

Linear low density polyethylene

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Bob Gregory and Bob Barr offered the following comments on the properties and processing of linear low density polyethylene. These consultants seem to agree on most points regarding this relatively new polyethylene resin. Please send any comments you might have to Bob Gregory. —Ed.

Not exactly a new polymer historically, but one that is new to many of us, LLDPE has some unique processing properties which make extrusion different from conventional branched LDPE.

Phillips has been capable of producing LLDPE for many years, while DuPont of Canada has been marketing solution polymerized LLDPE mainly used in the Canadian market. Dow, with its solution polymerized resin, and Union Carbide and its licensee Exxon are marketing gas phase polymerized LLDPE in the U.S. A significant penetration of the high pressure LDPE market is predicted. The enhanced physical properties of LLDPE such as puncture resistance make its future look bright.

Does it extrude on conventional LDPE equipment? It does with some limitation. In general, the apparent viscosity at processing temperatures and shear rates are greater than with conventional high pressure LDPE. It is, therefore, difficult to extrude equivalent rates of LLDPE without a requirement of more available torque and an anticipated higher melt temperature.

Some authorities are recommending shorter L/D length extruders for LLDPE in order to keep the melt temperature at lower values. They argue with some validity that LLDPE is less viscosity sensitive to temperature, thus reducing the need for enhanced distributive mixing compared to LDPE with its requirement of longer extruders. On the other hand, many knowledgeable consultants, suppliers, and converters argue that the end product requirements related to end product cooling typical to blown and cast film processes demand the same degree of temperature homogeneity that conventional LDPE requires and that short L/D extruders with reduced distributive mixing are not necessarily an appropriate answer.

This column is an open forum to your comments or experience. The Consultants' Corner will happily report your replies and attempt to answer your questions concerning LLDPE. Maybe you, like me, are wondering how the excess reactor capacity now used to produce high pressure LDPE will be used as linear LDPE moves into the market. Any answers from the field?

Direct your replies to: - Robert B. Gregory

See also

- Blown film vs. the cast film process
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