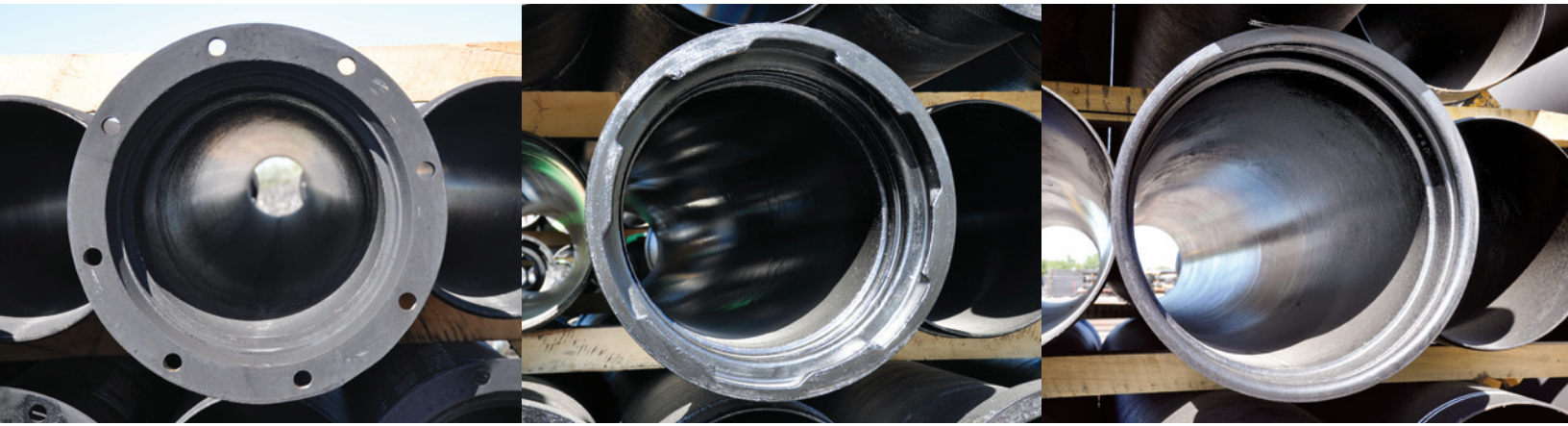


# MCWANE DUCTILE IRON PIPE



Boltless restrained joint systems • Multiple design options available from 3"–36" •  
Fast and easy installation • 350 psi pressure rating • Independently tested



IRON STRONG

[mcwaneductile.com](http://mcwaneductile.com)

## SURE STOP® GASKET FOR TYTON® JOINT

| Size In. | Rating psi | Deflection Degrees |
|----------|------------|--------------------|
| 3        | 350        | 5                  |
| 4        | 350        | 5                  |
| 6        | 350        | 5                  |
| 8        | 350        | 5                  |
| 10       | 350        | 5                  |
| 12       | 350        | 5                  |
| 14       | 350        | 4                  |
| 16       | 350        | 4                  |
| 18       | 350        | 4                  |
| 20       | 350        | 2.5                |
| 24       | 350        | 2.5                |

SURE STOP 350® GASKETS are available in sizes 3 in. – 24 in., and with a rating of 350 psi they will meet or exceed the capabilities of ductile iron pipe, valves, and fittings.

SURE STOP 350® GASKETS are NSF 61 approved, UL listed, and FM approved.

FM Rating: 4 in. – 6 in. = 250 psi  
18 in. – 24 in. = 200 psi

### APPLICATION NOTES

- For ductile iron applications utilizing TYTON® pipe, vales, and fittings made to AWWA specifications.
- In cold weather assembly maintain the temperature of the gasket above 40° F.
- The socket of the joint should be clean and free of debris or significant corrosion.
- Gasket should be properly seated in the bell socket.
- Keep the pipe and joint in alignment during assembly. If installed out of alignment, the gasket can be pushed out of position, creating the potential for leaks or failure.
- If deflection is wanted in the joint, deflect before fully inserting the joint.
- Some extension of the joint will occur when pressurized. To avoid this, the joint should be pulled out after assembly to “set” the stainless steel teeth in the inserted pipe.
- Once assembled, the joint can be disassembled using steel shims.
- When cut pipe is used, the following steps are required:
  - Ensure that the spigot end is properly beveled
  - Mark the joint depth on the spigot so it is clear when the joint is fully inserted.
  - Ensure that the pipe meets the required dimensional tolerances.
- Do not reuse SURE STOP 350® GASKETS, as they may have been damaged during any previous installation or during removal.
- Do not use SURE STOP 350® GASKETS to conduct electricity through the pipe joint, as they could be damaged and fail.
- Do not use SURE STOP 350® GASKETS in above ground applications.
- Do not use SURE STOP 350® GASKETS with thick coating on the pipe exterior.
- If SURE STOP 350® GASKETS are used in straight casings, you must pull the pipe through the casing. Do not push the pipe.

### FIELD CUT PIPE

When pipe is cut in the field, the cut end may be readily conditioned so that it can be used to make up the next joint. The outside of the cut end should be beveled about 1/4-inch at an angle of about 30 degrees (Figure 1). This can be quite easily done with a coarse file or a portable grinder. The operation removes any sharp, rough edges which otherwise might damage the gasket.

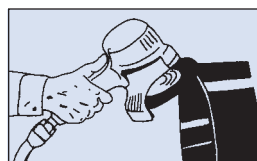
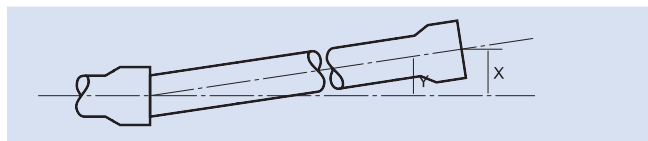


Figure 1

When ductile iron pipe 14 in. and larger is to be cut in the field, the material should be ordered as “GAUGED FULL LENGTH”. Pipe that is “gauged full length” is specially marked to avoid confusion. The ANSI/AWWA standard for ductile iron pipe requires factory gauging of the spigot end. Accordingly, pipe selected for field cutting should also be field gauged in the location of the cut and found to be within the tolerances shown in Table 1. In the field, a mechanical joint gland can be used as a gauging device.

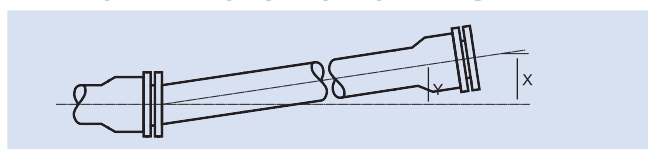
## JOINT DEFLECTION CHART



### PUSH-ON JOINT PIPE Maximum Allowable Joint Deflection

| Pipe Size In. | Y-Maximum Joint Deflection in Degrees | X Deflection in Inches 18 ft. Length | Approximate Radius in ft. of Curve Produced by Succession of Joints 18 ft. Length |
|---------------|---------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|
| 3             | 5°                                    | 19                                   | 205                                                                               |
| 4             | 5°                                    | 19                                   | 205                                                                               |
| 6             | 5°                                    | 19                                   | 205                                                                               |
| 8             | 5°                                    | 19                                   | 205                                                                               |
| 10            | 5°                                    | 19                                   | 205                                                                               |
| 12            | 5°                                    | 19                                   | 205                                                                               |
| 14            | 5°                                    | 19                                   | 205                                                                               |
| 16            | 5°                                    | 19                                   | 205                                                                               |
| 18            | 5°                                    | 19                                   | 205                                                                               |
| 20            | 5°                                    | 19                                   | 205                                                                               |
| 24            | 5°                                    | 19                                   | 205                                                                               |
| 30            | 5°                                    | 19                                   | 205                                                                               |
| 36            | 4°                                    | 15                                   | 260                                                                               |

### MAXIMUM DEFLECTION FOR FULL LENGTH PIPE



### MECHANICAL JOINT PIPE Maximum Allowable Joint Deflection

| Pipe Size In. | Y-Maximum Joint Deflection in Degrees | X Deflection in Inches 18 ft. Length | Approximate Radius in ft. of Curve Produced by Succession of Joints 18 ft. Length |
|---------------|---------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|
| 6             | 7°–7'                                 | 27                                   | 145                                                                               |
| 8             | 5°–21'                                | 20                                   | 195                                                                               |
| 10            | 5°–21'                                | 20                                   | 195                                                                               |
| 12            | 5°–21'                                | 20                                   | 195                                                                               |
| 14            | 3°–35'                                | 13.5                                 | 285                                                                               |
| 16            | 3°–35'                                | 13.5                                 | 285                                                                               |
| 18            | 3°–0'                                 | 11                                   | 340                                                                               |
| 20            | 3°–0'                                 | 11                                   | 340                                                                               |
| 24            | 2°–23'                                | 9                                    | 450                                                                               |

TABLE 1: SUITABLE PIPE DIAMETERS FOR FIELD CUTS AND RESTRAINED JOINT FIELD FABRICATION

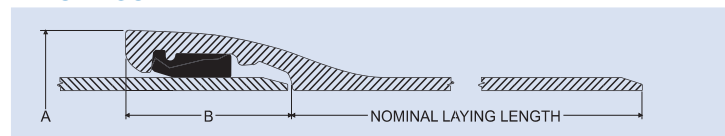
| Pipe Size In. | Min. Pipe Diameter In. | Max. Pipe Diameter In. | Min. Pipe Circumference In. | Max. Pipe Circumference In. |
|---------------|------------------------|------------------------|-----------------------------|-----------------------------|
| 3             | 3.9                    | 4.02                   | 12-1/4                      | 12-5/8                      |
| 4             | 4.74                   | 4.86                   | 14-29/32                    | 15-9/32                     |
| 6             | 6.84                   | 6.96                   | 21-1/2                      | 21-7/8                      |
| 8             | 8.99                   | 9.11                   | 28-1/4                      | 28-5/8                      |
| 10            | 11.04                  | 11.16                  | 34-11/16                    | 35-1/16                     |
| 12            | 13.14                  | 13.26                  | 41-9/32                     | 41-21/32                    |
| 14            | 15.22                  | 15.35                  | 47-13/16                    | 48-7/32                     |
| 16            | 17.32                  | 17.45                  | 54-13/32                    | 54-13/16                    |
| 18            | 19.42                  | 19.55                  | 61                          | 61-13/32                    |
| 20            | 21.52                  | 21.65                  | 67-19/32                    | 68                          |
| 24            | 25.72                  | 25.85                  | 80-13/16                    | 81-7/32                     |
| 30            | 31.94                  | 32.08                  | 100-11/32                   | 100-25/32                   |
| 36            | 38.24                  | 38.38                  | 120-1/8                     | 120-9/16                    |

Above Table Based on ANSI/AWWA C151/A21.51 Guidelines for Push-On Joints.

### THE BACKHOE METHOD OF ASSEMBLY

A backhoe may be used to assemble pipe of intermediate and larger sizes. The plain end of the pipe should be carefully guided by hand into the bell of the previously assembled pipe. The bucket of the backhoe may then be used to push the pipe until fully seated. A timber header should be used between the pipe and backhoe bucket to avoid damage to the pipe.

## TYTON® JOINT PIPE

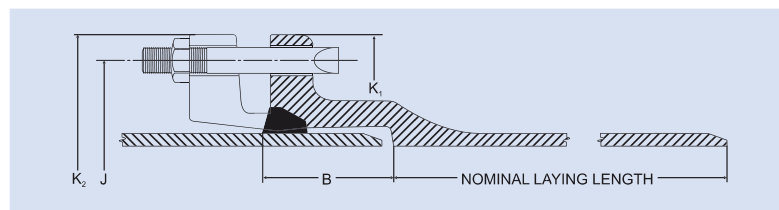


**Tyton® Joint**

| Pipe Size In. | Pipe Thickness In. |     | Outside Diameter | *Dimensions In. |      |
|---------------|--------------------|-----|------------------|-----------------|------|
|               | From               | To  |                  | A               | B    |
| 3             | .25                | .40 | 3.96             | 5.80            | 3.00 |
| 4             | .25                | .41 | 4.80             | 7.10            | 3.15 |
| 6             | .25                | .43 | 6.90             | 8.63            | 3.38 |
| 8             | .25                | .45 | 9.05             | 10.94           | 3.69 |
| 10            | .26                | .47 | 11.10            | 13.32           | 3.75 |
| 12            | .28                | .49 | 13.20            | 15.06           | 3.75 |
| 14            | .28                | .51 | 15.30            | 17.80           | 5.00 |
| 16            | .30                | .52 | 17.40            | 19.98           | 5.00 |
| 18            | .31                | .53 | 19.50            | 22.00           | 5.00 |
| 20            | .33                | .54 | 21.60            | 24.12           | 5.25 |
| 24            | .33                | .56 | 25.80            | 28.43           | 5.50 |
| 30            | .34                | .63 | 32.00            | 35.40           | 6.55 |
| 36            | .38                | .73 | 38.30            | 41.84           | 7.00 |

\*Nominal laying length is 18 ft.

## MECHANICAL JOINT PIPE

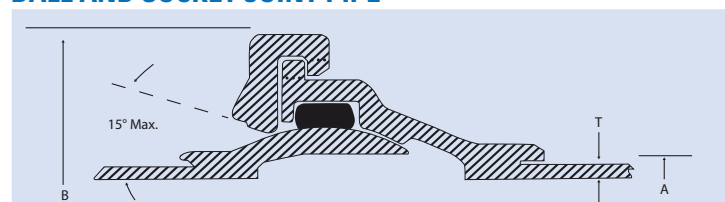


| Pipe<br>Size<br>In. | Pipe<br>Thickness<br>In. |     | Outside<br>Diameter | *Dimensions In. |       |       |       |    |     | Bolts       |               | Bell<br>Weight<br>Lb. | Gland**<br>Bolts<br>Gasket<br>Weight<br>Lb. |
|---------------------|--------------------------|-----|---------------------|-----------------|-------|-------|-------|----|-----|-------------|---------------|-----------------------|---------------------------------------------|
|                     | From                     | To  |                     | In.             | B     | J     | K1    | K2 | No. | Size<br>In. | Length<br>In. |                       |                                             |
| 3                   | .25                      | .40 | 3.96                | 2.50            | 6.19  | 7.62  | 7.69  | 4  | 5/8 | 3           | 11            | 7                     |                                             |
| 4                   | .26                      | .41 | 4.80                | 2.50            | 7.50  | 9.06  | 9.12  | 4  | 3/4 | 3-1/2       | 16            | 10                    |                                             |
| 6                   | .25                      | .43 | 6.90                | 2.50            | 9.50  | 11.06 | 11.12 | 6  | 3/4 | 3-1/2       | 18            | 16                    |                                             |
| 8                   | .27                      | .45 | 9.05                | 2.50            | 11.75 | 13.31 | 13.37 | 6  | 3/4 | 4           | 24            | 25                    |                                             |
| 10                  | .29                      | .47 | 11.10               | 2.50            | 14.00 | 15.62 | 15.62 | 8  | 3/4 | 4           | 31            | 30                    |                                             |
| 12                  | .31                      | .49 | 13.20               | 2.50            | 16.25 | 17.88 | 17.88 | 8  | 3/4 | 4           | 37            | 40                    |                                             |
| 14                  | .33                      | .51 | 15.30               | 3.50            | 18.75 | 20.25 | 20.25 | 10 | 3/4 | 4-1/2       | 61            | 45                    |                                             |
| 16                  | .34                      | .52 | 17.40               | 3.50            | 21.00 | 22.50 | 22.50 | 12 | 3/4 | 4-1/2       | 74            | 55                    |                                             |
| 18                  | .35                      | .53 | 19.50               | 3.50            | 23.25 | 24.75 | 24.75 | 12 | 3/4 | 4-1/2       | 85            | 65                    |                                             |
| 20                  | .36                      | .54 | 21.60               | 3.50            | 25.50 | 27.00 | 27.00 | 14 | 3/4 | 4-1/2       | 98            | 85                    |                                             |
| 24                  | .38                      | .56 | 25.80               | 3.50            | 30.00 | 31.50 | 31.50 | 16 | 3/4 | 5           | 123           | 105                   |                                             |

\* Nominal laying length is 18 ft.

\*\* Weight shown for regular grey cast iron follower gland, corton bolts and rubber gasket.

