


## Quality Certification

<b>Product Name: EPOXY-PHENOLIC GLASS LAMINATED SHEETS</b>				Test No.: 20200320			
Type: <b>FR4/ G10</b>				Test Date: 20200320			
Product Standard: GB/T 1303.1-1998				Test Method: GB5130-1997			
Testd Room Temperature: 18 °C							
Relative humidity: 56 %							
No.	Tested Item			Unit	Standard	Result	Note
1	Density			g/cm <sup>3</sup>	1.70-2.0	1.94	
2	Flexural strength perpendicular to laminations			Mpa	≥340	450	
3	Tensile strength			Mpa	≥300	380	
4	Impact strength parallel to laminations (Notched Charpy)			Kj/m <sup>2</sup>	≥33	42	
5	Water absorption			Mg	≤34	15	
6	Insulation resistance	After soaking		Ω	≥5.0×10 <sup>8</sup>	10.2×10 <sup>8</sup>	
7	Dielectric loss				≤0.04	0.012	
8	Dielectric strength parallel to lamination			KV	≥35	46	
9	Working temperature			°C	130	136	
Result		Qualified					

*For and on behalf of*  
**WUHAN FENHAR NEW MATERIAL CO., LIMITED**  
**武漢凡華新材料有限公司**

  
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## Quality Certification

<b>Product Name: EPOXY-PHENOLIC GLASS LAMINATED SHEETS</b>					Test No.:20200320
Type: <b>G11</b>					Test Date: 20200320
Product Standard:GB/T1303.2-2009					
Testd Room Temperature: 18 ℃					
Relative humidity: 56 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Density	g/cm <sup>3</sup>	1.70-2.0	1.98	
2	Flexural Strength Lengthwise	Mpa	≥340	473	
3	Tensile strength Lengthwise	Mpa	≥314	374	
4	Impact Strength Flatwise (Notched Charpy)	Kj/m <sup>2</sup>	≥33	46.8	
5	Dielectric Strength Perpendicular to Lamination	MV/m	≥11.8	12.6	
6	Dielectric Strength Parallel to Lamination	KV	≥35	78.3	
7	Insulation Resistance After Soaking	MΩ	≥5.0x10 <sup>4</sup>	1.4x10 <sup>5</sup>	
8	Water Absorption	%	≤0.17	0.07	
9	Working temperature	℃	155	155	
Result					
Qualified					

<b>Product Name: UPGM-203</b>					Test No.:20200320
Type: <b>GPO3</b>					Test Date: 20200320
Product Standard:GB/T1303.2-2009					
Testd Room Temperature: 18 ℃					
Relative humidity: 56 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Density	g/cm <sup>3</sup>		1.86	
2	Tensile Strength	Mpa		132.00	
3	Flexural Strength	Mpa		210	
4	Vertical Compression Strength	Mpa		227	
5	Vertical Electrical Strength(Rapid Rise in normal oil)	MV/m		20.7	
6	Parallel Puncture Voltage(Rapid Rise in normal oil)	KV		79	
7	Insulation Resistance	Ω		6.1x10 <sup>13</sup>	
8	Water Absorption	%		0.27	
9	Working Temperature	℃		155	
10	Oxygen Index	%		44.7	
11	Flammability	Grade		V-0	

<b>Product Name: UPGM-203</b>					Test No.:20200320
Type: <b>SMC</b>					Test Date: 20200320
Product Standard:GB/T1303.2-2009					
Testd Room Temperature: 18 ℃					
Relative humidity: 56 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Density	g/cm <sup>3</sup>		1.78	
2	Tensile Strength	Mpa		120.00	
3	Flexural Strength	Mpa		198	
4	Vertical Compression Strength	Mpa		206	
5	Vertical Electrical Strength(Rapid Rise in normal oil)	MV/m		21.2	
6	Parallel Puncture Voltage(Rapid Rise in normal oil)	KV		81	
7	Insulation Resistance	Ω		5.7x10 <sup>13</sup>	
8	Water Absorption	%		0.27	
9	Working Temperature	℃		155	
10	Oxygen Index	%		32.3	
11	Flammability	Grade		V-0	

