


High Performance Polyimide



85HP's unique blend of pure polyimide resin and micro-fine proprietary fillers results in superior performance for demanding applications. Compared to conventional polyimide systems, 85HP has a lower Z-axis expansion and twice the thermal conductivity. 85HP reduces resin cracking and wicking in designs with high density plated through holes and vias. 85HP prepreg has resin flow characteristics and pressed thickness matching standard polyimides.

Features:

- Meets IPC4101/40 and /41 description and specification
 - Pure polyimide, no secondary resin
 - No epoxy added, blended or reacted
- Best-in-Class thermal properties
 - T_g => 250°C
 - Decomposition temperature 430°C
 - T_c = 0.5 W/mK, 2x thermal conductivity
 - T₃₀₀ > 60 min.
- Reduced Z-axis expansion
- Minimizes cracking and wicking
- Balanced glass weave
- RoHS/WEEE compliant

Typical Applications:

- High process or assembly temperatures (lead-free soldering)
 - Designs with high layer counts and MLB complexity
 - Equipment exposed to extreme temperatures
 - Defense systems
 - Aircraft engine instrumentation
 - Semiconductor testing (burn-in boards)
 - Petroleum exploration (down-hole drilling)
 - Under-hood automotive
 - Industrial sensor systems
 - Space and satellites
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85HP

Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	Prepreg @ 69% RC	4.0	IPC TM-650 2.5.5.3
@ 1 GHz	-		IPC TM-650 2.5.5.9
Dissipation Factor @ 1 MHz		0.008	IPC TM-650 2.5.5.3
@ 1 GHz			IPC TM-650 2.5.5.9
Volume Resistivity			
C96/35/90	MΩ-cm	1.5 x 10 ⁸	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	3.0 x 10 ⁸	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	1.6 x 10 ⁹	IPC TM-650 2.5.17.1
E24/125	MΩ	1.6 x 10 ⁸	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1500 (59)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV		IPC TM-650 2.5.6
Arc Resistance	sec	143	IPC TM-650 2.5.1
Thermal Properties			
Glass Transition Temperature (Tg)			
TMA	°C	=>250	IPC TM-650 2.4.24C
DSC	°C		IPC TM-650 2.4.25D
Decomposition Temperature			
Initial	°C	380	IPC TM-650 2.4.24.6
5% weight loss	°C	430	IPC TM-650 2.4.24.6
T260	min	>60	IPC TM-650 2.4.24.1
T288	min	>60	IPC TM-650 2.4.24.1
T300	min	>60	IPC TM-650 2.4.24.1
CTE (X,Y)	ppm/°C	17	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	45	IPC TM-650 2.4.24C
> Tg	ppm/°C	150	IPC TM-650 2.4.24C
z-axis Expansion (50-260°C)	%	1	IPC TM-650 2.4.24C
Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb./in (N/mm)	6.5 (1.1)	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	6.5 (1.1)	IPC TM-650 2.4.8.2A
After Process Solutions	lb./in (N/mm)	6.5 (1.1)	IPC TM-650 2.4.8C
Young's Modulus CD/MD	Mpsi (GPa)	3.0	ASTM E111
Tensile Strength CD/MD	kpsi (MPa)	35 (241)	ASTM D3039
Poisson's Ratio	-	0.15	ATM E13204
Physical Properties			
Water Absorption (0.062")	%	0.32	IPC TM-650 2.6.2.1A
Density	g/cm ³	1.7	ASTM D792 Method A
Thermal Conductivity	W/mK	0.5	ASTM E1461
Flammability	class	HB	UL-94

Results listed above are typical properties, provided without warranty, expressed or implied, and without liability. Properties may vary, depending on design and application. Arlon reserves the right to change or update these values.

85HP

Availability:

Arlon Part Number	Glass Style	Ho (mils)	Scaled Flow Hf (mils)	Scaled Flow ΔH (mils)
85H6770	1067	2.40	2.00	0.40
85H8663	1086	3.25	2.80	0.45
85H3358	3313	4.40	3.90	0.50
85H2654	2116	5.00	4.45	0.55

Recommended Process Conditions:

Vacuum desiccate the prepreg for 8 - 12 hours prior to lamination.

Process inner-layers through develop, etch, and strip using standard industry practices. Use brown oxide or alternatives on inner layers. Adjust dwell time in the oxide bath to ensure uniform coating. Bake inner layers in a rack for 60 minutes at 107°C - 121°C (225°F - 250°F) immediately prior to lay-up.

Lamination Cycle: (Steps 1-5)

- 1) Pre-vacuum for 30 - 45 minutes
- 2) Control the heat rise to 4.5°C - 6.5°C (8°F - 12°F) per minute between 100°C and 150°C (210°F and 300°F). Vacuum lamination is preferred. Start point vacuum lamination pressures are shown in the table below:

Panel Size		Pressure	
in.	mm	psi	kg/cm ²
12 x 18	305 x 457	275	19
16 x 18	406 x 457	350	25
18 x 24	457 x 610	400	28

- 3) Product temperature at start of cure = 218°C (425°F)
- 4) Cure time at temperature = 2.0 hours
- 5) Cool down under pressure at $\leq 5^\circ\text{C}/\text{min}$ ($10^\circ\text{F}/\text{min}$)

Drill at 350-400 SFM. Undercut bits are recommended for vias 0.018" (0.45mm) and smaller. De-smear using alkaline permanganate or plasma with settings appropriate for polyimide; plasma is preferred for positive etchback.

Conventional plating processes are compatible with 85HP.

Standard profiling parameters may be used;

Bake for 1 - 2 hours at 250°F (121°C) prior to solder to reflow of HASL.

