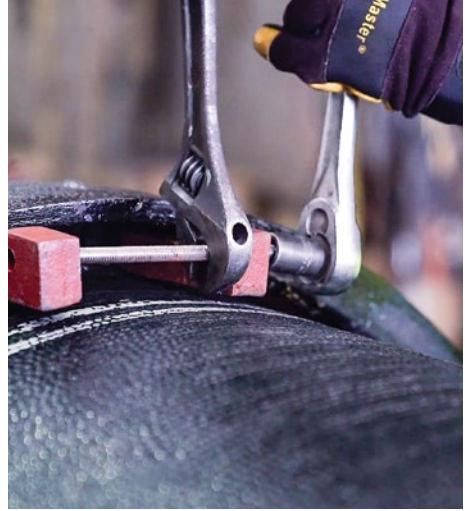


HP LOK® Pipe & Fittings

Ductile Iron
Pipe 60"-64"
Fittings 42"-64"



PIPE

FABRICATION

RESTRAINED JOINTS

FITTINGS

GASKETS

COATINGS & LININGS

U.S. PIPE

A QUIKRETE® COMPANY

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The logo for U.S. PIPE, featuring the letters "U.S." in a large, bold, sans-serif font above the word "PIPE" in a slightly smaller, bold, sans-serif font. Both are white and set against a solid red rectangular background. The background of the entire page features a dynamic, high-speed photograph of water splashing, with droplets and ripples visible in shades of blue and white.

**U.S.
PIPE**

ANSI/AWWA STANDARDS

ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast, for Water.

Asphaltic outside coating and inside lining are in accordance with ANSI/AWWA C151/A21.51.

ANSI/AWWA C153/A21.53 Ductile-Iron Compact Fittings For Water Service or ANSI/AWWA C110/A21.10 Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., For Water.

TR FLEX® Fittings conform to applicable requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10.

ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

Cement lining, in accordance with ANSI/AWWA C104 or special linings and/or coatings can be furnished for specific conditions.

ASTM A746-03 Standard Specification for Ductile Iron Gravity Sewer Pipe.

ASTM A716-08 Standard Specification for Ductile Culvert Pipe.

ASTM A536 Standard Specification for Ductile Iron Castings.

ASTM C150 Standard Specification for Portland Cement.

HP LOK® Restrained Joint Pipe and Fittings provide flexible push-on joints for 60"–64" pipe sizes, and 42"-64" fittings.

The HP LOK Restrained Joint has a working pressure equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi.

Pipe for wastewater service may be furnished in accordance with ASTM 746 Standard Specification for Ductile Iron Gravity Sewer Pipe. For certain wastewater applications, a ceramic quartz filled, amine cured, novalac epoxy lining is available — see PROTECTO 401™ Ceramic Epoxy Lined Pipe and Fittings brochure.

HP LOK Pipe and Fittings utilize the Tyton Gasket.

An HP LOK Ring that is factory installed in the bell provides a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.

The standard cement-mortar lining supplied in pipe is ASTM C150 Type II. The lining may be supplied in either single or double thickness. Sulfate resistant Type V cement is available on special order.

*For higher pressure ratings, consult your U.S. Pipe Sales Representative.

For a suggested design procedure for the restraint of thrust forces in pressurized, buried Ductile Iron piping systems, the design engineer should refer to the current DIPRA publication "Thrust Restraint Design for Ductile Iron Pipe" or the U.S. Pipe brochure "The Use And Application of Restrained Joints for Ductile Iron Pipelines."

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

For certain wastewater applications a ceramic epoxy lining is available—see PROTECTO 401™ Ceramic Epoxy Lined Pipe and Fittings Brochure.

NOTE: Each of the following is a nationally recognized standards organization: American National Standards Institute (ANSI), American Water Works Association (AWWA), American Society for Testing and Materials (ASTM), Underwriters Laboratories (UL), National Fire Protection Association (NFPA), National Sanitation Foundation (NSF), Factory Mutual (FM)



GENERAL INFO

SUGGESTED SPECIFICATIONS

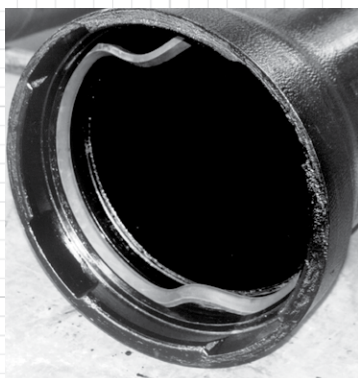
42"–64" restrained joints shall be HP LOK Pipe and Fittings or pre-approved equal. Restrained push-on joints for pipe and fittings shall be designed for a water working pressure of 350 in accordance with ANSI/AWWA C111/A21.51 Rubber-Gasket Joints for Ductile Iron Pipe and Fittings.

Restrained joint pipe shall be Ductile Iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push-on joints for such pipe shall be in accordance with ANSI/AWWA C111/A21.11 "Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings." Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50, "Thickness Design of Ductile-Iron Pressure Pipe," and shall be based on laying conditions and internal pressures as stated in the project plans and specifications. Fittings shall be manufactured of Ductile Iron per grade 70-50-05 as specified in AWWA C153 and C110.

NOTE: Cement mortar lining and seal coating for pipe and fittings, where applicable, shall be in accordance with ANSI/AWWA C104/A21.4. Asphaltic outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 for fittings.

ASSEMBLY INSTRUCTIONS

TYTON GASKET ASSEMBLY



NOTE: For underwater installations, a special lubricant is available from U.S. Pipe.

All foreign matter in the socket must be removed, i.e., mud, sand, cinders, gravel, pebbles, trash, frozen material, etc. The gasket seat should be thoroughly inspected to be certain it is clean. Foreign matter in the gasket seat may cause a leak. The gasket must be wiped clean with a clean cloth, flexed, and then placed into the socket with the rounded bulb end entering first. Looping the gasket in the initial insertion will facilitate seating the gasket heel evenly around the retainer seat. 4" through 12" sizes require only one loop.

For larger sizes, additional loops may be required: 42" through 54", four to six loops; 60" and 64", six or more loops. Evenly space the loops around the socket with each loop raised 4–5 inches. After loops are established, push each loop down to finish installation of the gasket. When installing Tyton Joint Pipe in sub-freezing weather, the gaskets, prior to their use, must be kept at a temperature of at least 40°F by suitable means, such as storing in a heated area or keeping them immersed in a tank of warm water. If the gaskets are kept in warm water, they should be dried before placing in the pipe socket.

LUBRICATION

After the gasket has been inserted into the gasket seating area of the socket, a thin film of Tyton Joint Lubricant should be applied to the inside surface of the gasket which will come in contact with the beveled end of the pipe. In warm, dry weather conditions, the lubricant can dry out, especially when applied to warm or hot pipe, it will be necessary to add a small amount of water to hydrate the lubricant. Only Tyton Joint Lubricant should be used.

CAUTION: The use of spray-on lubricant is not recommended. Experience has determined that spray-on lubricant may not have sufficient lubricity to allow joint assembly without gasket displacement.

Clean the spigot end of the pipe back to the assembly stripes. Apply Tyton Joint Lubricant to the cleaned spigot end. Do not allow the lubricated surface to touch the ground or trench sides prior to installation.

