



TPE 5345

Flexible Flame Retardant Thermoplastic Vulcanizate (TPV) Compound for FR Insulation and Jacketing Applications

Description

TPE 5345 is a flexible natural, olefin-based thermoplastic vulcanizate (TPV) intended for wire and cable insulation and jacketing applications where high temperature performance and excellent flame resistance are required. **TPE 5345** complies with “Restriction of Hazardous Substances” Directive, Citation 2002-95-EC, commonly known as RoHS. **TPE 5345** exhibits excellent wet and dry electrical properties and superior oil resistance. It also provides good resistance to abrasion, impact and crush. **TPE 5345** also exhibits superior low temperature properties as demonstrated by it passing cold bend and impact testing at -40°C.

TPE 5345 contains a halogen-based, flame retardant additive package designed to reduce normal flame spread characteristics. It also offers good extrusion processing characteristics on either conventional polyethylene or PVC extrusion lines.

TPE 5345 is readily pigmented to a variety of colors using standard wire and cable color concentrates designed for thermoplastic or crosslinked polyolefins.

UL Listings (QMTT2.E341949)

- 720 hour Sunlight Resistance
- Dry Rating 90°C
- Wet Rating 75°C

Specifications

Cables manufactured using **TPE 5345** in accordance with standard industry practices should meet the following industry cable specifications:

- Underwriters Laboratories Standard 62 Class 1.14 and 1.18 for Jacketing
- Underwriters Laboratories Standard 62 Class 2.20 and 2.28 for Insulation
- Underwriters Laboratories Standard 62 Class 36 Insulation and Jacketing

Physical Properties	Typical Value ^{(2) (4)}	Unit	Test Method ⁽¹⁾
Density	1.17	g / cm ³	ASTM D 792
Tensile Strength	2400 (16.5)	psi (Mpa)	ASTM D 412
Ultimate Elongation	600	%	ASTM D 412
Flexural Modulus	42,000 (290)	psi (Mpa)	ASTM D 790
Heat Aging, 7 days at 136°C			UL 1581
Tensile Strength Retention	90	%	ASTM D 412
Ultimate Elongation Retention	75	%	ASTM D 412
Durometer Hardness, Shore A	92	-	ASTM D 2240
Brittleness Temperature	-40	°C	ASTM D 746
Limiting Oxygen Index	25	%	ASTM D 2863
Oil Resistance 96h @ 100°C			UL 2556
Retained Tensile	91	%	
Retained Elongation	82	%	
Oil Resistance 60 days @ 75°C			UL 2556
Retained Tensile	96	%	
Retained Elongation	88	%	

Electrical Properties	Typical Value ^{(2) (3)}	Unit	Test Method ⁽¹⁾
Dielectric Constant (60 Hz)	2.40	-	ASTM D 150
Dissipation Factor (60 Hz)	0.0027	-	ASTM D 150
Dielectric Strength	660	V / mil	ASTM D 149
Volume Resistivity	1.6 x 10 ¹⁶	Ω cm	ASTM D 257

(1) Tested in accordance with the latest issue of the designated Test Methods.

(2) Data represents typical values and should not be used for specification work.

(3) All electrical properties tested on a 0.075 inch thick molded plaque.

(4) All physical properties tested on a 0.030 inch thick extruded tape

(5) 12 AWG Wire Samples

General Processing Guidelines

The guideline below is meant as a reference to general specifications and process parameters. For more detailed processing information contact M. Holland technical services.

Machine Tool Specifications

Die Design	Pressure tooling is preferred for insulation applications, as well as low draw down or minimal over sizing of the insulation or jacket.
Screw design	3:1 Compression ratio with shear mixer (maddock, barrier, or both)
Screens	20/40/60 recommended. If the extrudate exhibits porosity, try higher mesh screen packs (up to 100 mesh) to increase the melt pressure

Processing Parameters

Temperature settings	Zone 1: 185°C (365°F) Zone 2: 195°C (380°F) Zone 3: 200°C (395°F) Zone 4: 210°C (415°F) Gate and Die: 215°C (420°F)
RPM	This compound is shear dependant to achieve a good melt. Depending on the extruder size, 35 would be a good target. Use shear heat from the extruder before adjusting the heat profile.
Wire preheat	Preheating wire to a minimum of 120°C (250°F) will increase initial elongation properties and retention after heat aging.
Melt temperature	210 to 220°C (415 to 425°F)
Cooling	Slower cooling rates improve the elongation retention (after heat aging) of the insulation and jacket. This can be achieved by lowering the line speed, increasing the preheating of the wire, using warm water cooling or sequential cooling baths with warm to cold water.
Drying	It is recommended to dry the material prior to processing. Use a desiccant dryer for 3 hours at 80°C (180°F)
Coloring	The addition of any carrier resin can affect material properties, including hardness and retention properties. Some pigments also affect these properties. Pre-coloring or standard color concentrates (master batches) that use PP, TPE, PE, SEBS as the carrier can be used. Carrier-less color concentrates may also be used. Color concentrate addition of up to 3% has been used without dramatically affecting properties.

Warning: This compound is subject to instability if left at processing temperatures static in the extruder. A slow purge is recommended for line down situations.

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