THOMPSON™
PIPE GROUP
PRESSURE

Concrete Pressure Pipe
Installation Guide

PLEASE NOTE:
All operations described in this guide should be performed in accordance with Occupational Safety and Health Act regulations, state and local codes and recognized safe practices. All material handling equipment illustrated or described in this guide should have sizes and capacities determined by a qualified person

Concrete pressure pipe from Thompson Pipe Group can be installed easily, rapidly and economically because of its inherent ruggedness and its rubber-gasketed, steel joint that assures a watertight pressure connection. The purpose of this guide is to provide useful instructions on the proper methods of installing Thompson Concrete Pressure Pipe.

To help ensure long life and trouble-free service through proper pipe installation, a Thompson Pipe Group field representative is available to offer the benefit of our many years of service.

Note: *The information provided in this installation guide is merely designed to provide helpful information on the subjects discussed. It is not intended to take the place of any manufacturer's installation instructions, safety guidelines, industry standards or practice, or common sense. Thompson Pipe Group is not responsible, and specifically disclaims, any and all liability for any direct or indirect damages of any kind, consequences or the like, to any person or persons utilizing or accessing the information and/or guidelines in this booklet. Furthermore, Thompson does not assume any liability and does not guarantee that the information/guidelines provided herein are free of errors, omissions or defects. Thompson further disclaims any and all warranties and/or guarantees, express or implied, including without limitation, the warranties of merchantability and fitness for a particular purpose. Thompson makes no warranties that the functions, services or information provided herein will be error free or without defect. In no event shall Thompson be liable for damages of any kind, including but not limited to indirect, special, incidental, exemplary, punitive or consequential damages as a result of the information contained in this booklet.*

Planning/Technical Information

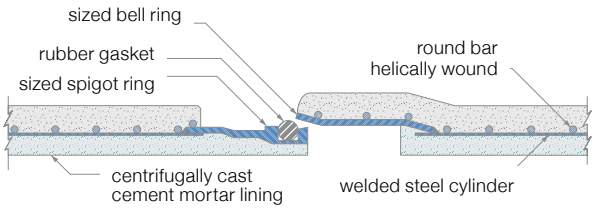
Thompson Pipe Group manufactures four types of Pressure Pipe in diameters ranging from 10 inches to 144 inches, and for pressures up to 400 psi:

- Bar-Wrapped Cylinder Concrete Pipe (B-303)
- Prestressed Concrete Lined Cylinder Pipe (L-301)
- Prestressed Concrete Embedded Cylinder Pipe (E-301)
- Welded Steel Pressure Pipe (S-200)

This guide addresses all concrete pressure pipe and provides tables of weights and dimensions of each in the following pages. Please contact your local sales representative for information on our Welded Steel Pressure Pipe.

Bar-Wrapped Concrete Cylinder Pipe (B-303) combines the physical strength of steel with the structural and protective properties of high strength cement mortar. A round, mild steel bar is helically wrapped around the steel cylinder and all surfaces are encased in cement mortar. This composite pipe reacts as a unit when resisting internal pressure and external loads.

The basis of design provides a safety factor comparable to other waterworks pipe materials for normal service conditions and surge or water hammer. The stress in the steel components at working pressure is limited to one half the yield strength of the steel.



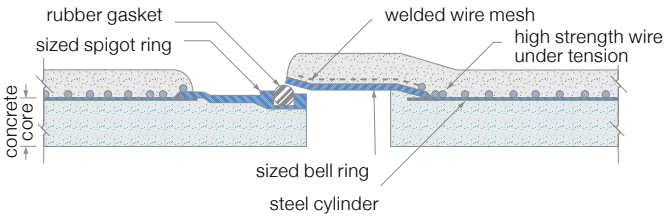
B-303 bar-wrapped concrete cylinder pipe (For pipe made in Florida and Texas)

Typical pipe section				
Pipe I.D.	Nominal O.D. at Bell	Nominal O.D. at Barrel	Nominal Pipe Laying Length	Approximate Pipe Weight (lb/ft)
10"	14-1/2"	13-1/2"	20'	75
12"	16-1/2"	15-1/2"	20'	91
14"	18-1/2"	17-1/2"	20'	100
16"	20-1/2"	19-1/2"	20'	113
18"	23"	22"	20'	141
20"	25"	24"	20' – 32'	157
24"	29"	28"	20' – 32'	188
27"	32"	31"	20' – 40'	222
30"	35"	34"	20' – 40'	247
33"	38"	37"	20' – 40'	282
36"	41"	40"	20' – 40'	316
39"	44"	43"	20' – 40'	347
42"	47"	46"	20' – 40'	375
45"	50"	49"	20' – 40'	416
48"	53"	52"	20' – 40'	450
60"	65"	64"	20' – 40'	557
64"	69"	68"	24'	613
66"	71"	70"	24'	672
72"	77"	76"	24'	735

Note
**Availability of diameters and laying lengths varies by location. Contact your sales representative for more information.*

In Prestressed Concrete Lined Cylinder Pipe (L-301), prestressing is achieved by helically wrapping, under measured tension and at uniform spacing, a high tensile strength wire around the concrete-lined steel cylinder. This wire wrap places the steel cylinder and concrete core in compression, developing the pipe's ability to withstand specified hydrostatic pressures and external loads with a safety factor comparable to other waterworks piping materials.

Concrete's high compressive strength and steel's high tensile strength are combined to form a rigid structure. This feature allows the pipe to perform even when design working loads are exceeded.



L-301 prestressed concrete lined cylinder pipe pipe data sheet (for pipe made in Texas)

Typical pipe section				
Pipe I.D.*	Nominal O.D. at Bell	Nominal O.D. at Barrel	Nominal Pipe Laying Length	Approximate Pipe Weight (lb/ft)
16"	22-1/2"	20"	20'	140
18"	24-3/4"	22-1/4"	24'	155
20"	27"	24-1/2"	24'	185
24"	31-1/2"	29"	32'	240
27"	35"	32-1/2"	32'	290
30"	38-1/4"	35-3/4"	32'	350
33"	41-3/4"	39-1/4"	32'	400
36"	45"	42-1/2"	24'	475
39"	48-1/2"	46"	24'	520
42"	51-3/4"	49-1/4"	20'	590
45"	55-1/4"	52-3/4"	16'	650
48"	58-1/2"	56"	16'	760

L-301 prestressed concrete lined cylinder pipe pipe data sheet (for pipe made in Florida and Illinois)

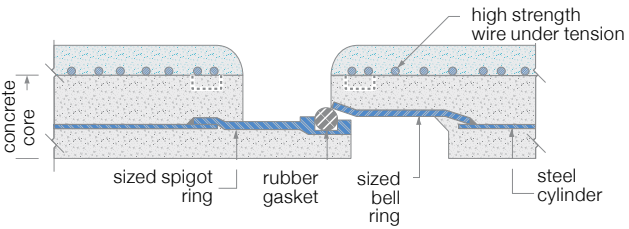
Typical pipe section				
Pipe I.D.*	Nominal O.D. at Bell	Nominal O.D. at Barrel	Nominal Pipe Laying Length	Approximate Pipe Weight (lb/ft)
16"	22-1/2"	20"	20'	140
18"	24-3/4"	22-1/4"	20'	155
20"	27"	24-1/2"	20'	185
24"	31-1/2"	29"	20'	240
30"	38-1/4"	35-3/4"	20'	350
36"	45"	42-1/2"	20'	475
42"	51-1/4"	49-1/4"	20'	590
48"	58"	56"	20'	760

Note

**Availability of diameters and laying lengths varies by location. Contact your sales representative for more information.*

In Prestressed Concrete Embedded Cylinder Pipe (E-301), prestressing is achieved by helically wrapping, under measured tension and at uniform spacing, a high tensile strength wire around the concrete core. This wire wrap places the concrete core and the embedded cylinder in compression, developing the pipe's ability to withstand specified hydrostatic pressures and external loads with a safety factor comparable to other waterworks piping materials.

Concrete's high compressive strength and steel's high tensile strength are combined to form a rigid structure. This feature allows the pipe to perform even if the design working loads are exceeded.