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## Quality Certification

<b>Product Name: Epoxy Glass Sheet</b>				Test No.:20201119		
Type: <b>EPGC203</b>				Test Date: 20201119		
Product Standard:GB/T 1303.4-2009 (IEC60893-3-2:2003)				Test Method: IEC 60893-2:2003		
Testd Room Temperature: 22 °C						
Relative humidity: 56 %						
No.	Tested Item		Unit	Standard	Result	Note
1	Density		g/cm <sup>3</sup>	1.80-2.0	1.95	
2	Flexural strength perpendicular to laminations		Mpa	≥340	723	
3	Tensile strength		Mpa	≥300	469	
4	Impact strength parallel to laminations (Notched Charpy)		KJ/m <sup>2</sup>	≥33	150	
5	Water absorption		%	≤0.71	0.04	
6	Insulation resistance	After soaking	MΩ	≥5.0×10 <sup>4</sup>	2.1×10 <sup>8</sup>	
7	Felting intension		N	≥5600	8184	
8	Dielectric strength parallel to lamination		KV	≥35	55	
9	Tg(DSC Method)		°C	155	158	
10	Dielectric Strength Perpendicular to Lamination		MV/m	≥11.8	12.9	
Result			Qualified			

<b>Product Name: Epoxy Glass Sheet</b>				Test No.:20200318		
Type: class H G11				Test Date: 20200318		
Product Standard:GB/T 1303.4-2009 (IEC60893-3-2:2003)				Test Method: IEC 60893-2:2003		
Testd Room Temperature: 22 °C						
Relative humidity: 56 %						
No.	Tested Item		Unit	Standard	Result	Note
1	Density		g/cm <sup>3</sup>	1.80-2.0	1.93	
2	Flexural strength perpendicular to laminations		Mpa	≥340	766	
3	Tensile strength		Mpa	≥300	570	
4	Impact strength parallel to laminations (Notched Charpy)		KJ/m <sup>2</sup>	≥33	136	
5	Water absorption		%	≤0.71	0.03	
6	Insulation resistance	After soaking	MΩ	≥5.0×10 <sup>4</sup>	2.6×10 <sup>8</sup>	
7	Felting intension		N	≥5600	9300	
8	Dielectric strength parallel to lamination		KV	≥35	80	
9	Tg(DSC Method)		°C	180	183	
10	Dielectric Strength Perpendicular to Lamination		MV/m	≥11.8	16	
Result			Qualified			



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## Quality Certification

Product Name: EPOXY GLASS MAT LAMINATED SHEET				Test No.:20220820	
Type: EPGM203				Test Date: 20220820	
Product Standard:IEC60893-2:2003					
Testd Room Temperature: 18 °C					
Relative humidity: 56 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Density	g/cm <sup>3</sup>		1.96	
2	Flexural Strength Lengthwise	Mpa		at 23°C	451
3				at 150°C	233
4				at 180°C	176
5	Modulus of elasticity in flexure	Mpa		at 23°C	1.85x10 <sup>4</sup>
6				at 150°C	1.53x10 <sup>4</sup>
7				at 180°C	1.18x10 <sup>4</sup>
8	Tensile strength	Mpa		220	
9	Compressive strength	MPa		450	
10	Bonding strength	N		5900	
11	Shearing strength	Mpa		27.6	
12	Notched impact strength CHARPY method	KJ/m2		90	
13	Relative permittivity			3.86	
14	Dissipation factor at 1MHz			0.018	
15	Insulation resistance after 24h immersion in water	MΩ		4.5x10 <sup>6</sup>	
16	Edgewise breakdown voltage	KV		69	
17	Flatwise electric strength	KV/mm		15	
Result		Qualified			

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## Quality Certification

Product Name: PRESS PAPER			Test No.:20220820					
Type: Primary Color			Test Date: 20220820					
Product Standard:QB/T2688-2005								
Testd Room Temperature: 18 °C								
Relative humidity: 56 %								
No.	Tested Item		Unit	Result				
				0.1-0.15mm	0.15-0.2mm	0.2-0.25mm	0.3mm	0.3-0.5mm
1	Density		g/cm <sup>3</sup>	1.1~1.25				
2	Tensile strength	Edgewise	N/mm <sup>2</sup>	70	80	90	90	90
3		Flatwise		35	35	35	35	35
4		Edgewise after bending		60	65	70	65	/
5	Electrical Strength	Unbend in the air	Kv/mm	12	12	11	11	11
6		Bended in the air		8	8	8	8	8
7	Ash content ≤		%	1				
8	Moisture content ≤		%	8				
9	Conductivity of aqueous extract		Ms/m	8				
10	PH Value of Aqueous Exact		/	6.0-9.0				
Result			Qualified					

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### Quality Certification

NAME :DMD-F Green

Size: 0.18mm\*1000mm

Inspection No.:20220224180

Date: FEB 24, 2022

NO.	Inspection Item		Unit	Standard	Actual	
1	Thickness		mm	0.18±0.02	0.18	
2	Density		g/m <sup>2</sup>	175±15%	189.35	
3	Tensile Strength	TD	Not Bend	N/cm	≥90	115
			Bend	N/cm	≥80	100
		MD	Not Bend	N/cm	≥90	115
			Bend	N/cm	≥85	110
4	Elongation at Break	TD	Not Bend	%	≥15	30
			Bend	%	≥15	34
		MD	Not Bend	%	≥10	12.5
			Bend	%	≥10	15.1
5	BDV	Not Bend		kV	≥6	7.2
		Bend		kV	≥6	7.1
6	Cohesiveness		/	No stratification	No stratification	
7	Heat-shrinkage rate (155±2°C/10min)			No delamination, no blistering, no glue	No delamination, no blistering, no glue	
8	Appearance			The surface should be uniform, smooth, and free of defects such as bubbles, pinholes, wrinkles, impurities and defects, and the product should be able to unwind without damage.		

