

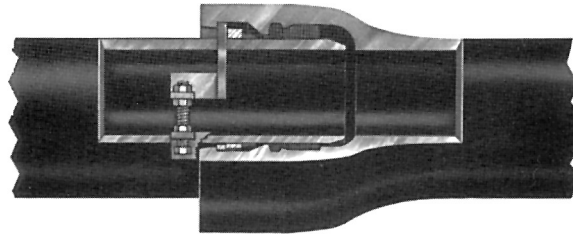


**AMERICAN DUCTILE IRON PIPE**

## **AMERICAN Ductile Iron Lok-Ring® Joint Pipe**

**Centrifugally Cast for Water, Sewage, or Other Liquids**

**64"**



The AMERICAN Lok-Ring® Joint is another restrained joint that utilizes the sealing features of the time-proven AMERICAN Fastite Joint. It is an essentially boltless, flexible restrained connection that provides an easily assembled positive restraint against endwise separation due to thrust resulting from internal pressure or external forces. Only a minimal amount of time is required to complete the Lok-Ring assembly, or disassembly if necessary.

The patented\* AMERICAN Lok-Ring® Joint is 64" and designed for working pressures up to 250 psi. It can be used with any lesser pressure class of ductile iron pipe with the maximum operating pressure rating of the joint limited in such cases to that of the pipe. An alloy steel welded-on retainer ring and a split lok-ring, assembled behind the retainer ring, provide the means of restraint. The split lok-ring is held "snug" against the pipe O.D. for assembly of the AMERICAN Fastite portion of the joint. After the plain end of the pipe is assembled into the Lok-Ring bell, the lok-ring is released, permitting it to expand. The lok-ring is thus securely positioned behind the welded-on retainer ring and in the socket locking groove on the I.D. of the Lok-Ring bell. This locks the joint.

The joint can be easily disassembled if the need arises, using the closure-spreader mechanism provided for this purpose. The lok-ring, welded retainer ring and all parts of the closure-spreader mechanism are all constructed of cor-

rosion-resistant, high-strength, low-alloy (HSLA) steel. This is the same type steel specified for bolting material per ANSI/AWWA C111/A21.11. The alloy steel of the lok-ring and the welded retainer ring is also the same material that has been used successfully in several AMERICAN restrained joint constructions for approximately 40 years. The weld is aluminum bronze (also as was used in the Lok-Fast Joint), and both the weld and ring are cathodic to, and thus protected by, the greater area of the ductile iron pipe. Welding is performed using welders qualified to produce high-quality, dependable welds.

Standard Fastite gaskets and lubricant are used with the AMERICAN Lok-Ring® Joint. (See Section 2 for gasket compounds.) AMERICAN recommends underwater lubricant where the joint is to be assembled in very wet conditions or under water.

The AMERICAN Lok-Ring® Joint is designed to permit deflection in order to facilitate installation and accommodate settlement. It may be safely deflected after assembly to the limits shown in Table No. 9-8. These deflection values have proven adequate for thousands of Lok-Ring joints furnished over the past several years and exceed the deflection capabilities of many types of restrained joints that have performed successfully for many years in buried service. It is noted that rotation of the lok-ring under great loads helps to distribute the forces substantially around and between the bell and spigot members.

\* U.S. Patents 4,428,604 and 4,524,505.



## AMERICAN Ductile Iron Lok-Ring® Joint Pipe

### Centrifugally Cast for Water, Sewage, or Other Liquids

AMERICAN Lok-Ring® Pipe is ductile iron, grade 60-42-10, manufactured and tested in accordance with AWWA C151. It is normally furnished standard asphaltic coated outside and cement lined in accordance with AWWA C104. When specified, other special coatings or linings can be furnished as described in Section 11.

A full complement of AMERICAN Lok-

Ring ductile iron fittings is available. These fittings are available in both bell-bell and bell-plain end configurations for installation versatility and economy. Lok-Ring fittings meet applicable requirements of ANSI/AWWA C153/A21.53 and are pressure rated for at least 250 psi in most configurations. Check AMERICAN if higher pressure is required. See Section 4.