E-301 prestressed concrete embedded cylinder pipe

pipe data sheet (for pipe made in Texas)

Typical pipe section				
Pipe I.D.	Joint Diameter	Nominal Pipe O.D.	Nominal Pipe Laying Length	Approximate Pipe Weight (lb/ft)
54"	58"	64"	20'	1000
60"	64"	70-1/2"	20'	1175
66"	70"	78"	16'	1470
72"	76-1/2"	84-1/2"	24'	1660
78"	82-1/2"	90-1/2"	20'	1790
84"	88-1/2"	96-1/2"	20'	1930
90"	94-1/2"	103-1/2"	20'	2220
96"	100-1/2"	111"	16'	2640
102"	106-1/2"	118"	16'	2990
108"	112-1/2"	124"	16'	3150
114"	118-1/2"	131"	16'	3530
120"	124-1/2"	138"	16'	3930
126"	132-5/8"	145-1/8"	16'	4450
132"	137-7/8"	151"	16'	4535
138"	143-7/8"	158"	16'	4990
144"	149-7/8"	164"	16'	5350

Note

**Availability of diameters and laying lengths varies by location. Contact your sales representative for more information.*

E-301 prestressed concrete embedded cylinder pipe

pipe data sheet (for pipe made in Florida, Illinois)

Typical pipe section				
Pipe I.D.	Joint Diameter	Nominal Pipe O.D.	Nominal Pipe Laying Length	Approximate Pipe Weight (lb/ft)
36"	39"	42-1/2"	20'	450
42"	45"	51"	20'	725
48"	51-1/4"	58"	20'	900
54"	57-3/4"	64"	20'	1000
60"	63-7/8"	71"	20'	1240
66"	70-1/8"	78"	20'	1500
72"	76-3/8"	85"	20'	1780
78"	82-1/2"	92"	20'	2060
84"	88-3/4"	99-1/8"	20'	2390
90"	94-7/8"	105-1/8"	20'	2540
96"	101-1/8"	111-1/8"	20'	2700
102"	106-7/8"	117-1/8"	20'	2900
108"	113-1/8"	123-5/8"	20'	3150
114"	120-5/8"	130-3/8"	20'	3450
120"	126-5/8"	138"	16'	3930
126"	132-5/8"	145-1/8"	16'	4450
132"	138-5/8"	150-5/8"	16'	4550
138"	143-7/8"	158"	16'	4990
144"	150-5/8"	164"	16'	5350

Note

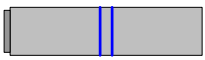
**Availability of diameters and laying lengths varies by location.*
Contact your sales representative for more information.

A **painted stripe** around a pipe means there is something different about the pipe from the standard straight lengths.

1. A **red stripe** means that the pipe has an outlet in it. Two outlets - two red stripes. The stripe is painted at the outlet.

2. A **yellow stripe** means that the pipe has a thrust restraint joint. It could be at both ends or either end.

3. A **blue stripe** around the middle of the pipe means that it is a half bevel. The spigot has center punch marks on the long and short sides. An “L” is painted at the long side, and an “S” is painted at the short side.



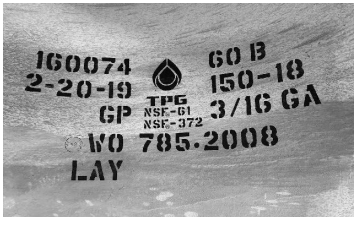
Two blue stripes around the middle means that the pipe is a full bevel.

4. Pipe with a steel cylinder thicker than standard will have the cylinder gauge thickness marked inside the pipe. The spigot ring will also have a paint mark applied to the shank corresponding to the cylinder thickness. The color codes are:

no mark	**=**	**16-gauge cylinder**
yellow	**=**	**14-gauge cylinder**
red	**=**	**12-gauge cylinder**
orange	**=**	**10-gauge cylinder**
white	**=**	**3/16"-plate cylinder**
green	**=**	**1/4"-plate cylinder**
blue	**=**	**3/8"-plate cylinder**
pink	**=**	**5/16"-plate cylinder**

The inside of each pipe section, fitting or special pipe section should be plainly marked with the project number, pipe diameter and pressure class for which the section or fitting is designed. In addition, all fittings and special pipe sections shall be marked with an identifying number or station corresponding to that shown on the layout schedule. All fittings or special sections requiring special field orientation during installation shall be properly marked.

pipe information shown inside



bend short side

markings on a flange

long side of a beveled pipe

Checklist for contractors

Cable sling	For picking up pipe
Pry bars and timbers	To block up and pry the pipe section to proper alignment
Joint lubrication compound	At least 25 pounds of joint lubrication compound to start the job
Brush	Similar to whitewash brush, for applying lubrication compound to joint rings
Joint stoppers	Two, to hold joint open while checking gaskets. Needed only if checking joints with internal feeler gauge
Feeler gauges	To check gaskets, either internal or external type
Grout bands	Grout bands, sometimes referred to as Diapers, furnished by Thompson Pipe Group for retaining outside joint grout
Grout	Type I or II Portland cement (unless a different type of cement is required by project specifications) and clean sand for pouring outside joints
Mortar trough or wheelbarrow	For mixing grout
Banding tools	For tightening or fastening grout bands around pipe

In The Field

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Pipe product supplied by Thompson Pipe Group is inspected at the plant before shipping. However, before unloading, the pipe should be checked for damage that may have occurred during transmit. **Be sure to note any such damage on the delivery transit before accepting the pipe.**

A crane or backhoe outfitted with a steel cable sling on the bucket may be used to unload pipe without supplemental external coating. Multiple slings are often used in handling large pipe and fittings. Chains must not be used to lift pipe. Externally painted pipe should be handled with nylon slings or other lifting devices that will not damage the supplemental external coating.

A forklift may be used if field conditions permit. The uprights of the forklift should be cushioned to prevent damage to the pipe exterior from impact.

Pipe can be stored directly on the ground in non-freezing conditions. If freezing conditions are expected, the pipe must be set on wooden timbers up off of the ground.

Check the rubber gaskets and other miscellaneous materials for quantity and size. If laying operations are not to begin immediately, be sure to store gaskets in a cool place, out of the sun and away from fuel oil, gasoline and other materials that can damage rubber.

unloading the pipe with backhoe using the single sling method

If steel reinforcement on the pipe is exposed due to damaged mortar, that portion of the pipe must be repaired with fresh mortar. Remove all damaged mortar. Mix 3 parts of sharp, clean sand with one part Portland cement. If time is of the essence, a suitable quick-setting mortar mix may be used. Do not use a quick-setting Portland mix that contains chloride accelerators. Also, do not use masonry mortar. The repair mortar should provide a minimum of 3/4" cover over the wire and any exposed steel.

Severed or damaged reinforcement must be repaired. Contact Thompson Pipe Group to obtain the proper repair material.

Spigot and bell rings can sometimes be damaged and deformed during handling. This damage may result in a leaking joint. They can usually be repaired at the jobsite. Give Thompson Pipe Group a call for assistance.

Digging the trench and checking the grade

In most cases, the trench is excavated long enough for one section of the pipe. The trench should be wide enough for a good bedding and backfilling job and within the limits defined in the contract documents.

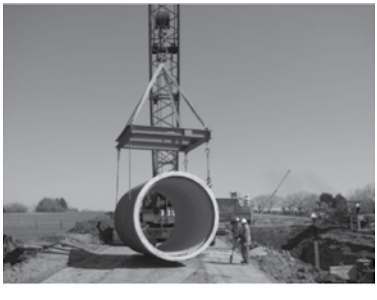
Pipe should not be laid directly on a rock foundation. The grade can be checked with a transit, a level or with a laser.

While the grade is being checked, install one side of a grout band around the bell end of the previous section and fold it back.

preparing the trench for the next pipe length

Slip the lifting sling under the pipe at its balancing point. In most cases a single sling is capable of handling the pipe. However, as dictated by weight and diameter an arrangement of two slings may be needed. This decision is at the contractor's discretion.

backhoe picking pipe up with sling



crane handling pipe using a lifting sling assembly

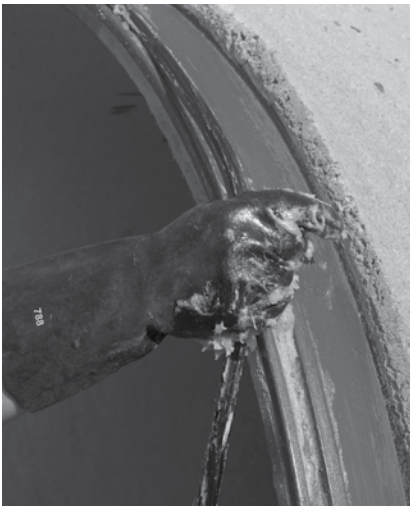
Cleaning and lubricating the joint

The steel joints are manufactured to close tolerances. They must be clean and lubricated properly to slide together easily, thus all dirt and foreign matter must be cleaned from the spigot and bell rings. Lubricate the spigot and gasket separately prior to placing the gasket on the pipe. Lubricate the bell ring's entire inner surface.

Lubricate spigot ring in gasket groove area when the pipe is lowered part way into the trench or just before. At the same time, lubricate the bell ring on the previous pipe. Be sure to keep the lubricated surface free of dirt.

Lubricate the gasket with joint lubricating compound prior to installing it in the spigot groove. Warm if required in cold weather.

CAUTION: *Use only the lubricant supplied by Thompson Pipe Group which is a vegetable type. Petroleum based lubricants will damage the rubber gasket and must not be used.*



Pull a lubricated gasket out of the bucket and stretch it around the spigot. Once the gasket is in place, insert a smooth rod (such as the shaft of a screwdriver) between the gasket and the spigot ring. Run the rod completely around the joint, once in each direction. This stretches the gasket evenly around the spigot and helps to assure a good seal. Now coat the gasket lightly with lubricant.

