



Global Thermoset Composite Solutions

Sheet Products - Property Comparison

			NP130	NP130HF	NP500A	NP500CR
			Glass Fabric			
			Epoxy			
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.80	1.95	1.77	1.80
Rockwell Hardness (0.250" Build-up)		M Scale	100	110	99	100
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	0.10	--	0.22	0.10
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	80,000 / 60,000	-- / --	66,000 / 60,000	75,000 / 65,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	2,700 / 2,400	-- / --	3,400 / 3,300	2,700 / 2,400
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	50,000 / 40,000	70,000 / 65,000	40,000 / 32,000	45,000 / 38,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	15.00 / 12.00	13.00 / 9.00	9.50 / 7.50	14.00 / 12.00
Compressive Strength (0.500")	Flatwise	psi	70,000	71,000	62,800	65,000
Bonding Strength (0.500")	Condition A	lb	2,200	2,500	2,500	2,200
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	22,000	--	19,000	22,000
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	130 / 140	130 / 140	130 / 140	130 / 140
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	10.0 / 12.0	13.7 / 14.7	9.6 / 12.1	10.0 / 13.0
Flammability Rating U.L. 94 (0.062")	Condition A	Class	V-0	V-0	HB	HB
<b>ELECTRICAL PROPERTIES</b>						
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	0.025	--	--	0.025
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	4.80	--	--	4.80
Breakdown Voltage (0.062")	Condition A	kV	65	--	48	60
	Condition D-48/50		54	--	49	50
Electric Strength (0.062")	Condition A	V/mil	670	--	690	670
	Condition D-48/50		650	--	690	660
Arc Resistance D495 (0.125")	Condition A	sec	120	75	--	100
Comparative Tracking Index D3638 (0.125")		V	150	150	--	150

NOTE a: A double dash (--) indicates that the value has not been determined or is not applicable to the product.

NOTE b: All testing per ASTM D348 unless otherwise noted.

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Sheet Products - Property Comparison

			NP504	MC507U	NP509	NP510A
			Glass Fabric			
			Phenolic	Silicone	Melamine	Epoxy
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.85	1.88	1.90	1.85
Rockwell Hardness (0.250" Build-up)		M Scale	110	100	115	98
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	2.00	0.19	0.50	0.10
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	55,000 / 50,000	24,300 / 21,700	70,500 / 63,200	65,000 / 52,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	29,000 / 26,000
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,800 / 1,400	-- / --	2,000 / 1,700	2,900 / 2,600
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	42,000 / 34,000	-- / --	50,000 / 35,000	40,000 / 32,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	12.00 / 11.00	17.00 / 11.50	16.50 / 12.50	7.90 / 7.30
Compressive Strength (0.500")	Flatwise	psi	76,000	--	85,000	66,000
Bonding Strength (0.500")	Condition A	lb	1,500	750	1,900	2,300
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	18,000	--	18,000	21,500
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	140 / 170	170 / 220	-- / 140	130 / 140
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	15.0 / 18.0	-- / --	15.0 / 18.0	10.0 / 13.0
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	V-0	V-0	V-0
<b>ELECTRICAL PROPERTIES</b>						
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	--	0.045	0.015	0.032
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	4.67	7.03	4.80
Breakdown Voltage (0.062")	Condition A	kV	55	55	70	66
	Condition D-48/50		40	32	65	65
Electric Strength (0.062")	Condition A	V/mil	600	350	540	630
	Condition D-48/50		580	--	550	670
Arc Resistance D495 (0.125")	Condition A	sec	100	200	185	130
Comparative Tracking Index D3638 (0.125")		V	150	--	600+	300

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Sheet Products - Property Comparison

