

3050 - Installation of Plastic Pipe

Updated 3/10/2016

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1. INSTALLATION PROCEDURES

1. Excavating

1. Excavating and backfilling methods for plastic are the same as steel pipe. The backfill must be free of rocks and other objects which could damage the plastic pipe. When needed, rock shield material will be specified by the Engineer. If the trench bottom is rocky, the trench must be undercut 6" and then backfilled with rock-free earth. Further, the trench must be graded to provide a firm, continuous bearing surface for the pipe.
2. The normal installation depth for plastic services is 24". The normal installation depth for plastic mains is 36".
3. The width of installation trenches should be held to a practical minimum consistent with the size pipe being installed.

2. Alignment & Joining of Plastic Pipe

1. Plastic valves should be installed in the excavation to prevent valves from twisting as the pipe is lowered into the ditch.
2. Joining which must be done in the excavation should be well planned to ensure that enough space is available and that proper alignment is achieved. Electrofusion is the preferred method of making tie-in joints in excavations. Butt fusion joints are not allowed to make tie-ins in excavations.
3. Butt fusion joints should not be made unless one, or both, of the pipe ends are unrestricted and free to move longitudinally. At least one side of the butt fusion joint should involve:
 1. A single section of pipe that is no more than 40' in length,
 2. Coiled pipe that is on a free moving reel, or
 3. An individual butt fusion fitting.
4. Care should be taken to avoid buckling, gouging, and other mechanical damage when lowering into the ditch. Pipe should be laid so that there are no bends with a radius less than 20 times the pipe diameter, and no joints within 3 feet of any bend.
5. Mechanical connections, where required, will be made by means of approved fittings. Mechanical connections are the preferred method of joining pipe in wet or muddy conditions. Mechanical fittings are the preferred method of repairing plastic pipe sizes below 2". Mechanical joints must be reinforced with metal insert stiffeners. Furthermore, these fittings should not require coating or cathodic protection.

6. Align all pipe and fittings joints true to line and grade. Protective sleeves should be installed, when specified by the fitting manufacturer, to protect against bending and shear forces. Note: Extremely cold weather makes plastic pipe less flexible and can increase the likelihood of impact failure.
7. All plastic pipe should be buried far enough away from steam lines, water lines, power lines, and other sources of heat to avoid temperature in excess of 100°F.
8. Because plastic pipe contracts as it cools at a rate of 1" per 100' for each 10°F, you are required to snake the pipe in the bottom of the trench. This provides for slack in the pipeline to be taken up as the pipe cools and contracts in the ditch prior to backfilling.
9. Lines must be backfilled prior to tying-in to allow for maximum contraction at that time. The first 6" of backfill material must be free of rock and other material that would damage the pipe. Do not use mechanical tampers on the first 6" of backfill

3. Laying the Pipe

1. Plastic lines must be snaked from side to side within the trench to provide an excess length of pipe to offset contraction of the pipe during cold weather. Excessive bending in plastic piping system, particularly at joints, must be avoided. Pipe where joined to fittings should be laid true to line and grade and backfilled carefully to prevent differential settlement and thus excessive bending or external loading which might damage the pipe.
2. Fusion joints must not be located at points where unequal settling of backfill is likely to create excessive stress. Fusion joints must not be located near the end of a casing or a borehole because settling of backfill can create excessive stress at these points.

4. Bends

1. Plastic pipe is reasonably flexible, therefore adaptable to irregular trench lines. Changes in direction requiring a smaller radius than listed below must be made with fittings. Miter bends are not permitted.

Minimum Bend Radius		
Pipe Size	Pipe Without Joints	Pipe Containing Joints
1-1/4"	30"	15'
2"	40"	25'
3"	60"	35'
4"	80"	45'
6"	120"	60'

5. Boring

1. See D&I [1010 - Construction Specifications](#) and D&I [1015 - Horizontal Directional Drilling \(HDD\)](#).

6. Testing and Tapping

1. After all connections have been visually inspected, apply the proper air test.
2. If the saddle fusion is not properly attached, abandon the tee and repeat the saddle and service fusions with a new tee.
3. After testing the service and checking for leaks, tap the main. Purge the service through the service cock at the meter location. Soap test all the connections at the main after tanning.

4. Individual services are to be tested at 100 psig for 15 minutes duration and qualified to operate at 60 psig.

7. Purging of Plastic Pipe

1. The following procedures must be followed when purging plastic pipelines. Particular attention to prevention of static electric discharge must be practiced.