Quantities of joint lubricant

Pipe Diameter (in.)	Approximate Number of Joints per 25 Pounds of Lubricant
16"	85
18"	74
20"	64
24"	42
30"	38
36"	34
42"	30
48"	25
54"	21
60"	17
66"	16
72"	15
78"	14
84"	13
90"	12
96"	10
102"	8
108"	8
114"	8
120"	7
126"	6
132"	6
138"	5
144"	5

Lower the backhoe boom to most horizontal and keep the bucket in as much as possible. Align the spigot and bell so the spigot will enter the bell squarely. A bottom man can guide the pipe from the bell end.

Then, by engaging the boom hoist, kick out with the bucket pushing the joint home.

Don't let dirt touch the lubricated surfaces. If the pipe is properly aligned with the previously installed section, the pipe will slide in smoothly.

When using a trench box, check the pipe to make sure none of the joints have pulled apart after the trench box is pulled ahead.

crew positions pipe. Prevailing regulations on trench safety must be followed

Fitting joints slide together the same as straight pipe. The long and short sides are marked on the face of the bell and spigot similar to bevel pipe. Pull hoists (come-alongs) can be attached and used to pull the joint home while the backhoe supports the elbow from above.

Accessories such as flange bolts, nuts and gaskets and mechanical joint glands, gaskets, t-bolts and nuts are not normally supplied by Thompson Pipe Group.

Fitting suspended vertically by sling

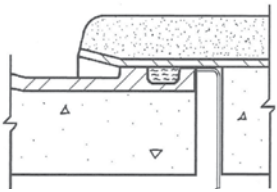
wall pieces

When pouring concrete around a wall piece, be sure to:

1. Brace the wall piece to maintain its roundness before pouring the wall, **or**
2. Join the wall pieces with a pipe section before the wall is poured and leave joined until the concrete wall has cured. This assures that the joint ring in the wall piece maintains its roundness.

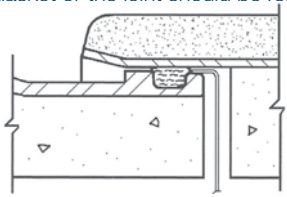
Internal checking 24" and larger standard, deep and restrained joints

The use of joint stoppers allows you to maintain consistent inside joint space. These hold the section apart so you can check the gasket with a feeler gauge. After the joint gasket is checked, remove the joint stoppers and push the joint home or grout the interior joint (where applicable).



The front nose of the spigot fits snugly against the inside surface of the bell ring. Under normal conditions, you will not be able to insert the feeler gauge between the spigot nose and the bell surface due to the snug fit. *If the feeler gauge won't fit between bell and spigot anywhere, it means the joint is okay.*

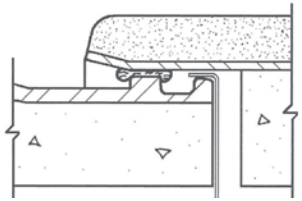
Occasionally, the joint rings may permit the feeler gauge to be inserted over the spigot nose. If this happens, you must be able to feel the gasket or the joint should be remade.

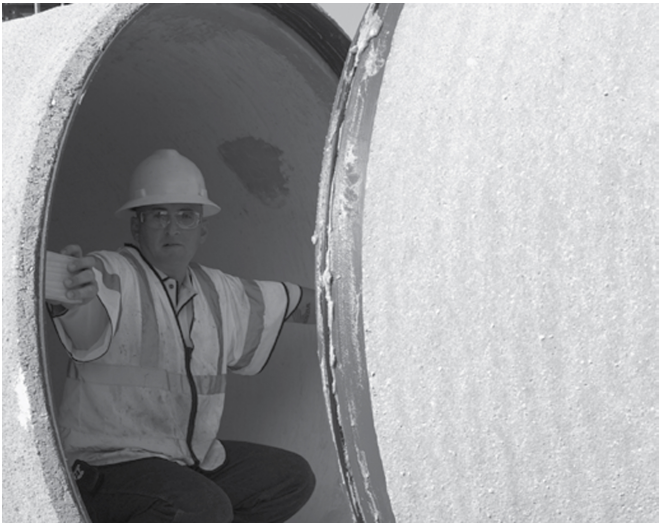


Feeler gauge fits between bell and spigot. If the gasket can be felt, it means the joint is okay. (Check full circumference of joint to make sure gasket is in place anywhere feeler gauge can slip through.)

If the feeler gauge fits between the bell and spigot and the ga ket can't be felt, it indicates the gasket has been rolled or is cut. The joint should be pulled apart and re-made using a new gasket.

Joint stops and internal feeler gauges are not to be used with Snap Ring restrained joints. Use external feeler gauge (see page 29).



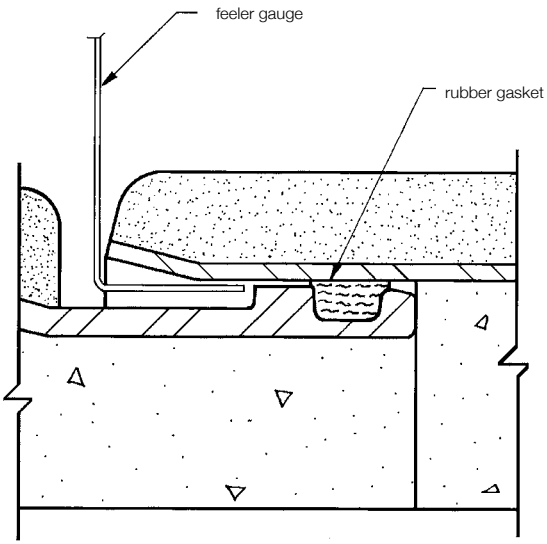


inside man holds joint stoppers in place before spigot end is pushed home

inside feeler gauge in use

External checking of 20" and smaller joints and all snap ring joints

The gaskets on 20" and smaller pipe and all Snap Ring joints must be checked from the outside of the pipe using an external feeler gauge. If the gasket can be felt after the pipe is shoved home, the joint must be disassembled and re-made.



if you feel the gasket, re-make the joint

Gaskets on pipe larger than 20" can also be checked from the exterior as described above.

Grade and line changes

The time to open the joint for grade or alignment changes is after you've joined the pipe straight on. Restrained joints such as the Snap Ring type or the harness clamp type must be homed and the Snap Ring tightened down or the harness clamp installed, respectively, before the joint is opened for deflection

Beveled pipe gives a greater deflection than is possible with a normal joint opening on straight pipe. (See pages 37-45 for deflection tables)

On certain projects it's a good idea to keep a few bevel adapters on hand for unexpected obstacles. (see page 46.)

To protect the exposed steel at the pipe ends, a grout collar is poured around the outside of the joint using the foam-lined grout band provided as a form.

- Place the grout band so it will straddle the joint with the foam side against the concrete and the fabric side out. Tighten the straps making sure the grout band is tight across the bottom and the foam is tight across the pipe.
- Mix one part Portland cement (use ASTM C150 type I or type II unless another type is specified) to three parts sand with enough water to provide a free-flowing grout that can be poured from the bucket.
- Pour the grout into the joint to fill the grout band around the full circumference.

On larger pipe sizes, fill only one-third of the grout band at a time, allowing grout to set between pours or place backfill around the bottom one-third of the grout band to provide support while the entire grout band is filled. Precautions should be taken such that the grout band is not pressed against the pipe preventing grout from flowing into the bottom of the joint.

grout band attached to pipe with steel straps sewn into the hems

pouring of fresh grout into the diaper band.

Interior joint protection

For pipe carrying untreated sanitary sewage or seawater, the interior surfaces of the joint rings must be protected in one of the following ways:

- Thompson Pipe Group can paint the portions of the joint rings that will be in contact with the water.
- A 1:3 stiff mortar mix of Portland cement and sand is applied by the installing contractor to the interior joint recess.
- The contractor shall apply a butyl rubber mastic joint filler to the spigot end or bell socket prior to joining the pipe such that the mastic squeezes out and fills the interior joint recess.

For pipe carrying fresh water (raw or potable or treated sewage, no field applied interior joint protection is required if the 4 mil zinc protective coating is on our joint rings. However, the engineer's specifications should be followed when mortaring is indicated.

Standard and restrained joints

Pipe Diameter	Cubic Feet of Grout Per Standard Joint (approximately)	Cubic Feet of Grout Per Mechanically Restrained Joint
16"	0.26	0.73
18"	0.28	0.81
20"	0.30	0.86
24"	0.37	1.06
30"	0.45	1.32
36"	0.53	1.57
42"	0.85	1.77
48"	0.96	2.02
54"	1.27	3.18
60"	1.46	4.50
66"	1.66	5.03
72"	1.87	5.75
78"	2.09	6.55
84"	2.32	7.36
90"	2.45	7.83
96"	2.56	8.24
102"	3.20	8.87
108"	3.41	9.26
114"	3.50	9.92
120"	3.93	10.29
126"	4.26	10.96
13"	4.36	11.32
138"	4.66	12.00
144"	4.97	12.35

Backfilling and compacting a ound and over the pipe should be done in accordance with the contract specifications.

