

# 3010 - General Procedures

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### **1. INTRODUCTION**

1. Plastic pipe has generally replaced steel pipe in gas piping and is a well tested concept in the industry. After many years of experience, it has been found that plastic pipe is economically feasible, is a dependable piping system when installed properly, produces a smoother gas flow than other piping, is quicker and easier to install and repair, may be squeezed off in an emergency to stop the flow of gas, and is easier to handle and warehouse than other piping.
2. The following precautions must be taken with plastic pipe, in addition to those necessary for steel pipe:
  1. Plastic pipe shall not be used at pressures exceeding 60 psig unless approved by System Engineering. All exceptions and the justifications shall be documented.
  2. Plastic pipe shall not be used in above ground installations (except in service risers).
  3. Plastic pipe requires special precautions in handling, storage and excavation.
  4. Joints must be made and inspected by qualified personnel.
  5. Valves must be of the low torque type and be properly supported.
  6. Plastic pipe must be snaked in the ditch to provide for shrinkage upon cooling.
  7. Plastic service pipe installed in casing or conduit where temperature variations may exist must be properly restrained to prevent pullout.
  8. Plastic pipe should only be installed in areas where substantial external loads are not anticipated.
3. The following plastic pipe section is intended to provide a guideline for installation of plastic pipe.

## 2. GENERAL INFORMATION

1. Joining -- All connections must be accomplished by approved methods. These approved methods are butt fusion, socket fusion, saddle fusion, electrofusion, and mechanical couplings.
2. Testing -- All plastic pipe will be tested as set forth in [DENC and DESC O&M Manual Ch 9 Pressure Test Requirements](#). Pressure testing shall not be done until plastic has cooled. Refer to D&I Section [3020 - Fusion Procedures](#) for specific cooling times. Pipe should be restrained during testing to prevent pull-out.
3. Expansion and Contraction -- Plastic pipe expands or contracts approximately 1" per 100' for each 10 degrees Fahrenheit. This is approximately ten times the amount of expansion or contraction of steel. This property of plastic requires special procedures designed to prevent the possibility of a "pull out" from the connections. Providing slack pipe in the ditch, backfilling before making tie-ins, using factory made transition fittings and compression couplings with locking type stiffeners are some of the methods used to prevent this possibility. If this work is improperly installed in the summer, winter temperatures will cause pullouts and breaks in the piping.
4. Squeezing Plastic Pipe - Plastic Pipe can be successfully squeezed using the proper equipment and procedures. All new squeeze points on plastic pipe shall be identified in accordance with O&M [Ch 12-E Repair of Plastic and Steel Pipelines](#). Any squeeze points on 4" and larger plastic pipe should have an Electrofusion Clamp installed to reinforce the pipe at the squeeze points. If an Electrofusion Clamp can not be used, squeeze points on plastic pipe larger than 4" should be planned for removal.
5. Alternatives to Squeezing Plastic Pipe - An electrofusion SHORTSTOPP PE Bottom Branch Outlet fitting from TD Williamson is one of the preferred methods for branch connections. The SHORTSTOPP PE Bottom Branch Outlet fitting may also be used to stop off plastic pipe in lieu of squeezing by tapping only the top of the fitting and pipe. The SHORTSTOPPE PE Bottom Outlet fitting (with only the top tapped out for use as a line stopper) is a method for extending plastic mains 4" and larger.

## 3. GENERAL SPECIFICATIONS

1. Standard Sizes

Size	SDR	Max PSIG @ 73°F	Max PSIG @ 120°F	Coiled or Straight
1/2" CTS (5/8" OD)	7	100	100	Coiled
3/4" IPS	11	80	69	Coiled
1" CTS (1-1/8" OD)	12.5	70	60	Coiled
1-1/4" IPS	10	89	76	Coiled
2" IPS	11	80	69	Coiled
2" IPS	11	80	69	Straight
4" IPS	11.5	76	66	Straight
6" IPS	11.5	76	66	Straight
6" IPS	13.5	64	55	Straight
8" IPS	11.5	76	66	Straight
8" IPS	13.5	64	55	Straight

Note: SDR 13.5 is the standard for 6" and larger plastic pipe. 73°F design temperature is used for below ground installations. 120°F design temperature is used for above ground installations.

## 2. Type Connections

1. Heat fusion, electrofusion and mechanical connections may be used following proper procedures.

## 3. Limitations for Use

1. Plastic pipe should not to be used in sections designated as critical areas, i.e., within the bounds of navigable streams, railroad right-of-way, vaults or other underground enclosures unless approved by System Engineering.
2. Plastic must also be protected from any source of heat which could impair the serviceability of the plastic, and should not be installed inside buildings.

## 4. Material Specifications

1. The approved plastic pipe and fittings are those manufactured of unimodal MDPE 2406/2708 or HDPE 3408 Resin in accordance with ASTM D-2513, meeting the requirements of OPS Rules, [Part 192](#), Transportation of Natural and Other Gas by Pipelines Minimum Safety Standards.

