

## ENERGY SECTOR

				CIP 100 & 200 Series	CIP 300 Series	Ultem 1000	Ultem 2300	Victrix PEEK 450G	Victrix PEEK 450GL30	Victrix PEEK 450CA30	Victrix PEEK 450FC30	Ketron PEEK HPV	Techtron HPV	Torlon 4503	Torlon 4203	Torlon 4501	
		Units	ASTM Test Method			Polyetherimide	30% Glass Filled Polyetherimide	Poly- etheretherketone	30% Glass Filled PEEK	30% Carbon Fiber PEEK	Bearing Grade PEEK	Bearing Grade PEEK	Bearing Grade Polyphenylene- sulfide	Compression Molded Polyamideimide	Extruded Polyamideimide	Compression Molded Bearing Polyamideimide	
MECHANICAL	1	Strength to Weight Ratio	ksi	-	-	12.9	11.3	10.9	15.1	24	-	7.6	7.6	12.9	12.8	6.9	
	2	Specific Gravity @ 73 F	-	D792	-	-	1.28	1.51	1.30	1.50	1.41	-	1.44	1.43	1.40	1.41	1.45
	3	Tensile Strength @ 73 F, (ult)/(yld)	psi	D638	11000	11000	16500 (ult)	17000 (ult)	14100 (ult)	22620 (ult)	33785 (ult)	21800	17400	10900 (ult)	18000 (ult)	18000 (ult)	10000 (ult)
	4	Tensile Modulus of Elasticity @ 73 F	psi	D638	470000	470000	475000	800000	522000	1407000	1885000	1200000	1100000	540000	500000	600000	440000
	5	Tensile Elongation at Break @ 73 F	%	D638	-	-	80	3	5	2.0	2	2.5	3	5	5	5	3
	6	Flexural Strength @ 73 F	psi	D790	-	-	20000	30000	24650	33785	51475	30500	-	10500	24000	24000	20000
	7	Flexural Modulus of Elasticity @ 73 F	psi	D790	260000	260000	500000	900000	594500	1450000	2929000	1170000	-	535000	600000	600000	650000
	8	Shear Strength @ 73 F	psi	D732	12000	12000	15000	-	7685 (ult)	14065 (ult)	14065 (ult)	11600	-	-	-	16000	-
	9	Compressive Strength, (% Deformation) @73 F	psi	D695	50000	50000	22000 (10)	32000 (10)	17255 (10)	31175 (10)	34800 (10)	21800	21800 (10)	-	17000 (10)	28000 (10)	18000 (10)
	10	Compressive Modulus of Elasticity @73 F	psi	D695	-	-	480000	625000	-	-	-	-	-	-	350000	700000	350000
	11	Hardness, Rockwell, Scale as noted @73 F	-	D785	M100	M112 (R125)	M114 (R127)	M99(R126)	M103(R124)	M107(R124)	-	-	M99	M84	M119 (E80)	M120 (E80)	M106 (E70)
	12	Hardness, Durometer, Shore D @73 F	-	D2240	-	-	D86	D86	-	-	-	-	-	-	D90	-	D90
	13	Izod Impact, (Notched) @73 F	ft-lb/in of notch	D256 TypeA	-	-	0.5	1.0	1.6	1.8	1.6	1.2	0.7	1.4	1.5	2.0	0.5
	14	Coefficient of Friction, (Dry vs. Steel) Dynamic	-	-	-	-	0.42	-	-	-	-	-	0.24	0.16	0.30	0.27	0.20
	15	Limiting PV, (with 4 to 1 factor of safety applied)	psi-ft/min	-	-	-	1875	-	-	-	-	-	13000	17000	-	17500	22500
THERMAL	16	Coefficient of Linear Thermal Expansion @73 F	in/in/F	E-831 (TMA)	1.8E-05	2.0E-05	3.1E-05	1.1E-05	2.6E-05	1.2E-05	8.0E-06	-	1.4E-05	3.3E-05	1.5E-05	1.7E-05	2.0E-05
	17	Heat Deflection Temperature @ 264 psi	F	D648	-	-	392	410	306	600	600	-	446	240	532	532	534
	18	Tg-Glass transition temperature, (Amorphous)	F	D3418	-	-	419	419	289	289	289	-	289	-	527	527	527
	19	Melting Point, (VS=Vicat Softening Temp.)	F	D3418	-	-	-	-	644	644	644	644	644	536	-	-	-
	20	Continuous Service Temperature in Air, (Max.)	F	-	200	400	340	340	480	480	480	599	482	430	500	500	500
21	Thermal Conductivity	BTU-in/hr-ft <sup>2</sup> -F	-	-	-	0.90	1.15	1.75	2.98	6.37	1.67	1.70	2.10	1.80	1.80	3.70	
ELECTRICAL	22	Dielectric Strength, Short Term	Volts/mil	D149	-	-	830	770	480	500	-	-	-	500	580	580	-
	23	Volume Resistivity	ohm-cm	D257	-	-	6.7E+17	3.0E+16	4.9E+16	1.0E+16	1.4E+05	-	<1E8	>E13	2.0E+17	2.0E+17	8.0E+15
	24	Dielectric Constant @ 10E6 Hz	-	D150	-	-	3.2	3.7	3.3	3.7	-	-	-	-	3.9	3.9	5.4
	25	Dissipation Factor @ 10E6 Hz	-	D150	-	-	0.001	0.002	0.003	0.004	-	-	-	-	0.031	0.031	0.042
	26	Flammability @ 3.1 mm unless noted	-	UL94	-	-	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O
	27	Water Absorbtion, Immersion, 24 Hrs	% by wt.	D570(7)	-	-	0.25	0.18	0.50	0.11	0.06	0.06	0.05	0.01	0.35	0.40	0.30
28	Water Absorbtion, Saturation	% by wt.	D570(7)	-	-	1.25	.90	0.50	-	-	-	0.30	0.09	1.70	1.70	1.50	