Result	Qualified
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### Quality Certification

NAME :DMD-F Green

Size: 0.23\*1000mm

Inspection No.:202109242300

Date: Sep 24, 2021

NO.	Inspection Item		Unit	Standard	Actual	
1	Thickness		mm	0.23±0.03	0.23	
2	Density		g/m <sup>2</sup>	270±15%	265.41	
3	Tensile Strength	TD	Not Bend	N/cm	≥120	135.21
			Bend	N/cm	≥110	136.50
	MD	Not Bend	N/cm	≥140	162.52	
		Bend	N/cm	≥120	153.52	
4	Elongation at Break	TD	Not Bend	%	≥14	30.51
			Bend	%	≥13	32.85
	MD	Not Bend	%	≥10	13.20	
		Bend	%	≥9	12.15	
5	BDV	Not Bend		kV	≥10	12.50
		Bend		kV	≥9	12.00
6	Cohesiveness		/	No stratification	No stratification	
7	Heat-shrinkage rate (155±2°C/10min)			No delamination, no blistering, no glue	No delamination, no blistering, no glue	
8	Appearance			The surface should be uniform, smooth, and free of defects such as bubbles, pinholes, wrinkles, impurities and defects, and the product should be able to unwind without damage.		

Result	Qualified
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### Quality Certification

 NAME :DMD-F Green  
 Inspection No.:20210924300

 SIZE: 0.28MM  
 Date: Sep 24, 2021

NO.	Inspection Item	Unit	Standard	Actual		
1	Thickness	mm	0.28±0.03	0.285		
2	Density	g/m <sup>2</sup>	340±15%	324.85		
3	Tensile Strength	TD	Not Bend	N/cm	≥150	215
			Bend	N/cm	≥130	145
		MD	Not Bend	N/cm	≥170	187
			Bend	N/cm	≥150	165
4	Elongation at Break	TD	Not Bend	%	≥5	20
			Bend	%	≥5	12
		MD	Not Bend	%	≥5	15
			Bend	%	≥5	14
5	BDV	Not Bend		kV	≥11	13
		Bend		kV	≥11	12
6	Cohesiveness	/	No stratification	No stratification		
7	Heat-shrinkage rate (155±2℃/10min)			No delamination, no blistering, no glue	No delamination, no blistering, no glue	
8	Appearance				The surface should be uniform, smooth, and free of defects such as bubbles, pinholes, wrinkles, impurities and defects, and the product should be able to unwind without damage.	
Result		Qualified				

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## Quality Certification

 NAME :DMD-F Green  
 Inspection No.:20220224130

 Size: 0.13mm\*1000mm  
 Date: FEB 24, 2022

NO.	Inspection Item		Unit	Standard	Actual	
1	Thickness		mm	0.13±0.02	0.14	
2	Density		g/m <sup>2</sup>	140±15%	155.00	
3	Tensile Strength	TD	Not Bend	N/cm	≥80	95
			Bend	N/cm	≥70	90
		MD	Not Bend	N/cm	≥90	110
			Bend	N/cm	≥80	100
4	Elongation at Break	TD	Not Bend	%	≥10	28
			Bend	%	≥10	32
		MD	Not Bend	%	≥10	11.9
			Bend	%	≥10	14.2
5	BDV	Not Bend		kV	≥6	7.0
		Bend		kV	≥6	7.0
6	Cohesiveness		/	No stratification	No stratification	
7	Heat-shrinkage rate (155±2°C/10min)			No delamination, no blistering, no glue	No delamination, no blistering, no glue	
8	Appearance			The surface should be uniform, smooth, and free of defects such as bubbles, pinholes, wrinkles, impurities and defects, and the product should be able to unwind without damage.		

