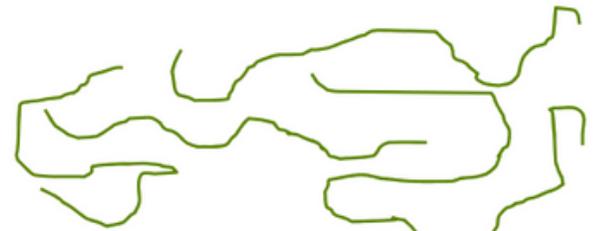


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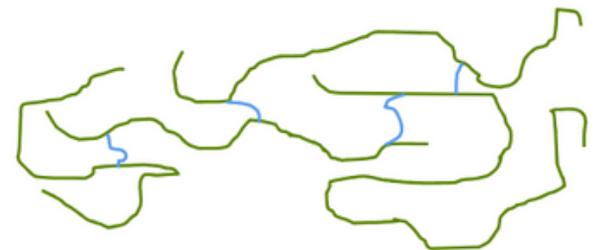
Crosslinked Polyethylene

Traditional linear polyethylene rotomolding grades are accessible, but they often do not have the physical properties necessary for high-performance applications. To achieve improved physical properties, linear polyethylene can be crosslinked. Crosslinking is a heat-initiated process in which bonds are created between neighbouring polymers to create a thermoset network. The crosslinking process enhances multiple physical properties of the polymer. Most importantly, crosslink polyethylene has greater impact strength than linear polyethylene and does not experience brittle failures. In addition to this, its impact strength is maintained in temperatures as low as -40°C (-40°F). Other physical properties are improved through crosslinking as well such as toughness, barrier properties, abrasion resistance and stiffness.

Crosslinked polyethylene also offers higher chemical resistance and exceptional environmental stress crack resistance, making it perfect for chemical storage of acids or cleaning agents. In addition to this, crosslink polyethylene can be used to create multi-layer systems, combining its high strength and rigidity with a barrier layer for improved fuel permeation properties. Through multi-layer systems, crosslink polyethylene is the ideal choice for the creation of fuel tanks and pressure vessels. Designing high-performance Type IV carbon overwrapped pressure vessels with crosslinked polyethylene function well for CNG storage.



Schematic representation of linear PE molecules

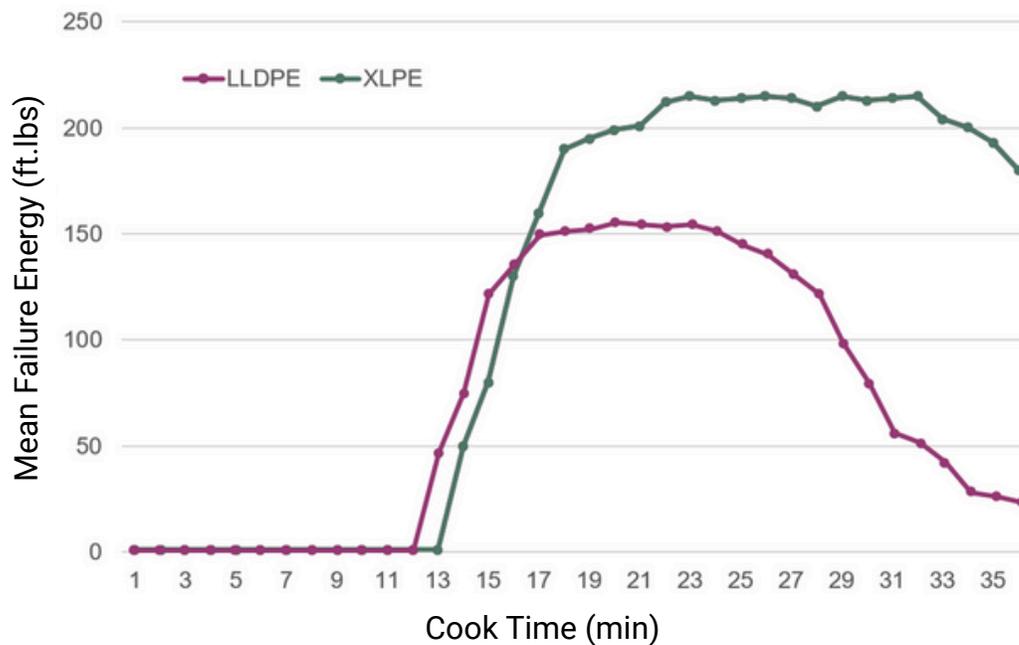


Schematic representation of XLPE molecules

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In addition to its improved physical properties, there are manufacturing advantages to using crosslink polyethylene over linear polyethylene. The rotational molding process uses intense heat; however, crosslink polyethylene has a substantial resistance to heat degradation. Notably, crosslink polyethylene requires more ventilation when molding compared to linear materials. It is imperative that the ventilation ports on molds are adequately sized in order to reduce common defects like pinholes, coining/pock marks, blowholes/suckholes, and flash at the parting line. If you are experiencing materials or technical challenges with rotomolding product, Ingenia has years of experience in rotational molding and offer the support you need.

Impact strength versus time in oven for LLDPE and crosslink - heat degradation comparison



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In summary, crosslink polyethylene used in rotational molding has benefits beyond linear polyethylene including:

- Increased impact strength
 - Maintains impact strength at -40°C (-40°F)
 - No brittle failures
- Increased stiffness
- Increased resistance to abrasion
- Improved barrier properties
- Significantly improved environmental stress cracking resistance
- Greater chemical resistance

Contact your Ingenia Polymer Sales or Technical Service Representative to learn more

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