## BALL AND SOCKET JOINT PIPE



| Pipe<br>Size<br>In. | Thickness         |     | A<br><br>Pipe<br>O.D. | B<br><br>Retainer<br>O.D. | Full Length Weight - Lb.** |                |                  | Safe<br>End<br>Pull<br>Lb. |
|---------------------|-------------------|-----|-----------------------|---------------------------|----------------------------|----------------|------------------|----------------------------|
|                     | Class<br>(A21.51) | T   |                       |                           | As<br>Shipped              | Under Water    |                  |                            |
|                     |                   |     |                       |                           |                            | Full of<br>Air | Full of<br>Water |                            |
| 6                   | 55                | .40 | 6.90                  | 13.88                     | 545                        | 240            | 465              | 50,000                     |
| 8                   | 55                | .42 | 9.05                  | 16.63                     | 770                        | 240            | 655              | 70,000                     |
| 10                  | 55                | .44 | 11.10                 | 19.13                     | 1005                       | 220            | 860              | 95,000                     |
| 12                  | 55                | .46 | 13.20                 | 22.00                     | 1270                       | 155            | 1080             | 120,000                    |
| 14                  | 56                | .51 | 15.30                 | 24.50                     | 1655                       | 160            | 1410             | 145,000                    |
| 16                  | 56                | .52 | 17.40                 | 27.00                     | 1990                       | 45             | 1685             | 165,000                    |
| 18                  | 56                | .53 | 19.50                 | 30.00                     | 2375                       | -70            | 2015             | 195,000                    |
|                     | 58*               | .59 |                       |                           | 2560                       | 110            | 2170             |                            |
| 20                  | 56                | .54 | 21.60                 | 32.75                     | 2810                       | -200           | 2375             | 210,000                    |
|                     | 59*               | .63 |                       |                           | 3110                       | 100            | 2635             |                            |
| 24                  | 56                | .56 | 25.80                 | 38.25                     | 3700                       | -620           | 3110             | 260,000                    |
|                     | 62*               | .74 |                       |                           | 4415                       | 95             | 3715             |                            |
| 30                  | 58                | .71 | 32.00                 | 46.25                     | 5855                       | -900           | 4920             | 335,000                    |
|                     | 61*               | .83 |                       |                           | 6435                       | -180           | 5360             |                            |
| 36                  | 57                | .78 | 38.30                 | 54.25                     | 8145                       | -1300          | 6880             | 400,000                    |
|                     | 59*               | .88 |                       |                           | 8725                       | -725           | 7330             |                            |

\* Thickness required to overcome buoyancy.

\*\* Weights listed are for 18'-0" laying lengths. Nominal full lengths vary by size.

Pipe, Bell, Ball and Retainer are ductile iron.

Dimensions and weights are subject to manufacturing tolerances.

6 in. - 24 in. pressure rating: 350 psi

30 in. - 36 in. pressure rating: 250 psi

## STANDARD DIMENSIONS AND WEIGHTS OF 3" THROUGH 36" PUSH-ON JOINT DUCTILE IRON PIPE

| Pipe Size In. | Pressure Class psi | Nominal Thickness In. | OD* In. | Wt. of Barrel Per Ft. † Lb. | Tyton® Joint    |                    |                       |
|---------------|--------------------|-----------------------|---------|-----------------------------|-----------------|--------------------|-----------------------|
|               |                    |                       |         |                             | Wt. of Bell Lb. | Wt. Per Lgth.† Lb. | Avg. Wt. Per Ft.‡ Lb. |
| 3             | 350                | 0.25                  | 3.96    | 8.90                        | 7.00            | 185                | 9.20                  |
| 4             | 350                | 0.25                  | 4.80    | 10.90                       | 9.00            | 225                | 11.30                 |
| 6             | 350                | 0.25                  | 6.90    | 16.00                       | 11.00           | 300                | 16.60                 |
| 8             | 350                | 0.25                  | 9.05    | 21.10                       | 17.00           | 395                | 22.00                 |
| 10            | 350                | 0.26                  | 11.10   | 27.10                       | 24.00           | 510                | 28.40                 |
| 12            | 350                | 0.28                  | 13.20   | 34.80                       | 29.00           | 655                | 36.40                 |
| 14            | 250                | 0.28                  | 15.30   | 40.40                       | 45.00           | 770                | 42.90                 |
|               | 300                | 0.30                  | 15.30   | 43.30                       | 45.00           | 825                | 45.80                 |
|               | 350                | 0.31                  | 15.30   | 44.70                       | 45.00           | 850                | 47.20                 |
| 16            | 250                | 0.30                  | 17.40   | 49.30                       | 54.00           | 940                | 52.30                 |
|               | 300                | 0.32                  | 17.40   | 52.50                       | 54.00           | 1000               | 55.50                 |
|               | 350                | 0.34                  | 17.40   | 55.80                       | 54.00           | 1060               | 58.80                 |
| 18            | 250                | 0.31                  | 19.50   | 57.20                       | 59.00           | 1090               | 60.50                 |
|               | 300                | 0.34                  | 19.50   | 62.60                       | 59.00           | 1185               | 65.90                 |
|               | 350                | 0.36                  | 19.50   | 66.20                       | 59.00           | 1250               | 69.50                 |
| 20            | 250                | 0.33                  | 21.60   | 67.50                       | 74.00           | 1290               | 71.60                 |
|               | 300                | 0.36                  | 21.60   | 73.50                       | 74.00           | 1395               | 77.60                 |
|               | 350                | 0.38                  | 21.60   | 77.50                       | 74.00           | 1470               | 81.60                 |
| 24            | 200                | 0.33                  | 25.80   | 80.80                       | 95.00           | 1550               | 86.10                 |
|               | 250                | 0.37                  | 25.80   | 90.50                       | 95.00           | 1725               | 95.80                 |
|               | 300                | 0.40                  | 25.80   | 97.70                       | 95.00           | 1855               | 103.00                |
|               | 350                | 0.43                  | 25.80   | 104.90                      | 95.00           | 1985               | 110.20                |
| 30**          | 150                | 0.34                  | 32.00   | 103.50                      | 139.00          | 2000               | 111.20                |
|               | 200                | 0.38                  | 32.00   | 115.50                      | 139.00          | 2220               | 123.20                |
|               | 250                | 0.42                  | 32.00   | 127.50                      | 139.00          | 2435               | 135.20                |
|               | 300                | 0.45                  | 32.00   | 136.50                      | 139.00          | 2595               | 144.20                |
|               | 350                | 0.49                  | 32.00   | 148.40                      | 139.00          | 2810               | 156.10                |
| 36**          | 150                | 0.38                  | 38.30   | 138.50                      | 184.00          | 2675               | 148.70                |
|               | 200                | 0.42                  | 38.30   | 152.90                      | 184.00          | 2935               | 163.10                |
|               | 250                | 0.47                  | 38.30   | 170.90                      | 184.00          | 3260               | 181.10                |
|               | 300                | 0.51                  | 38.30   | 185.30                      | 184.00          | 3520               | 195.50                |
|               | 350                | 0.56                  | 38.30   | 203.20                      | 184.00          | 3840               | 213.40                |

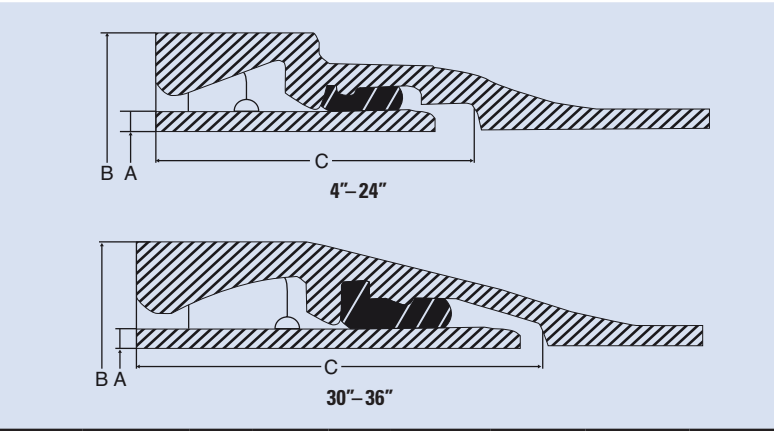
† Including bell; calculated weight of pipe rounded off to the nearest 5 lb.

‡ Including bell; average weight per foot, based on calculated weight of pipe before rounding.

\* Tolerances of OD of spigot end: 3-12 in. = +0.06 in. & -0.06 in.; 14-24 in. = +0.05 in. & -0.08 in.; 30-36 in. = +0.08 in. & -0.06 in.

\*\* Fastite® Joint

TR FLEX® RESTRAINED JOINT PIPE

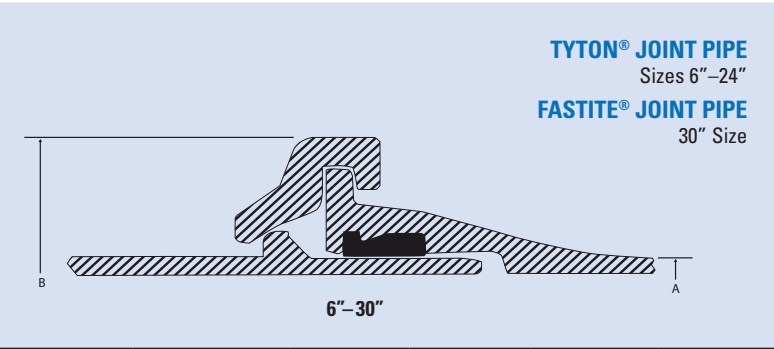


| Pipe Size In. | *Pressure Rating psi | A     | B        | C     | # of D.I. Locking Segments | # of Rubber Segments Retainers | Max Deflection Degrees | Pullout |
|---------------|----------------------|-------|----------|-------|----------------------------|--------------------------------|------------------------|---------|
|               |                      | In.   | PIPE In. | In.   |                            |                                |                        |         |
| 4             | 350                  | 4.80  | 7.25     | 4.84  | 2                          | 1                              | 5                      | 0.03    |
| 6             | 350                  | 6.90  | 9.52     | 5.27  | 2                          | 1                              | 5                      | 0.04    |
| 8             | 350                  | 9.05  | 11.93    | 5.82  | 2                          | 1                              | 5                      | 0.04    |
| 10            | 350                  | 11.10 | 14.37    | 6.03  | 2                          | 1                              | 5                      | 0.05    |
| 12            | 350                  | 13.20 | 16.68    | 6.30  | 4                          | 2                              | 5                      | 0.06    |
| 14            | 350                  | 15.30 | 19.16    | 7.75  | 4                          | 2                              | 3-1/4                  | 0.05    |
| 16            | 350                  | 17.40 | 21.46    | 7.95  | 4                          | 2                              | 3-1/4                  | 0.05    |
| 18            | 350                  | 19.50 | 23.76    | 8.19  | 4                          | 2                              | 3                      | 0.05    |
| 20            | 350                  | 21.60 | 26.04    | 8.40  | 4                          | 2                              | 2-1/2                  | 0.05    |
| 24            | 350                  | 25.80 | 30.61    | 8.86  | 8                          | 4                              | 2-1/4                  | 0.05    |
| 30            | 250                  | 32.00 | 36.88    | 10.28 | 8                          | 4                              | 1-3/4                  | 0.05    |
| 36            | 250                  | 38.30 | 43.85    | 10.87 | 8                          | 4                              | 1-1/2                  | 0.05    |

\*The TR FLEX® Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 4 in. through 24 in. and 250 psi for 30 in. through 36 in.

NOTE: These deflections are based on joints with nominal dimensions.

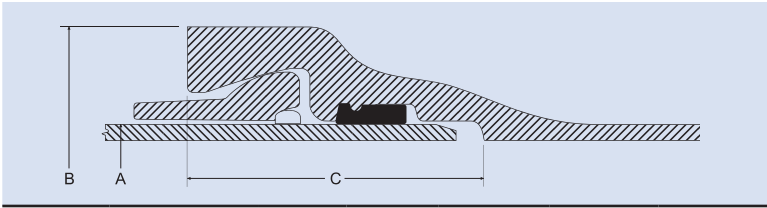
SUPER-LOCK® RESTRAINED JOINT PIPE



| Pipe Size In. | *Pressure Rating psi | Deflection |                | A         | B             |
|---------------|----------------------|------------|----------------|-----------|---------------|
|               |                      | Degrees    | Inches in 18ft | Pipe O.D. | Retainer O.D. |
| 6             | 350                  | 4          | 15             | 6.90      | 11.75         |
| 8             | 350                  | 4          | 15             | 9.05      | 14.38         |
| 10            | 350                  | 4          | 15             | 11.10     | 16.75         |
| 12            | 350                  | 4          | 15             | 13.20     | 19.13         |
| 14            | 350                  | 3          | 11             | 15.30     | 21.75         |
| 16            | 350                  | 3          | 11             | 17.40     | 24.00         |
| 18            | 350                  | 3          | 11             | 19.50     | 26.38         |
| 20            | 350                  | 3          | 11             | 21.60     | 28.63         |
| 24            | 350                  | 3          | 11             | 25.80     | 33.75         |
| 30            | 250                  | 3          | 11             | 32.00     | 40.13         |

\* In the 14 in. and larger sizes, pressure rating is limited to the rating of the pipe barrel thickness selected.  
Dimensions subject to manufacturing tolerances.

THRUST-LOCK™ BOLTLESS RESTRAINED JOINT PIPE



Thrust-Lock™ Boltless Restrained Joint

| Pipe Size In. | *Pressure Rating psi | Deflection |                | A         | B         | C             |
|---------------|----------------------|------------|----------------|-----------|-----------|---------------|
|               |                      | Degrees    | Inches in 18ft | Pipe O.D. | Bell O.D. | Spigot Socket |
| 6             | 350                  | 4          | 15             | 6.90      | 10.187    | 5.01          |
| 8             | 350                  | 4          | 15             | 9.05      | 13.187    | 5.57          |
| 10            | 350                  | 4          | 15             | 11.10     | 15.187    | 5.88          |
| 12            | 350                  | 4          | 15             | 13.20     | 17.250    | 6.13          |
| 14            | 350                  | 4          | 15             | 15.30     | 20.625    | 7.63          |
| 16            | 350                  | 4          | 15             | 17.40     | 22.375    | 7.88          |
| 18            | 350                  | 4          | 15             | 19.50     | 25.125    | 8.13          |
| 20            | 350                  | 4          | 15             | 21.60     | 27.250    | 8.38          |
| 24            | 350                  | 4          | 15             | 25.80     | 31.562    | 8.63          |
| 30            | 250                  | 2          | 7              | 32.00     | 39.06     | 10.53         |

\*The THRUST-LOCK™ Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 6 in. through 24 in. and 250 psi for 30 in.

NOTE: These deflections are based on joints with nominal dimensions.

RATED WORKING PRESSURE AND MAXIMUM DEPTH OF COVER

| Pipe Size In. | *Pressure Rating psi | Nominal Thickness In. | Laying Conditions           |               |               |               |               |
|---------------|----------------------|-----------------------|-----------------------------|---------------|---------------|---------------|---------------|
|               |                      |                       | Type 1 Trench               | Type 2 Trench | Type 3 Trench | Type 4 Trench | Type 5 Trench |
|               |                      |                       | Maximum depth of cover ±-ft |               |               |               |               |
| 3             | 350                  | 0.25                  | 78                          | 88            | 99            | 100\$         | 100\$         |
| 4             | 350                  | 0.25                  | 53                          | 61            | 69            | 85            | 100\$         |
| 6             | 350                  | 0.25                  | 26                          | 31            | 37            | 47            | 65            |
| 8             | 350                  | 0.25                  | 16                          | 20            | 25            | 34            | 50            |
| 10            | 350                  | 0.26                  | 11**                        | 15            | 19            | 28            | 45            |
| 12            | 350                  | 0.28                  | 10**                        | 15            | 19            | 28            | 44            |
| 14            | 250                  | 0.28                  | ††                          | 11**          | 15            | 23            | 36            |
|               | 300                  | 0.30                  | ††                          | 13            | 17            | 26            | 42            |
|               | 350                  | 0.31                  | ††                          | 14            | 19            | 27            | 44            |
| 16            | 250                  | 0.30                  | ††                          | 11**          | 15            | 24            | 34            |
|               | 300                  | 0.32                  | ††                          | 13            | 17            | 26            | 39            |
|               | 350                  | 0.34                  | ††                          | 15            | 20            | 28            | 44            |
| 18            | 250                  | 0.31                  | ††                          | 10**          | 14            | 22            | 31            |
|               | 300                  | 0.34                  | ††                          | 13            | 17            | 26            | 36            |
|               | 350                  | 0.36                  | ††                          | 15            | 19            | 28            | 41            |
| 20            | 250                  | 0.33                  | ††                          | 10            | 14            | 22            | 30            |
|               | 300                  | 0.36                  | ††                          | 13            | 17            | 26            | 35            |
|               | 350                  | 0.38                  | ††                          | 15            | 19            | 28            | 38            |
| 24            | 200                  | 0.33                  | ††                          | 8**           | 12            | 17            | 25            |
|               | 250                  | 0.37                  | ††                          | 11            | 15            | 20            | 29            |
|               | 300                  | 0.40                  | ††                          | 13            | 17            | 24            | 32            |
|               | 350                  | 0.43                  | ††                          | 15            | 19            | 28            | 37            |
| 30            | 150                  | 0.34                  | ††                          | --            | 9             | 14            | 22            |
|               | 200                  | 0.38                  | ††                          | 8**           | 12            | 16            | 24            |
|               | 250                  | 0.42                  | ††                          | 11            | 15            | 19            | 27            |
|               | 300                  | 0.45                  | ††                          | 12            | 16            | 21            | 29            |
| 36            | 350                  | 0.49                  | ††                          | 15            | 19            | 25            | 33            |
|               | 150                  | 0.38                  | ††                          | --            | 9             | 14            | 21            |
|               | 200                  | 0.42                  | ††                          | 8**           | 12            | 15            | 23            |
|               | 250                  | 0.47                  | ††                          | 10            | 14            | 18            | 25            |
|               | 300                  | 0.51                  | ††                          | 12            | 16            | 20            | 28            |
|               | 350                  | 0.56                  | ††                          | 15            | 19            | 24            | 32            |

‡ An allowance for a single H-20 truck with 1.5 impact factor is included for all depths of cover.  
\$ Calculated maximum depth of cover exceeds 100 ft. (30.5 m).  
\*\* Minimum allowable depth of cover is 3 ft. (0.9 m).  
†† For pipe 14 in. (350 mm) and larger, consideration should be given to the use of laying conditions other than Type 1.

