

### Sheet Products - Property Comparison

			BP11HPN	BP11MPN	BP11NPG	BP11NPN
			Cotton (Canvas)			
			Phenolic	Phenolic - Graphite	Phenolic	
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.37	1.44	1.40	1.37
Rockwell Hardness (0.250" Build-up)		M Scale	100	105	90	100
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	3.40	1.20	2.20	3.50
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	18,000 / 18,000	18,000 / --	19,000 / 15,000	18,000 / 17,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	2,500 / 2,400	-- / --	1,200 / 1,000	1,600 / 1,500
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	-- / --	12,000 / --	10,000 / 7,000	12,000 / 9,700
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	2.35 / 2.02	2.00 / 1.20	1.70 / 1.40	3.10 / 2.70
Compressive Strength (0.500")	Flatwise	psi	35,000	38,000	38,000	34,000
Bonding Strength (0.500")	Condition A	lb	2,700	1,700	1,800	2,500
	Condition D-48/50		2,400	--	--	2,300
Shear Strength (0.062")	Perpendicular	psi	--	13,000	13,000	14,000
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	-- / 145	115 / 125	-- / 125	115 / 125
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	-- / --	-- / --	18.0 / 24.0	20.0 / 22.0
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	-	--	--	--	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	--	--	--
Breakdown Voltage (0.062")	Condition A	kV	55	--	--	20
	Condition D-48/50		--	--	--	5
Electric Strength (0.062")	Condition A	V/mil	527	--	--	400
	Condition D-48/50		--	--	--	150
Arc Resistance D495 (0.125")	Condition A	sec	--	--	--	15
Comparative Tracking Index D3638 (0.125")		V	--	--	--	155

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

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### Sheet Products - Property Comparison

			BP12NPN	BP13HPM	BP13NPM	BP14NPG
			Cotton (Canvas)			
			Phenolic	Phenolic - MoS2	Phenolic - Graphite	
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.35	1.40	1.40	1.41
Rockwell Hardness (0.250" Build-up)		M Scale	100	100	100	100
Moisture Absorption (0.062")	Condition D <sub>1-24/23</sub>	%	1.80	--	1.95	2.50
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	25,000 / 22,700	-- / --	19,000 / 17,000	20,000 / 18,000
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,700 / 1,300	-- / --	1,200 / 1,000	1,300 / 1,000
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	12,700 / 10,900	16,000 / 9,000	11,000 / 9,000	11,000 / 9,000
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	1.60 / 1.40	3.50 / 2.70	1.70 / 1.40	-- / --
Compressive Strength (0.500")	Flatwise	psi	35,000	49,000	36,000	36,000
Bonding Strength (0.500")	Condition A	lb	1,900	2,300	1,900	2,000
	Condition D-48/50		--	--	--	--
Shear Strength (0.062")	Perpendicular	psi	14,000	--	13,500	13,000
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	-- / 125	-- / 145	-- / 145	-- / 145
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	" / " / °C x 10 <sup>-6</sup>	20.0 / 22.0	10.0 / 15.0	18.0 / 24.0	18.0 / 22.0
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>1-24/23</sub>	-	--	--	--	--
Permittivity (0.062")	Condition D <sub>1-24/23</sub>	-	--	--	--	--
Breakdown Voltage (0.062")	Condition A	kV	40	--	--	--
	Condition D-48/50		3	--	--	--
Electric Strength (0.062")	Condition A	V/mil	550	--	--	--
	Condition D-48/50		300	--	--	--
Arc Resistance D495 (0.125")	Condition A	sec	--	--	--	--
Comparative Tracking Index D3638 (0.125")		V	--	--	--	--

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Sheet Products - Property Comparison