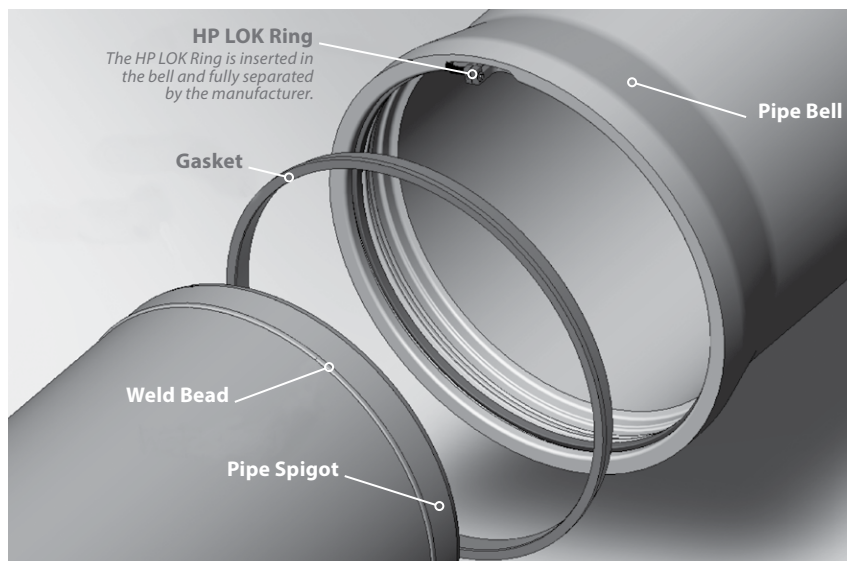
ASSEMBLY INSTRUCTIONS

JOINT ASSEMBLY

1. The gasket and HP LOK ring sections of the bell must be clean and free of debris or any foreign matter. (See page 6)
2. Install the gasket in the bell. Do not lubricate gasket prior to installing bell. (See page 6)
3. Lubricate the gasket and spigot end of the mating pipe with Tyton Joint Lubricant. (See page 6)
4. Position the pipe so that the slot in the bell is in a 10 to 2 o'clock location, this will help with bolt/ring handle access, especially in larger pipe sizes.
5. Check to make sure the ring's inside diameter is flush or no more than 0.0625 inch above the lug-mouth groove, the weld bead must be able to pass over this section of the bell and ring.
6. Insert the spigot end into the bell. The installer must make sure that the spigot end is fully homed in the bell and not deflected. Hold the nut between the ring handles and rotate the bolt counter-clockwise and remove it, keep the nut as it will be used in step 7. Grasp the ring handle closest to you with one hand while pushing the other ring handle away from you; if the ring slides back and forth in the slot cavity easily and

a visual check of the ring around its full circumference insures the ring is in contact with the pipe and not setting on top of the weld bead, the ring is in its correct position. If the ring will not slide back and forth push and realign the spigot so the pipe is not deflected. Slide the ring handles to center them in the bell slot. (See photo 2)

7. Insert the bolt through the second set of through holes in the ring handles and install the nut. Snug the nut with only enough torque to make sure the ring stays in contact with the pipe. (See photo 3)
8. Pull back on the inserted pipe to extend the joint and remove the slack. Do not use excessive force. The spigot end should slide easily under the HP LOK ring to allow engagement to the weld bead.
9. Tighten the bolt/nut to 15–20 ft-lbs of torque. Do not over tighten. There will be a gap between the ring handles; the width of the gap is variable depending upon pipe dimensions. (See photo 3)
10. Deflect the joint as desired, not to exceed 0.5 degree.
11. The joint is now completely assembled.



Components required for each joint:

- 1 HP LOK Ring (factory installed)
- 1 Tyton Gasket
- Tyton Joint Lubricant
- 1 Jack/Clamp Bolt and Nut-304 Stainless Steel



Photo 1

- Pipe as shipped with ring inserted and spread



Photo 2

- Removing bolt from the Jack position.

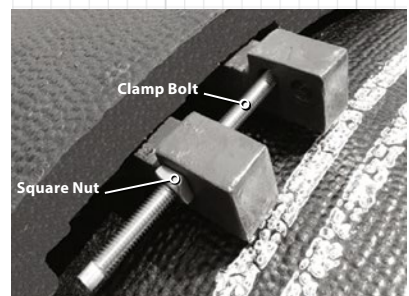


Photo 3

- Final Assembly

ASSEMBLY INSTRUCTIONS

ALTERNATE METHODS OF ASSEMBLY

A feeler gage may be inserted between the bell and the plain end of the assembled joint to verify the position of the gasket. When the gage encounters the gasket, increased resistance will be felt. Note the depth of insertion of the gage. Continue probing around the periphery of the joint, noting the depth to resistance each time. If the depth of insertion is uniform, the gasket has remained in place. If, at any point, the depth of insertion increases significantly, this indicates a dislodged gasket. The joint should be disassembled, thoroughly cleaned with water, and examined for any condition that might have caused the gasket to become dislodged before attempting to reassemble the joint. *Backhoe Method of Assembly (8"–64" Pipe)*

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 carefully push the pipe until fully seated. A timber header should be used between the pipe and the backhoe bucket to avoid damage to the pipe. Caution: Avoid "slamming" the pipe home to prevent damage to lining material inside the bell at the back of the socket.

COME-A-LONG METHOD OF ASSEMBLY (3"–64" Pipe)

Installers may prefer to use come-a-longs to assemble pipe of all sizes. This method is especially useful in tight or hard to reach locations. Two (2) 3/4–2 ton chain hoists, 24 feet of chain and two (2) bell choker slings for 3"–24". Two to four- 3–4 ton chain hoists for 30"–64" sizes.

SUBAQUEOUS/UNDERWATER APPLICATIONS NOTES.

Underwater installations are difficult and require special attention to be successful. If pipe will be assembled under water, please contact USP for additional assistance that will aid underwater assembly. USP does not recommend choker straps or cables be used to assemble pipe joints underwater. Experience has shown the use of such devices does not provide enough axial force for assembly. Additionally, use of choking type devices can damage special coatings and polyethylene encasement meant to protect the pipe from corrosion. The preferred method to assemble joints underwater is to use the back-hoe bucket to push against the bell. Special subaqueous lube must also be used for the gasket and spigot.

NOTE:

Procedures outlined in figures 1–4 on page 4, showing the assembly of Tyton Joint Pipe, should be followed before proceeding with the methods shown below.

ASSEMBLY INSTRUCTIONS

PIPELINE EXPANSION

HP LOK PIPE AND FITTINGS SOCKET PULL OUT

(Linear Expansion Within The Assembled Socket)

In HP LOK Pipe and Fitting sockets, there is a small amount of slack or pullout available at each joint. This pullout, or expansion capability, is the result of clearance inside the socket required for joint assembly. The expansion can be minimized by extending the joint after assembly and prior to setting the joint deflection.

The expansion of the joint in both pipe and fitting sockets must be considered, especially in the following cases:

- When HP LOK Pipe are used above ground (*bridge crossings, on piers, etc.*),
- When HP LOK Pipe are used in poor soil conditions (*swamps, marshes, etc.*),
- When long lengths of HP LOK Pipe are required for restraint due to high operating pressures and/or unfavorable soil parameters,
- Where HP LOK Pipe are used inside casing pipe.
- Where HP LOK Pipe and Fittings are in vertical applications. If HP LOK joints are used in vertical installations, provisions must be made to keep the joint extended. Failure to keep vertical joints extended can result in movement of pipeline components.
- When HP LOK Pipe are used inside a casing pipe, it is recommended that the assembled pipe be pulled through the casing.
- Please note that if the joint is not extended during assembly, the expansion per joint during line pressurization will increase the length of a 1000 foot long installation up to 3 feet, depending upon the pipe size. *(Refer to Table 1 for the Pullout at each joint.)*

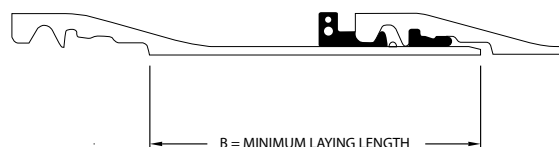
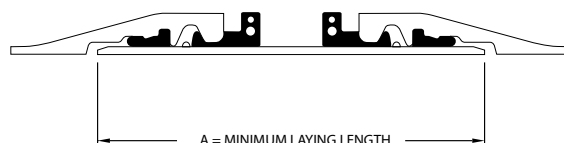
MINIMUM LAYING LENGTHS FOR HP LOK PIPE

The following drawings and Table 1 define the minimum lengths for HP LOK Pipe when furnished in either Plain End x Plain End, or Bell x Plain End. The minimum laying lengths are determined on the basis of the socket depth and the minimum space required in front of the pipe bell face to clear the HP LOK Ring and provide access to the jack and clamp bolts. These minimum laying lengths must be considered when ordering factory cut lengths or field cutting HP LOK Pipe.

