TPE 5595R

Flame Retardant Thermoplastic Elastomer (TPE) Compound for Self-Regulating Heater Cable and FR Insulation and Jacketing Applications

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Description

TPE 5595R is a natural, olefin-based thermoplastic elastomer (TPE) intended for wire and cable insulation and jacketing applications where high temperature performance and excellent flame resistance are required. **TPE 5595R** complies with “Restriction of Hazardous Substances” Directive, Citation 2002-95-EC, commonly known as RoHS. **TPE 5595R** exhibits excellent wet and dry electrical properties. It also provides good resistance to abrasion, impact and crush. **TPE 5595R** also exhibits superior low temperature properties as demonstrated by it passing cold bend and impact testing at -50°C.

TPE 5595R contains a halogen-based, flame retardant additive package designed to reduce normal PE flame spread characteristics and achieve a VW-1 flame resistant rating on 14 AWG wires and larger. It also offers good extrusion processing characteristics on either conventional polyethylene or PVC extrusion lines. In addition, **TPE 5595R** contains a UV stabilization additive package that provides effective long-term UV weather resistance.

TPE 5595R is readily pigmented to a variety of colors using standard wire and cable color concentrates designed for thermoplastic or crosslinked polyolefins.

Application

TPE 5595R is used in self-regulating heater cable and other flame-retardant insulation or jacketing constructions. Specifically, this product is rated a V-0 by UL Standard 94 at a minimum thickness of 0.062 inches. **TPE 5595R** can achieve a VW-1 flame resistance on 14 AWG or larger conductors as per UL Standard 1581.

Specifications

Cables manufactured using **TPE 5595R** in accordance with standard industry practices should meet the following industry cable specifications:

- Underwriters Laboratories Standard 62 Heater Cables HPD & HSJ
- Underwriters Laboratories Standard 62 Electric Vehicle Cables EVJ, EVJE, EV, EVE, & EVT
- Underwriters Laboratories Standard 62 Thermoplastic Service Cords
- Underwriters Laboratories Standard 94 V-0
- Underwriters Laboratories Standard 2556 VW-1

General Processing Guidelines

Extrusion start-up and shut-down procedures are similar to those of polyethylene. Since these materials are non-corrosive or abrasive, no special recommendations are made for barrel and screw materials of construction. A suggested melt temperature of 400ºF (204ºC) should provide a good quality product. Exposure of these materials to elevated temperatures >450ºF (230ºC) for prolonged periods of time has been shown to decrease long-term stability. Preheating the conductor to 125-150ºC is recommended during insulation extrusion to minimize orientation and internal stress that could result in poorer physical properties.

Physical Properties	**Typical Value** (2)(4)	**Unit**	**Test Method** (1)
Density	1.28	g / cm^3	ASTM D 792
Tensile Strength	2650 (18.3)	psi (Mpa)	ASTM D 412
Ultimate Elongation	670	%	ASTM D 412
Flexural Modulus	43,150 (297)	psi (Mpa)	ASTM D 790
Heat Aging, 7 days at 136°C			UL 1581
Tensile Strength Retention	100	%	ASTM D 412
Ultimate Elongation Retention	95	%	ASTM D 412
Heat Aging, 7 days at 158°C			UL 1581
Tensile Strength Retention	91	%	ASTM D 412
Ultimate Elongation Retention	81	%	ASTM D 412
Durometer Hardness, Shore D (15 s delay)	41	-	ASTM D 2240
Durometer Hardness, Shore A (15 s delay)	93	-	ASTM D 2240
Brittleness Temperature	-50 (< -45)	°F (°C)	ASTM D 746
Limiting Oxygen Index	28	%	ASTM D 2863
Flammability	V-0	-	UL 94

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 (32 mils) (3,500 v/s ramp)	1,307	V / mil	ASTM D 149
Volume Resistivity	1.6 x 10^{16}	Ω cm	ASTM D 257

Suggested Extrusion Equipment		Suggested Extrusion Conditions	
Extruder L/D:	20:1 (minimum)	Throat:	Water-cooled
Extruder L/D:	24:1 (preferred)	Zone 1:	370°F (190°C)
Screw:	Barrier or Single Flight	Zone 2:	390°F (200°C)
Compression Ratio:	2.7 to 3.5:1	Zone 3:	400°F (204°C)
Die:	Smooth transition, With >= 1/8 in. land Die & Tip include angle: 22-35°	Zone 4: Head / Die:	400°F (204°C) 410-450°F (210-230°C)

(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.

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