

Tech Note PLP 201

ASTM F2619 – “Standard Specification for High-Density Polyethylene (PE) Line Pipe.”



APPLICATIONS

ASTM F2619 – “Standard Specification for High-Density Polyethylene (PE) Line Pipe” was developed specifically to address the demanding and diverse needs of the oil and gas industry – crude oil, wet or dry gas, brine or other production water, and multi-phase fluids. Historically ASTM D2513 or API 15LE have been the standards most often specified for these applications. However, D2513 has evolved to be only for PE pipe for the distribution of natural gas in regulated applications for all class locations - including densely populated areas. Because of use in these high consequence areas D2513 continues to be revised to include specific requirements that may only be necessary in the residential gas distribution industry.

Interstate pipelines fall under the jurisdiction of the federal Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA). Many states adopt the same or similar rules for intrastate pipelines. The regulations for the operation of these pipelines are detailed in 49 CFR Part 192. Gathering lines are defined in §192.8, “How are onshore gathering lines and regulated onshore gathering lines determined?” For **regulated** pipelines the only referenced product standard for polyethylene pipe is ASTM D2513-99. Generally a non-metallic gathering system in a Class 1 location is not considered a regulated gathering line. Class 1 is defined as, “Any class location unit that has 10 or fewer buildings intended for human occupancy.” (see § 192.5). Of course, any pipeline transporting only water would not be under the jurisdiction of part 192. However, Individual state regulations may apply.

Pipeline Plastics recommends specifying ASTM F2619 for “oil patch” piping applications when not considered a regulated application or when non-hydrocarbon fluids will be transported. The pipeline operator should always check local regulations, as well as the potential for a pipeline to be considered regulated in the future due to code changes or changes in class location category.

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Pressure Design

Pipeline Plastics ENERGY PIPE is manufactured using a high performance PE 4710 compound meeting the demanding requirements and rigors of the oil & gas industry. Design operation temperatures range from -20°F to 140°F. Maximum operating pressures are detailed on the Pipeline Plastics Energy Piping specification sheet and follow the PPI Handbook of Polyethylene Pipe, second edition, Chapter 3 and 6 for determination of maximum operating pressures. For design temperatures other than 73°F see Chapter 3, Table A.2. For the transportation of fluids other than water see PPI publication TR-9 for additional service factor guidance.

$$PC = \frac{2 * HDS}{(DR - 1)} * SF_E * SF_T$$

Where:

- PC = pressure class, psi
- HDS = hydrostatic design stress
= 1000 psi for PLP Water Pipe at 73°F
- DR = dimension ratio (actual average OD/min wall thickness, t)
- SF_E = environmental service factor
= 1.0 for water and most sanitary sewer
(see PPI TR-9 for additional information)
- SF_T = temperature service factor
= 1.0 at 73°F (see chart)

Outdoor Weatherability

Pipeline Plastics ENERGY PIPE contains a minimum of 2% finely divided and dispersed carbon black. Research and testing supports this will protect the PE pipe from the negative effects of UV for up to 70 years, depending on the actual service environment.

Pressure Surge and Fatigue

Pipeline Plastics ENERGY PIPE can withstand surge events associated with frequent pump on/off cycles, instant value closures or catastrophic system shutdown. Pressures and surge events generating up to 2X PR for occasional surge, and 1.5X PR for repeated surge is allowed for up to 10 million cycles (see PPI Technical Report, "Fatigue of Plastic Water Pipe: A technical Review with Recommendations for PE 4710 Pipe Design Fatigue.")

Joining

Pipeline Plastics ENERGY PIPE can be joined by heat fusion using industry accepted ASTM F2620 procedure for butt-fusion and saddle fusion. Electro-fusion as well as many type of mechanical couplings or flange adaptors design for use on HDPE pipe can also be used. Always follow the fitting manufacturer installation procedure.

Design, Installation and Leak Testing

Pipeline Plastics recommends following the practices and guidance of the Plastics Pipe Institute Handbook of Polyethylene Pipe, second edition available on the PPI website www.plasticpipe.org. Additional guidance is available with the PPI Calculator <http://plasticpipe.org/publications/software-ppi-calculator.html>.

Leak testing should be performed according to ASTM F2164, "Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure." Appropriate safety considerations should always be followed.

