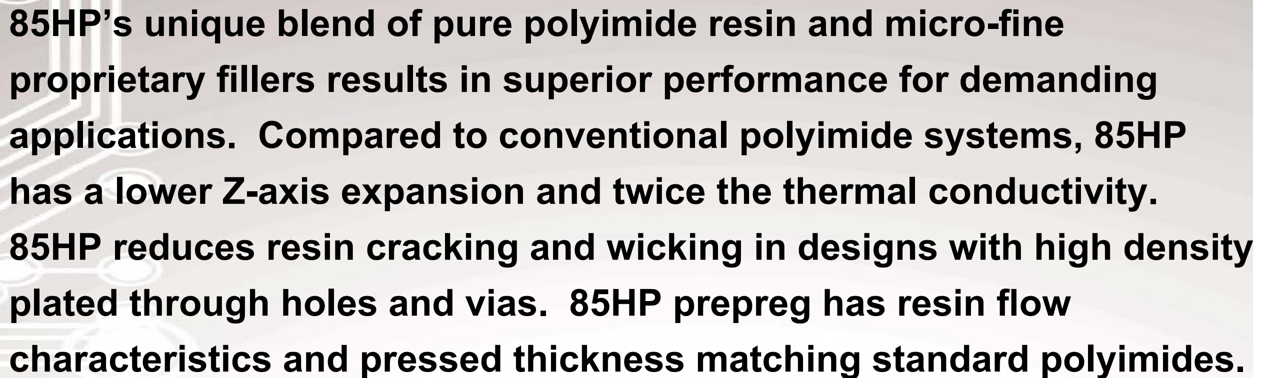
85HP

ARLON ELECTRONIC MATERIALS

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:

- Validated to IPC4101/40, /41 and /43 specifications
    - Pure polyimide, no secondary resin
    - No epoxy added, blended or reacted
- Best-in-Class thermal properties
    - Tg=> 250°C
    - Decomposition temperature 430°C
    - Tc = 0.5 W/mK, 2x thermal conductivity
    - Longer time to delamination -T300 >60 minutes
- Low Z-axis expansion of less than 1% between 50ºC-260ºC
- Lower loss tangent than conventional polyimide resin systems - 0.009@ 1MHz
- 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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Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	@ 54% RC	4.2	IPC TM-650 2.5.5.9
Dissipation Factor @ 1 MHz	@ 54% RC	0.009	IPC TM-650 2.5.5.9
Volume Resistivity			
C96/35/90	MΩ-cm	8.0×10^7	IPC TM-650 2.5.17.1A
E24/125	MΩ-cm	5.9×10^7	IPC TM-650 2.5.17.1A
Surface Resistivity			
C96/35/90	MΩ	1.6×10^9	IPC TM-650 2.5.17.1A
E24/125	MΩ	6.9×10^7	IPC TM-650 2.5.17.1A
Electrical Strength	Volts/mil (kV/mm)	1208 (48)	IPC TM-650 2.5.6.2A
Arc Resistance	sec	182	IPC TM-650 2.5.1B
Thermal Properties			
Glass Transition Temperature (Tg)			
TMA	°C	≥250	IPC TM-650 2.4.24C
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, 17	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	38.8	IPC TM-650 2.4.24C
> Tg	ppm/°C	154	IPC TM-650 2.4.24C
z-axis Expansion (50-260ºC)	%	≤1	IPC TM-650 2.4.24C
Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb./in (N/mm)	6.3 (1.11)	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	5.2 (.92)	IPC TM-650 2.4.8.3A
After Process Solutions	lb./in (N/mm)	5.3 (.93)	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	ASTM E13204
Physical Properties			
Water Absorption (0.059")	%	0.19	IPC TM-650 2.6.2.1A
Density	g/cm3	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.

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Availability:

Arlon Part Number	Glass Style	Resin (%)	Ho (mils)	Scaled Flow Hf (mils)	Scaled Flow ∆ H (mils)
85H6770	1067	70	2.40	2.00	0.40
85H8663	1086	63	3.25	2.80	0.45
85H3358	3313	58	4.40	3.90	0.50
85H2654	2116	54	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 and150°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/cm2
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 ≤ 5°C/min (10°F/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.

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For samples, technical assistance and customer service, please contact Arlon Electronic Materials at the following locations:

NORTH AMERICA:

Arlon EMD, 9433 Hyssop Drive, Rancho Cucamonga, CA
Tel: (909) 987-9533 • Fax: (909) 987-8541

FRANCE:
CCI Eurolam
9, rue Marcelin Bertholet
92160 Antony, France

Phone: (33) 146744747
Fax: (33) 146666313

GERMANY:
CCI Eurolam
Otto-Hahn-Str. 46 63303
Dreiech Germany

Phone: (49) 610339920
Fax: (49) 6103399229

UK & SCANDINAVIA:
CCI Eurolam – UK
Ulness Walton Lane
Leyland, PR26 8NB, UK

Phone: (44) 1772452236
Fax: (44) 1772456859

ITALY:
CCI Eurolam
9, rue Marcelin Bertholet
92160 Antony, France

Phone: (33) 146744755
Fax: (33) 146666313

ISRAEL:
Tech Knowledge, Ltd. 159 Yigal
Alon Street,
Tel Aviv 6744367, Israel

Phone: (972) 36958117
Fax: (972) 36917117

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493 Wen-zhong [illegible]
Oounty [illegible]

[illegible]
[illegible]

SINGAPORE:
C.T.S. Industries Pte Ltd
47 Kaki Bukit Place
Singapore 416225

Phone: (65) 6276 3328
Fax: (65) 6276 3336

JAPAN:
Nakao Corp.
12-8 Nihonbashi Hisamatsu-Cho Tokyo
103-0005 Japan

Phone: (81) 336623201
Fax: (81) 336617118

KOREA
UniMicrotek Co. Ltd.
478 Baekbeom-Ro, Bupyeong-Gu
Incheon, Korea

Phone: (82) 32-424-1776
Fax: (82) 505-720-1785

CHINA:
Zack Peng
Room 6A, Unit 2, Bldg 2
Jin Cheng Shi Dai, Tian Road
Shenzhen, China 518103

Phone: (86) 75528236491
Fax: (86) 75528236463

INDIA:
Synertec
301 Raheja Chambers,12 Museum Rd
Bangalore, India 560001

Phone: (91) 80-25585432
Fax: (91) 80-25588565

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