm	6.500 165.1	14.00 356	4.50 114	43.6 19.8

Size		No. 30 45° Lateral		
Nominal Size Inches mm	Actual Outside Diameter Inches mm	C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg
6 150	6.625 168.3	14.00 356	4.50 114	43.6 19.8
8 200	8.625 219.1	18.00 457	6.00 152	72.0 32.7
10 250	10.750 273.0	20.50 521	6.50 165	105.0 47.6
12 300	12.750 323.9	23.00 584	7.00 178	165.0 74.8
14 # 350	14.000 355.6	26.50 673	7.50 191	276.0 125.2
16 # 400	16.000 406.4	29.00 737	8.00 203	344.2 156.1
18 # 450	18.000 457.0	32.00 813	8.50 216	429.0 194.6
20 # 500	20.000 508.0	35.00 889	9.00 229	500.0 226.8
24 # 600	24.000 610.0	40.00 1016	10.00 254	715.0 324.3
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05			

(d) Ductile iron

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

## Grooved End Fittings



NO. 10 ELBOW

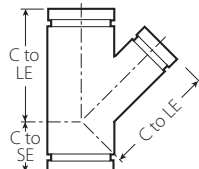


NO. 20 TEE

### 45° Reducing Lateral

#### NO. 30-R

(Segmentally Welded Steel)



NO. 30-R

Size			No. 30-R 45° Reducing Lateral		
Nominal Size Inches mm			C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg
3 80	x	3 80	x	2 50	8.50 216
				2½ 65	8.50 216
4 100	x	4 100	x	2 50	10.50 267
				2½ 65	10.50 267
				3 80	10.50 267
5 125	x	5 125	x	2 50	12.50 318
				3 80	12.50 318
				4 100	12.50 318
6 150	x	6 150	x	3 80	14.00 356
				4 100	14.00 356
				5 125	14.00 356
8 200	x	8 200	x	4 100	18.00 457
				5 125	18.00 457
				6 150	18.00 457
10 250	x	10 250	x	4 100	20.50 521
				5 125	20.50 521
				6 150	20.50 521
				8 200	20.50 521
12 300	x	12 300	x	5 125	23.00 584
				6 150	23.00 584
				8 200	23.00 584
				10 250	23.00 584

Size			No. 30-R 45° Reducing Lateral		
Nominal Size Inches mm			C to LE Inches mm	C to SE Inches mm	Approx. Weight Each Lbs. kg
# 14 350	x	14 350	x	4 100	26.50 673
				6 150	26.50 673
				8 200	26.50 673
				10 250	26.50 673
				12 300	26.50 673
# 16 400	x	16 400	x	6 150	29.00 737
				8 200	29.00 737
				10 250	29.00 737
				12 300	29.00 737
				14 350	29.00 737
# 18 450	x	18 450	x	6 150	32.00 813
				8 200	32.00 813
				12 300	32.00 813
				14 350	32.00 813
				16 400	32.00 813
# 20 500	x	20 500	x	12 300	35.00 889
				14 350	35.00 889
				16 400	35.00 889
# 24 600	x	24 600	x	16 400	40.00 1016
				20 600	40.00 1016
14 – 24 350 – 600			<b>AGS</b> For AGS fitting information, see publication 20.05		

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

## Grooved End Fittings



NO. 10 ELBOW

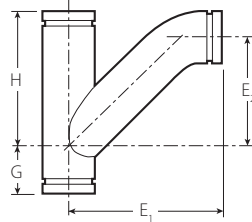


NO. 20 TEE

### Tee Wye

#### NO. 32

(Segmentally Welded Steel)



NO. 32

Size			No. 32 Tee Wye				
Nominal Size Inches mm			G Inches mm	H Inches mm	E <sub>1</sub> Inches mm	E <sub>2</sub> Inches mm	Approx. Wgt. Each Lbs. kg
2 50	×	2 50	2.75 70	7.00 178	9.00 229	4.63 118	6.4 2.9
2½ 65	×	2½ 65	3.00 76	7.75 197	10.50 267	5.75 146	11.5 5.2
3 80	×	3 80	3.25 83	8.50 216	11.50 292	6.50 165	14.3 6.5
3½ 90	×	3½ 90	3.25 89	10.00 254	13.00 330	7.75 197	22.9 10.4
4 100	×	4 100	3.75 95	10.50 267	12.88 327	7.88 200	23.0 10.4
		4 100	3.75 95	10.50 267	13.63 346	8.13 207	26.0 11.8
		4 100	3.75 95	10.50 267	13.63 346	8.13 207	26.0 11.8
5 125	×	5 125	4.00 102	12.50 318	14.25 362	9.25 235	29.0 13.2
		5 125	4.00 102	12.50 318	15.13 384	9.63 245	36.7 16.6
		5 125	4.00 102	12.50 318	16.13 410	10.00 254	48.0 21.8
		5 125	4.00 102	12.50 318	16.13 410	10.00 254	48.0 21.8
6 150	×	6 150	4.50 114	14.00 356	15.31 389	10.31 262	37.3 16.9
		6 150	4.50 114	14.00 356	16.25 413	10.75 273	46.3 21.0
		6 150	4.50 114	14.00 356	17.25 438	11.13 283	55.0 24.9
		6 150	4.50 114	14.00 356	18.25 464	11.50 292	60.5 27.4
		6 150	4.50 114	14.00 356	18.25 464	11.50 292	60.5 27.4

Size			No. 32 Tee Wye				
Nominal Size Inches mm			G Inches mm	H Inches mm	E <sub>1</sub> Inches mm	E <sub>2</sub> Inches mm	Approx. Wgt. Each Lbs. kg
8 200	×	8 200	6.00 152	18.00 457	18.19 462	13.19 335	76.0 34.5
		4 100	6.00 152	18.00 457	19.00 483	13.50 343	76.4 34.7
		5 125	6.00 152	18.00 457	20.00 508	13.88 352	85.6 38.8
		6 150	6.00 152	18.00 457	21.13 537	14.38 365	112.0 50.8
		8 200	6.00 152	18.00 457	23.25 591	15.25 387	127.1 57.7
		8 200	6.00 152	18.00 457	23.25 591	15.25 387	127.1 57.7
10 250	×	10 250	6.50 165	20.50 521	19.88 505	14.88 378	96.0 43.5
		4 100	6.50 165	20.50 521	20.75 527	15.25 387	97.4 44.2
		5 125	6.50 165	20.50 521	21.88 556	15.75 400	115.0 52.2
10 250	×	10 250	6.50 165	20.50 521	22.88 581	16.13 410	133.1 60.4
		8 200	6.50 165	20.50 521	27.25 692	19.25 489	156.0 70.8
		10 250	6.50 165	20.50 521	27.25 692	18.00 457	190.0 86.2
		10 250	6.50 165	20.50 521	27.25 692	18.00 457	190.0 86.2
12 300	×	12 300	7.00 178	23.00 584	31.00 787	20.50 521	240.0 108.9

## Grooved End Fittings



NO. 10 ELBOW

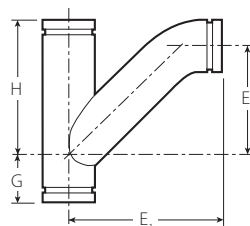


NO. 20 TEE

### Reducing Tee Wye

#### NO. 32-R

(Segmentally Welded Steel)



NO. 32-R

Size	No. 32-R Reducing Tee Wye				
Nominal Size Inches mm	G Inches mm	H Inches mm	E <sub>1</sub> Inches mm	E <sub>2</sub> Inches mm	Approx. Wgt. Each Lbs. kg
4 100 × 3 80 × 3 80	3.50 89	9.50 241	10.75 273	5.75 146	16.0 7.3
4 100	3.75 95	10.50 267	13.63 346	8.13 206	16.0 7.3
5 125 × 3 80 × 3 80	1.25 32	9.75 248	11.50 292	7.63 194	25.0 11.3
5 125	4.00 102	12.50 318	16.13 410	11.13 283	43.4 19.5
5 125 × 4 100 × 3 80	1.88 48	9.13 232	11.88 302	6.88 175	21.0 9.5
4 100	1.88 48	9.13 232	12.75 324	7.25 184	25.0 11.3

Size	No. 32-R Reducing Tee Wye				
Nominal Size Inches mm	G Inches mm	H Inches mm	E <sub>1</sub> Inches mm	E <sub>2</sub> Inches mm	Approx. Wgt. Each Lbs. kg
6 150 × 4 100 × 6 150	4.50 114	14.00 356	18.25 464	11.50 292	61.0 27.7
6 150 × 5 125 × 3 80	1.25 32	10.75 273	13.00 330	8.00 203	27.0 12.2
4 100	1.25 32	10.75 273	13.88 352	8.38 213	31.0 14.1
8 200 × 6 150 × 4 100	1.00 25	12.00 304	14.75 375	9.25 235	45.0 20.4
8 200	6.00 152	18.00 457	23.25 591	15.25 387	112.0 50.8



## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### Adapter Nipple

**NO. 40** Grv. × Thd.

**NO. 42** Grv. × Bev.

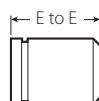
**NO. 43** Grv. × Grv.  
(Steel)



NO. 40 \*



NO. 43



NO. 42

Size		No. 40, 42, 43 Adapter Nipple (sw)	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg
3/4 20	1.050 26.9	3.00 76	0.3 0.1
1 25	1.315 33.7	3.00 76	0.4 0.2
1 1/4 32	1.660 42.4	4.00 102	0.8 0.4
1 1/2 40	1.900 48.3	4.00 102	0.9 0.4
2 50	2.375 60.3	4.00 102	1.2 0.5
2 1/2 65	2.875 73.0	4.00 102	1.9 0.9
3 80	3.500 88.9	4.00 102	2.5 1.1
3 1/2 90	4.000 101.6	4.00 102	2.1 0.9
4 100	4.500 114.3	6.00 152	5.5 2.5
5 125	5.563 141.3	6.00 152	7.4 3.4

Size		No. 40, 42, 43 Adapter Nipple (sw)	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg
6 150	6.625 168.3	6.00 152	9.5 4.3
8 200	8.625 219.1	6.00 152	14.2 6.4
10 250	10.750 273.0	8.00 203	27.0 12.2
12 300	12.750 323.9	8.00 203	33.0 15.0

\* Available with British Standard Pipe Threads, specify "BSP" clearly on order.

#### IMPORTANT NOTES:

For pump package nipples with 1 1/2"/40mm hole cut to receive Style 923 Vic-Let or Style 924 Vic-O-Well request special No. 40, 42 or 43 nipples and specify No. 40-H, 42-H or 43-H on order. NOTE: 4 – 12"/100 – 300mm diameter – 8"/200mm minimum length required.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### Cap

**NO. 60**  
(Ductile Iron)



NO. 60

Size		No. 60 Cap	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	T Thickness Inches mm	Approx. Weight Each Lbs. kg
3/4 20	1.050 26.9	0.88 22	0.2 0.1
1 25	1.315 33.7	0.88 22	0.3 0.1
1 1/4 32	1.660 42.4	0.88 22	0.3 0.1
1 1/2 40	1.900 48.3	0.88 22	0.5 0.2
2 50	2.375 60.3	0.88 22	0.6 0.3
2 1/2 65	2.875 73.0	0.88 22	1.0 0.5
76.1 mm	3.000 76.1	0.88 22	1.2 0.5
3 80	3.500 88.9	0.88 22	1.2 0.5
3 1/2 90	4.000 101.6	0.88 22	2.5 1.1
108.0 mm	4.250 108.0	1.00 25	2.3 1.0
4 100	4.500 114.3	1.00 25	2.5 1.1
4 1/2 120	5.000 127.0	1.00 25	2.5 1.1
133.0 mm	5.250 133.0	1.00 25	4.5 2.0
139.7 mm	5.500 139.7	1.00 25	4.5 2.0
5 125	5.563 141.3	1.00 25	4.6 2.1
159.0 mm	6.250 159.0	1.00 25	6.8 3.1

Size		No. 60 Cap	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	T Thickness Inches mm	Approx. Weight Each Lbs. kg
165.1 mm	6.500 165.1	1.00 25	7.3 3.3
6 150	6.625 168.3	1.00 25	6.1 2.8
8 200	8.625 219.1	1.19 30	13.1 5.9
10 250	10.750 273.0	1.25 32	21.0 9.5
12 300	12.750 323.9	1.25 32	35.6 16.2
14 # 350	14.000 355.6	9.50 241	*
16 # 400	16.000 406.4	10.00 254	*
18 # 450	18.000 457.0	11.00 279	*
20 # 500	20.000 508.0	12.00 305	*
24 # 600	24.000 610.0	*	*
14 – 24 350 – 600	<b>AGS</b> For AGS fitting information, see publication 20.05		

#### IMPORTANT NOTES:

\* Steel dish caps available through 24"/600mm, contact Victaulic.

No. 60 cap is not suitable for use in vacuum service with Style 72 or 750 couplings. No. 61 bull plugs should be used, see pg. 35.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### Flanged Adapter Nipple

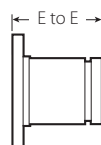
**NO. 41** ANSI Class 125 (Cast Iron)

**NO. 45F** ANSI Class 150 Flat Face (Steel)

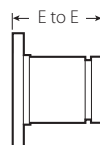
**NO. 45R** ANSI Class 150 Raised Face (Steel)

**NO. 46F** ANSI Class 300 Flat Face (Steel)

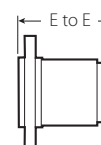
**NO. 46R** ANSI Class 300 Raised Face (Steel)



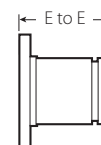
NO. 41



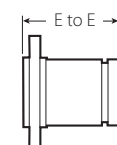
NO. 45F




NO. 45R



NO. 46F



NO. 46R

Size		No. 41 ANSI 125 Flange Adapter Nipple		No. 45F and No. 45R ANSI 150 Flange Adapter Nipple		No. 46F and No. 46R ANSI 300 Flange Adapter Nipple	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
¾ 20	1.050 26.9	3 76	—	3 76	2.3 1.0	3 76	3.3 1.5
1 25	1.315 33.7	3 76	2.5 1.1	3 76	2.7 1.2	3 76	3.9 1.8
1¼ 32	1.660 42.4	4 102	3.0 1.4	4 102	3.3 1.5	4 102	4.8 2.2
1½ 40	1.900 48.3	4 102	3.5 1.6	4 102	3.9 1.8	4 102	6.9 3.1
2 50	2.375 60.3	4 102	5.5 2.5	4 102	6.2 2.8	4 102	8.2 3.7
2½ 65	2.875 73.0	4 102	8.0 3.6	4 102	9.9 4.5	4 102	11.9 5.4
3 80	3.500 88.9	4 102	9.5 4.3	4 102	11.4 5.2	4 102	16.5 7.5
3½ 90	4.00 101.6	4 102	12.0 5.4	4 102	15.1 6.8	4 102	20.1 9.1
4 100	4.500 114.3	6 152	16.7 7.6	6 152	18.4 8.3	6 152	27.4 12.4
5 125	5.563 141.3	6 152	21.5 9.8	6 152	21.3 9.7	6 152	35.3 16.0
6 150	6.625 168.3	6 152	26.5 12.0	6 152	27.5 12.5	6 152	47.5 21.5
8 200	8.625 219.1	6 152	39.0 17.7	6 152	41.3 18.8	6 152	70.3 31.9
10 250	10.750 273.0	8 203	57.0 25.9	8 203	59.8 27.1	8 203	100.8 45.7
12 300	12.750 323.9	8 203	41.0 18.6	8 203	88.2 40.0	8 203	146.2 66.3
14 # 350	14.000 355.6	8 203	—	8 203	+	8 203	+
16 # 400	16.000 406.4	8 203	—	8 203	+	8 203	+
18 # 450	18.000 457.0	8 203	—	8 203	+	8 203	+
20 # 500	20.000 508.0	8 203	—	8 203	+	8 203	+
24 # 600	24.000 610.0	8 203	—	8 203	+	8 203	+
14 – 24 350 – 600	 For AGS fitting information, see publication 20.05						

#### IMPORTANT NOTES:

+ Contact Victaulic for details.

Flanged adapter nipples are supplied with standard rolled grooves.

Standard cut grooves or machining for rubber lining are optionally available. Contact Victaulic for details.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

## Grooved End Fittings



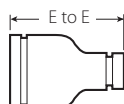
NO. 10 ELBOW

NO. 20 TEE

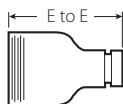
### Swaged Nipple

NO. 53 Grv. x Grv.

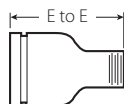
NO. 54 Grv. x Thd.

NO. 55 Thd. x Grv.  
(Steel)

NO. 53



NO. 55



NO. 54

Size		No. 53, 54 and 55 Swaged Nipples	
Nominal Size		E to E	Approx. Weight Each
Inches		Inches	Lbs.
mm		mm	kg
2	×	6.50	2.0
50	25	165	0.9
	1 1/4	6.50	2.0
	32	165	0.9
	1 1/2	6.50	2.0
	40	165	0.9
2 1/2	×	7.00	3.0
65	25	178	1.4
	1 1/4	7.00	3.0
	32	178	1.4
	1 1/2	7.00	3.0
	40	178	1.4
	2	7.00	3.0
	50	178	1.4
3	×	8.00	4.5
80	25	203	2.0
	1 1/4	8.00	4.5
	32	203	2.0
	1 1/2	8.00	4.4
	40	203	2.0
	2	8.00	4.5
	50	203	2.0
	2 1/2	8.00	4.5
	65	203	2.0
3 1/2	×	8.00	6.8
90	3	203	3.1
	80		
4	×	9.00	7.5
100	25	229	3.4
	1 1/4	9.00	7.5
	32	229	3.4
	1 1/2	9.00	7.5
	40	229	3.4
	2	9.00	7.5
	50	229	3.4
4	×	9.00	7.5
100	2 1/2	229	3.4
	65		

Size		No. 53, 54 and 55 Swaged Nipples	
Nominal Size		E to E	Approx. Weight Each
Inches		Inches	Lbs.
mm		mm	kg
4	×	9.00	7.5
100	3	229	3.4
	3 1/2	9.00	7.5
	90	229	3.4
5	×	11.00	11.5
125	2	279	5.2
	50		
	3	11.00	11.3
	80	279	5.1
	4	11.00	11.5
	100	279	5.2
6	×	12.00	17.0
150	1	305	7.7
	25		
	1 1/4	12.00	17.0
	32	305	7.7
	1 1/2	12.00	17.2
	40	305	7.8
	2	12.00	17.4
	50	305	7.9
	2 1/2	12.00	17.4
	65	305	7.9
	3	12.00	17.4
	80	305	7.9
	3 1/2	12.00	17.4
	90	305	7.9
	4	12.00	17.5
	100	305	7.9
	4 1/2	12.00	17.5
	120	305	7.9
	5	12.00	17.5
	125	305	7.9
8	×	+	20.0
200	6		9.1
	150		

+ Contact Victaulic for details.

