

2007 EDITION

# ROUNDING METHODS

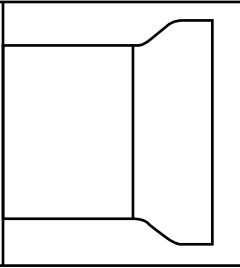
OUT-OF-ROUND 12" AND LARGER DIAMETER  
DUCTILE IRON PIPE



FOR WATER & WASTEWATER, FIRE PROTECTION & INDUSTRIAL APPLICATIONS

**MORE  
THAN  
JUST  
PIPE.**

**U.S.  
PIPE**



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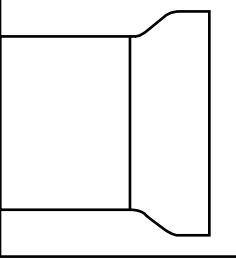


2007 EDITION

P 2

## Table of Contents

Overview	3
Determination of Ovalness	4
Preparation of Out-Of-Round Pipe For Assembly	5
Products for Water, Waste Water and Fire Protection	7



# ROUNDING METHODS



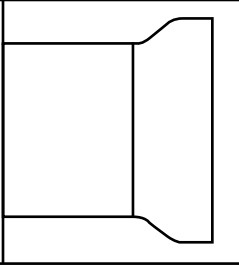
2007 EDITION

P 3

## Overview

Customers have at times experienced difficulties when attempting to socket 12" and larger diameter Ductile Iron Pipe. These joint assembly difficulties are sometimes caused by ovalness (egg shape) of the pipe at the plain end. In a push-on joint, if the pipe is properly beveled, the pipe plain end will round itself to the bell socket throat of the push-on joint before compressing the gasket. While the problem of out-of-round pipe is most often encountered when assembling field cut plain ends of Ductile Iron Pipe into mechanical joint fittings, valves, and other related items the phenomenon may also be encountered with "factory plain ends" should they be subjected to adverse storage conditions and/or handling prior to joint assembly.

U.S. Pipe and Foundry Company, LLC inspects all pipe prior to shipment in accordance with applicable ANSI and AWWA standards which require that the inside of the pipe bell sockets and the outside of the spigot ends be verified with appropriate gauges. The gauging is effected to ensure proper assembly of the pipe joints at the factory ends. This gauging does not, however ensure that other points along the pipe barrel may not be oval and that should the pipe be cut to less than full length in the field, joint assembly problems will not be encountered. It is noted that, while a very rare occurrence, factory plain ends may also be encountered at the installation location with oval plain ends. The following pages address methods that may be employed to eliminate joint assembly problems caused by oval shaped plain end pipe should such be encountered.



# ROUNDING METHODS



2007 EDITION

P 4

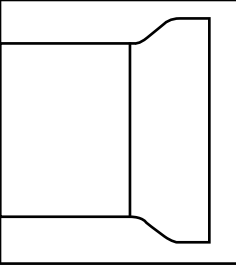
## Determination of Ovalness

When assembly problems are encountered in the field due to pipe ovalness, the first item necessary for remedial action is to determine the location of the maximum and minimum diameters of the pipe spigot end. The maximum and minimum diameters can be located by measuring the diameter of the pipe across several different axes. It is not necessary to have the actual dimensions of the maximum and minimum axes, only their location. The measurements can be made with whatever is available, a rod, stick, rule, or similar measuring device.

Table 1.

PIPE SIZE Inches	PIPE OUTSIDE DIAMETER Inches	
	MAXIMUM	MINIMUM
12	13.26	13.14
14	15.35	15.22
16	17.45	17.32
18	19.55	19.42
20	21.65	21.52
24	25.85	25.72
30	32.08	31.94
36	38.38	38.24
42	44.58	44.44
48	50.88	50.74
54	57.60	57.46
60	61.65	61.51
64	65.71	65.57

**NOTE:** Before cutting a piece of pipe in the field, the diameter of the pipe at the point where the barrel is to be cut must be verified. This is done by measuring the diameter with a diameter tape graduated in 100<sup>th</sup>'s



# ROUNDING METHODS



2007 EDITION

P 5

## Preparation of Out-Of-Round Pipe For Assembly

### Temporary Rounding Method

#### Equipment required:

- Jack (minimum 10 ton capacity recommended). A Port-A-Power type of jack, in which the pump end and reservoir is connected to the cylinder by a hydraulic hose, is most suitable for use when the pipe cannot be moved to orient the minor axis vertically. When the pipe can be oriented, inexpensive bottle jacks can be used successfully.
- 2 Wooden Blocks (hard oak recommended)
- 2 Steel Plates (minimum 1/4" thick and sized to cover the wooden blocks)

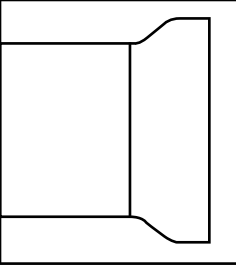
This procedure allows an oval spigot to be temporarily rerounded so that the joint can be socketed with the equipment holding the pipe in round. Once the spigot is homed in the socket and the equipment removed, the watertight integrity of the joint is ensured by the pipe barrel bearing against the throat of a push-on joint or the centering shoulder of the mechanical joint and the compression of the gasket.

