44N

ARLON ELECTRONIC MATERIALS

Filled Epoxy Prepreg

Arlon's 44N is a high resin content multifunctional (170°C) epoxy prepreg system with a proprietary microdisperse ceramic filler system. 44N is engineered for the filling of clearance holes in thin metal cores such as 0.006" Copper-invar-Copper or via holes in sequentially laminated MLB designs. Based on Arlon's 45N, the 44N system is compatible with conventional epoxy lamination and fabrication.

Features:

- Meets IPC4101/98 description and specification
- UL recognized as UL94 V-0
- Micro-disperse ceramic filled to minimize resin shrinkage and cracking in filled clearance holes
- Prepreg format eliminates the need for messy paste fill material in high volume applications
- High Tg compatible with conventional multifunctional epoxy processing
- Filled system has reduced Z-direction expansion and improved thermal conductivity for improved plated through hole reliability
- Suitable for most Lead-Free applications
- RoHS/WEEE compliant

Typical Applications:

- Automotive Under-hood applications
- Backplanes and Mother Boards
- Ball Grid Array Packaging
- High layer count MLB's
- Filling thick metal copper ground planes

44N

Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	-	4.2 to 4.6	IPC TM-650 2.5.5.3
Dissipation Factor @ 1 MHz		0.025	IPC TM-650 2.5.5.3
Volume Resistivity			
C96/35/90	MΩ-cm	2.6×10^7	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	3.3×10^7	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	4.0×10^4	IPC TM-650 2.5.17.1
E24/125	MΩ	2.9×10^7	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1500	IPC TM-650 2.5.6.2
Arc Resistance	sec	65	IPC TM-650 2.5.1
Thermal Properties			
Glass Transition Temperature (Tg)			
DSC	°C	175	IPC TM-650 2.4.25D
CTE (X,Y)	ppm/°C	14 - 16	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	55	IPC TM-650 2.4.24
> Tg	ppm/°C	200	IPC TM-650 2.4.24
z-axis Expansion (50-260ºC)	%	2.4	IPC TM-650 2.4.24
Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb./in (N/mm)	8	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	8	IPC TM-650 2.4.8.2A
After Process Solutions	lb./in (N/mm)	8	IPC TM-650 2.4.8C
Young's Modulus CD/MD	Mpsi (GPa)	2.8	ASTM E111
Physical Properties			
Water Absorption (0.062")	%	0.1	IPC TM-650 2.6.2.1A
Density	g/cm^3	1.85	ASTM D792 Method A
Thermal Conductivity	W/mK	0.3	ASTM E1461
Flammability	class	V0	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.

44N

Availability:

Arlon Part Number	Glass Style	Resin (%)	Resin Flow	Ceramic Load	Yield per Ply
44N0680	106	80	50 ± 5%	14 ± 2	0.0015"

Recommended Process Conditions:

We suggest the use of vacuum or vacuum assist lamination. Pressure, temperature and time may vary depending on the available equipment, panel size and complexity and other factors.
Controlling the heat-up rate, of the multilayer package, to 8-12°F/4-7°C per minute between 150°F and 300°F/65-150°C is recommended.
See start point recommendations for pressure in 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

A 90 minute cure at a temperature of 365°F/185°C should achieve a Tg of >170°C. When the lamination package contains layers of metal core, the cure time may need to be extended to offset the heat lagging effects of the metal.
NOTE: for sequential lamination use 60 minutes for the first lamination and 90 minutes for the final.
Cool down under pressure at < 10°F/min (5.5°C/min). Cool down at < 5°F/min (3°C/min) can enhance reliability and resistance to cracking.

Drill at 350 SFM. Undercut bits are recommended for vias 0.018” (0.45cm) and smaller De-smear using alkaline permanganate or plasma with settings appropriate for FR-4. slightly longer dwell times may be needed for multifunctional compared with difunctional FR-4.
Bake for 1 – 2 hours at 250°F (121°C) prior to solder reflow or HASL.

ELECTRONIC MATERIALS

...Challenge Us!

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

TAIWAN: Advantic
Technology Inc. (ATI) 9F No. 493 Wen-zhong Rd, Taoyuan County 330, Taiwan (R.O.C.)

Phone: (886) 3-3260047 Fax: (886) 3-3260063

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