VALOX™ FR RESIN ENH4550

REGION ASIA

DESCRIPTION

VALOX ENH4550 is a 25% glass reinforced, non-chlorinated/brominated flame retardant Polybutylene Terephthalate (PBT) injection moldable grade with excellent chemical resistance. It has a UL94V0@0.30mm and 5VA@2.0mm flame rating. This is a good candidate for a variety of applications needing a sustainable FR PBT solution.

TYPICAL PROPERTY VALUES

Revision 20190925

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL			
Tensile Stress, yld, Type I, 5 mm/min	115	MPa	ASTM D 638
Tensile Stress, brk, Type I, 5 mm/min	115	MPa	ASTM D 638
Tensile Strain, yld, Type I, 5 mm/min	2	%	ASTM D 638
Tensile Strain, brk, Type I, 5 mm/min	2	%	ASTM D 638
Tensile Modulus, 5 mm/min	10300	MPa	ASTM D 638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	165	MPa	ASTM D 790
Flexural Stress, brk, 1.3 mm/min, 50 mm span	165	MPa	ASTM D 790
Flexural Modulus, 1.3 mm/min, 50 mm span	8800	MPa	ASTM D 790
Tensile Stress, yield, 5 mm/min	112	MPa	ISO 527
Tensile Stress, break, 5 mm/min	112	MPa	ISO 527
Tensile Strain, yield, 5 mm/min	2	%	ISO 527
Tensile Strain, break, 5 mm/min	2	%	ISO 527
Tensile Modulus, 1 mm/min	10400	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	175	MPa	ISO 178
Flexural Stress, break, 2 mm/min	175	MPa	ISO 178
Flexural Strain, break, 2 mm/min	2	%	ISO 178
Flexural Modulus, 2 mm/min	9200	MPa	ISO 178
Ball Indentation Hardness, H358/30	174	MPa	ISO 2039-1
Hardness, Rockwell R	124	-	ISO 2039-2
IMPACT			
Izod Impact, unnotched, 23°C	550	J/m	ASTM D 4812
Izod Impact, unnotched, -30°C	525	J/m	ASTM D 4812
Izod Impact, notched, 23°C	70	J/m	ASTM D 256
Izod Impact, notched, 0°C	70	J/m	ASTM D 256
Izod Impact, notched, -30°C	65	J/m	ASTM D 256
Instrumented Impact Total Energy, 23°C	6	J	ASTM D 3763
Izod Impact, unnotched 80*10*4 +23°C	40	kJ/m²	ISO 180/1U
Izod Impact, unnotched 80*10*4 -30°C	35	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	8	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 Impact, notched, -30°C	8	kJ/m²	ISO 179/2C
Charpy Impact, unnotched, 23°C	45	kJ/m²	ISO 179/2C
Charpy Impact, unnotched, -30°C	40	kJ/m²	ISO 179/2C
THERMAL			
Vicat Softening Temp, Rate A/50	215	°C	ASTM D 1525
Vicat Softening Temp, Rate B/50	205	°C	ASTM D 1525
HDT, 0.45 MPa, 3.2 mm, unannealed	220	°C	ASTM D 648
HDT, 1.82 MPa, 3.2mm, unannealed	205	°C	ASTM D 648
CTE, -40°C to 40°C, flow	2.43E-05	1/°C	ASTM E 831
CTE, -40°C to 40°C, xflow	6.3E-05	1/°C	ASTM E 831
CTE, -40°C to 40°C, flow	2.8E-05	1/°C	ISO 11359-2
CTE, -40°C to 40°C, xflow	7.1E-05	1/°C	ISO 11359-2
CTE, 23°C to 80°C, flow	2.2E-05	1/°C	ISO 11359-2
CTE, 23°C to 80°C, xflow	9.1E-05	1/°C	ISO 11359-2
CTE, 23°C to 150°C, flow	2.5E-05	1/°C	ISO 11359-2
CTE, 23°C to 150°C, xflow	1.48E-04	1/°C	ISO 11359-2
Ball Pressure Test, 125°C +/- 2°C	Pass	-	IEC 60695-10-2
Vicat Softening Temp, Rate A/50	220	°C	ISO 306
Vicat Softening Temp, Rate B/50	207	°C	ISO 306
Vicat Softening Temp, Rate B/120	208	°C	ISO 306
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 [1]	130	°C	UL 746B
Relative Temp Index, Mech w/impact [1]	140	°C	UL 746B
Relative Temp Index, Mech w/o impact [1]	140	°C	UL 746B
PHYSICAL			
Specific Gravity	1.52	-	ASTM D 792
Filler Content	25	%	ASTM D 229
Mold Shrinkage on Tensile Bar, flow	0.1 – 0.5	%	SABIC method
Mold Shrinkage, flow, 3.2 mm	0.1 – 0.5	%	SABIC method
Mold Shrinkage on Tensile Bar, xflow	0.6 – 1.2	%	SABIC method
Mold Shrinkage, xflow, 3.2 mm	0.5 – 1.1	%	SABIC method
Melt Flow Rate, 250°C/5.0 kgf	25	g/10 min	ASTM D 1238
Melt Flow Rate, 265°C/5.0 kgf	27	g/10 min	ASTM D 1238
Density	1.52	g/cm³	ISO 1183
Water Absorption, (23°C/sat)	0.23	%	ISO 62
Moisture Absorption (23°C / 50% RH)	0.06	%	ISO 62
Melt Volume Rate, MVR at 250°C/5.0 kg	18	cm³/10 min	ISO 1133
Melt Volume Rate, MVR at 265°C/5.0 kg	18	cm³/10 min	ISO 1133
Melt Viscosity, 250°C, 1500 sec-1	210	Pa-s	ISO 11443
Melt Viscosity, 260°C, 1500 sec-1	160	Pa-s	ISO 11443
ELECTRICAL			
Volume Resistivity	1.E+15	Ohm-cm	ASTM D 257
Dielectric Strength, in air, 3.2 mm	21	kV/mm	ASTM D 149
Dielectric Strength, in oil, 0.8 mm	30	kV/mm	ASTM D 149

