VALOX™ FR RESINS 4521

REGION EUROPE

DESCRIPTION

VALOX 4521 is a 20% glass filled, high flow, flame retardant Polybutylene Terephthalate (PBT) injection moldable grade. It has excellent chemical resistance and a UL94V0@0.75 flame rating and 5VA@2.0mm.

TYPICAL PROPERTY VALUES

Revision 20211104

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL			
Tensile Stress, yld, Type I, 5 mm/min	110	MPa	ASTM D638
Tensile Stress, brk, Type I, 5 mm/min	110	MPa	ASTM D638
Tensile Strain, yld, Type I, 5 mm/min	2	%	ASTM D638
Tensile Strain, brk, Type I, 5 mm/min	2	%	ASTM D638
Tensile Modulus, 5 mm/min	7800	MPa	ASTM D638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	155	MPa	ASTM D790
Flexural Stress, brk, 1.3 mm/min, 50 mm span	155	MPa	ASTM D790
Flexural Modulus, 1.3 mm/min, 50 mm span	6500	MPa	ASTM D790
Tensile Stress, yield, 5 mm/min	110	MPa	ISO 527
Tensile Stress, break, 5 mm/min	110	MPa	ISO 527
Tensile Strain, yield, 5 mm/min	2	%	ISO 527
Tensile Strain, break, 5 mm/min	3	%	ISO 527
Tensile Modulus, 1 mm/min	8000	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	160	MPa	ISO 178
Flexural Stress, break, 2 mm/min	160	MPa	ISO 178
Flexural Strain, break, 2 mm/min	3	%	ISO 178
Flexural Modulus, 2 mm/min	7000	MPa	ISO 178
Ball Indentation Hardness, H358/30	142	MPa	ISO 2039-1
Hardness, Rockwell R	120	-	ISO 2039-2
IMPACT			
Charpy Impact, unnotched, 23°C	40	kJ/m²	ISO 179/2C
Charpy Impact, unnotched, -30°C	30	kJ/m²	ISO 179/2C
Izod Impact, unnotched, 23°C	530	J/m	ASTM D4812
Izod Impact, unnotched, -30°C	470	J/m	ASTM D4812
Izod Impact, notched, 23°C	70	J/m	ASTM D256
Izod Impact, notched, 0°C	70	J/m	ASTM D256
Izod Impact, notched, -30°C	65	J/m	ASTM D256
Izod Impact, unnotched 80*10*4 +23°C	35	kJ/m²	ISO 180/1U
Izod Impact, unnotched 80*10*4 -30°C	30	kJ/m²	ISO 180/1U
Izod Impact, notched 80*10*4 +23°C	8	kJ/m²	ISO 180/1A
Izod Impact, notched 80*10*4 0°C	8	kJ/m²	ISO 180/1A
Izod Impact, notched 80*10*4 -30°C	7	kJ/m²	ISO 180/1A
Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm	5	kJ/m²	ISO 179/1eA
Charpy Impact, notched, 23°C	8	kJ/m²	ISO 179/2C