SIZE	INCHES		FEET
	DIMENSION		PULLOUT
	A	B	Maximum
42	27.00	20.00	0.04
48	29.00	23.00	0.05
54	29.00	23.00	0.05
60	29.00	23.00	0.05
64	29.00	23.00	0.05

Table 1.

Minimum Laying Lengths & Average Pullout For Each HP Lok Pipe or Fittings Socket



ASSEMBLY INSTRUCTIONS

FIELD CUT PIPE

INCHES		
SIZE	DIMENSION	
	Minimum	Maximum
42	44.44	44.58
48	50.74	50.88
54	57.46	57.60
60	61.51	61.65
64	65.57	65.71

Table 2.

NOTE: For accuracy, a diameter tape graduated in 100th's must be used.

MAKING A FIELD CUT

When ductile iron pipe 14" and larger is to be cut in the field, the material should be ordered as "Gauged Pipe." A Gauged Pipe is a pipe whose barrel circumference is within the spigot dimensional specifications as determined by diameter tape measurements over the pipe's length to within approximately 2 feet of the bell chime.

Pipe that is "gauged" is specially marked to avoid confusion with a green paint stripe around the spigot and green paint on the bell face. ANSI/AWWA C151/A21.5 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 ensured to be within the tolerances shown in Table 2.

Before making the field cut, measure the pipe diameter at the location to be cut with a diameter tape graduated in 100th's. The diameter circumference should fall within the range shown below in Table 2. If the measurement is not within the prescribed range, another pipe should be selected and checked before cutting. Abrasive saws are commonly used to cut pipe 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 with a portable grinder or disk grinder, refer to a shop manufactured bevel as a guide for proper shape. Additional grinding may be required to further bevel the pipe if difficulty in assembly of the joint is encountered. This operation removes any sharp, rough edges that otherwise might damage the gasket.

The pipe must be cut as square as is practical. A field cut end that is not square may leak, especially if the joint is fully deflected. Measure from the factory manufactured spigot end to the desired cut location. Mark the measured distance around the diameter of the pipe at sufficient intervals to determine a square cut-line (*a line perpendicular to the axis of the pipe*). Scribe the square cut-line around the O.D. of the pipe.

NOTE: When necessary, pipe may be rounded in accordance with U.S. Pipe's Brochure, recommended methods for rounding the cut ends of out-of-round 14" and larger diameter ductile iron pipe.

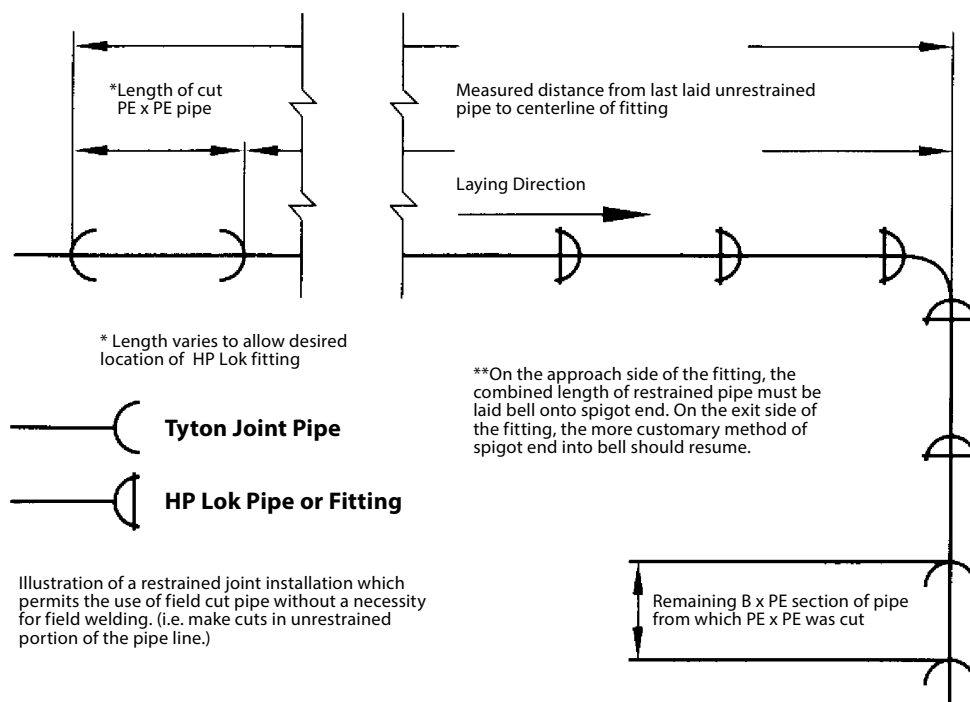
ASSEMBLY INSTRUCTIONS

FIELD CUT PIPE (Continued)

UNRESTRAINED FIELD CUT PIPE INSTALLATION METHOD

The following schematic illustrates the use of a field cut pipe in the unrestrained portions of the line, to eliminate the requirement for a field weldment.

Thrust Restraint Design For Ductile Iron Pipe Published by the Ductile Iron Pipe Research Association (DIPRA).



Pipe installations may require field cutting, particularly where fittings are used. By planning ahead, many field cuts can be made in the portion of the line involving standard Tyton Joint Pipe thus eliminating the need to weld HP LOK Pipe.

30"-36" TR Flex fittings can be used with 30"-36" HP LOK Pipe however, the pressure rating is reduced to 250 psi with the use of PC 350, 30"-36" HP LOK Pipe. If a pressure class pipe lower than PC350 is used with TR Flex Fittings, contact a U.S. Pipe Sales Representative for a Working Pressure rating.

In the event field cuts are required in the restrained section of the line, please refer to the HP LOK Field Weld brochure where the procedure describes how to weld a round steel bar to the plain end of field cut HP LOK Pipe. The procedure has been qualified in conformance with the American National Standards Institute/American Society Standard ANSI/AWS D11.2-89, Section 8.

NOTE: U.S. Pipe does not recommend, suggest or condone welding on zinc coated pipe without the zinc coating being removed from the weld location. All safety and health precautions as per ANSI/AWS D11.2 Guide for Welding Iron Castings – Section 10 and Appendix F – Safety and Health Fact Sheets, should be followed for safe welding practices and the removal of the zinc coating prior to welding.

