

Cryogenic Material Options

Property	Condition	Unit	PCTFE	Modified TFE Hybrid	Polyimide	ECTFE	ETFE280	PFA350	V-PTFE	V-PEEK	PEEK CT	FEP	PVDF
Trade Names			Neoflon® M-400H, (Kel-F®)	Ultraflon 500FM	Meldin® 7001CM	Halar®	Tefzel™	Teflon™ PFA 350	Fluon®, Neoflon®, Polyfon®	Ketron®, TECAPEEK®	Victrex CT™ 200	Teflon™, Daikin, Neoflon™	Hylar®, Kynar®, Solef®
Tensile Strength	Yield RT	psi	4,800-5700	4600	12,500	7,000	6,700	4,000	3,600	15,600	13,750	3,500	7850
	Break -RT	psi	–	–	–	–	–	–	–	–	29,000	–	–
Tensile Elongation	Break RT	%	100-250 ¹	450	8	200	300	300	250-400 ¹	35-60	70	300	50
	Break -320°F	%	–	–	–	–	–	–	–	–	8	–	–
Tensile Modulus		ksi	218	94.0	–	240.0	217.5	101.5	87.0	–	–	72.5	319.0
Flexural Strength	RT	psi	9,500-10,300 ¹	–	15,800	–	–	No break	No break	25,300	21,700	1,400	11,000
	-320°F	psi	–	–	–	–	–	–	–	–	63,000	–	–
Flexural Modulus	RT	psi	–	–	460,000	240,000	170,000	85-90,000 ¹	72,000	600,000	507,000	90,000	319,000-335,000 ¹
	-320°F	psi	–	–	–	–	–	–	–	–	783,200	–	–
Compressive Strength	RT	psi	5,900	–	18,500	1,500	2,500	–	3,500	19,000	17,400	2,100	15,000
	-320°F	psi	–	–	–	–	–	–	70,000	–	44,200	–	–
Deformation Under Load	RT/24 hours	%	≤0.2	4	0.1	–	0.2	2	3	0.09	–	–	–
Melting Point		°F	415	630	–	464	536	582	No Melt	644	650	500	334-345 ¹
Tg Glass Transition			258 (HDT)	–	–	240 (HDT)	177 (HDT)	–	RT	350 (HDT)	289	130 (HDT)	–
CoTE	Avg below Tg	ppm K ⁻¹	–	–	2.7 x 10 ⁻⁵	5.6 x 10 ⁻⁵	7.5 x 10 ⁻⁵	7.8 x 10 ⁻⁵	7.5 x 10 ⁻⁵	2.6 x 10 ⁻⁵	65	3.2 x 10 ⁻⁵	8.3 x 10 ⁻⁵
	-30 to -100°F	cm/cmC	5.1 x 10 ⁻⁵	–	–	–	–	–	–	–	–	–	–
Heat Deflection Temperature	@ 66 PSI	°F	248	–	–	240	219	164	250	–	–	158	–
	@ 264 PSI	°F	–	–	–	169	160	118	122	–	–	129	–
Density		g/cm ³	2.11-2.17 ¹	2.16	1.43	1.68	1.7	2.12-2.17 ¹	2.1-2.2 ¹	1.3	1.3	2.14	1.78
Hardness	Rockwell	Shore D	D85-95	D53	D40-55	D75-90	D72	D55-60	D58-62	M104	D84	D56	–
Limiting Oxygen Index		%	–	–	100	–	30-36	>95	>95	–	–	>95	–
Dielectric Constant		1 MHz	–	–	3.34	–	2.6	2.1	–	–	–	2.1	–

¹ Data varies based on the processing method used in manufacturing. Thus the range.

The information in this table is based on published information by each resin manufacturer. All trademarks are the property of their respective owners.

PCTFE
Trade Name(s): Neoflon® M-400H, (Kel-F®)
$\left[\begin{array}{c} \text{F} & \text{F} \\ & \\ -\text{C} & - & \text{C}- \\ & \\ \text{F} & \text{Cl} \end{array} \right]_n$
A thermoplastic fluoropolymer material with outstanding strength, stiffness, and dimensional stability. It also has good chemical resistance and is often specified for cryogenic seals and components.