## Grooved End Fittings



NO. 10 ELBOW

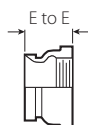


NO. 20 TEE

### Female Threaded Adapter

#### NO. 80

(Ductile Iron \*)



NO. 80

Size		No. 80 Female Threaded Adapter	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg
3/4 20	1.050 26.9	2.00 51	1.0 0.5
1 25	1.315 33.7	2.06 52	1.0 0.5
1 1/4 32	1.660 42.4	2.31 (sw) 59	1.5 0.7
1 1/2 40	1.900 48.3	2.31 (sw) 59	1.5 0.7
2 50	2.375 60.3	2.50 64	1.4 0.6
2 1/2 65	2.875 73.0	2.75 70	1.5 0.7
3 80	3.500 88.9	2.75 70	2.9 1.3
4 100	4.500 114.3	3.25 83	4.5 2.0

\* Ductile iron except those marked (sw) which are segmentally welded steel.

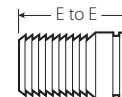
#### IMPORTANT NOTE:

Available with British Standard Pipe threads, specify "BSP" clearly on order.

### Hose Nipple

#### NO. 48

(Segmentally Welded Steel)



NO. 48

Size		No. 48 Hose Nipple	
Nominal Size Inches mm	Actual Outside Diameter Inches mm	E to E Inches mm	Approx. Weight Each Lbs. kg
3/4 20	1.050 26.9	3.12 79	0.3 0.1
1 25	1.315 33.7	3.38 86	0.4 0.2
1 1/4 32	1.660 42.4	3.88 98	0.6 0.3
1 1/2 40	1.900 48.3	3.88 98	0.8 0.4
2 50	2.375 60.3	4.50 114	1.1 0.5
2 1/2 65	2.875 73.0	5.38 137	2.0 0.9
3 80	3.500 88.9	5.75 146	3.2 1.5
4 100	4.500 114.3	7.00 178	4.9 2.2
5 125	5.563 141.3	8.75 222	8.0 3.6
6 150	6.625 168.3	10.12 257	14.3 6.5
8 200	8.625 219.1	11.88 302	24.7 11.2
10 250	10.750 273.0	12.50 318	40.1 18.2
12 300	12.750 323.9	14.50 368	62.0 28.1

## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

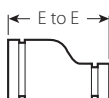
### Concentric/Eccentric Reducer

NO. 50 Concentric

NO. 51 Eccentric

(Ductile Iron  $\nabla$ )

NO. 50



NO. 51

Size		No. 50 Concentric Reducer		No. 51 Eccentric Reducer	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
1 1/4 32	3/4 20	+	1.9 0.9	—	—
	1 25	+	1.9 0.9	—	—
1 1/2 40	3/4 20	+	1.4 0.6	—	—
	1 25	2.50 * (sw) 64	0.8 0.4	8.50 216	4.5 2.0
	1 1/4 32	2.50 * (sw) 64	1.0 0.5	—	—
2 50	3/4 20	2.50 * (sw) 64	0.9 0.3	9.00 229	2.0 0.9
	1 25	2.50 * (sw) 64	0.7 0.3	9.00 229	2.3 1.0
	1 1/4 32	2.50 * (sw) 64	1.2 0.5	9.00 229	4.6 2.1
	1 1/2 40	2.50 * (sw) 64	1.0 0.5	9.00 229	4.6 2.1
	2 50	2.50 (sw) 64	3.9 1.8	9.50 241	4.3 2.0
2 1/2 65	3/4 20	+	1.3 0.6	+	3.3 1.5
	1 25	9.50 64	3.6 1.5	9.50 241	3.5 1.6
	1 1/4 32	2.50 * (sw) 64	3.3 1.5	9.50 241	+
	1 1/2 40	2.50 * (sw) 64	3.6 1.6	9.50 241	3.7 1.7
	2 50	2.50 (sw) 64	3.9 1.8	9.50 241	4.3 2.0
3 80	3/4 20	+	1.5 0.7	+	4.5 2.0
	1 25	2.50 * (sw) 64	1.3 0.6	9.50 241	4.8 2.2
	1 1/4 32	+	3.0 1.4	+	4.8 2.2
	1 1/2 40	2.50 * (sw) 64	5.1 2.3	9.50 241	5.1 2.3
	2 50	2.50 * (sw) 64	1.6 0.7	3.50 (sw) 89	6.0 2.7
	2 1/2 65	2.50 * (sw) 64	1.8 0.8	3.50 (sw) 89	7.0 3.2
	76.1	2.50 (sw) 64	2.1 1.0	—	—

Size		No. 50 Concentric Reducer		No. 51 Eccentric Reducer	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
3 1/2 90	3 80	2.50 (sw) 64	2.0 0.9	9.50 241	7.0 3.2
4 100	1 25	3.00 * (sw) 76	3.0 1.4	13.00 330	6.5 2.9
	1 1/4 32	+	4.6 2.1	—	—
	1 1/2 40	10.00 254	6.9 3.1	10.00 254	8.1 3.7
	2 50	3.00 * (sw) 76	2.4 1.1	4.00 (sw) 102	3.3 1.5
	2 1/2 65	3.00 * (sw) 76	2.7 1.2	4.00 (sw) 102	3.4 1.5
5 125	3 80	3.00 * (sw) 76	3.2 1.4	4.00 (sw) 102	3.5 1.6
	3 1/2 90	3.00 (sw) 76	2.9 1.3	10.00 254	8.0 3.6
	2 50	11.00 279	9.0 4.1	11.00 279	5.2 2.4
	2 1/2 65	11.00 279	11.0 5.0	11.00 279	10.8 4.9
	3 80	4.00 (sw) 102	5.5 2.5	11.00 279	11.1 5.0
6 150	4 100	3.50 (sw) 89	4.3 1.9	5.00 (sw) 127	12.0 5.4
	1 25	4.00 * (sw) 102	5.0 2.3	11.50 292	14.5 6.6
	1 1/2 40	+	5.5 2.5	+	+
	2 50	4.00 * (sw) 102	6.6 3.0	11.50 292	14.5 6.6
	2 1/2 65	4.00 * (sw) 102	6.4 2.9	11.50 292	14.2 6.4
8 200	3 80	4.00 * (sw) 102	6.4 2.9	5.50 (sw) 140	15.0 6.8
	4 100	4.00 (sw) 102	6.5 2.9	5.50 (sw) 140	17.0 7.7
	5 125	4.00 (sw) 102	6.4 2.9	5.50 (sw) 140	17.0 7.7
	2 1/2 65	16.00 * (sw) 406	7.9 3.6	12.00 305	26.1 11.8
	3 80	5.00 (sw) 127	9.3 4.2	12.00 305	22.0 10.0

## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

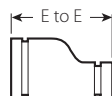
### Concentric/Eccentric Reducer

**NO. 50** Concentric

**NO. 51** Eccentric  
(Ductile Iron ‡)



NO. 50



NO. 51

Size		No. 50 Concentric Reducer		No. 51 Eccentric Reducer	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
8 200	4 100	5.00 (sw) 127	10.4 4.8	12.00 305	23.0 10.4
	5 125	5.00 (sw) 127	11.6 5.2	12.00 305	23.0 10.4
	6 150	5.00 (sw) 127	11.9 5.4	6.00 (sw) 152	24.0 10.9
10 250	4 100	6.00 (sw) 152	19.7 8.9	13.00 330	32.0 14.5
	5 125	+	34.3 15.6	+	34.6 15.7
	6 150	6.00 (sw) 152	20.0 9.1	13.00 330	36.9 16.7
	8 200	6.00 (sw) 152	22.0 10.0	7.00 (sw) 178	21.6 9.8
12 300	4 100	+	44.0 20.0	14.00 356	48.0 21.8
	6 150	7.00 (sw) 178	24.6 11.2	14.00 356	50.0 22.7
	8 200	7.00 (sw) 178	52.0 23.6	14.00 356	53.5 24.3
	10 250	7.00 (sw) 178	39.0 17.7	14.00 356	57.0 25.9
# 14 350	6 150	13.00 330	65.0 29.5	13.00 330	60.0 27.2
	8 200	13.00 330	65.0 29.5	13.00 330	60.0 27.2
	10 250	13.00 330	66.0 29.9	13.00 330	65.0 29.5
	12 300	13.00 330	68.0 30.8	13.00 330	66.0 29.9
	14 350	13.00 330	68.0 30.8	13.00 330	66.0 29.9
# 16 400	8 200	14.00 356	73.0 33.1	14.00 355	73.0 33.1
	10 § 250	14.00 356	73.0 33.1	14.00 355	73.0 33.1
	12 300	14.00 356	73.0 33.1	14.00 355	73.0 33.1
	14 350	14.00 356	73.0 33.1	14.00 355	73.0 33.1
# 18 450	10 250	15.00 381	91.0 41.3	15.00 381	91.0 41.3

Size		No. 50 Concentric Reducer		No. 51 Eccentric Reducer	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
# 18 450	12 300	15.00 381	91.0 41.3	15.00 381	91.0 41.3
	14 350	15.00 381	91.0 41.3	15.00 381	91.0 41.3
	16 400	15.00 381	91.0 41.3	15.00 381	91.0 41.3
# 20 500	10 250	20.00 508	110.0 49.9	20.00 508	177.0 80.3
	12 300	20.00 508	120.0 54.4	20.00 508	120.0 54.4
	14 350	20.00 508	149.0 67.9	20.00 508	149.0 67.9
	16 400	20.00 508	120.0 54.4	20.00 508	120.0 54.4
	18 450	20.00 508	136.0 61.7	20.00 508	136.0 61.7
	20 500	20.00 508	151.0 68.5	20.00 508	190.0 86.2
# 24 600	10 250	20.00 508	142.0 64.4	20.00 508	142.0 64.4
	12 300	20.00 508	150.0 68.0	20.00 508	150.0 68.0
	14 350	20.00 508	162.0 73.5	20.00 508	162.0 73.5
	16 400	20.00 508	162.0 73.5	20.00 508	162.0 73.5
	18 450	20.00 508	162.0 73.5	20.00 508	162.0 73.5
	20 500	20.00 508	151.0 68.5	20.00 508	190.0 86.2
14 - 24 350 - 600		<b>AGS™</b> For AGS fitting information, see publication 20.05			

+ Contact Victaulic for details.

\* Available with male threaded small end No. 52.

‡ Ductile Iron except those marked (sw) which are segmentally welded steel.

#### IMPORTANT NOTE:

Steel eccentric reducers available through 30"/750mm, contact Victaulic for dimensions.

# For use on cut grooved systems only. For roll grooved systems, Victaulic offers the Advanced Groove System (AGS). For pricing and availability of cut groove fittings in this size, contact your nearest Victaulic sales office.

§ cast fitting available for J.I.S. size. Contact Victaulic for details.



## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### Small Threaded Reducer

#### NO. 52

(Ductile Iron \*)



NO. 52



NO. 52F

Size		No. 52 Small Threaded Reducer		No. 52F Concentric Reducer with BSPT Female Threaded End	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
1 1/2 40	× 1 25	2.50 64	0.8 0.4	—	—
	1 1/4 32	2.50 64	0.9 0.4	—	—
2 50	× 3/4 20	2.50 64	0.9 0.4	—	—
	1 25	2.50 64	0.7 0.3	—	—
	1 1/4 32	2.50 64	1.2 0.5	—	—
	1 1/2 40	2.50 64	1.0 0.5	—	—
2 1/2 65	× 1 25	+(sw)	1.0 0.5	—	—
	1 1/4 32	2.50 (sw) 64	1.2 0.5	—	—
	1 1/2 40	2.50 (sw) 64	1.3 0.6	—	—
	2 50	3.00 76	1.4 0.6	—	—
76.1	× 48.3 60	63.5 —	0.8 —	63.5 63.5	0.77 0.85
3 80	× 3/4 20	+(sw)	1.5 0.7	—	—
	1 25	2.50 64	1.3 0.6	—	—
	1 1/2 40	2.50 (sw) 64	1.5 0.7	—	—
	2 50	2.50 64	1.5 0.7	—	—
	2 1/2 65	2.50 64	2.4 1.1	—	—
88.9	× 42.4 48.3 60	63.5 63.5 —	0.9 0.9 —	63.5 63.5 63.5	0.82 0.85 0.89
4 100	× 1 25	3.00 76	2.3 1.0	—	—
	1 1/2 40	+(sw)	2.5 1.1	—	—
	2 50	3.00 76	2.6 1.2	—	—

Size		No. 52 Small Threaded Reducer		No. 52F Concentric Reducer with BSPT Female Threaded End	
Nominal Size Inches mm		E to E Inches mm	Approx. Weight Each Lbs. kg	E to E Inches mm	Approx. Weight Each Lbs. kg
4 100	× 2 1/2 65	3.00 76	2.6 1.2	—	—
	3 80	3.00 76	2.5 1.1	—	—
108	× 42.4 48.3 60	76.2 76.2 —	1.3 1.3 —	76.2 76.2 76.2	1.32 1.35 1.39
114.3	× 42.4 48.3 60	76.2 76.2 —	1.3 1.3 —	76.2 76.2 76.2	1.30 1.34 1.40
5 125	× 4 100	+	4.5 2.0	—	—
133	× 60	—	—	114.3	2.17
139	× 60	—	—	114.3	2.26
6 150	× 1 25	4.00 102	5.5 2.5	—	—
	2 50	4.00 102	5.7 2.6	—	—
	2 1/2 65	4.00 102	5.8 2.6	—	—
	3 80	4.00 102	5.8 2.6	—	—
	4 100	+(sw)	6.5 2.9	—	—
	5 125	+(sw)	2.0 0.9	—	—
159	× 42.4 48.3 60	114.3 114.3 —	2.2 2.2 —	114.3 114.3 114.3	2.45 2.51 2.60
165.1	× 42.4 48.3 60	101.6 101.6 —	2.4 2.6 —	101.6 101.6 101.6	2.90 2.95 3.00
8 200	× 2 50	16.00 406	1.5 0.7	—	—
	2 1/2 65	16.00 406	1.7 0.8	—	—

+ Contact Victaulic for details.

\* Ductile iron except those marked (sw) which are segmentally welded steel.

#### IMPORTANT NOTE:

Available with British Standard Pipe Threads, specify "BSP" clearly on order





## Grooved End Fittings



NO. 10 ELBOW



NO. 20 TEE

### WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

### NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

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86-21-54253300  
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vicap@victaulic.com

#### MIDDLE EAST

971-4-883-88-70  
971-4-883-88-60 (fax)

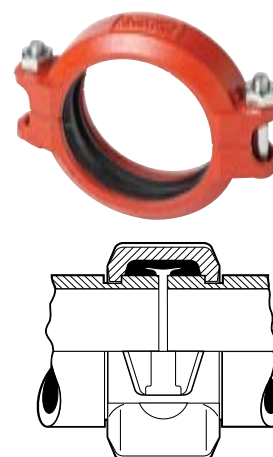


WCAS-6M8PF7

## Flexible Coupling

### STYLE 75

Style 75 is available where moderate pressures are expected or weight considerations are a factor. Up to 50% lighter in weight than the Style 77, the Style 75 coupling is recommended for service up to 500 psi/3450 kPa depending on size. Housings are cast in two identical pieces in all sizes. Hot-dip galvanized and special coatings are available for all sizes.



*Exaggerated for clarity*

#### MATERIAL SPECIFICATIONS

**Housing:** Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

**Housing Coating:** Orange enamel.

- **Optional:** Hot dipped galvanized and others.

**Gasket:** (specify choice\*)

- **Grade "E" EPDM**

EPDM (Green color code). Temperature range  $-30^{\circ}\text{F}$  to  $+230^{\circ}\text{F}$  /  $-34^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$ . Recommended for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold  $+86^{\circ}\text{F}$  /  $+30^{\circ}\text{C}$  and hot  $+180^{\circ}\text{F}$  /  $+82^{\circ}\text{C}$  potable water service. NOT RECOMMENDED FOR PETROLEUM SERVICES.

- **Grade "T" nitrile**

Nitrile (Orange color code). Temperature range  $-20^{\circ}\text{F}$  to  $+180^{\circ}\text{F}$  /  $-29^{\circ}\text{C}$  to  $+82^{\circ}\text{C}$ . Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range; except hot, dry air over  $+140^{\circ}\text{F}$  /  $+60^{\circ}\text{C}$  and water over  $+150^{\circ}\text{F}$  /  $+66^{\circ}\text{C}$ . NOT RECOMMENDED FOR HOT WATER SERVICES.

\* Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

**Bolts/Nuts:** Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

#### JOB/OWNER

System No. \_\_\_\_\_

Location \_\_\_\_\_

#### CONTRACTOR

Submitted By \_\_\_\_\_

Date \_\_\_\_\_

#### ENGINEER

Spec Sect \_\_\_\_\_ Para \_\_\_\_\_

Approved \_\_\_\_\_

Date \_\_\_\_\_

[www.victaulic.com](http://www.victaulic.com)

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# Flexible Coupling

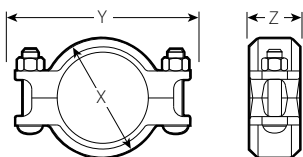
## STYLE 75

### DIMENSIONS

Size		Max. Work Pressure *	Max. End Load *	Allow. Pipe End Sep. †	Deflect. Fr. C <sub>L</sub> †		Bolt/Nut@ No – Size	Dimensions – Inches/mm			Approx. Wgt. Each
Nominal Size Inches mm	Actual Outside Diameter Inches mm	psi kPa	Lbs. N	Inches mm	Per Cplg. Deg.	Pipe In./Ft. mm/m	Inches	X	Y	Z	Lbs. kg
1 25	1.315 33.4	500 3450	680 3025	0 – 0.06 0 – 1.6	2° – 43'	0.57 48	2 – 3/8 x 2	2.38 61	4.27 108	1.77 45	1.3 0.6
1 1/4 32	1.660 42.2	500 3450	1080 4805	0 – 0.06 0 – 1.6	2° – 10'	0.45 38	2 – 3/8 x 2	2.68 68	4.61 117	1.77 45	1.4 0.6
1 1/2 40	1.900 48.3	500 3450	1,420 6320	0 – 0.06 0 – 1.6	1° – 56'	0.40 33	2 – 3/8 x 2	2.91 74	4.82 122	1.77 45	1.5 0.6
2 50	2.375 60.3	500 3450	2,215 9860	0 – 0.06 0 – 1.6	1° – 31'	0.32 26	2 – 3/8 x 2	3.43 87	5.22 133	1.88 48	1.7 0.8
2 1/2 65	2.875 73.0	500 3450	3,245 14440	0 – 0.06 0 – 1.6	1° – 15'	0.26 22	2 – 3/8 x 2	3.88 98	5.68 144	1.88 48	1.9 0.9
76.1 mm ±	3.000 76.1	500 3450	3,535 15730	0 – 0.06 0 – 1.6	1° – 12'	0.26 22	2 – 3/8 x 2	4.00 102	5.90 150	1.88 48	1.9 0.9
3 80	3.500 88.9	500 3450	4,800 21360	0 – 0.06 0 – 1.6	1° – 2'	0.22 18	2 – 1/2 x 2 3/4	4.50 114	7.00 178	1.88 48	2.9 1.3
3 1/2 90	4.000 101.6	500 3450	6,300 28035	0 – 0.06 0 – 1.6	0° – 54'	0.19 16	2 – 1/2 x 2 3/4	5.00 127	7.50 191	1.88 48	2.9 1.3
4 100	4.500 114.3	500 3450	7,950 35380	0 – 0.13 0 – 3.2	1° – 36'	0.34 28	2 – 1/2 x 2 3/4	5.80 147	8.03 204	2.13 54	4.1 1.9
108.0mm	4.250 108.0	450 3100	6,380 28395	0 – 0.13 0 – 3.2	1° – 41'	0.35 29	2 – 12 x 70.0	5.55 141	7.79 198	2.13 54	3.7 1.7
4 1/2 120	5.000 127.0	450 3100	8,820 39250	0 – 0.13 0 – 3.2	1° – 26'	0.25 21	2 – 5/8 x 3 1/4	6.13 156	9.43 240	2.13 54	5.5 2.5
5 125	5.563 141.3	450 3100	10,935 48660	0 – 0.13 0 – 3.2	1° – 18'	0.27 23	2 – 5/8 x 3 1/4	6.88 175	10.07 256	2.13 54	5.8 2.6
133.0mm	5.250 133.0	450 3100	9,735 43325	0 – 0.13 0 – 3.2	1° – 21'	0.28 24	2 – 16 x 82.5	6.55 166	9.37 238	2.13 54	6.0 2.7
139.7mm ±	5.500 139.7	450 3100	10,665 47460	0 – 0.13 0 – 3.2	1° – 18'	0.28 24	2 – 5/8 x 3 1/4	6.80 173	9.59 244	2.13 54	6.3 2.9
152.4mm	6.000 152.4	450 3100	12,735 56670	0 – 0.13 0 – 3.2	1° – 12'	0.21 18	2 – 5/8 x 3 1/4	7.38 187	10.48 266	1.88 48	6.2 2.8
6 150	6.625 168.3	450 3100	15,525 69085	0 – 0.13 0 – 3.2	1° – 5'	0.23 18	2 – 5/8 x 3 1/4	8.00 203	11.07 281	2.13 54	7.0 3.2

Continued on page 3.

\* † @ ± Refer to notes on page 3.



# Flexible Coupling

## STYLE 75

### DIMENSIONS

Size		Max. Work Pressure *	Max. End Load *	Allow. Pipe End Sep. †	Deflect. Fr. C <sub>L</sub> †		Bolt/Nut@ No – Size	Dimensions – Inches/mm			Approx. Wgt. Each
Nominal Size Inches mm	Actual Outside Diameter Inches mm	psi kPa	Lbs. N	Inches mm	Per Cplg. Deg.	Pipe In./Ft. mm/m	Inches	X	Y	Z	Lbs. kg
159.0mm	6.250 159.0	450 3100	13.800 61405	0 – 0.13 0 – 3.2	1° – 9'	0.24 20	2 – 16 x 82.5	7.63 194	10.49 266	2.13 54	6.8 3.1
203.2mm #	8.000 203.2	450 3100	22.635 100725	0 – 0.13 0 – 3.2	0° – 54'	0.16 13	2 – ¾ x 4 ¼	9.72 247	13.33 339	2.31 58	12.6 5.7
8 200	8.625 219.1	450 3100	26.280 116945	0 – 0.13 0 – 3.2	0° – 50'	0.18 14	2 – ¾ x 4 ¼	10.34 263	13.97 355	2.32 59	12.4 5.6
254.0mm #	10.000 254.0	350 2400	27.500 122375	0 – 0.13 0 – 3.2	0° – 43'	0.15 11	2 – 7/8 x 5 ½	12.16 309	15.81 402	2.53 64	20.8 9.4
304.8mm #	12.000 304.8	350 2400	39.500 175775	0 – 0.13 0 – 3.2	0° – 36'	0.13 9	2 – 7/8 x 5 ½	14.16 360	17.69 449	2.53 64	23.6 10.7

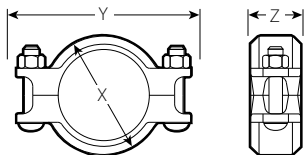
\* Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 1/2 times the figures shown.

† Allowable Pipe End Separation and Deflection figures show the maximum nominal range of movement available at each joint for standard roll grooved pipe. Figures for standard cut grooved pipe may be doubled. These figures are maximums; for design and installation purposes these figures should be reduced by: 50% for ¾ – 3 1/2"/20 – 90 mm; 25% for 4"/100 mm and larger.

@ Number of bolts required equals number of housing segments.

Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.





# Flexible Coupling

STYLE 75

**WARRANTY**

Refer to the Warranty section of the current Price List or contact Victaulic for details.

**NOTE**

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

**INSTALLATION**

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at [www.victaulic.com](http://www.victaulic.com).



For complete contact information, visit [www.victaulic.com](http://www.victaulic.com)

06.05 1470 REV J UPDATED 1/2008  
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# UNITED BRASS WORKS, INC.

714 S. Main St., Randleman, NC 27317

Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com



## Model 126SUL Angle Valve Soft Disc



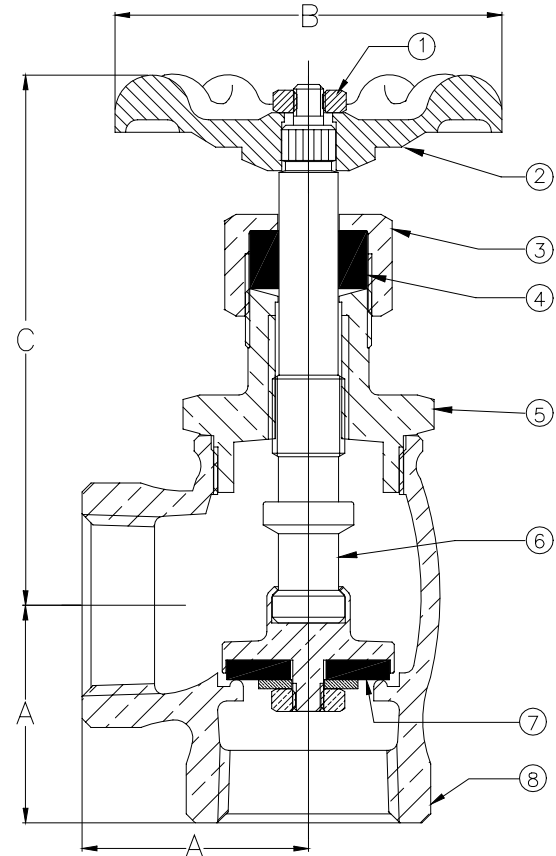
UL Listed for Fire Sprinkler Service at 250 WOG

200 WOG @ 180 ° Max

100% Pressure Tested

Threaded Ends

Rising Stem • Integral Seat



### MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Hand Wheel	Aluminum
3	Packing Nut	Brass
4	Packing	Graphite Non-Asbestos
5	Bonnet (1/2" – 1") Bonnet (1 1/4" – 2")	Brass Bronze
6	Stem & Seat Assembly	Brass
7	Disc	Buna N
8	Body	Bronze

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	1.03	1.22	1.47	1.75	2.00	2.34
B	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	3.13	3.25	4.38	4.50	5.25	5.63
Ship Wt. (lbs.)	0.69	0.94	1.76	2.50	3.26	5.32
Qty. Unit Pack	12	6	6	4	2	2
Qty. Per Case	72	60	36	24	12	12



**UNITED BRASS WORKS, INC.**

714 S. Main St., Randleman, NC 27317

Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com



## Model 125SUL Globe Valve

Soft Disc



UL Listed for Fire Sprinkler Service at 250 WOG

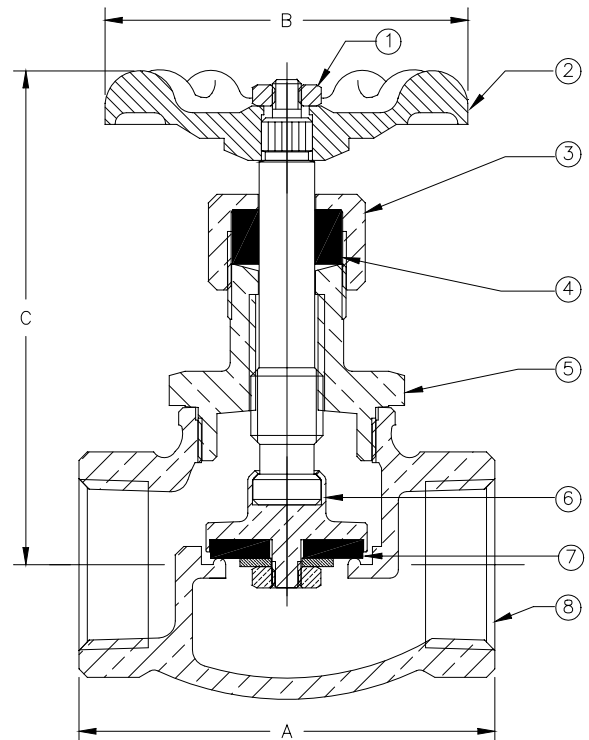
200 WOG @ 180 ° Max

100% Pressure Tested

Threaded Ends • Integral Seat

Rising Stem

Swivel Disc Holder



### MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Hand Wheel	Aluminum
3	Packing Nut	Brass
4	Packing	Graphite Non-Asb.
5	Bonnet (1/2" – 1") Bonnet (1 1/4" – 2")	Brass Bronze
6	Stem & Disc Assm.	Brass
7	Disc	Buna N
8	Body	Bronze

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	2.22	2.47	2.97	3.56	4.06	4.69
B	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	3.38	3.50	4.25	4.75	5.50	5.50
Ship Wt. (lbs.)	0.69	0.94	1.76	2.50	3.26	5.32
Qty. Unit Pack	12	6	6	4	2	2
Qty. Per Case	72	60	36	24	12	12



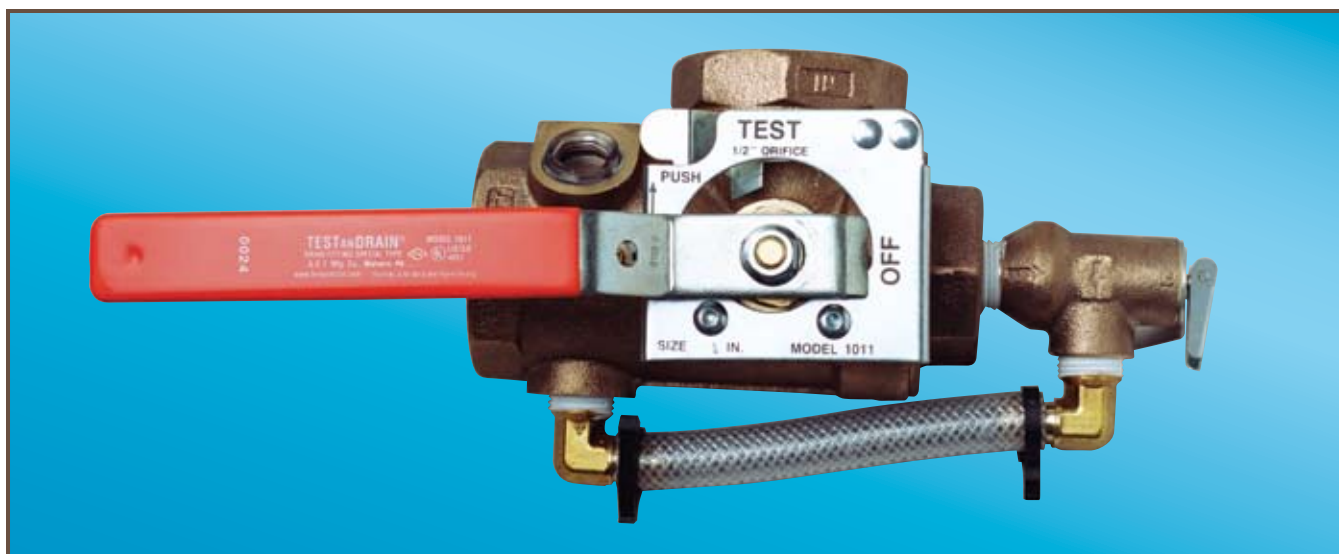
Model 1011A

# TEST<sup>AN</sup>DRAIN<sup>®</sup>

Sectional Floor Control Test and Drain Valve  
for Systems Requiring Pressure Relief Valve



3/4" 1" 1 1/4" 1 1/2" 2"



- The AGF Manufacturing Inc. **Model 1011A TEST<sup>AN</sup>DRAIN<sup>®</sup>** matches all the features and benefits of our **Model 1000** by providing both the test function and the express drain function in a multistory installation for a wet fire sprinkler system, with the added feature of an integral **Model 7000 Pressure Relief Valve** with drainage piping.
- The **Model 1011A** complies with the requirements of NFPA-13 that stipulate a pressure relief valve be installed on all gridded systems and downstream of all pressure reducing valves (see reverse).
- The **Model 1011A TEST<sup>AN</sup>DRAIN<sup>®</sup>** is a compact single handle ball valve which includes a tamper resistant test orifice and integral tamper resistant sight glasses, and is 300 PSI rated.
- Available in a full range of sizes from 3/4" to 2" NPT and BSPT, with all specifiable orifice sizes 3/8" (2.8K), 7/16" (4.2K), 1/2" (5.6K), 17/32" (8.0K), 5/8" (11.2K, ELO), 3/4" (14.0K, ESFR), and K25 as required by NFPA 13, 2007 Edition (see reverse).
- The included UL/FM **Model 7000 Pressure Relief Valve** features a flushing handle and is factory rated for 175 PSI. Other pressure settings are available and may be substituted.
- Designed to relieve excess system pressure caused by surges or temperature changes as well as solve the difficult problem of providing the relief valve with a convenient drainage-piping outlet.
- Shipped with relief valve and bypass drain ports plugged to expedite pressure testing the system.
- A locking kit is available and can be ordered with the valve to provide vandal resistance or prevent unintentional alarm activation.
- Repair kits including (1) adapter gasket, (1) ball, (2) valve seats, (1) stem packing, and (1) stem washer are available for all **TEST<sup>AN</sup>DRAIN<sup>®</sup>** valves. Valve and orifice size must be specified when ordering.

NOTE: It is important to note that the pressure rating of the relief valve indicates an operating range of pressure for both opening and closing of the valve. Standard relief valves are required to OPEN in a range of pressure between 90% and 105% of their rating. The valves are required to CLOSE at a pressure above 80% of that rating. The relief valve should be installed where it is easily accessible for maintenance. Care should be taken that the relief valve CANNOT be isolated from the system when the system is operational. A relief valve should NEVER have a shutoff valve or a plug downstream of its outlet.

