D324 Melamine Glass Cloth Laminated Sheet
Q/DJ$_{10}$-148-2000
Standard No.: Q/DJ$_{10}$-148-2000

324 melamine glass cloth laminated sheet is made from electric alkali-free glass fabric impregnated with melamine formaldehyde resin. It is made at high temperature and high pressure. D324 laminated sheet has good mechanical, electrical properties and excellent arc resistance. It is suitable for making insulating structural parts and components with arc resistance in electric apparatus.

1 Technical requirements

1.1 Appearance

Its surface should be flat and smooth, free of bubbles, contaminants and other defects, slight scuffing is allowed, its edges should show net cuts and be free of delamination and laceration.

1.2 Dimension

The area is no less than 300mm×400mm,960mm×1960mm,the nominal thickness and the allowed deviation are as shown Form 1

Form 1

Nominal thickness	Deviation	Nominal thickness	Deviation
0.5	±0.12	3.0	±0.37
0.6	±0.13	4.0	±0.45
0.8	±0.16	5.0	±0.52
1.0	±0.18	6.0	±0.60
1.2	±0.21	8.0	±0.72
1.6	±0.24	10.0	±0.82
2.0	±0.28	11.0～20.0	±1.30
2.5	±0.33	22.0～30.0	±1.50
Note: The product of non-nominal thickness is settled upon negotiation between sellers and buyers, its tolerance adopts the value of next bigger nominal thickness.			

1.3 Bending deflection

Bending deflection is as shown in Form 2

Form 2 mm

Thickness	Bending deflection
5.0～7.0	≤10
8.0～10.0	≤7
＞10.0～30.0	≤3

1.4 Machining

The laminated sheets should be free from crackles and scraps after being machined.

1.5 The mechanical, physical and dielectric properties of the laminated sheets.

The properties are shown in Form 3.

Form 3

No.	Property		Unit	Value
1	Density		g/cm^3	1.80～2.00
2	Bending strength perpendicular to the laminations	MD	MPa	⩾147
		TD		⩾147
3	Charpy impact strength No gap	MD	kJ/m^2	⩾118
		TD		⩾98
4	Dielectric strength perpendicular to the laminations in transformer oil at 90℃±2℃	0.5～1.0mm	MV/m	⩾14.0
		1.1～2.0mm		⩾12.0
		2.1～3.0mm		⩾10.0
		>3.0mm, Machining at one side.		⩾10.0
5	Breakdown voltage parallel to the laminations in transformer oil at 90℃±2℃		kV	⩾20
6	Arc resistance		S	⩾180
7	Water absorption		%	⩽3
Note: Other technical requirements are negotiable between the buyers and sellers.				

2 Testing method

2.1 Appearance

Visual observation

2.2 Machining

As per *Machining Methods for Insulating Laminated Products*, Standard No.JB/Z141-79.

2.3 Specimen treatment before test

The specimen should be treated in an oven with 105℃ circular sirocco for one hour.

2.4 Density

As per Method A of GB1033. Weight of specimen: 2g-50g

2.5 Charpy impact strength

The specimen should be no gap specimen, if the nominal thickness is 3mm～10mm, use the nominal thickness to test, if the nominal thickness is less than 3mm, test is unnecessary, if the nominal thickness is more than 10mm, it should be machined to 10mm±0.2mm from one side. The number of the specimen is no less than 5. Measure 3 places to get their arithmetic average value as its testing result, the precision should be 0.1mm for testing the dimension, if the nominal thickness is no more than 5mm, the span should be 40mm±0.2mm, if the nominal thickness is more than 5mm, the span should be 70mm±2mm. The test should be parallel to the lamination, the specimen machined from one side should face to bob. Impact speed of bob is 3.5m/s±0.5m/s. If the specimen does not break or does not break in the middle part of trisection, the testing result is invalid, rare values of testing results can have the deviation of less than ±15% compared with the average value.

Impact strength

$$\sigma_n = \frac{A_n}{b_n \cdot h_n}$$

In which:

σ_n——Impact strength kJ/m

A_n——kJ;

b_n——Width of specimen, m

h_n——Thickness of specimen, m

2.6 Dielectric strength perpendicular to the laminations

Give it pressure after 30min in clear transformer oil at the temperature of 90℃±℃, and then test it with high speed step-up method.

2.7 Breakdown voltage parallel to the laminations.

The length of the specimen is 60mm, the width is 30mm, if the nominal thickness is no less than 6mm, use the nominal thickness to test, for those whose nominal thickness is less than 6mm, the test is unnecessary. Drill hole in the middle of the thickness of the specimen, the depth of the hole is 20mm, and the testing distance is 10mm±0.2mm, use the high-speed step-up method to test. The medium is clear transformer oil, the temperature is 90℃±2℃. If rare values have the deviation of 15% compared with the average value, another 5 specimens should be tested, and use the average value of the breakdown voltage of 10 specimens as the testing result.

2.8 Arc resistance

As per GB 1411—1978.

2.9 Others are as per GB 5130—1985.

3 Inspection, marks, package, transportation and storage

The inspection items are as per Clause 1.1,1.2,1.3 and Item 4,6 of Form 3, the items in Clause 1.1,1.2,1.3 should be checked one by one.

3.2 The laminated sheet shall be placed on underlay plates with height of more than 5cm from the floor in a clean and dry storage room where the temperature is below 40℃. It should be far from fire and heat sources and sunshine. The storage life of the laminated sheet is 18 months after leaving factory. If the laminated sheets have been stored more than 18 months, they may still be used after being tested to be qualified according to the technical requirements.

3.2 The other items are as per GB 1305-1985.

4 Remarks

4.1 The laminated sheets have different properties compared with the metal. The methods of JB/Z141—1979 must be adopted to avoid damage when the product is machined.

4.2 Thermal conductivity of the laminated sheets is small, so high cutting speed and small depth of cut should be adopted when the product is machined. Cool it with the method of compressional cooling. While punching, the mould should have high precision and small gap to avoid emergence of burrs.

4.3 There is decrease in its humidity resistance after it is machined, so insulating teatment is needed according to application.

4.4 D324 laminated sheet has good punching shear property and high arc resistance , its electric strength is tested to be more than 180 seconds with gap nmethod.It is suitable for making arc-extinguishing material in electrical equipment such as automatic switch.

4.5 A lot of dust is produced when it is machined, so measures for labour protection should be taken.

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