产品比较

Technical Data

产品说明	
Hyflon® PFA P450	Hyflon® PFA is a unique family of semi-crystalline, melt processable perfluoropolymers which combine excellent mechanical characteristics to unique properties such as chemical inertness, heat resistance, inherent flame resistance, low surface energy, and exceptional dielectric properties. Hyflon® PFA resins have been designed to retain their properties over a wide range of temperatures from cryogenic to 250-260°C (482-500°F) and are the material of choice in applications such as linings in the Chemical Process Industry, specialty cables, semiconductor industry, aerospace, and other challenging industries. Hyflon® PFA P450 is a medium molecular weight, high melt flow rate multi purpose resin designed for cable extrusion and injection molding. Hyflon® PFA P450 has obtained UL758 recognition for continuous use at 260°C (500°F) and is an ASTM D3307 - Type I resin.
Teflon® PFA 440HPB	For inventory control purposes product name may be followed by an X. Products labeled PFA 440HPB and PFA 440HPB X are equivalent and all information in this document is applicable to both. Typical Application Applications for DuPont™ Teflon ® PFA 440HPB include fluid handling components for critical, high-purity processes like semiconductor, pharmaceutical, and biotechnology, as well as applications where purity in the parts-per-billion range is needed. Teflon ® PFA 440HPB offers a slightly lower melt flow rate than Teflon ® PFA 440HPA, ultimately providing a higher degree of stress-crack resistance. Description DuPont™ Teflon ® PFA 440HPB is a special purpose fluoroplastic resin available in pellet form. This resin is a chemically modified form of Teflon ® PFA 340 that combines many of the benefits of the parent resin (a relatively high typical melt flow rate of 14) with several additional benefits including enhanced purity, improved thermal stability while processing, and chemical inertness; for example, to ozonated fluids. Table 1 shows the typical property data for Teflon ® PFA 440HPB. Teflon ® PFA 440HPB is a premium resin with the lowest level of extractables designed to meet ultra-high purity requirements. Teflon ® PFA 440HPB has a relatively high melt flow rate for injection molding and extrusion processes, and the highest level of inertness due to stable end group polymer structure. The enhanced purity of Teflon ® PFA 440HPB makes it suitable for applications that require improved color, lower extractable fluorides, and freedom from other foreign materials. This product contains no additives and is designed for hostile chemical environments where purity in the parts-per-billion range is needed. Examples are in semiconductor manufacture, fluid handling systems for industry or life sciences, and instrumentation for precise measurements of fluid systems. Compared to other thermoplastics, the high melt strength and thermal stability of Teflon ® PFA 440HPB can be used to improve processing rates, combining the processing ease of conventional thermoplastics with many properties similar to those of polytetrafluoroethylene. Properly processed products made from neat Teflon ® PFA 440HPB resin provide the superior properties characteristic of fluoroplastic resins: chemical inertness, exceptional dielectric properties, heat resistance, toughness and flexibility, low coefficient of friction, non-stick characteristics, negligible moisture absorption, low flammability, performance at temperature extremes, and excellent weather resistance. In a flame situation, products of Teflon ® PFA 440HPB resist ignition and do not 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. Teflon ® PFA 440HPB meets the requirements of ASTM D3307, Type I
Teflon® PFA	For inventory control purposes product name may be followed by an X. Products labeled PFA 450HP and PFA 450HP X are equivalent and all information in this document is applicable to both. Typical Application

产品比较

450HP

Applications for DuPont™ Teflon ® PFA 450HP include tubing, chemical linings for pipes, valves, and fittings used in the chemical processing industries, unsupported pipe linings for the production of ultra-pure chemicals, semiconductor components, and fluid handling components for high-performance chemical delivery systems where purity in the parts-per-billion range is needed. Teflon ® PFA 450HP is preferred in applications where extended service is required in hostile environments involving chemical, thermal, and mechanical stress.

Description
DuPont™ Teflon ® PFA 450HP is a special purpose fluoroplastic resin available in pellet form. This resin is a chemically modified form of Teflon ® PFA 350 that combines many of the benefits of the parent resin (highest resistance to environmental stress-cracking with a typical MIT folding endurance of 500,000*) with several additional benefits including enhanced purity, improved thermal stability while processing, and chemical inertness; for example, to ozonated fluids. Table 1 shows the typical property data for Teflon ® PFA 450HP.