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Torlon 4301	Torlon 5530	VespeI SP-1	Tectron PPS	40% Glass Filled Ryton PPS	Celazole PBI	Virgin Teflon	25% Glass Reinforced Teflon	Fluorosint 207	Fluorosint 500
Extruded Bearing Grade Polyamideimide	Compression Molded 30% GF Polyamideimide	Dupont Polyimide	Extruded Polyphenylene-sulfide	Compression Molded 40% GF PPS	Polybenzimidazole	Polytetrafluoroethylene	25% Glass Filled Polytetrafluoroethylene	FDA Synthetic Mica-Filled PTFE	Synthetic Mica-Filled PTFE
8.3	9.3	8.7	7.4	7.7	17.7	-	-	0.7	0.5
1.45	1.61	1.43	1.35	1.70	1.30	2.16	2.22	2.30	2.32
12000 (ult)	14000 (ult)	12500 (ult)	13500 (ult)	13000 (ult)	23000 (ult)	4500 (ult)	2800 (ult)	1500	1100
900000	500000	-	500000	730000	850000	-	-	250000	300000
3	3	8	15	2.0	3	400	325	50	10
31000	20000	16000	21000	23000	32000	-	-	2000	2200
1000000	800000	450000	575000	1000000	950000	50000-90000	-	350000	500000
16400	-	13000	9000	-	-	-	-	1700	2100
24000 (10)	18000 (10)	19300 (10)	21500 (10)	24000 (10)	50000 (10)	600 (1)	1000 (1)	3800 (10)	4000 (10)
950000	350000	350000	430000	1300000	900000	-	-	225000	250000
M106 (E70)	M120 (E77)	(E45)	M95(R125)	M94(R125)	M125 (E105)	-	-	(R50)	(R55)
-	D90	-	D85	D86	-	D55	D54	D65	D70
0.8	0.7	0.8	0.6	1.0	0.5	3.0	-	1.0	0.9
0.20	0.20	0.29	0.40	-	0.24	.05-.08	.10-.13	0.17	0.18
22500	20000	-	-	-	37500	-	-	8000	8000
1.4E-05	2.5E-05	3.0E-05	2.8E-05	2.5E-05	1.3E-05	7.0E-05	3-8E-05	5.7E-05	2.4E-05
534	520	680	250	490	800 (DMA)	115	-	210	270
527	527	-	-	-	750 (DMA)	-	-	-	-
-	-	-	540	540	-	621	621	621	621
500	500	-	425	450	650	500	500	500	500
3.70	2.50	2.40	2.00	2.10	2.80	1.70	2.60	-	5.30
-	700	560	540	385	550	600	-	200	275
3.0E+15	2.0E+17	1E15-1E16	4.5E+16	-	1.0E+14	>10E+18	-	>1E13	>1E14
6.0	6.3	3.6	3.0	-	-	-	-	2.7	2.9
0.037	0.220	0.003	0.001	-	-	-	-	0.008	0.008
V-O	V-O	-	V-O	V-O	V-O	V-O	-	V-O	V-O
0.28	0.30	0.24	0.01	0.02	0.40	0.00	-	0.03	0.10
1.50	1.50	1.30	0.03	0.03	-	-	-	2.00	3.00

**PRECISION MACHINED PLASTIC COMPONENTS**