



**Glass cloth and glass mat base epoxy resin  
Flame retardant copper clad laminate**

**CEM-3-10**

**FEATURES**

- Wearing of drill bit is much less than that of FR-4, especially suitable for punch process
- Electrical properties as well as chemical resistance are the same as those of FR-4.
- Excellent in anti-tracking property (CTI=600V)
- UL file number E98983
- Through-hole reliability and warpage have been improved in order to replace some portions of the FR-4 market.
- IPC-4101E L12

**PERFORMANCE LIST**

Characteristics	Unit	Condition	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	1.4 x 10 <sup>7</sup>	10 <sup>6</sup> ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	9.5 x 10 <sup>5</sup>	10 <sup>4</sup> ↑	2.5.17	
Permittivity 1MHz	-	C-24/23/50	4.7	5.4 ↓	2.5.5.2	
Loss tangent 1MHz	-	C-24/23/50	0.021	0.035 ↓	2.5.5.2	
Dielectric breakdown	KV	D-48/50	60 ↑	40 ↑	2.5.6	
Moisture absorption	%	D-24/23	0.09	0.50 ↓	2.6.2.1	
Flammability	-	C-48/23/50	V-0	V-0	UL94	
Peel strength 1oz (≥0.5mm)	lb/in	288°C x 10" solder floating	8-11	6 ↑	2.4.8	
Thermal stress	SEC	260°C dipping	200 ↑	40 ↑	2.4.13.1	
Flexural strength	LW	N/mm <sup>2</sup>	A	300-400	276 ↑	2.4.4
	CW	N/mm <sup>2</sup>	A	200-300	186 ↑	2.4.4
Coefficient of thermal expansion						
Z-axis before Tg	ppm/°C	TMA	55	N/A	2.4.24	
Z-axis after Tg	ppm/°C		285			
Glass transition temperature	°C	DSC	135 ± 5	N/A	2.4.25	
Punchability	Kg/cm <sup>2</sup>	Shear strength ASTM D-732	1150	N/A	ASTM D-732	
Comparative Tracking Index	V	Etched	600 ↑	N/A	ASTM-D3638	
Decomposition temperature (Td 5% W/L)	°C	TGA	325	N/A	2.4.24.6	

Data shown are nominal values for reference only.

**NOTE:**

The average value in the table refers to samples of .062" 1/1.

**CERTIFICATION UL**

- UL File No.: E98983
- ANSI TYPE: CEM-3