In the case of semi-rigid pipe (B-303), the load-carrying capabilities of the pipe can only be realized if the pipe is uniformly supported along the bottom, under the haunches and up the sides as high as called for in the bedding specifications. Rigid pipe (L-301 and E-301), although not as dependent on highly-compacted backfill for its load-carrying capabilities, must be uniformly supported along its bottom and under the haunches to prevent future settling or movement.

backhoe is used to backfill pipe

Most project specifications require the performance of a post-construction hydrostatic pressure test to confirm watertightness. For very long lines, it is sometimes convenient to test shorter sections as they are completed rather than wait and test the entire project at one time. Air testing of a pipeline is dangerous and should never be attempted. The procedure for hydrostatic field testing of the completed pipeline is contained in the contract specifications. These are several key points to keep in mind when field testing

1. The specified test pressure is often greater than the design working pressure of the pipeline. Unless otherwise specified measure the test pressure at the lowest point in the pipeline to insure the test pressure is not exceeded anyplace in the pipeline.
2. Prior to filling the line, all blocking, valves, air release valves, bolts on blind flanges, etc. must be thoroughly inspected.
3. The pipe should be filled at a slow rate to minimize air entrapment and potential surge pressures. After filling, the line should be left pressurized (generally at the pressure of the filling source) for a minimum of 48 hours prior to testing. This will saturate the concrete core and reduce the apparent leakage due to absorption by the pipe walls.
4. Approach the test pressures slowly due to the huge forces which will be developed in the untried line
5. While the test is underway, inspect the entire route of the pipeline periodically and if any leaks are found, repair them. All observed leaks must be repaired.

Testable joints
If testable joints are utilized, please see specific project shop drawings and instructions for details of their use.

Joints and Closures

Bevels and deflections

deflection data (for pipe made in Texas)

B-303					
Pipe Diameter	Std. Laying Length	Std. Max Deflection Angle (deg)	Std.* Max Offset	Nom** Inside Joint Space	Max*** Inside Joint Space
10"	20'	3.62	1' – 3-1/8"	1/4"	1"
12"	20'	3.10	1' – 1"	1/4"	1"
14"	20'	2.73	0' – 11-3/8"	1/4"	1"
16"	20'	2.40	0' – 10-1/8"	1/4"	1"
18"	20'	2.12	0' – 8-7/8"	1/4"	1"
20"	20'	1.93	0' – 8-1/8"	1/4"	1"
21"	32'	1.85	1' – 0-3/8"	1/4"	1"
24"	32'	1.63	0' – 11"	1/2"	1.25"
27"	32'	1.47	0' – 9-7/8"	1/2"	1.25"
30"	32'	1.33	0' – 8-7/8"	1/2"	1.25"
33"	32'	1.22	0' – 8-1/8"	1/2"	1.25"
36"	32'	1.12	0' – 7-1/2"	1/2"	1.25"
39"	32'	1.03	0' – 6-7/8"	1/2"	1.25"
42"	32'	0.97	0' – 6-1/2"	1/2"	1.25"
45"	32'	0.90	0' – 6"	1/2"	1.25"
48"	32'	0.85	0' – 5-3/4"	1/2"	1.25"
53"	32'	0.80	0' – 5-3/8"	1/2"	1.25"
57"	32'	0.72	0' – 4-7/8"	1/2"	1.25"
60"	32'	0.69	0' – 4-3/8"	1/2"	1.25"
64"	32'	0.65	0' – 4"	1/2"	1.25"

*Values for offset are lower when pipe length is less than the standard length.

**Nominal inside joint space is needed for straight pipe to lay at standard length.

***Maximum inside joint space assures sufficient overlap for joint to remain watertight. Standard maximum joint pull assumes short side of inside joint space is at nominal width and long side at maximum. Some additional deflection can be made by closing the inside joint space of the short side while maintaining the specified maximum joint space on the long side.

Bevels and deflections

deflection data (for pipe made in Texas)

L-301					
Pipe Diameter	Std. Laying Length	Std. Max Deflection Angle (deg)	Std.* Max Offset	Nom** Inside Joint Space	Max*** Inside Joint Space
16"	20'	2.33	9-3/4"	1/4"	1"
18"	20'	2.07	8-5/8"	1/4"	1"
20"	20'	1.87	7-7/8"	1/4"	1"
24"	32'	1.57	10-1/2"	1/2"	1.25"
27"	32'	1.40	9-3/8"	1/2"	1.25"
30"	32'	1.27	8-1/2"	1/2"	1.25"
33"	32'	1.13	7-5/8"	3/4"	1.5"
36"	24'	1.03	5-1/4"	3/4"	1.5"
39"	24'	0.97	4-7/8"	3/4"	1.5"
42"	20'	0.90	3-3/4"	3/4"	1.5"
42"	24'	0.90	4-1/2"	3/4"	1.5"
45"	16'	0.83	2-3/4"	3/4"	1.5"
48"	16'	0.78	2-5/8"	3/4"	1.5"

*Values for offset are lower when pipe length is less than the standard length.

**Nominal inside joint space is needed for straight pipe to lay at standard length.

***Maximum inside joint space assures sufficient overlap for joint to remain watertight. Standard maximum joint pull assumes short side of inside joint space is at nominal width and long side at maximum. Some additional deflection can be made by closing the inside joint space of the short side while maintaining the specified maximum joint space on the long side.

Bevels and deflections

deflection data (for pipe made in Texas)

E-301					
Pipe Diameter	Std. Laying Length	Std. Max Deflection Angle (deg)	Std.* Max Offset	Nom** Inside Joint Space	Max*** Inside Joint Space
54"	20'	0.74	0' – 3-3/8"	7/8"	1.625"
60"	20'	0.90	0' – 3-3/4"	7/8"	1.625"
66"	16'	0.82	0' – 2-3/4"	7/8"	1.625"
72"	24'	0.75	0' – 3-3/4"	7/8"	1.625"
78"	20'	0.69	0' – 2-7/8"	7/8"	1.625"
84"	20'	0.65	0' – 2-3/4"	7/8"	1.625"
90"	20'	0.61	0' – 2"	7/8"	1.625"
96"	16'	0.57	0' – 1-7/8"	7/8"	1.625"
102"	16'	0.54	0' – 1-3/4"	7/8"	1.625"
108"	16'	0.51	0' – 1-3/4"	7/8"	1.625"
114"	16'	0.48	0' – 1-5/8"	7/8"	1.625"
120"	16'	0.46	0' – 1-1/2"	7/8"	1.625"
126"	16'	0.87	0' – 2-7/8"	1"	3"
132"	16'	0.83	0' – 2-3/4"	1"	3"
138"	16'	0.80	0' – 2-5/8"	1"	3"
144"	16'	0.76	0' – 2-1/2"	1"	3"

*Values for offset are lower when pipe length is less than the standard length.

**Nominal inside joint space is needed for straight pipe to lay at standard length.

***Maximum inside joint space assures sufficient overlap for joint to remain watertight. Standard maximum joint pull assumes short side of inside joint space is at nominal width and long side at maximum. Some additional deflection can be made by closing the inside joint space of the short side while maintaining the specified maximum joint space on the long side.

Bevels and deflections

deflection data (for pipe made in FL)

B-303				
Pipe Diameter	Std. Laying Length	Std. Max Deflection Angle (deg)	Std.* Max Offset	Max*** Inside Joint Space
18"	32'	4.93	2' - 9"	1 3/4"
20"	20'	4.49	1' - 8 1/2"	1 3/4"
24"	32'	3.81	2' - 1 1/2"	1 3/4"
30"	32'	3.09	1' - 8 5/8"	1 3/4"
36"	32'	2.61	1' - 5 1/2"	1 3/4"
42"	32'	2.26	1' - 3 1/8"	1 3/4"
48"	32'	1.99	1' - 1 1/4"	1 3/4"
54"	32'	2.03	1' - 3/4"	2"
60"	24'	1.84	1' - 1/4"	2"

*Values for offset are lower when pipe length is less than the standard length.

***Maximum inside joint space assures sufficient overlap for joint to remain watertight. Standard maximum joint pull assumes short side of inside joint space is at nominal width and long side at maximum. Some additional deflection can be made by closing the inside joint space of the short side while maintaining the specified maximum joint space on the long side.

