



PRODUCT DATA
GETEK® Product Data Sheet

EPOXY/POLYPHENYLENE OXIDE RESIN
TYPE: IPC-4101/25 (NEMA FR-4)

UL FILE NO.: E35132

NOMINAL THICKNESS (INCHES)	THICKNESS TOLERANCE (INCHES)	DOUBLE-SIDED			SINGLE-SIDED		
		GE GRADE	E GLASS CONSTRUCTION	Dk @ 1 MHz	GE GRADE	E GLASS CONSTRUCTION	Dk @ 1 MHz
.0027	+/- .0005	ML200D	1080	3.8	-	-	-
.004	+/- .0005	ML200D	2313	3.9	-	-	-
.005	+/- .0007	ML200M	2313/106	3.8	-	-	-
.006	+/- .0007	ML200D	2313/1080	3.9	-	-	-
.007	+/- .0010	ML200M	(2) 2313	3.8	-	-	-
.008	+/- .0010	ML200D	2313/2116	3.9	-	-	-
.010	+/- .0010	ML200D	(2) 2116	3.9	-	-	-
.012	+/- .0010	ML200D	1080/7628/1080	3.9	-	-	-
.014	+/- .0015	ML200D	(2) 7628	4.2	-	-	-
.018	+/- .0015	ML200D	7628/2313/7628	4.1	-	-	-
.021	+/- .0020	ML200D	(3) 7628	4.2	-	-	-
.024	+/- .0020	ML200C	2116/(2) 7628/2116	4.1	-	-	-
.028	+/- .0020	ML200D	(4) 7628	4.2	-	-	-
.028, Alt	+/- .0020	ML200C	1080/2313/(3) 2116/2313/1080	3.8	-	-	-
.031	+/- .0030	ML200C	2116/(3) 7628/2116	4.1	-	-	-
.031‡	+/- .0040	RG200D	(4) 7628	4.2	-	-	-
.044‡	+/- .0050	RG200D	(6) 7628	4.2	-	-	-
.059‡	+/- .0050	RG200D	(8) 7628	4.2	RG200D	(8) 7628	4.2

TYPICAL LAMINATE PROPERTIES

PROPERTY	TEST METHOD	CONDITION	VALUE
THERMAL			
Glass Transition Temp (°C)	DMA	A	175-185
Z-Expansion (%)	IPC-TM-650 2.4.41 (TMA)	A	3.8†
ELECTRICAL			
Electrical Strength (Volts/Mil)	IPC-TM-650 2.5.6.2	D-48/50	1000-1200
Volume Resistivity (Megohm-CM)	IPC-TM-650 2.5.17.1	C-96/35/90	> 10 ⁶
Surface Resistivity (Megohm)	IPC-TM-650 2.5.17.1	C-96/35/90	> 10 ⁴
ARC Resistance (Sec.)	IPC-TM-650 2.5.1	D-48/50	> 60
Dielectric Constant @ 1 MHz	IPC-TM-650 2.5.5.3	C-24/23/50	3.6-4.2
Dissipation Factor @ 1 MHz	IPC-TM-650 2.5.5.3	C-24/23/50	.010-.015
PHYSICAL			
Moisture Absorption (%)	IPC-TM-650 2.6.2.1	D-24/23	.12†
Peel Strength 1 oz./ft ² Cu.(Lb/In)	IPC-TM-650 2.4.8	A	8-9
After Thermal Stress		10 Sec @ 550° F	8-9
Dimensional Stability (Mils/Inch)	IPC-TM-650 2.4.39		< .5
Flammability††	UL 94		VO

† Typical value listed is for an .028 (4 ply 7628) core.

