



**Continuous filament woven glass fabric  
 Surfaces, cellulose paper core**

**CEM-1-97 / CEM-1-97PM**

**■ FEATURES**

- Consists of an epoxy cellulose core and epoxy woven glass. This combination allows for excellent electrical properties, cold punchability, low warpage, high dimensional stability and superior thermal stability during IR fusing or hot air leveling.
- Plated through-holes are not recommended because the cellulose core is easily attacked by the electrolyte (moisture).
- IPC-4101E is applicable.
- BSI Certificate No. 8485

**■ PERFORMANCE LIST**

Characteristics		Unit	Conditioning	Typical Values	SPEC	Test Method
Volume resistivity		MΩ-cm	C-96/35/90	5.0 x 10 <sup>8</sup>	10 <sup>6</sup> ↑	2.5.17
Surface resistivity		MΩ	C-96/35/90	5.0 x 10 <sup>7</sup>	10 <sup>4</sup> ↑	2.5.17
Permittivity 1MHz		-	C-24/23/50	4.40	5.4 ↓	2.5.5.2
Loss tangent 1 MHz		-	C-24/23/50	0.030	0.035 ↓	2.5.5.2
Dielectric breakdown		KV	D-48/50	60 ↑	40 ↑	2.5.6
Moisture absorption		%	E-1/105+D-24/23	0.15 ↓	0.50 ↓	2.6.2.1
Flammability		-	C-48/23/50	94V0	94V0	UL94
Peel strength 1oz (≥0.5mm)		lb/in	288°C x 10" solder floating	11	6 ↑	2.4.8
Thermal stress		SEC	260°C dipping	80 ↑	20 ↑	2.4.13.1
Flexural strength	LW	N/mm <sup>2</sup>	A	300-400	242 ↑	2.4.4
	CW	N/mm <sup>2</sup>	A	200-300	172 ↑	2.4.4
TG	BFCPPY/ CPPY	°C	DSC	105 ± 5	N/A	2.4.25
Punchability		Kg/cm <sup>2</sup>	ASTM D-732 Shear strength	900	N/A	ASTM D-732
Comparative tracking index		Voltage	Etched	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:**

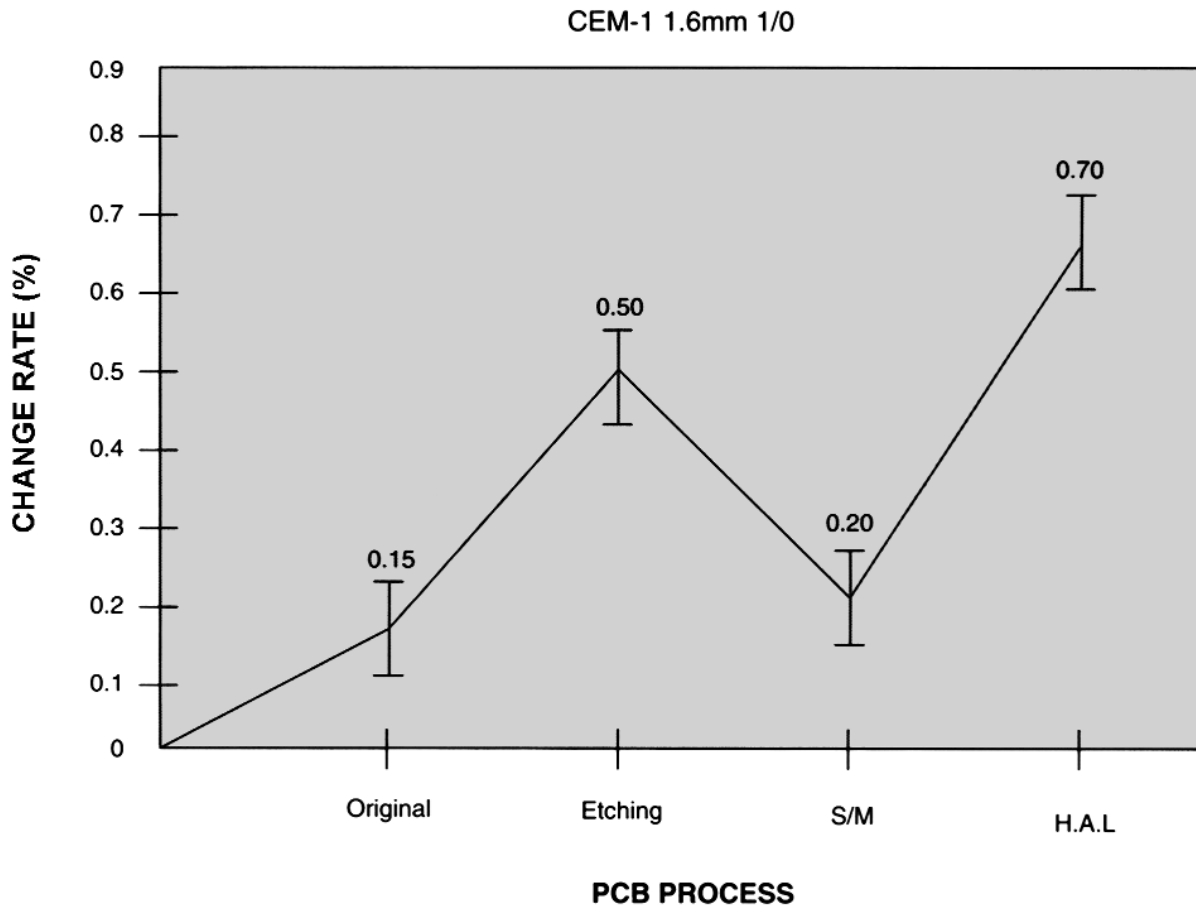
The average value in the table refers to samples of .062" 1/1.  
 Test method per IPC-TM-650



■ Recommended drilling parameters of CEM-1 single & double side

drill bit Ø (mm)		CEM-1 1.6mm 1/x			CEM-1 1.6mm1/1		
		RPM	IPM	CHIP LOAD (mil)	RPM	IPM	CHIP LOAD (mil)
a stack of 4 heights	0.6~0.65	70000	90	1.3	70000	90	1.3
	0.7~0.85	70000	110	1.6	70000	110	1.6
	0.9~1.05	66000	120	1.8	66000	120	1.8
	1.05~1.35	60000	115	1.9	60000	132	2.2
a stack of 3 heights	0.6~0.65	70000	115	1.6	70000	115	1.6
	0.7~0.85	65000	125	1.9	70000	125	1.8
	0.9~1.05	62000	150	2.4	60000	132	2.2
	1.05~1.35	58000	145	2.5	60000	165	2.8

■ Less Bow & Twist





**■ CERTIFICATION UL**

- UL File No.: E98983
- ANSI TYPE: CEM-1

Flammability UL-94	V-0
Temperature index (°C) electrical/mechanical	130/140
Solder limits 288°C (second)	20
Maximun operating temperature (°C)	130

**■ PRODUCT SIZE & THICKNESS**

THICKNESS inch (mm)	COPPER CLADDING oz (µm)	SIZE		THICKNESS TOLERANCE inch (mm)
		inch	mm	
0.062 (1.6)	0.5 (17)	48.8 x 36.6	1240 x 0930	± 0.005 (±0.13)
to	1.0 (35)	48.8 x 40.5	1240 x 1030	
0.047 (1.2)	2.0 (70)	48.8 x 42.5	1240 x 1080	