TPE TIPS

ISSUE 5

Versaflex® OM Series Material Review

Versaflex® Thermoplastic Elastomer Alloys are designed for overmolding a soft elastomeric material onto various engineering thermoplastic materials including but not limited to: Nylon 6, Nylon 6/6, Nylon 6/12, ABS, PC, ABS/PC blends, Copolyester, Propionate, and Polystyrene. The ability to overmold a soft thermoplastic elastomer (TPE) over rigid thermoplastic substrates allows designers to eliminate the need for primers and adhesives, or having to use mechanical interlocks. The result is greater design flexibility, ease of manufacture, and lower manufacturing costs.

ADDITIONAL FEATURES OF VERSAFLEX®

Versaflex® TPE alloys can make your product feel like nothing else on the market. The soft touch characteristics of Versaflex TPEs can be customized to create the unique feel that your application requires (tactile, slippery, wet grip, silky). The Versaflex product family includes:

- *Overmolding TPEs with excellent adhesion to a wide range of engineering plastics*
- *Clear, heat resistant TPEs*
- *Ultraclear grades*
- *Ultrasoft TPEs down to 30 Shore OO*

FACTORS THAT CAN AFFECT ADHESION TO SUBSTRATE

Each family of Versaflex® Thermoplastic Elastomers has unique variables that can affect the level of adhesion between the TPE and rigid thermoplastic material.

These factors include:

- *Drying of the TPE*
- *Level of Regrind*
- *Type of Color Concentrate Used*
- *Type of Rigid Thermoplastics*
  ie: Glass Filled, Mineral Filled
- *Heat Stabilized, etc.*
- *Processing Conditions of the TPE*
- *Melt Temperature of the TPE*
- *Substrate Preparation Prior to Overmolding TPE*
- *Injection Molding Equipment*
- *Barrel and Shot Size*
- *Manifold and Runner Size*
- *Gate Size and Location*

For assistance in optimizing your design, please contact your GLS Representative prior to cutting prototype and/or production tools. You may also want to obtain a free copy of our GLS Overmold Design Guide.

As an industry leader in soft tactile grip thermoplastic elastomers, GLS Corporation can suggest the right hardness range of products to meet your most demanding applications.

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Typical Injection Molding Process Conditions

TPE Description	OM6050 -1 OM6050 -9	OM6065 -1 OM6065 -9	OM2040 OM2060	OM1040 -1	OM1060 -1 OM1060 -9	OM1245 -1	OM1255 -1 OM1255 -9	OM1262 -1 OM1262 -9
Substrate Description	Nylon 6 Nylon 6/6 Nylon 6/12	Nylon 6 Nylon 6/6 Nylon 6/12	Propionate Copolyester	ABS, PC ABS/PC	ABS, PC ABS/PC	ABS, PC ABS/PC	ABS, PC ABS/PC	ABS, PC ABS/PC
Rear, °F (°C)	350 -420 (176 -215)	350 -420 (176 -215)	310 -380 (154 -193)	350 -420 (176 -215)	350 -420 (176 -215)	310 -380 (154 -193)	310 -380 (154 -193)	340 -410 (171 -210)
Center, °F (°C)	400 -470 (204 -243)	400 -470 (204 -243)	310 -380 (154 -193)	360 -430 (182 -221)	360 -430 (182 -221)	310 -380 (154 -193)	310 -380 (154 -193)	380 -450 (193 -232)
Front, °F (°C)	410 -480 (210 -248)	410 -480 (210 -248)	330 -400 (165 -204)	380 -450 (193 -232)	380 -450 (193 -232)	330 -400 (165 -204)	330 -400 (165 -204)	400 -470 (204 -243)
Nozzle, °F (°C)	420 -490 (215 -254)	420 -490 (215 -254)	350 -420 (176 -215)	400 -470 (204 -243)	400 -470 (204 -243)	350 -420 (176 -215)	350 -420 (176 -215)	420 -490 (215 -254)
Melt, °F (°C)	440 -500 (226 -260)	440 -500 (226 -260)	380 -440 (193 -226)	430 -490 (221 -254)	430 -460 (221 -254)	360 -420 (182 -215)	360 -420 (182 -215)	430 -490 (221 -254)
Mold, °F (°C)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)	70 -90 (21 -32)
TPE Drying °F (°C) Time (hrs)	Yes 130 -150 (54 -66) 3	Yes 130 -150 (54 -66) 3	Yes 130 -150 (54 -66) 3	Not Necessary	Not Necessary	Yes 130 -150 (54 -66) 3	Yes 130 -150 (54 -66) 3	Yes 130 -150 (54 -66) 3
Color Carrier	TPU	TPU	TPU, PP	TPU, PP	TPU, PP	TPU, PP	TPU, PP	TPU, PP
Preheat Substrate	May Improve Adhesion	May Improve Adhesion	Not Necessary	Not Necessary	Not Necessary	Not Necessary	Not Necessary	Not Necessary
Regrind %	<20	< 20	<20	<20	<20	<20	<20	<20
Melt Residence Time	< 8 min	< 8 min	< 8 min	< 8 min	< 8 min	< 8 min	< 8 min	< 8 min
Injection Speed	Slow to Mo d-erate	Slow to Mo d-erate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Screw Rpm	75 -125	75 -125	75 -125	75 -125	75 -125	75 -125	75 -125	75 -125
Back Pressure PSI (kPa)	50 -175 (345 -1206)	50 -175 (345 -1206)	50 -175 (345 -1206)	50 -175 (345 -1206)	50 -175 (345 -1206)	50 -175 345 -1206)	50 -175 (345 -1206)	50 -175 (345 -1206)

Table 1. Suggested Processing Conditions for VERSAflex® TPE Alloys

The conditions listed above are typical injection molding process conditions for these materials. Final process conditions may vary from this in order to develop optimal parts and adhesion. The –1 materials in the table above are the natural color formulas. The –9 materials are black versions of the same formulas.

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