Deflection data - Standard joints
(for pipe made in FL and IL)

E-301						
Pipe Diameter	Joint Depth	Max Joint Opening	Max Deflection Angle (deg)	Max Offset	Minimum Curve Radius	Average Laying Length
54"	4-1/8"	7/8"	0.87	3-5/8"	1,325'	20'
60"	4-1/4"	1"	0.90	3-3/4"	1,280'	20'
66"	4-3/8"	1-1/8"	0.92	3-7/8"	1,250'	20'
72"	4-1/2"	1-1/4"	0.94	3-15/16"	1,225'	20'
78"	4-5/8"	1-3/8"	0.95	4"	1,205'	20'
84"	4-3/4"	1-1/2"	0.97	4-1/16"	1,190'	20'
90"	4-7/8"	1-5/8"	0.98	4-1/8"	1,175'	20'
96"	4-7/8"	1-5/8"	0.92	3-7/8"	1,250'	20'
102"	6"	2-1/2"	1.34	5-5/8"	860'	20'
108"	6"	2-1/2"	1.27	5-5/16"	910'	20'
114"	6"	2-1/2"	1.19	5"	970'	20'
120"	6"	2-1/2"	1.13	3-3/4"	815'	16'
126"	6"	2-1/2"	1.08	3-5/8"	855'	16'
132"	6"	2-1/2"	1.03	3-1/2"	895'	16'
138"	6"	2-1/2"	0.99	3-5/16"	930'	16'
144"	6"	2-1/2"	0.95	3-3/16"	970'	16'

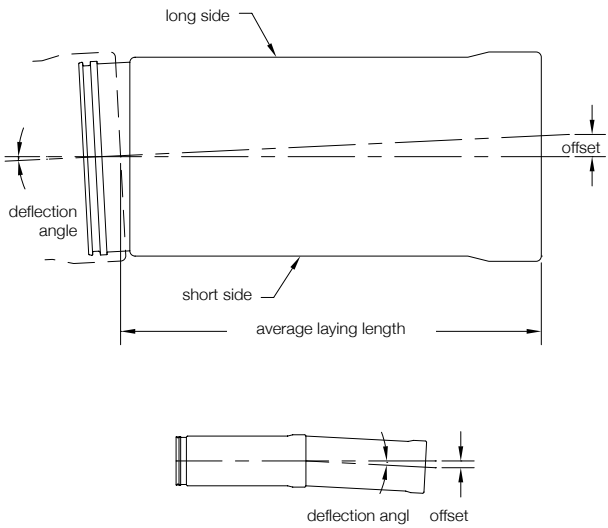
Deflection data - Deep joints
(for pipe made in FL and IL)

L-301						
Pipe Diameter	Joint Depth	Max Joint Opening	Max Deflection Angle (deg)	Max Offset	Minimum Curve Radius	Average Laying Length
16"	4-1/2"	1-3/4"	5.4	22-5/8"	215'	20'
18"	4-1/2"	1-3/4"	4.82	20-3/16"	240'	20'
20"	4-1/2"	1-3/4"	4.35	18-1/4"	265'	20'
24"	4-1/2"	1-3/4"	3.64	15-1/4"	315'	20'
30"	4-1/2"	1-3/4"	2.92	12-1/4"	395'	20'
36"	4-1/2"	1-3/4"	2.44	10-1/4"	470'	20'
42"	4-1/2"	1-3/4"	2.12	8-7/8"	545'	20'
48"	4-1/2"	1-3/4"	1.86	7-13/16"	620'	20'

Bevels and deflections

Deflection data - half bevel pipe (for pipe made in FL and IL)

L-301						
Pipe Diam.	Joint Depth	Max. Joint Opening	Range of Deflection Angle (deg)	Range of Offset	Range of Curve Radius	Average Laying Length
16"	not made					
18"	not made					
20"	4-1/2"	1-3/4"	0.00-6.43	0" – 26-7/8"	180'-∞	20'
24"	4-1/2"	1-3/4"	0.00-5.72	0" – 23-15/16"	200'-∞	20'
30"	4-1/2"	1-3/4"	0.00-5.02	0" – 20-15/16"	230'-∞	20'
36"	4-1/2"	1-3/4"	0.00-4.54	0" – 18-11/16"	255'-∞	20'
42"	4-1/2"	1-3/4"	0.00-4.24	0" – 17-11/16"	270'-∞	20'
48"	4-1/2"	1-3/4"	0.26-3.98	1-1/8" – 16-5/8"	290'-4,315'	20'



Bevels and deflections

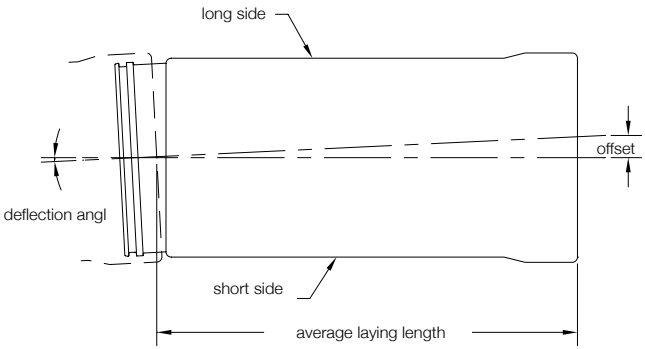
deflection data - half bevel pipe (for pipe made in FL and IL)

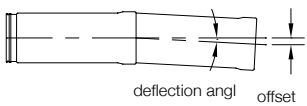
E-301						
Pipe Diam.	Joint Depth	Max. Joint Opening	Range of Deflection Angle (deg)	Range of Offset	Range of Curve Radius	Average Laying Length
36"	4-1/2"	1-3/4"	0.00-4.77	0" – 19-15/16"	240'-∞	20'
42"	4-1/2"	1-3/4"	0.00-4.45	0" – 18-5/8"	260'-∞	20'
48"	4-1/2"	1-3/4"	0.28-4.19	1-3/16" – 17-1/2"	275'-4,095'	20'
54"	4-1/8"	7/8"	1.36-3.10	5-11/16" – 12-15/16"	370'-840'	20'
60"	4-1/4"	1"	1.34-3.14	5-5/8" – 13-1/16"	365'-850'	20'
66"	4-3/8"	1-1/8"	1.33-3.16	5-9/16" – 13-3/16"	365'-865'	20'
72"	4-1/2"	1-1/4"	1.31-3.19	5-1/2" – 13-5/16"	360'-870'	20'
78"	4-5/8"	1-3/8"	1.30-3.21	5-7/16" – 13-3/8"	355'-880'	20'
84"	4-3/4"	1-1/2"	1.29-3.23	5-3/8" – 13-7/16"	355'-885'	20'
90"	4-7/8"	1-5/8"	1.28-3.24	5-5/16" – 13-1/2"	355'-890'	20'
96"	4-7/8"	1-5/8"	1.34-3.19	3-5/8" – 13-1/4"	360'-850'	20'
102"	6"	2-1/2"	0.94-3.62	3-7/8" – 15-1/16"	315'-1,215'	20'
108"	6"	2-1/2"	1.01-3.54	4-3/16" – 14-3/4"	325'-1,125'	20'
114"	6"	2-1/2"	1.07-3.44	4-7/16" – 14-5/16"	330'-1,065'	20'
120"	6"	2-1/2"	1.13-3.39	3-3/4" – 11-1/4"	270'-800'	16'
126"	6"	2-1/2"	1.19-3.35	3-15/16" – 11-1/8"	275'-765'	16'
132"	6"	2-1/2"	1.24-3.31	4-1/8" – 10-15/16"	275'-735'	16'
138"	6"	2-1/2"	1.29-3.27	4-1/4" – 10-13/16"	280'-705'	16'
144"	6"	2-1/2"	1.33-3.23	4-3/8" – 10-11/16"	280'-685'	16'

Bevels and deflections

deflection data - full bevel pipe (for pipe made in FL and IL)

L-301						
Pipe Diam.	Joint Depth	Max. Joint Opening	Range of Deflection Angle (deg)	Range of Offset	Range of Curve Radius	Average Laying Length
16"	4-1/2"	1-3/4"	0.00-9.53	0" – 39-11/16"	120'-∞	20'
18"	4-1/2"	1-3/4"	0.00-8.96	0" – 37-5/16"	130'-∞	20'
20"	4-1/2"	1-3/4"	0.00-8.50	0" – 35-3/8"	135'-∞	20'
24"	4-1/2"	1-3/4"	0.52-7.80	2-3/16" – 32-1/2"	150'-2,205'	20'
30"	4-1/2"	1-3/4"	1.25-7.10	5-3/16" – 29-9/16"	165'-915'	20'
36"	4-1/2"	1-3/4"	1.74-6.63	7-1/4" – 27-9/16"	175'-655'	20'
42"	4-1/2"	1-3/4"	2.12-6.36	8-13/16" – 26-7/16"	180'-540'	20'
48"	4-1/2"	1-3/4"	2.38-6.09	9-7/8" – 25-5/16"	190'-480'	20'