**Reliability, Versatility, Code Compatibility**



# TEST AND DRAIN®

Model 1011A 300 PSI Bronze Ball Valve, Model 7000 Pressure Relief Valve  
Factory Rated at 175 PSI with other settings available

## Model 1011A

### DIMENSIONS

Orifice Size Available: 3/8", 7/16", 1/2", 17/32", ELO (5/8")\*, ESFR (3/4")\*, & K25\*\*

SIZE	A	B	C	D	E	F	G	H
3/4"	7 9/16" (191 mm)	1 1/2" (37.5 mm)	2 3/16" (57 mm)	3 5/8" (93 mm)	3 3/8" (86 mm)	1 13/16" (46 mm)	4 9/16" (117 mm)	6 3/8" (162.5 mm)
1"	7 9/16" (191 mm)	1 1/2" (37.5 mm)	2 3/16" (57 mm)	3 5/8" (93 mm)	3 3/8" (86 mm)	1 13/16" (46 mm)	4 9/16" (117 mm)	6 3/8" (162.5 mm)
1 1/4"	7 15/16" (201 mm)	1 11/16" (43 mm)	2 9/16" (65 mm)	4 1/4" (108 mm)	3 5/8" (91 mm)	1 15/16" (51 mm)	5 9/16" (141 mm)	5 1/2" (192 mm)
1 1/2"	8 15/16" (227 mm)	1 13/16" (45 mm)	3 1/4" (81.5 mm)	5 1/16" (127 mm)	3 7/8" (99 mm)	2 5/8" (67 mm)	8 1/4" (207 mm)	10 7/8" (274 mm)
2"	8 15/16" (227 mm)	1 13/16" (45 mm)	3 1/4" (81.5 mm)	5 1/16" (127 mm)	3 7/8" (99 mm)	2 5/8" (67 mm)	8 1/4" (207 mm)	10 7/8" (274 mm)

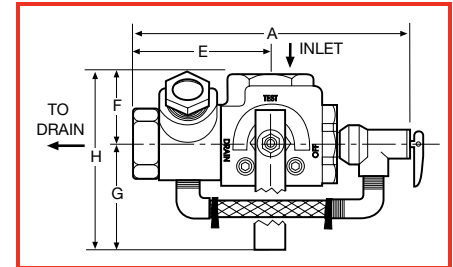
\* Available on 1 1/4" to 2" size units only \*\* Available on 1 1/2" and 2" size units only

### THE MODEL 1011A PROVIDES ALL OF THE FOLLOWING...

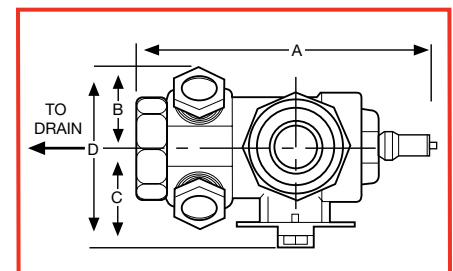
From the 2016 Edition of NFPA 13

- Chapter 8.16.2.4.1\* Provisions shall be made to properly drain all parts of the system.
- Chapter 8.16.2.4.2 Drain connections, interior sectional or floor control valve(s) – shall be provided with a drain connection having a minimum size as shown in Table 8.16.2.4.2.
- Chapter 8.16.2.4.3 & 8.16.2.4.3 Drains shall discharge outside or to a drain capable of handling the flow of the drain.
- Chapter 8.16.2.4.4 Drains shall discharge outside or to a drain capable of handling the flow of the drain.
- Chapter A.8.17.4.2 (Wet Pipe System) test connection is permitted to terminate into a drain capable of accepting full flow... using an approved sight test connection containing a smooth bore corrosion-resistant orifice giving a flow equivalent to one sprinkler...
- Chapter 8.17.4.2.2 The test connection valve shall be readily accessible.
- Chapter 8.17.4.2.4 shall be permitted to be installed in any location... downstream of the waterflow alarm.
- Chapter 8.17.4.3.1 (Dry Pipe System) a trip test connection not less than 1" in diameter, terminating in a smooth bore corrosion-resistant orifice, to provide a flow equivalent to one sprinkler...
- Chapter 8.17.4.3.2 The trip test connection... with a shutoff valve and plug not less than 1", at least one of which shall be brass.
- Chapter 7.1.2 - a gridded wet pipe system shall be provided with a relief valve set to operate at 175 PSI or 10 PSI in excess of the maximum system pressure, whichever is greater.
- Chapter 8.16.1.2.3\* A relief valve of not less than 1/2" in size shall be provided on the discharge side of the pressure-reducing valve set to operate at a pressure not exceeding 175 PSI.
- Chapter A.8.16.1.2.3 - consideration should be given to piping the discharge from the (pressure relief) valve

### MODEL 1011A - FRONT VIEW



### MODEL 1011A - PLAN VIEW



### MATERIALS

Handle: Steel  
 Stem: Rod Brass  
 Ball: C.P. Brass  
 Body: Bronze  
 Valve Seat: Impregnated Teflon®  
 Indicator Plate: Steel  
 Relief Valve: Bronze  
 Bypass Fittings: Brass  
 Bypass Tubing: Nylobraid

### APPROVALS

UL and ULC Listed: (EX4019 & EX4533)  
 FM Approved  
 NYC-BSA No. 720-87-SM



**USA Patent # 4741361 and Other Patents Pending**



**AGF Manufacturing Inc.**  
 100 Quaker Lane, Malvern, PA 19355  
 Phone: 610-240-4900  
 Fax: 610-240-4906  
[www.testandrain.com](http://www.testandrain.com)

Job Name: \_\_\_\_\_  
 Architect: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Contractor: \_\_\_\_\_

## **Model BFV-N Butterfly Valve Grooved End 2½ Inch - 10 Inch (DN65 - DN250)**

### **General Description**

The Model BFV-N Grooved End Butterfly Valves (Ref. Figure 1) are indicating type valves designed for use in fire protection systems where a visual indication is required as to whether the valve is open or closed. They are used, for example, as system, sectional, and pump water control valves. They have cut groove inlet and outlet connections that are suitable for use with grooved end pipe couplings that are listed and approved for fire protection systems.

For applications requiring supervision of the open position of the valve, the Gear Operators for the Model BFV-N Butterfly Valves are provided with two sets of factory installed internal switches each having SPDT contacts. The supervisory switches transfer their electrical contacts when there is movement from the valve's normal open position during the first two revolutions of the handwheel.

#### **WARNINGS**

*The Model BFV-N Grooved End Butterfly Valves described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.*

*The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.*

### **Technical Data**

**Model**  
BFV-N

**Sizes: ANSI Inches / DN**  
2½ (DN65), 3 (DN80),  
4 (DN100), 5 (DN125),  
6 (DN150), 8 (DN200), 10 (DN250)

#### **Approvals**

The 2½ through 10 inch (DN65 - DN250) Model BFV-N Grooved End Butterfly Valves are UL and C-UL Listed and FM Approved.

All laboratory listings and approvals are for indoor and outdoor use.

#### **Maximum Working Pressure**

- 2½ - 8 Inch (DN65 - DN200):  
300 psi (20,7) bar
- 10 Inch (DN250):  
175 psi (12,0 bar)

#### **Materials of Construction:**

##### **Body**

Ductile iron conforming to ASTM A-395

##### **Body Coating**

Polyamide

##### **Disc**

Ductile iron conforming to ASTM A-395

##### **Disc Seal**

Grade EPDM "E" encapsulated rubber conforming to ASTM D-2000

##### **Upper & Lower Stem**

Type 416 Stainless Steel conforming to ASTM 582

##### **Lower Plug**

PVC

##### **Operator**

Gear operator with iron housing



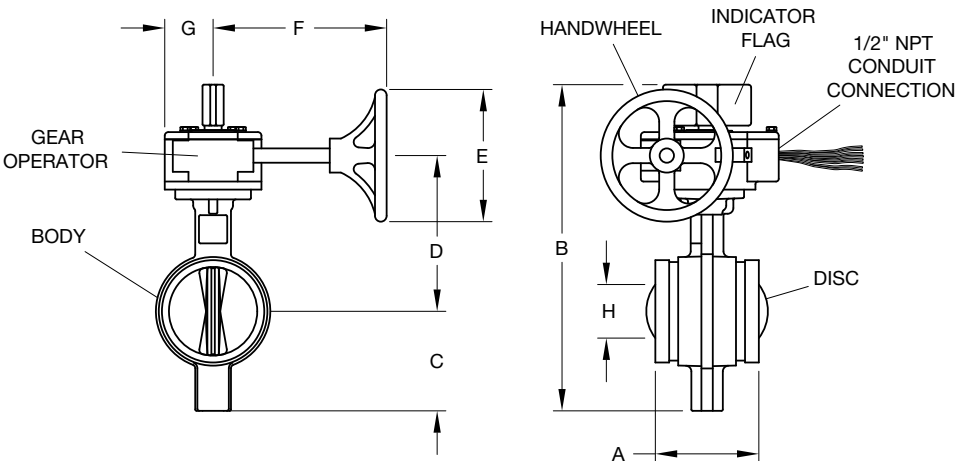
#### **Friction Loss**

The approximate friction loss, based on the Hazen Williams formula and expressed in equivalent length of pipe with C= 120, is as follows. The data is based on friction loss information collected at a typical flow rate of 15 feet per second.

- 6.9 feet of 2½ inch Sch. 40 pipe for the 2½ inch valve.
- 8.7 feet of 3 inch Sch. 40 pipe for the 3 inch valve.
- 4.5 feet of 4 inch Sch. 40 pipe for the 4 inch valve.
- 6.6 feet of 5 inch Sch. 40 pipe for the 5 inch valve.
- 11.1 feet of 6 inch Sch. 40 pipe for the 6 inch valve.
- 10.2 feet of 8 inch Sch. 30 pipe for the 8 inch valve.
- 12.1 feet of 10 inch Sch. 30 pipe for the 10 inch valve.



Nominal Valve Sizes	Pipe O.D.	Nominal Installation Dimensions in Inches and (mm)								Weight
		A	B	C	D	E	F	G	H	lbs. (kg)
2-1/2" DN65	2.88 (73,0)	3.85 (98,0)	11.71 (297,4)	3.25 (83,0)	5.43 (137,9)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	0	22 (10,0)
3" DN80	3.50 (88,9)	3.85 (98,0)	12.25 (311,1)	3.54 (90,0)	5.68 (144,2)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	0	23 (10,4)
4" DN100	4.50 (114,3)	4.56 (116,0)	13.95 (354,3)	4.35 (110,0)	6.58 (167,1)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	0	28 (12,7)
5" DN125	5.56 (141,3)	5.86 (149,0)	14.93 (379,2)	4.84 (123,0)	7.07 (179,6)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	0	31 (14,1)
6" DN150	6.63 (168,3)	5.86 (149,0)	17.31 (439,7)	5.93 (151,0)	8.35 (212,0)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	0.67 (17,0)	41 (18,6)
8" DN200	8.63 (219,1)	5.26 (134,0)	19.20 (487,7)	6.87 (174,0)	9.29 (236,0)	6.00 (152,4)	7.81 (198,4)	2.50 (63,5)	5.86 (148,8)	53 (24,1)
10" DN250	10.75 (273,1)	6.29 (160,0)	25.11 (637,8)	9.17 (233,0)	11.50 (292,1)	9.00 (228,6)	7.68 (195,1)	3.00 (76,2)	7.41 (188,2)	88 (40,0)



**FIGURE 1**  
**MODEL BFV-N GROOVED END BUTTERFLY VALVE**  
**- NOMINAL DIMENSIONS -**



## Installation

The Model BFV-N Grooved End Butterfly Valves may be installed with flow in either direction and can be positioned either horizontally or vertically.

The grooved end pipe couplings used with the Model BFV-N must be listed or approved for fire protection service and installed in accordance with the manufacturers instructions.

The Model BFV-N Butterfly Valve may be installed with any schedule of pressure class of pipe or tubing that is listed or approved for fire protection.

As applicable, refer to Figure 2 for the internal switch wiring diagram.

Conduit and electrical connections are to be made in accordance with the authority having jurisdiction and/or the National Electrical Code. With reference to Figure 2, the "supervisory switch" is intended for connection to the supervisory circuit of a fire alarm control panel in accordance with NFPA 72. The "auxiliary switch" is intended for the unsupervised connection to auxiliary equipment in accordance with NFPA 70, National Electric Code.

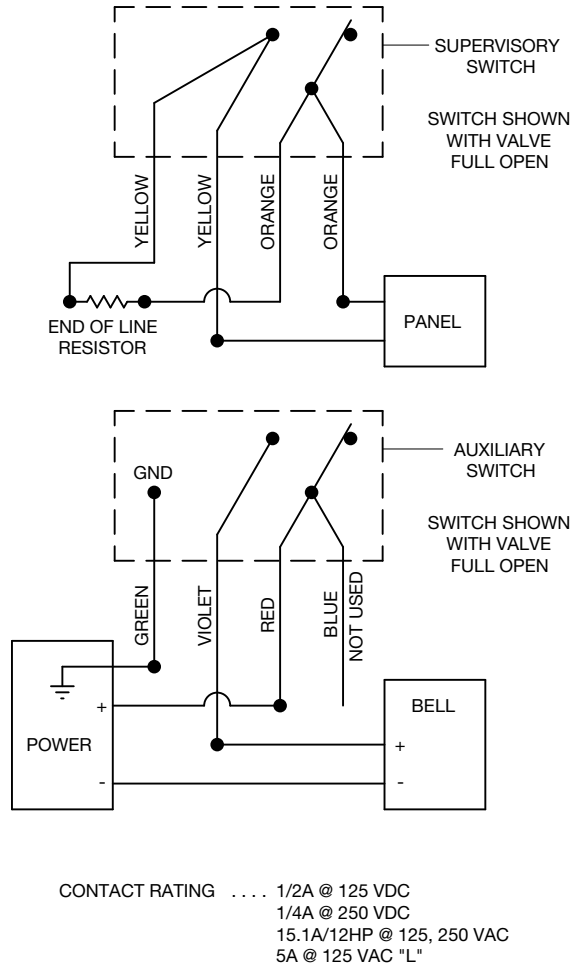
### NOTE

*For outdoor applications with internal supervisory switches, it is recommended that wiring connections be made at a temperature above 15°F (-9°C), in order to insure sufficient flexibility of the wire lead insulation.*

## Care and Maintenance

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in accordance with the applicable standards of the National Fire Protection Association (e.g., NFPA25), in addition to the standards of any authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions. Any impairment must be immediately corrected.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified inspection service.



**FIGURE 2**  
**MODEL BFV-N BUTTERFLY VALVE**  
**- INTERNAL SWITCH WIRING DIAGRAM -**

### NOTE

*Before closing a fire protection system control valve for maintenance or inspection work on either the valve or fire protection system which it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this decision must be notified.*

**Limited  
Warranty**

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

In no event shall TFBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFBP was informed about the possibility of such damages, and in no event shall TFBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

**Ordering  
Procedure**

**Grooved End Butterfly Valves:**  
Specify: (specify inch size) Model BFV-N Grooved End Butterfly Valve with internal supervisory switches, P/N (specify).

Valve Size	Valve Part Number
2½ .....	59-300-F-025N
3 .....	59-300-F-030N
4 .....	59-300-F-040N
5 .....	59-300-F-050N
6 .....	59-300-F-060N
8 .....	59-300-F-080N
10 .....	59-300-F-010N



**UL, ULC, and FM Approved**

**Sizes Available:** 6" (150mm), 8" (200mm) and 10" (250mm)

**Voltages Available:** 24VAC  
120VAC  
12VDC (10.2 to 15.6) Polarized  
24VDC (20.4 to 31.2) Polarized

**Service Use:** Fire Alarm  
General Signaling  
Burglar Alarm

**Environment:** Indoor or outdoor use (See Note 1)  
-40° to 150°F (-40° to 66°C)  
(Outdoor use requires weatherproof backbox.)

**Termination:** AC Bells - 4 No. 18 AWG stranded wires  
DC Bells - Terminal strip

**Finish:** Red powder coating

**Optional:** Model BBK-1 weatherproof backbox  
Model BBX-1 deep weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox or BBX-1 deep weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

**Notes:**

1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
3. ULC only applies to MBA DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	MBA126	1750070	.12A	85	76
8 (200)	12VDC	MBA128	1750080	.12A	90	77
10 (250)	12VDC	MBA1210	1750060	.12A	92	78
6 (150)	24VDC	MBA246	1750100	.06A	87	77
8 (200)	24VDC	MBA248	1750110	.06A	91	79
10 (250)	24VDC	MBA2410	1750090	.06A	94	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

All DC bells are polarized and have built-in transient protection.

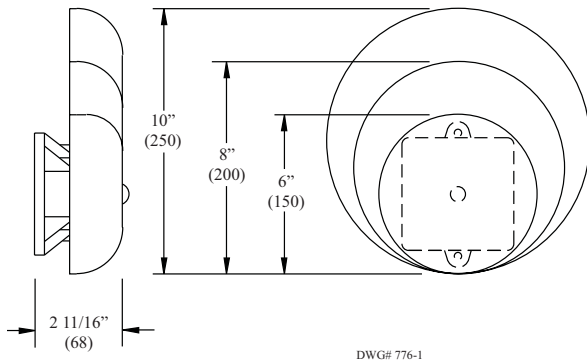
\* Does not have ULC listing.

**WARNING**

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or BBX-1. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

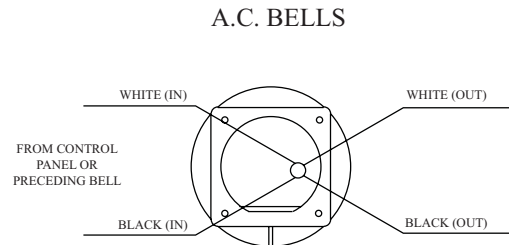
### Bells Dimensions Inches (mm)

Fig. 1



### Wiring (rear view)

Fig. 3



**CAUTION:**  
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

#### NOTES:

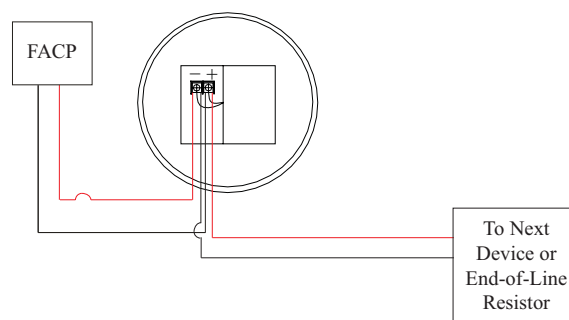
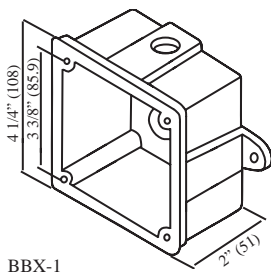
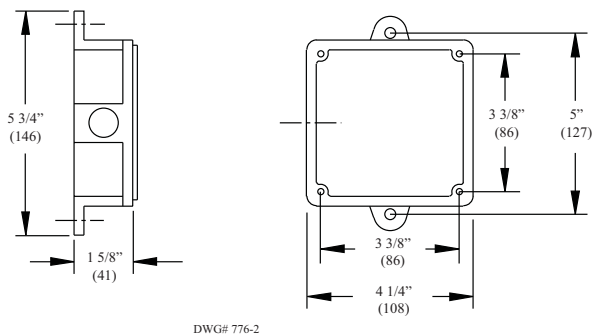
1. WHEN USING AC BELLS, TERMINATE EACH EXTRA WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS.