## TYTON® AND FASTITE® PUSH-ON JOINTS

### ASSEMBLY INSTRUCTIONS

- Step 1.** Thoroughly clean out the bell with special attention to the gasket recess. Remove any foreign material or excess paint. Clean the spigot or beveled plain end and remove any sharp edges with a standard file.
- Step 2.** After making sure that the correct gasket is being used, insert it into the recess in the bell with the small end of the gasket facing the bell face.
- Step 3.** Apply lubricant to the inside surface of the gasket, making sure that the entire surface is coated. Apply a generous coating of lubricant to the beveled portion of the plain end.
- Step 4.** Guide the plain end into the bell and, while maintaining straight alignment, push the plain end into the bell socket. Once the joint is assembled, necessary deflection can be accomplished. When assembly is complete, the bell face should be aligned between the two white depth rings, for Tyton® Joints. Fastite® Joints have only 1 assembly stripe.

## MECHANICAL JOINT

### ASSEMBLY INSTRUCTIONS

- Step 1.** Clean the bell socket and spigot or plain end. Lubricate both the gasket and plain end by brushing an approved pipe lubricant.
- Step 2.** Place the gland on the plain end with the lip extension toward the plain end. Place the gasket on the plain end with the narrow edge facing the plain end.
- Step 3.** Insert the plain end into the bell and press the gasket into the bell recess. Push the gland toward the socket and center it around the pipe with the gland lip against the gasket.
- Step 4.** Insert and tighten the bolts. It is important to maintain the same distance between the gland and the bell face at all times. This is best done by alternating side to side and top to bottom, while tightening the bolts.

**Note:** Achieving the recommended bolt torque, particularly with large diameter pipe, may require repeating the process up to 5 times or more. Recommended bolt torque ranges are as follows:

| Pipe Size In. | Bolt Diameter In. | Nut Across Flats In. | Wrench Length In. | Torque Range Foot Lbs. |
|---------------|-------------------|----------------------|-------------------|------------------------|
| 3             | 5/8               | 1-1/16               | 8                 | 45 to 60               |
| 4–24          | 3/4               | 1-1/4                | 10                | 75 to 90               |

## NOMINAL THICKNESS FOR STANDARD PRESSURE CLASSES OF DUCTILE IRON PIPE

| Size In. | Outside Diameter In. | Pressure Class*        |      |      |      |        |
|----------|----------------------|------------------------|------|------|------|--------|
|          |                      | 150                    | 200  | 250  | 300  | 350    |
|          |                      | Normal Thickness — in. |      |      |      |        |
| 3        | 3.96                 | —                      | —    | —    | —    | 0.25** |
| 4        | 4.80                 | —                      | —    | —    | —    | 0.25** |
| 6        | 6.90                 | —                      | —    | —    | —    | 0.25** |
| 8        | 9.05                 | —                      | —    | —    | —    | 0.25** |
| 10       | 11.10                | —                      | —    | —    | —    | 0.26   |
| 12       | 13.20                | —                      | —    | —    | —    | 0.28   |
| 14       | 15.30                | —                      | —    | 0.28 | 0.30 | 0.31   |
| 16       | 17.40                | —                      | —    | 0.30 | 0.32 | 0.34   |
| 18       | 19.5                 | —                      | —    | 0.31 | 0.34 | 0.36   |
| 20       | 21.60                | —                      | —    | 0.33 | 0.36 | 0.38   |
| 24       | 25.80                | —                      | 0.33 | 0.37 | 0.40 | 0.43   |
| 30       | 32.00                | 0.34                   | 0.38 | 0.42 | 0.45 | 0.49   |
| 36       | 38.30                | 0.38                   | 0.42 | 0.47 | 0.51 | 0.56   |

\* Pressure Classes are defined as the rated water pressure of the pipe in psi. The thicknesses shown are adequate for the rated water working pressure plus a surge allowance of 100 psi. Calculations are based on a minimum yield strength of 42,000 and a 2.0 safety factor times the sum of the working pressure and 100 psi surge allowance.

\*\*Calculated thicknesses for these sizes and pressure ratings are less than those shown above. Presently, these are the lowest nominal thicknesses available in these sizes.

NOTE: Per ANSI/AWWA C150/A21.50 the thicknesses above include the 0.08 in. service allowance and the casting tolerance listed below by size ranges:

| SIZE (Inches) | CASTING TOLERANCES (Inches) |
|---------------|-----------------------------|
| 3–8           | -0.05                       |
| 10–12         | -0.06                       |
| 14–36         | -0.07                       |

## TR FLEX® RESTRAINED JOINT

### ASSEMBLY INSTRUCTIONS

- Step 1.** (4"–10") Lay pipe such that one of the bell slots is accessible.  
(12"–20") Lay pipe such that both of the bell slots are accessible, in the horizontal position if possible.  
(24"–36") Lay pipe such that all four of the bell slots are accessible, in the diagonal position if possible.
- Step 2.** Clean the bell socket and insert gasket.
- Step 3.** Clean the spigot end to the assembly stripes.
- Step 4.** Lubricate the exposed surface of the gasket and pipe spigot end back to the weld bead.
- Step 5.** Make a normal push-on joint assembly, completely homing the pipe until the first assembly strip is in the bell socket. Keeping the joint in straight alignment during the assembly process.
- Step 6.** (4"–10") Insert the right-hand locking segment into a bell slot and slide the segment clockwise around the pipe.  
(12"–36") Insert lower locking segment into a bell slot and slide the segment around the pipe.
- Step 7.** (4"–10") Insert left-hand locking segment into the bell slot and slide the segment counter-clockwise around the pipe.  
(12"–36") Insert upper locking segment into the same bell slot and rotate around the pipe.
- Step 8.** (4"–10") Hold the segments apart and wedge the rubber retainer into the slot between the two locking segments.  
(12"–36") Hold the upper segment in place and wedge the rubber retainer into the slot between the two locking segments.
- Step 9.** (4"–10") None.  
(12"–20") Repeat steps 6–8 for other slot. Make sure that all 4 locking segments and 2 rubber retainers are securely in place.  
(24"–36") Repeat steps 6–8 for other slot. Make sure that all 8 locking segments and 4 rubber retainers are securely in place.
- Step 10.** Extend the joint to remove the slack in the locking segment cavity. Joint extension is necessary to attain the marked laying length on the pipe and to minimize growth or extension of the line as it is pressurized.
- Step 11.** Set the joint deflection as required.

## THRUST-LOCK™ RESTRAINED JOINT

### ASSEMBLY INSTRUCTIONS

- Step 1.** Ring Installation. Put lock ring on the spigot end of the pipe. Pry the lock ring over the weldment. Use the hammer to tap the cover. Lock ring installation is complete.
- Step 2.** Clean the Bell and Spigot. Thoroughly clean out the bell with special attention to the gasket recess. Remove any foreign material or excess paint. Clean the spigot end and remove any sharp edges.
- Step 3.** Insert the gasket into the recess in the bell with the small end of the gasket facing the bell face.
- Step 4.** Lubricate the Bell and Spigot. Apply lubricant to the inside surface of the gasket. Apply a generous coating of lubricant to the spigot end.
- Step 5.** Insert Pipe. Guide the spigot end into the bell and, while maintaining straight alignment, push the pipe into the bell socket.
- Step 6.** Insert Lock Ring. Push lock ring into the bell.
- Step 7.** Rotate the lock ring until the lugs align. Use a hammer to tap the ring if required. Install the anti-rotation wedges at 3 and 9 o'clock if the pipe is being used inside of a casing. Deflect the joint if desired.

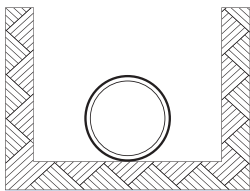
## SUPER-LOCK®

### ASSEMBLY INSTRUCTIONS

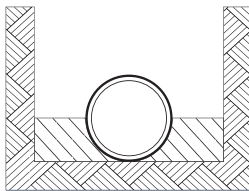
- Step 1.** Remove hook bolts securing retainer to plain end. Clean plain end of pipe. Clean out any dirt behind retainer lugs. Lubricant should be applied to the beveled nose.
- Step 2.** Assemble the joint in accordance with Clow Assembly Instructions (See Table A on page 13). Make certain that the bell is clean prior to gasket insertion. Be sure that the correct gasket is used.
- Step 3.** Guide plain end into Super-Lock® bell and provide reasonably straight alignment. "Make" joint by pushing the plain end into the bell. A jack or come-a-long may also be used to pull the plain end into the bell. Position retainer so that the recesses line up with the lugs on the bell. Slide retainer over bell and rotate until the lugs on the bell and the retainer line up.
- Step 4.** At drilled hole on retainer O.D., insert retainer lock in recess formed by lugs on bell and retainer. Insert roll pin in drilled hole and drive flush with retainer O.D.
- Step 5.** Take any necessary deflection after joint is completely assembled.

**Caution: do not over deflect the joint beyond the maximum deflection column specified on page 2 or subject the joint to bending stress to obtain additional deflection.**

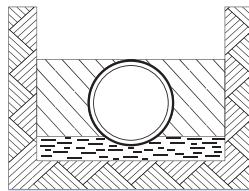
## LAYING CONDITIONS



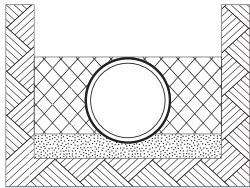
**Type 1\***  
Flat-bottom trench.† Loose backfill.



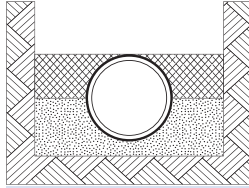
**Type 2**  
Flat-bottom trench.† Backfill lightly consolidated to centerline of pipe.



**Type 3**  
Pipe bedded in 4 in. (100 mm) minimum of loose soil.++ Backfill lightly consolidated to top of pipe.



**Type 4**  
Pipe bedded in sand, gravel, or crushed stone to depth of 1/8 pipe diameter, 4 in. (100 mm) minimum. Backfill compacted to top of pipe. (Approximately 80 percent Standard Proctor, AASHTO T-99.)



**Type 5**  
Pipe bedded in compacted granular material to centerline of pipe. Compacted granular or select material++ to top of pipe. (Approximately 90 percent Standard Proctor, AASHTO T-99.)

\* For 14 in. (355-mm) and larger pipe, consideration should be given to the use of laying conditions other than Type 1.

† "Flat-bottom" is defined as undisturbed earth.

++ "Loose soil" or "select material" is defined as native soil excavated from the trench, free of rocks, foreign materials, and frozen earth.

### Notes:

Consideration of the pipe-zone embedment conditions included in this figure may be influenced by factors other than pipe strength. For additional information on pipe bedding and backfill, see ANSI/AWWA C600.

American Association of State Highway and Transportation Officials, 444 N. Capitol St. N.W., Suite 225, Washington, DC 20001.

## STANDARDS APPLICABLE TO DUCTILE IRON PIPE AND FITTINGS

|                                                          |                          |
|----------------------------------------------------------|--------------------------|
| <b>THICKNESS DESIGN OF DUCTILE IRON PIPE</b>             | ANSI/AWWA C150/A21.50    |
| <b>DUCTILE IRON PIPE FOR WATER AND OTHER LIQUIDS</b>     | ANSI/AWWA C151/A21.51    |
|                                                          | FEDERAL WWP421D, Grade C |
| <b>DUCTILE IRON PIPE FOR GRAVITY FLOW SERVICE</b>        | ANSI/ASTM A746           |
| <b>DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS</b> |                          |
| 3 in. through 36 in.                                     | ANSI/AWWA C110/A21.10    |
| <b>DUCTILE IRON COMPACT FITTINGS</b>                     |                          |
| 3 in. through 24 in.                                     | ANSI/AWWA C153/A21.53    |
| <b>FLANGED FITTINGS</b>                                  | ANSI/AWWA C110/A21.10    |
|                                                          | ANSI B16.1               |
| <b>DUCTILE IRON PIPE WITH THREADED FLANGES</b>           | ANSI/AWWA C115/21.15     |
| <b>COATINGS AND LININGS</b>                              |                          |
| Asphaltic                                                | Double Bit Int. Seal     |
|                                                          | ANSI/AWWA C151/A21.51    |
|                                                          | ANSI/AWWA C110/A21.10    |
|                                                          | ANSI/AWWA C153/A21.53    |
|                                                          | ANSI/AWWA C104/A21.4     |
| Various Epoxy Linings and Coatings                       | MANUFACTURER'S STANDARD  |
| Exterior Polyethylene Encasement                         | ANSI/AWWA C105/A21.5     |
| <b>JOINTS – PIPE AND FITTINGS</b>                        |                          |
| Push-On and Mechanical Rubber-Gasket Joints              | ANSI/AWWA C111/A21.11    |
|                                                          | FEDERAL WWP421D          |
| Flanged                                                  | ANSI/AWWA C115/A21.15    |
|                                                          | ANSI B16.1               |
|                                                          | ANSI/AWWA C606           |
| Grooved and Shouldered                                   |                          |
| <b>PIPE THREADS</b>                                      | ANSI B2.1                |
| <b>INSTALLATION</b>                                      | ANSI/AWWA C600           |



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## DIMENSIONS AND WEIGHTS FOR SPECIAL CLASSES OF PUSH-ON DUCTILE IRON PIPE

