

Extrusion Performance of High Molecular Weight Linear Low Density Polyethylene

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Abstract

The blown film industry has broadly accepted linear low density polyethylene (LLDPE) since Union Carbide introduced the UNIPOL[®] polyethylene process in the late 1970s. LLDPE yields film products of higher strength than conventional low density polyethylene (LDPE). Recently commercialized, new high molecular weight (HMW) LLDPE resins, Tuflin[®] and Tuflin Plus Polymers, allow the production of significantly higher strength films.

To realize the full benefits of these HMW resins, screw designs and operating conditions must be carefully selected to ensure high output rates and acceptable process stability without polymer degradation. The influence of key extrusion characteristics such as screw type, common length to diameter ratio's, screw speed and head pressure were assessed as well as the influence of melt temperature on thermal stability of the resin.

Preferred screw designs and scaling parameters were defined which allow for the efficient and stable extrusion of these resins for common blown film extrusion line sizes. Further, these studies showed that even at the extreme processing conditions where melt temperatures over 540°F (282°C) were recorded, the resins studied showed excellent thermal stability.