

SAFETY INSTRUCTIONS FOR TRUSS PIPE®

**UNLOADING AND
INSTALLING**



C  **NTECH**®
ENGINEERED SOLUTIONS

Preface

This instruction booklet is for your crews. Distribute it to help them install Contech® TRUSS PIPE® correctly. TRUSS PIPE is a semi-rigid pipe that is installed following the trench construction, bedding, haunching, initial backfill, and other requirements of ASTM D 2680 "Standard Specification for Acrylonitrile Butadiene–Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping."

Don't assume experienced workers know all the answers. Review these instructions with your supervisors and crews. It can mean a better job for you and your customer.

We suggest that you adopt a policy of performance testing the first few manhole runs. It will give you an early check that installation procedures are correct. If you have any questions about these instructions, call your Contech TRUSS PIPE Dealer or your Contech Sales Engineer, or carefully review ASTM D 2680.

Contents Page

Unloading and Handling.	4
Trenching.	6
Embedment Materials.	6
Bedding.	8
Backfilling	9
Deep Laterals.	10
Solvent Welding Joints	11
Assembling Gasketed Joints	15
Installing Saddle Fittings	15
Adapters	18
Caps.	20
Mechanical Plugs	20
Field Repair	21
Laser Beams.	23
Curved Sewers	23
Miscellaneous Tips	24
Air Testing	25
Post Install Cleaning	27

 This safety alert symbol indicates important safety messages. When you see this symbol, be alert to the possibility of personal injury and be sure you understand the message that follows.

Terms you should know:

WARNING

Alerts you to hazards or unsafe practices that **CAN** result in severe personal injury or property damage.

SAFETY INSTRUCTIONS

Messages about procedures or actions that must be followed for safe handling of structural plate products.

	<p>WARNING</p> <p>Falling or rolling pipe can cause severe personal injury or death.</p> <p>Read and follow all safety instructions before unloading pipe.</p>
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UNLOADING AND HANDLING

The following equipment is recommended for unloading pipe pallets:

- Forklift with full-length forks to engage entire pallet width, front-end loader or backhoe with fork adapters full-length to engage entire pallet width.

*Other loading methods such as hoisting are not recommended. **Do not stand or ride on the load of pipe while it is being unloaded.***

NOTE: The pipe is palletized by steel straps around a wood frame. Once the pallet is opened, light interior strapping will maintain the bundle's shape as individual pipes are removed for use.

While industry studies, such as conducted by the PVC Pipe Association, have confirmed little or no deleterious effect resulting from UV exposure related to 2 years or longer of uncovered storage of PVC pipes – Contech recommends best practices be followed to limit excessive exposure to sun and contaminants prior to installation including first in/first out rotation of inventories.

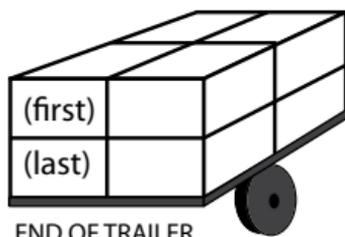
SAFETY INSTRUCTIONS

Failure to follow these instructions can result in serious injury or death and/or damage to pipe.

1. Only trained and authorized equipment operators are to be permitted to unload the trailer.

2. Wear approved safety hat and shoes, gloves and eye protection.
3. Park the truck and trailer on level ground before you start unloading.
4. Keep all unauthorized persons clear of the area when the driver releases the binders from the trailer and during unloading.
5. Do not cut the 1/2-inch steel strapping around the wood frame until the pallets have been placed on level ground and will not be moved again as a unit. It is recommended that the steel strapping be cut with appropriately sized shears or other similar cutting tools.
6. Know the capabilities and rated load capacities of your lifting equipment. Never exceed them.
7. Do not stand or ride on the load of pipe while it is being unloaded.

8. If unloading at multiple points, secure pallets between drop-off points. For each unit of four pallets, always unload the top pallets first (See diagram).