DWG# 776-3

### Weatherproof Backbox Dimensions Inches (mm)

Fig. 2

Box has one threaded 1/2" conduit entrance



### Installation

1. The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

### **WARNING**

Failure to install striker down will prevent bell from operating.

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL  
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM



# LISTING SERVICE

**LISTING No.** 7135-0328:0119

Page 1 of 1

**CATEGORY:** 7135 -- AUDIBLE DEVICES

**LISTEE:** Potter Electric Signal Co1609 Park 370 Place, Hazelwood, MO 63042 United States  
Contact: Brad Serangeli (314) 628-2218 Fax (314) 595-6999  
Email: brads@pottersignal.com

**DESIGN:** Models SB624-153075, SB624-75110, PBA246, PBA248, PBA2410, PBA1206, PBA1208, PBA12010, \*PBD-126, \*PBD-128, \*PBD-1210, \*PBD-246, \*PBD-248, \* PBD-2410 vibrating bells. Suitable for outdoor use when used with Model BBK-1 backbox. Models are AC or DC powered and available in 6", 8" and 10". Models MBA-6, -8 and -10 bells, suitable for outdoor use when used with Model BBX-1 backbox. Refer to listee's data sheet for detailed product description and operational considerations.

**RATING:** PBA-246, -248, -2410: 24 VAC  
PBA-1206, -1208, -12010: 120 VAC  
MBA-6, -8, -10: 12 or 24 VDC  
\*PBD-126, -128, -1210: 12VDC, .12A  
\*PBD-246, -248, -2410: 24VDC, .06A

**INSTALLATION:** In accordance with listee's printed installation instruction, applicable codes & ordinances, and in a manner acceptable to the authority having jurisdiction.

**MARKING:** Listee's name, model number and UL label.

**APPROVAL:** Listed as audible devices for use with separately listed compatible fire alarm control units. If this appliance is required to produce a distinctive three-pulse Temporal Pattern Fire Alarm Evacuation Signal (for total evacuation) in accordance with NFPA 72, 2002 Edition, the appliance must be used with a fire alarm control unit that can generate the temporal pattern signal. Refer to manufacturer's Installation Manual for details.

\*Revision 01-31-2017 dcc



This listing is based upon technical data submitted by the applicant. CSFM Fire Engineering staff has reviewed the test results and/or other data but does not make an independent verification of any claims. This listing is not an endorsement or recommendation of the item listed. This listing should not be used to verify correct operational requirements or installation criteria. Refer to listee's data sheet, installation instructions and/or other

Date Issued: **July 01, 2022**

Listing Expires **June 30, 2023**

Authorized By: **VICTOR WONG**, Program Coordinator  
Fire Engineering Division



U.S. Pat. No. 3921989, Canadian Pat. No. 1009680  
Other Patents Pending,  
Potter Electric, Rd., 1990

**UL, ULC, and CSFM Listed**

**Service Pressure:** Up to 450 PSI (31 BAR)

**Flow Required for Alarm:** 3.0 GPM (11,4 LPM)

**Maximum Surge:** 18 FPS (5,5 m/s)

**Power Requirements:**

STANDBY: 10ma at 120V AC or 1.5ma at 24V AC/DC

ALARM: 40ma at 120V AC or 35ma at 24V AC/DC

**Contact Ratings:** DPDT (Form C)

2 Amps at 0-30VDC or 0-125VAC resistive

**Conduit Entrances:** 2 knockouts provided for 1/2" conduit

**Environmental Specifications:**

- Suitable for indoor or outdoor use with factory installed gasket and die-cast housing.
- NEMA 4 Rated Enclosure - use with appropriate conduit fitting.
- Temperature Range: 40°F/120°F, 4,5°C/49°C
- Non-corrosive sleeve factory installed in saddle.

**Caution:** This device is not intended for applications in explosive environments.

**Nominal OD and Wall Thickness:**

2" (60,3mm OD), 3,9mm to 4,5mm wall

2 1/2" (73,0mm OD), 4,8mm to 5,2mm wall

2 1/2" (76,1mm OD), 4,3mm to 4,7mm wall

3" (88,9mm OD), 5,0mm to 5,6mm wall

4" (114,3mm OD), 5,4mm to 6,4mm wall

**Service use:** Water mist systems where low flow for alarm is required.

**Optional:** Cover Tamper Switch Kit, Stock No. 0090018

**General Information**

The Model VSG is a flexible vane type of waterflow switch for use in wet pipe water mist systems where a low flow for alarm is required. It is designed for installation in sections of 2 to 4 inch (50mm to 100mm) stainless steel or brass pipe with wall thickness in accordance with the above specifications (see "Nominal OD and Wall Thickness").

The unit may also be used as a sectional waterflow detector on large systems.

The unit contains an output relay and an adjustable electronic retard. The relay is actuated when a flow of 3 gallons per minute (11,4 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

**Enclosure**

The unit is enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin no. 5400775 for installation instructions of this switch.

**Installation** See Fig. 1

These devices may be mounted on a horizontal or vertical pipe. On horizontal pipe they should be installed on the top side of the pipe where they will be accessible. The units should not be installed within 6" (15cm) of a fitting which changes the direction of the waterflow or within 24" (60cm) of a valve or drain.

Drain the system and drill a hole in the pipe using a circular saw in a slow speed drill. The 2" (50mm) and 2 1/2" (65mm) devices require a hole with a diameter of 1 1/4" +1/8" -1/16" (32mm ± 2mm). The 3" (80mm) and 4" (100mm) devices require a hole with a diameter of 2" ± 1/8" (50mm ± 2mm).

Clean the inside of the pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole.

Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Install the saddle strap and tighten nuts alternately to an eventual 20 ft-lbs. (27 n-m) of torque. See Fig. 1. The vane must not rub the inside of the pipe or bind in any way.

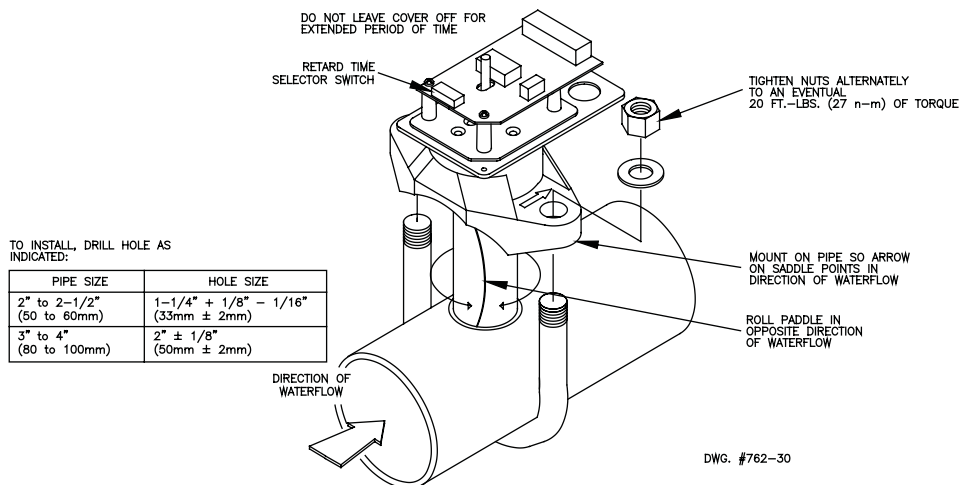
### Retard Adjustment

The retard time is selected by turning the appropriate switches to the off position.  
Example: For 45 seconds turn switches 1, 2 and 3 to the off position.

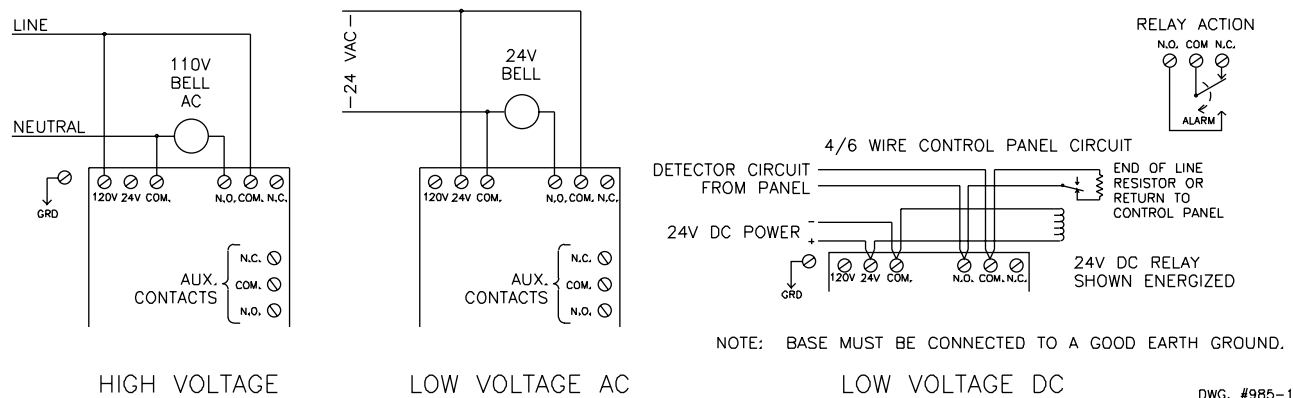
Approximate time is as follows:

Switch Off	Time in Sec.
1 thru 8 On	0
1	15
1 & 2	30
1, 2, & 3	45
1, 2, 3, & 4	60
1, 2, 3, 4, & 5	75
1, 2, 3, 4, 5, & 6	90
7	not used
8	not used

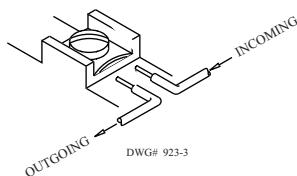
**Fig. 1**



**Fig. 2 Typical Electrical Connections**



**Fig. 3 Switch Terminal Connections Clamping Plate Terminal**



### CAUTION

When supervised circuits are used the following must be observed:  
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire becomes dislodged from under the terminal.

### Application Warning!

Due to the possibility of unintended discharges caused by pressure surges, trapped air, or short retard times, waterflow switches that are monitoring wet pipe sprinkler systems should not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems.

**Testing:** The operation of the waterflow switch and the associated alarms is to be tested upon completion of the installation and periodically thereafter in accordance with the applicable NFPA standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

A minimum flow of 3 GPM (11.4 LPM) is required to activate this device.



CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL  
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM



# LISTING SERVICE

**LISTING No.** 7770-0328:0001

Page 1 of 1

**CATEGORY:** 7770 -- VALVES/SWITCHES

**LISTEE:** Potter Electric Signal Co 1609 Park 370 Place, Hazelwood, MO 63042 United States  
Contact: Brad Serangeli (314) 628-2218 Fax (314) 595-6999  
Email: brads@pottersignal.com

**DESIGN:** Vane and pressure type water flow alarm switches listed below. Refer to listee's data sheet for detailed product description and operational considerations.

Vane Types:

VSR-CF	VSR-D	VSR-F	VSR-SF
VSR-FE-2	VS-SP	VS-F	VSR-SFG
VSR-SFT	VSG	VSR	VSR-S
VSR-C	VSR-ST	VSR-SG	

Pressure Type:

WFS-B	WFSR-C	WFSPD-B	PS10
PS-10A	PS-100A	WFSR-F	PS100

**INSTALLATION:** In accordance with listee's printed installation instructions, applicable codes and ordinances and in a manner acceptable to the authority having jurisdiction.

**MARKING:** Listee's name, model number and UL or FM label.

**APPROVAL:** Listed as waterflow alarm switches for use with fire sprinkler systems. Vane models may be used in wet pipe systems; pressure models may be used in wet or dry systems. Model VSR-CF is for use on K, L or M copper pipe (2", 2-1/2", 3", 4") and listed CPVC pipe (2", 2-1/2", 3"). Model VSR-SF for use on 1", 1-1/4", 1-1/2" and \*2" steel, copper or listed plastic pipe. Model VSG is for low flow rate. Model VSR-SFG and VSR-SFT are for use on 1", 1-1/4", 1-1/2" and \*2" plastic pipe. Models VS-F, VSR-F, VSR-FE and VSR-FE-2 is for use on 2", 2-1/2", 3", 3-1/2", 4", 5", 6", 8" and 10" pipe. \*Model VSR is for use on steel pipe sizes from 2" through 8". Vane type switches may be used outdoors when the outdoor temperature never falls below 40oF.

Rev\*5-17-2007 jw



This listing is based upon technical data submitted by the applicant. CSFM Fire Engineering staff has reviewed the test results and/or other data but does not make an independent verification of any claims. This listing is not an endorsement or recommendation of the item listed. This listing should not be used to verify correct operational requirements or installation criteria. Refer to listee's data sheet, installation instructions and/or other

Date Issued: **July 01, 2022**

Listing Expires **June 30, 2023**

Authorized By: **VICTOR WONG**, Program Coordinator  
Fire Engineering Division



**Conduit Entrances:** Two knockouts for 1/2" conduit provided.

**Service Use:**

Automatic Sprinkler	NFPA-13
One or two family dwelling	NFPA-13D
Residential occupancy up to four stories	NFPA-13R
National Fire Alarm Code	NFPA-72

The Model PCVS is a weather proof and tamper resistant switch for monitoring the open position of fire sprinkler control valves of the post indicator, butterfly and other types. Depending on the model, one or two SPDT (Form C) contacts are provided which will operate when the valve position is altered from an open state.

The unit mounts in a 1/2" NPT tapped hole in the post indicator or butterfly valve housing. The device is engaged by the indicating assembly of the post indicator or the operating mechanism of the butterfly valve, actuating switch(es) when the valve is fully open. The unit should be installed where it is accessible for service.

The cover is held in place by two tamper resistant screws that require a special tool to remove. The tool is furnished with each device and

**UL, ULC, and CSFM Listed, FM Approved, NYMEA Accepted, CE Marked**

**Dimensions:** 4.75"L x 2.25"W x 8.2"H (stem extended)  
12,1cm L x 5,7cm W x 18,3cm H

**Weight:** 1.35 lb. (0,61 kg.)

**Enclosure:** Cover - Die-cast

Finish - Red Spatter Enamel

Base - Die Cast Zinc

All parts have corrosion resistant finishes.

**Cover Tamper:** Tamper Resistant Screws,  
Optional cover tamper kit available

**Mounting:** 1/2" NPT

**Contact Rating:** PCVS-1: One set of SPDT (Form C)  
PCVS-2: Two sets of SPDT (Form C)  
15.00 Amps at 125/250VAC  
2.50 Amps at 30VDC resistive

**Environmental Limitations:** -40°F to +140°F (-40°C to 60°C)

**NEMA 4 and NEMA 6P Enclosure (IP67) when used with appropriate watertight conduit fittings.**

Indoor or Outdoor Use (Not for use in hazardous locations. See bulletin no. 5400694 PIVS-U-EX for hazardous locations.)

should be left with the building owner or responsible party. Replacement or additional cover screws and hex keys are available. See ordering information.

**Optional Cover Tamper Switch**

A field installable cover tamper switch is available as an option which may be used to indicate removal of the cover. See ordering information.

**Testing**

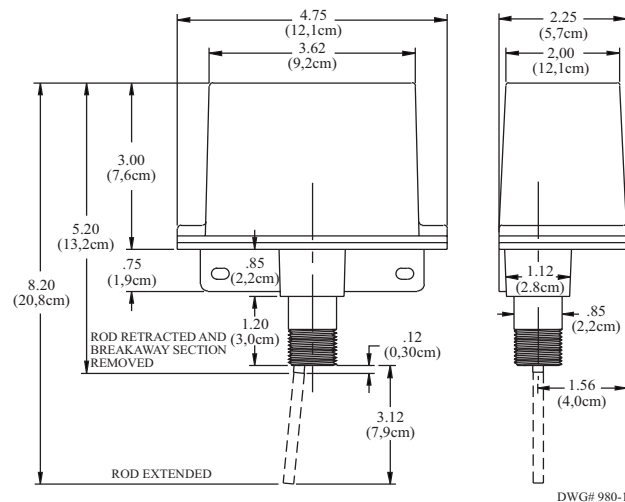
The PCVS and its associated protective monitoring system should be tested in accordance with applicable NFPA codes and standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

**Ordering Information**

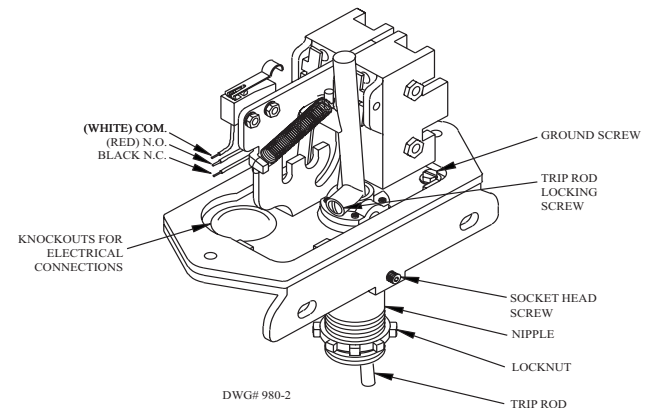
Model	Description	Stock No.
PCVS-1	Potter Control Valve Switch (single switch)	1010107
PCVS-2	Potter Control Valve Switch (double switch)	1010207
--	Cover Screw	5490344
--	Hex Key for Cover Screws and Installation Adjustments	5250062
PBK-S	Pratt Butterfly Valve Kit - Up to 12" (300mm)	0090133
PBK-L	Pratt Butterfly Valve Kit - 14" (355mm) and Up	0090132
PVK	Pratt Valve Kit	1000060
--	Optional Cover Tamper Switch Kit	0090131
KBK	Kennedy Butterfly Valve Kit	0090143

For pressure reducer type valve installation kits (if required) contact valve manufacturer.

