

PLP TechNote 205

Guidance on Pipe Damage Evaluation



Pipeline Plastics (PLP) polyethylene pipe products made from PE4710 and PE2708 are used in wide range of applications from gas to water and wastewater application. Polyethylene pipe is very tough and well suited for the rigors of multiple types of installation practices – direct bury, slip-line, and trenchless. While PLP products are engineered to maximize durability and long-term strength, activities such as shipping and handling, installation and 3rd party damage can result in damage to the pipe that requires evaluation and potential remediation.

In accordance with industry practice PLP recommends that the maximum allowable damage to a pipe is no more than 10% of the thickness of the wall. This damage can be caused by, but not limited to - cuts, scrapes, gouges, or abrasions. Examples of such damage can be found below:



This 10% is considered an industry best practice as recommended after thorough research and investigation by the gas distribution industry and other related industries utilizing PE pipe. This number represents a conservative recommendation based on that research. The following references can be reviewed for such recommendations:

- **Plastics Pipe Institute, Handbook of Polyethylene Pipe, 2nd Edition Page 28:**

For PE pipelines, damage should not exceed about 10% of the minimum wall thickness required for the pipeline's operating pressure or the minimum wall thickness required to meet structural design requirements. Excessive damage generally requires removing the damaged section or reinforcement with a full encirclement repair clamp. Excessively deep cuts, abrasions or grooves cannot be repaired by using hot gas or extrusion welding to fill the damaged area with PE material because these methods do not provide sufficient bond strength for pressure service or to restore structural strength.

If damage is not excessive, the shape of the damage may be a consideration. Sharp notches and cuts may be dressed smooth so the notch is blunted. Blunt scrapes or gouges should not require attention. Minor surface abrasion from sliding on the ground or insertion into a casing should not be of concern.

Damage such as punctures and tears will generally require cutting the pipe to remove the damaged section and replacement with undamaged pipe. Small punctures may occasionally be repaired with patching saddles that are saddle fused or electrofused over the puncture.

- **Plastics Pipe Institute, Material Handling Guide for HDPE Pipe and Fittings, Section 6.0 Pipe and Fitting Storage:**

Before pipe and/or fittings are placed into storage, they should be visually inspected for scratches, gouges, discoloration and other defects. Damaged or questionable materials should not be put into storage. Cuts and gouges that reduce the wall thickness by more than 10% may impair long-term service life and should be discarded.

- **AWWA M55, "Design and Installation of PE Pipe":**

All AWWA PE pipe is marked to identify size, dimension ratio, pressure class, materials, date of manufacture, and the manufacturer's production code. When the pipe is received, it should be visually inspected to verify that the correct product was received. The product should be checked for damage that may have occurred during transit. Look for fractures, kinking, deep gouges, or cuts. Minor scratches or scuffing will not impair the serviceability of the PE pipe and fittings. However, PE 4710 pipe (up to 65-in diameter) with gouges or cuts in excess of 10 percent of the product wall should not normally be used. The length of pipe affected by the damaged section may be cut out and the remainder of the product reused. The commercial carrier and manufacturer should be advised immediately of any damage or discrepancies.

Pipe should always be inspected upon reception from the manufacturer, prior to installation, or upon exposure of existing facilities. Should any damage be identified, the pipe should be thoroughly inspected and any damaged measured using a pit gauge or damage indicator.

Upon discovery and confirmation of damage in excess of 10% of the pipe wall, that section of pipe should be immediately discarded if not yet in service and should be scheduled for replacement if already in service. While not generally an immediate hazard, damaged pipe can lead to reduced ultimate service life and should not be overlooked. Any damage to pipe should be inspected and reviewed to ensure safety and compliance with all federal and state codes to ensure compliance.

Options for repair of in-service pipe are detailed in Plastics Pipe Institute, "MAB Basic HDPE Repair Options." Available for download at <https://plasticpipe.org/pdf/mab-basic-hdpe-repair-options-mab4.pdf>

For further assistance please contact Pipeline Plastics' Customer Service Department.

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