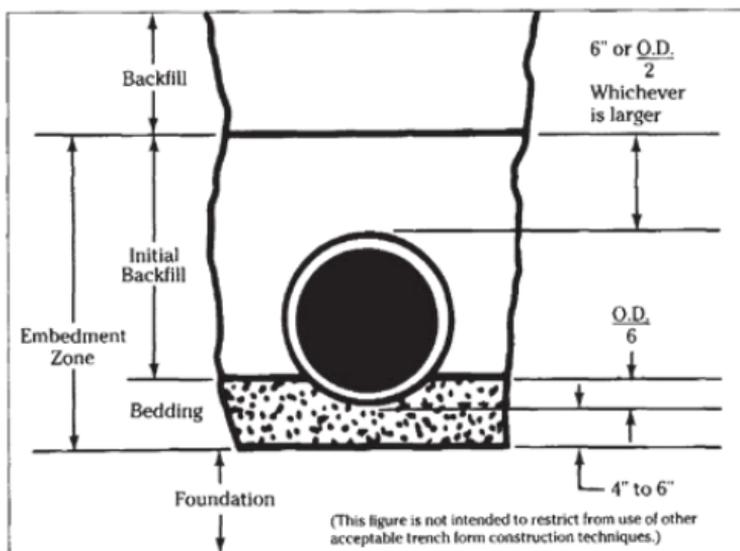
9. Never attach chains or wire rope to the pipe. They could damage the pipe.
10. Do not push pallets off the trailer or permit to drop to the ground.
11. Do not drag TRUSS PIPE across the ground.
12. Do not stack TRUSS PIPE over two pallets high. Stacks of three or more pallets can damage bottom pipes and can become unstable.
13. Handle TRUSS PIPE (and other plastic pipe) with extra care in freezing or cold weather. See pages 12 and 24 for additional cold weather installation information.

GENERAL – TRENCHING AND BEDDING

1. Follow project specifications and OSHA rules.
2. The trench width needs to be only wide enough to safely allow room for a man to work.
3. The pipe needs a good, uniform support in the bedding. A granular cushion helps provide this. It also makes it easier to lay to grade and line.
4. When using select, native soils, be sure they are finely divided and no larger than 1½-inches. If the select, native soil is clay or silt, don't use it if it's too wet or too hard and dry.
5. Remove any rock or highly plastic silt and clay from the bed 4 inches to 6 inches below the pipe and replace it with a good granular cushion.
6. For best results, keep water out of the working area in the trench bottom.

GENERAL – EMBEDMENT MATERIALS

Embedment soils used in semi-rigid thermoplastic pipe installation are described in ASTM D 2680 Appendix (Class I, II, III, IV Types ML, CL). The embedment soils should be capable of being readily densified. Use select, native soils which are free of clods, debris, frozen lumps, rock and stones (or similar object) larger than 1½-inch.



PIPE/SOIL ENVELOPE AND TRENCH ZONES

The moisture content and the plasticity of silt and clay soils have considerable effect upon their usefulness. When these soils are within their optimum moisture content range, they can often be worked relatively easily, however, when too wet and lumpy, they are unacceptable for use in the embedment zone. They are also unacceptable as dry, hard clods when soil particle size requirements are exceeded. Lumps or clods create undesirable point loads or disrupt the uniformity of the pipe's support.

Select, native soil is free of Class V-Type (frozen earth, debris, organic peat, large rocks, etc.) material, normally finely divided and not highly saturated with water. Concrete is not recommended in the embedment zone because its unyielding nature can cause problems.

BEDDING

To install the pipe true to line and grade, surface grade the bed to obtain a uniform and continuous support below the pipe. Pipe may either be placed upon a uniform and flat bedding surface or into a shaped area conforming to the pipe periphery.

Shape or deposit bedding material in the haunch to stabilize pipe alignment during subsequent operations.

Use Class I and II soils in the bedding without special densification efforts. It is usually necessary to densify loose or imported Class III soils. When in undisturbed native Class IV soils, carefully shape the bed to conform it to the bottom pipe periphery and to support the pipe uniformly and continuously. When select Class IV soils are returned to the bedding, they shall be carefully densified using tampers, light rollers or similar compaction equipment.

Do not use Class IV soils for bedding when they are outside of the optimum moisture content range which permits these soils to be worked easily to obtain the uniform and continuous support.

Note on Pipe Bow and Potential Ponding

Contech manufactures, and our quality control procedures confirm, product that meets or exceeds industry as well as ASTM standards. However, transportation and handling can result in a slight bow to PVC TRUSS pipe. In situations requiring extremely flat grades it may be necessary to monitor any bow in the pipe and install accordingly. In these instances it may be necessary to identify the crown of each individual pipe and install that crown either at the 3:00 or 9:00 position. This practice should serve to minimize any potential ponding.

