PAEK polyaryletherketone

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	polyaryletherketone	
Acronym	-	PAEK	
COMMERCIAL POLYMERS			
Some manufacturers	-	Solvay	
Trade names	-	AvaSpire	
PHYSICAL PROPERTIES			
Density at 20°C	g cm^{-3}	1.29-1.32	
Melting temperature, DSC	°C	340; 340-345 (30-40% glass fiber); 340 (30% carbon fiber)	
Thermal expansion coefficient, 23-80°C	$°C^{-1}$	0.45-0.47E-4; 0.16-0.17E-4 (30-40% glass fiber)	
Thermal conductivity, melt	W m^{-1} K^{-1}	0.2	
Glass transition temperature	°C	150-158; 150-158 (30-40% glass fiber); 150 (30% carbon fiber)	
Specific heat capacity	J K^{-1} kg^{-1}	1450	
Maximum service temperature	°C	350	
Long term service temperature	°C	250	
Heat deflection temperature at 1.8 MPa	°C	161-252; 213-286 (30-40% glass fiber); 267-276 (30% carbon fiber)	
Dielectric constant at 100 Hz/1 MHz	-	3.88/4.00 (40% glass fiber)	
Relative permittivity at 1 MHz	-	3.1	
Dissipation factor at 1 MHz	E-4	40	
Volume resistivity	ohm-m	6.2E+17; 2E16 (30-40% glass fiber)	
Surface resistivity	ohm	1.9E+17	
Electric strength K20/P50, d=0.60.8 mm	kV mm^{-1}	16 (30-40% glass fiber)	
MECHANICAL & RHEOLOGICAL PROPERTIES			
Tensile strength	MPa	84-93.8; 156-191 (30-40% glass fiber); 176-201 (30% carbon fiber)	
Tensile modulus	MPa	2,900-3,720; 9,900-15,200 (30-40% glass fiber); 18,800-22,100 (30% carbon fiber)	
Tensile stress at yield	MPa	84-87	
Elongation	%	26-76; 1.8-2.9 (30-40% glass fiber); 1.5-2.0 (30% carbon fiber)	
Tensile yield strain	%	5.0-6.7	
Flexural strength	MPa	122-141; 234-253 (30-40% glass fiber); 259-317 (30% carbon fiber)	
Flexural modulus	MPa	3,100-3,720; 9,400-14,800 (30-40% glass fiber); 16,500-19,300 (30% carbon fiber)	
Compressive strength	MPa	228 (30-40% glass fiber)	
Young's modulus	MPa	4100	
Izod impact strength, unnotched, 23°C	J m^{-1}	no break; 590-960 (30-40% glass fiber); 530 (30% carbon fiber)	
Izod impact strength, notched, 23°C	J m^{-1}	75-100; 53-110 (30-40% glass fiber)	

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PARAMETER	UNIT	VALUE	REFERENCES
Shear strength	MPa	79 (30-40% glass fiber)	
Rockwell hardness	-	M93	
Shrinkage	%	0.8-1.3; 0.3-1.3 (30-40% glass fiber); 0.1-0.5 (30% carbon fiber)	
Melt viscosity, shear rate=1000 s^{-1}	Pa s	410-450; 410-450 (30-40% glass fiber); 470 (30% carbon fiber)	
Melt index, 400°C/2.16 kg	g/10 min	1-5; 7-9 (30-40% glass fiber)	
CHEMICAL RESISTANCE			
Aromatic hydrocarbons	-	excellent	
Esters	-	excellent	
Halogenated hydrocarbons	-	excellent	
Ketones	-	excellent	
FLAMMABILITY			
UL 94 rating	-	V-0; V-0 or V-1 (30-40% glass fiber)	
TOXICITY			
Carcinogenic effect	-	not listed by ACGIH, NIOSH, NTP	
PROCESSING			
Typical processing methods	-	extrusion blow molding, fiber spinning, film extrusion, injection blow molding, injection molding, machining, profile extrusion, thermoforming, wire and cable extrusion	
Preprocess drying: temperature/ time/residual moisture	°C/h/%	150/4/-; 149-175/2.5-4/- (30-40% glass fiber)	
Processing temperature	°C	354-382; 366-404 (30-40% glass fiber)	
Applications	-	aircraft, automotive, bearings, bushings, connectors, electrical/ electronics, film, fuel lines, gears, medical, oil/gas, semiconductors, seals	
Outstanding properties	-	ductile, high heat resistance, flame retardant	