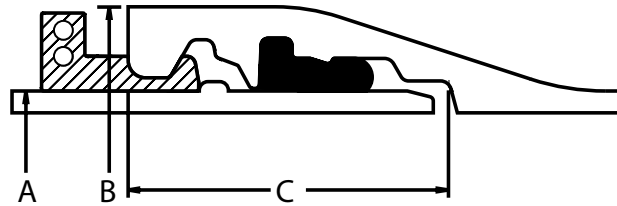
ASSEMBLY INSTRUCTIONS

NOTES

1. Large unbalanced thrust forces can be produced at dead ends, bends, tees or size changes of high pressure and/or large diameter piping systems.
2. Concrete thrust blocks or restrained joint pipe and fittings can normally be used to resist the unbalanced thrust forces.
3. In underground piping systems, an unbalanced thrust force can normally be resisted by providing a designed length of restraint at a change in direction or diameter where thrust forces are anticipated. Restrained joint pipe normally must transfer the thrust forces to the soil surrounding the pipeline.
4. The U.S. Pipe calculator or Thrust Restraint Design For Ductile Iron Pipe published by the Ductile Iron Pipe Research Association (*DIPRA*) are two methods used to calculate the required length of restraint at a change in direction. These resources are available through your U.S. Pipe Sales Representative.
5. Most restrained joints allow for joint take-up after installation. The amount of take-up or slack can vary considerably with the type of joint and installation conditions. Thrust forces produced by internal pressures can result in removal of this joint take-up thereby increasing the length of the restrained section of the line. In any situation or configuration where increases in the line segment length could be detrimental to the pipeline or surrounding structures, the restrained joints should be fully extended during installation.
6. An increase in line segment length can also result in additional joint deflection. If an increase in length or other line movement are anticipated, the deflection of the restrained joints should be limited to only a portion of the joint design deflection during the installation of the pipe.
7. In fully extended, totally restrained piping systems, the thrust forces are carried by the piping system, and the resistance to the thrust is not dependent upon the surrounding soil. In situations where there is insufficient space to provide the designed restrained length, or where there are poor soil conditions, the entire section of line should be restrained or other external means of restraint provided.
8. If restrained joint pipe is used in a casing and is subjected to thrust, the joints should be fully extended to take up the joint slack prior to making end connections. The length of restraint in the casing should not be considered as part of the designed length of restraint required to provide the soil resistance to the thrust forces.
9. Above ground lines subject to thrust forces should be fully restrained and extended to remove any slack from the joint. The joint can be extended by pulling out on the pipe after the restrained joint assembly is made. The thrust forces can cause an unexpected increase in length of an above ground line if the slack is not first removed from the joint. When restrained joint pipe are used for bridge crossings or other above ground installations, each length of pipe must be supported in a manner to restrict both vertical and horizontal movement.
10. It is the responsibility of the Purchaser or Consulting Engineer to ensure that proper trench preparation, compaction and pipe installation procedures are followed and that adequate restrained lengths or thrust block designs are provided to resist the unbalanced thrust loads generated by the installed piping systems.
11. In general, restrained joints are more electrically conductive than conventional push-on joints used for Ductile Iron pipe. This increased conductivity can make a restrained section of the line more susceptible to stray current corrosion caused by direct currents from sources such as electrical transit systems or cathodically protected steel structures (steel pipe, underground storage tanks, etc.). If exposure to stray current is anticipated, contact your U.S. Pipe Sales Representative for the recommended method of protection.
12. If HP LOK joints are used in vertical installations, provisions must be made to keep the joint extended. Failure to keep vertical joints extended can result in movement of pipeline components.

SPECIFICATIONS

BASIC DIMENSIONS



60" - 64" HP LOK Assembly Cross Section

INCHES	PSI	INCHES					FEET
SIZE	WORKING PRESSURE ^a	A	B PIPE	B FITTINGS	C PIPE	C FITTINGS	PULLOUT
42	350	44.50	-	50.54	-	9.24	0.04
48	350	50.80	-	58.05	-	9.91	0.05
54	350	57.56	-	65.39	-	9.91	0.05
60	350	61.61	67.95	69.65	10.06	9.91	0.05
64	250	65.67	71.70	73.90	10.06	9.91	0.05

NOTE: Actual B and C Dimensions may be up to 0.50" greater than dimensions shown in this table. The maximum deflection for HP LOK joints is 0.5 degree.

^aThe HP LOK Restrained Joint has a working pressure equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi. For higher pressure ratings, contact your U.S. Pipe Sales Representative.

SPECIFICATIONS

PRESSURE CLASS (Thickness, Dimension & Weight)

INCHES	PSI	INCHES		POUNDS			
SIZE	PRESSURE CLASS	THICKNESS	OUTSIDE DIAMETER ^a	WEIGHT PER LENGTH ^b	BARREL WEIGHT PER FOOT	WEIGHT PER LENGTH ^b	BARREL WEIGHT PER FOOT
					18-FOOT LAYING LENGTH	20-FOOT LAYING LENGTH	
60	150	0.54	61.6	—	—	7409	317.0
60	200	0.61	61.6	—	—	8223	357.7
60	250	0.68	61.6	—	—	9035	398.3
60	300	0.76	61.6	—	—	9961	444.6
60	350	0.83	61.6	—	—	10769	485.0
64	150	0.56	65.7	—	—	8248	350.5
64	200	0.64	65.7	—	—	9240	400.1
64	250	0.72	65.7	—	—	10230	449.6
64	300	0.80	65.7	—	—	11216	498.9
64	350	0.87	65.7	—	—	12078	542.0

NOTE: Thicknesses and dimensions of 30" through 64" Ductile Iron pipe conform to ANSI/AWWA C151/A21.51. Weights may vary from the standard because of differences in bell weights.

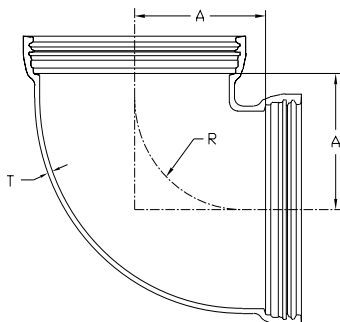
^aTolerance of O.D. of spigot end: 30"–48", +0.08", -0.06"; 54"–64", +0.04", -0.10".

^bIncluding bell; calculated weight of pipe rounded off to nearest 5 lbs.

SPECIFICATIONS-FITTINGS

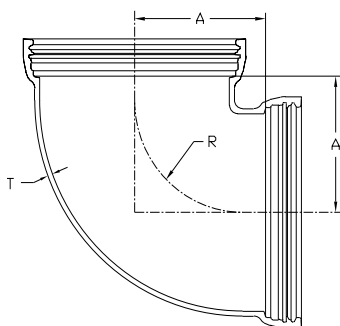
BENDS

**90°
Bend**
Bell x Bell



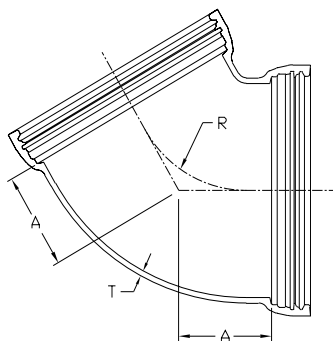
INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	27.50	24.50	3750
48	350	1.42	31.00	28.00	5340
54	350	1.55	39.00	35.28	7250
60	350	1.50	41.00	33.34	8205
64	350	1.50	45.50	35.29	9633

**90°
Bend**
Compact
Bell x Bell



INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	28.00	25.75	2750
48	350	0.90	31.50	28.90	3819
54	350	1.05	37.00	32.73	5726
60	350	1.10	39.50	34.71	6615

**60°
Bend**
Bell x Bell

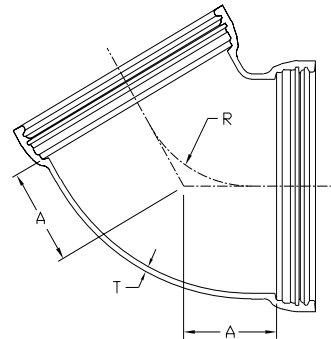


INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	19.00	25.98	3270
48	350	1.42	21.00	29.44	4327
54	350	1.55	24.00	34.50	5831

SPECIFICATIONS-FITTINGS

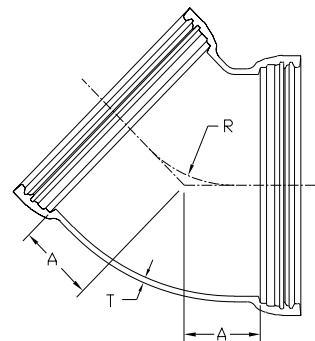
BENDS (Continued)

