

EVOPRENE® TPE Extrusion Troubleshooting Guide

This guide is intended for production troubleshooting. Please contact us with any questions.

X = Primary Remedy
• = Secondary Remedy

	Temperatures				Screw Speed		Haul Off				Screw Design				Miscellaneous							
	Head		Barrel		Increase	Decrease	Speed		Pressure		Compression Ratio		Metering Zone or L/D Ratio		Screen Pack		Increase Water Bath Cooling	Clean Spider / Breaker Plate	Purge and Clean Machine	Cool Hopper Throat	Vacuum Vent	Preheat Feedstock
	Increase	Decrease	Increase	Decrease			Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease						
Flow marks across	•		X				•		•		•		X									
Flow lines along	X														•		X					
Irregular lumps	•		X								X				X			•				
Bittiness											•				X			•				
Rippled surface						X			•													
Fractured surface	•		X					X	•				•									
Dull surface	X		•																			
Porosity / splash marks											•				•						X	X
Ragged edges	X		X			•			•									•				
Discolouring		•		X		X							•					•				
Burning		•		X		X							•			X		•	X			
Twisting	•												•									
Distortion		•		X					•													
Variable thickness									X												X	
Surging			•			•					X		X								X	
Low output	•		X		X							•			•			•				•
Motor overload	•		X			•						•		•		•		•				•
Delamination																		•		X		
Die bleed		•	•			X																
Low melt strength		X		•	•			X				•					•					

NOTES:

General purpose extrusion screw

Cooling: cold water bath, long enough to adequately cool

Predrying: normally not necessary

EVOPRENE family	All temps in celcius (°C)					L/D Ratio	Compression	Breaker Plate / Screen	Draw-Down	Die Swell
	Head/Die	Barrels								
Super G	200-220	200-220	200	190	180	20-24:1	2.5 - 3.5	Breaker +2x80 mesh screens	5-10%	2-5%
G	185	180	175	170	160	20-24:1	2.5 - 3.5			2-5%
COGEE	250-270	185	175	170	160	20-24:1	2.5 - 3.5			2-5%
GC	185	160-180	150-175	150-160	150-160	20-24:1	2.5 - 3.5			5-10%
Standard	140-180	140-175	140-170	140-165	140-160	15-24:1	1.5-3.0	Breaker only		10%

Machine Type & Screw Design

Processing is best carried out on single-screw extruders fitted with high volume, low shear transfer screws. This type of screw is typically used for flexible PVC or polyolefins. Screws fitted with several rows of mixing pins have given good results. Although not essential, it is best to avoid intensive mixing screw designs, as they lead to overheating and degradation.

Length to Diameter (L/D) Ratio

For all EVOPRENE families except the standard family, the L/D should be 20/1-24/1. For the standard family, we recommend 15/1-24/1.

Compression Ratio (C/R)

For all EVOPRENE families except the standard family, the C/R should be 2.5-3.5. Please note that soft, unfilled grades will benefit from a higher C/R. For the standard family, we recommend a C/R of 1.5-3.0.

Breaker Plates and Screens

For all EVOPRENE families except the standard family, we recommend both breaker plates and screens - typically 2x80 or 3x60 mesh are recommended. The screens help to build shear, but this is only effective if the gap between the screens and the die is minimized. For the standard family, normally just the breaker plate is required.

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Die Design

For all EVOPRENE families except the standard family, we recommend pressure dies with a very short land of about 5mm (we find this to be most effective). The softer the grade, the more important this is. For the standard family, we found that flat plat dies 10-12 mm thick work well.

Maximum Safe Melt Temperature

EVOPRENE family	Melt °C
Super G	280
G	250
COGEE	280
Standard	220

Extruder Output

This depends on machine size, screw design and speed, and motor / gearbox capacity. Grades designed for profile extrusion can be run at 80-100 kg per hour on 65mm extruders.

Draw-Down

Excessive draw-down should be avoided as this leads to high orientation and low strength. Typical level is 10%. Draw-down levels are much lower for "G" grades which have low die swell.

Cooling

A standard water bath is sufficient. If additional cooling is required, thinner sections can be doubled through the bath.

Drying

EVOPRENE family	Drying recommendations
Super G	No pre-drying necessary except grades with specific gravity greater than 1.2 should be checked if over six (6) months old.
G	
COGEE	Predry for four (4) hours at 60°C
Standard	No pre-drying necessary

Regrind

All sprues, runners and unwanted parts can be reground and blended with virgin EVOPRENE TPE compounds of similar type to produce satisfactory product. Loading of around 20% have been found acceptable. Of course, we recommend all necessary testing is carried out on the finished product to ensure suitability.

Purging

It is essential to purge the barrel clean of other materials before processing EVOPRENE grades. For all EVOPRENE families, polypropylene is recommended as a purge material. For standard grades, polyethylene or virgin SBS can also be used.

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