| Pipe Size In. | Thickness Class | Nominal Thickness In. | OD* In. | Wt. of Barrel Per Ft. † Lb. | Tyton® Joint    |                    |                       |
|---------------|-----------------|-----------------------|---------|-----------------------------|-----------------|--------------------|-----------------------|
|               |                 |                       |         |                             | Wt. of Bell Lb. | Wt. Per Lgth.† Lb. | Avg. Wt. Per Ft.± Lb. |
| 3             | 52              | 0.28                  | 3.96    | 9.9                         | 7               | 185                | 10.3                  |
| 3             | 54              | 0.34                  | 3.96    | 11.8                        | 7               | 220                | 12.2                  |
| 3             | 56              | 0.40                  | 3.96    | 13.7                        | 7               | 255                | 14.1                  |
| 4             | 51              | 0.26                  | 4.80    | 11.3                        | 9               | 210                | 11.8                  |
| 4             | 52              | 0.29                  | 4.80    | 12.6                        | 9               | 235                | 13.1                  |
| 4             | 53              | 0.32                  | 4.80    | 13.8                        | 9               | 255                | 14.3                  |
| 4             | 54              | 0.35                  | 4.80    | 15                          | 9               | 280                | 15.5                  |
| 4             | 56              | 0.41                  | 4.80    | 17.3                        | 9               | 320                | 17.8                  |
| 6             | 50              | 0.25                  | 6.90    | 16                          | 11              | 300                | 16.6                  |
| 6             | 51              | 0.28                  | 6.90    | 17.8                        | 11              | 330                | 18.4                  |
| 6             | 52              | 0.31                  | 6.90    | 19.6                        | 11              | 365                | 20.2                  |
| 6             | 53              | 0.34                  | 6.90    | 21.4                        | 11              | 395                | 22.0                  |
| 6             | 54              | 0.37                  | 6.90    | 23.2                        | 11              | 430                | 23.8                  |
| 6             | 55              | 0.40                  | 6.90    | 25                          | 11              | 460                | 25.6                  |
| 6             | 56              | 0.43                  | 6.90    | 26.7                        | 11              | 490                | 27.3                  |
| 8             | 50              | 0.27                  | 9.05    | 22.8                        | 17              | 425                | 23.7                  |
| 8             | 51              | 0.30                  | 9.05    | 25.2                        | 17              | 470                | 26.1                  |
| 8             | 52              | 0.33                  | 9.05    | 27.7                        | 17              | 515                | 28.6                  |
| 8             | 53              | 0.36                  | 9.05    | 30.1                        | 17              | 560                | 31.0                  |
| 8             | 54              | 0.39                  | 9.05    | 32.5                        | 17              | 600                | 33.4                  |
| 8             | 55              | 0.42                  | 9.05    | 34.8                        | 17              | 645                | 35.7                  |
| 8             | 56              | 0.45                  | 9.05    | 37.2                        | 17              | 685                | 38.1                  |
| 10            | 50              | 0.29                  | 11.10   | 30.1                        | 24              | 565                | 31.4                  |
| 10            | 51              | 0.32                  | 11.10   | 33.2                        | 24              | 620                | 34.5                  |
| 10            | 52              | 0.35                  | 11.10   | 36.2                        | 24              | 675                | 37.5                  |
| 10            | 53              | 0.38                  | 11.10   | 39.2                        | 24              | 730                | 40.5                  |
| 10            | 54              | 0.41                  | 11.10   | 42.1                        | 24              | 780                | 43.4                  |
| 10            | 55              | 0.44                  | 11.10   | 45.1                        | 24              | 835                | 46.4                  |
| 10            | 56              | 0.47                  | 11.10   | 48                          | 24              | 890                | 49.3                  |
| 12            | 50              | 0.31                  | 13.20   | 38.4                        | 29              | 720                | 40.0                  |
| 12            | 51              | 0.34                  | 13.20   | 42                          | 29              | 785                | 43.6                  |
| 12            | 52              | 0.37                  | 13.20   | 45.6                        | 29              | 850                | 47.2                  |
| 12            | 53              | 0.40                  | 13.20   | 49.2                        | 29              | 915                | 50.8                  |
| 12            | 54              | 0.43                  | 13.20   | 52.8                        | 29              | 980                | 54.4                  |
| 12            | 55              | 0.46                  | 13.20   | 56.3                        | 29              | 1040               | 57.9                  |
| 12            | 56              | 0.49                  | 13.20   | 59.9                        | 29              | 1105               | 61.5                  |
| 14            | 50              | 0.33                  | 15.30   | 47.5                        | 45              | 900                | 50.0                  |
| 14            | 51              | 0.36                  | 15.30   | 51.7                        | 45              | 975                | 54.2                  |
| 14            | 52              | 0.39                  | 15.30   | 55.9                        | 45              | 1050               | 58.4                  |
| 14            | 53              | 0.42                  | 15.30   | 60.1                        | 45              | 1125               | 62.6                  |
| 14            | 54              | 0.45                  | 15.30   | 64.2                        | 45              | 1200               | 66.7                  |
| 14            | 55              | 0.48                  | 15.30   | 68.4                        | 45              | 1275               | 70.9                  |
| 14            | 56              | 0.51                  | 15.30   | 72.5                        | 45              | 1350               | 75.0                  |
| 16            | 50              | 0.34                  | 17.40   | 55.8                        | 54              | 1060               | 58.8                  |
| 16            | 51              | 0.37                  | 17.40   | 60.6                        | 54              | 1145               | 63.6                  |
| 16            | 52              | 0.40                  | 17.40   | 65.4                        | 54              | 1230               | 68.4                  |
| 16            | 53              | 0.43                  | 17.40   | 70.1                        | 54              | 1315               | 73.1                  |
| 16            | 54              | 0.46                  | 17.40   | 74.9                        | 54              | 1400               | 77.9                  |
| 16            | 55              | 0.49                  | 17.40   | 79.7                        | 54              | 1490               | 82.7                  |
| 16            | 56              | 0.52                  | 17.40   | 84.4                        | 54              | 1575               | 87.4                  |
| 18            | 50              | 0.35                  | 19.50   | 64.4                        | 59              | 1220               | 67.7                  |
| 18            | 51              | 0.38                  | 19.50   | 69.8                        | 59              | 1315               | 73.1                  |
| 18            | 52              | 0.41                  | 19.50   | 75.2                        | 59              | 1415               | 78.5                  |
| 18            | 53              | 0.44                  | 19.50   | 80.6                        | 59              | 1510               | 83.9                  |
| 18            | 54              | 0.47                  | 19.50   | 86                          | 59              | 1605               | 89.3                  |
| 18            | 55              | 0.50                  | 19.50   | 91.3                        | 59              | 1700               | 94.6                  |
| 18            | 56              | 0.53                  | 19.50   | 96.7                        | 59              | 1800               | 100.0                 |
| 20            | 50              | 0.36                  | 21.60   | 73.5                        | 74              | 1395               | 77.6                  |
| 20            | 51              | 0.39                  | 21.60   | 79.5                        | 74              | 1505               | 83.6                  |
| 20            | 52              | 0.42                  | 21.60   | 85.5                        | 74              | 1615               | 89.6                  |
| 20            | 53              | 0.45                  | 21.60   | 91.5                        | 74              | 1720               | 95.6                  |
| 20            | 54              | 0.48                  | 21.60   | 97.5                        | 74              | 1830               | 101.6                 |
| 20            | 55              | 0.51                  | 21.60   | 103.4                       | 74              | 1935               | 107.5                 |
| 20            | 56              | 0.54                  | 21.60   | 109.3                       | 74              | 2040               | 113.4                 |
| 24            | 50              | 0.38                  | 25.80   | 92.9                        | 95              | 1765               | 98.2                  |
| 24            | 51              | 0.41                  | 25.80   | 100.1                       | 95              | 1895               | 105.4                 |
| 24            | 52              | 0.44                  | 25.80   | 107.3                       | 95              | 2025               | 112.6                 |
| 24            | 53              | 0.47                  | 25.80   | 114.4                       | 95              | 2155               | 119.7                 |
| 24            | 54              | 0.50                  | 25.80   | 121.6                       | 95              | 2285               | 126.9                 |
| 24            | 55              | 0.53                  | 25.80   | 128.8                       | 95              | 2415               | 134.1                 |
| 24            | 56              | 0.56                  | 25.80   | 135.9                       | 95              | 2540               | 141.2                 |
| 30            | 50              | 0.39                  | 32.00   | 118.5                       | 139             | 2270               | 126.2                 |
| 30            | 51              | 0.43                  | 32.00   | 130.5                       | 139             | 2490               | 138.2                 |
| 30            | 52              | 0.47                  | 32.00   | 142.5                       | 139             | 2705               | 150.2                 |
| 30            | 53              | 0.51                  | 32.00   | 154.4                       | 139             | 2920               | 162.1                 |
| 30            | 54              | 0.55                  | 32.00   | 166.3                       | 139             | 3130               | 174.0                 |
| 30            | 55              | 0.59                  | 32.00   | 178.2                       | 139             | 3345               | 185.9                 |
| 30            | 56              | 0.63                  | 32.00   | 190.0                       | 139             | 3560               | 197.7                 |
| 36            | 50              | 0.43                  | 38.30   | 156.5                       | 184             | 3000               | 166.7                 |
| 36            | 51              | 0.48                  | 38.30   | 174.5                       | 184             | 3325               | 184.7                 |
| 36            | 52              | 0.53                  | 38.30   | 192.4                       | 184             | 3645               | 202.6                 |
| 36            | 53              | 0.58                  | 38.30   | 210.3                       | 184             | 3970               | 220.5                 |
| 36            | 54              | 0.63                  | 38.30   | 228.1                       | 184             | 4290               | 238.3                 |
| 36            | 55              | 0.68                  | 38.30   | 245.9                       | 184             | 4610               | 256.1                 |
| 36            | 56              | 0.73                  | 38.30   | 263.7                       | 184             | 4930               | 273.9                 |

†Including bell; calculated weight of pipe rounded off to the nearest 5 lb.

‡Including bell; average weight per foot, based on calculated weight of pipe before rounding.

\*Tolerances of OD of spigot end; 3–12 in. ±0.06 in., 14–24 in. ±0.05 in., 30–36 in. ±0.08 in., 42–60 in. ±0.06 in.



IRON STRONG

[McWaneDuctile.com](http://McWaneDuctile.com)

# SURE STOP 350<sup>®</sup> GASKET

3"-24"



McWane Ductile is a division of McWane, Inc.

For Generations

# SURE STOP 350® GASKET FOR TYTON® JOINT FROM MCWANE DUCTILE

Sure Stop 350® Gaskets are available from 3" through 24" to provide instant and easy joint restraint for Tyton Joint® pipe.

Sure Stop 350 Gaskets are rated for 350 psi working pressure with a 2:1 safety factor and allow up to a 5-degree deflection at each joint. McWane Ductile's Sure Stop 350 Gaskets are boltless,

allowing quick, simple installation without special wrenches or tools, and are Underwriters Lab (UL) listed and Factory Mutual (FM) approved. McWane Ductile's Sure Stop 350 Gaskets can

be furnished with various gasket compounds, including the standard SBR, Neoprene, EPDM, Nitrile and Viton. Please contact your local sales representative for more information.

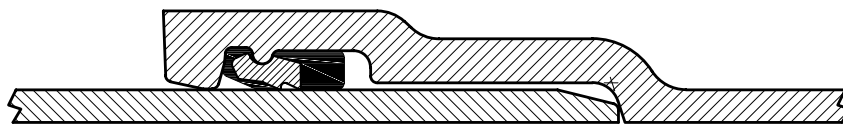


## APPLICATION NOTES

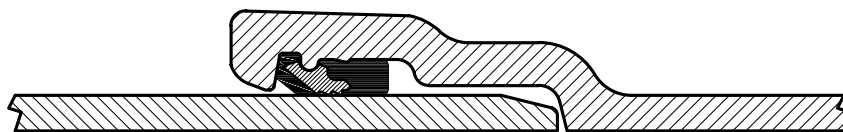
1. For Ductile iron applications utilizing Tyton pipe, valves and fittings are made to AWWA specifications.
2. In cold weather assembly, maintain the temperature of the gasket above 40° F.
3. The socket of the joint should be clean and free of debris or significant corrosion.
4. Gasket should be properly seated in the bell socket.
5. Keep the pipe and joint in alignment during assembly. If installed out of alignment, the gasket can be pushed out of position, creating the potential for leaks or failure.
6. If deflection is wanted in the joint, deflect before fully inserting the joint.
7. Some extension of the joint will occur when pressurized. To avoid this, the joint should be pulled out after assembly to "set" the stainless steel teeth in the inserted pipe.
8. Once assembled, the joint can be disassembled using steel shims.
9. When cut pipe is used, the following steps are required:
  - a. Ensure that the spigot end is properly beveled.
  - b. Mark the joint depth on the spigot so it is clear when the joint is fully inserted.
  - c. Ensure that the pipe meets the required dimensional tolerances.
10. Do not reuse Sure Stop 350 Gaskets, as they may have been damaged during any previous installation or during removal.
11. Do not use Sure Stop 350 Gaskets to conduct electricity through the pipe joint, as they could be damaged and fail.
12. Do not use Sure Stop 350 Gaskets in above-ground applications.
13. Do not use Sure Stop 350 Gaskets with thick coating on the pipe exterior.
14. If Sure Stop 350 Gaskets are used in straight casings, you must pull the pipe through the casing. Do not push the pipe.

## BELL DETAILS

3"-12"



14"-24"



## DETAILS & DIMENSIONS

| SIZE IN. | RATING PSI | DEFLECTION DEGREES |
|----------|------------|--------------------|
| 3        | 350        | 5                  |
| 4        | 350        | 5                  |
| 6        | 350        | 5                  |
| 8        | 350        | 5                  |
| 10       | 350        | 5                  |
| 12       | 350        | 5                  |
| 14       | 350        | 4                  |
| 16       | 350        | 4                  |
| 18       | 350        | 4                  |
| 20       | 350        | 2.5                |
| 24       | 350        | 2.5                |

Sure Stop 350® Gaskets are available in sizes 3-24 inches, and with a rating of 350 psi, they will meet or exceed the capabilities of Ductile iron pipe, valves and fittings.

Sure Stop 350 Gaskets are NSF 61 approved, UL listed and FM approved.

FM Rating: 3-16 in. = 250 psi | 18-24 in. = 200 psi

| PIPE SIZE<br>NOMINAL IN. | CIRCUMFERENCE |           | DIAMETER |        |
|--------------------------|---------------|-----------|----------|--------|
|                          | MIN.          | MAX.      | MIN.     | MAX.   |
| 3                        | 12-1/4"       | 12-5/8"   | 3.90"    | 4.02"  |
| 4                        | 14-29/32"     | 15-9/32"  | 4.74"    | 4.86"  |
| 6                        | 21-1/2"       | 21-7/8"   | 6.84"    | 6.96"  |
| 8                        | 28-1/4"       | 28-5/8"   | 8.99"    | 9.11"  |
| 10                       | 34-11/16"     | 35-1/16"  | 11.04"   | 11.16" |
| 12                       | 41-9/32"      | 41-21/32" | 13.14"   | 13.26" |
| 14                       | 47-13/16"     | 48-7/32"  | 15.22"   | 15.35" |
| 16                       | 54-13/32"     | 54-13/16" | 17.32"   | 17.45" |
| 18                       | 61"           | 61-13/32" | 19.42"   | 19.55" |
| 20                       | 67-19/32"     | 68"       | 21.52"   | 21.65" |
| 24                       | 80-13/16"     | 81-7/32"  | 25.72"   | 25.85" |

# COMPATIBILITY NOTE

McWane Ductile's Sure Stop 350® Gasket is designed for use in Tyton Joint Ductile iron pipe products manufactured by McWane Ductile to conform to the latest licensed Tyton Joint drawings and parameters. Sure Stop 350 Gaskets may also be used in any other Tyton Joint provided it conforms to the latest licensed Tyton Joint drawings and

parameters. Sure Stop 350 Gaskets are not warranted for use in any other products or non-licensed push-on joints. Additionally, gaskets not provided by McWane Ductile, whether restrained or non-restrained, are not warranted for use in McWane Ductile products.

## STANDARDS APPLICABLE TO DUCTILE IRON PIPE AND FITTINGS

|                                                                                 |                                                                     |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>THICKNESS DESIGN OF DUCTILE IRON PIPE</b>                                    | ANSI/AWWA C150/A21.50                                               |
| <b>DUCTILE IRON PIPE FOR WATER AND OTHER LIQUIDS</b>                            | ANSI/AWWA C151/A21.51, FEDERAL WWP421D, GRADE C                     |
| <b>DUCTILE IRON PIPE FOR GRAVITY FLOW SERVICE</b>                               | ANSI/ASTM A746                                                      |
| <b>DUCTILE IRON FITTINGS FOR WATER AND OTHER LIQUIDS</b> (3 in. through 36 in.) | ANSI/AWWA C110/A21.10                                               |
| <b>DUCTILE IRON COMPACT FITTINGS</b> (3 in. through 24 in.)                     | ANSI/AWWA C153/A21.53                                               |
| <b>FLANGED FITTINGS</b>                                                         | ANSI/AWWA C110/A21.10, ANSI B16.1                                   |
| <b>DUCTILE IRON PIPE WITH THREADED FLANGES</b>                                  | ANSI/AWWA C115/21.15                                                |
| <b>COATINGS AND LININGS</b>                                                     |                                                                     |
| Asphaltic                                                                       | ANSI/AWWA C151/A21.51, ANSI/AWWA C110/A21.10, ANSI/AWWA C153/A21.53 |
| Cement Lining                                                                   | ANSI/AWWA C104/A21.4                                                |
| Various Epoxy Linings and Coatings                                              | MANUFACTURER'S STANDARD                                             |
| Exterior Polyethylene Encasement                                                | ANSI/AWWA C105/A21.5                                                |
| <b>JOINTS — PIPE AND FITTINGS</b>                                               |                                                                     |
| Push-On and Mechanical Rubber-Gasket Joints                                     | ANSI/AWWA C111/A21.11, FEDERAL WWP421D                              |
| Flanged                                                                         | ANSI/AWWA C115/A21.15, ANSI B16.1                                   |
| Grooved and Shouldered                                                          | ANSI/AWWA C606                                                      |
| <b>PIPE THREADS</b>                                                             | ANSI B2.1                                                           |
| <b>INSTALLATION</b>                                                             | ANSI/AWWA C600                                                      |

Tyton® and Tyton Joint® are registered trademarks of U.S. Pipe and Foundry.



### POCKET ENGINEER

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Phillipsburg, NJ 08865  
908-454-1161

#### OHIO

2266 S. 6th St.  
Coshocton, OH 43812  
740-622-6651

#### UTAH

1401 E. 2000 South  
Provo, UT 84606  
801-373-6910



[canadapipe.com](http://canadapipe.com)

#### CANADA

Suite 1, 55 Frid Street,  
Hamilton, Ontario, Canada  
L8P 4M3

Rev. June 2021



**COMMITTED TO ENVIRONMENTAL RESPONSIBILITY**

KENNEDY VALVE COMPANY IS COMMITTED TO PROTECTING OUR NATURAL RESOURCES THROUGH ENVIRONMENTALLY RESPONSIBLE MANUFACTURING PRACTICES, INCLUDING THE USE OF 80+% RECYCLED CONTENT IN OUR HYDRANTS AND VALVES.

To learn more about our commitment to the environment, call 800-782-5831.

**RECOMMENDED SPECIFICATIONS**

1. Valves shall conform to the latest revision of **AWWA Standard C509** covering resilient seated gate valves for water supply service.
2. The valves shall have an iron body, bonnet, and O-ring plate. The wedge shall be totally encapsulated with rubber.
3. The sealing rubber shall be permanently bonded to the wedge per ASTM D429.
4. Valves shall be supplied with O-ring seals at all pressure retaining joints. No flat gaskets shall be allowed.
5. The valves shall be either non-rising stem or rising stem **opening by turning left** or right, and provided with 2" square operating nut or a handwheel with the word "Open" and an arrow to indicate the direction to open.
6. Stems shall be cast copper alloy with integral collars in full compliance with AWWA. All stems shall operate with copper alloy stem nuts independent of wedge and of stem (in NRS valves).
7. All stems shall have two O-rings located above thrust collar and one O-ring below. Stem O-rings shall be replaceable with valve fully opened and subjected to full pressure. The stems on 2" – 12" shall also have a low torque thrust bearing located above and below the stem collar to reduce friction during operation.
8. Waterway shall be smooth, unobstructed and free of all pockets, cavities and depressions in the seat area. Valves 2" and larger shall accept a full size tapping cutter.
9. The body, bonnet and O-ring plate shall be fusion-bonded epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C550 and be NSF 61 Certified.
10. Each valve shall have maker's name, pressure rating, and year in which it was manufactured cast in the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to the requirements of AWWA C509 (and UL/FM where applicable).
11. Valves shall have all component parts cast and assembled in the USA and shall be manufactured by the Kennedy Valve Company.

**The original, and the definitive standard.**

# RESILIENT WEDGE GATE VALVES

**2" THROUGH 12"  
MODEL KS-FW**



**ISO 9001**



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

AWWA C509 250 PSI • UL/FM Approved 200 PSI • NSF 61 Certified • Full Water Way • Fusion Bond Epoxy Coated • 10 Year Limited Warranty



**1021 East Water Street • PO Box 931 • Elmira, New York 14901**  
PHONE 607-734-2211 FAX 1-800-952-4771

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**For Generations**



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**For Generations**

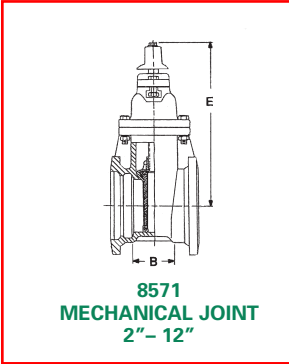
# RESILIENT WEDGE VALVE

In 1975, Kennedy recognized the increased requirements and escalating maintenance cost of water systems in the United States.