1. Static Electricity -- When plastic gas lines are being purged, static electric charges may build up and in a small number of instances cause a fire. Clean gas apparently does not build up static electric charges when flowing, but gas flowing at a rapid rate and containing particulate matter may build up such charges. To help prevent static electricity, wet soapy rags should be placed over the pipe in contact with wet earth. This will provide a low resistant path to ground for any electrical charge that exists on the pipe.
2. Purging -- All mains must be purged after installation until the pipeline is free of air. After testing new mains according to standard procedures, the new main shall be tied into the existing main after a control fitting or squeeze-off tool is installed at the tie-in point. At the far end of the new main, if a new service line is not available for purging, connect a purge fitting and riser. The purge fitting may consist of a service tee with a 5/8" or 3/4" outlet, with the outlet piping extending at least eight feet above ground. Plastic pipe shall not be used for the discharge riser. A service squeeze-off tool should be installed on the outlet approximately one (1) foot from the purge fitting to control gas flow. Ground the plastic main at the squeeze-off unit(s) with wet rags to wet earth as described in the preceding section. With the purge fitting and squeeze unit open, partially open the control fitting or squeeze unit at the tie-in point to admit gas to the new main. Be sure proper grounding of main is maintained throughout the purging operation.

Purging shall continue uninterrupted until new main is free of air. To prevent accidental ignition, each source of ignition must be removed from the area and a fire extinguisher must be provided. When purging a service line through the meter cock, use a second valve, temporarily installed downstream of the meter cock, to control the purge rate. This will minimize valve lubricant from being displaced in the meter cock. Most service lines can be purged in less than 10 seconds through a slightly opened valve.

8. Completing the Line

1. Backfill the bell hole at the main, using a hand tamp below the service and 12" above it to ensure that the line rests on firm ground and is satisfactorily cushioned. Backfill material must be free of rocks or other material that would damage the plastic. Complete the backfilling in this usual manner.

9. Locating Plastic Pipe

1. Tracer wire should be installed with direct buried plastic pipe for location via electronic detectors. Tracer wire should be installed adjacent to plastic mains or services, avoiding contact with the pipe to the extent possible. Warning Tape should be installed 12" above the tracer wire (18" above plastic pipe) to prevent damage and serve as a warning to excavators. See Construction Detail [2.02.100 - Trench Detail - Main in ROW \(Non SCDOT\)](#), [2.02.200 - Trench Detail - Main Within SCDOT ROW](#), [3.02.100 - Trench Detail - Service in ROW \(Non SCDOT\)](#), [3.02.200 - Trench Detail - Service within SCDOT ROW](#), [3.02.300 - Trench Detail - Service on Private Property](#).
2. Tracer wire connections below ground should be made with an approved splice kit or split bolt connector wrapped with rubber tape and then electrical tape. Cold tape may be used in lieu of rubber tape and electrical tape. See Construction Detail [1.05.100 - Split bolt connection](#) & [1.05.110 - Splice Kit Connection](#).
3. Test points are required for accessing buried tracer wire (see Construction Detail [2.06.100 - Test Point - Flush Mounted](#) & [2.06.110 - Test Point - Above Ground](#)). Tracer wire test points should be installed at the following locations:

2. At each take-off point for lateral main extensions
3. At the end of plastic mains and any point of tracer wire termination
4. 5-lb anodes should be installed on each 2,500' section of tracer wire.
5. Repairs to Trace Safe wire and Trace Safe connectors should be made in accordance with manufacturer's instructions. See Construction Detail [1.05.200 - Trace Safe to Trace Safe Connector](#), [1.05.210 - Trace Safe to 12 Gauge Wire](#), [1.05.220 - Trace Safe Locator Lug](#), [1.05.230 - Trace Safe Main to Lateral Connector](#).

2. FIELD INSPECTION OF PLASTIC JOINTS

1. Joints must be visually inspected during each step of the fusion process and pipe preparation, i.e. cleaning, scraping and using isopropyl wipes, while fitting and pipe is fused and after fusion process is completed. Approved joining procedures must be followed and the completed joint must have an acceptable appearance. Each person that makes a joint is responsible for inspecting his or her joint.
2. All plastic pipe joints shall be clearly marked in permanent ink to identify the name of the individual that made the joint and the date the joint was made. The individual's name (first initial and complete last name) and date must be legibly printed on the plastic pipe within 12 inches of the joint. The joint shall be marked immediately after it has been made and inspected by the joiner.
3. Each person that inspects a joint must be qualified by appropriate training or experience in evaluating the acceptability of plastic pipe joints made under the applicable joining procedures.
4. The following items may be checked to ensure that correct procedures are being adhered to:
 1. Pipe preparation - line up
 2. Use of depth gauge and cold ring(s)
 3. Condition of heating tool
 4. Heating time and temperature
 5. Proper stab depths
 6. Condition of joining tools
 7. Cooling time
5. A production joint may be cut out periodically for a quality control test.

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