**Fig. 1 Dimensions**



**Fig. 2 Parts**



### Typical Installations On Post Indicator Valve Housings (See Figs. 3 Thru 6)

Refer to Fig. 2 for the location of parts described in the following instructions.

Note: If the sprinkler system is in service the owner or authorized representative should be notified, before any work is done on the system, that the valve controlling the water supply to the system may be closed for periods of time during the installation and testing of this device, resulting in all or portions of the system being inoperative during these periods.

If the system is not in service and valve is closed, be sure that opening the valve will not allow any unwanted water flow due to openings in the system, such as heads off, broken or incomplete piping, etc.

1. Position the valve to fully open ("OPEN" should appear in the window of the housing). Partially close the valve while observing the direction that the target assembly moves. Reopen the valve.

If the valve housing is predrilled with a 1/2" NPT for installation of a monitoring switch, remove the 1/2" plug and fully open the valve. Make sure that "OPEN" appears in the window of the housing. GO TO STEP NO. 6.

2. Remove the head and target assembly (consultation with valve manufacturer is recommended).
3. If the target assembly moved up as the valve was closed, measure the distance from the bottom of the head to the lower part of the target assembly that will contact the trip rod of the PCVS (see Fig. 3). This is usually a plate or bar on the target assembly, on a side adjacent to the "OPEN/SHUT" plates. Subtract 1/8" from the measurement.

If the target moved down as the valve was closed, measure the distance from the bottom of the head to the upper portion of the target assembly that will contact the trip rod of the PCVS (see Fig. 4). Add 1/8" (3,2mm) to this measurement.

4. Mark the housing at the proper location. Using a 23/32" (18,2mm) drill bit, drill and then tap a 1/2" NPT in the housing on the side that coincides with the portion of the target assembly that will engage the trip rod of the PCVS.
5. Replace the head and target assembly.
6. Loosen the socket head screw that holds the nipple in the PCVS and remove the nipple.
7. Screw the locknut that is provided onto the nipple.
8. Screw the nipple into the 1/2" NPT hole in the valve housing - hand tighten. Tighten the locknut against the valve housing to secure the nipple firmly in place.
9. Insert a scale or probe thru the nipple to measure the distance from the

open end of the nipple to the target assembly. Subtract 1/2" (12,5mm) from this measurement.

NOTE: In some cases, it may be necessary to attach an angle bracket to the target assembly to engage the PCVS trip rod.

10. Using the special tool provided, loosen the two cover screws and remove the cover from the PCVS.
11. Loosen the locking screw that holds the trip rod in place and adjust the rod length, from the end of the collar to the end of the rod, using the dimension determined in Step 9. Tighten the locking screw to hold the rod in place.  
NOTE: If trip rod length is excessive, loosen the locking screw and remove the trip rod from the trip lever. Using pliers, break off the one (1) inch long notched section (see Fig. 7). Reinstall trip rod and repeat Step 11 procedure.
12. Partially close the valve (3 to 4 revolutions of the handle/hand wheel).
13. Slide the PCVS unit as far as possible onto the nipple, observing which direction the rod will move when the valve is closed. Orient the device to actuate the switches when the valve is open. Tighten the socket head screw in the collar.
14. Carefully open the valve to the fully open position. As the target moves to the open position it should engage the trip rod and actuate the switch(es). There should be a minimum overtravel of 1/2 revolution of the handle/hand wheel after the switch(es) actuate (a continuity meter connected to each set of contacts is one method that could be used to determine this).
15. Slowly close the valve. The switch must operate during the first two revolutions of the handle/hand wheel or during 1/5 of the travel distance of the valve control apparatus from its normal condition.  
NOTE: Small adjustments of the target position may be necessary (consultation with valve manufacturer is recommended).
16. Complete the required electrical wiring, connections and tests. The valve should be operated through the entire cycle of fully closed and fully open to determine the integrity of the PCVS installation and the signaling system. Check that all electrical and mechanical connections are secure.
17. When the installation and testing are complete, return valve to its proper position.
18. Alternative installation for other post indicator valve housing shown in Fig. 5 and 6.

Fig. 3

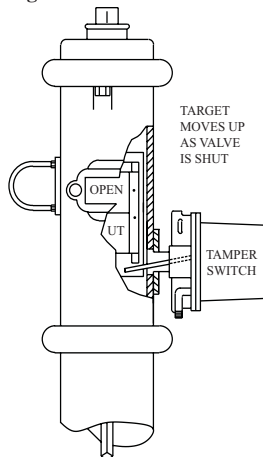


Fig. 4

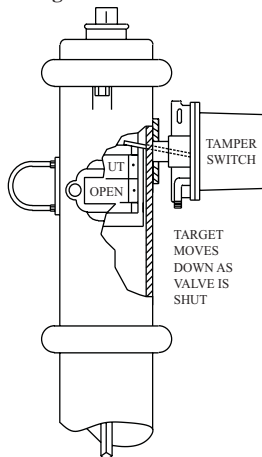


Fig. 5

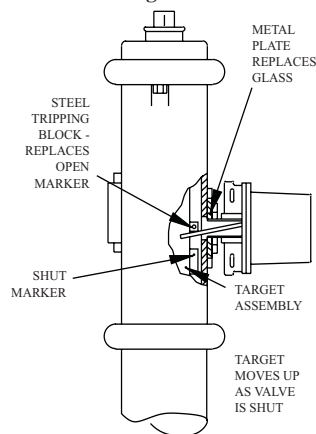
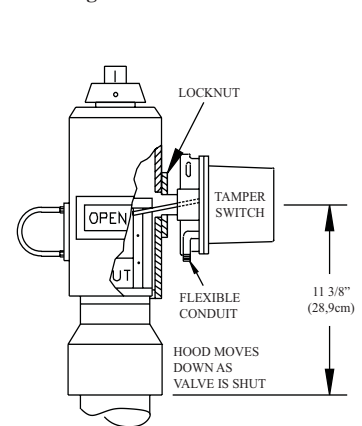


Fig. 6



DWG# 980-30

**Notes:**

1. Subject to the approval of the "authority having jurisdiction" the alternate method of installation shown in Fig. 5 may be used. In this method, one of the glass windows of the housing is replaced with a 1/4" thick metal plate that is cut to fit in place of the glass and drilled and tapped to receive the 1/2" NPT pipe nipple. In some cases it may be necessary to attach an angle bracket to the target assembly to engage the PCVS trip rod.
2. If the target is stationary and a hood arrangement is used, such as is shown in Fig. 6, the hood must be drilled with a 23/32" drill and tapped with a 1/2" NPT. The center line of this hole should be 1/8" below the portion of target assembly that strikes the PCVS trip rod. The 11 3/8" dimension shown is for a Clow Valve. Flexible conduit must be used for this type of installation.

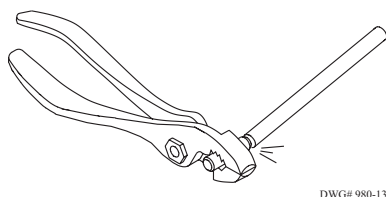
**Typical Installation On A Butterfly Valve (See Figs. 9 And 10)**

Refer to Fig. 2 for location of parts described in the following instructions:

- B1. Remove the 1/2" NPT plug from the gear operator case.
- B2. Loosen the set screw that holds the nipple in the PCVS and remove the nipple.
- B3. Screw the locknut that is provided onto the nipple.
- B4. Screw the nipple into the 1/2" NPT hole in the gear operator - hand tighten. Tighten the locknut against the case, to secure the nipple firmly in place.
- B5. Partially close the valve (3 or 4 revolutions of the hand wheel or crank).
- B6. Using the special tool provided, loosen the two cover screws and remove the cover from the PCVS.
- B7. Loosen the locking screw that holds the trip rod in place. Estimate trip rod length required and extend slightly past that point. Slide the PCVS unit as far as possible onto the nipple, observing which direction the rod will move when the valve is closed. Orient the device to actuate switches when valve is open.  
Note: If trip rod length is excessive, loosen the locking screw and remove the trip rod from the trip lever. Using pliers, break off the one (1) inch long notched section (see Fig. 7). Reinstall trip rod and repeat Step B7 procedure.

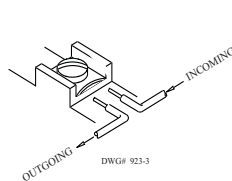
- B8. Remove device from nipple and withdraw trip rod 1/32" (0,80mm) (this dimension is important). Tighten the locking screw to hold the rod in place. Re-install the device on the nipple. Tighten the screw in the collar against the nipple.  
Note: In some cases it may be necessary to remove the gear box cover to ensure correct operation (consultation with the valve manufacturer is recommended).
- B9. Carefully open the valve to its full open position, as the boss on the gear hub moves to the open position it must engage the PCVS trip rod and actuate the switch(es). There should be a minimum overtravel or revolution of the crank or hand wheel after the switch(es) actuate (a continuity meter connected to each set of contacts is one method that could be used to determine this).  
Note: Slight adjustment of gear stops may be necessary to prevent overtravel of the trip rod (consultation with valve manufacture is recommended).
- B10. Carefully close the valve. The switch(es) must operate during the first two revolutions of the crank or hand wheel or during 1/5 of the travel distance of the valve control apparatus from its normal condition.
- B11. Complete the required electrical wiring, connections and tests. The valve should be operated through the entire cycle of fully closed and fully open to determine the integrity of the PCVS installation

Fig. 7 Breaking Excessive Rod Length



DWG# 980-13

Fig. 8 Switch Terminal Connections Clamping Plate Terminal

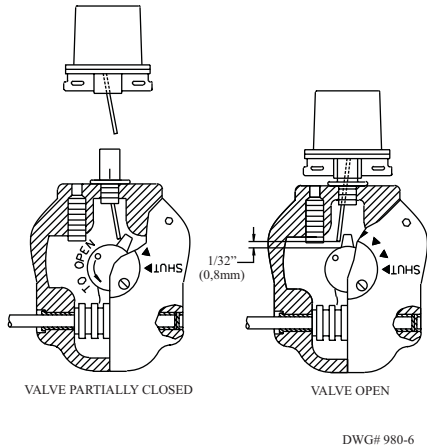


DWG# 923-3

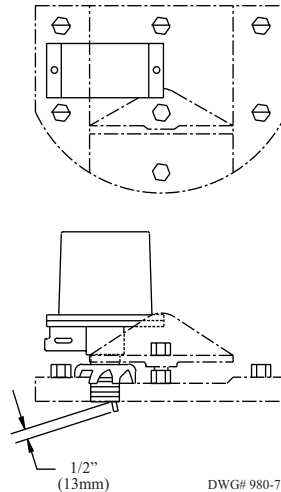
**CAUTION**

An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire becomes dislodged from under the terminal.

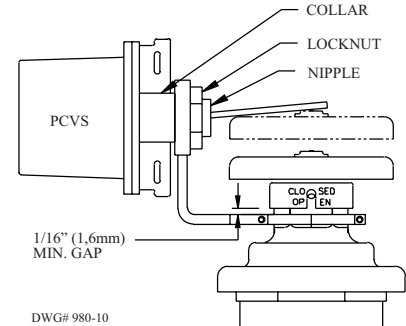
**ITT Grinnell/Kennedy Indicating Butterfly Valve**  
**Fig. 9**



**Dresser Indicating Butterfly Valve**  
**Fig. 10**



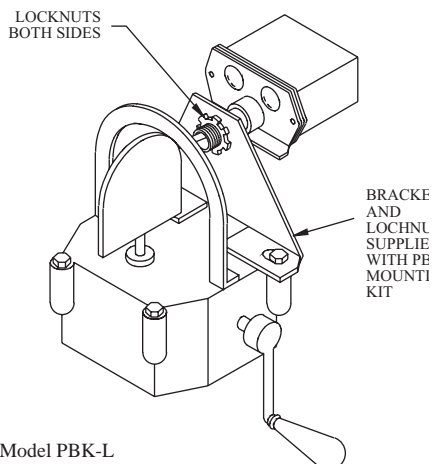
**Typical Pressure Reducer Type Valve Installation**  
**Fig. 11**



This figure shows the Model PCVS mounted on the valve yoke, with a bracket supplied by the valve manufacturer, to supervise a pressure reducer type valve.

Note: This application is subject to the approval of the authority having jurisdiction.

**PBK - Pratt IBV Butterfly Valve Kit**  
**Fig. 12**



Model PBK-L  
Stock No. 0090132  
(MDT-4S Actuator)

Model PBK-M  
Stock No. 0090146  
(MDT-3S Actuator)

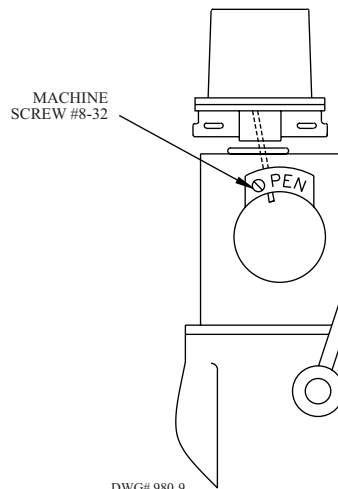
Model PBK-S  
Stock No. 0090133  
(MDT-2S Actuator)

Pratt Butterfly Valve Kit as used to mount a PCVS on a Pratt Model IBV Valve.

Kits contain: Bracket, nuts and instructions

Note: This application is subject to the approval of the authority having jurisdiction.

**PVK - Pratt PIVA Post Indicator Valve Kit**  
**(Stock No. 1000060)**  
**Fig. 13**



Pratt Valve Kit as used to mount a PCVS on a Pratt Model PIVA Valve.

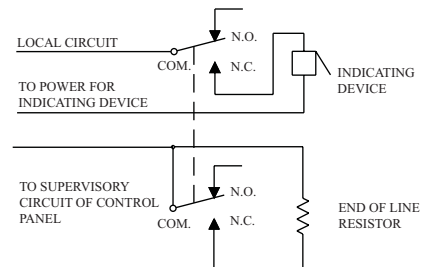
Kit contains: Instructions, template, screw and nut.

Note: This application is subject to the approval of the authority having jurisdiction.

**Typical Electrical Connections**

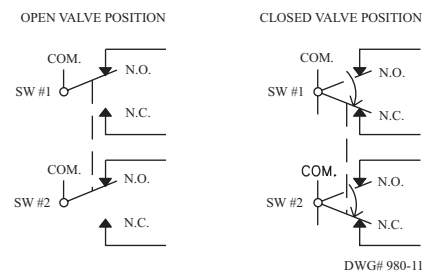
Please Note: This device should be wired in accordance with the applicable parts of the National Electrical Code, all state and local codes, applicable NFPA Standards and the requirements of the authority having jurisdiction.

**Fig. 14**



Contacts shown in normal (valve open) condition.

**Typical Switch Action**



Switches Shown in Valve Open Position

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL  
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM



# LISTING SERVICE

**LISTING No.** 7770-0328:0010

Page 1 of 1

**CATEGORY:** 7770 -- VALVES/SWITCHES

**LISTEE:** Potter Electric Signal Co 1609 Park 370 Place, Hazelwood, MO 63042 United States  
Contact: Brad Serangeli (314) 628-2218 Fax (314) 595-6999  
Email: brads@pottersignal.com

**DESIGN:** Supervisory switches listed below to monitor pressure, OS&Y, gate, globe/gate, PIV, tank temperature or water level valves. Refer to listee's data sheet for detailed product description and operational considerations.

HLS-B	WLS-W	WLS-S	PS-40A
PS-120A	OSYSU-2	OSYS-B	PMS
PTS-B	OSYSU-1	GVS	PCVS-1
PIVS-B	TTS-S	TTS-W	PCVS-2
WLS	PTS-C	PS40	PS120
RBVS	*PS15	*PS25	

**INSTALLATION:** In accordance with listee's printed instructions, applicable codes and ordinances and in a manner acceptable to the authority having jurisdiction.

**MARKING:** Listee's name, model designation and FM or UL label.

**APPROVAL:** Listed as sprinkler system supervisory switches.

**NOTE:** Formerly 7738-0328:010

\*Revision 09-07-2016 dc



This listing is based upon technical data submitted by the applicant. CSFM Fire Engineering staff has reviewed the test results and/or other data but does not make an independent verification of any claims. This listing is not an endorsement or recommendation of the item listed. This listing should not be used to verify correct operational requirements or installation criteria. Refer to listee's data sheet, installation instructions and/or other

Date Issued: **July 01, 2022**

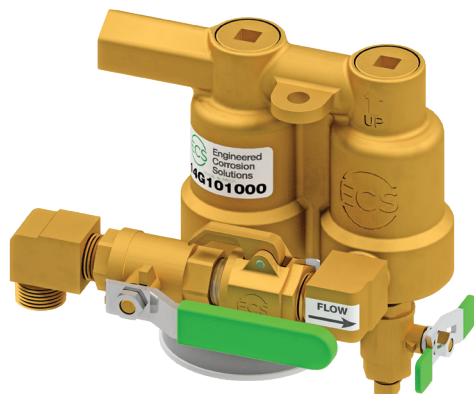
Listing Expires **June 30, 2023**

Authorized By: **VICTOR WONG**, Program Coordinator  
Fire Engineering Division



# PAV-W/WS

ECS Ejector Automatic Air Vent



## Features

ECS Ejector Automatic Air Vent (U.S. Patents No. 8,636,023)

- Patented redundant float design - Eliminates piping to a drain
- Cam-Lock Coupling - Easy installation and servicing
- Pressure Gauge - Visual monitoring from the floor
- Isolation Ball Valve Included
- Available in Supervised (PAV-WS)
- Entire Assembly is FM 1344 Approved - Air Vents for Automatic Sprinkler Systems
- Entire Assembly is UL VPMG Listed - Valves, Automatic Air Release



## General Description

The ECS Ejector Automatic Air Vent (PAV-W/WS) is a device that provides automatic venting of trapped air in wet pipe fire sprinkler systems. As a fire sprinkler system is filled with water, trapped air migrates to the high point of the system near the vent installation location which allows for trapped air to be vented. Trapped air contains oxygen which is the primary cause of corrosion in fire sprinkler systems. Corrosion in wet pipe fire sprinkler systems is directly proportional to the amount of oxygen trapped within the system piping, so a reduction in trapped air will in turn reduce the internal corrosion activity of the fire sprinkler system. Venting the trapped air in a wet pipe sprinkler system can improve water delivery time and reduce false water flow alarms.