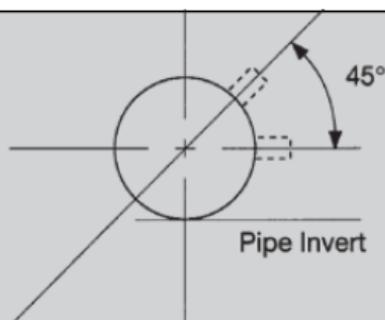
INITIAL BACKFILL

Place initial backfill materials in a manner to achieve uniform pipe support and loading over the pipe and bedding. Deposit Class I, II, III and allowable Class IV materials simultaneously on each side of the pipe to prevent lateral displacement of the pipe, making certain the materials fill the haunch area. Densify as required, paying special attention to Class IV materials.

GENERAL-BACKFILLING

1. Follow project specifications and OSHA rules.
2. Keep frozen lumps, junk and rocks of 1 1/2-inch size and larger a minimum of 6 inches away from the pipe.
3. Place the backfill quickly to avoid floating the pipe, then spread it so the pipe is supported and loaded evenly.
4. A good stomping next to the pipe always helps. Avoid using impact-type paving breakers or hydro-hammers because they may damage the pipe.
5. Don't block or cradle pipe with hard solid chunks, wood, rock, brick or concrete. The pipe must have uniform support.
6. When laterals, risers, or drop manholes are required, the installation must be designed to ensure the pipe and fittings are not damaged by loads generated due to soil dragdown and/or poor installation practices. Generally, as sewer depths increase and/or soil quality declines, additional attention must be given to these loads to ensure a satisfactory installation. Heavy loads can buckle the lateral pipe or punch it through the main sewer. For normal jobs follow instructions 7 and 8. If the lateral is deep or unusual, ask the engineer and/or the manufacturer for advice.

7. Don't hang a load on chimneys, risers or stacks as you may damage the pipe or joint. **Tamp** as you bring the backfill up evenly around the risers.
8. Backfill carefully underneath and around the lateral pipe where it joins the main sewer.



In order to minimize lateral pipe “punch-through” potential, it is recommended to install wye or tee fittings at an angle no greater than 45° from the horizontal centerline. Stacks (installing wyes or tees at a 90° angle from the pipe horizontal centerline) should not be allowed.

SOLVENT WELDING JOINTS

The Contech factory builds the pipe joints to close tolerances. To ensure trouble-free jointing, use only Contech primer and cements. These are specially formulated for TRUSS PIPE.

The primer softens the plastic surfaces and the cement seals the joint. The joint dries tight after you apply the primer and cement and “push the spigot home.” Home marks are provided.

Follow These Steps

1. Apply plenty of primer and cement on the spigot and inside the bell. Use a johnny mop or brush. Don't pour primer on. Care should be taken to seal the truss sections when entering and exiting manholes to avoid false air tests (see Page 25).
2. Apply cement the same way – immediately.
3. Without delay, give the spigot a twist while pushing it to the home mark. A rope sling around the pipe has worked on big pipe, with a push from the back end.
4. Use a bar and block to push the spigot all the way home on big pipe and anytime the pipe isn't twisted home.
5. Wipe excess cement off pipe.
6. All PVC solvent welds require primer.

SOLVENT WELDING PVC (PVC TO PVC OR ABS)

1. **PVC TRUSS PIPE** joints are made using CONTECH purple primer and **blue** PVC cement is used for all bell-to-spigot joints.
2. **Thoroughly dry both the bell and spigot of wet pipe with a rag.** Use liberal amounts of primer on both the bell and spigot.
3. **Underwater jointing or jointing with water standing in the bell is not recommended.** Dewater the trench.
4. Do not thin PVC cement with primer. Discard if cement becomes too thick to spread evenly.
5. When temperatures are near zero:
 - a. Follow cold weather jointing practices (See Page 13, Items 3, 4, and 5).
 - b. Backfill immediately so the joint can cure at warmer ground temperatures.
 - c. Allow two weeks cure before air testing.
 - d. Do not disturb the joint during this cure period.