			MC511A	MC511AF	MC511SN	NP511
			Glass Fabric			
			Epoxy			
PHYSICAL PROPERTIES						
Specific Gravity (0.500")		-	1.91	1.91	1.80	1.80
Rockwell Hardness (0.250" Build-up)		M Scale	115	110	110	112
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	0.10	0.09	0.05	0.20
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	71,500 / 61,000	57,000 / --	63,000 / --	80,000 / 70,000
	Condition E-1/150 T150 Lengthwise / Crosswise		37,000 / --	30,000 / --	-- / --	40,000 / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	-- / --	-- / --	3,000 / 2,700
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	-- / --	41,000 / --	46,000 / --	43,000 / 37,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	18.00 / 14.00	10.00 / 10.00	-- / --	12.00 / 9.00
Compressive Strength (0.500")	Flatwise	psi	--	50,000	51,000	63,000
Bonding Strength (0.500")	Condition A	lb	2,200	2,200	2,500	2,200
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	--	21,000	22,000	22,000
THERMAL PROPERTIES						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	170 / 180	170 / 180	170 / 180	170 / 180
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	-- / --	-- / --	-- / --	13.0 / 15.0
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	HB	HB	HB
ELECTRICAL PROPERTIES						
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	0.028	0.019	--	0.020
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	4.50	4.50	--	4.80
Breakdown Voltage (0.062")	Condition A	kV	65	65	--	60
	Condition D-48/50		--	--	--	55
Electric Strength (0.062")	Condition A	V/mil	610	550	--	700
	Condition D-48/50		650	--	--	720
Arc Resistance D495 (0.125")	Condition A	sec	185	185	--	120
Comparative Tracking Index D3638 (0.125")		V	--	--	--	150

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Sheet Products - Property Comparison

			NP511EM	NP512	MC514MG
			Glass Fabric		
			Epoxy		Phenolic
<b>PHYSICAL PROPERTIES</b>					
Specific Gravity (0.500")		-	1.80	1.95	1.80
Rockwell Hardness (0.250" Build-up)		M Scale	114	115	110
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	--	0.10	--
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	-- / --	84,000 / 73,000	34,000 / 25,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	4,200 / 4,100	-- / --
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	55,000 / 50,000	40,000 / 32,000	-- / --
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	-- / --	-- / --	-- / --
Compressive Strength (0.500")	Flatwise	psi	89,000	44,000	48,000
Bonding Strength (0.500")	Condition A	lb	2,300	2,100	1,100
	Condition D-48/50		--	--	--
Shear Strength (0.062")	Perpendicular	psi	--	18,000	--
<b>THERMAL PROPERTIES</b>					
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	170 / 180	140 / 140	-- / 155
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	" / " / °C x 10 <sup>-6</sup>	12.7 / 16.2	-- / --	-- / --
Flammability Rating (0.062") U.L. 94	Condition A	Class	HB	V-0	HB
<b>ELECTRICAL PROPERTIES</b>					
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	--	0.019	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	5.00	--
Breakdown Voltage (0.062")	Condition A	kV	--	60	--
	Condition D-48/50		--	56	--
Electric Strength (0.062")	Condition A	V/mil	--	800	--
	Condition D-48/50		--	750	--
Arc Resistance D495 (0.125")	Condition A	sec	170	--	--
Comparative Tracking Index D3638 (0.125")		V	600	--	--

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Sheet Products - Property Comparison

			NP572	P95
			Glass Fabric	
			Epoxy	Polyimide
<b>PHYSICAL PROPERTIES</b>				
Specific Gravity (0.500")		-	1.89	1.84
Rockwell Hardness (0.250" Build-up)		M Scale	108	120
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	0.02	0.35
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	68,500 / 53,000	78,000 / 66,000
	Condition E-1/150 T150 Lengthwise / Crosswise		45,700 / 41,900	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	3,200 / 2,800
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	47,300 / 35,000	48,000 / 40,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	12.50 / 10.30	11.50 / 7.50
Compressive Strength (0.500")	Flatwise	psi	72,100	70,000
Bonding Strength (0.500")	Condition A	lb	1,800	1,500
	Condition D-48/50		--	--
Shear Strength (0.062")	Perpendicular	psi	25,200	27,000
<b>THERMAL PROPERTIES</b>				
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	-- / --	-- / 200
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	-- / --	10.0 / 13.0
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	HB
<b>ELECTRICAL PROPERTIES</b>				
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	0.018	0.010
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	4.10	4.80
Breakdown Voltage (0.062")	Condition A	kV	69	65
	Condition D-48/50		--	55
Electric Strength (0.062")	Condition A	V/mil	680	850
	Condition D-48/50		760	750
Arc Resistance D495 (0.125")	Condition A	sec	185	130
Comparative Tracking Index D3638 (0.125")		V	--	240

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