Definitions and Clarification of Information Collected on Report Form

PLASTIC PIPE DATA-COLLECTION INITIATIVE
DEFINITIONS

Administered by

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PLASTIC PIPE DATA-COLLECTION INITIATIVE
DEFINITIONS

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The Plastic Pipe Database Committee (PPDC) has been formed to develop and maintain a voluntary data collection process that supports the analysis of the frequency and causes of in-service plastic piping system and appurtenance failures and/or leaks (failures). Data to be collected includes failure of any plastic or metallic component (fitting, pipe, part, etc.) including plastic grommets, seals, o-rings and other appurtenances used in plastic gas distribution systems.

Note: highlighted text and areas indicate updated information.

Clarification of Data to Be Collected on the Report Form

The report form should be used to submit failures of plastic pipe and metal and/or plastic appurtenances contained within plastic piping systems.

Failure
Refers to an unintentional release of gas either through the body of the fitting or pipe due to a breach in the material or through the interface of a joining of two materials due to a breach in the sealing mechanism. May also be referred to as leak.

1) Pipe or Fitting identification

This is the material of which the failed pipe or component is made. Typical materials are Polyethylene (PE), Polyvinyl Chloride (PVC), or Polyamide (PA). A two or three letter designation may be on the print line of the pipe or fitting or be available in operator records.

a) Type of Material

The letter code indicating the material which the pipe or fitting is made from such as PE, PVC, or PA. If type of material is unknown, indicate color (For example, tan, orange, yellow, black, black-yellow, white-blue).

b) Manufacturer

This is the name of the company that produced the pipe or fitting. The manufacturer name would typically be on the print line of a pipe, on a sticker attached to a fitting or stamped into the fitting.

c) ASTM F2897 16-Character Code, Print Line or Label (if available)

If available, provide ASTM F2897 16-character code. Otherwise, provide the printed line of information on the pipe Outside Diameter (OD) that contains all the pertinent information which relates to the traceability of the pipe or the information printed on a label affixed to a fitting.

d) SDR, DR, Schedule or wall thickness

The standard dimension ratio (SDR), dimensional ratio (DR), schedule or wall thickness. The SDR or DR is the pipe OD divided by pipe wall. The schedule number of the pipe is an alternate identifier. These numbers can be found on the print line or in the case of DR and SDR, by measuring the wall thickness and dividing it into the pipes outside diameter. The wall thickness is the measurement in inches between the inside and outside wall of the plastic pipe. It may be found on the print line or measured using a caliper.

e) Nominal Size

This is usually found on the print line as a number and a three-letter designation such as IPS (Iron Pipe Size) or, CTS (Copper Tubing Size). This may be marked on operator records as well.
For components with multiple sizes, report the size where the failure occurred. For example, for a 2"X1/2" tapping tee, with the failure on the ½" outlet, report the size as ½". If the failure was at the tapping tee cap, the size should be reported as the size of the outlet of the tee. If the failure occurred at the joint between the fitting and the main, report the main size, 2".

2) Date of Manufacture

This is the date the component was manufactured. This is typically found on the print line and may be coded. For assistance in reading the code, contact the Manufacturer if they are still in business.

3) Method of Installation

This is the method that was used to install the plastic piping into the ground. Different methods of installation place different stresses on the plastic pipe. If the method of installation is not known factually, the investigator may record an educated guess if that guess is supported by additional written assumptions.

a) Open trench

This is where a trench is dug, the plastic piping is installed and the ditch is recovered with backfill according to accepted practices.

b) Bored/HDD

The plastic piping is inserted into a bored hole produced by some type of drilling equipment according to accepted practices. This is sometimes referred to as horizontal directional drilling or guided boring.

c) Plowed in

The plastic piping is inserted through a chute or guide behind a tractor or earth moving equipment with a plowing attachment and the pipe is installed as the plow moves across the ground. The piping is fed from a stationary reel that is not part of the plowing equipment.

d) Insertion

The plastic piping is installed by pushing or pulling into an existing pipe that is usually metal.

e) Joint trench

The plastic piping is installed into the same trench as other utilities such as sewer, water, electricity and telephone. This is also sometimes referred to as common trench.

f) Planted

The plastic piping is on a reel that is a part of the trenching equipment and is fed into the ground as the equipment moves along the ground. There is a reduced tensile stress on the pipe as opposed to plowing.

g) Unknown

Only use unknown when there are no records or other indications of installation method. It is important to identify the installation method where possible.

h) Other

Installation is known but not by a method listed. Please describe the method on the blank line of the form.

