

Sheet Products - Property Comparison

			NP600	NP602	NP605	NP610
			Paper			
			Phenolic			
PHYSICAL PROPERTIES						
Specific Gravity (0.500")		-	1.38	1.30	1.30	1.40
Rockwell Hardness (0.250" Build-up)		M Scale	90	90	90	90
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	8.00	8.00	8.00	1.80
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	25,000 / 25,000	25,000 / 22,000	25,000 / 25,000	34,000 / 28,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	-- / --	-- / --	1,900 / 1,400
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	17,000 / 13,000	17,000 / 13,000	17,000 / 13,000	17,000 / 13,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	0.55 / 0.50	0.55 / 0.50	0.55 / 0.50	0.82 / 0.76
Compressive Strength (0.500")	Flatwise	psi	35,000	35,000	35,000	35,000
Bonding Strength (0.500")	Condition A	lb	--	--	--	1,000
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	--	--	--	15,000
THERMAL PROPERTIES						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	150 / 150	150 / 150	150 / 150	130 / 130
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/" / °C x 10 <sup>-6</sup>	-- / --	-- / --	-- / --	13.0 / 17.0
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	-	--	--	--	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	--	--	--
Breakdown Voltage (0.062")	Condition A	kV	60	60	--	40
	Condition D-48/50		3	3	--	--
Electric Strength (0.062")	Condition A	V/mil	--	--	--	600
	Condition D-48/50		--	--	--	--
Arc Resistance D495 (0.125")	Condition A	sec	--	--	--	90
Comparative Tracking Index D3638 (0.125")		V	--	--	--	--

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

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Sheet Products - Property Comparison

			NP611	NP611R	NP612	NP613
			Paper			
			Phenolic		Epoxy	
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.35	1.35	1.38	1.35
Rockwell Hardness (0.250" Build-up)		M Scale	100	100	84	90
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	1.50	1.50	3.20	--
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	29,000 / 22,000	29,000 / 22,000	19,300 / 17,600	27,000 / 22,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,200 / 900	1,200 / 900	1,000 / 850	-- / --
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	18,000 / 13,500	18,000 / 13,500	12,500 / 8,400	-- / --
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	0.70 / 0.60	0.70 / 0.60	0.76 / 0.66	1.25 / 1.00
Compressive Strength (0.500")	Flatwise	psi	45,000	45,000	27,000	40,000
Bonding Strength (0.500")	Condition A	lb	1,100	1,100	1,400	1,000
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	12,200	12,200	9,500	--
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	130 / 130	130 / 130	130 / 130	140 / 140
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	13.0 / 17.0	13.0 / 17.0	15.0 / 19.0	-- / --
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	HB	HB	HB
<b>ELECTRICAL PROPERTIES</b>						
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	--	--	0.060	0.040
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	--	5.50	4.60
Breakdown Voltage (0.062")	Condition A	kV	50	50	55	> 40
	Condition D-48/50		4	4	10	6
Electric Strength (0.062")	Condition A	V/mil	600	600	700	--
	Condition D-48/50		--	--	--	--
Arc Resistance D495 (0.125")	Condition A	sec	75	75	110	--
Comparative Tracking Index D3638 (0.125")		V	180	180	500	--

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Sheet Products - Property Comparison

