Techtron® LSG HPV PPS

QUADRANT ENGINEERING PLASTIC PRODUCTS

PRODUCT DATA SHEET

Techtron® LSG HPV PPS stock shapes are produced from a proprietary, reinforced and internally lubricated polyphenylene sulfide compound. This material exhibits and excellent combination of properties including wear resistance, load bearing capability and dimensional stability when exposed to chemicals and high temperature environments. Techtron® LSG HPV PPS stock shapes have also been successfully type tested for their compliance with both United States Pharmacopeia (USP) and ISO 10993-1 guideline requirements for Biocompatibility Testing of Materials, and they come with full traceability from resin to stock shape. These features, added to a very good sterilizability by means of steam, dry heat, ethylene oxide, plasma and gamma irradiation, make Techtron® LSG HPV PPS stock shapes very suitable for applications in the medical, pharmaceutical and biotechnology markets.

Physical properties (indicative values ▪)

PROPERTIES	Test methods	Units	VALUES
Colour	-	-	deep blue
Density	ISO 1183-1	g/cm³	1.42
Water absorption:			
- after 24/96 h immersion in water of 23°C (1)	ISO 62	mg	1-2
	ISO 62	%	0.01 / 0.02
- at saturation in air of 23°C / 50% RH	-	%	0.05
- at saturation in water of 23°C	-	%	0.20
Thermal Properties			
Melting temperature (DSC, 10°C/min)	ISO 11357-1/-3	°C	280
Thermal conductivity at 23°C	-	W/(K.m)	0.30
Coefficient of linear thermal expansion:			
- average value between 23 and 100°C	-	m/(m.K)	50.10^{-6}
- average value between 23 and 150°C	-	m/(m.K)	60.10^{-6}
- average value above 150°C	-	m/(m.K)	100.10^{-6}
Temperature of deflection under load:			
- method A: 1.8 MPa	ISO 75-1/-2	°C	115
Max. allowable service temperature in air:			
- for short periods (2)	-	°C	260
- continuously : for min. 20,000 h (3)	-	°C	220
Min. service temperature (4)	-	°C	- 20
Flammability (5):			
- "Oxygen Index"	ISO 4589-1/-2	%	44
- according to UL 94 (1.5 / 3 mm thickness)	-	-	V-0/V-0
Mechanical Properties at 23°C (6)			
Tension test (7):			
- tensile stress at break (8)	ISO 527-1/-2	MPa	78
- tensile strength (8)	ISO 527-1/-2	MPa	78
- tensile strain at break (8)	ISO 527-1/-2	%	3.5
- tensile modulus of elasticity (9)	ISO 527-1/-2	MPa	4000
Compression test (10):			
- compressive stress at 1 / 2 / 5% nominal strain (9)	ISO 604	Mpa	33 / 65 / 105
Flexural test (11) (12):			
- flexural strength	178	MPa	118
- flexural strain at flexural strength	178	%	4
- flexural stress at conventional deflection	178	MPa	109
Charpy impact strength - unnotched (13)	ISO 179-1/1eU	kJ/m²	25
Charpy impact strength - notched	ISO 179-1/1eA	kJ/m²	4
Ball indentation hardness (14)	ISO 2039-1	MPa	160
Rockwell hardness (14)	ISO 2039-2	-	M 82
Electrical Properties at 23 °C			
Electric strength (15)	IEC 60243-1	KV/mm	24
Volume resistivity	IEC 60093	Ohm.cm	$> 10^{14}$
Surface resistivity	IEC 60093	Ohm	$> 10^{13}$
Relative permittivity ε_r : - at 100 Hz	IEC 60250	-	3.3
- at 1 MHz	IEC 60250	-	3.3
Dielectric dissipation factor tan δ: - at 100 Hz	IEC 60250	-	0.003
- at 1 MHz	IEC 60250	-	0.003
Comparative tracking index (CTI)	IEC 60112	-	100

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m.

Certifications on biocompatibility type testing
USP Class VI ; ISO 10993-4 (hemocompatibility) ; ISO 10993-5 (cytotoxicity) ; ISO 10993-10 (intra-cutaneous reactivity & sensitization) ; ISO 10993-11 (acute systemic toxicity)

Legend:

(1) According to method 1 of ISO 62 and done on discs ∅ 50 x 3 mm.
(2) Only for short time exposure (a few hours) in applications where no or only a very low load is applied to the material.
(3) Temperature resistance over a period of min. 20,000 hours. After this period of time, there is a decrease in tensile strength of about 50% as compared with the original value. The temperature value given here is thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
(4) Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
(5) These ratings - derived from raw material supplier data and other publications - are not intended to reflect hazards presented by the materials under actual fire conditions. There is no UL-yellow card available for Techtron® LSG HPV PPS stock shapes.
(6) The figures given for the mechanical properties are average values of tests run on test specimens machined out of rod Ø 50 mm. Unless otherwise specified, the test specimens were taken from the mid between center and outside diameter with their largest size taken in axial direction (parallel to the extrusion direction).
(7) Test specimens: Type 1 B
(8) Test speed: 5 mm/min (chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material)
(9) Test speed: 1 mm/min
(10) Test specimens: cylinders ∅ 8 x 16 mm
(11) Test specimens: bars 4 x 10 x 80 mm
(12) Test speed: 2 mm/min
(13) Pendulum used: 4 J
(14) Measured on 10 mm thick disks Ø 50 mm, mid between center and outside diameter.

▪ This table is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties. **However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design.**
It has to be noted that this material is fibre reinforced, and consequently it is an anisotropic material (properties differ when measured parallel and perpendicular to the extrusion direction).

Quadrant's Life Science Grades should not be used for applications involving medical devices that are intended to remain implanted in the human body continuously for a period exceeding 24 hours/30 days*, or are intended to remain in contact with internal human tissue or bodily fluids for more than 24 hours/30 days*, or as critical components of medical devices that are essential to the continuation of human life.

***:** the period of **30 days only** applies to **KETRON® PEEK-CLASSIX™ LSG white.**