Teflon ® PFA 450HP is a relatively low melt flow rate (typical MFR of 2), premium resin with the lowest level of extractables designed to meet ultra-high purity requirements. An enhanced resistance to environmental stress-cracking makes Teflon ® PFA 450HP a preferred resin when extended service is required in hostile environments involving chemical, thermal, and mechanical stress. Additionally, the enhanced purity of Teflon ® PFA 450 HP makes it suitable for applications that require improved color, lower extractable fluorides, and freedom from other foreign materials. This product contains no additives and is designed for hostile chemical environments where purity in the parts-per-billion range is needed. Examples are in semiconductor manufacture, fluid handling systems for industry or life sciences, and instrumentation for precise measurements of fluid systems. Compared to other thermoplastics, the high melt strength and thermal stability of Teflon ® PFA 450HP can be used to improve processing rates, combining the processing ease of conventional thermoplastics with many properties similar to those of polytetrafluoroethylene.

Properly processed products made from neat Teflon ® PFA 450HP resin provide the superior properties characteristic of fluoroplastic resins: chemical inertness, exceptional dielectric properties, heat resistance, toughness and flexibility, low coefficient of friction, non-stick characteristics, negligible moisture absorption, low flammability, performance at temperature extremes, and excellent weather resistance.

In a flame situation, products of Teflon ® PFA 450HP resist ignition and do not 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.

Teflon ® PFA 450HP meets the requirements of ASTM D3307, Type II

总体	Hyflon® PFA P450	Teflon® PFA 440HPB	Teflon® PFA 450HP
生产商/供应商	• Solvay Specialty Polymers	• DuPont Fluoropolymers	• DuPont Fluoropolymers
通用符号	• PFA	• PFA	• PFA

产品比较

总体	Hyflon® PFA P450	Teflon® PFA 440HPB	Teflon® PFA 450HP
特性	• 半结晶 • 流动性高 • 耐热性，高 • 中等分子量 • 阻燃性	• 纯度高 • 低摩擦系数 • 低吸湿性 • 低烟度 • 良好的电气性能 • 良好的熔体强度 • 良好的柔韧性 • 流动性高 • 耐化学性良好 • 耐气候影响性能良好 • 耐热性，中等 • 热稳定性，良好 • 韧性良好 • 食品接触的合规性	• 纯度高 • 低摩擦系数 • 低吸湿性 • 低烟度 • 高 ESCR（抗应力开裂） • 良好的电气性能 • 良好的熔体强度 • 良好的柔韧性 • 流动性低 • 耐化学性良好 • 耐气候影响性能良好 • 耐热性，中等 • 热稳定性，良好 • 韧性良好 • 食品接触的合规性
用途	• 半导体模制化合物 • 衬里 • 电缆护套 • 航空航天应用	• 液体处理	• 衬里 • 管道系统 • 管件 • 液体处理
机构评级	• ASTM D 3307 Type I • UL 758	• FDA 21 CFR 177.1550 • 欧洲 10/1/2011 12:00:00 AM	• FDA 21 CFR 177.1550 • 欧洲 10/1/2011 12:00:00 AM
形式	• 粒子	• 粒子	• 粒子
加工方法	• 挤出 • 注射成型	• 挤出 • 树脂传递成型 • 压缩模塑 • 注射成型	• 吹塑成型 • 挤出 • 树脂传递成型 • 压缩模塑 • 注射成型

物理性能	Hyflon® PFA P450	Teflon® PFA 440HPB	Teflon® PFA 450HP	单位制	测试方法
比重	2.13 到 2.18	2.16	2.15		ASTM D792
熔流率（熔体流动速率）					
372°C/5.0 kg	--	14	2.0	g/10 min	ASTM D3307 ISO 12086
372°C/5.0 kg	10 到 17	--	--	g/10 min	ASTM D1238
吸水率 (24 hr)	--	< 0.030	< 0.030	%	ASTM D570
机械性能	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
拉伸模量[4] (73°F)	72500 到 87000	--	--	psi	ASTM D1708