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	18.00	25.25	2416
48	350	0.90	20.00	28.40	3329
54	350	1.05	24.00	34.78	4977
60	350	1.10	24.00	35.31	5550



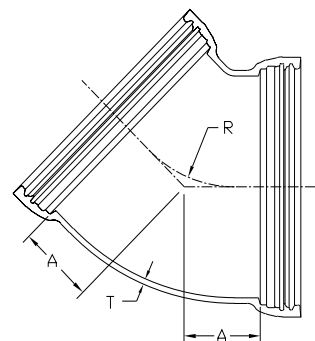
60° Bend
Compact
Bell x Bell

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	14.00	26.56	2743
48	350	1.42	15.00	28.97	3893
54	350	1.55	20.50	41.05	5420
60	350	1.50	21.50	45.48	6057
64	350	1.50	22.50	47.78	6650



45° Bend
Bell x Bell

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	13.00	25.25	2177
48	350	0.90	14.50	28.40	3000
54	350	1.05	20.50	35.73	4749
60	350	1.10	21.50	39.71	5395

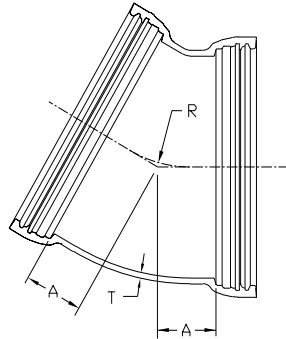


45° Bend
Compact
Bell x Bell

SPECIFICATIONS-FITTINGS

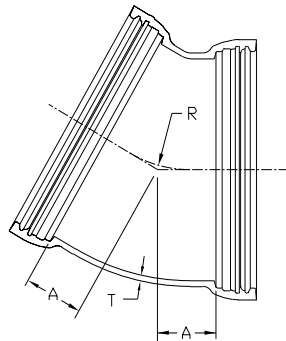
BENDS (Continued)

**30°
Bend**
Bell x Bell



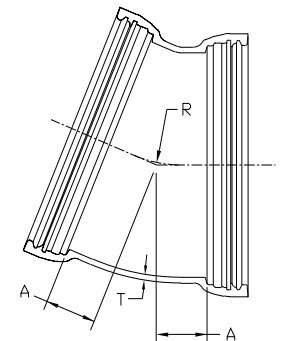
INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	12.00	29.86	2731
48	350	1.42	14.00	37.32	3693
54	350	1.55	16.00	44.50	4997
60	350	1.50	19.00	55.38	5865
64	350	1.50	18.50	58.93	5982

**30°
Bend**
Compact
Bell x Bell



INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	10.00	25.25	2026
48	350	0.90	11.00	28.40	2779
54	350	1.05	16.00	35.73	4375
60	350	1.10	19.00	39.71	5194

**22.5°
Bend**
Bell x Bell

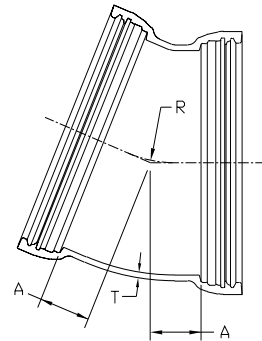


INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	9.00	30.16	2610
48	350	1.42	10.00	35.19	2590
54	350	1.55	14.00	34.24	4692
60	350	1.50	12.00	39.41	4885
64	350	1.50	11.00	41.68	5278

SPECIFICATIONS-FITTINGS

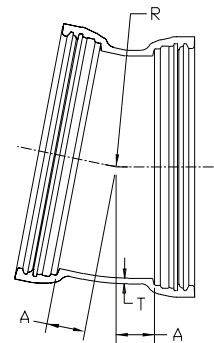
BENDS (Continued)

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	8.00	25.25	1917
48	350	0.90	9.00	28.40	2643
54	350	1.05	12.00	35.73	4007
60	350	1.10	12.00	39.71	4463



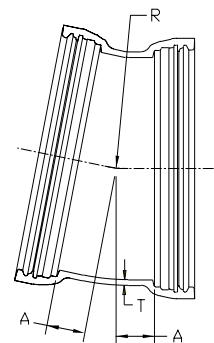
**22.5°
Bend**
Compact
Bell x Bell

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	9.00	60.92	2616
48	350	1.42	10.00	71.07	3350
54	350	1.55	5.10	30.81	3407
60	350	1.50	8.50	44.07	4230
64	350	1.50	7.00	43.56	4245



**11.25°
Bend**
Bell x Bell

INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	6.00	24.82	1894
48	350	0.90	7.50	27.90	2695
54	350	1.05	8.00	32.05	3460
60	350	1.10	8.00	35.10	3771



**11.25°
Bend**
Compact
Bell x Bell

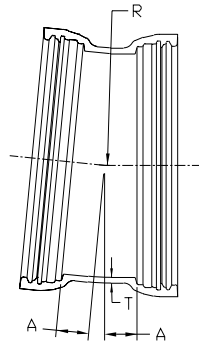
SPECIFICATIONS-FITTINGS

BENDS (Continued)

5.625°

Bend

Bell x Bell

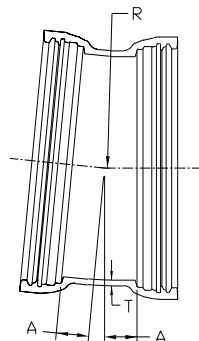


INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	1.28	9.00	101.78	2583
48	350	1.42	10.00	122.13	3358
54	350	1.55	11.00	161.29	4329
60	350	1.50	8.50	88.34	4252
64	350	1.50	7.00	87.33	4247

5.625°

Bend

Compact
Bell x Bell

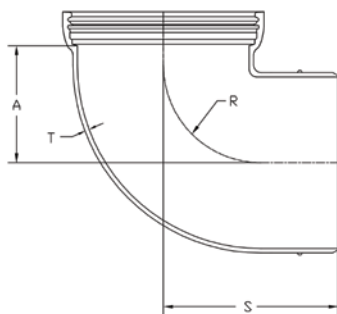


INCHES	PSI	INCHES			POUNDS
SIZE	PRESSURE RATING	DIMENSIONS			WEIGHT
		T	A	R	
42	350	0.82	5.00	25.25	1684
48	350	0.90	5.25	28.40	2378
54	350	1.05	8.00	35.73	3635
60	350	1.10	8.50	39.71	4101

90°

Bend

Compact
Bell x PE

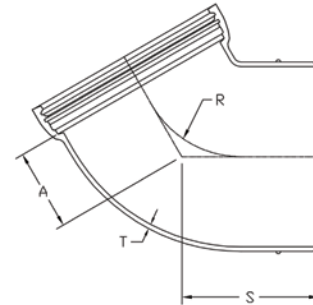


INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	28.00	38.00	25.75	2330
48	350	0.90	31.50	41.50	28.90	3206
54	350	1.05	37.00	47.00	32.73	4804
60	350	1.10	39.50	49.50	34.71	5594

SPECIFICATIONS-FITTINGS

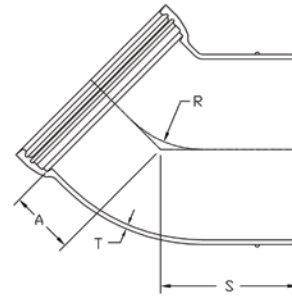
BENDS (Continued)

INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	18.00	28.00	25.25	1976
48	350	0.90	20.00	30.00	28.40	2692
54	350	1.05	24.00	34.00	34.78	4019
60	350	1.10	24.00	34.00	35.31	4509