			NP625	NP629	NP630	NP631
			Paper			
			Phenolic			
PHYSICAL PROPERTIES						
Specific Gravity (0.500")		-	1.39	1.39	1.38	1.38
Rockwell Hardness (0.250" Build-up)		M Scale	85	95	101	115
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	1.60	2.00	1.30	1.00
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	19,000 / 17,000	22,000 / 17,000	20,000 / 15,000	16,000 / 13,200
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,000 / 850	-- / --	1,300 / 1,050	1,100 / 900
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	12,400 / 10,400	13,500 / 11,500	14,000 / 12,000	15,000 / 12,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	0.75 / 0.70	0.50 / 0.40	0.55 / 0.45	0.65 / 0.60
Compressive Strength (0.500")	Flatwise	psi	29,500	25,000	30,000	32,000
Bonding Strength (0.500")	Condition A	lb	1,100	900	1,000	1,000
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	10,500	11,500	12,800	11,500
THERMAL PROPERTIES						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	130 / 130	130 / 130	130 / 130	125 / 125
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	15.0 / 19.0	-- / --	15.0 / 19.0	16.0 / 20.0
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	-	0.060	0.052	0.050	0.035
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	6.05	6.20	6.10	4.80
Breakdown Voltage (0.062")	Condition A	kV	50	40	40	60
	Condition D-48/50		--	5	10	15
Electric Strength (0.062")	Condition A	V/mil	700	--	700	750
	Condition D-48/50		--	--	600	600
Arc Resistance D495 (0.125")	Condition A	sec	90	--	110	124
Comparative Tracking Index D3638 (0.125")		V	180	--	200	200

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Global Thermoset Composite Solutions

Sheet Products - Property Comparison

			NP643	NP660	NP664
			Paper		
			Epoxy	Phenolic	
<b>PHYSICAL PROPERTIES</b>					
Specific Gravity (0.500")		-	1.40	1.35	1.37
Rockwell Hardness (0.250" Build-up)		M Scale	115	100	90
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	--	3.50	5.50
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	27,700 / 20,800	33,000 / 30,000	26,000 / 24,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	1,900 / 1,400	1,200 1,000
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	16,900 / 13,900	20,000 / 16,000	22,500 / 12,500
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	0.65 0.56	0.75 / 0.70	0.67 / 0.62
Compressive Strength (0.500")	Flatwise	psi	44,100	49,000	30,000
Bonding Strength (0.500")	Condition A	lb	900	1,100	1,100
	Condition D-48/50		--	--	--
Shear Strength (0.062")	Perpendicular	psi	--	14,000	11,000
<b>THERMAL PROPERTIES</b>					
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	140 / 140	130 / 130	130 / 130
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	-- / --	13.0 / 17.0	18.0 / 20.0
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	HB	HB
<b>ELECTRICAL PROPERTIES</b>					
Dissipation Factor (0.062")	Condition D <sub>1</sub> -24/23	-	0.057	0.045	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	4.50	5.45	--
Breakdown Voltage (0.062")	Condition A	kV	> 65	47	60
	Condition D-48/50		6	--	10
Electric Strength (0.062")	Condition A	V/mil	170	500	500
	Condition D-48/50		--	300	300
Arc Resistance D495 (0.125")	Condition A	sec	120	60	110
Comparative Tracking Index D3638 (0.125")		V	150	150	180

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Global Thermoset Composite Solutions

Sheet Products - Property Comparison

			NP843	MC844G
			Semi-conductive Surfaces	Paper
			Phenolic	
<b>PHYSICAL PROPERTIES</b>				
Specific Gravity (0.500")		-	1.40	1.40
Rockwell Hardness (0.250" Build-up)		M Scale	100	--
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	--	2.47
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	-- / --	32,000 / 25,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	20,000 / 13,500
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	-- / --	-- / --
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	22,000 / 15,000	17,900 / 12,500
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	0.70 / 0.50	1.05 / 0.94
Compressive Strength (0.500")	Flatwise	psi	44,000	48,800
Bonding Strength (0.500")	Condition A	lb	1,000	1,200
	Condition D-48/50		--	--
Shear Strength (0.062")	Perpendicular	psi	--	17,000
<b>THERMAL PROPERTIES</b>				
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	125 / 125	130 / 130
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	10.0 / 12.0	-- / --
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	-	--	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	--
Breakdown Voltage (0.062")	Condition A	kV	--	--
	Condition D-48/50		--	--
Electric Strength (0.062")	Condition A	V/mil	--	--
	Condition D-48/50		--	--
Arc Resistance D495 (0.125")	Condition A	sec	--	--
Comparative Tracking Index D3638 (0.125")		V	--	--

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