4) Type of soil in contact with pipe

This is to determine the kind of soil that was in contact with the plastic pipe.

a) Sand

A sedimentary material, finer than a granule and courser than silt, with grains between 0.06 and 2.0 millimeters in diameter.

b) Loam

Soil that has no or few rocks or pebbles but has some peat or peat like parts in the soil.

c) Clay

Very fine soil that becomes slimy or plastic when mixed with water and compacts tightly and is hard to remove from the ditch and from your boots.

d) Rocky

The soil contains rocks that are smooth and rounded, such as at the beach or in rivers, or sharp and angular such as those caused by excavation and/or blasting.

e) Slurry

A mixture of water and clay, or other soil materials.

f) Other

None of the above, please describe.

5) Operating Pressure

a) At time of failure

The pressure at which the line was operating when the failure occurred or was discovered.

b) Normal Range (If known)

The operating pressure range over a full year.

6) Date of Installation
The date, or year (typically found in Operator Records), when the pipe, fitting or joint was installed.

7) Failure Analysis Section

7a) Failure Location

This replies to the question: Where did the failure happen?

If the manufactured fitting assembly includes small pipe segments (pups) and the failure occurs within the fitting assembly including those pups, select Fitting and complete section 7b (Failure in Fitting). If the failure occurs in the field connection between the fitting assembly and another fitting or pipe, then select Joint and complete section 7c (Failure in Joint).

i) Pipe
The failure was in the plastic pipe.

ii) Fitting
The failure in the fitting, not in the joint between the pipe and the fitting, such as a valve stem leak, a leak through the body of the fitting, a broken bolt, a threaded cap failure on a tee, a corrosion leak on a fitting, or other.

iii) Joint
The failure was in the joint formed by the connection between the pipe and the fitting or between two sections of pipe not caused by a failure of the fitting.

7b) Failure in Fitting

i) Transition

The failure was within a fitting between different piping materials. This includes both mechanical pullout-resistant metal and plastic couplings and factory produced weld-in and fuse-in fittings. This would not apply to failures in the field joint formed by the connection between the pipe and the fitting.

ii) Valve

The was at a valve - either fusion or mechanically joined types.
Do not report Excess Flow Valve (EFV) malfunctions such as tripping or resetting issues. If an EFV leaks to atmosphere, report the component of the EFV that failed; e.g. pipe, fitting or joint.

iii) Meter riser

The failure occurred on a component of a meter riser. There are two basic types of meter risers: the first is the anodeless riser in which the plastic is the gas carrier up inside the steel riser casing to a point above grade: the second is the all steel riser in which the plastic is fitted to a steel compression fitting, below ground, at the end of the horizontal leg of the riser. Almost all risers installed today are the “anodeless” type.

iv) Mechanical fitting

The failure occurred on a component of a stab type, nut follower, bolted, or other type of compression connection, made of metal or plastic. This will include both pullout-resistant and seal-only types but does not include transition fittings. This would not apply to failures in the field joint formed by the connection between the pipe and the fitting.

v) Heat Fusion fitting

The failure occurred in a conventional or hot plate fusion fitting. This would include conventional plastic fusion fittings such as socket fusion couplings, ells and tees and saddle fusion tees. This would not include butt fusion joints but would include failures in the mold seams of molded plastic fittings. This

would only apply to failures in the bodies of fusion fittings and not failures in the joints between the fittings and pipe.

vi) Electrofusion fitting

The failure occurred in an electrofusion fitting. This would include electrofusion saddles, patching saddles and couplings, ells, and tees. This would not include butt fusion joints,but would include failures in the bodies or seams of molded of extruded body electrofusion fittings. This would not apply to failures in the joints between the fittings and pipe.

vii) Threaded Cap

The failure was attributed to the threaded cap. This includes loose caps, cracked caps, sealing component (e.g. o-ring) defects, and other failures. Non-threaded cap failures should be included in the appropriate type of fitting (e.g. electrofusion, heat fusion).

viii) Other

If the fitting does not match any of the above types, please describe.

7c) Failure in Joint

The failure was in the joint formed by the connection between the pipe and the fitting or between two sections of pipe.

i) Mechanical

The failure was at a mechanical joint. This would include all types as described above in section 7b) iv).

ii) Electrofusion

The failure was in the electrofusion joint. This would include couplers, elbows, tees, saddle tees, branch saddles, and patching saddles.

iii) Butt fusion

The failure occurred in a hot plate fused butt fusion joint.

iv) Socket fusion

The failure occurred in a hot plate fused socket fusion joint.

v) Saddle fusion

The failure occurred in a hot plate fused saddle fusion joint. This would not include either electrofusion saddles or mechanical saddles.

vi) Solvent

The failure occurred in the joining area of a solvent cemented joint. This would only apply to solvent cement plastics such as PVC or ABS.

vii) Other

The failure was at a joint not listed, please describe details here.