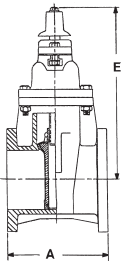
Kennedy responded by introducing the first R/W (Resilient Wedge) Valve in America. This introduction revolutionized the valve market in the U.S.

Kennedy was the first to introduce, and still leads in the design and technical development, of the bubble-tight resilient seating valve.

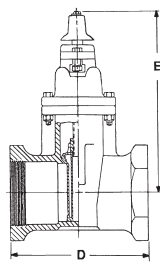
The Kennedy Resilient Wedge Valve, with its unique features and benefits, were the first to be manufactured with both AWWA and UL/FM approval for all water system requirements.



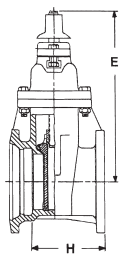
8571  
MECHANICAL JOINT  
2" - 12"



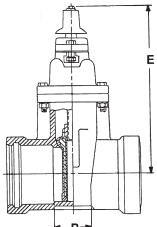
8561  
FLANGED  
2" - 12"



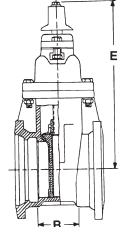
8057  
THREADED ENDS  
2" - 3"



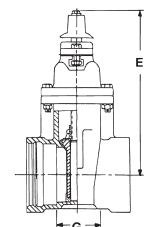
8572  
FLANGED X MJ  
3" - 12"



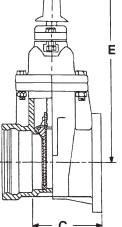
8597  
PUSH ON FOR  
SDR PVC  
2" - 12"



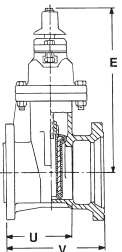
8576  
MECHANICAL  
CUTTING IN JOINT  
4" - 12"



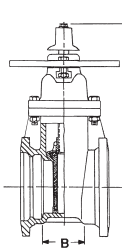
8901  
TYTON ENDS FOR DUCTILE  
IRON AND C900 PVC PIPE  
4" - 12"



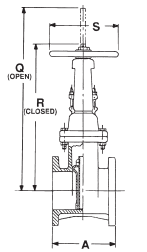
8902  
FLANGED X TYTON  
4" - 12"



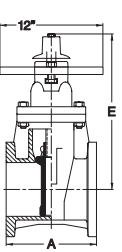
8950  
MECHANICAL JOINT  
FOR TAPPING  
3" - 12"



8071  
MECHANICAL JOINT  
POST INDICATOR VALVE  
2" - 12"



8068A  
FLANGED OS & Y  
CONSTRUCTION  
2" - 12"



8701A  
FLANGED POST  
INDICATOR VALVE

**NOTE:**  
It is recommended that valves be installed with stems vertical when used in raw sewage or sludge applications or in water with excessive sediment. Flanged end connections not recommended for buried service.

| VALVE SIZE | A      | B      | C      | D     | E      | G     | H      | P     | Q      | R      | S     | U      | V      | NO. OF TURNS TO FULL OPEN |
|------------|--------|--------|--------|-------|--------|-------|--------|-------|--------|--------|-------|--------|--------|---------------------------|
| 2"         | 7      | 3-1/4  | —      | 5-3/8 | 10-7/8 | —     | —      | 3     | 10     | 12     | 7-1/4 | —      | —      | 6-1/2                     |
| 2-1/2"     | 7-1/2  | —      | —      | 7-1/8 | 11-3/8 | —     | —      | 3-1/4 | 16-3/8 | 13-7/8 | 7-1/4 | —      | —      | 8                         |
| 3"         | 8      | 3-1/2  | —      | 7-1/8 | 12-3/8 | —     | 5-3/4  | 3-1/2 | 18-7/8 | 15-5/8 | 10    | 5-3/4  | 8-1/4  | 10                        |
| 4"         | 9      | 4-1/2  | 6-3/4  | —     | 14-3/4 | 4-5/8 | 6-3/4  | 4-1/2 | 22-3/4 | 18-1/4 | 10    | 6-3/4  | 9-1/4  | 13-1/2                    |
| 6"         | 10-1/2 | 5-1/2  | 7-7/8  | —     | 19     | 5-1/4 | 8      | 5     | 30-1/8 | 23-3/4 | 12    | 8      | 10-1/2 | 19-1/2                    |
| 8"         | 11-1/2 | 8-1/8  | 8-1/2  | —     | 22-1/2 | 5-5/8 | 9-3/4  | 5-1/2 | 37-3/4 | 29-1/4 | 14    | 10-3/4 | 13-1/4 | 25-1/2                    |
| 10"        | 13     | 10-1/2 | 10     | —     | 26-1/2 | 7     | 11-3/4 | 7     | 45-3/4 | 35-3/8 | 18    | 12-1/2 | 14-7/8 | 31-1/2                    |
| 12"        | 14     | 10-3/4 | 11-1/4 | —     | 30     | 8-1/2 | 12     | 8-1/2 | 53-1/8 | 40-5/8 | 18    | 12-1/2 | 15     | 37-3/4                    |

## ENGINEERING FEATURES

### THRUST BEARINGS

Delrin thrust bearings above and below the thrust collar reduce friction and minimize operating torques.

### COPPER ALLOY STEM

Long, trouble-free life with high strength, non-corrosive copper alloy stem and stem nut.

### STAINLESS STEEL HARDWARE

304 stainless steel nuts and bolts provide long-life corrosion protection.

### 100% COATED WEDGE

100% coated wedge ensures bubble-tight seal every time up to 250 PSI. With twin seal design.

### ELLIPTICAL BOLT HOLES

Hole design on MJ connection eliminates the need for anti-rotation bolts.

### MINIMAL FLOW LOSS

Smooth, unobstructed waterway is free of pockets, cavities and depressions, allowing for minimal flow loss and lower pumping costs. All valves accept full-size tapping cutter.

### REPLACEABLE O-RINGS

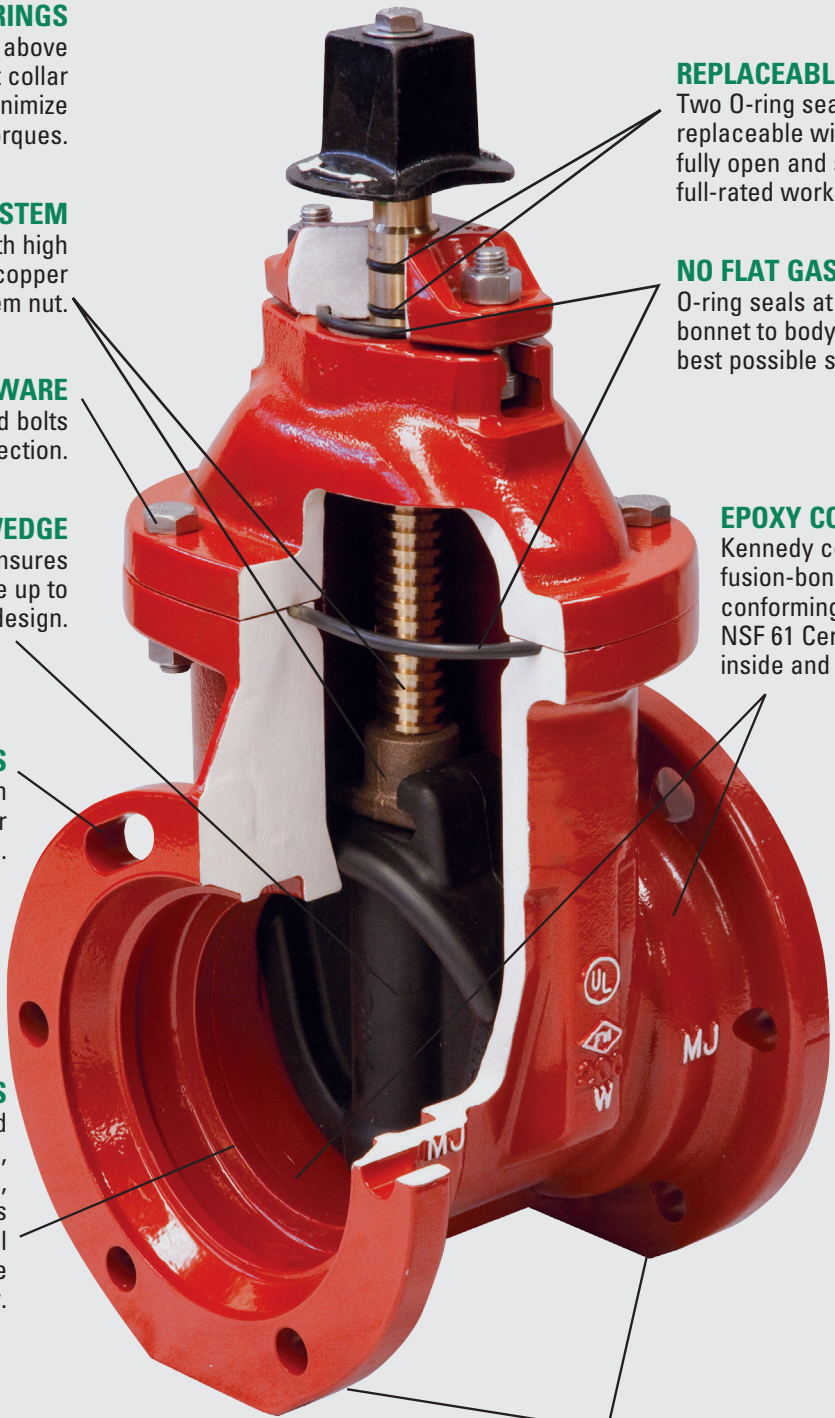
Two O-ring seals are replaceable with the valve fully open and subjected to full-rated working pressure.

### NO FLAT GASKETS

O-ring seals at stuffing box and bonnet to body flanges to ensure the best possible seal. No flat gaskets.

### EPOXY COATING

Kennedy corrosion resistant fusion-bonded epoxy coating, conforming to AWWA C550 and NSF 61 Certified, protects both inside and outside of valve.



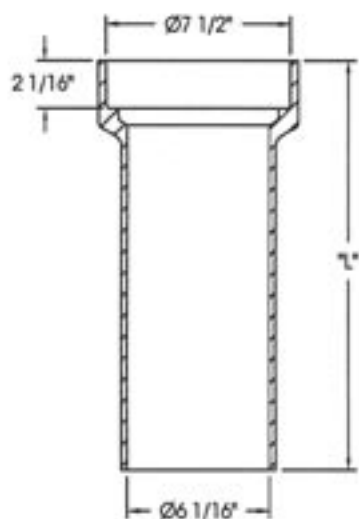
### EASY STORAGE

Pads on the bottom of all valves keep valve in upright position for easier storage and protection from the elements.

**VALVE RATING:** All valves are rated at 250 PSI for AWWA service and 200 PSI for UL/FM service. All valves are hydrostatically tested to 500 PSI.

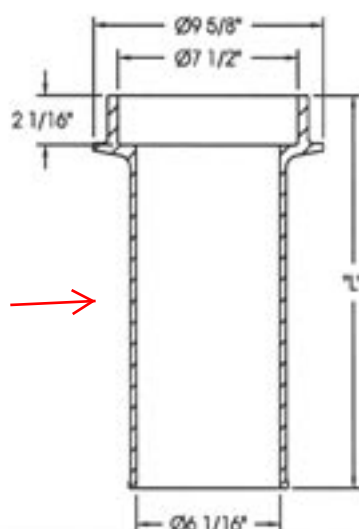
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## SLIDE TOP NO FLANGE



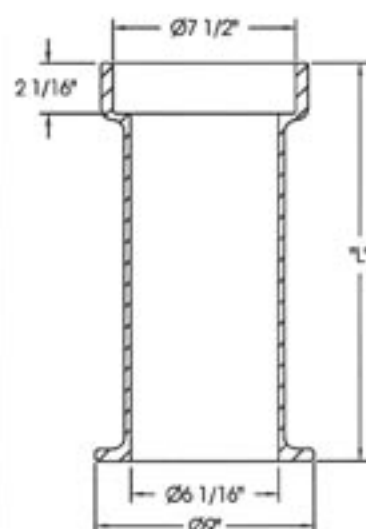
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V738 | 10      | 19          |
| V739 | 16      | 26          |
| V744 | 26      | 41          |
| V749 | 36      | 51          |

## SLIDE TOP TOP FLANGE



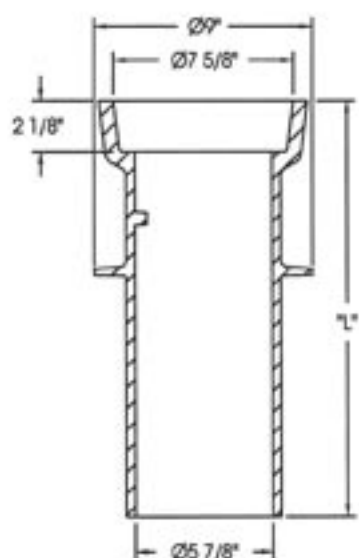
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V737 | 10      | 22          |
| V741 | 16      | 27          |
| V747 | 26      | 38          |
| V750 | 36      | 53          |

## SLIDE TOP BOTTOM FLANGE



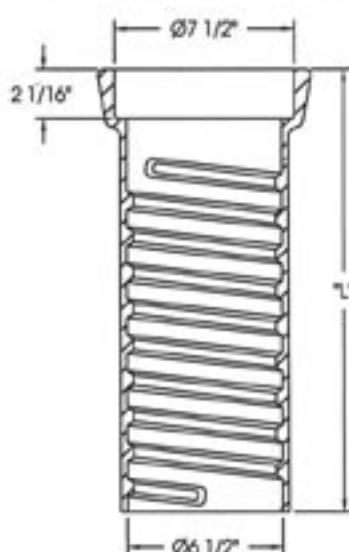
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V743 | 16      | 31          |
| V748 | 26      | 40          |

## SLIDE TOP MIDDLE FLANGE



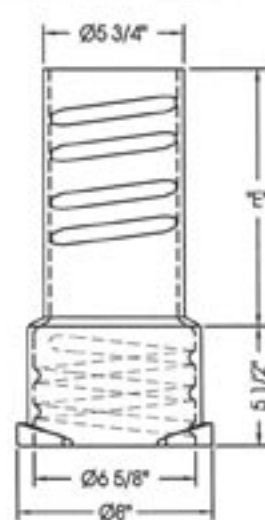
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V757 | 26      | 41          |

## SCREW TOP



| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V733 | 10      | 21          |
| V734 | 17      | 32          |
| V735 | 27      | 51          |

## SCREW EXTENSION



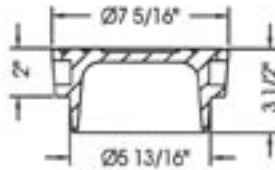
| CODE     | E (IN.) | Weight (Lb) |
|----------|---------|-------------|
| V813-#57 | 9       | 20          |
| 7344-#58 | 14      | 26          |
| 7345-#59 | 18      | 32          |
| V816-#60 | 26      | 36          |
| V817-#61 | 29      | 42          |

# BIBBY STE-CROIX U S A

Division of McWane Inc.