SOLVENT WELDING TIPS

1. When a cement bead about as thick as the coupling appears around the bell after the spigot is home, you have made a good joint.
2. Primer and cement dry out more quickly in hot and dry weather. If a skin forms on the pipe, you have waited too long to make your joint. When this happens, clean the surfaces with primer and re- cement. At such times, work faster and keep the primer and cement containers closed.
3. In cold, wet weather the joint sets up more slowly. If a trench box or shield is being used, you should stake the last pipe before moving the box to prevent disjoints.
4. When temperatures are cold or below freezing, pre-prime the bell and spigot by scrubbing the primer in. Then with the surfaces still soft, follow the normal jointing procedure.
5. When you pre-prime, allow plenty of time for the primer to soften the material, or scrub it in longer.
6. Re-push the joint right away if it was moved to set grade, and be sure the pipe is homed.
7. After joining, cover the pipe with backfill, but only after the joint is tight and cement has surface hardened.
8. Allow adequate cure time prior to air testing.

JOINING SOLVENT WELDED TRUSS PIPE AND FITTINGS

To make PVC solvent welds, use CONTECH PVC cement (blue) with PVC primer (purple). Note: Solvent welding PVC in standing or running water is not recommended.

Primer and Cement Requirements for Making Solvent Weld Pipe Joints

CEMENT AND PRIMER USAGE (Joints per Gallon)		
Pipe Size (Inches)	Primer	Cement
4	125	86
6	55	38
8	40	28
10	28	20
12	21	15
15	14	10

ASSEMBLING GASKETED JOINTS (No primer or cement required)

The gasket is factory-installed in the bell. The joint cannot be assembled without proper lubrication. Follow these steps:

1. Thoroughly clean the bell and spigot. Make certain the gasket is seated properly.
2. Apply liberal amounts of gasket lubricant to the gasket and to the spigot end.
 - a. Use a johnny mop or brush.
 - b. Do not remove the gasket from the bell after it is lubricated or to apply lubricant.
 - c. Make certain the outer edge of the spigot is well lubed.
3. Align the joint and push the spigot to the home mark using a bar and block from the back end. Take care so the wood block protects the pipe end from the bar. On larger diameters, come-alongs, a choker, etc. may be beneficial in starting the pipe stab. Be careful not to overinsert.
4. Chamfer the outer pipe wall on fieldcut spigot ends. File to remove all burrs and rough spots.
5. If a trench box or shield is being used, the last pipe may require staking before the box is moved to prevent disjoints.

JOINING PVC GASKETED PIPE AND FITTINGS (ASTM D 3212)

Lubricant Requirements (Joints per Gallon)	
Pipe Size (Inches)	Primer
4	300
6	220
8	100
10	64
12	48
15	25

WARNING

1. Read safety precautions listed on primer and cement cans.
2. Keep both primer and cement away from open flames. Treat like gasoline.
3. Avoid prolonged breathing of vapors in tight places like manholes.
4. May be fatal if swallowed.
5. Prevent primer and cement from getting in your eyes. If it does, wash your eyes with water for 10 to 15 minutes. Consult a doctor immediately.
6. If you are working in closed spaces and become ill, see a doctor and tell him that you were exposed to a plastic pipe primer. Cements contain:
 - ABS primer is methyl ethyl ketone (MEK).
 - ABS cement contains MEK and ABS solids.
 - PVC primer contains tetrahydrofuran, MEK, and cyclohexanone.
 - PVC cement contains tetrahydrofuran, cyclohexanone, MEK and PVC solids.

SOLVENT WELDED SADDLE

1. Stick template on TRUSS PIPE to mark outline of hole required.
2. Use keyhole, slow speed saber saw or other instruments to cut hole. Don't start a hole with hammer or hatchet. Use a drill, awl or other sharp cutting tool. This is especially important for PCV TRUSS PIPE in cold weather.
3. Place steel bands loosely around pipe and then apply primer and cement liberally to entire area of pipe and underside of saddle—the same as with a joint.
4. Immediately place saddle firmly on pipe and tighten two stainless steel bands around pipe and saddle. Leave straps on.

INSTALLING BUSHINGS



Solvent weld as instructed for pipe joints (pg. 12-16).

Be sure that the bushing is placed so that the closed end of the double wall faces the bell (see arrow).

MANHOLE WATER STOPS

Where manhole boots or A-lok type gaskets are not used, grout the connection after putting a manhole water stop on the pipe near the center of the manhole wall. Gasket fins point to manhole outside. Use a screwdriver to pull the slack out of the steel band. A 5/16-inch socket wrench will finish the tightening.



Manhole stops are needed to stop leaks because concrete won't bond easily to the plastic.

OTHER MANHOLE CONNECTIONS

Rubber boots and other types of flexible connections between the pipe and manhole should be installed according to manufacturer's instructions.

