

Properly Specifying the Correct HDPE Pipe and Manufacturer for Oil & Gas Applications

Pipeline Plastics Energy pipe is a high performance PE4710 polyethylene piping product designed for a range of applications. A PE4710 compound is the latest and highest performing PE compound recognized by ASTM F2619, API 15LE and other common standards.

STANDARDS

When specifying a polyethylene pipe for oil and gas applications it is important to specify the correct materials in order to make sure a high performance PE4710 with a cell classification PE445574C per ASTM D3350 is used. It is equally important to source from a manufacturer that can convert the raw materials into pipe that meets, or exceeds, the minimum requirements of the performance standard(s) to which the pipe is manufactured. Pipeline Plastics Energy pipe is manufactured to meet or exceed all the requirements of ASTM F2619 as well as API 15LE. Both of these standards are specific to oil and gas gathering applications with the fluids and operating conditions that will likely be encountered.

- ASTM D3350, “Standard Specification for Polyethylene Plastics Pipe and Fittings Materials”
- ASTM F2619, “Standard Specification for High-Density Polyethylene (PE) Line Pipe”
- API 15LE, “Specification for Polyethylene (PE) Line Pipe”

PE PIPING COMPOUNDS

These standards reference and/or require a PE4710 compound be used in the manufacture of PE pipe. **The PE pipe manufacturer must have a dependent listing on their compound in the Plastics Pipe Institute Technical Report-4 (PPI TR-4): [Plastics Pipe Institute TR-4 Listed Materials](#)**

This signifies the pipe manufacturer has been evaluated and granted a dependent listing by the company supplying the polyethylene resin to have the capability to reproduce their PE4710 compound having the same long-term hydrostatic performance as the original compound.

- Plastics Pipe Institute (PPI) TR-4 Dependent Listing as PE4710
- Hydrostatic Design Basis (HDB) 1,600 psi @ 73°F (23°C) per ASTM D2837
- Hydrostatic Design Stress (HDS) of 1000 psi @ 73°F (23°C) per PPI TR-4
- Hydrostatic Design Basis 1,000 psi @ 140°F (60°C) per ASTM D2837

During the extrusion process the PE resin is mixed with a **specific approved carbon black concentrate** such that the finished pipe contains 2-3% of carbon black. If a “*non-approved*” generic carbon black concentrate is used the final PE compound is no longer a PE4710 and no longer meets the requirements of the standards, nor the PPI TR-4 dependent listing requirements. The pipe extrusion equipment must be designed to handle in-plant blending and mixing so the carbon black is adequately dispersed resulting in a homogeneous mixture.

ASTM F2619 states – “...*To the extent commercially practical, pipe and fittings shall be uniform throughout in finish, opacity and color except for color stripes if applicable.*”

Poor mixing can lead to issues during the butt-fusion process resulting in lower strength joints. Pipeline Plastics will not be responsible for fusion joints to poor quality HDPE pipe.

QUALITY ASSURANCE AND RECORD RETENTION

The pipe manufacturer must be able to demonstrate extensive history of manufacturing pipe for oil and gas gathering applications – 10 years. They must have a Quality Assurance program for incoming raw materials as well as the finished product. The quality program shall confirm that sufficient production and quality records are maintained to demonstrate conformance to requirements and verify effective product manufacturing to the requirements of this standard. Markings on the pipe should include sufficient information so that tracking back to the specific lot/batch of raw materials is possible. The pipe manufacturer should be prepared to provide, on request, confirmation of incoming material conformance as well as pertinent quality assurance testing on final pipe. This could be in the form of a Certificate of Conformance. **Before accepting shipment of pipe in the field the pipe should be inspected for any visual defects or damage, as well as proper print line markings.**

JOINING

Pipeline Plastics recommends the heat fusion joining of our pipe follow ASTM F2620 and/or PPI TR-33. PE pipe made from the appropriate PE4710 compounds and manufactured in a quality fashion have demonstrated they can be joined by these methods or cross-fused with other high quality PE 4710 PE pipe. We recommend only using qualified fusion joining personnel and destructive proof testing such as a field bend-back test or a Guided Side-Bend Test.

- ASTM F2620, “Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings”
- PPI TR-33, “Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe”
- ASTM F3183, “Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint”

SUMMARY

Following these standards, recommendations and guidelines will give the best assurance of obtaining quality PE piping products for a successful installation and long service life of the PE piping system.

- Specifying appropriate product performance standards ASTM F2619 and API 15LE
- Requiring a Plastics Pipe Institute (PPI) Compound Listing in TR-4 for the pipe manufacturer.
- Experience manufacturing HDPE pipe for Oil & Gas Applications and a Quality Assurance program with record retention.
- Modern pipe extrusion equipment designed for in-plant blending and mixing.
- Material traceability to specific lot/batch of raw materials.
- Heat fusion Joining as per established methods ASTM F2620 and PPI TR-33

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