			BP15NPN	BP81NPN
			Cotton (Canvas)	
			Phenolic	
<b>PHYSICAL PROPERTIES</b>				
Specific Gravity (0.500")		-	1.35	1.47
Rockwell Hardness (0.250" Build-up)		M Scale	90	100
Moisture Absorption (0.062")	Condition D <sub>1-24/23</sub>	%	4.20	2.50
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	17,000 / 14,000	-- / --
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,100 / 900	-- / --
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	10,000 / 6,000	43,000 / --
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	2.50 / 2.00	-- / --
Compressive Strength (0.500")	Flatwise	psi	25,000	43,000
Bonding Strength (0.500")	Condition A	lb	1,800	1,200
	Condition D-48/50		--	--
Shear Strength (0.062")	Perpendicular	psi	12,000	--
<b>THERMAL PROPERTIES</b>				
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	125 / 125	-- / 150
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"°Cx10 <sup>-6</sup>	-- / --	-- / --
Flammability Rating U.L. 94 (0.062")	Condition A	Class	HB	HB
<b>ELECTRICAL PROPERTIES</b>				
Dissipation Factor (0.062")	Condition D <sub>1-24/23</sub>	-	--	--
Permittivity (0.062")	Condition D <sub>1-24/23</sub>	-	--	--
Breakdown Voltage (0.062")	Condition A	kV	65	--
	Condition D-48/50		4	--
Electric Strength (0.062")	Condition A	V/mil	480	--
	Condition D-48/50		350	--
Arc Resistance D495 (0.125")	Condition A	sec	10	--
Comparative Tracking Index D3638 (0.125")		V	150	--

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**Sheet Products - Property Comparison**

			BP21NPG	BP21NPM	BP21NPN	BP25NPP
			Cotton (Fine Weave Linen)			
			Phenolic - Graphite	Phenolic - MoS2	Phenolic	Phenolic-PTFE
<b>PHYSICAL PROPERTIES</b>						
Specific Gravity (0.500")		-	1.39	1.39	1.34	--
Rockwell Hardness (0.250" Build-up)		M Scale	100	103	100	--
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	1.50	2.40	2.30	1.19
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	20,100 / 19,200	23,800 / 18,000	24,500 / 18,500	22,000 / 21,500
	Condition E-1/150 T150 Lengthwise / Crosswise		-- / --	-- / --	-- / --	-- / --
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	1,500 / 1,100	1,500 / 1,100	1,700 / 1,300	-- / --
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	13,500 / 9,500	14,000 / 9,700	14,000 / 10,000	-- / --
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	1.42 / 1.35	1.60 / 1.30	1.70 / 1.35	1.96 / 1.46
Compressive Strength (0.500")	Flatwise	psi	35,000	39,000	38,000	--
Bonding Strength (0.500")	Condition A	lb	1,900	1,900	2,000	1,370
	Condition D-48/50		--	--	--	1,250
Shear Strength (0.062")	Perpendicular	psi	14,500	14,500	13,500	--
<b>THERMAL PROPERTIES</b>						
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	-- / 125	130 / 130	115 / 125	-- / --
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	10.0 / 12.0	10.0 / 12.0	18.0 / 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	-	--	--	0.070	--
Permittivity (0.062")	Condition D <sub>1</sub> -24/23	-	--	--	5.80	--
Breakdown Voltage (0.062")	Condition A	kV	--	30	45	25
	Condition D-48/50		--	5	2	--
Electric Strength (0.062")	Condition A	V/mil	--	--	575	--
	Condition D-48/50		--	--	450	--
Arc Resistance D495 (0.125")	Condition A	sec	--	--	15	--
Comparative Tracking Index D3638 (0.125")		V	--	--	170	--

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Sheet Products - Property Comparison

		BP45NPM	
		Aramid/Glass	
		Phenolic	
<b>PHYSICAL PROPERTIES</b>			
Specific Gravity (0.500")		-	1.54
Rockwell Hardness (0.250" Build-up)		M Scale	95
Moisture Absorption (0.062")	Condition D <sub>1</sub> -24/23	%	1.94
Flexural Strength (0.062")	Condition A Lengthwise / Crosswise	psi	36,700 / 17,500
	Condition E-1/150 T150 Lengthwise / Crosswise		29,200 / 15,500
Flexural Modulus (0.062")	Lengthwise / Crosswise	kpsi	
Tensile Strength (0.125")	Lengthwise / Crosswise	psi	25,600 / 9,700
Izod Impact Strength (0.500")	Condition E-48/50 Lengthwise / Crosswise	ft-lb/in (notched)	22.90 / 7.30
Compressive Strength (0.500")	Flatwise	psi	40,700
Bonding Strength (0.500")	Condition A	lb	2,400
	Condition D-48/50		--
Shear Strength (0.062")	Perpendicular	psi	Could Not Break
<b>THERMAL PROPERTIES</b>			
Temperature Index <sup>1</sup>	Electrical / Mechanical	°C	-- / 165
Coefficient of Thermal Expansion (0.125")	X-axis / Y-axis	"/"/°Cx10 <sup>-6</sup>	27.0 / 39.8
Flammability Rating U.L. 94 (0.062")	Condition A	Class	
<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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