#### Standard Dimensions

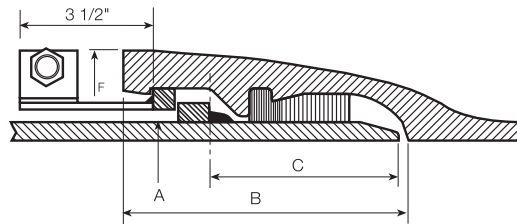


Table No. 9-6

Size in.	Working Pressure* psi	Nominal Laying Length† ft.	A Outside Diameter in.	B Socket Depth in.	C Plain End to Retaining Ring in.	F Bell O.D.†† in.	Retainer Ring	Lok-Ring
64	250	20	65.67	10.57	6.38	70.45	3/4" x 1 1/4"	3/4" x 1 1/4"

\*Working pressure is the maximum pressure rating of the joint and is based on its capability to resist thrust due to internal pressure. If higher working pressure is required, check AMERICAN.

†Laying length is nominal 20 feet. Where exact lengths are required, contact AMERICAN. (See minimum laying lengths in Table No. 9-7.)

††Dimensions subject to change at our option. Check AMERICAN if smaller or exact dimensions are required. Note that the struts may protrude slightly above the bell in one spot; contact AMERICAN if this may be critical to the application.



## AMERICAN Ductile Iron Lok-Ring® Joint Pipe

### Minimum Laying Lengths

Table No. 9-7

Size in.	Lok-Ring & Lok-Ring End	Lok-Ring End & Lok-Ring End
64	2'-6"	3'-0"

### Allowable Joint Deflection

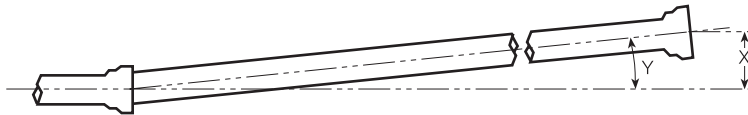


Table No. 9-8

Size in.	Nominal Laying Length ft.	Maximum Recommended Deflection	
		X Offset* per Length in.	Y Deflection Angle
64	20	2	1/2°

\*Offset distances are based on 20' lengths of pipe.



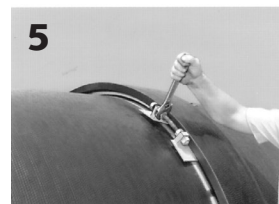
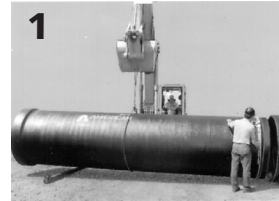
## AMERICAN Ductile Iron Lok-Ring® Joint Pipe Assembly Instructions

Thoroughly clean the socket locking groove as well as the Fastite gasket recess and pipe plain end, being sure to remove any mud, gravel, or any other foreign matter. Insert standard Fastite gasket and lubricate the joint components in accordance with standard Fastite assembly instructions and, with pipe in essentially straight alignment, assemble the plain end into the Lok-Ring bell. **(Photos 1 & 2.)** Assembly tools shown in **Photo 2** are available from AMERICAN on a rental basis for installers not electing assembly with a backhoe or other like equipment.

Once the spigot is completely inserted as evidenced by the spigot stripe disappearing into the bell (the orientation of the spigot stripe in relationship to the bell face is an indication of pipe alignment), loosen the outside stud closure nuts fully to the end of the stud to allow the lok-ring to spring outward and into the socket locking groove.\* In lieu of the outside stud closure nut provided for this purpose, some installers prefer to install a "quick release" locking clamp or grip device beforehand (e.g., "outside the trench") and back the outside closure nut out of the way for very rapid assembly. **(Photo 3.)** The correct seating\*\* of the lok-ring in the socket locking groove should be accompanied by an obvious spreading of the lok-ring struts. If

inspection around the joint reveals that the lok-ring is not completely seated in the annular socket locking groove at any location, the lok-ring may be completely seated by tapping the loose lok-ring into the socket locking groove with a flat caulking tool and/or by moving the entering pipe slightly. When a visual inspection to determine the lok-ring position is not practical, such as in an underwater installation, **a feeler gauge can be used to ensure that the lok-ring is correctly seated in the socket locking groove all around the joint. (Photo 4.)**