## 5. Approved Manufacturers

1. The following plastic pipe manufactures have been approved for unimodal gas pipe: Charter Plastics, Performance Pipe, Dura-Line, and Uponor. Engineering must approve all plastic pipe manufacturers.

# 4. TOOLS AND EQUIPMENT

1. Tools and equipment manufactured by Ridgid, DuPont, MacElroy, Iriquois, MT Deason, Frialen, Central Plastics, Innogaz, and Mustang are considered satisfactory for joining plastic pipe by heat fusion method. System Engineering shall approve other manufacturers of heat fusion tools. All manufacturers' procedures shall be followed.

# 5. CARE OF TOOLS

1. General Maintenance -- All tools used for fusion joining must be kept clean and in good working order. Tools are to be lubricated, where required, according to the manufacturer's recommendation.
2. Heating Tools and Heater Faces -- All heating tools and heater faces must be cleaned of residual plastic after each use with a cotton rag and/or soft stick. The use of "Pam" or other coatings to prevent sticking of plastic to Teflon faces is strictly prohibited. Excessive accumulation under the face plates may be further removed with emery cloth periodically.
3. Temperature Control - Electric -- Each heating tool should minimally be checked daily and each time the heating tool is disconnected from power (and preferably before each use) with temperature sticks by touching to the edge of the heater face prior to performing fusion work to see that the thermometer is indicating the desired temperature. The temperature for the heating tool is preset by the manufacturer, but minor adjustments in temperature may be made by adjusting the set screw located in the top of the thermoswitch. To lower the temperature, turn the set screw clockwise, and to raise it, turn it counterclockwise. Do not turn the set screw more than 1/8 of a turn at a time and allow the unit to stabilize at the new temperature before adjusting further. One complete turn of the thermoswitch set screw equals approximately 100 degrees Fahrenheit.
4. WARNING: Maximum control temperature is 600 degrees Fahrenheit and attempting to raise the temperature above 600 degrees Fahrenheit will destroy the thermoswitch.

## 6. HANDLING OF PLASTIC PIPE

1. Plastic pipe is a reasonably durable product, highly resistant to impact. However, the following precautions must be observed when handling plastic pipe:

### 1. Retention and Storage

1. To prevent deterioration from ultra-violet rays of the sun and general weathering, plastic pipe stock should be rotated so that older stock is used first. Pipe stored outside for as long as two years should be used immediately even if transfer and shipment is necessary. Do not use plastic pipe which has been stored outside longer than three (3) years.

### 2. Damage Prevention

1. Coils of pipe should be stored in a horizontal position and be adequately supported to prevent crushing. All plastic pipe must have the ends sealed to prevent condensation inside the pipe and to keep out foreign matter. Plastic pipe in which condensation has formed may be flushed out with methanol. No other organic solvents can contact the plastic pipe and care must be taken to prevent primer or mastic from contacting the plastic while coating adjacent steel mains or fittings.
2. Plastic pipe can be cut or punctured by sharp objects, and inspections must be carried out to prevent such damage immediately prior to burial. Pipe sections containing such cuts, punctures, or gouges must be cut out. A good rule of thumb for determining if a piece of pipe has been damaged to such an extent as to be unstable is if the wall thickness has been punctured or scratched to a depth greater than 10% of the wall thickness as determined by a pit gauge.
3. In addition, plastic pipe is heat sensitive and should be protected from excessive heat or flame except as required for heat fusion connections. After a plastic system has been placed in service, under no circumstances should a "live" pipe or tubing be left exposed and unattended, thus subjecting it to possible external damage from brush or trash fires

### 3. Loading and Transportation

1. When loading or unloading plastic pipe, it is preferable to use two or more men so that the pipe can be placed into position without damage.
2. During transport, the plastic pipe should be continuously supported with soft, or padded, strapping in such a manner so as to minimize movement between the pipe and its support. Carrying supplies or equipment on top of plastic pipe is absolutely prohibited. Extreme care must be taken in the handling and hauling of plastic pipe in the yard. Handling with a forklift is considered detrimental to the pipe unless a second man is supervising the loading and placement. Reels are recommended as a means of handling and distributing the pipe in the field. Do not roll coils of pipe on surfaces that may damage the pipe.

### 4. Cleanliness

1. Cleanliness is an absolute necessity in the handling of plastic materials. This specification recommends that all crews keep an ample supply of burlap bags for storing cleaning tools, pipe, and fittings. Also a supply of clean, dry cotton rags (not synthetics) is needed for more refined cleaning. A clean working area adjacent to the pipeline is also essential. A piece of plywood (30" x 48") provides a good "work bench". Wooden tongue depressors are ideal for cleaning molten plastic from heater faces and should be used for this purpose. Keep the tools for plastic fusion in tool boxes.

(UNCONTROLLED IF PRINTED)