Result	Qualified
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For and on behalf of  
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### Quality Certification

 NAME :DMD-F Green  
 Inspection No.:20210924300

 SIZE: 0.35MM  
 Date: Sep 24, 2021

NO.	Inspection Item	Unit	Standard	Actual		
1	Thickness	mm	0.35±0.03	0.345		
2	Density	g/m <sup>2</sup>	400±15%	398.00		
3	Tensile Strength	TD	Not Bend	N/cm	≥220	314.8
			Bend	N/cm	≥200	324.31
		MD	Not Bend	N/cm	≥300	320.55
			Bend	N/cm	≥220	289.09
4	Elongation at Break	TD	Not Bend	%	≥5	85.82
			Bend	%	≥5	87.17
		MD	Not Bend	%	≥5	21.98
			Bend	%	≥5	18.43
5	BDV	Not Bend		kV	≥16	18.28
		Bend		kV	≥16	19.62
6	Cohesiveness	/	No stratification	No stratification		
7	Heat-shrinkage rate (155±2°C/10min)		No delamination, no blistering, no glue	No delamination, no blistering, no glue		
8	Appearance		The surface should be uniform, smooth, and free of defects such as bubbles, pinholes, wrinkles, impurities and defects, and the product should be able to unwind without damage.			
Result		Qualified				

*For and on behalf of*  
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## Quality Certification

<b>Product Name: FR4 CCL</b>				Test No.:2021081123			
<b>Material Spec: 1.50 35/0um UV 41*49</b>				Test Date: 20210811			
Testd Room Temperature: 18 °C							
Relative humidity: 56 %							
No.	Tested Item	Unit	Quality Spec			Result	Test Method
1	Thickness	mm	Class B/L			1.45~1.53	IPC-4101
2	Peel Strength	/	0.5oz	1.0oz	2.0oz	PASS	Float 288°C IPC-TM-650 2.4.8
			≥6.0LBS/IN	≥8.0LBS/IN	≥12.0LBS/IN		
			≥6.0LBS/IN	≥8.0LBS/IN	≥12.0LBS/IN		
3	Permittivity at 1MHz	/	≤5.4			5.04	IPC-TM-650 2.5.5.3
4	Dissipation Factory at 1MHz	/	≤0.035			0.018	IPC-TM-650 2.5.5.3
5	Dimension Stability	%	≤0.05%		Warp	-0.01%	IPC-TM-650 2.4.39
					Fill	-0.0147%	
6	Flexural Strength	N/mm2	Warp:414			526	IPC-TM-650 2.4.4
			Fill:345			434	
7	Water Absorption	%	Double	Single		0.031%	IPC-TM-650 2.6.2.1
			<0.8%	<0.35%			
8	Bow and Twist	%	Double	Single		1.05%	IPC-TM-650 2.4.22.1
			≤1.0%	≤1.5%			
9	Glass Transition Point	°C	≥110			123	DSC Method
10	Visual: Pit and Dent	/	<60 points/300x300mm			PASS	IPC-4101
11	Dielectric Breakdown	KV	>30			36	IPC-TM-650 2.5.6
12	Thermal Stress	/	No Blister or Delamination			PASS	288°C Dipping 20"
13	Flammability	/	UL94-V0			PASS	IPC-TM-650 2.3.10
Result						Qualified	

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## Quality Certification

<b>Product Name: Mica CLOTH</b>		Test No.: 20200320			
Type: <b>Golden Fire-resistance Mica CLOTH</b>		Test Date: 20200320			
Product Standard: <b>GB/T 5019.2-2009</b>		Test Method: GB/T5019.2-2009z			
Testd Room Temperature: 15 °C					
Relative humidity: 65 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Thickness	mm	0.32±0.02	0.33	
2	Mica content	%	≥69.3	72.1	
3	Volatile content	%	≤0.82	0.76	
4	Adhesive content	%	≥11.6	13	
5	Tensile Strength	N/10mm	≥300	311	
6	Dielectric strength	MV/m	≥35.7	36.8	
7	Resistivity	MΩ	≥1	1.2	
8	Refractory characteristics	°C	1000±20°C	1000	
Result		Qualified			

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## Quality Certification

<b>Product Name: Mica Tape</b>			Test No.:20200320		
Type: <b>Golden Fire-resistance Mica Tape</b>			Test Date: 20200320		
Product Standard: <b>GB/T 5019.2-2009</b>			Test Method: GB/T5019.2-2009z		
Testd Room Temperature: 15 °C					
Relative humidity: 65 %					
No.	Tested Item	Unit	Standard	Result	Note
1	Thickness	mm	0.14±0.02	0.14	
2	Mica content	%	≥69.3	72.1	
3	Volatile content	%	≤0.82	0.76	
4	Adhesive content	%	≥11.6	13	
5	Width tolerance	mm	±0.01	OK	
6	Tensile Strength	N/10mm	≥123	129	
7	Dielectric strength	MV/m	≥35.7	38	
8	Resistivity	Ω.m	≥5.9*10	1	
9	Breakdown voltage	KV	>5	6.2	
Refractory characteristics		°C	750±50°C	786	
Result		Qualified			

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