It is recommended that some type of pad be used between the jack and the pipe to distribute the load and avoid damage to the lining. Sections of 4" x 4" timber, approximately 6"–8" long and oriented with the longitudinal axis of the pipe are satisfactory. This arrangement is placed in line with the minimum diameter and approximately 4" into the pipe from the spigot end.

Pressure is applied to the jack to extend the minimum diameter while measurements are taken to determine when the minimum and maximum diameters are equal. An alternative to measuring the diameters is to extend the minimum diameter until a solid mechanical joint gland can be slid easily over the pipe spigot end. The spigot end is then socketed. If the joint is a mechanical joint, the gasket is put in place and the gland drawn up with properly torqued bolts prior to release of the Port-A-Power. After joint assembly, the Port-A-Power and other equipment are removed from the pipe. If the procedure is properly used, the cement lining will not be damaged.

**NOTE:** The jack pressure should be released slowly as an abrupt release of pressure will tend to cause the pipe spigot to return to its original oval shape.

Care must be taken while following this procedure to avoid damage to the cement lining of the pipe. Total deflection should be limited to a maximum of three percent (3%) of the pipe barrel outside diameter.



# ROUNDING METHODS



2007 EDITION

P 6

## Preparation of Out-Of-Round Pipe For Assembly (cont.)

### Permanent Rounding Method

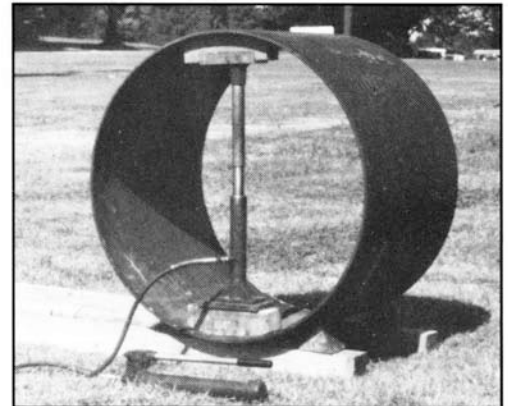
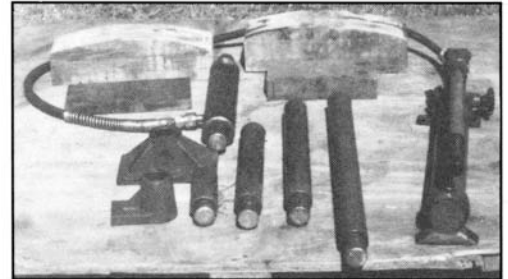
#### Equipment required:

- Hydraulic "Port-A-Power" (minimum 10-ton capacity)
- 2 Wooden Blocks (hard oak recommended)
- 2 Steel Plates (minimum 1/4" thick and sized to cover the wooden blocks)

The procedure is similar to the Temporary Rounding Method except that the pipe is permanently round so that the equipment may be removed from the pipe during the joint assembly operation.

To rround the pipe by this method, the pressure is applied with the jack along the minor diameter until the minor diameter is approximately one half (1/2) inch greater than the major axis. The pressure of the jack is released slowly and the minimum and maximum diameters measured. If the ovalness still exists, the procedure is repeated increasing the minor diameter and additional one-half (1/2) inch, i.e. one (1) inch. If after slowly releasing the jack pressure, the spigot is still found to be oval, the procedure is to be repeated as many times as necessary, each time increasing the stressed minor diameter by one-half (1/2) inch increments.

After the spigot has been rounded, the equipment can be removed and the pipe joint assembled. If the pipe has "rested" for an extended period of time from the rerounding operation to the joint assembly, the roundness should be verified prior to joint assembly.



**NOTE:** The jack pressure should be released slowly as an abrupt release of pressure will tend to cause the pipe spigot to return to its original oval shape.

Care must be taken while following this procedure to avoid damage to the cement lining of the pipe. Total deflection should be limited to a maximum of three percent (3%) of the pipe barrel outside diameter.

# ROUNDING METHODS



2007 EDITION

P 7

## Products for Water, Wastewater and Fire Protection

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

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



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