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Dielectric Strength, in oil, 1.6 mm	24	kV/mm	ASTM D 149
Dielectric Strength, in oil, 3.2 mm	20	kV/mm	ASTM D 149
Relative Permittivity, 1 MHz	3.4	-	ASTM D 150
Dissipation Factor, 1 MHz	0.12	-	ASTM D 150
Volume Resistivity	1.E+15	Ohm-cm	IEC 60093
Surface Resistivity, ROA	>1.E+15	Ohm	IEC 60093
Dielectric Strength, in oil, 0.8 mm	30	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 1.6 mm	24	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 3.2 mm	19	kV/mm	IEC 60243-1
Relative Permittivity, 1 MHz	3.4	-	IEC 60250
Dissipation Factor, 1 MHz	0.12	-	IEC 60250
Comparative Tracking Index [2]	300	V	IEC 60112
Comparative Tracking Index (UL) {PLC}	2	PLC Code	UL 746A
Hot-Wire Ignition (HWI), PLC 0	≥0.75	mm	UL 746A
Hot-Wire Ignition (HWI), PLC 3	≥0.4	mm	UL 746A
High Amp Arc Ignition (HAI), PLC 0	≥0.4	mm	UL 746A
High Voltage Arc Track Rate {PLC}	0	PLC Code	UL 746A
Arc Resistance, Tungsten {PLC}	6	PLC Code	ASTM D 495
FLAME CHARACTERISTICS [1]			
UL Yellow Card Link	E207780-100986524	-	-
UL Yellow Card Link 2	E207780-101458997	-	-
UL Recognized, 94-5VA Flame Class Rating	≥2	mm	UL 94
UL Recognized, 94V-0 Flame Class Rating	≥0.3	mm	UL 94
Glow Wire Ignitability Temperature, 3.0 mm	775	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 1.5 mm	750	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 1.0 mm	775	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 0.8 mm	775	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 0.75 mm	775	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 0.4 mm	775	°C	IEC 60695-2-13
Glow Wire Flammability Index, 3.0 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.0 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 0.75 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 0.4 mm	960	°C	IEC 60695-2-12
UV-light, water exposure/immersion	F1	-	UL 746C
Glow Wire Flammability Index 960°C, passes at, by VDE	1	mm	IEC 60695-2-12
Glow Wire Ignitability Temperature, 3.0 mm, by VDE	775	°C	IEC 60695-2-13
INJECTION MOLDING			
Drying Temperature	110 – 120	°C	
Drying Time	2 – 4	hrs	
Maximum Moisture Content	0.02	%	
Melt Temperature	245 – 260	°C	
Nozzle Temperature	230 – 255	°C	
Front - Zone 3 Temperature	240 – 260	°C	
Middle - Zone 2 Temperature	235 – 250	°C	

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Rear - Zone 1 Temperature	230 – 240	°C	
Hopper Temperature	40 – 60	°C	
Mold Temperature	40 – 100	°C	

(1) UL Ratings shown on the technical datasheet might not cover the full range of thicknesses and colors. For details, please see the UL Yellow Card.

(2) Value shown here is based on internal measurement.

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