†† This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

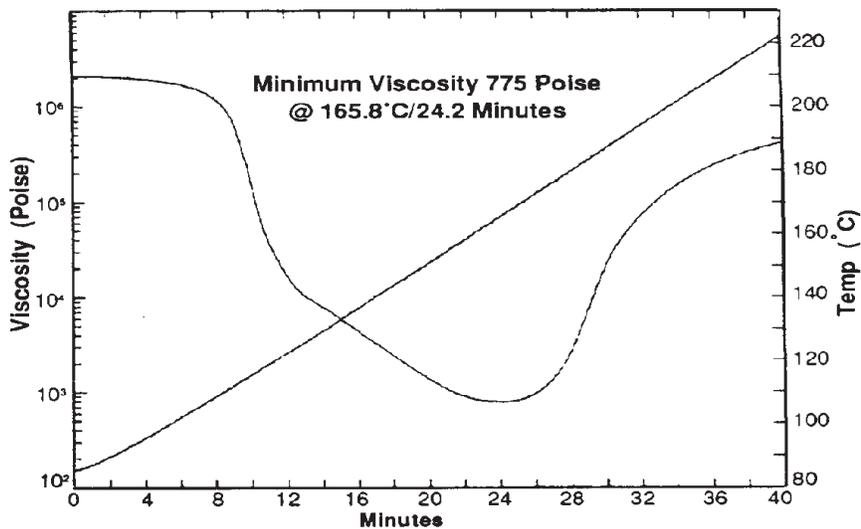
‡ Nominal thickness includes copper cladding for RG200, Core only for ML200.

GETEK® LAMINATES EPOXY/POLYPHENYLENE OXIDE RESIN

GRADE: GETEK® Prepreg (Bonding Sheet)
TYPE: IPC-4101/25 (NEMA FR-4)

UL File No.: E35132

GE Grade	Glass Style	Resin Content (%)	Minimum Melt Viscosity (Poise) ⁽²⁾	Scales Flow Pressed Thickness ⁽¹⁾ (Inches)	Volatile Content (%)
T017550X	106	75 +/- 3	500 - 2500	.0022 +/- .0003	.5 Max.
T416340X	1080	63 +/- 3	500 - 2500	.0027 +/- .0003	.5 Max.
T315530X	2313	55 +/- 3	500 - 2500	.0036 +/- .0003	.5 Max.
T615430X	2116	54 +/- 3	500 - 2500	.0046 +/- .0003	.5 Max.
T814225X	7628	42 +/- 3	500 - 2500	.0067 +/- .0004	.5 Max.



All GE Prepregs are rheology tested and controlled to minimum melt viscosity. This has proven to reduce material variation and is a more reliable test method for characterizing Prepreg performance.

TYPICAL LAMINATION CYCLES:

Optional Low Pressure (Kiss) Cycle
(Applies to all Press Types)

High Pressure - Hydraulic
- Vacuum Assist Hyd.
- Autoclave

Rate of Rise (175 ° F - 275 ° F)

Hold Time

Maximum Laminate Temperature

Cool Down Rate

Post Bake (Cure)

Press Cure Cycle

25-75 PSI Kiss, Apply High Pressure Prior to Package Exterior Reaching 220° F

300 - 400 PSI

225 - 350 PSI

150 - 175 PSI

6 - 9° F/Min⁽³⁾

375° - 385°F for 150 Minutes

395°F (385°F preferred)

< 10°F/Min

Not Required for Cure

Oven Cure Cycle

300 - 400 PSI

225 - 350 PSI

150 - 175 PSI

6 - 9° F/Min⁽³⁾

60 Minutes at 350° F

395°F (385°F preferred)

<10°F/Min

Package at 375° - 385°F for
150 minutes minimum for cure

(These are typical lamination cycles being used for GETEK® materials. Users should perform their own tests to determine the optimum process cycle.)

- (1) Non standard IPC test - contact GE Tech Service for description of test method.
- (2) Minimum melt viscosity is measured using parallel plate method with a 3.5°C/min. rate of heat rise.
- (3) Lower rate of rise acceptable for autoclave presses.

GE Electromaterials

General Electric Company

1350 S. Second Street

Coshocton, OH 43812

(800) 848-3710

<http://www.ge.com/electromaterials>

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