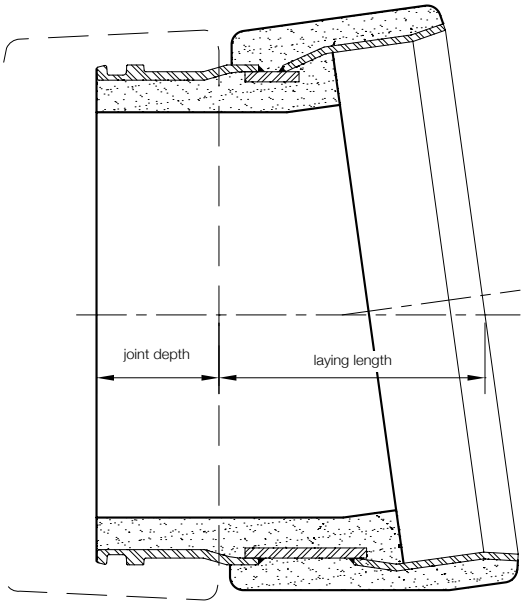
Bevels and deflections

deflection data - full bevel pipe (for pipe made in FL and IL)

E-301						
Pipe Diam.	Joint Depth	Max. Joint Opening	Range of Deflection Angle (deg)	Range of Offset	Range of Curve Radius	Average Laying Length
36"	4-1/2"	1-3/4"	1.83-6.97	7-5/8" – 29"	165'-625'	20'
42"	4-1/2"	1-3/4"	2.22-6.67	9-1/4" – 27-3/4"	175'-515'	20'
48"	4-1/2"	1-3/4"	2.51-6.42	10-7/16" – 26-5/8"	180'-455'	20'
54"	4-1/8"	7/8"	3.59-5.32	14-7/8" – 22-1/16"	215'-320'	20'
60"	4-1/4"	1"	3.58-5.26	14-7/8" – 22-1/4"	215'-320'	20'
66"	4-3/8"	1-1/8"	3.57-5.40	14-13/16" – 22-3/8"	210'-320'	20'
72"	4-1/2"	1-1/4"	3.55-5.43	14-3/4" – 22-1/2"	210'-320'	20'
78"	4-5/8"	1-3/8"	3.55-5.46	14-11/16" – 22 9/16"	210'-320'	20'
84"	4-3/4"	1-1/2"	3.54-5.48	14-5/8" – 22-5/8"	210'-320'	20'
90"	4-7/8"	1-5/8"	3.54-5.50	14-5/8" – 22-11/16"	210'-320'	20'
96"	4-7/8"	1-5/8"	3.60-5.44	14-7/8" – 22-7/16"	210'-315'	20'
102"	6"	2-1/2"	3.21-5.89	13-1/4" – 24-1/4"	195'-355'	20'
108"	6"	2-1/2"	3.28-5.81	13-1/2" – 23-15/16"	195'-345'	20'
114"	6"	2-1/2"	3.32-5.69	13-5/8" – 23-3/8"	200'-340'	20'
120"	6"	2-1/2"	3.38-5.65	11-1/16" – 18-1/2"	155'-265'	16'
126"	6"	2-1/2"	3.45-5.61	11-1/4" – 18-5/16"	160'-260'	16'
132"	6"	2-1/2"	3.50-5.57	11-7/16" – 18-3/16"	165'-255'	16'
138"	6"	2-1/2"	3.56-5.54	11-5/8" – 18-1/16"	165'-255'	16'
144"	6"	2-1/2"	3.60-5.51	11-3/4" – 17-15/16"	165'-250'	16'

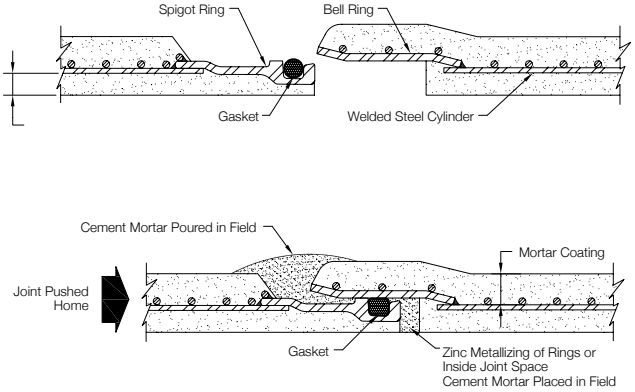
Bevel adapters (Grade adapters)

Bevel adapters may be used to make minor grade or alignment changes beyond normal joint deflection when unmarked utilities or other obstacles are encountered.

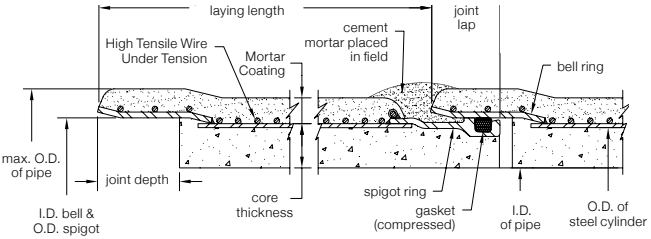


The rubber-and-steel joint

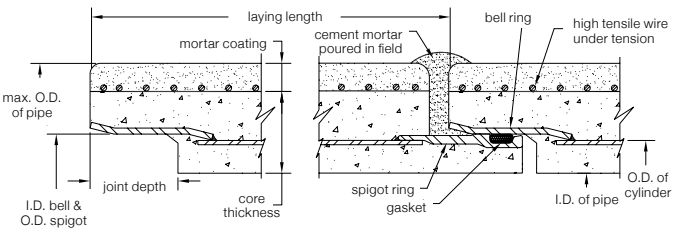
The rubber-and-steel joint slides together fast. Here's how it works.



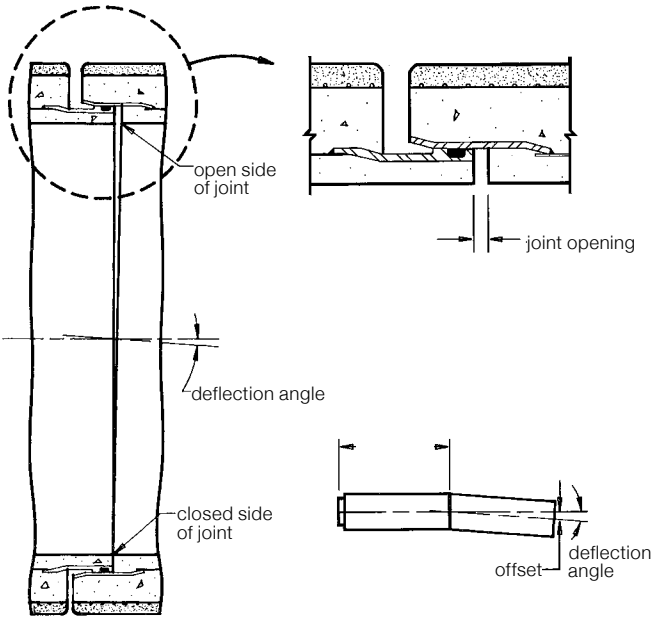
Typical joint
prestressed lined cylinder pipe (LCP)



Typical joint
prestressed embedded cylinder pipe (ECP)



Detail of joint opening



At locations where the pipeline changes size and direction or is bulkheaded, internal line pressure develops thrusts that may exceed the bearing capacity of the soil.

In most cases, restrained joints are used to counteract this thrust. Thompson Pipe Group manufactures several types of restrained joints for this purpose. Two are illustrated on the following pages.

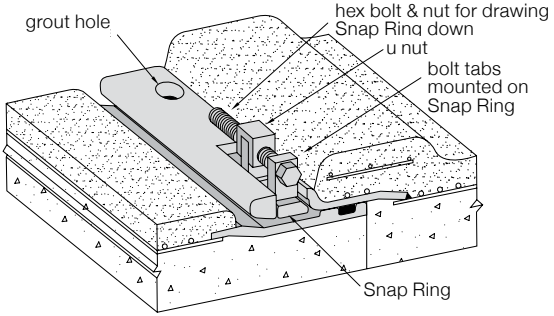
Another method for counteracting thrust is to pour a concrete thrust block behind the fitting subjected to thrust. This increases the bearing surface area of the fitting against the soil and prevents the fitting from moving and causing a joint leak.