## WATER COVER

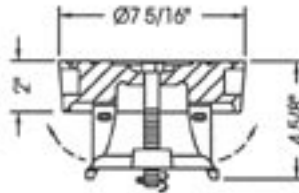
For off road or low traffic flow



| CODE | Weight (Lb) | MODEL |
|------|-------------|-------|
| V878 | 13          | WATER |
| V879 | 13          | GAS   |
| V880 | 13          | SEWER |

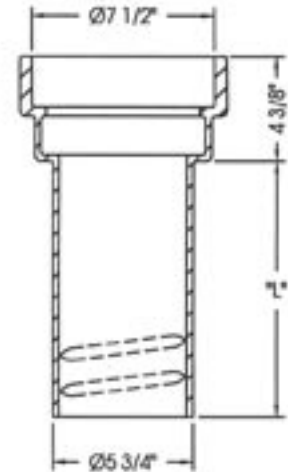
## LOCKING COVER

For high traffic flow



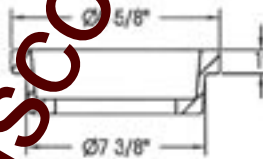
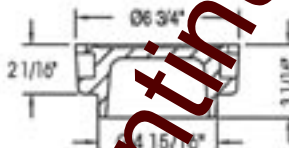
| CODE | Weight (Lb) |
|------|-------------|
| S881 | 13          |

## ADJUSTABLE SCREW RISERS



| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V852 | 12 1/2  | 26          |
| V853 | 24      | 39          |
| V854 | 30      | 46          |

## 1" FIXED RISER W/SPECIAL COVER

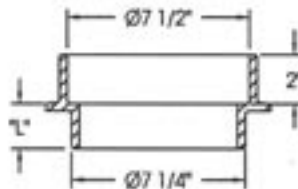


SPECIAL RISER COVER

\*RISER WITH COVER

| CODE  | Description | Weight (Lb) |
|-------|-------------|-------------|
| *S833 | COMPLETE    | 23          |
| V834  | RISER ONLY  | 9           |
| V877  | COVER ONLY  | 14          |

## FIXED RISERS



RISERS ACCEPT REGULAR COVER

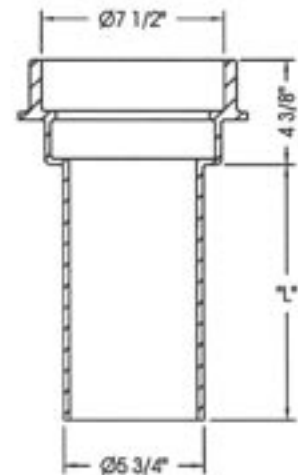
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V829 | 1       | 6           |
| V830 | 1 1/2   | 7           |
| V831 | 2       | 9           |
| V832 | 3       | 13          |
| V833 | 4       | 14          |

## KEY FOR PENTAGON HEAD



| CODE | Weight (Lb) |
|------|-------------|
| V314 | 0.8         |

## ADJUSTABLE SLIDE RISERS



| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V856 | 6       | 19          |
| V858 | 12      | 26          |
| V862 | 24      | 39          |

BIBBY

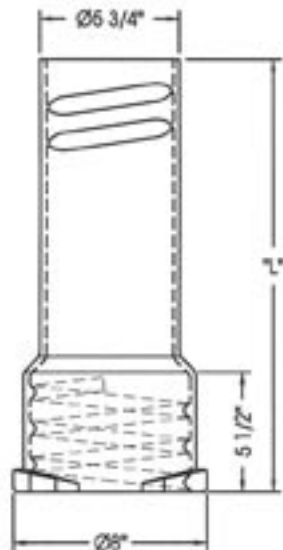


STE-CROIX

U S A

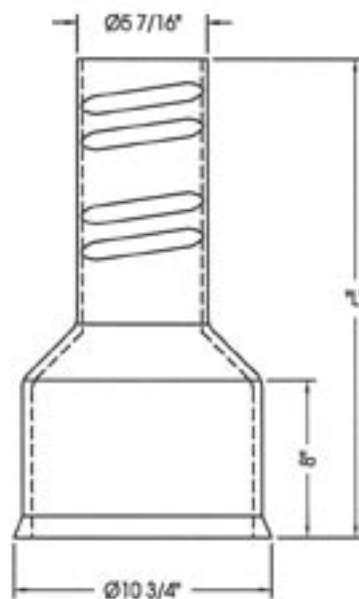
Division of McWane Inc.

## SCREW BOTTOM



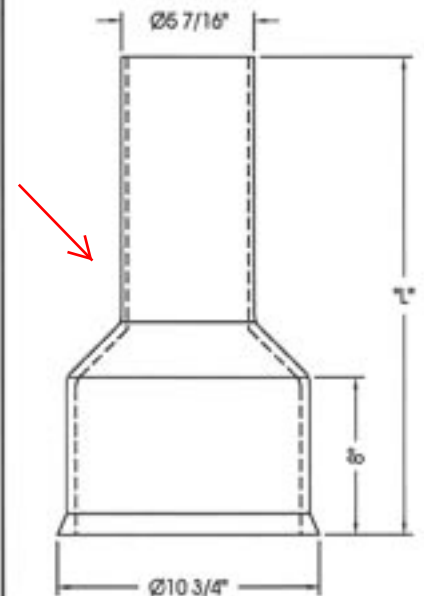
| CODE     | L (IN.) | Weight (Lb) |
|----------|---------|-------------|
| V813 #57 | 14      | 20          |
| 7344 #58 | 19      | 26          |
| 7345 #59 | 23 1/2  | 32          |
| V816 #60 | 31      | 36          |
| V817 #61 | 34      | 42          |

## SCREW BELL BOTTOM



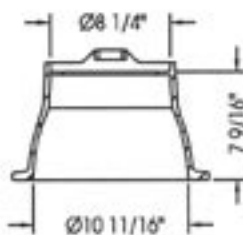
| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V770 | 24      | 35          |
| V771 | 30      | 44          |
| V772 | 36      | 54          |

## SLIP BELL BOTTOM



| CODE | L (IN.) | Weight (Lb) |
|------|---------|-------------|
| V791 | 16      | 30          |
| V792 | 24      | 37          |
| V794 | 30      | 42          |
| 7354 | 36      | 47          |
| 7355 | 48      | 56          |
| 7356 | 60      | 63          |

## #4 BASE



FOR 4 INCHES VALVES OR SMALLER.

| CODE | Weight (Lb) |
|------|-------------|
| V868 | 29          |

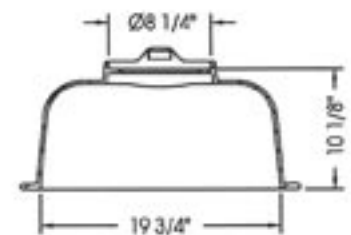
## #6 BASE



FOR 8 INCHES VALVES OR SMALLER.

| CODE | Weight (Lb) |
|------|-------------|
| 7341 | 41          |

## #160 OVAL BASE



FOR 16 INCHES VALVES OR SMALLER.

| CODE | Weight (Lb) |
|------|-------------|
| V870 | 54          |

# BIBBY



# STE-CROIX

# U S A

Division of McWane Inc.



## MECHANICAL JOINT C153 DUCTILE IRON COMPACT FITTINGS

Sizes 3" thru 16" UL Listed For Fire Main Equipment

### SAMPLE SPECIFICATIONS (Current ANSI/AWWA revisions apply)

Mechanical joint watermain fittings with accessories, 2" through 48" shall be manufactured from ductile iron in accordance with and meet all applicable terms and provisions of standards **ANSI/AWWA C153/A21.53 and**

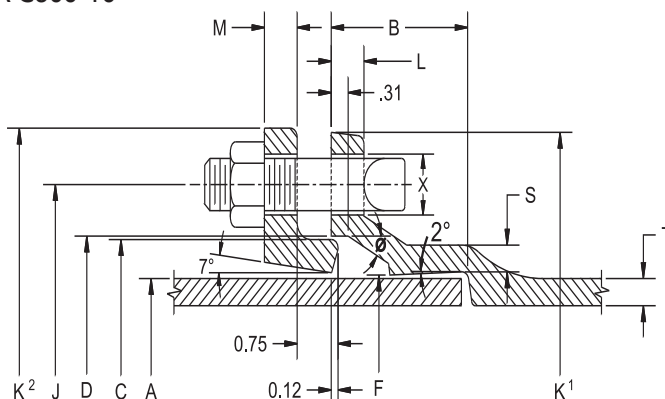
**ANSI/AWWA C111/A21.11.** Ductile iron mechanical joint fittings 2" through 24" shall be rated for 350 PSI working pressure. Ductile iron 30" through 48" shall be rated for 250 psi working pressure. Flanged ductile iron fittings in 24-in. (610 mm) and smaller sizes may be rated for 350 psi (2,413 kPa) with the use of special (annular ring or comparable) gaskets. All coated and lined fittings meet requirements of NSF-61.

NOTE - EXCEPTIONS: Mechanical joint fittings with flanged branches are rated for water pressure of 250 PSI.

NOTE - Wyes over 12" are not pressure rated. Contact manufacturer for rating in your application.

NOTE - Fittings are cement lined and seal coated in accordance with ANSI/AWWA C104/A21.4. Fittings are available double cement-lined, bare, or epoxy coated upon request. Epoxy coating per ANSI/AWWA C116

NOTE - Installation per AWWA C600-10



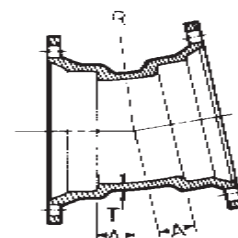
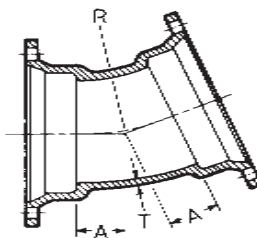
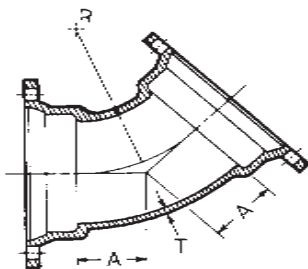
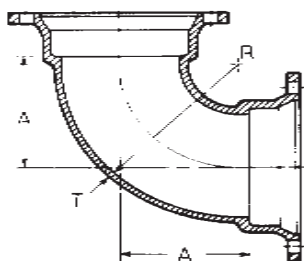
NOMINAL JOINT DIMENSIONS IN INCHES

BOLTS

| Size | A Dia. | B    | C Dia. | D Dia. | F Dia. | J Dia. | K <sup>1</sup> Dia. | K <sup>2</sup> Dia. | L    | M    | S    | T   | X     | Size        | No. |
|------|--------|------|--------|--------|--------|--------|---------------------|---------------------|------|------|------|-----|-------|-------------|-----|
| 3    | 3.96   | 2.50 | 4.84   | 4.94   | 4.06   | 6.19   | 7.62                | 7.69                | .58  | .62  | .39  | .33 | 3/4   | 5/8x3       | 4   |
| 4    | 4.80   | 2.50 | 5.92   | 6.02   | 4.90   | 7.50   | 9.06                | 9.12                | .60  | .75  | .39  | .34 | 7/8   | 3/4x3 1/2   | 4   |
| 6    | 6.90   | 2.50 | 8.02   | 8.12   | 7.00   | 9.50   | 11.06               | 11.12               | .63  | .88  | .43  | .36 | 7/8   | 3/4x3 1/2   | 6   |
| 8    | 9.05   | 2.50 | 10.17  | 10.27  | 9.15   | 11.75  | 13.31               | 13.37               | .66  | 1.00 | .45  | .38 | 7/8   | 3/4x4       | 6   |
| 10   | 11.10  | 2.50 | 12.22  | 12.34  | 11.20  | 14.00  | 15.62               | 15.62               | .70  | 1.00 | .47  | .40 | 7/8   | 3/4x4       | 8   |
| 12   | 13.20  | 2.50 | 14.32  | 14.44  | 13.30  | 16.25  | 17.88               | 17.88               | .73  | 1.00 | .49  | .42 | 7/8   | 3/4x4       | 8   |
| 14   | 15.30  | 3.50 | 16.40  | 16.54  | 15.44  | 18.75  | 20.31               | 20.25               | .79  | 1.25 | .55  | .47 | 7/8   | 3/4x4 1/2   | 10  |
| 16   | 17.40  | 3.50 | 18.50  | 18.64  | 17.54  | 21.00  | 22.56               | 22.50               | .85  | 1.31 | .58  | .50 | 7/8   | 3/4x4 1/2   | 12  |
| 18   | 19.50  | 3.50 | 20.60  | 20.74  | 19.64  | 23.25  | 24.83               | 24.75               | 1.00 | 1.38 | .68  | .54 | 7/8   | 3/4x4 1/2   | 12  |
| 20   | 21.60  | 3.50 | 22.70  | 22.84  | 21.74  | 25.50  | 27.08               | 27.00               | 1.02 | 1.44 | .69  | .57 | 7/8   | 3/4x4 1/2   | 14  |
| 24   | 25.80  | 3.50 | 26.90  | 27.04  | 25.94  | 30.00  | 31.58               | 31.50               | 1.02 | 1.56 | .75  | .61 | 7/8   | 3/4x5       | 16  |
| 30   | 32.00  | 4.00 | 33.29  | 33.46  | 32.17  | 36.88  | 39.12               | 39.12               | 1.31 | 2.00 | .82  | .66 | 1 1/8 | 1x6         | 20  |
| 36   | 38.30  | 4.00 | 39.59  | 39.76  | 38.47  | 43.75  | 46.00               | 46.00               | 1.45 | 2.00 | 1.00 | .74 | 1 1/8 | 1x6         | 24  |
| 42   | 44.50  | 4.00 | 45.79  | 45.96  | 44.67  | 50.62  | 53.12               | 53.12               | 1.45 | 2.00 | 1.25 | .82 | 1 3/8 | 1 1/4x6 1/2 | 28  |
| 48   | 50.80  | 4.00 | 52.09  | 52.26  | 50.97  | 57.50  | 60.00               | 60.00               | 1.45 | 2.00 | 1.35 | .90 | 1 3/8 | 1 1/4x6 1/2 | 32  |

**NOTE:** 2 Inch MJ ASTM A536 ductile iron Compact fittings (2"-22.5 bend, 2"-45 bend, 2"-90 bend, 2"x12" solid sleeve, 2"x2" tee, 4"x2" tee, and 4"x2" reducer) will be available beginning 2012. Call Tyler Union for availability and product dimensions.

### BENDS



#### 90° Bends (1/4)

#### 45° Bends (1/8)

#### 22½° Bends (1/16)

#### 11¼° Bends (1/32)

| Size | Dimensions |       |       |  | Weight | Dimensions |       |  | Weight | Dimensions |       |  | Weight | Dimensions |       |  | Weight |
|------|------------|-------|-------|--|--------|------------|-------|--|--------|------------|-------|--|--------|------------|-------|--|--------|
|      | T          | A     | R     |  |        | A          | R     |  |        | A          | R     |  |        | A          | R     |  |        |
| 3    | .34        | 3.5   | 2.5   |  | 19     | 2.00       | 2.41  |  | 17     | 1.50       | 2.51  |  | 15     | 1.25       | 2.53  |  | 16     |
| 4    | .35        | 4.0   | 3.0   |  | 22     | 2.50       | 3.56  |  | 20     | 1.75       | 3.81  |  | 18     | 1.50       | 5.12  |  | 18     |
| 6    | .37        | 6.5   | 6.0   |  | 49     | 3.50       | 7.25  |  | 39     | 2.25       | 6.35  |  | 31     | 1.50       | 5.12  |  | 29     |
| 8    | .39        | 7.5   | 7.0   |  | 64     | 4.00       | 8.44  |  | 56     | 2.85       | 11.80 |  | 50     | 2.06       | 15.80 |  | 45     |
| 10   | .41        | 9.5   | 9.0   |  | 102    | 5.01       | 10.88 |  | 78     | 3.35       | 14.35 |  | 66     | 2.32       | 18.36 |  | 59     |
| 12   | .43        | 10.5  | 10.0  |  | 129    | 5.98       | 13.25 |  | 102    | 3.86       | 16.90 |  | 87     | 2.56       | 20.90 |  | 82     |
| 14   | .51        | 12.0  | 11.5  |  | 214    | 5.50       | 12.06 |  | 155    | 3.93       | 17.25 |  | 142    | 2.59       | 21.25 |  | 136    |
| 16   | .52        | 13.0  | 12.5  |  | 273    | 5.98       | 13.25 |  | 204    | 3.98       | 17.50 |  | 178    | 2.62       | 21.50 |  | 157    |
| 18   | .59        | 15.5  | 14.0  |  | 411    | 6.50       | 12.36 |  | 292    | 7.50       | 30.19 |  | 286    | 3.00       | 60.84 |  | 283    |
| 20   | .60        | 17.0  | 15.5  |  | 519    | 7.00       | 13.59 |  | 372    | 8.50       | 35.19 |  | 376    | 3.50       | 71.07 |  | 374    |
| 24   | .62        | 17.0  | 15.5  |  | 721    | 7.50       | 14.89 |  | 490    | 9.00       | 37.69 |  | 512    | 3.50       | 76.12 |  | 487    |
| 30   | .66        | 21.50 | 19.0  |  | 930    | 10.50      | 9.31  |  | 716    | 6.75       | 21.36 |  | 665    | 4.75       | 22.84 |  | 600    |
| 36   | .74        | 24.50 | 22.0  |  | 1450   | 11.50      | 21.73 |  | 1110   | 7.75       | 26.39 |  | 960    | 5.00       | 25.38 |  | 820    |
| 42   | .82        | 29.25 | 26.7  |  | 2205   | 14.00      | 27.76 |  | 1610   | 9.00       | 32.68 |  | 1350   | 6.00       | 35.54 |  | 1180   |
| 48   | .90        | 33.25 | 30.75 |  | 2990   | 15.00      | 30.17 |  | 2090   | 10.00      | 27.70 |  | 1760   | 6.50       | 40.61 |  | 1475   |

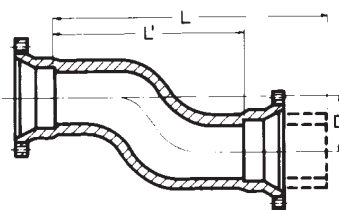
\*\*Note: 2 Inch Compact ductile iron 22.5, 45, and 90 degree bends available in 2012. Call Tyler Union for information.

### \*OFFSETS

#### MJ x MJ

#### MJ x PE

| Size | D  | Dimensions     |      | Weights |       |
|------|----|----------------|------|---------|-------|
|      |    | L <sup>1</sup> | L    | MJxMJ   | MJxPE |
| 4    | 6  | 10             | --   | 42      | --    |
| 4    | 12 | 16             | --   | 52      | --    |
| 4    | 18 | 22             | --   | 58      | --    |
| 4    | 24 | 28             | --   | 70      | --    |
| 6    | 6  | 12             | 17.5 | 50      | --    |
| 6    | 12 | 18             | --   | 65      | --    |
| 6    | 18 | 24             | --   | 82      | --    |
| 6    | 24 | 30             | --   | 91      | --    |
| 8    | 6  | 13             | --   | 79      | --    |
| 8    | 12 | 19             | --   | 96      | --    |
| 8    | 18 | 25             | --   | 116     | --    |
| 10   | 12 | 21             | --   | 136     | --    |
| 12   | 6  | 17             | --   | 137     | --    |



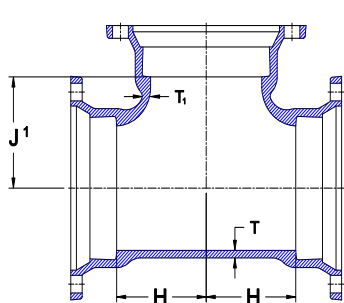
\* Not included in AWWA C153.