CONSTRUCTION AT MANHOLES

Extra care is required to build the proper support around the pipe which enters or exits a manhole. Using Class I or II soils or hand tool densified Class III soil is usually the more cost-effective procedure to prevent excessive shearing forces from developing.

ADAPTERS

Page 19 shows the standard adapters for 4-inch and 6-inch lateral pipe. When using the rubber sleeves for clay pipe, be sure to cut the plastic seating off the clay pipe spigot before connecting.

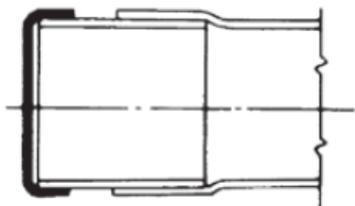
Other Pipe Spigot	Use Contech Adapter No.	
Type I Clay	F442 F443 F444	F662 F663 F664
Type III Clay (has O-Ring)	F492 F493 F494	F662 F663 F664
Cast Iron (plain end)	Fernco 1056-44 for 4" 1056-66 for 6"	
ABS or PVC drain waste/vent	4" or 6" to Sch. 40 or DWV spigot	
Larger than 6" Pipe	Use Contech, Fernco, or equal	

- + Clean clay pipe spigot—no plastic end casing left on pipe. This rubber adapter is preferable because it compensates for the variable dimensions of clay pipe existing throughout installation.

Joint Sketch	How Sealed
	Tighten straps over rubber adapter
+ 	Compress spigot rubber or O-Ring
	Tighten straps over rubber coupling
	Solvent weld
Donut or coupling	Contech, Fernco or equal

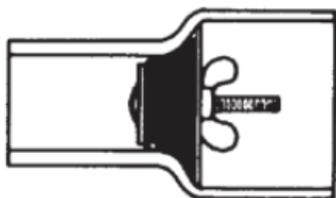
CAPS AND PLUGS

Solvent weld caps in place.



4" & 6" Spigot Caps

Note that bell caps won't fit over 4-inch and 6-inch pipe belled ends.



In placing plugs, be sure the rubber part is past the shoulder of the bell into the pipe and tighten the fly nut well. Don't use lubricants. Block and stake mechanical plugs.



Mechanical plugs must not be used for air testing!

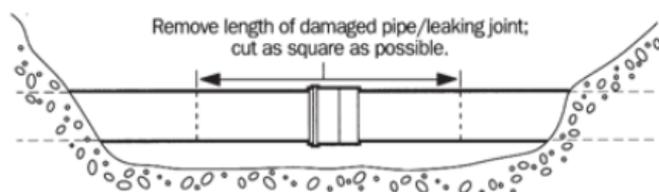
FIELD REPAIRS

Damaged TRUSS PIPE can be repaired/ replaced using either flexible rubber couplings or PVC couplings. Follow these steps to install the new section using two flexible rubber couplings:

1. Cut out damaged areas and cut a length of replacement pipe to just fit.
2. Expose the existing cut pipe ends to give working room under them.
3. Install a flexible rubber adapter on each end of the replacement section using gasket lube or vegetable oil as a lubricant. Slide the adapters (or roll them) back and position the replacement section.
4. Slide (or roll) the adapters over the joint at each end of the replacement section so that they are centered over the joint. Gasket lube or vegetable oil can be used as a lubricant.
5. Install and tighten the stainless steel bands, making certain they are positioned properly.
6. Where specifications require, a plastic shear stop is available. This split ring fits over the rubber coupling, between the stainless steel bands. It is held in place with two additional stainless steel bands.
7. Tamp bedding material under the joints where it was disturbed to gain working room.

Small holes and breaks can be repaired by solvent welding patches made from pallet packing coupling or split couplings. Follow the procedure for applying saddle fittings (Page 17, Steps 3 and 4).

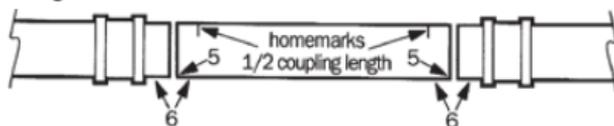
Follow these steps to install the new section using two PVC repair couplings.



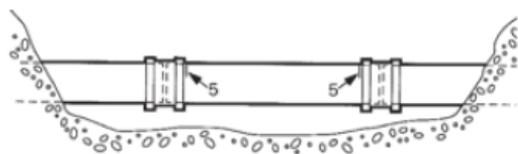
1. Chamfer outer edge of TRUSS PIPE wall.
2. Clean thoroughly and lube liberally remaining pipe spigots approximately 1 1/2 times the coupling length.



