TTFEP2

FEP Extrusion Resin

Description

TTFEP2 is a melt processable perfluoro co-polymer of tetrafluoroethylene and hexafluoropropylene. It is intended for use as high temperature wire and cable insulations and jackets. **TTFEP2** exhibits good extrusion processing characteristics.

TTFEP2 is readily pigmented to a variety of colors using FEP based wire and cable color concentrates.

Application

TTFEP2 is intended for high temperature products including data cable, fire alarm wire, plenum cable and instrumentation cables. TTFEP2 is also used in tubing applications.

Safety Precautions

Adequate ventilation in properly maintained processing and handling areas will eliminate known hazards to personnel. Resin containers should be opened and used in well ventilated areas.

Equipment used to process at melt temperatures should be provided local exhaust ventilation to completely remove all fumes and vapors from the processing area. Additionally, care should be exercised to avoid the contamination of cigarettes and other forms of smoking tobacco when using fluoroplastic resins. Before processing any fluoroplastics, read the Safety Data Sheet available upon request. Also read the detailed information in the latest edition of the “Guide to the Safe Handling of Fluoropolymer Resins”’ published by the Fluoropolymers Division of the Plastics Industry Association (www.plasticsindustry.org/supply-chain/material-suppliers/fluoropolymers-division).

Storage and Handling

The properties of **TTFEP2** are not affected by storage time. Ambient storage conditions should be free of airborne contamination and water condensation when opening and emptying the package.

Physical Properties	Typical Value [2]	Unit	Test Method [1]
Specific Gravity	2.16		ASTM D 792
Melting Point	265	ºC	ASTM D 4591
Melt Index	0.8 to 2.0	(g/10 min)	ASTM D 2116
Tensile Strength	4,350 (30)	psi (MPa)	ASTM D 638
Ultimate Elongation	350	%	ASTM D 638
Heat Aging, 7 days at 232ºC			
Tensile Strength Retention	>= 80	%	ASTM D 412
Ultimate Elongation Retention	>= 100	%	ASTM D 412
Volatiles	<0.07	%	ASTM D 2369

Electrical Properties	Typical Value [2]	Unit	Test Method [1]
Dielectric Constant (1 MHz)	2.15	-	ASTM D 150
Dissipation Factor (1 MHz)	.0007	-	ASTM D 150

(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.

General Processing Guidelines

The extrusion, tooling and molding machines used for TTFEP2 should be constructed of high nickel alloy corrosion- resistant materials and capable of operating at temperatures up to 400ºC (750ºF). TTFEP2 is typically applied as a wire insulation and cable jacket using tubing techniques and Draw-Down Ratios (DDR) generally ranging from 30:1 to 80:1. Higher DDRs usually allow for greater line speed. A draw-ratio balance (DRB) ranging from 0.9 to 1.1 is recommended. A controlled vacuum is required at the rear of the crosshead to adjust the melt cone to the desired length. A melt cone that is too long results in excessive variations while a melt cone that is too short result in excessive spark failures and cone breaks. An electric wire preheater located as close to the crosshead as possible is recommended for preheating the wire. Although the amount of preheat will depend on the application. The coated wire should pass through an air gap followed by a warm-water quench at (110 °F to 150 °F) to allow uniform cooling and prevent the formation of shrinkage voids in the insulation. The cooling is highly dependent on the thickness of the insulation.

Color Concentrates: FEP based on color concentrates are commercially available from several manufacturers. Your M. Holland representative can recommend AG 9400 color concentrates for your particular application.

Typical Temperature Profile for Extruding TTFEP2

Zone	°C	°F
Rear Zone 2	349	660
Rear Center 2	371	700
Center	390	735
Front Center	395	745
Front	399	750
Clamp	404	760
Adapter	404	760
Crosshead	404	760
Die Holder	404	760
Melt	399	750

1 Based on a 60 mm extruder with a 30:1 L/D; adjustments may be needed for other equipment.
2 For a smaller machine, it will be necessary to raise the temperature to ensure that the resin is completely melted before entry into the extruder's transition zone. A surging output at the idle could be caused by incomplete melting.
3 Process temperatures should be below 395ºC to avoid any emission of toxic gas.

The above recommendations are general recommendations and modifications for individual machines and run conditions might be necessary.

Package and Transportation

TTFEP2 is packed net 25 kgs drums with quality certificate and lot number. **TTFEP2** can be transported as a non- dangerous product.

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