Once the lok-ring is correctly seated in the socket locking groove, turn the inside stud spreader nuts out firmly against the struts **(Photo 5.)** as shown to ensure firm contact of the lok-ring in the socket locking groove. **During the lok-ring spreading operation, the outside stud closure nuts should be positioned so as not to restrict the outward movement of the drilled struts on the stud.** (The outside stud closure nuts perform no function in the finished joint; however, these closure nuts can be used to effect simple disassembly of the joint, if required, by reversing the assembly procedure outlined above.) Once the inside spreader nuts are properly positioned, the lok-ring is positively secured in the socket locking groove.



**\*Note:** The lok-ring is normally shipped in position on the pipe plain end behind the welded-on retainer ring. See page 9-25 if field assembly of lok-ring is required.

**\*\*Note:** It is imperative that the installer verify that the lok-ring is seated outward in the socket locking groove completely around each joint. Lok-rings are painted yellow to visually aid in this verification.



## AMERICAN DUCTILE IRON PIPE

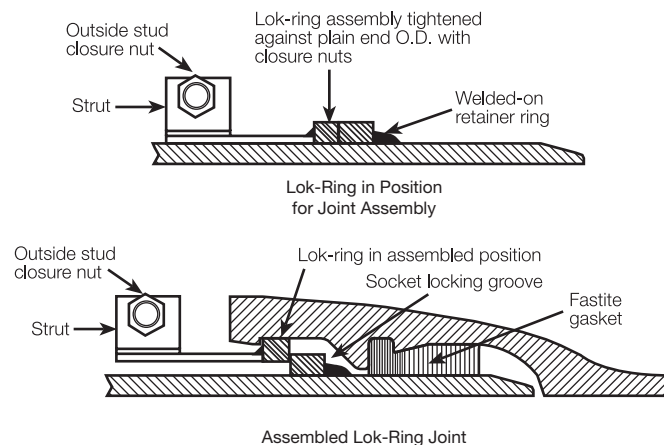
"Backward" installation. AMERICAN does not recommend "backward laying" (bells assembled over spigots, rather than spigots inserted into bells as pictured in this literature) of large-diameter ductile iron pipe in buried installations. AMERICAN can furnish bell and plain end fittings to minimize the need for backward pipe laying.

Other devices such as sleeves and couplings may also be employed for this reason. However, if this condition cannot be avoided, we strongly recommend that installers contact AMERICAN for instructions on how to reduce the potential for problems that could occur when assembling pipe in this manner.

### FIELD ASSEMBLY OF LOK-RING

Should it be necessary to place the lok-ring on the pipe spigot in the field, unscrew and remove one outside stud closure nut to permit the lok-ring to be spread and positioned on the plain end of the pipe behind the welded-on retainer ring.

To complete field placing of the lok-ring on the pipe, reassemble the outside stud closure nut and tighten both outside stud closure nuts to pull lok-ring substantially flush against the pipe barrel and immediately behind the welded-on retainer ring.



NOTE: The AMERICAN Lok-Ring Joint allows for joint take-up after installation. In most underground installations, including most restrained bend locations, this feature is advantageous in that increased thrust-resisting soil forces are generated. Also, expansion and contraction due to temperature variations may be accommodated without excessive stress in the pipe members.

**In any application where axial or lateral movement may be undesirable, such as certain bridge crossings, certain other exposed or unburied piping applications, or certain connections of restrained pipe sections to rigid piping, special design or installation provisions, including effective joint extension, may be necessary to control any unacceptable pipeline movement.**

Depending on job conditions and restrained pipe length, cumulative joint take-up can be substantial, particularly in exposed or unburied piping applications. In this regard, joints may be extended after assembly to minimize further joint take-up in test or service.

The amount of joint take-up or line movement in buried restrained pipelines is substantially limited by the surrounding soil. Therefore, system security and safety is maximized by filling and testing restrained sections of pipelines **after backfilling** as recommended by ANSI/AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances and AWWA M41.