



ENGAGE™ Polyolefin Elastomers Extrusion Guide

The ENGAGE™ Polyolefin Elastomers (POEs) listed in Table 1 can be used in a variety of extrusion applications, including sheeting, tubing, and profiles. This guide will provide a processor with general equipment setup and troubleshooting guidelines to help successfully extrude and handle the product.

ENGAGE™ POEs have a wide processing temperature window. The temperatures listed in Table 2 may be used as a reference point and can vary $\pm 5^{\circ}\text{C}$. These temperatures can be further optimized, but normally will not require more than 10°C adjustment.

Polypropylene can be added to ENGAGE™ Polyolefin Elastomers to provide a higher melting matrix that reduces setup time and increases part service temperature. Processing conditions noted in Table 2 may need to be modified to accommodate the higher melting point of the polypropylene.

ENGAGE™
POLYOLEFIN ELASTOMERS

Table 2: Extrusion Parameters (Starting Point)

Material	Melt °C	Die °C	Adapter °C	Zone 3 °C	Zone 2 °C	Zone 1 °C
ENGAGE™ POE >0.890 density	205	205	205	205	195	180
ENGAGE™ POE <0.890 density ⁽¹⁾	195	195	195	195	180	160

⁽¹⁾ Use of a jacketed feed throat is recommended to avoid bridging with <0.890 density grades.

Table 3: Equipment and Processing

Equipment/Processing	Suggested Guidelines
Extruder	L/D ratio 20:1 or higher
Screw Type	General purpose polyolefin screw
Compression Ratio	2.5:1-3.5:1
Screen Pack	80/60/40 mesh
Purge Compound	Shut down at 150°C with highly stabilized polyethylene
Drying	Not required
Recycling	Fully recyclable. Conventional granulators with sharp blades should be used.
Regrind Usage	ENGAGE™ POE is often used as a modifier for olefin recycle streams, but you should conduct regrind studies to determine specific limits for your application.
Release Additive	An amide wax masterbatch is often beneficial for polymers <0.890 density
Tubing or Profile Extrusion	
Sizing	Either air or vacuum
Water Bath	5-10°C
Sheet Extrusion	
Chill Rolls	20-100°C – Adjust as needed for smooth surfaces
Metal Release Additive	If needed for roll sticking
Release Paper	Suggested for all grades if using polished rolls. Textured sheeting reduces need for release paper, especially for > 0.890 density grades.

Table 1: ENGAGE™ POEs for Extrusion Applications

Typical Physical Properties ⁽¹⁾	ENGAGE™ 8540	ENGAGE™ 8480	ENGAGE™ 8440	ENGAGE™ 8003	ENR ⁽²⁾ 7256	ENGAGE™ HM 7387 ⁽³⁾	ENGAGE™ HM 7487 ⁽³⁾
Density (g/cm ³)	0.908	0.902	0.897	0.885	0.885	0.870	0.860
Melt Index (190°C, 2.16 kg)	1	1	1.6	1	2	<0.5	<0.5
Tubing and Profiles	•	•	•	•	•	•	•
Sheeting		•			•	•	•

⁽¹⁾ Typical properties; not to be construed as specifications. Users should confirm results by their own tests.

⁽²⁾ ENR designates a developmental grade. If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; (3) there is greater potential for Dow to change specifications and/or discontinue production; and (4) although Dow may from time to time provide samples of such products, Dow is not obligated to supply or otherwise commercialize such products for any use or application whatsoever.

⁽³⁾ ENGAGE™ HM 7387 POE and ENGAGE™ HM 7487 POE are frequently used in combination with polypropylene.

Table 4: Additives⁽¹⁾

Equipment/Processing	Benefit	Starting Point Levels of Active Ingredient
Amide Wax	Reduced surface tack	500 ppm (0.05%)
Fluoropolymer processing aid	Reduced melt fracture and die pressure	1000 ppm (0.1%)
Polydimethoxysiloxane (PDMS)	Scratch and mar	2000 ppm (0.2%)
Metal Release	Reduce adhesion to nip rolls	1000 ppm (0.1%)
Antioxidant or UV Stabilizer	Processing/end-use stability	As needed
Colorants	Product appearance	As needed

⁽¹⁾Masterbatch of ENGAGE™ Polyolefin Elastomers preferred, but can also use Low Density Polyethylene (LDPE) or Linear Low Density Polyethylene (LLDPE) carriers.

Table 5: Troubleshooting

Issue	Possible Cause	Suggestion
Melt fracture	Cold melt	Increase melt temperatures Increase die temperature
	Melt not mixed	Use higher compression ratio screw Use screw with mixing section
	Poor die design	Decrease land length
	Heater not working	Check heaters and thermocouples
	Polymer to metal friction or shear	Use Fluoropolymer processing aid
Uneven cross-section	Surging	Decrease extrusion rate Use screw with long feed or metering section Use finer screen pack to increase back pressure
High extruder pressure	Melt too cold	Increase melt temperatures Increase die temperature
	Clogged screen packs	Replace screen pack Wider mesh screen pack reducing back pressure

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