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机械性能	Hyflon® PFA P450	Teflon® PFA 440HPB	Teflon® PFA 450HP	单位制	测试方法
抗张强度					
断裂, 73°F	> 3050	--	--	psi	ASTM D1708
73°F	--	3630	4060	psi	ASTM D3307 ISO 12086
482°F	--	2030	2030	psi	ASTM D3307 ISO 12086
伸长率					
断裂, 73°F	--	300	300	%	ASTM D3307 ISO 12086
断裂, 73°F	> 280	--	--	%	ASTM D1708
断裂, 482°F	--	480	500	%	ASTM D3307 ISO 12086
弯曲模量					ASTM D790 ISO 178
73°F	--	85600	90600	psi	
482°F	--	7980	10000	psi	
弯曲寿命 (11.8 mil)	4.0E+3 到 6.0E+3	--	--	Cycles	ASTM D2176
冲击性能	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
简支梁缺口冲击强度	无断裂	--	--		ASTM D256
硬度	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
肖氏硬度					
邵氏 D	55 到 60	55	55		ASTM D2240
邵氏 D	--	55	55		ISO 868
热性能	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
连续使用温度	500	--	--	°F	
熔融温度					
--	--	581	581	°F	ASTM D4591
--	572 到 590	--	--	°F	ASTM D3307
结晶峰温度 (DSC)	527 到 545	--	--	°F	DSC
线形热膨胀系数 - 流动	6.7E-5 到 1.1E-4	--	--	in/in/°F	ASTM D696
比热 (73°F)	0.215 到 0.263	--	--	Btu/lb/°F	DSC
导热系数 (104°F)	1.4	--	--	Btu·in/hr/ft²/°F	ASTM C177
结晶热	25.0 到 35.0	--	--	J/g	DSC
融合热量	25.0 到 35.0	--	--	J/g	DSC
电气性能	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
表面电阻率	> 1.0E+17	--	--	ohm	ASTM D257

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电气性能	Hyflon® PFA P450	Teflon® PFA 440HPB	Teflon® PFA 450HP	单位制	测试方法
体积电阻率					
--	> 1.0E+17	1.0E+18	1.0E+18	ohm·cm	ASTM D257
--	--	1.0E+18	1.0E+18	ohm·cm	ISO 1325
介电强度					
--	890 到 1000	--	--	V/mil	ASTM D149
0.00984 in [5]	--	2000	2000	V/mil	ASTM D149
0.00984 in	--	2000	2000	V/mil	IEC 60243-1
介电常数					
1 MHz	--	2.03	2.03		ASTM D150 IEC 60250
73°F, 50 Hz	2.10	--	--		ASTM D150
73°F, 100 kHz	2.10	--	--		ASTM D150
耗散因数					
1 MHz	--	< 2.0E-4	< 2.0E-4		ASTM D150 IEC 60250
73°F, 50 Hz	< 5.0E-4	--	--		ASTM D150
73°F, 100 kHz	< 5.0E-4	--	--		ASTM D150
可燃性	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
UL 阻燃等级					UL 94
--	V-0	--	--		
-- [6]	--	V-0	V-0		
极限氧指数					
--	95	> 95	> 95	%	ASTM D2863
--	--	> 95	> 95	%	ISO 4589-2
补充信息	**Hyflon® PFA P450**	**Teflon® PFA 440HPB**	**Teflon® PFA 450HP**	**单位制**	**测试方法**
Critical Shear Rate (702°F)	--	50.0	12.0	sec^-1	
MIT Folding Endurance [7] (7.9 mil)	--	1.5E+4	5.0E+5	Cycles	ASTM D2176

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Hyflon® PFA P450	PROCESSING • Because PFA is corrosive in the melt, machinery used to process Hyflon should be lined with corrosion resistant alloys. Clean, reworked material can be used up to 25% in weight. HEALTH SAFETY AND ENVIRONMENT • Hyflon PFA P450 is a very inert polymer and it is not harmful if used and handled according to standard processing procedures. If handled inappropriately, it may release harmful toxic chemicals. Please refer to the Material Safety Data Sheets for more information on handling and safety. PACKAGING AND STORAGE • Hyflon PFA P450 resin is available in 25 kg (55 lbs) and 500 kg (1102 lbs) packaging. Though it has an indefinite shelf life, it is recommended to store it in a clean area, protected by direct sun light and possible contamination.
Teflon® PFA 440HPB	Weather and Chemical Resistance: Outstanding
Teflon® PFA 450HP	Weather and Chemical Resistance: Outstanding