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Charpy -30°C, V-notch Edgew 80*10*4 sp=62mm	5	kJ/m²	ISO 179/1eA
Charpy Impact, notched, -30°C	8	kJ/m²	ISO 179/2C
Charpy 23°C, Unnotch Edgew 80*10*4 sp=62mm	30	kJ/m²	ISO 179/1eU
Charpy -30°C, Unnotch Edgew 80*10*4 sp=62mm	28	kJ/m²	ISO 179/1eU
THERMAL			
Vicat Softening Temp, Rate A/50	218	°C	ASTM D1525
Vicat Softening Temp, Rate B/50	206	°C	ASTM D1525
HDT, 0.45 MPa, 3.2 mm, unannealed	218	°C	ASTM D648
HDT, 1.82 MPa, 3.2mm, unannealed	205	°C	ASTM D648
CTE, 23°C to 150°C, flow	2.5E-05	1/°C	ASTM E831
CTE, 23°C to 150°C, xflow	1.8E-04	1/°C	ASTM E831
Thermal Conductivity	0.27	W/m-°C	ISO 8302
CTE, -40°C to 40°C, flow	2.7E-05	1/°C	ISO 11359-2
CTE, -40°C to 40°C, xflow	7.4E-05	1/°C	ISO 11359-2
CTE, 23°C to 80°C, flow	2.5E-05	1/°C	ISO 11359-2
CTE, 23°C to 80°C, xflow	1.2E-04	1/°C	ISO 11359-2
CTE, 23°C to 150°C, flow	2.E-05	1/°C	ISO 11359-2
CTE, 23°C to 150°C, xflow	1.3E-04	1/°C	ISO 11359-2
Ball Pressure Test, 125°C +/- 2°C	PASSES	-	IEC 60695-10-2
Vicat Softening Temp, Rate A/50	220	°C	ISO 306
Vicat Softening Temp, Rate B/50	210	°C	ISO 306
Vicat Softening Temp, Rate B/120	208	°C	ISO 306
HDT/Be, 0.45MPa Edgew 120*10*4 sp=100mm	220	°C	ISO 75/Be
HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm	205	°C	ISO 75/Ae
HDT/Bf, 0.45 MPa Flatw 80*10*4 sp=64mm	220	°C	ISO 75/Bf
HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm	207	°C	ISO 75/Af
Relative Temp Index, Elec	130	°C	UL 746B
Relative Temp Index, Mech w/impact	130	°C	UL 746B
Relative Temp Index, Mech w/o impact	130	°C	UL 746B
PHYSICAL			
Specific Gravity	1.58	-	ASTM D792
Filler Content	20	%	ASTM D229
Mold Shrinkage on Tensile Bar, flow	0.3 – 0.7	%	SABIC method
Mold Shrinkage on Tensile Bar, xflow	0.6 – 0.9	%	SABIC method
Melt Flow Rate, 265°C/5.0 kgf	90	g/10 min	ASTM D1238
Density	1.58	g/cm³	ISO 1183
Water Absorption, (23°C/saturated)	0.28	%	ISO 62-1
Moisture Absorption (23°C / 50% RH)	0.09	%	ISO 62
Melt Flow Rate, 250°C/2.16 kg	26	g/10 min	ISO 1133
Melt Volume Rate, MVR at 250°C/2.16 kg	19	cm³/10 min	ISO 1133
Melt Volume Rate, MVR at 250°C/5.0 kg	65	cm³/10 min	ISO 1133
Melt Volume Rate, MVR at 265°C/5.0 kg	95	cm³/10 min	ISO 1133
Melt Viscosity, 260°C, 1500 sec-1	95	Pa-s	ISO 11443
ELECTRICAL			
Volume Resistivity	1.E+15	Ω.cm	ASTM D257

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Dielectric Strength, in oil, 0.8 mm	37	kV/mm	ASTM D149
Dielectric Strength, in oil, 1.6 mm	25	kV/mm	ASTM D149
Dielectric Strength, in oil, 3.2 mm	20	kV/mm	ASTM D149
Relative Permittivity, 1 MHz	3.4	-	ASTM D150
Dissipation Factor, 1 MHz	0.015	-	ASTM D150
Arc Resistance, Tungsten {PLC}	5	PLC Code	ASTM D495
Hot Wire Ignition {PLC}	0	PLC Code	UL 746A
High Voltage Arc Track Rate {PLC}	4	PLC Code	UL 746A
High Ampere Arc Ign, surface {PLC}	0	PLC Code	UL 746A
Comparative Tracking Index (UL) {PLC}	2	PLC Code	UL 746A
Volume Resistivity	1.E+15	Ω.cm	IEC 60093
Surface Resistivity, ROA	>1.E+15	Ω	IEC 60093
Dielectric Strength, in oil, 0.8 mm	37	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 1.6 mm	25	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 3.2 mm	20	kV/mm	IEC 60243-1
Relative Permittivity, 1 MHz	3.4	-	IEC 60250
Dissipation Factor, 50/60 Hz	0.001	-	IEC 60250
Dissipation Factor, 1 MHz	0.015	-	IEC 60250
Comparative Tracking Index	275	V	IEC 60112
Relative Permittivity, 50/60 Hz	3.3	-	IEC 60250
FLAME CHARACTERISTICS			
UL Recognized, 94V-0 Flame Class Rating	0.75	mm	UL 94
UL Recognized, 94-5VA Flame Class Rating	2	mm	UL 94
UL Recognized, 94-5VB Flame Class Rating	1.5	mm	UL 94
Glow Wire Flammability Index 960°C, passes at	3.2	mm	IEC 60695-2-12
Oxygen Index (LOI)	29	%	ISO 4589
INJECTION MOLDING			
Drying Temperature	110 – 120	°C	
Drying Time	2 – 4	Hrs	
Maximum Moisture Content	0.02	%	
Melt Temperature	250 – 270	°C	
Nozzle Temperature	240 – 260	°C	
Front - Zone 3 Temperature	245 – 265	°C	
Middle - Zone 2 Temperature	240 – 255	°C	
Rear - Zone 1 Temperature	230 – 245	°C	
Hopper Temperature	40 – 60	°C	
Mold Temperature	40 – 100	°C	

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