The float mechanism on the ECS Ejector Automatic Air Vent will automatically close when water reaches the vent and the redundant design eliminates the need to plumb the PAV-W/WS to drain. If the primary float valve allows any significant amount of water to leak past it, the second float valve will close preventing water from discharging and provide a system pressure reading on the pressure gauge. This condition will be an indication that the primary automatic gas vent valve has failed and requires service or replacement. The pressure gauge is designed to be visible from the floor below the ECS Ejector Automatic Air Vent from a distance of approximately 30 feet.

There are two available models of the ECS Ejector Automatic Air Vent: PAV-W and PAV-WS. The units both operate as described previously; however, the PAV-WS includes a single contact rated 24VAC/DC @ 2A for electronic monitoring. When connected to a building alarm system, connect the contact of the PAV-WS using the appropriate end-of-line supervision device, as required by the building alarm manufacture.

## Specifications

<b>Dimensions</b>	8" (W) x 7" (H) x 6" (D)
<b>Weight</b>	7 Lbs (3kg)*
<b>Service Pressure</b>	Up to 175 PSIG (12 Bar)
<b>System Connection</b>	½" NPTM
<b>Temperature Range</b>	40°F - 270°F (5°C - 132°C)
<b>Clear Height</b>	5"

\*Support Hanger Not Required

## Installation

The ECS Ejector Automatic Air Vent must be installed as shown on the engineering design documents. If a location is not provided, install the vent at an accessible high point on the fire sprinkler system remote from the system riser where gas can be vented and at a location that the pressure gauge provided for visual monitoring can be viewed from directly below. The PAV-W/WS is also equipped with brass components that allows the device to be installed in areas subject to external corrosion. For detailed installation and operation please refer to the PAV-W/WS installation sheet.

## Maintenance

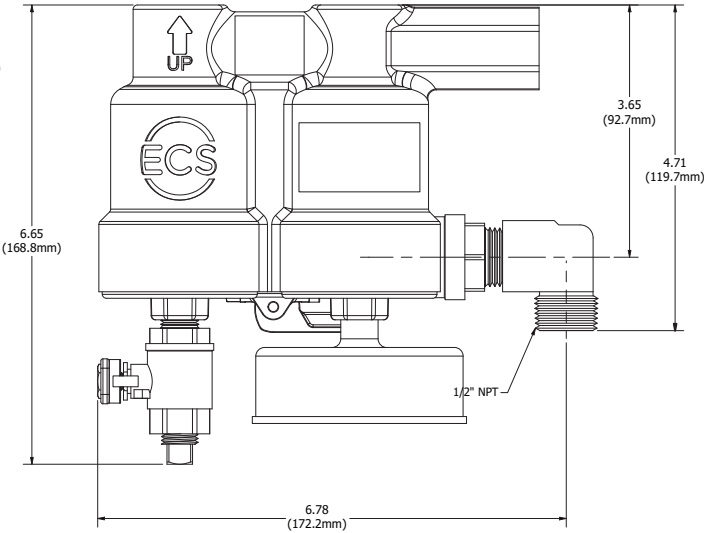
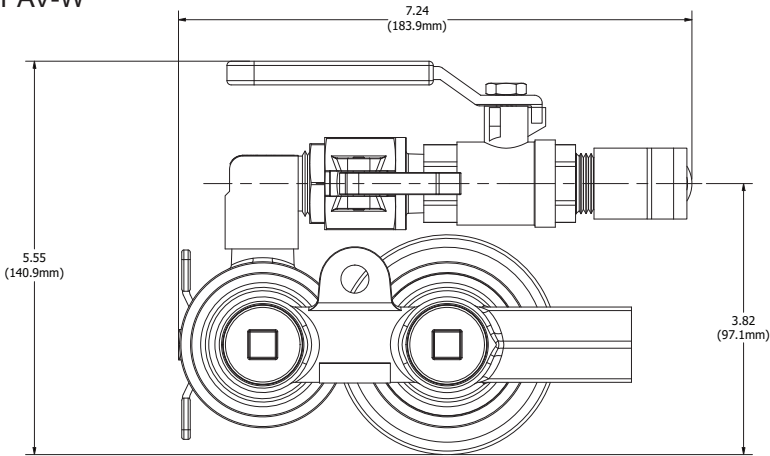
The ECS Ejector Automatic Air Vent (PAV-W/WS) requires limited maintenance. ECS recommends inspecting annually, check the pressure gauge on the bottom of the vent assembly.



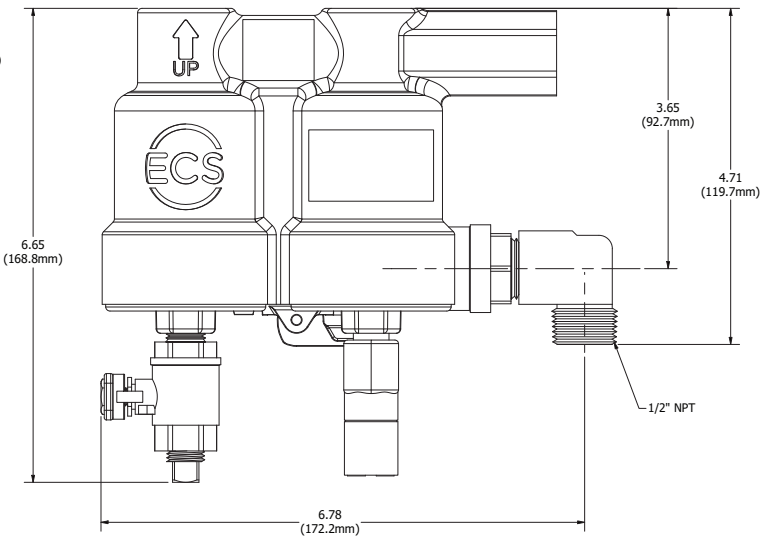
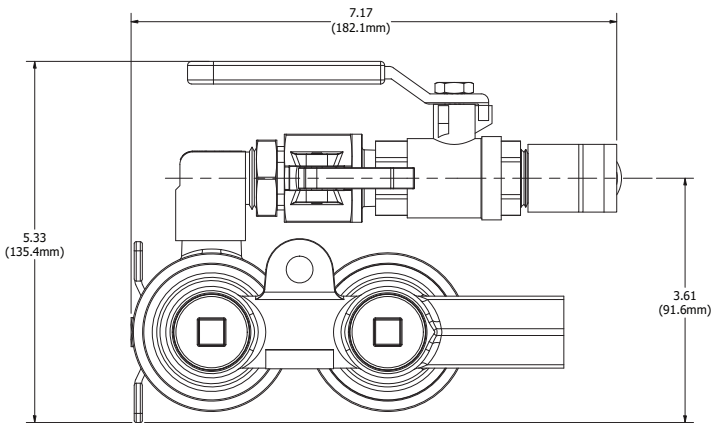
# PAV-W/WS

ECS Ejector Automatic Air Vent

PAV-W



PAV-WS



## Fig. 25 - Surge Restrainer



**Size Range** — One size fits 3/4" thru 2" pipe.

**Material** — Steel

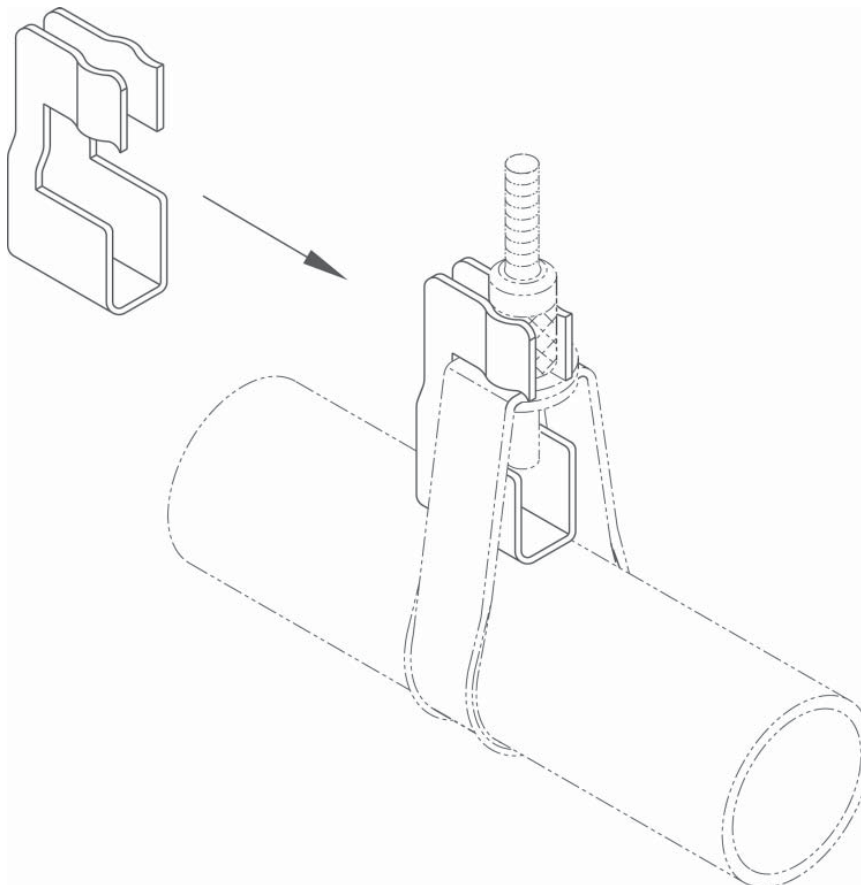
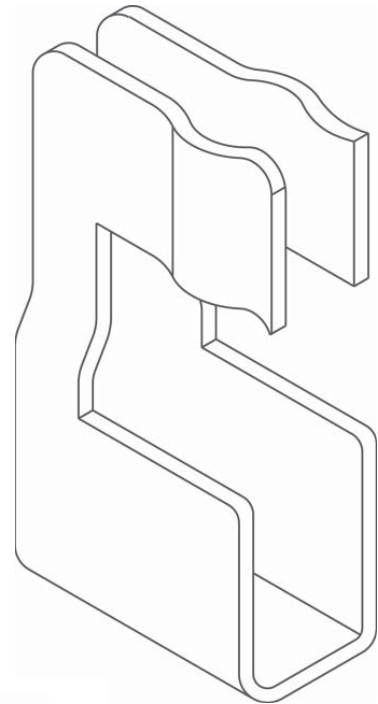
**Function** — Designed to be used in conjunction with TOLCO<sup>™</sup> Band Hangers to restrict the upward movement of piping as it occurs during sprinkler head activation or earthquake type activity. The surge restrainer is easily and efficiently installed by snapping into a locking position on the band hanger. This product is intended to satisfy the requirements as indicated in the National Fire Protection Association (NFPA 13, 2016 Edition), 6-2.3.3, 6-2.3.4 and A-6i-2.3.3 Can be used to restrain either steel pipe or CPVC plastic Pipe.

**Approvals** — Underwriters' Laboratories Listed **only** when used with TOLCO band hangers Fig. 2, 2NFPA and 200, in the USA (**UL**) and Canada (**cUL**).

**Finish** — Pre-Galvanized

**Order By** — Figure number and TOLCO band hanger, size from 3/4" thru 2".

Patent #5,344,108



## Fig. 98 - Rod Stiffener

**Size Range** — Secures 3/8" thru 7/8" hanger rod

**Material** — Carbon Steel

**Function** — Secures channel to hanger rod for vertical seismic bracing.

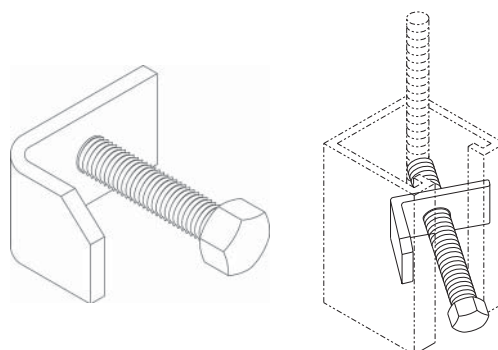
**Approvals** — Underwriters Laboratories Listed in the USA (UL) and Canada (cUL). Included in our Seismic Restraints Catalog approved by the State of California Office of Statewide Health Planning and Development (OSHPD). For additional load, spacing and placement information relating to OSHPD projects, please refer to the TOLCO Seismic Restraint Systems Guidelines

**Finish** — Electro Galvanized

**Note** — Available in HDG finish or Stainless Steel materials.

**Order By** — Figure number

Component of State of California OSHPD Approved Seismic Restraints System



## Fig. 99 - All Thread Rod Cut to Length

**Size Range** — Secures 3/8" thru 7/8" rod in 1" increments

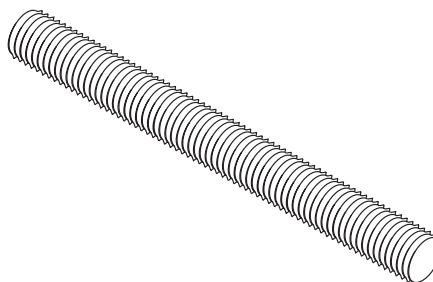
**Material** — Carbon Steel

**Maximum Temperature** — 750°F

**Finish** — Plain

**Note** — Available in Electro-Galvanized and HDG finish or Stainless Steel materials.

**Order By** — Figure number, rod diameter, rod length and finish



### Dimensions • Weights

Rod Size	Max. Rec. Load Lbs. For Service Temps	
	650°F	750°F
3/8	610	540
1/2	1130	1010
5/8	1810	1610
3/4	2710	2420
7/8	3770	3360

## Fig. 100 - All Thread Rod Full Lengths

**Size Range** — Secures 3/8" thru 7/8" rod in 10' lengths

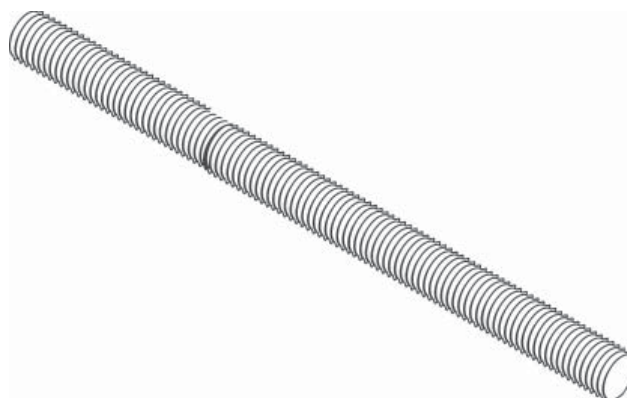
**Material** — Carbon Steel

**Maximum Temperature** — 750°F

**Finish** — Plain

**Note** — Available in Electro-Galvanized and HDG finish or Stainless Steel materials.

**Order By** — Figure number, rod diameter and finish



### Dimensions • Weights

Rod Size	Max Rec. Load Lbs. For Service Temps		Approx. Wt./100
	650°F	750°F	
1/4	240	215	12
3/8	610	540	29
1/2	1130	1010	53
5/8	1810	1610	84
3/4	2710	2420	123
7/8	3770	3360	169
1	4960	4420	222
1 1/4	8000	7140	360
1 1/2	11630	10370	510

## Fig. 200 - "Trimline" Adjustable Band Hanger

**Size Range** — 1/2" thru 8" pipe

**Material** — Carbon Steel, Mil. Galvanized to G90 specifications

**Function** — For fire sprinkler and other general piping purposes. Knurled swivel nut design permits hanger adjustment after installation.

**Features** —

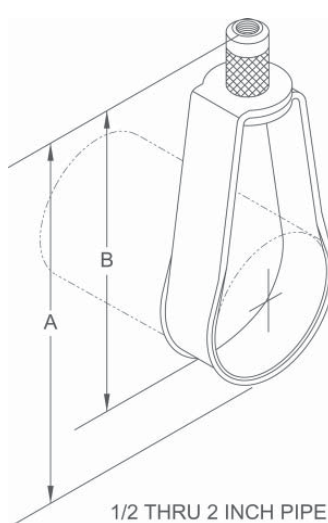
- (1/2" thru 2") Flared edges ease installation for all pipe types and protect CPVC plastic pipe from abrasion. Captured design keeps adjusting nut from separating with hanger. Hanger is easily installed around pipe.
- (2 1/2" thru 8" Spring tension on nut holds it securely in hanger before installation. Adjusting nut is easily removed.

**Approvals** — Underwriters' Laboratories listed (1/2" thru 8") in the USA (**UL**) and Canada (**cUL**) for steel and CPVC plastic pipe and Factory Mutual Engineering Approved (3/4" thru 8"). Conforms to Federal Specifications WW-H-171E, Type 10 and Manufacturers Standardization Society SP-69, Type 10.