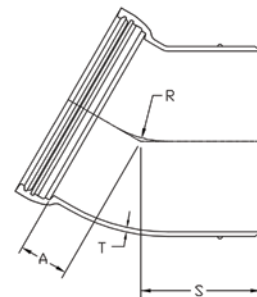
60° Bend
Compact
Bell x PE

INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	13.00	23.00	25.25	1736
48	350	0.90	14.50	24.50	28.40	2363
54	350	1.05	20.50	30.50	35.73	3792
60	350	1.10	21.50	31.50	39.71	4336



45° Bend
Compact
Bell x PE

INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	10.00	20.00	25.25	1586
48	350	0.90	11.00	21.00	28.40	2143
54	350	1.05	16.00	26.00	35.73	3417
60	350	1.10	19.00	29.00	39.71	4134



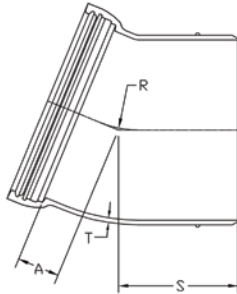
30° Bend
Compact
Bell x PE

SPECIFICATIONS-FITTINGS

BENDS (Continued)

22.5° Bend

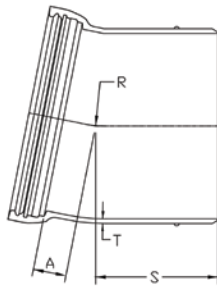
Compact
Bell x PE



INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	8.00	18.00	25.25	1477
48	350	0.90	9.00	19.00	28.40	2006
54	350	1.05	12.00	22.00	35.73	3049
60	350	1.10	12.00	22.00	39.71	3404

11.25° Bend

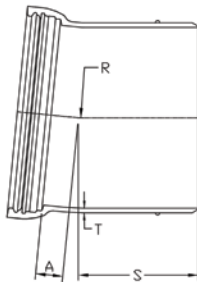
Compact
Bell x PE



INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	5.75	15.75	25.25	1351
48	350	0.90	6.50	16.50	28.40	1831
54	350	1.05	10.00	20.00	35.73	2866
60	350	1.10	8.50	18.50	39.71	3040

5.625° Bend

Compact
Bell x PE

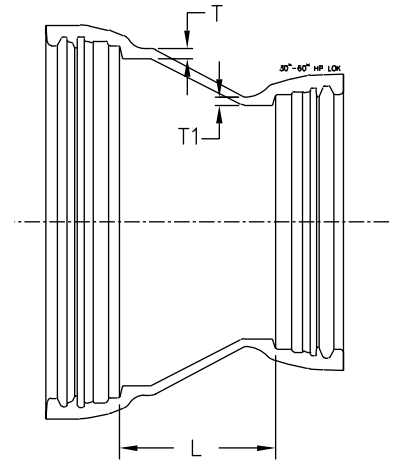


INCHES	PSI	INCHES				POUNDS
SIZE	PRESSURE RATING	DIMENSIONS				WEIGHT
		T	A	S	R	
42	350	0.82	5.00	15.00	25.25	1276
48	350	0.90	5.25	15.25	28.40	1742
54	350	1.05	8.00	18.00	35.73	2678
60	350	1.10	8.50	18.50	39.71	3041

SPECIFICATIONS - FITTINGS

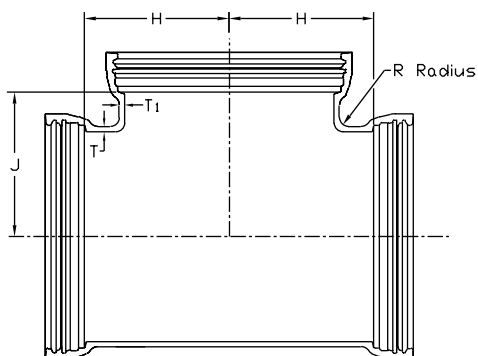
REDUCERS

INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
LEB	SEB	L	T	T1	
42	20 TR FLEX	42.0	1.28	0.80	2192
42	24 TR FLEX	42.0	1.28	0.89	2371
42	30 HP LOK	20.0	1.28	1.03	1887
42	36 HP LOK	20.0	1.28	1.15	2130
48	24 TR FLEX	48.0	1.42	0.89	3080
48	30 HP LOK	48.0	1.42	1.03	3404
48	36 HP LOK	36.0	1.42	1.15	3258
48	42 HP LOK	36.0	1.42	1.28	3655
54	24 TR FLEX	38.0	1.55	0.89	3176
54	30 HP LOK	32.0	1.55	1.03	3218
54	36 HP LOK	28.0	1.55	1.15	3314
54	42 HP LOK	25.0	1.55	1.28	3489
54	48 HP LOK	18.0	1.55	1.42	3540
60	30 HP LOK	35.4	1.50	1.03	3470
60	36 HP LOK	30.0	1.50	1.15	3539
60	42 HP LOK	24.0	1.50	1.28	3589
60	48 HP LOK	18.0	1.50	1.42	3669
60	54 HP LOK	13.0	1.50	1.55	3731
64	36 HP LOK	32.5	1.50	1.15	3866
64	42 HP LOK	27.5	1.50	1.28	3980
64	48 HP LOK	22.5	1.50	1.42	4128
64	54 HP LOK	15.5	1.50	1.55	4073
64	60 HP LOK	12.5	1.50	1.50	3965



SPECIFICATIONS - FITTINGS

TEES



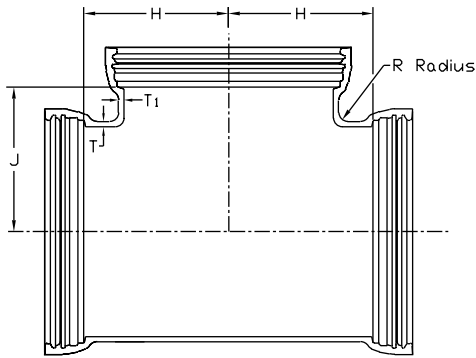
INCHES	
BELL SIZE/TYPE	DIMENSIONS
	T or T1
42 HP LOK	1.28
48 HP LOK	1.42
54 HP LOK	1.55
60 HP LOK	1.50
64 HP LOK	1.50

INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
RUN	BRANCH	H	J	R	
42	12 TR FLEX	20.0	30.0	3.0	3641
42	14 TR FLEX	20.0	30.0	3.0	3467
42	16 TR FLEX	20.0	30.0	3.0	3495
42	18 TR FLEX	20.0	30.0	3.0	3522
42	20 TR FLEX	20.0	30.0	3.0	3561
42	24 TR FLEX	20.0	30.0	3.0	3641
42	30 HP LOK	31.0	31.0	4.0	4786
42	36 HP LOK	31.0	31.0	4.0	5011
42	42 HP LOK	31.0	31.0	4.0	5491
48	12 TR FLEX	26.0	34.0	4.0	5170
48	14 TR FLEX	26.0	34.0	4.0	5208
48	16 TR FLEX	26.0	34.0	4.0	5235
48	18 TR FLEX	26.0	34.0	4.0	5261
48	20 TR FLEX	26.0	34.0	4.0	5299
48	24 TR FLEX	26.0	34.0	4.0	5375
48	30 HP LOK	26.0	34.0	4.0	5510
48	36 HP LOK	34.0	34.0	4.0	6596
48	42 HP LOK	34.0	34.0	4.0	6897
48	48 HP LOK	34.0	34.0	4.0	7559
54	30 HP LOK	31.0	37.0	2.5	7469
54	36 HP LOK	31.0	37.0	2.5	7623
54	42 HP LOK	31.0	39.0	2.5	7954
54	48 HP LOK	31.0	39.0	2.5	8380
54	54 HP LOK	35.8	35.8	2.5	9615
60	30 HP LOK	31.0	42.0	2.5	7899
60	36 HP LOK	31.0	42.0	2.5	8080
60	42 HP LOK	41.0	43.0	2.5	9854
60	48 HP LOK	41.0	43.0	2.5	10284
60	54 HP LOK	41.0	43.0	2.5	10849
60	60 HP LOK	41.0	41.0	2.5	11112
64	36 HP LOK	29.5	44.0	2.5	8394
64	42 HP LOK	45.5	45.0	2.5	11205
64	48 HP LOK	45.5	45.0	2.5	11601
64	54 HP LOK	45.5	46.0	2.5	12172
64	60 HP LOK	45.5	44.0	2.5	12198
64	64 HP LOK	45.5	45.5	2.5	12840