8) Failure Cause
What caused the failure of the plastic pipe?

a) Squeeze off

There is an indication that the failure occurred at a current or previously squeezed off location. (This is one cause of a brittle-type crack.)

b) Point loading

There is evidence of a foreign object (e.g. rock, tree root, etc.) pushing or rubbing against the pipe. (This is one cause of a brittle-type crack).

c) Excessive expansion/contraction

This will be discovered upon leak repair. Examination of the pipe and coupling will determine if the fault was due to thermal induced contraction/expansion or due to outside force. Thermal expansion/contraction can occur when the pipe is anchored, due to a socket, mechanical coupling, elbow or tee, and there is an axial force due to the expansion or contraction caused by temperature changes. If there is ductile failure in the pipe and not in the joint, the failure is most likely due to outside force. If the plastic pipe has pulled out and shows signs of gradual creep, it is likely due to poor installation especially if the coupling is pullout resistant. If the failure is slow crack growth adjacent to the fitting, this could be due to fatigue or excessive bending caused by point loading at the joint and/or improper installation of sleeves or backfill.

d) Excess external earth loading

Examination of the section of pipe will reveal if the pipe was excessively bent, kinked or mishandled. If the failure is the brittle type, it will occur at the area of maximum stress. If this is where a protective sleeve should have been installed, or where a moving load was being applied such as a driveway and the pipe was installed shallow or poorly backfilled then the cause is clear. Examination of the leak and the area of the leak should provide the answer. This type of failure usually occurs because of bending and stress loading where a pipe (more flexible) enters a fitting such as a socket fusion fitting (less flexible).

e) Installation Error

Leakage was caused by not following proper installation procedures or operating instructions. An example would be indications of failure to follow manufacturer recommended installation procedures such as torque requirements, tapping cutter or stab depth and pipe surface preparation.

f) Previous Impact

The sample was originally submitted as a plastic pipe material failure and upon further examination it was determined there were multiple modes of failure. An example would be a brittle crack through the pipe wall next to a third party (outside force) gouge that initiated the crack in the pipe wall. If the pipe failure occurred sometime after the impact, then this is reported as a Previous Impact pipe failure using the plastic pipe database form. Failures reported or eligible to be reported as third party damage under the Common Ground Initiative would not be reported again under this category.

g) Material Defect

The pipe, fitting or joint failed due to a defect in the material.
Note: This cause should only be checked when it is clear the failure was due to a defect in the material of the pipe, fitting or joint.

h) Threaded Cap

Select or describe the most appropriate type of threaded cap failure.

i) Corrosion

The failure was due to corrosion on the metallic portion of the fitting. This would include fittings that are metallic and plastic fittings with metallic subcomponents.

j) Gopher/Rodent/Worm Damage

The failure was due to animal damage including gopher, rodent, worm or insect.

k) Unknown: Not Excavated – Abandoned

The pipe, fitting or joint that failed was not excavated and was abandoned in place.

l) Unknown: Not Excavated – Replaced

The pipe, fitting or joint that failed was not excavated and was replaced.

m) Unknown

The sample was destroyed or an unusual event occurred so that the failure cause could not be determined.

n) Other

Did your examination reveal any other cause of failure (e.g. static electricity, electrostatic discharge, pin holing, overpressure, excessive temperature)? Please describe it here. The description “outside force” is not sufficiently specific and in some cases may inadvertently duplicate items included under the other categories above, where specific data are being sought by the PPDC for specific causes. Examples of such are:

- tree roots which fall under category 8(b) Point Loading,
- excessive earth loading which falls under category 8(d) Excess External Earth Loading, or
- delayed third party damage which falls under category 8(f) Previous Impact.

Therefore, if you use outside force, as the failure cause, please be more specific and describe what caused the outside force. For example, if it is lightning or static electricity, please specify as such. Please refer to the definitions in the first sentence of the first paragraph under this heading.

9) Date of Failure

The date the failure occurred or was discovered. If you are submitting data whose failure date predates January 25, 2001, and you do not know the actual date of failure to at least the month/year, please indicate this is historical data by entering 01/01/1950 under this entry. This date will serve as a flag for the actual date on any failure known to have occurred prior to January 25, 2001.