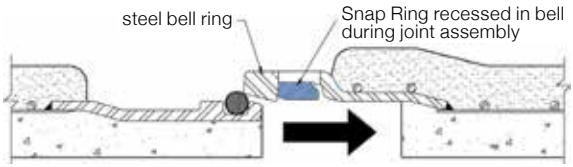
When constructing a thrust block, follow the engineer's design specifications closely. Always:

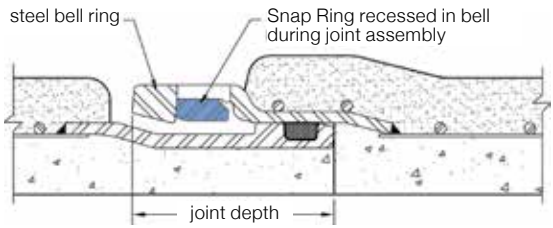
1. Pour the block against undisturbed trench wall

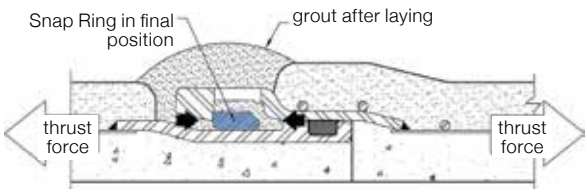
2. Pour only around the fitting and leave adjacent joints flexible

Snap Ring® Installation Sequence





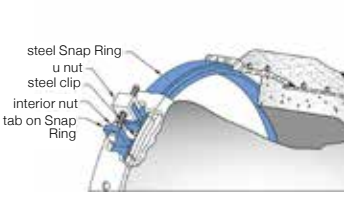




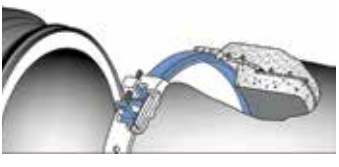
Snap Ring® 5-step installation

The Snap Ring joint system has proved to be a fast and easy way to make a better restrained joint. The five steps below explain how the Snap Ring joint is installed.

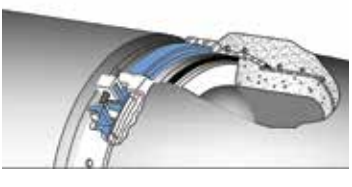
1. The steel Snap Ring is preassembled at the manufacturing facility inside the steel bell of the pipe. The Snap Ring is held in position by a bolt and U-nut assembly. A steel sliding clip completes the ring circumference.



2. As the steel spigot end of the adjoining pipe section is inserted into the bell, the Snap Ring stays in its expanded position.



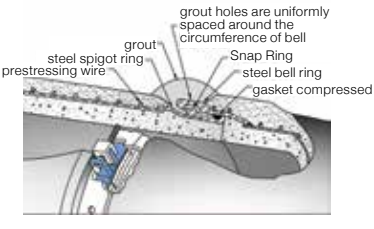
3. After the spigot ring is pushed completely home, the interior nut is loosened.



Snap Ring® 5-step installation (cont)

4. A single bolt connecting the two tabs is used to tighten the Snap Ring down into the lock position. The Snap Ring now restrains separation of the joint while permitting minor deflection in the joint (prior to grouting). Visually examine grout holes around circumference to ensure insert is completely engaged.

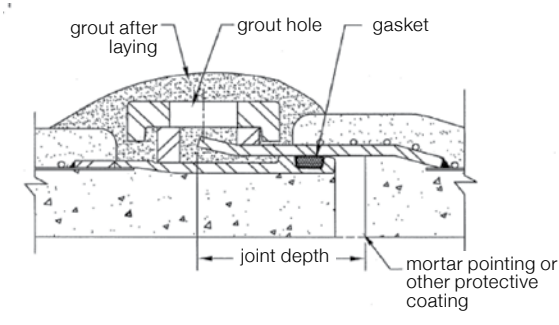
5. Portland cement grout is poured around the joint inside a special diaper made for this joint. The grout flows into the grout holes in the steel bell ring to fill voids around the Snap Ring. The joint is now locked into final position, and the entire joint is protected by Portland cement grout.



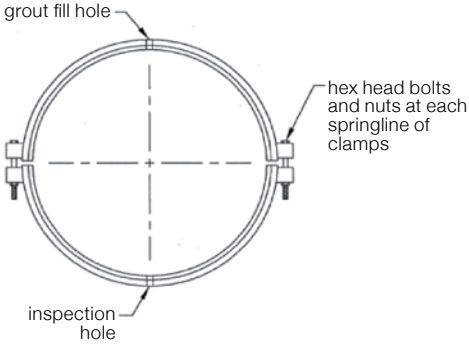
single bolt of Snap Ring restrained joint in unlocked position

The “clamp-type” joint provides restraint for large pipe diameters. This joint is restrained by a two-part harness clamp. The bottom half of the harness clamp is positioned under the joint prior to placing the next pipe length. After the pipe is installed, the top half of the clamp is positioned over the joint and secured to the bottom half by tightening bolts on each side. Grout is then poured into the grout band over the joint before the line is pressurized. The grout distributes any thrust loads around the joint as well as providing corrosion protection for the joint.

Completely assembled



End view of harness clamp



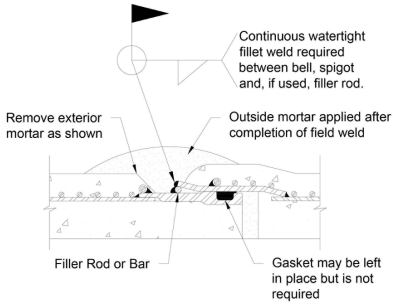
Clamp-type harnessed joint

grout band and bottom half of harness clamp in position under joint prior to placing next pipe length

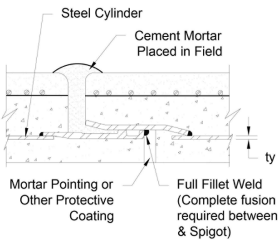
after joint is completed, top half of clamp is positioned and tightened down

Field-welded joints are an alternative to mechanically-restrained joints such as the Snap Ring and the harness clamp. They are used to restrain the joints effectively transmitting thrust forces.

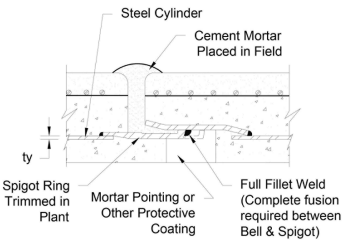
B-303 or L-301



E-301



For ty less than 3/16", where ty is equal to cylinder thickness.



For ty 3/16" or greater, where ty is equal to cylinder thickness.

Note

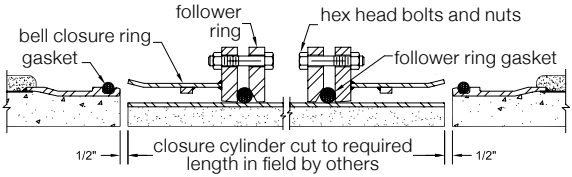
If joint welding is required for a long length of adjacent pipes, more attention should be given to the pipe bedding or flowable fill material should be utilized in this area. Differential bedding settlement may cause bending and shear over and above normal conditions which may cause excessive stresses to the pipeline.

Closures

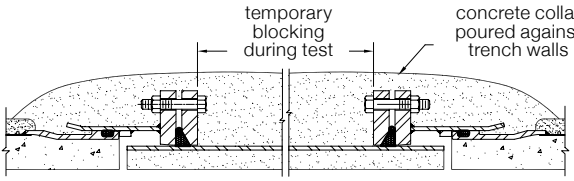
Closures are used on most pipeline projects to close lines laid from two directions. Depending upon geographic location, **Thompson Pipe Group** supplies a variety of closure sections, as shown on the following pages. Closure sections may be fabricated to match almost any joint type including: gasket, flange, plain end and mechanical joint bell. They can be field cut to suit the gap in the line.

A typical closure assembly consists of two fabricated short pipes complete with one plain steel end on each, and either a bolted sleeve coupling or split sleeve. The use of a coupling requires bolting the assembly together to seal the closure. Welding is not required, however the standard couplings do not resist unbalanced forces (thrust). Couplings with restraining systems are available. A split sleeve welded joint may be used in lieu of a coupling in a restrained area; however it requires welding the circumference on each plain steel end. Both methods require mortar encasement of the exterior exposed steel components, and inside mortaring of split sleeve welded joint is recommended. For this reason, split sleeve welded joints are generally used for large diameter pipeline where access is practical.

Follower ring closure installation



open position



closed position

Note

Closure installation must be pressure tested before concrete collar is cast. Block the follower rings during testing period.

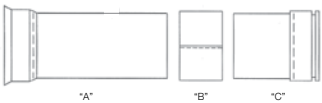
Closure cylinder thickness equal to or greater than fitting plate thickness on design sheet.

Double spigot adapter not included unless ordered.

The Split Butt-Strap Closure Section

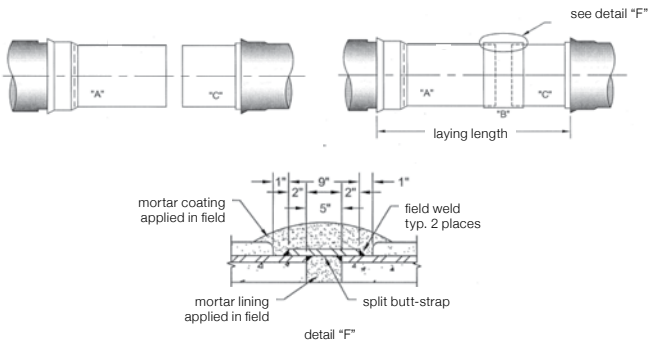
The split butt-strap closure section has a factory attached joint/plain end assembly. This plain end is adjacent to the field-adjusted plain end when the closure is positioned in the final gap in the line A split butt-strap is welded over the two plain ends and the line is closed out.