Table continued on next page. ►

SPECIFICATIONS - FITTINGS

COMPACT TEES



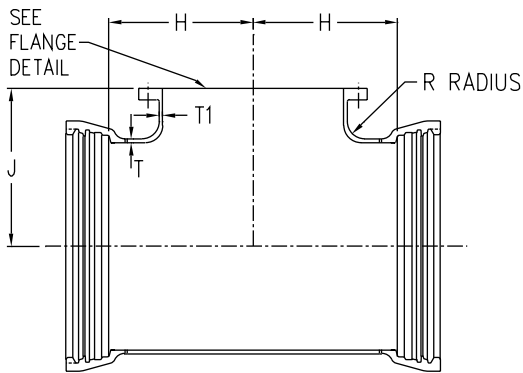
INCHES	
BELL SIZE/TYPE	DIMENSIONS
	T or T1
42 HP LOK	0.82
48 HP LOK	0.90
54 HP LOK	0.90
60 HP LOK	0.94
64 HP LOK	0.99

INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
RUN	BRANCH	H	J	R	
42	12 TR FLEX	—	—	—	
42	14 TR FLEX	—	—	—	—
42	16 TR FLEX	—	—	—	—
42	18 TR FLEX	—	—	—	—
42	20 TR FLEX	—	—	—	—
42	24 TR FLEX	—	—	—	—
42	30 HP LOK	—	—	—	—
42	36 HP LOK	—	—	—	—
42	42 HP LOK	28.5	28.5	4.0	3848
48	12 TR FLEX	—	—	—	—
48	14 TR FLEX	—	—	—	—
48	16 TR FLEX	—	—	—	—
48	18 TR FLEX	—	—	—	—
48	20 TR FLEX	23.0	32.0	—	3871
48	24 TR FLEX	23.0	32.0	—	3940
48	30 HP LOK	23.0	32.0	—	4059
48	36 HP LOK	—	—	—	—
48	42 HP LOK	—	—	—	—
48	48 HP LOK	32.0	32.0	4.0	5312
54	30 HP LOK	31.0	37.0	4.5	6235
54	36 HP LOK	31.0	37.0	4.5	6315
54	42 HP LOK	36.0	39.0	4.5	7067
54	48 HP LOK	36.0	39.0	4.5	7354
54	54 HP LOK	37.0	37.0	4.5	7957
60	30 HP LOK	31.0	42.0	6.0	6959
60	36 HP LOK	31.0	42.0	6.0	7047
60	42 HP LOK	41.0	43.0	6.0	8373
60	48 HP LOK	41.0	43.0	6.0	8632
60	54 HP LOK	41.0	41.0	6.0	9090
60	60 HP LOK	41.0	41.0	6.0	9438

Table continued on next page. ►

SPECIFICATIONS - FITTINGS

FLANGE TEES



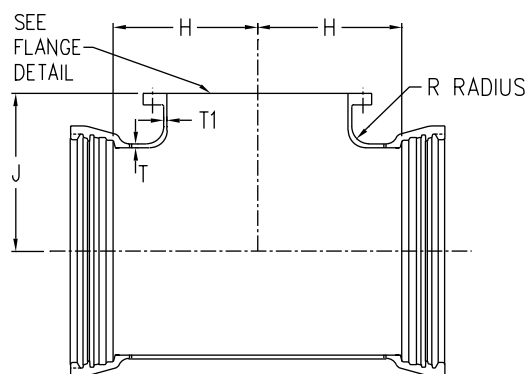
INCHES	
BELL SIZE/TYPE	DIMENSIONS
	T or T1
42 HP LOK/FLG.	1.28
48 HP LOK/FLG.	1.42
54 HP LOK/FLG.	1.55
60 HP LOK/FLG.	1.50
64 HP LOK/FLG.	1.50

INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
RUN	BRANCH	H	J	R	
42	12 FLANGE	20.0	30.0	3.0	3402
42	14 FLANGE	20.0	30.0	3.0	3404
42	16 FLANGE	20.0	30.0	3.0	3421
42	18 FLANGE	20.0	30.0	3.0	3427
42	20 FLANGE	20.0	30.0	3.0	3452
42	24 FLANGE	20.0	30.0	3.0	3498
42	30 FLANGE	31.0	31.0	4.0	4586
42	36 FLANGE	31.0	31.0	4.0	4784
42	42 FLANGE	31.0	31.0	4.0	5190
48	12 FLANGE	26.0	34.0	4.0	5145
48	14 FLANGE	26.0	34.0	4.0	5145
48	16 FLANGE	26.0	34.0	4.0	5161
48	18 FLANGE	26.0	34.0	4.0	5166
48	20 FLANGE	26.0	34.0	4.0	5190
48	24 FLANGE	26.0	34.0	4.0	5232
48	30 FLANGE	26.0	34.0	4.0	5310
48	36 FLANGE	34.0	34.0	4.0	6368
48	42 FLANGE	34.0	34.0	4.0	6596
48	48 FLANGE	34.0	34.0	4.0	7061
54	30 FLANGE	31.0	37.0	2.5	7261
54	36 FLANGE	31.0	37.0	2.5	7383
54	42 FLANGE	31.0	39.0	2.5	7634
54	48 FLANGE	31.0	39.0	2.5	7856
54	54 FLANGE	35.8	39.0	2.5	9092
60	30 FLANGE	31.0	42.0	2.5	7691
60	36 FLANGE	31.0	43.0	2.5	7874
60	42 FLANGE	41.0	43.0	2.5	9534
60	48 FLANGE	41.0	43.0	2.5	9760
60	54 FLANGE	41.0	43.0	2.5	10096
60	60 FLANGE	41.0	43.0	2.5	10749
64	36 FLANGE	29.5	44.0	2.5	8154
64	42 FLANGE	45.5	45.0	2.5	10885
64	48 FLANGE	45.5	45.0	2.5	11077
64	54 FLANGE	45.5	46.0	2.5	11419
64	60 FLANGE	45.5	46.0	2.5	11835
64	64 FLANGE	45.5	48.5	2.5	12875

Table continued on next page. ►

SPECIFICATIONS - FITTINGS

FLANGE COMPACT TEES

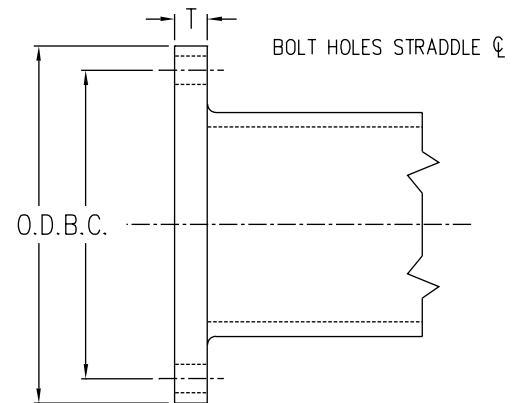


INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
RUN	BRANCH	H	J	R	
54	30	31.0	37.0	4.5	6053
54	36	31.0	37.0	4.5	6205
54	42	36.0	39.0	4.5	6868
54	48	36.0	39.0	4.5	7057
54	54	37.0	39.0	4.5	7379
60	30	31.0	42.0	6.0	6772
60	36	31.0	42.0	6.0	6936
60	42	41.0	43.0	6.0	8175
60	48	41.0	43.0	6.0	8267
60	54	41.0	43.0	6.0	8511
60	60	41.0	43.0	6.0	9141