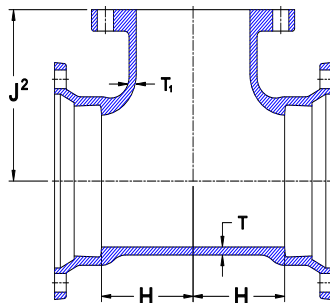
# MECHANICAL JOINT C153 DUCTILE IRON COMPACT FITTINGS

Sizes 3" thru 16" UL Listed For Fire Main Equipment

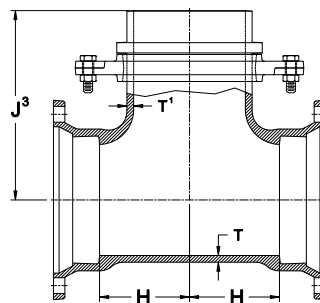
## TEES



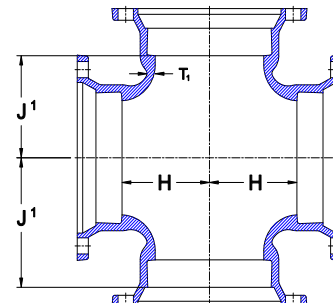
**MJ Tee**



**MJ x FE Tee**



**MJ x Swivel Tee**



**Cross**

| Size  | T   | T <sup>1</sup> | H    | Dimensions     |                | J <sup>3</sup> | MJ  | Weights |       | Cross |
|-------|-----|----------------|------|----------------|----------------|----------------|-----|---------|-------|-------|
|       |     |                |      | J <sup>1</sup> | J <sup>2</sup> |                |     | MJxFE   | †MJxS |       |
| 3     | .34 | .34            | 3.5  | 3.50           | 5.5            | ...            | 26  | 29      | ...   | 31    |
| 4x3   | .35 | .34            | 3.5  | 4.00           | 6.5            | ...            | 35  | 34      | ...   | 39    |
| 4     | .35 | .35            | 4.0  | 4.00           | 6.5            | ...            | 36  | 39      | ...   | 45    |
| 6x3   | .37 | .34            | 4.0  | 4.00           | 6.5            | ...            | 51  | 54      | ...   | ...   |
| 6x4   | .37 | .35            | 4.0  | 5.00           | 8.0            | ...            | 52  | 57      | ...   | 62    |
| 6     | .37 | .37            | 5.0  | 5.00           | 8.0            | 10.50          | 66  | 68      | 77    | 79    |
| 8x3   | .39 | .34            | 4.0  | 6.50           | 9.0            | ...            | 56  | ...     | ...   | ...   |
| 8x4   | .39 | .35            | 4.5  | 6.50           | 9.0            | ...            | 72  | 82      | ...   | 84    |
| 8x6   | .39 | .37            | 5.5  | 6.50           | 9.0            | 11.50          | 79  | 81      | 105   | 98    |
| 8     | .39 | .39            | 6.5  | 6.50           | 9.0            | 11.50          | 90  | 101     | 116   | 112   |
| 10x3  | .41 | .34            | 4.0  | 7.50           | 11.0           | ...            | 80  | ...     | ...   | ...   |
| 10x4  | .41 | .35            | 4.5  | 7.50           | 11.0           | ...            | 82  | 92      | ...   | 98    |
| 10x6  | .41 | .37            | 5.5  | 7.50           | 11.0           | 13.00          | 99  | 116     | 114   | 121   |
| 10x8  | .41 | .39            | 6.5  | 7.50           | 11.0           | 13.00          | 116 | 128     | 138   | 135   |
| 10    | .41 | .41            | 7.5  | 7.50           | 11.0           | ...            | 132 | 144     | ...   | 156   |
| 12x3  | .43 | .34            | 4.0  | 8.75           | 12.0           | ...            | 99  | ...     | ...   | ...   |
| 12x4  | .43 | .35            | 4.5  | 8.75           | 12.0           | ...            | 108 | 118     | ...   | 119   |
| 12x6  | .43 | .37            | 5.5  | 8.75           | 12.0           | 14.25          | 119 | 133     | 132   | 138   |
| 12x8  | .43 | .39            | 6.5  | 8.75           | 12.0           | 14.25          | 126 | 146     | 149   | 149   |
| 12x10 | .43 | .41            | 7.5  | 8.75           | 12.0           | ...            | 159 | 174     | ...   | 187   |
| 12    | .43 | .43            | 8.75 | 8.75           | 12.0           | ...            | 171 | 198     | ...   | 202   |
| 14x6  | .51 | .44            | 6.5  | 10.50          | 14.0           | 16.00          | 183 | 205     | 211   | 210   |
| 14x8  | .51 | .45            | 7.5  | 10.50          | 14.0           | ...            | 211 | ...     | ...   | 231   |
| 14x10 | .51 | .46            | 8.5  | 10.50          | 14.0           | ...            | 229 | 244     | ...   | 255   |
| 14x12 | .51 | .47            | 9.5  | 10.50          | 14.0           | ...            | 245 | 284     | ...   | 269   |
| 14    | .51 | .51            | 10.5 | 10.50          | 14.0           | ...            | 281 | 291     | ...   | 299   |
| 16x6  | .52 | .45            | 6.5  | 11.50          | 15.0           | 17.00          | 222 | 230     | 243   | 250   |
| 16x8  | .52 | .46            | 7.5  | 11.50          | 15.0           | ...            | 245 | 248     | ...   | 264   |
| 16x10 | .52 | .47            | 8.5  | 11.50          | 15.0           | ...            | 265 | 287     | ...   | 286   |
| 16x12 | .52 | .48            | 9.5  | 11.50          | 15.0           | ...            | 277 | 312     | ...   | 312   |
| 16x14 | .52 | .51            | 10.5 | 11.50          | 15.0           | ...            | 317 | 348     | ...   | ...   |
| 16    | .52 | .52            | 11.5 | 11.50          | 15.0           | ...            | 337 | 324     | ...   | 451   |
| 18x6  | .59 | .44            | 6.5  | 14.50          | 15.5           | 18.00          | 275 | 261     | 279   | ...   |
| 18x8  | .59 | .45            | 7.5  | 14.50          | 14.5           | ...            | 280 | 351     | ...   | ...   |
| 18x10 | .59 | .47            | 8.5  | 12.50          | ...            | ...            | 286 | ...     | ...   | ...   |
| 18x12 | .59 | .49            | 9.5  | 12.50          | ...            | ...            | 372 | ...     | ...   | ...   |
| 18x14 | .59 | .56            | 10.5 | 12.50          | ...            | ...            | 415 | ...     | ...   | ...   |
| 18x16 | .59 | .57            | 11.5 | 12.50          | ...            | ...            | 445 | ...     | ...   | ...   |
| 18x18 | .59 | .59            | 13.0 | 12.50          | ...            | ...            | 490 | ...     | ...   | ...   |

NOTE: Contact TU Inside Sales representative for MJ Crosses larger than 16 inch. †MJxSwl Weights include swivel gland.

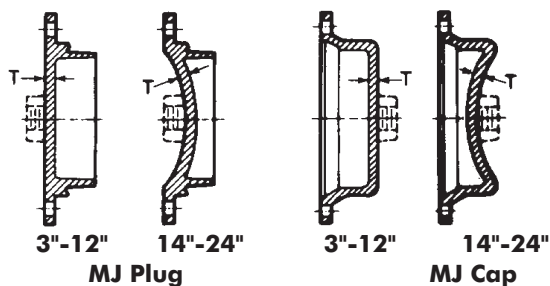
\*\*NOTE: 2"x2" and 4"x2" Compact C153 tees available in 2012. Call Tyler Union for information.



## MECHANICAL JOINT C153 DUCTILE IRON COMPACT FITTINGS

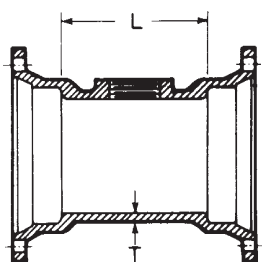
Sizes 3" thru 16" UL Listed For Fire Main Equipment

### SOLID & TAPPED PLUGS & CAPS



| Size | Dimensions |   | Max. Tap | Weights |      |
|------|------------|---|----------|---------|------|
|      | T          |   |          | Plugs   | Caps |
| 3    | .46        | 2 |          | 9       | 8    |
| 4    | .46        | 2 |          | 9       | 10   |
| 6    | .46        | 2 |          | 18      | 18   |
| 8    | .46        | 2 |          | 25      | 26   |
| 10   | .56        | 2 |          | 36      | 32   |
| 12   | .56        | 2 |          | 47      | 46   |
| 14   | .62        | 2 |          | 76      | 85   |
| 16   | .62        | 2 |          | 98      | 94   |
| 18   | .65        | 2 |          | 138     | 121  |
| 20   | .66        | 2 |          | 158     | 149  |
| 24   | .68        | 2 |          | 223     | 210  |
| 30   | .66        | 2 |          | 355     | 345  |
| 36   | .74        | 2 |          | 688     | 626  |
| 42   | .82        | 2 |          | 1091    | 723  |
| 48   | .90        | 2 |          | 1455    | 974  |

### TAPPED TEE

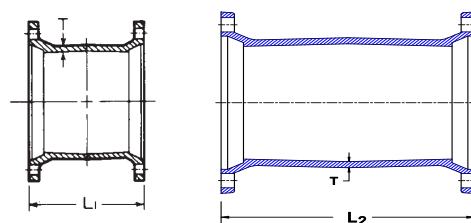


MJ x FE Flange  
Dimensions are  
on inside front  
cover.

#### MJ Tapped Tee (2" Tap)

| Size | Dimensions |   | Max. Tap | Weights |
|------|------------|---|----------|---------|
|      | T          | L |          |         |
| 3    | .34        | 6 | 2        | 19      |
| 4    | .35        | 6 | 2        | 23      |
| 6    | .37        | 6 | 2        | 35      |
| 8    | .39        | 6 | 2        | 54      |
| 10   | .41        | 6 | 2        | 68      |
| 12   | .43        | 6 | 2        | 88      |
| 16   | .52        | 6 | 2        | 164     |

### SOLID SLEEVES

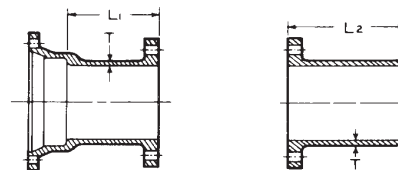


| Size | T   | Dimensions     |                | Weights |      |
|------|-----|----------------|----------------|---------|------|
|      |     | L <sup>1</sup> | L <sup>2</sup> | Short   | Long |
| 3    | .34 | 7.5            | 12             | 13      | 22   |
| 4    | .35 | 7.5            | 12             | 19      | 25   |
| 6    | .37 | 7.5            | 12             | 28      | 39   |
| 8    | .39 | 7.5            | 12             | 38      | 55   |
| 10   | .41 | 7.5            | 12             | 48      | 68   |
| 12   | .43 | 7.5            | 12             | 62      | 81   |
| 14   | .56 | 9.5            | 15             | 116     | 146  |
| 16   | .57 | 9.5            | 15             | 138     | 174  |
| 18   | .68 | 9.5            | 15             | 160     | 230  |
| 20   | .69 | 9.5            | 15             | 212     | 269  |
| 24   | .75 | 9.5            | 15             | 272     | 380  |
| 30   | .66 | 15.0           | 15             | 500     | ...  |
| 30   | .66 | ...            | 24             | ...     | 640  |
| 36   | .74 | 15.0           | 15             | 725     | 662  |
| 36   | .74 | ...            | 24             | ...     | 925  |
| 42   | .82 | ...            | 24             | ...     | 1146 |
| 48   | .90 | ...            | 24             | ...     | 1455 |

Note: 2"x12" C153 Sleeves available, call for information

### ADAPTERS

\*Note: Verify non domestic laying lengths with Tyler Union



| Size | T   | Dimensions     |                | Weights |       |
|------|-----|----------------|----------------|---------|-------|
|      |     | L <sup>1</sup> | L <sup>2</sup> | MJxFE   | FExPE |
| 3    | .34 | *6             | 12             | 18      | ...   |
| 4    | .35 | *6             | 12             | 26      | 23    |
| 6    | .37 | *6             | 12             | 36      | 35    |
| 8    | .39 | *6             | 12             | 50      | 50    |
| 10   | .41 | *6             | 12             | 60      | 69    |
| 12   | .43 | *6             | 12             | 88      | 88    |
| 14   | .51 | *6             | 12             | 127     | ...   |
| 16   | .52 | *6             | 12             | 155     | 149   |
| 18   | .56 | *6             | ...            | 195     | ...   |
| 20   | .60 | *6             | ...            | 275     | ...   |
| 24   | .62 | *6             | ...            | 305     | ...   |
| 30   | .66 | *7             | ...            | 470     | ...   |
| 36   | .74 | *8             | ...            | 750     | ...   |



**DOMESTIC**

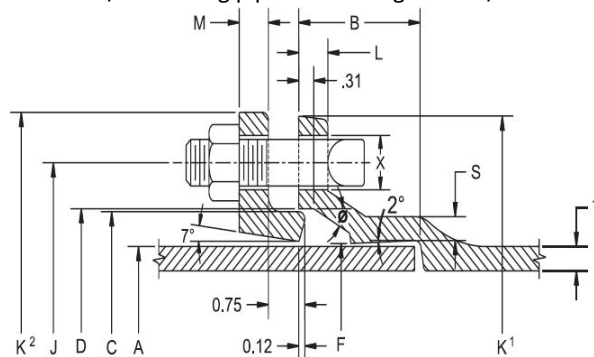


**NON-DOMESTIC**

## SUBMITTAL: C153 MECHANICAL JOINT PRODUCT

(Current revisions for the noted Standards apply)

|                             |                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SIZES:</b>               | 2" through 64" (2" not included in ANSI/AWWA C153 standard)                                                                                                                                                                                                                                                       |
| <b>STANDARDS:</b>           | ANSI/AWWA C153/A21.53, NFPA13/24, 3"-16" UL and 3"-10" FM listed & approved (File - Tyler Union)                                                                                                                                                                                                                  |
| <b>MATERIAL:</b>            | Cast of ASTM A536 qualified ductile iron. Date code is cast on and required for traceability.                                                                                                                                                                                                                     |
| <b>PRESSURE RATING:</b>     | *Flanged fittings rated at 250 psi. Mechanical joints 2" – 24" rated at 350 psi and 30" – 48" at 250 psi.<br>*Note: With rubber annular ring flange gasket, 2" – 24" Flanged fittings can be rated at 350 psi.<br>Note: Wyes over 12" are not pressure rated. Contact Tyler Union for rating in your application. |
| <b>DEFLECTION:</b>          | Max joint deflection 2"– 12", 5° and 14"– 48", 3°. Reduces by 50% at nominal pipe & fitting diameters                                                                                                                                                                                                             |
| <b>NSF-61 &amp; NSF372:</b> | Meets all requirements including Annex G, Tyler Union's Underwriters Laboratory listing MH16439.                                                                                                                                                                                                                  |
| <b>ASPHALT COATING:</b>     | Per ANSI/AWWA C104/A21.4 and ANSI/AWWA C153/A21.53.                                                                                                                                                                                                                                                               |
| <b>CEMENT LINING:</b>       | Per ANSI/AWWA C104/A21.4, with double cement lining.                                                                                                                                                                                                                                                              |
| <b>EPOXY COATING:</b>       | Fusion bonded epoxy per ANSI/AWWA C116/A21.16. Additional coatings available upon request.                                                                                                                                                                                                                        |
| <b>BARE FITTINGS:</b>       | Available upon request.                                                                                                                                                                                                                                                                                           |
| <b>FASTENERS:</b>           | High strength low alloy weathering steel per ANSI/AWWA C111/A21.11 and ASTM A242                                                                                                                                                                                                                                  |
| <b>INSTALLATION:</b>        | Install per AWWA C600/C651 using pipe conforming to ANSI/AWWA C151/A21.51 or AWWA C900/905.                                                                                                                                                                                                                       |