Modified TFE Hybrid
Trade Name(s): Ultraflon 500FM
PTFE with a perfluoropropyl vinyl ether (PPVE) modifier which enhances a number of characteristics, including lowering deformation, reducing permeability, and providing better compression stress relaxation at elevated temperatures.

ECTFE
Trade Name(s): Halar®
$\left[\begin{array}{c} \text{F} & \text{Cl} & \text{H} & \text{H} \\ & & & \\ -\text{C} & - & \text{C} & - & \text{C} & - & \text{C}- \\ & & & \\ \text{F} & \text{F} & \text{H} & \text{H} \end{array} \right]_n$
A partially fluorinated polymer developed to provide chemical resistance in heavy duty corrosion applications. ECTFE has a wide continuous usage temperature range between -105°F to +300°F.

ETFE280
Trade Name(s): Tefzel™
$\left[\begin{array}{c} \text{H} & \text{H} & \text{F} & \text{F} \\ & & & \\ -\text{C} & - & \text{C} & - & \text{C} & - & \text{C}- \\ & & & \\ \text{H} & \text{H} & \text{F} & \text{F} \end{array} \right]_n$
A fluoroplastic resin with relatively low flow rate, greatly enhanced flex life, and resistance to environmental stress. It is mechanically tough and offers an excellent balance of properties, including broad thermal capability.

PFA350
Trade Name(s): Teflon™ PFA 350
General-purpose fluoropolymer resin with a relatively low flow rate, increased flex life, and resistance to stress-cracking. It retains properties after service at temperatures up to 500°F and also maintains useful properties as low as -320°F.

Polyimide
Trade Name(s): Meldin® 7001CM
Meldin is ideal for electrical and thermal insulating applications. More ductile than ceramics, and lighter weight than metals, Meldin 7001 is a popular choice for structural parts in aerospace and other applications where metal replacement is desirable.

V-PTFE
Trade Name(s): Fluon®, Neoflon®, Polyflon®
$\left[\begin{array}{c} \text{F} & \text{F} \\ & \\ -\text{C} & - & \text{C}- \\ & \\ \text{F} & \text{F} \end{array} \right]_n$
Made from pure PTFE resin, it is an incredibly versatile material with a wide variety of applications. PTFE features a broad temperature range and is unaffected by UV, with excellent electrical insulation properties and extreme chemical resistance.

V-PEEK
Trade Name(s): Ketron®, TECAPEEK®
High-performance, semi-crystalline thermoplastic material with outstanding thermal and chemical resistance properties. It possesses excellent mechanical strength across a broad temperature range and good dimensional stability.

PEEK CT
Trade Name(s): Victrex CT™ 200
Exhibits improved sealing over a wider range of temperatures compared to commonly used materials such as PCTFE. It does so at low temperatures on account of its greater ductility; at high temps due to its superior creep resistance.

FEP
Trade Name(s): Teflon™, Daikin Neoflon™
Developed specifically for cryogenics applications. Tough, flexible copolymer with good chemical resistance, high purity, and low stiffness. Outstanding electrical properties, UV resistance.

PVDF
Trade Name(s): Hylar®, Kynar®, Solef®
$\left[\begin{array}{c} \text{H} & \text{F} \\ & \\ -\text{C} & - & \text{C}- \\ & \\ \text{H} & \text{F} \end{array} \right]_n$
Melt-processable copolymer, high purity with high chemical resistance, mechanical strength and magno-electric properties. PVDF has a low density in comparison to other fluoropolymers.


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- Self-Lubricating
- Low weight | High Strength
- Chemical Resistance
- Direct replacement for Bronze



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- Self-Lubricating
- High Load | Low Speed
- 54,400 PSI Compressive Strength
- Exceptional Resistance to Vibration and Impact



 **TriSteel[™]**

- Self-Lubricating
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- Metal Backed Bearing System
- 100% Lead Free



 **Rulon[®]**

- Self-Lubricating
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- Low Coefficient of Friction
- Chemically Resistant



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