SPECIFICATIONS - FITTINGS

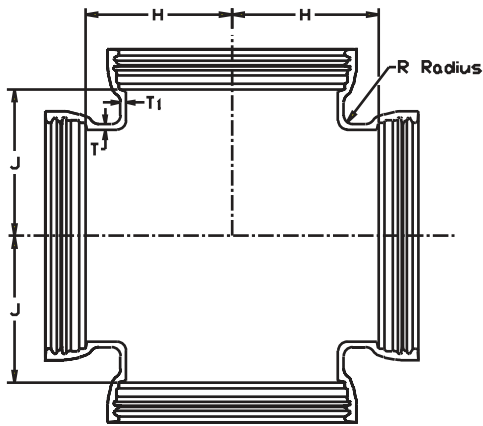
FLANGE DETAILS

INCHES					
SIZE	DIMENSIONS				NO. OF BOLTS
	OD	BC	T	BOLT HOLE DIA.	
42	53.00	49.50	2.62	1.625	36
48	59.50	56.00	2.75	1.625	44
54	66.25	62.75	3.00	2.000	44
60	73.00	69.25	3.12	2.000	52
64	80.00	76.00	3.38	2.000	52



SPECIFICATIONS - FITTINGS

CROSSES



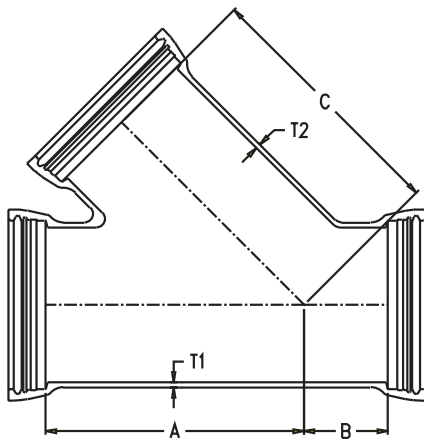
INCHES	
BELL SIZE/TYPE	DIMENSIONS
	T or T1
42 HP LOK/FLG.	1.28
48 HP LOK/FLG.	1.42
54 HP LOK/FLG.	1.55
60 HP LOK/FLG.	1.50
64 HP LOK/FLG.	1.50

INCHES					POUNDS
SIZE		DIMENSIONS			WEIGHT
RUN	BRANCH	H	J	R	
42	2 TR FLEX	23.0	30.0	3.0	3796
42	14 TR FLEX	23.0	30.0	3.0	3875
42	16 TR FLEX	23.0	30.0	3.0	3931
42	18 TR FLEX	23.0	30.0	3.0	3985
42	20 TR FLEX	23.0	30.0	3.0	4063
42	24 TR FLEX	23.0	30.0	3.0	4224
42	30 HP LOK	31.0	31.0	4.0	5275
42	36 HP LOK	31.0	31.0	4.0	5725
42	42 HP LOK	31.0	31.0	4.0	6683
48	12 TR FLEX	26.0	34.0	4.0	5275
48	14 TR FLEX	26.0	34.0	4.0	5351
48	16 TR FLEX	26.0	34.0	4.0	5405
48	18 TR FLEX	26.0	34.0	4.0	5457
48	20 TR FLEX	26.0	34.0	4.0	5532
48	24 TR FLEX	26.0	34.0	4.0	5685
48	30 HP LOK	26.0	34.0	4.0	5955
48	36 HP LOK	34.0	34.0	4.0	7229
48	42 HP LOK	34.0	34.0	4.0	7830
48	48 HP LOK	34.0	34.0	4.0	9156
54	30 HP LOK	31.0	37.0	4.0	7857
54	36 HP LOK	31.0	37.0	4.0	8164
54	42 HP LOK	31.0	39.0	4.0	8827
54	48 HP LOK	31.0	39.0	4.0	9579
54	54 HP LOK	35.8	35.8	3.8	11479
60	30 HP LOK	31.0	42.0	4.0	8367
60	36 HP LOK	31.0	42.0	4.0	8730
60	42 HP LOK	41.0	43.0	4.0	10815
60	48 HP LOK	41.0	43.0	4.0	11676
60	54 HP LOK	41.0	43.0	4.0	12805
60	60 HP LOK	41.0	41.0	4.0	13331
64	36 HP LOK	29.5	44.0	—	8994
64	48 HP LOK	45.5	45.0	—	12157
64	48 HP LOK	45.5	45.0	—	12960
64	54 HP LOK	45.5	46.0	—	14100
64	60 HP LOK	45.5	44.0	—	14153
64	64 HP LOK	45.5	45.5	—	15436

Table continued on next page. ►

SPECIFICATIONS - FITTINGS

WYES



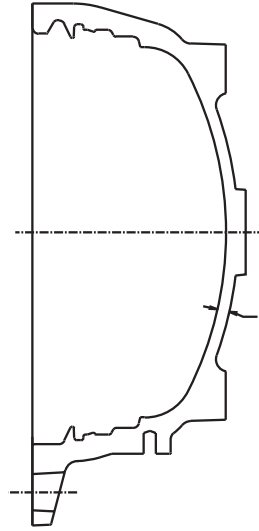
		INCHES					POUNDS
SIZE		DIMENSIONS					WEIGHT
RUN	BRANCH	A	B	C	T1	T2	
42	24 TR FLEX	69.0	19.5	69.0	1.78	1.16	8075
42	30 HP LOK	69.0	19.5	69.0	1.78	1.37	8512
42	36 HP LOK	69.0	19.5	69.0	1.78	1.58	9020
42	42 HP LOK	69.0	19.5	69.0	1.78	1.78	9628
48	24 TR FLEX	77.5	21.5	77.5	1.96	1.16	10985
48	30 HP LOK	77.5	21.5	77.5	1.96	1.37	11453
48	36 HP LOK	77.5	21.5	77.5	1.96	1.58	11998
48	42 HP LOK	77.5	21.5	77.5	1.96	1.78	12647
48	48 HP LOK	77.5	21.5	77.5	1.96	1.96	13407

SPECIFICATIONS-ACCESSORIES

CAPS & PLUGS

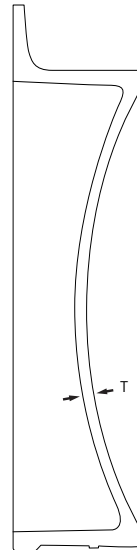
Caps

INCHES		POUNDS
SIZE	DIMENSIONS	WEIGHT
	T	
42	1.0	1729
48	1.3	2078
54	1.5	2769
60	1.6	3292
64	1.7	3889



Plugs

INCHES		POUNDS
SIZE	DIMENSIONS	WEIGHT
	T	
42	1.3	1291
48	1.4	1793
54	1.5	2252
60	1.8	2555
64	1.8	3125



NOTES

U.S. Pipe, A Quikrete® Company, is the leading manufacturer and a principal supplier of highly engineered ductile iron pipe and fabrication in the United States and Canada. Providing custom solutions to owners, engineers and contractors for even the most demanding applications, including water transmission and distribution lines, plant piping, intake and outfall lines, and other diverse applications.

U.S. Pipe, A Quikrete® Company, is the leading manufacturer and a principal supplier of highly engineered ductile iron pipe and fabrication in the United States and Canada. Providing custom solutions to owners, engineers and contractors for even the most demanding applications, including water transmission and distribution lines, plant piping, intake and outfall lines, and other diverse applications.

NOTES

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