ExxonMobil Chemical

EXACT® Plastomers

Processing Guidelines in Molding Applications

EQUIPMENT

EXACT® Plastomers can be processed using conventional injection-molding equipment like that used to mold LLDPE. General purpose (LDPE) screws with a compression ratio in the range of 2:1 to 3:1 can be used. Although higher torques are required to turn the screw, this is usually not a limiting factor with most molding machines. These polymers are not moisture sensitive and do not require corrosion resistant screws, barrels or molds.

TEMPERATURE SETTINGS

Since EXACT Plastomers are lower melting than LLDPE, a rear zone temperature similar to that used with conventional LDPE or EVA should be used to prevent melting in the feed zone of the machine. In fact, EXACT Plastomers with densities of 0.885 g/cc and less, which have melting points of 160°F (70°C) or lower, have been run successfully with a neutral rear zone. In addition, cooling water on the throat of the barrel is also required to prevent bridging in the bottom of the hopper.

A forward ramp temperature profile starting from about 250°F to 300°F (120°C to 150°C) or lower in the rear zone to about 300°F to 400°F (150°C to 200°C) in the front zone has been found to work well; higher temperatures can be used if needed to reduce viscosity to fill the mold, but melt temperatures in excess of 525°F (275°C) are not recommended.

Since these polymers are relatively low melting, low mold temperatures are needed. Mold coolant temperatures between 60°F and 85°F (15°C and 30°C) are usually sufficient to get good mold surface replication and also good part release.

INJECTION SPEED AND PRESSURES

As with LLDPE, fast-injection speeds usually work the best in that the melt has little opportunity for cooling. The limit for injection speed is usually the appearance of the part surface in the vicinity of the gate, usually duller at high-injection speeds due to melt fracture at the gate.

Because these are soft polymers with low shrinkage, they are more suspectible to overpacking and flashing. To avoid these problems, it is usually best to switch from the first (boost) to second (packing) pressure as soon as the mold fills. In addition, little or no cushion should be used and the second pressure should be considerable lower than the first (about 60% or less).

MOLD AND PART DESIGN

EXACT Plastomers have relatively low shrinkage and are much softer than LLDPE. These properties need to be taken into consideration when designing parts and molds. Molds should be designed with generous draft angles (3°-5° minimum, increasing as density decreases). Mold surface replication is usually excellent, which can lead to more difficult part ejection with highly polished molds; mold surfaces should be honed to a roughness of at least about 400-600 grit in every area of the part which does not require a high gloss and also all areas which by their design and position will be difficult to release from the mold. Knockout pins of large surface area usually work the best, especially those which work in conjunction with air assistance.

Internal mold releases can be added to improve part release. Additives like erucamide have been found to significantly improve part ejection, facilitating automatic running.

These polymers are not as pseudoplastic as LDPE or even LLDPE. As a result, runners need to be at least as large as those used with LLDPE, and possibly larger, especially for lower MI grades. In some cases, gates also need to be larger than those used with LLDPE. In addition, because they are usually soft and extensible, automatic degating with either tunnel gates or three plate molds is more difficult; hot runner molds with shutoff gate valves are preferred for automatically degated molding.

EXACT® Plastomers – For Your Precise Needs

www.exxonmobilchemical.com
www.exactplastomers.com

Printed in the USA • September 2001 • 119-0901-102 • 2,500