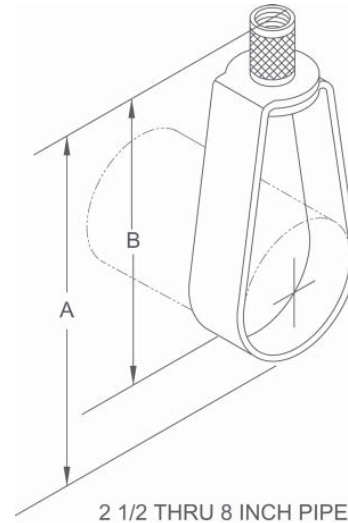
**Maximum Temperature** — 650°F

**Finish** — Mil. Galvanized. For Stainless Steel materials, order TOLCO™ Fig. 200WON.

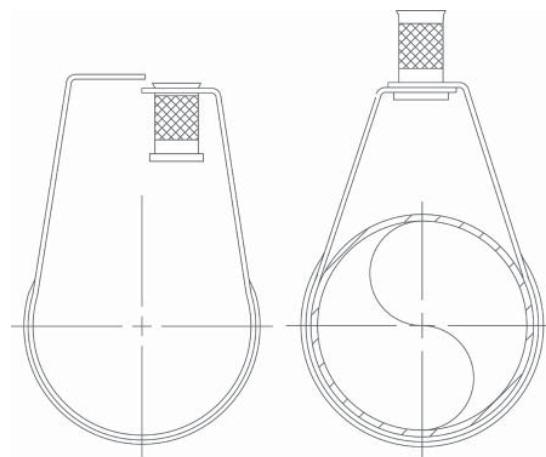
**Order By** — Figure number and pipe size



1/2 THRU 2 INCH PIPE



2 1/2 THRU 8 INCH PIPE



### Dimensions • Weights

Pipe Size	Rod Size Inch	Metric	A	B	Max. Rec. Load Lbs.	Approx. Length
1/2	3/8	8mm or 10mm	3 1/8	2 5/8	400	11
3/4	3/8	8mm or 10mm	3 1/8	2 1/2	400	11
1	3/8	8mm or 10mm	3 3/8	2 5/8	400	12
1 1/4	3/8	8mm or 10mm	3 3/4	2 7/8	400	13
1 1/2	3/8	8mm or 10mm	3 7/8	2 7/8	400	14
2	3/8	8mm or 10mm	4 1/2	3	400	15
2 1/2	3/8	10mm	5 5/8	4 1/8	600	27
3	3/8	10mm	5 7/8	4	600	29
3 1/2	3/8	10mm	7 3/8	5 1/4	600	34
4	3/8	10mm	7 3/8	5	1000	35
5	1/2	12mm	9 1/8	6 1/4	1250	66
6	1/2	12mm	10 1/8	6 3/4	1250	73
8	1/2	12mm	13 1/8	8 3/4	1250	136

# Upper Attachments

**Fig. 75 - Swivel Attachment**



**Size Range:** — 3/8"-16 Rod Attachment

**Material:** Steel

**Function:** Recommended applications for this product:

- May be used as a Branch Line Restraint for structural attachment to anchor bolt, beam clamp, etc.
- May be used in a pitched or sloped roof application, to meet requirements of NFPA 13 (2016) 9.1.2.6.

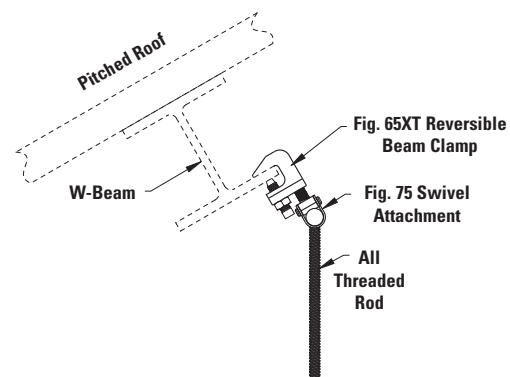
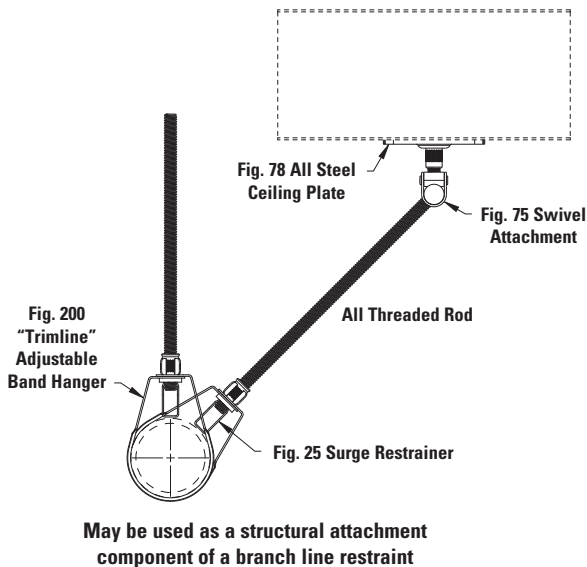
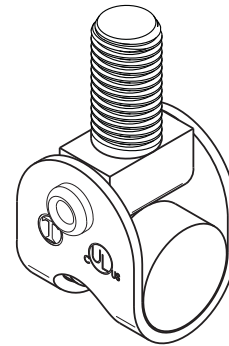
**Approvals:** Underwriters Laboratories Listed in the USA (**UL**) and Canada (**cUL**) to support up to 4" (100mm) pipe.

**Finish:** Electro-Galvanized

**Weight:** Approx. Wt./100 - 13.3 Lbs. (6.0kg)

**Order By:** Figure number

**Patent:** #7,887,248



May be used with a pitched roof application, to meet requirements of NFPA 13 (2016) Sec. 9.1.2.5.

# Seismic Bracing

**Fig. 1001 - Sway Brace Attachment**

**TOLCO**



**Size Range:** Pipe size to be braced: 1" (25mm) thru 8" (200mm) IPS.  
Pipe size used for bracing: 1" (25mm) and 1 1/4" (32mm) Schedule 40 IPS.

**Material:** Steel

**Function:** For bracing pipe against sway and seismic disturbance.  
The pipe attachment component of a sway brace system:  
Fig. 1001 is used in conjunction with a Fig. 900 Series fitting and joined together with bracing pipe per NFPA 13, forming a complete sway brace assembly.

**Features:** Can be used to brace schedules 7 through 40 IPS.  
Field adjustable, making critical pre-engineering of bracing pipe length unnecessary. Unique design requires no threading of bracing pipe. Comes assembled and ready for installation. Fig. 1001 has built-in visual verification of correct installation. See installation note below.

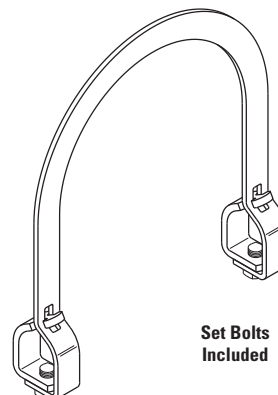
**Installation Note:** Position Fig. 1001 over the pipe to be braced and tighten two hex head cone point set bolts until heads bottom out. A minimum of 1" (25mm) pipe extension is recommended. Brace pipe can be installed on top or bottom of pipe to be braced.

**Approvals:** Underwriters Laboratories Listed in the USA (UL) and Canada (cUL).  
For FM Approval information refer to page 71.

**Finish:** Plain or Electro-Galvanized. Contact B-Line for alternative finishes and materials.

**Order By:** Order by figure number, pipe size to be braced, followed by pipe size used for bracing (1" (25mm) or 1 1/4" (32mm)), and finish.

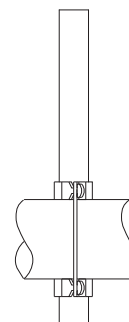
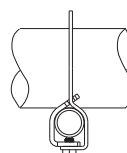
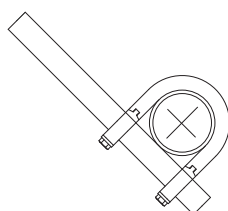
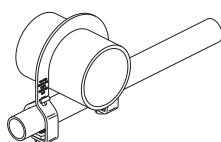
**Important Note:** Fig. 1001 is precision manufactured to perform its function as a critical component of a complete bracing assembly. To ensure performance, the UL Listing requires that Fig. 1001 must be used only with other TOLCO bracing products.



**Set Bolts  
Included**



Pipe Size  in. (mm)	Part Number & Approx. Wt./100				Design Load - Lbs.		
	1" (24mm) Brace Pipe		1 1/4" (32mm) Brace Pipe		For Brace Pipe Size 1" / 1 1/4"		
		Lbs. (kg)		Lbs. (kg)	Sch. 7 1" / 1 1/4"	Sch. 10 1" / 1 1/4"	Sch. 40 1" / 1 1/4"
1" (25)	<b>1001-1 X 1</b>	100.0 (45.3)	<b>1001-1 X 1 1/4</b>	118.0 (53.5)	-- / --	1000 / 1000	1000 / 1000
1 1/4" (32)	<b>1001-1 1/4 X 1</b>	100.0 (45.3)	<b>1001-1 1/4 X 1 1/4</b>	114.0 (51.7)	1000 / 1000	1000 / 1000	1000 / 1000
1 1/2" (40)	<b>1001-1 1/2 X 1</b>	100.0 (45.3)	<b>1001-1 1/2 X 1 1/4</b>	115.0 (52.1)	1000 / 1000	1500 / 1500	1500 / 1500
2" (50)	<b>1001-2 X 1</b>	108.0 (49.0)	<b>1001-2 X 1 1/4</b>	121.0 (54.8)	1000 / 1000	2015 / 2015	2015 / 2015
2 1/2" (65)	<b>1001-2 1/2 X 1</b>	138.6 (62.8)	<b>1001-2 1/2 X 1 1/4</b>	160.4 (72.7)	1600 / 1600	2015 / 2765	2015 / 2765
3" (80)	<b>1001-3 X 1</b>	147.2 (66.7)	<b>1001-3 X 1 1/4</b>	168.7 (76.5)	1600 / 1600	2015 / 2765	2015 / 2765
4" (100)	<b>1001-4 X 1</b>	160.9 (73.0)	<b>1001-4 X 1 1/4</b>	182.4 (82.7)	1600 / 1600	2015 / 2765	2015 / 2765
6" (150)	<b>1001-6 X 1</b>	190.0 (86.2)	<b>1001-6 X 1 1/4</b>	211.4 (95.9)	1600 / 1600	2015 / 2765	2015 / 2765
8" (200)	<b>1001-8 X 1</b>	217.4 (98.6)	<b>1001-8 X 1 1/4</b>	238.8 (108.3)	1600 / 1600	2015 / 2765	2015 / 2765





**Fig. 4L**

## Longitudinal "In-Line" Sway Brace Attachment



**Size Range** — 2½" through 8" IPS.

**Material** — Carbon Steel

**Function** — For bracing pipe against sway and seismic disturbance.

**Approvals** — Underwriter's Laboratories Listed in the USA (**UL**) and Canada (**cUL**) 2½" through 8".

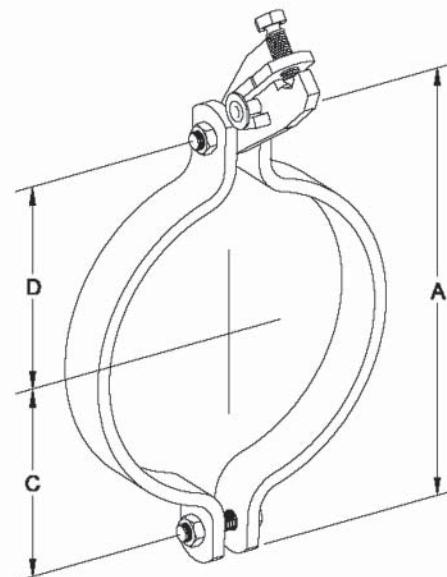
**Installation Instructions** — The Fig. 4L is the "braced pipe" attachment component of a longitudinal sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO structural attachment component to form a complete bracing assembly. NFPA 13 and/or OSHPD guidelines should be followed.

**To Install** — Place the Fig. 4L over the pipe to be braced and tighten bolts. Then engage "bracing pipe" into jaw opening and tighten set bolt until hex head snaps off. Jaw attachment can pivot for adjustment to proper brace angle.

**Finish** — Plain

**Note** — Available in electro-galvanized and HDG finish.

**Order By** — Figure number, pipe size and finish.

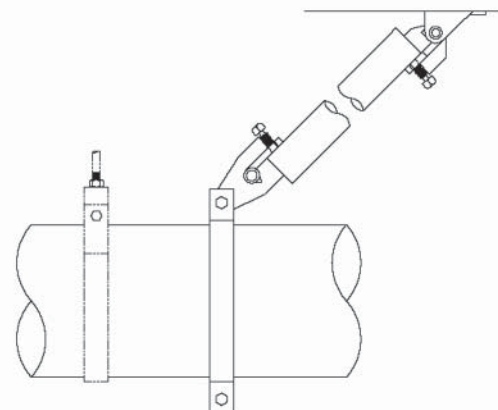


TOLCO® brand bracing components are designed to be compatible **ONLY** with other TOLCO® brand bracing components, resulting in a Listed seismic bracing assembly.

**DISCLAIMER** — NIBCO does **NOT** warrant against the failure of TOLCO® brand bracing components, in the instance that such TOLCO® brand bracing components are used in combination with products, parts or systems which are not manufactured or sold under the TOLCO® brand. NIBCO shall **NOT** be liable under any circumstance for any direct or indirect, incidental or consequential damages of any kind, including but not limited to loss of business or profit, where non-TOLCO brand bracing components have been, or are used.

### Dimensions • Weights

Sizes	A	C	D	Bolt Size	Max. Rec. Load Lbs.	Approx. Wt./100
2½	67/16	2½	2¾	1/2	2015	253
3	7	2¾	31/16	1/2	2015	268
4	8½	3¾	311/16	1/2	2015	348
5	9¾	37/8	4¾	1/2	2015	380
6	11½	5	5½	1/2	2015	640
8	13¾	611/16	6½	1/2	2015	728



Longitudinal Brace



4-Way Riser Brace  
(Plan view)



## Fig. 980 - Universal Swivel Sway Brace Attachment

**Size Range** — One size fits bracing pipe 1" thru 2", TOLCO 12 gauge channel, and all structural steel up to 1/4" thick.

**Material** — Carbon Steel

**Function** — Multi-functional attachment to structure or braced pipe fitting.

**Features** — This product's design incorporates a **concentric** attachment opening which is critical to the performance of structural seismic connections. NFPA 13 (2016) 9.3.5.8.4 indicates clearly that fastener table load values are based only on concentric loading. Mounts to any surface angle. Break off bolt head assures verification of proper installation.

**Installation** — The Fig.980 is the structural or transitional attachment component of a longitudinal or lateral sway brace assembly. It is intended to be combined with the "bracing pipe" and TOLCO "braced pipe" attachment, Fig. 1000, 1001, 2002, 4L, 4A or 4B to form a complete bracing assembly. NFPA 13 and/or OSHPD guidelines should be followed.

**To Install** — Place the Fig. 980 onto the "bracing pipe". Tighten the set bolt until set bolt head breaks off. Attachment can pivot for adjustment to proper brace angle.

**Approvals** — Underwriters Laboratories Listed in the USA (**UL**) and Canada (**cUL**). Approved by Factory Mutual Engineering (**FM**). Included in our Seismic Restraints Catalog approved by the State of California Office of Statewide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to the TOLCO Seismic Restraint Systems Guidelines.

**Note** — The Fig. 980 Swivel Attachment and the Fig. 1001, Fig. 1000, Fig. 2002, Fig. 4A, Fig. 4B or Fig. 4L Pipe Clamp make up a sway brace system of **UL** Listed attachments and bracing materials which satisfies the requirements of Underwriters' Laboratories and the National Fire Protection Association (**NFPA**)

**Finish** — Plain

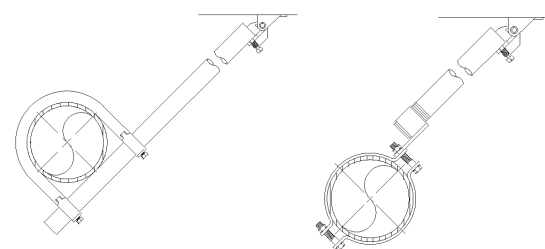
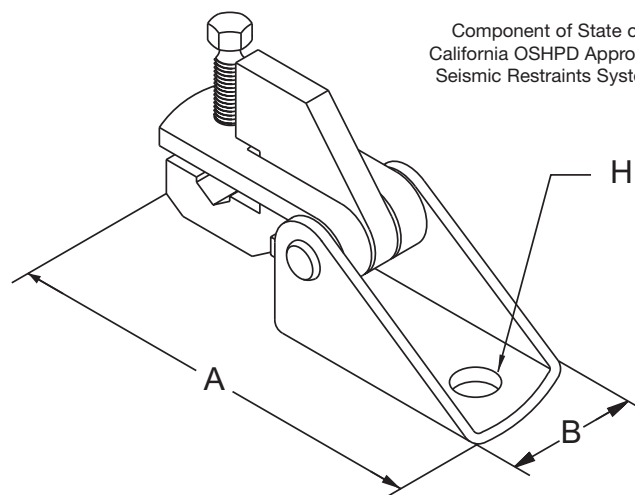
**Note** — Available in Electro-Galvanized finish.

**Order By** — Figure number and finish.

**Pat. #6,273,372, Pat. #6,517,030, Pat. #6,953,174,  
Pat. #6,708,930, Pat. #7,191,987, Pat. #7,441,730,  
Pat. #7,669,806**



Component of State of  
California OSHPD Approved  
Seismic Restraints System



Lateral Brace

Dimensions • Weights					
A	B	H*	Max. Design Load Lbs. (cULus)	Max. Design Load Lbs.** (FM)	Approx. Wt./100
5¼	1⅞	17/32	2765	2800	132

\* Available with hole sizes to accommodate up to 3/4" fastener. Consult factory.

\*\* The loads listed are axial loads on the brace. The horizontal load capacity, H, of the brace is:  $H = F \times \sin \theta$ , where  $\theta$  is the installation angle measured from the vertical.

TOLCO® brand bracing components are designed to be compatible **ONLY** with other TOLCO® brand bracing components, resulting in a Listed seismic bracing assembly. **DISCLAIMER** — NIBCO does **NOT** warrant against the failure of TOLCO® brand bracing components, in the instance that such TOLCO® brand bracing components are used in combination with products, parts or systems which are not manufactured or sold under the TOLCO® brand. NIBCO shall **NOT** be liable under any circumstance for any direct or indirect, incidental or consequential damages of any kind, including but not limited to loss of business or profit, where non-TOLCO brand bracing components have been, or are used.