



PFA (PERFLUOROALKOXY)

Material Properties

Overview

PFA (perfluoroalkoxy) is a fully fluorinated translucent, slightly flexible polymer with a low coefficient of friction and outstanding antistick properties. This tough material resists stress cracking and attack by nearly all chemicals and solvents. PFA is also temperature resistant, making it ideal for use in both high and low temperature environments. PFA is chemically stable and has excellent dielectric strength.

Processing

Because of its high melting and processing temperatures, PFA resin is extremely difficult to mold. PFA is high crystalline and viscous, and extremely shear sensitive. These properties make PFA prone to melt fracture, splay delamination and degradation. At higher temperatures, PFA is also corrosive to most metals, introducing the possibility of contamination.

Entegris is a leading processor of fluoropolymers such as PFA and other difficult to mold materials. With more than 30 years of molding experience, Entegris has adapted its manufacturing to meet the requirements of challenging materials. Component and tool design incorporate material data, increasing the reliability of finished parts. Process parameters such as material and mold temperature, cycle time and fill speed are set and controlled through product sampling and the use of Statistical Process Control (SPC) tools.

Features of PFA

Resin research and testing are conducted in Entegris' global laboratories. Resins are analyzed for temperature capability, chemical compatibility, structural tolerance and strength. The result of these studies is an extensive library of information Entegris' engineers can use when designing parts or processing materials.

- Inert to all solvents and chemicals for processing wafers
- Standard cassette can withstand continuous temperatures up to 180°C (356°F), and a wafer insertion temperature of 250°C (482°F).

Properties

Property		ASTM Method	Material Value
Tensile strength, PSI (MPa)	@ 23°C (73°F)	D3307	3,600 (25)
	@ 250°C (482°F)		1,800 (12)
Tensile yield strength, PSI (MPa)	@ 23°C (73°F)	D3307	2,000 (13.8)
Ultimate elongation, %	@ 23°C (73°F)	D3307	300
	@ 250°C (482°F)		480
Flexural modulus, PSI (MPa)	@ 23°C (73°F)	D790	85,000 (590)
	@ 250°C (482°F)		8,000 (55)
Hardness durometer		D2240	55
Impact strength, notched izod, J/m	@ 23°C (73°F)	D256	No break
	@ -193°C (-320°F)		1.2 ft-lb/in
Melting point, °C (°F)		DTA-E168	302–310 (575–590)
Water absorption, 24 h, %		D570	<0.03
Density		D792	2.12–2.17
Dielectric strength, kV/m Short time, 0.25 mm (0.010 in)		D149	80
Dielectric constant, 60–10 ⁶ Hz		D150	2.03
Dissipation factor, 60–10 ⁶ Hz		D150	0.0001
Volume resistivity, ohm-cm		D257	10 ¹⁸

Information taken from DuPont Bulletin 234398C.

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ENTEGRIS, INC.

Corporate Headquarters | 129 Concord Road | Billerica, MA 01821 USA
 Customer Service Tel. +1 952 556 4181 | Customer Service Fax +1 952 556 8022
 In North America 800 394 4083 | www.entegris.com