



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

## CEM-3-98

**■ 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)
- Through-hole reliability and warpage have been improved in order to replace some portions of the FR-4 market.
- IPC-4101C Specification is applicable.

**■ PERFORMANCE LIST**

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	$1.5 \times 10^7$	$10^6 \uparrow$	2.5.17	
Surface resistivity	MΩ	C-96/35/90	$9.7 \times 10^5$	$10^4 \uparrow$	2.5.17	
Permittivity 1MHZ	-	C-24/23/50	4.5	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	94V0	94V0	UL94	
Peel strength copper H oz	lb/in	288°C x 10" solder floating	8.4	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
Dimensional stability X-Y axis	%	E-0.5/170	<0.065	0.11 Max	2.4.39	
Coefficient of thermal expansion						
Z-axis before Tg	ppm/°C	TMA	55	N/A	2.4.24	
Z-axis after Tg	ppm/°C	TMA	285			
Glass transition temp	°C	DSC	130 ± 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	C-96/20/65	600	PLC 0	ASTM D-3638	
Decomposition Temperature (Td 5% W/L)	°C	TGA	310	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.  
Test method per IPC-TM-650

**■ CERTIFICATION UL**

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

