



Viscosity Differences in Polymer Melts

Polymer melts are non-Newtonian viscoelastic fluids. This means their melt viscosity is based primarily on shear rate at a given temperature.

In the Polypropylene arena, MFI (Melt Flow Index) or "Melt" is primarily used to differentiate PP's according to MFI.

This test has many inherent flaws. Melt at a given temperature and load is passed through a capillary 0.082" in diameter and an MFI calculated in grams/10 mins.

The shear rates are very low, usually in tens of reciprocal seconds. In most polymer processes like extrusion and injection molding, shear rates can approach thousands of reciprocal seconds.

The single point data of MFI is a very poor predictor of actual end-use melt behavior. Capillary rheometry involves many readings that form a viscosity curve that approximates actual shear rates on processing equipment.

With glass-reinforced materials, there could be issues with glass fibers blocking the capillary entrance.

The purpose of this piece is to portray MFI in its true light - as a crude indicator of melt flow, and, in most cases, not indicative of melt flow under end-use conditions.

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