



## TTPVDF4

### PVDF Extrusion & Injection Molding Resin

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#### Description

**TTPVDF4** is a low viscosity, melt processable, homopolymer of vinylidene fluoride. It has high mechanical strength, toughness and corrosion resistance. **TTPVDF4** exhibits good extrusion processing characteristics and can be readily injection molded. Conformable to Q/DYS 014-2015

**TTPVDF4** is readily pigmented to a variety of colors using PVDF based wire and cable color concentrates.

#### Application

**TTPVDF4** is intended for use as high temperature wire insulation and cable jacket. **TTPVDF4** is also used in tubing, film, injection molding and transfer molding 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](http://www.plasticsindustry.org/supply-chain/material-suppliers/fluoropolymers-division)).

#### Product Packaging

- 20 kgs woven plastic bags with inner antistatic polyethylene liner.
- 40 kgs plastic circular drums
- 500 kgs Bulk Bag
- 1 MT Bulk Bag

#### Storage

The properties of **TTPVDF4** are not affected by storage time. Ambient storage conditions should be free of airborne contamination and water condensation when opening and emptying the package. Recommended storage temperature range 5 to 30°C.

#### Transportation

The product should be transported as a non-dangerous product, avoiding heat, moisture and strong shock.

Physical Properties	Typical Value <sup>(2)</sup>	Unit	Test Method <sup>(1)</sup>
Specific Gravity	1.77 to 1.79		ASTM D 792
Melting Point	165 to 175	°C	ASTM D 3418
Melt Index (230°C, 5 kgs)	3.1 to 7.0	(g/10 min)	ASTM D 2116
Tensile Strength	5,075 (35)	psi (MPa)	ASTM D 638
Ultimate Elongation	25	%	ASTM D 638
Thermal Decomposition ≥	380	°C	TGA, 1% Wt. Loss N <sub>2</sub>
Hardness	70 to 80	Shore D	ASTM D 2240

(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 **TTPVDF4** should be constructed of high nickel alloy corrosion-resistant materials and capable of operating at temperatures up to 300°C (572°F). TTPVDF4 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: PVDF based on color concentrates are commercially available from several manufacturers. Your M. Holland representative can recommend color concentrates for your particular application

### Typical Temperature Profile for Extruding TTPVDF4

	°C	°F
Zone 1	180 - 200	356 - 392
Zone 2	200 - 220	392 - 428
Zone 3	210 - 230	410 - 446
Zone 4	210 - 230	410 - 446
Breaker	220 - 240	428 - 464
Head	220 - 240	428 - 464
Die	220 - 240	428 - 464

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 350°C to avoid any emission of toxic gas.

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

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