

## PEEK TUBE PRODUCT LINE

### HIGHER PERFORMANCE MATERIALS TO MEET HPHT (HIGH PRESSURE - HIGH TEMPERATURE) REQUIREMENTS

#### TYPICAL PROPERTY VALUES

Manufacturer

Ensinger Putnam manufactures injection molded PEEK Tubes. Our capabilities allow us to manufacture higher temperature materials to meet the increasing performance needs of OEM's worldwide. Our warehouse in Houston, Texas allows same day and next day delivery of standard materials that are in stock in our 450G and 450GL30 lines.



Material Grade /Description

Unfilled PEEK    30% Glass Filled PEEK    30% Carbon Filled PEEK    30% Carbon, PTFE and graphite    Wear Grade    Unfilled Higher Temperature Performance    30% Glass Filled Higher Temperature Performance    Unfilled PBI/PEEK Blend    Glass Filled PBI/PEEK Blend    Lube Grade PBI/PEEK Blend    Carbon filled PBI/PEEK Blend

PROPERTIES    ASTM TEST METHOD    UNITS    450G    450GL30    450CA30    450FC30    WG101    ST G45    ST45GL30    ASTM TEST METHOD    TU-60    TF-60V    TL-60    TF-60C

Physical Properties	Specific Gravity		ISO 1183		1.3	1.51	1.4	1.45	1.44	1.3	1.53			1.3	1.5	1.4	1.4
	Water Absorption	24 hours @ 73°F	-	-	-	-	-	-	-	-	-	D570			0.25%	0.20%	0.15%
		@ Equilibrium	-	-	-	-	-	-	-	-	-	D570		6.5%	4.6%	3.8%	4.0%

Mechanical Properties	Tensile Strength	Yield, 73°F	ISO 527	psi	14,500					16,700		D638	14 kpsi	19 kpsi	13 kpsi	27 kpsi
	Tensile Strength, Break	Break, 73°F				26,100	37,700	20,300	26,100		29,000		-	-	-	-
	Tensile Elongation	73°F	ISO 527	%	45	2.7	1.7	2.2	1.9	20.0	2.5	D638	1.8%	1.4%	0.9%	1.2%
	Tensile Modulus	73°F	ISO 527	psi	540,000	1,700,000	3,600,000	1,800,000	2,800,000	620,000	1,700,000	D638	740 kpsi	1490 kpsi	1990 kpsi	3480 kpsi
	Flexural Strength	73°F	ISO 178	psi	23,900	39,200	55,100	33,000	41,000	26,100	43,500	D790	21 kpsi	30 kpsi	23 kpsi	45 kpsi
	Flexural Modulus	73°F	ISO 178	psi	590,000	1,640,000	3,300,000	1,700,000	17	590,000	1,600,000	D790	700 kpsi	1490 kpsi	1790 kpsi	2990 kpsi
	Compressive Strength	73°F	ISO 604	psi	17,400	36,000	44,000	25,000	32,000	21,000	42,000	D695	30 kpsi	32 kpsi	18 kpsi	32 kpsi
	Izod Impact Strength	Notched, 73°F	ISO 180/A	ft-lb/in2	3.6	4.8	5	2.9	2.6	2.9	5.2		-	-	-	-

Thermal Properties	Melting Point		ISO 3146	°F	649	649	649	649	649	729	729	-	-	-	-	-
	Glass Transition (Tg)	Onset	ISO 3146	°F	289	289	289	289	289	324	324	-	-	-	-	-
	Heat Capacity @ 158°F				-	-	-	-	-	-	-	DSC	-	.27 Btu/lb°F	.28 Btu/lb°F	.28 Btu/lb°F
	Coefficient of Thermal Expansion	Average >Tg	ISO11359	-	78	61	56	64	50	69	56	-	-	-	-	-
	Coefficient of Linear Thermal Expansion 75-300°F				-	-	-	-	-	-	-	TMA	19 x 10-6 in/in°F	9 x 10-6 in/in°F	14 x 10-6 in/in°F	14 x 10-6 in/in°F
	Heat Deflection Temperature	260 psi	ISO 75A-f	°F	306	622	637	599	649	342	716	D648	-	590°F	590°F	608°F
	Thermal Conductivity	73°F	ISO/CD 22007-4	W/mK	0.29	0.3	0.95	0.87	1.3	0.29	0.3	-	-	-	-	-

Electrical Properties	Dielectric Strength	0.1 inch thickness	IEC 60243-1	V/mil	630	790	-	-	-	830	750	D149	433 V/mil	410 V/mil	-	-
	Dielectric Constant	1kHz	IEC 60250	n/a	2.8	3.2	-	-	-	3	3.3	D-150	3.4	3.9	-	-