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JIU JIANG Flex Co., Ltd

Product Specification Issue Date: April, 2006

LPEN FR Flame Retardant & RoHS Laminates of Polyethylene NaphthalateC opper

1. Description & Designation:

LPEN FR product consists of PEN film clad copper by coating adhesive. It includes various types according to different copper and PEN film utilized to meet the specific needs of customers.

Materials		Thickness	Supplier
Base film	PEN film	1, 2, 3, 4 and 5 mils (0.025, 0.05, 0.075, 0.1, 0.125mm) etc.	Teijin Dupont
Copper foil	EDHD Copper	1/2, 1.0 and 2.0 Oz/SF (0.018, 0.035, 0.070mm) etc.	Mitsui, Fukuda
	RA Copper	1/2, 1.0 and 2.0 Oz/SF (0.018, 0.035, 0.070mm) etc.	Nikko, Olin
Adhesive	Modified epoxy adhesive	Translucence, 0.5 1.0 mils (0.0125 0.025mm) etc.	USA, Japan
Laminate structure		Single side（S）, Double sides（D）	

- The ED copper is the type of EDHD and is classified by the treatment surface color: ED as coffee, EDPM as pink;
  The RA copper is classified by the treatment surface color: RA as pink, RAB as black
- Some special types appointed by customers can also be produced besides the common types of PEN and copper listed in the above form.
- LPENF R product is identified by the following method：

L PEN2 ED35 /S –FR 5 00
- 500：Width 500mm
- FR：Flame Retardant
- /S：Single side
- ED35：0.035mm Thickness EDHD Copper Foil
- PEN2：2 mils Thickness PEN Film
- L：Laminate

2. Features & Applications:

LPEN FR products are widely used in the data communication, personal computer and automotive fields. It possesses following features.

- Meet the RoHS requirement and pass SGS certificate.
- High bond strength and good chemical resistance.
- Excellent dimensional stability.
- Better than LPET in solder float.

3. Package

- Standard roll: 50+0.25 square meters or 500+2.0square feet per roll, maximum 2 splices and minimum 20m distance during two splices.
- Standard width: 500mm or 24 inches width except the customer's special instruction within the maximum width 24 inches.
- Inner diameter core: 6 inches (152mm) or 3inches (76mm), packed in carton and outside wrapped with PE film.

4. Storage:

- Storage time: 12 months since production date; please use after inspection again passed for the materials over the storage time.
- Recommended storage condition: temperature 68 86? (about room Temp. and cool no needed), maximum relative humidity 75%.
- Excessive exposure to heat and moisture may cause copper oxidation.

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LPEN FR Flame Retardant & RoHS Laminates of Polyethylene Naphthalate Copper Data Sheet of Performance

Property To Be Tested	Test Method	Typical Product Value LPEN2ED35/S FR	Typical Product Value LPEN1ED18/S FR
Peel strength, minimum, lb./in.w idth	IPCT M6 50 2.4.9		
As received	Method B	7.0	6.0
After sold float	Method D	7.0	6.0
After temperature cycling	Method F	7.0	6.0
Tensile strength, minimum lb./in.^{2}	IPCT M6 50 2.4.19	20,500	17,800
Elongation, minimum percent	IPCT M6 50 2.4.19	50	40
Flexural endurance, minimum cycles	IPCT M6 50 2.4.3	In 200 Out 80	In 4000 Out 2000
Adhesive Appearance	By eye	Translucence	Translucence
Adhesive Thickness	Q000463	0.023mm	0.023mm
Dimensional stability, maximum, percentage,	IPCT M6 50 2.2.4 Method B Method C	 (MD/TD)± 0.20 % (MD/TD)± 0.20 %	 (MD/TD)± 0.20 % (MD/TD)± 0.20 %
Solder float	Q000085	480? 10seconds Pass	480? 10seconds Pass
Flammability	IPCT M6 50 2.3.8.1	FR, No certificate	FR, No certificate
Flatness, maximum, mm,	Q000060	25 mm	25 mm
Chemical resistance, percentage	IPCT M6 50 2.3.2	80	80
Dielectric constant, maximum (at 1 MHz)	IPCT M6 50 2.5.5.3	3.20	3.20
Dissipation factor, maximum (at 1 MHz)	IPCT M6 50 2.5.5.3	0.015	0.015
Volume resistivity, minimum, megohmc m	IPCT M6 50 2.5.17	10^9	10^9
Surface resistance, minimum, megohms	IPCT M6 50 2.5.17	10^5	10^5
Dielectric strength, minimum, volts/mil	ASTM D 149	2500	2500
Insulation resistance, minimum, megohms, at ambient	IPCT M6 50 2.6.3.2	10^6	10^6
Moisture and insulation resistance, minimum, megohms	IPCT M6 50 2.6.3.2	10^5	10^5
Moisture absorption, maximum, percent	IPCT M6 50 2.6.2	1.0	1.0

Mark: Above data sheet are base on the typical products values. The final data for specific products supplied, please check the testing report attached with the shipment. These data are only for user's reference. The user should determine the suitability of JJFlex LPEN FR materials for each application.