3. Push repair coupling in position allowing 3" to 4" of spigot to extend beyond coupling.
4. Cut replacement length as close as possible to length that was removed



5. Chamfer both ends of outer edge of outer wall of new length and mark both ends of replacement piece half the length of the repair coupler.
6. Lube liberally the ends of the replacement length and in front of repair coupling on existing lengths.



7. Align replacement length with existing spigots and push repair couplings to homemarks.

LASER BEAMS

You must use an adequate blower, because fumes from curing solvent welded joints or temperature changes can deflect the beam and throw you off line and grade.

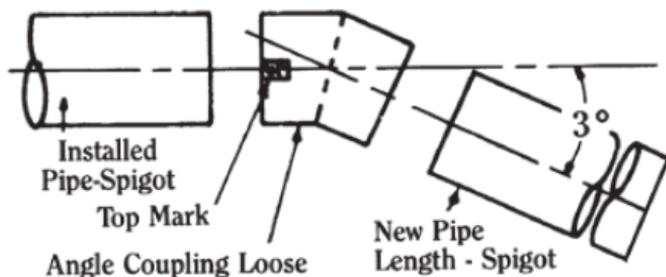
CURVED SEWERS

Curved sewers are built by cocking the joint slightly and using either straight or 3° couplings. The 3° coupling is shipped loose and its top is marked. That mark should be on top when the joint is made.

The following chart and sketch provide necessary installation data.

Minimum Radius of Curvature				
Pipe Diameter (Inches)	Std. Coupling (Feet)		3° Loose Coupling (Feet)	
	12'-6"	6'-3"	12'-6"	6'-3"
8	380	190	105	53
10	480	240	130	65
12	580	290	140	70
15	720	360	160	80

Allowable Play				
Pipe Diameter (Inches)	8	10	12	15
Play in Couplings	±1.9°	±1.5°	±1.25°	±1.0°



