Teflon™ PFA 9

Rotomolding Fluor

Product Information

Description

Teflon™ PFA 9738-JN is a premium resin available only as a free-flowing powder. Its most unique features, controlled particle size and size distribution, provide proper flow and fusion behavior in rotational molding process. In addition, Teflon™ PFA 9738-JN is chemically modified to yield enhanced resin purity, lower extractable fluorides, and freedom from other foreign materials. Its surface smoothness is improved by minimizing spherulite size, and its chemical permeability resistance is enhanced by increasing its crystallinity. This product contains no additives and is designed for hostile chemical environments where purity in the parts-per-billion range is needed.

The properties of Teflon™ PFA 9738-JN in molded form are similar to other grades of Teflon™ PFA (perfluoroalkoxy) fluoroplastic resin. Many properties are similar to those of polytetrafluoroethylene (PTFE).

Rotational molding is a favored process for making large, hollow parts or for lining objects with complex inside surfaces. Applications for Teflon™ PFA 9738-JN include linings molded in place using the object to be lined as the mold. Teflon™ PFA 9738-JN is preferred when high performance is a major requirement involving chemical, thermal, and mechanical stress.

Properly processed rotational moldings made from neat Teflon™ PFA 9738-JN resin provide the superior properties typical of the fluoroplastic resins: retention of physical properties after service at 260 °C (500 °F), useful properties at -196 °C (-321 °F), and chemical inertness to nearly all industrial chemicals and solvents. Dielectric properties are excellent. Molded products have moderate stiffness and high ultimate elongation.

Table 1 shows the typical property data for Teflon™ PFA 9738-JN.

In a flame situation, products of Teflon™ PFA 9738-JN resist ignition and do not themselves promote flame spread. When ignited by flame from other sources, their contribution of heat is very small and added at a slow rate with very little smoke.

Typical End Products

Teflon™ PFA 9738-JN is ideal for many end products for fluid handling in the chemical processing industries, including pump housings, vessels, columns, elbows, tees, and pipe sections with unusual shapes. In addition, any hollow structure with internal contours that permit uniform coating by powder flow is a candidate for lining, provided it can withstand high temperatures. Because of its enhanced resin purity, Teflon™ PFA 9738-JN is suitable for use in semiconductor manufacture and handling systems for industry or life sciences.

Processing

For rotational molding, Teflon™ PFA 9738-JN powder is placed inside a hollow metal structure that is slowly rotated biaxially and heated above the melting point of the powder. As the powder melts, it builds up on the inner surface of the structure. Powder flow and distribution are critical, because the high melt viscosity of Teflon™ PFA limits the lateral flow of melted resin. A cooling step then causes the molten resin to solidify and densify in place, creating an integral lining or a removable, hollow plastic part.

Good molding requires close attention to many details, such as choice of metals for the mold, preparation of the metal surface, rate of rotation, venting, and heating/ cooling cycles. The equipment must operate at high temperature and resist thermal shock.

Safety Precautions

WARNING! Vapors can be liberated that may be hazardous if inhaled.

Before using Teflon™ PFA 9738-JN, refer to the Safety Data Sheet and the latest edition of "The Guide to the Safe Handling of Fluoropolymer Resins," published by The Society of the Plastics Industry, Inc. (www.fluoropolymers.org) or by PlasticsEurope (www.plasticseurope.org).

Open and use containers only in well-ventilated areas using local exhaust ventilation (LEV). Vapors and fumes liberated during hot processing, or from smoking tobacco or cigarettes contaminated with Teflon™ PFA 9738-JN, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and pass within about 24 hours.

Vapors and fumes liberated during hot processing should be exhausted completely from the work area; contamination of tobacco with polymers should be avoided.

Mixtures with some finely divided metals, such as magnesium or aluminum, can be flammable or explosive under some conditions.

During rotational molding, a large volume of air is used to melt Teflon™ PFA 9738-JN resin and cool the molten resin. Vapors from molten resin should not be allowed to enter the operating area. Negative pressure should be maintained in the oven chamber, so that off-gas will be exhausted to the outside.

The same is true for the cooling chamber where exhaust blower rating should exceed that of the cooling air blower. Hot molds should be disassembled in a well-ventilated area. Vent tubes should be used on all molds to avoid pressure buildup.

Storage and Handling

Special product isolation and packaging procedures are used by Chemours to eliminate external contamination of Teflon™ PFA 9738-JN resin. Processors also must avoid contamination successful production of high-purity products.

The properties of Teflon™ PFA 9738-JN resins are not affected by storage time. Ambient storage conditions should be designed to avoid airborne contamination and formation of water condensation on the powder when it is removed from containers.

Packaging

Teflon™ PFA 9738-JN is packaged in drums containing 25 kg net weight.

Table 1: Typical Property Data for Teflon™ PFA 9738-JN

Property	Test Method*	Unit	Typical Value
Thermal			
Melting Endotherm Peak	D3307	°C (°F)	305-317 (581-603)
Coefficient of Linear Thermal Expansion 21-100 °C (70-212 °F) 100-149 °C (212-300 °F) 149-208 °C (300-406 °F)	D696	mm/mm/°C	 140×10^{-6} 180×10^{-6} 220×10^{-6}
Upper Service Temperature	—	°C (°F)	260 (500)
Melt Flow Rate (MFR 372/5.0)	D 3307	g/10 min	6.0
Mechanical			
Specific Gravity	D792	—	2.12-2.17
Tensile Strength, 23 °C (73 °F) 200 °C (392 °F)	D3307	MPa	33 15
Tensile Yield Strength, 23 °C (73 °F)	D3307	MPa	15
Ultimate Elongation, 23 °C (73 °F) 200 °C (392 °F)	D3307	%	430 570
Flexural Modulus, 23 °C (73 °F) 200 °C (392 °F)	D790	MPa	440 52
Hardness, Shore Durometer	D2240	—	D60
MIT Folding Endurance (0.20 mm film)	D2176	cycles	185,000**
Electrical			
Dielectric Strength, Short Time, 0.25 mm film	D 149	kV/mm	80
Dielectric Constant, 60-10^6 Hz	D150	—	2.03
Dissipation Factor, 60-10^6 Hz	D150	—	0.0001
Volume Resistivity	D 257	Ω·m	10^{16}
General			
Water Absorption, 24 hr	D570	%	<0.03
Weather and Chemical Resistance	—	—	Outstanding
Limiting Oxygen Index	D2863	%	>95

Typical properties are not suitable for specification purposes.
Statements, or data, regarding behavior in a flame situation are not intended to reflect hazards presented by this or any other material when under actual fire conditions.
*ASTM, unless otherwise specified.
**Depending on fabrication conditions.