A. Short piece with access
B. Split butt-strap (two pieces)
C. Short piece

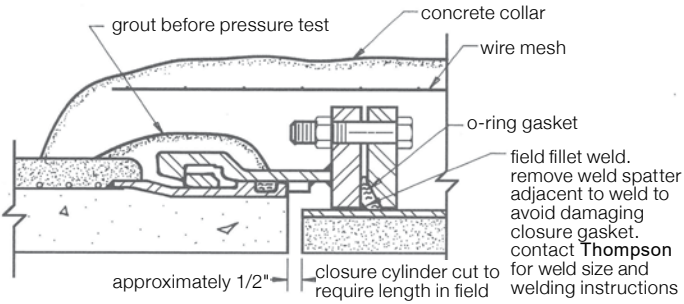


Installation Procedure

1. Measure clear space distance between joints of existing pipe.
2. Cut piece “C” to the required length.
3. Place piece “A” & “C” in the line; make up the joints in the normal manner.
4. Weld split butt-strap (piece “B”) in place.
5. Make up inside pipe and closure gap with cement mortar (1" minimum).

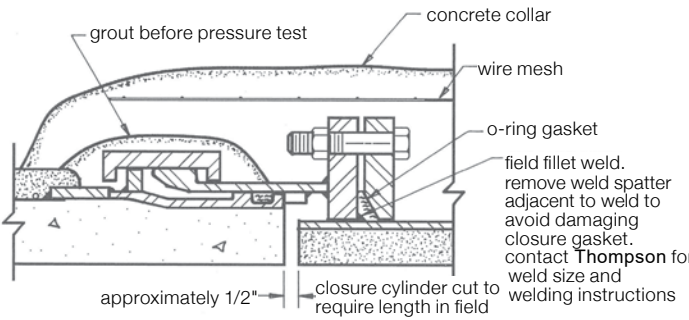


Follower ring closure with Snap Ring® restrained joints



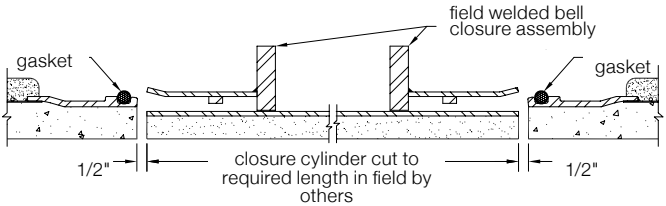
open position

Follower ring closure with clamp-type harnessed joints

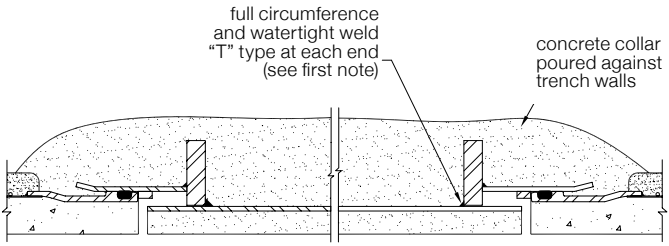


closed position

Field welded closure



open position



closed position

Note:
Weld thickness "T" as specified on laying schedule

Closure installation must be pressure tested before concrete collar is cast

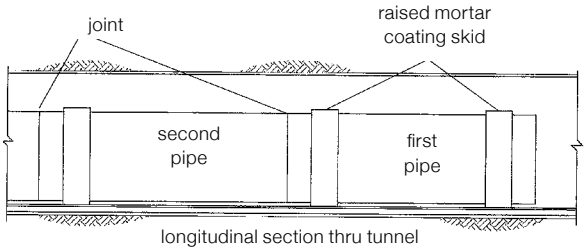
Closure cylinder thickness equal to or greater than fitting plate thickness listed on design sheet

Double spigot adapter not included unless ordered

follower ring closure is lowered into trench for installation

Tunnel pipe with raised mortar coating skids

For pipe installed in tunnels or casing pipe, raised mortar coating skids are provided on the pipe for sliding along the tunnel or casing invert.

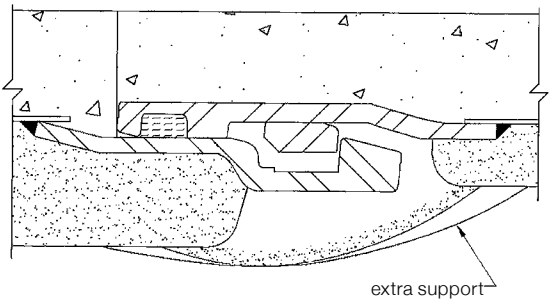


longitudinal section thru tunnel

Non-restrained joints in the carrier pipe, which are inside the tunnel liner, do not need external field applied joint p otection if the annular space between the tunnel liner and the carrier pipe will be filled with mortar or conc ete. If the annular space is left empty or filled with sand or gravel, the joints must either be diapered and grouted or an external joint filler must be used

Restrained joints in the carrier pipe, which are inside tunnel liners, must be individually diapered and grouted unless the annular space between the liner and carrier pipe is filled with mortar or concrete.

When diapering and grouting joints of tunnel pipe, the grout must not set until the line is in final position. Set etarder in the grout mix may be necessary to achieve this.



A standard diaper should be supported over bottom 270º with sheet metal, rubber belting or similar material to prevent the diaper from rubbing on the rails or the invert of the tunnel liner. This applies to all joint types when grouted.

Resources – Field Services, Tapping, Conversion Charts

Thompson Pipe Group has the equipment and experienced personnel to make pressure taps on all types of concrete pressure pipe, cast or ductile iron pipe and steel pipe while the lines remain in service. Tap sizes range from 3/4" to 60".

Additional information is available in our Engineering Manual or from our Field Services Group and our Engineering department.

Thompson Pipe Group Field Services are available 24 hours a day for emergency repairs. In the U.S., call: 972 262 3600 during normal business hours Central Standard Time or 800 445 1534 evenings, weekends and holidays.

Decimals of an inch and of a foot

Inches to Inch	Decimal	Feet to Inches	Inches to Inch	Decimal	Feet to Inches	Inches to Inch	Decimal	Feet to Inches
	.0104	1/8	11/32	.34375	4-1/8		.6771	8-1/8
1/32	.0208	1/4		.3542	4-1/4	11/16	.6875	8-1/4
	.03125	3/8		.3646	4-3/8		.6979	8-3/8
	.0417	1/2	3/8	.3750	4-1/2		.7083	8-1/2
	.0521	5/8		.3854	4-5/8	23/32	.71875	8-5/8
1/16	.0625	3/4		.3958	4-3/4		.7292	8-3/4
	.0729	7/8	13/32	.40625	4-7/8		.7396	8-7/8
	.0833	1		.4167	5	3/4	.7500	9
3/32	.09375	1-1/8		.4271	5-1/8		.7604	9-1/8
	.1042	1-1/4	7/16	.4375	5-1/4		.7708	9-1/4
	.1146	1-3/8		.4479	5-3/8	25/32	.78125	9-3/8
1/8	.1250	1-1/2		.4583	5-1/2		.7917	9-1/2
	.1354	1-5/8	15/32	.46875	5-5/8		.8021	9-5/8
	.1458	1-3/4		.4792	5-3/4	13/16	.8125	9-3/4
5/32	.15625	1-7/8		.4896	5-7/8		.8229	9-7/8
	.1667	2	1/2	.5000	6		.8333	10
	.1771	2-1/8		.5104	6-1/8	27/32	.84375	10-1/8
3/16	.1875	2-1/4		.5209	6-1/4		.8542	10-1/4
	.1979	2-3/8	17/32	.53125	6-3/8		.8646	10-3/8
	.2083	2-1/2		.5417	6-1/2	7/8	.8750	10-1/2
7/32	.21875	2-5/8		.5521	6-5/8		.8854	10-5/8
	.2292	2-3/4	9/16	.5625	6-3/4		.8958	10-3/4
	.2396	2-7/8		.5729	6-7/8	29/32	.90625	10-7/8
1/4	.2500	3		.5833	7		.9167	11
	.2604	3-1/8	19/32	.59375	7-1/8		.9271	11-1/8
	.2708	3-1/4		.6042	7-1/4	15/16	.9375	11-1/4
9/32	.28125	3-3/8		.6146	7-3/8		.9479	11-3/8
	.2917	3-1/2	5/8	.6250	7-1/2		.9583	11-1/2
	.3021	3-5/8		.6354	7-5/8	31/32	.96875	11-5/8
5/16	.3125	3-3/4		.6458	7-3/4		.9792	11-3/4
	.3229	3-7/8	21/32	.65625	7-7/8		.9896	11-7/8
	.3333	4		.6667	8	1	1.0000	12

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restoring the **balance**
creating the **future**

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Thompson Pipe Group is dedicated to providing unequaled customer service and unsurpassed product value in the construction industry while maintaining the highest commitment to its employees and operating in a safe and environmentaiiy responsibie manner.

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