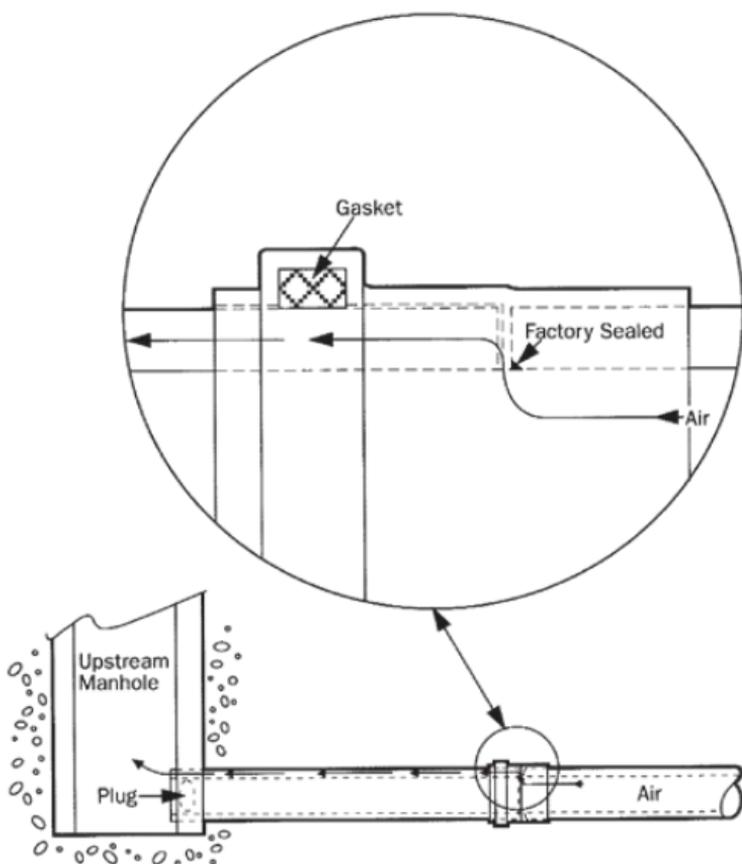
Plan View of Curvilinear Assembly

MISCELLANEOUS TIPS

1. When square cutting pipe with saw, rest pipe on shipping separators for best results.
2. If laying pipe through manhole, leave cutout section in place until you feather concrete over the cut in wall.
3. Avoid cement buildup inside at joints when deflection tests are run.
4. String only enough pipe to use during the day's laying operations.
5. Except at manhole entries, don't pour concrete against or encase the pipe in concrete.
6. Handle the pipe more gently in cold weather. When placing embedment materials in deep trenches at near zero temperatures, it may be desirable to use smaller aggregate (3/8-inch), a stone bucket for placement, or to otherwise blind the pipe before dumping coarse aggregates.
7. Joining is affected by cold temperatures; gaskets lose compressibility and PVC bells are more brittle. Proper bell-spigot alignment, adequate lubrication and using recommended joining procedures (i.e. bar and block) are more important in cold weather.

TESTING—FALSE AIR TEST

The last length of pipe going into the manhole may experience a false air test at the upstream end of a line. The factory side of the coupling is sealed at the center stop and the inner wall of the TRUSS PIPE. However, the last joint at the upstream end has an exposed spigot end in the coupling. Air may bleed through the grout into the manhole, indicating a leak but is actually a false air test. The air is passing between the pipe walls into the manhole even though joints are air-tight.



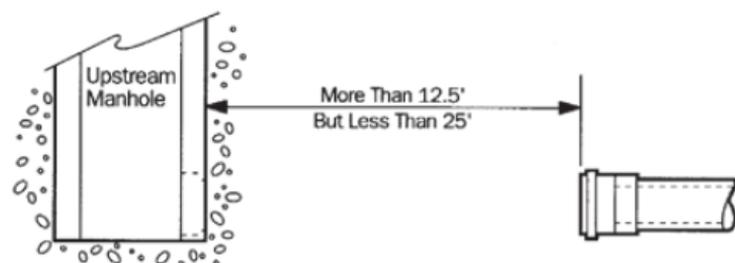
To minimize or prevent false air test occurrence...

For solvent welded joints

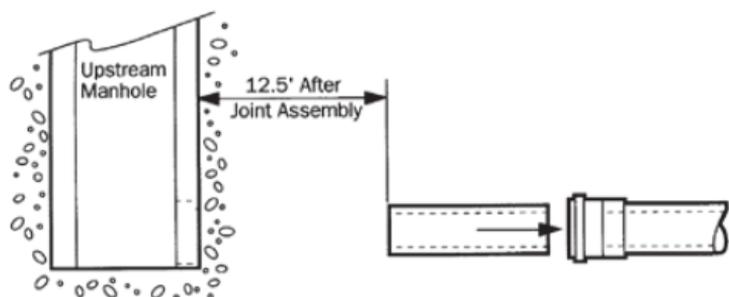
Coat the exposed mearlcrete in the spigot ends with solvent cement during joining.

For gasketed and solvent welded joints

Follow the "reverse jointing" procedure at the upstream manhole detailed below:

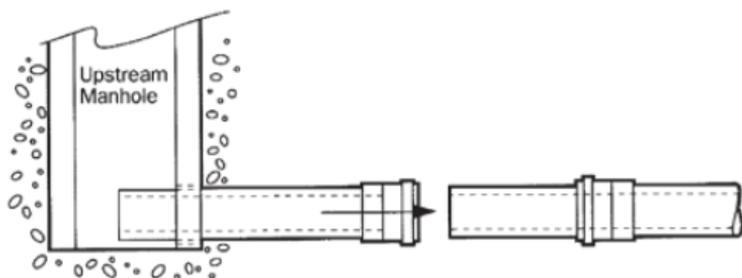


Pipe is inlaid in a normal (spigot to bell) fashion until within 25' of upstream manhole.



Cut a section of TRUSS PIPE (spigot x spigot) and join in a normal spigot into bell fashion. * Length should be as required to leave a 12.5' gap to the manhole.

*Use the remaining bell x spigot piece from the cut as the second piece to exit the other side of the manhole.



A standard 12.5' TRUSS PIPE section should be used for entry (and exit) into the manhole. Slide the spigot end into the manhole, and pull the section out until the bell joins the spigot of the previously installed pipe.

POST-INSTALLATION CLEANING OR JETTING

Due to the smooth waterway wall surface and resistance of TRUSS PIPE to allow for biologic adhesion post installation cleaning can be accomplished at relatively low nozzle pressure. Contech recommends pressure cleaning or jetting to be performed at pressures of 1,000 psi or less. Excessive nozzle pressures could result in damage to pipes or fittings.