**NOMINAL JOINT DIMENSIONS IN INCHES**

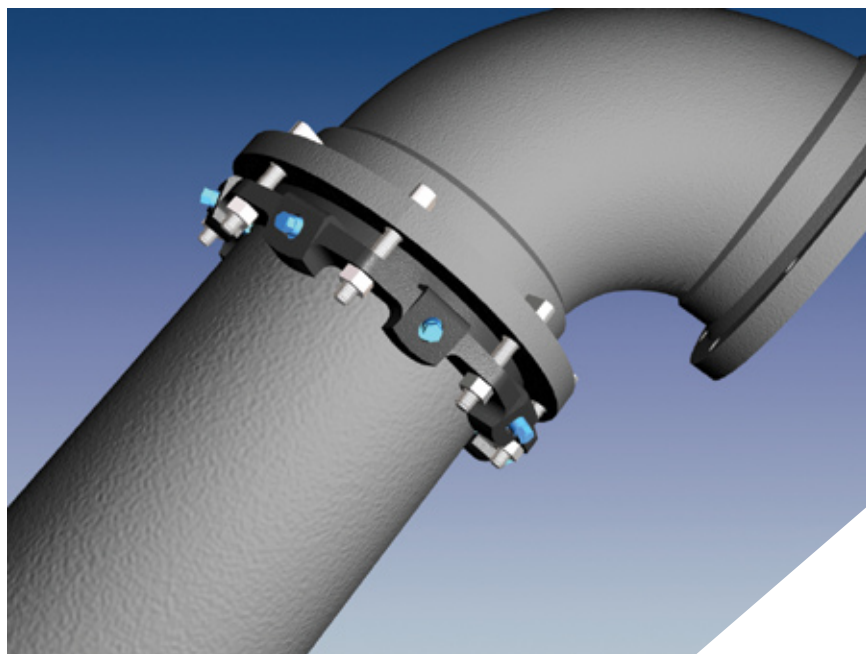
**BOLTS**

| Size<br>Inches | A Dia.<br>DI Pipe    | B Hub<br>Depth | C Dia.<br>GLAND | D Dia. | F Dia. | J Dia.<br>GLAND | K <sup>1</sup> Dia. | K <sup>2</sup> Dia.<br>GLAND | L    | M<br>GLAND | S    | T    | X     | Size      | Qty. |
|----------------|----------------------|----------------|-----------------|--------|--------|-----------------|---------------------|------------------------------|------|------------|------|------|-------|-----------|------|
| 2              | 2.51                 | 2.50           | 3.50            | 3.60   | 2.61   | 4.75            | 6.19                | 6.89                         | 0.58 | 0.62       | 0.36 | 0.30 | 3/4   | 5/8x3.0   | 2    |
| 3              | 3.96                 | 2.50           | 4.84            | 4.94   | 4.06   | 6.19            | 7.62                | 7.69                         | 0.58 | 0.62       | 0.39 | 0.33 | 3/4   | 5/8x3.0   | 4    |
| 4              | 4.80                 | 2.50           | 5.92            | 6.02   | 4.90   | 7.50            | 9.06                | 9.12                         | 0.60 | 0.75       | 0.39 | 0.34 | 7/8   | 3/4x3.5   | 4    |
| 6              | 6.90                 | 2.50           | 8.02            | 8.12   | 7.00   | 9.50            | 11.06               | 11.12                        | 0.63 | 0.88       | 0.43 | 0.36 | 7/8   | 3/4x3.5   | 6    |
| 8              | 9.05                 | 2.50           | 10.17           | 10.27  | 9.15   | 11.75           | 13.31               | 13.37                        | 0.66 | 1.00       | 0.45 | 0.38 | 7/8   | 3/4x4.0   | 6    |
| 10             | 11.10                | 2.50           | 12.22           | 12.34  | 11.20  | 14.00           | 15.62               | 15.62                        | 0.70 | 1.00       | 0.47 | 0.40 | 7/8   | 3/4x4.0   | 8    |
| 12             | 13.20                | 2.50           | 14.32           | 14.44  | 13.30  | 16.25           | 17.88               | 17.88                        | 0.73 | 1.00       | 0.49 | 0.42 | 7/8   | 3/4x4.0   | 8    |
| 14             | 15.30                | 3.50           | 16.40           | 16.54  | 15.44  | 18.75           | 20.31               | 20.25                        | 0.79 | 1.25       | 0.55 | 0.47 | 7/8   | 3/4x4.5   | 10   |
| 16             | 17.40                | 3.50           | 18.50           | 18.64  | 17.54  | 21.00           | 22.56               | 22.50                        | 0.85 | 1.31       | 0.58 | 0.50 | 7/8   | 3/4x4.5   | 12   |
| 18             | 19.50                | 3.50           | 20.60           | 20.74  | 19.64  | 23.25           | 24.83               | 24.75                        | 1.00 | 1.38       | 0.68 | 0.54 | 7/8   | 3/4x4.5   | 12   |
| 20             | 21.60                | 3.50           | 22.70           | 22.84  | 21.74  | 25.50           | 27.08               | 27.00                        | 1.02 | 1.44       | 0.69 | 0.57 | 7/8   | 3/4x4.5   | 14   |
| 24             | 25.80                | 3.50           | 26.90           | 27.04  | 25.94  | 30.00           | 31.58               | 31.50                        | 1.02 | 1.56       | 0.75 | 0.61 | 7/8   | 3/4x5.0   | 16   |
| 30             | 32.00                | 4.50           | 33.29           | 33.46  | 32.17  | 36.88           | 39.12               | 39.12                        | 1.31 | 2.00       | 0.82 | 0.66 | 1-1/8 | 1x6.0     | 20   |
| 36             | 38.30                | 4.50           | 39.59           | 39.76  | 38.47  | 43.75           | 46.00               | 46.00                        | 1.45 | 2.00       | 1.00 | 0.74 | 1-1/8 | 1x6.0     | 24   |
| 42             | 44.50                | 4.50           | 45.79           | 45.96  | 44.67  | 50.62           | 53.12               | 53.12                        | 1.45 | 2.00       | 1.25 | 0.82 | 1-3/8 | 1-1/4x6.5 | 28   |
| 48             | 50.80                | 4.50           | 52.09           | 52.26  | 50.97  | 57.50           | 60.00               | 60.00                        | 1.45 | 2.00       | 1.35 | 0.90 | 1-3/8 | 1-1/4x6.5 | 32   |
| 54             | Available on Request |                |                 |        |        |                 |                     |                              |      |            |      |      |       |           |      |
| 60             | Available on Request |                |                 |        |        |                 |                     |                              |      |            |      |      |       |           |      |
| 64             | Available on Request |                |                 |        |        |                 |                     |                              |      |            |      |      |       |           |      |

# 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<br>Pipe Size | Series<br>Number | Shipping<br>Weights | Post<br>Assembly<br>Deflection | Pressure<br>Rating<br>(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.

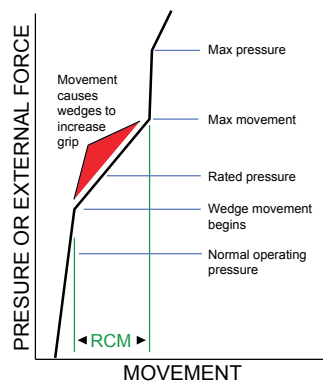
For use on all classes of ductile iron pipe (PC350 through PC150 and CL56 through CL50), for practically any application including valves, hydrants and pipe, the MEGALUG Mechanical Joint Restraint effectively and safely performs without damage to the pipe or cement linings.

## 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

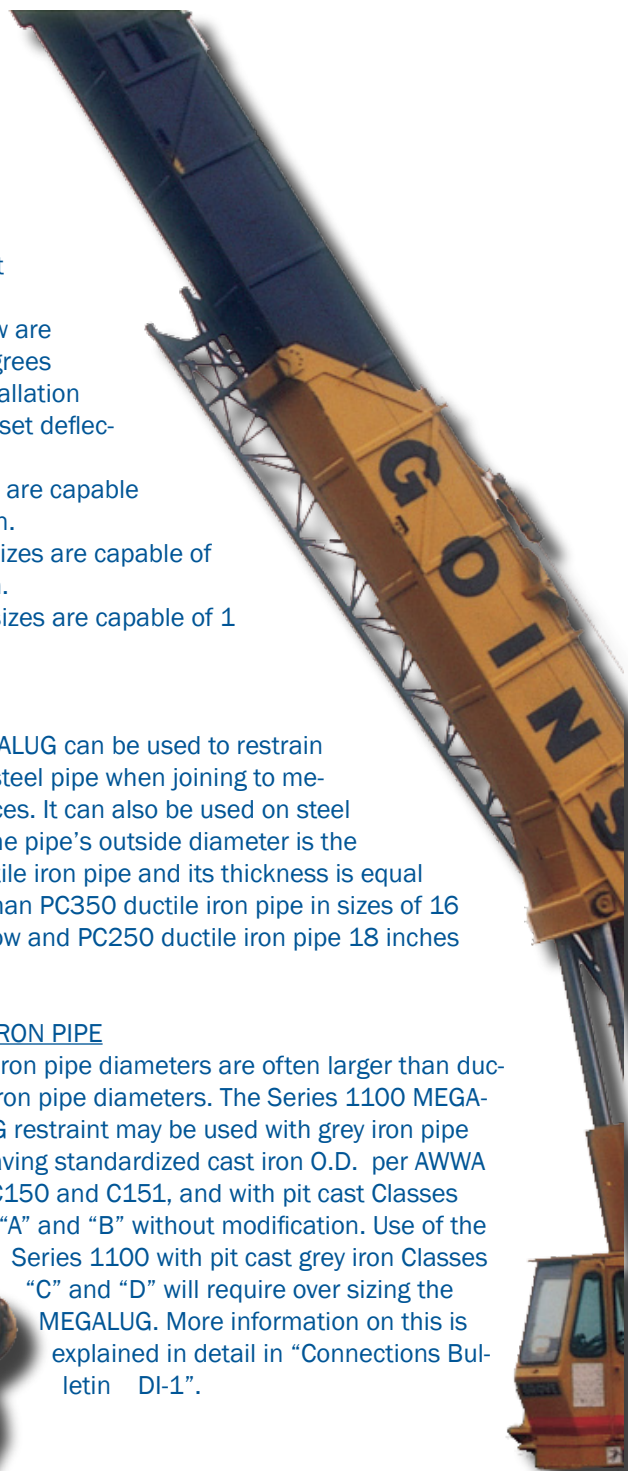
The 1100 Series MEGALUG can be used to restrain 3" - 8" SCH 40 or 80 steel pipe when joining to mechanical appurtenances. It can also be used on steel pipe in all sizes if the pipe's outside diameter is the same as the ductile iron pipe and its thickness is equal to or greater than PC350 ductile iron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

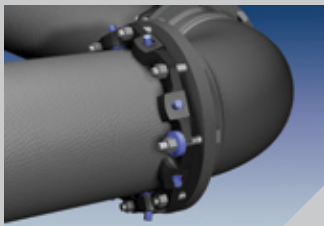
All casting bodies shall be surface pre-treated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

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).*

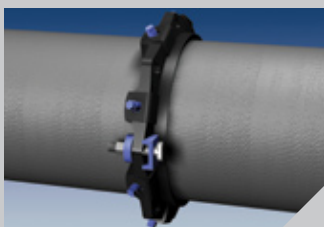
## Support Products

*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



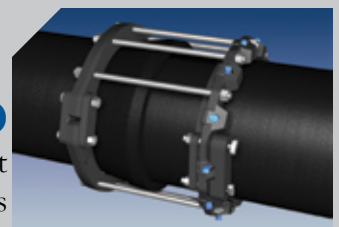
### Series 1100SDB

Split MEGALUG Restraint  
For Mid-Span Applications



### Series 1700

MEGALUG Restraint Harness  
For Push-On Bell Joints

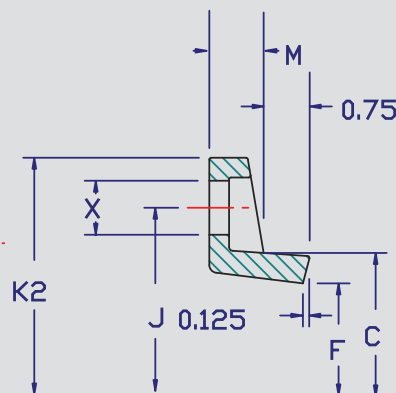
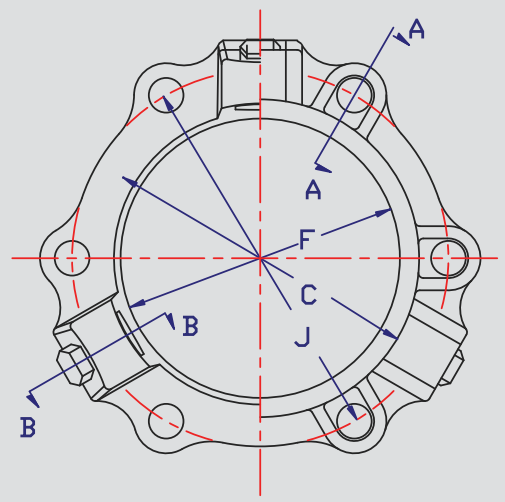


### Series 1100HD

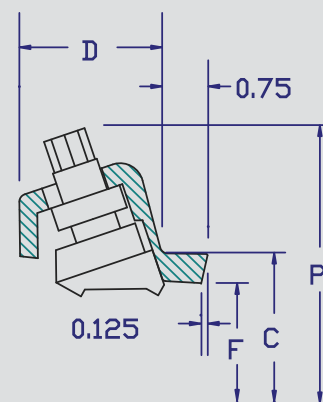
Split MEGALUG Restraint  
Harness for Existing Push-On Bells

## Series 1100 Submittal Reference Drawing

EBAA IRON



SECTION A-A



SECTION B-B

MADE IN USA

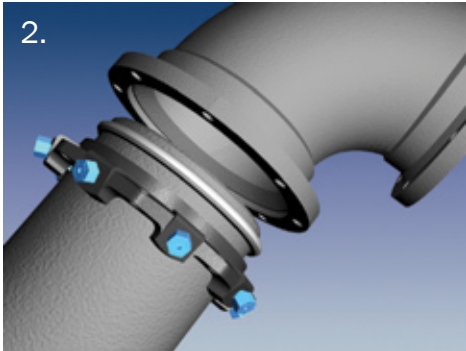
| Nominal Pipe Size | Series Number | C     | D    | F     | M    | P*    | X     | J     | K2    | Wedge QTY. | Bolt QTY. | Weight (LBS.) | Pressure Rating (PSI) |
|-------------------|---------------|-------|------|-------|------|-------|-------|-------|-------|------------|-----------|---------------|-----------------------|
| 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

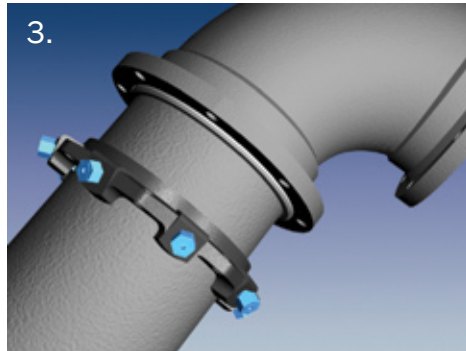
NOTE: Dimensions are in inches and are subject to change without notice.

- 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.

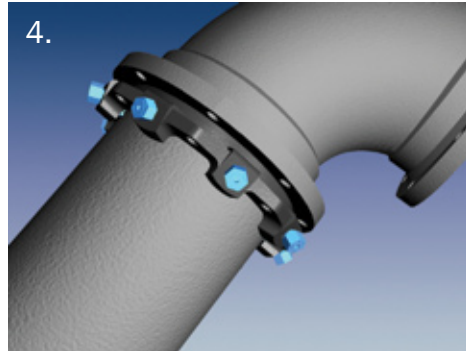
2.\* Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubrication meeting the requirement of ANSI/AWWA C111/A21.11,



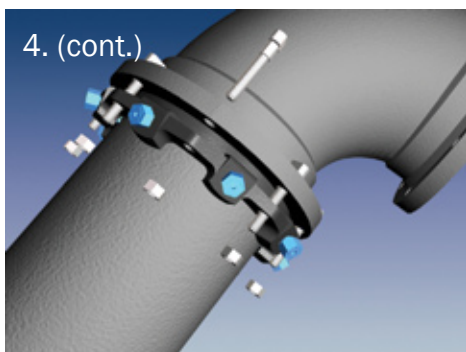
just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with lip extension toward the plain end, followed by the gasket.

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

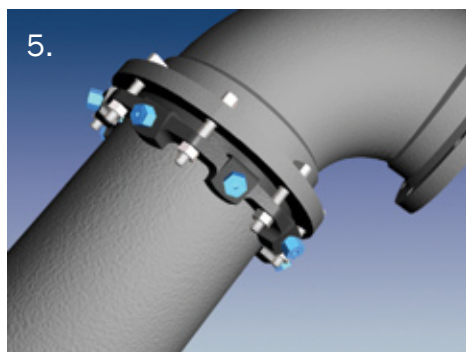
3.\* Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.



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.

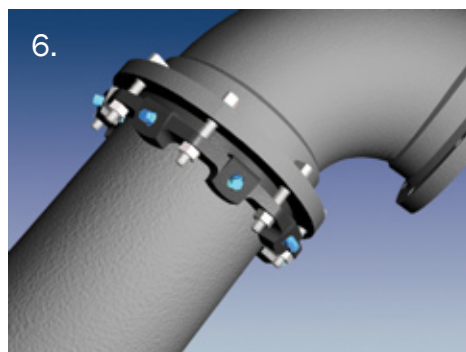


5.\* Tighten the bolts to the normal range of torque as indicated [3 inch 45-60 ft-lbs., 4-24 inch 75-90 ft-lbs., 30-36 inch 100-120 ft-lbs., and 42-48 inch 120-150 ft-lbs.] While at all times maintaining approximately the same distance between the gland and the face of the flange at all points around 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.



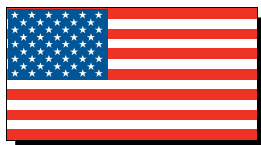
In large sizes (30-48 inch), five or more repetitions may be required. The use of a torque-indicating wrench will facilitate this procedure.

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".