

Data Sheet

NP-175F

- Phenolic cured and filled Laminates and Prepregs, Tg 170 °C (DSC)
- Exceptional consistent laminate quality due to exclusive use of Nan Ya's raw materials
- Adapted constructions and layouts pass more than 2000 cycles
- 40 °C / + 140 °C with CTE α_1 40 ppm/K
- Superior properties in CAF precarious conditions and very high thermal resistance
- IPC-4101C specification sheets 21, 24, 26, 97, 98, 99, 101, 126 are applicable

NP-175F

Revision Date: September 2011

NAN YA SPECIFICATION SHEET FOR NP-175F - High Tg filled, multifunctional Epoxy Laminates and Prepregs

SPECIFICATION SHEET #:	IPC-4101 / 21, 24, 26, 97, 98, 99, 101, 126
FLAME RETARDANT MECHANISM:	RoHS compliant Bromine, UL94 V-0
FILLERS (≥ 5 %):	Contains inorganic fillers
ID REFERENCE:	UL/ANSI: FR-4 / 21, 24, 26, 97, 98, 99, 101, 126

LAMINATE DATA SHEET

Laminate Properties	Specification < 0,50 mm [0,0197 in] 50% RC		Specification ≥ 0,50 mm [0,0197 in] 40% RC		Units metric [English]	Test Method (IPC-TM-650)	Ref. Para.	
	Typical Value	Specification	Typical Value	Specification				
Glass Transition Temperature (Tg) by DSC / TMA	173 / 165	≥ 170	173 / 165	≥ 170	°C	2.4.25	3.10.1.6	
Decomposition Temperature (Td) TGA	5% wt. loss 349	-	351 349	≥ 340 -	°C	2.4.24.6	3.10.1.8	
CTE, z-axis	prior Tg 40 - 60 above Tg 250 - 270	AABUS -	40 - 60 250 - 270	≤ 60 ≤ 300	ppm/°C	2.4.24	3.10.1.11	
CTE, x/y-axis	prior Tg 11 - 15 above Tg 11 - 15	AABUS -	11 - 15 11 - 15	AABUS -	ppm/°C	2.4.24	3.10.1.11	
Thermal Expansion (50 °C - 260 °C) z-axis	TE	2,9	2,9	≤ 3,0	%	2.4.24	3.10.1.11	
Thermal Conductivity	λ	0,49	0,49	-	W/mK	Laser Flash	-	
Thermal Resistance: Time to Delamination	T260 T288	> 60 > 20	> 60 > 20	≥ 30 ≥ 5	minutes	2.4.24.1	3.10.1.12	
Pressure Cooker Test - 2 hours (10 s solder dip @ 288 °C)	pass	pass visual	pass	pass visual	pass visual	-	-	
Thermal Stress 10 s at 288 °C [550,4 °F], minimum	A. unetched B. etched	pass pass	pass visual pass visual	pass pass	pass visual pass visual	rating	2.4.13.1	3.10.1.2
CAF Resistance	pass	AABUS	pass	AABUS	pass / fail	2.6.25	3.12.1.4	
Peel Strength, minimum	A. Low profile copper foil and very low profile copper foil - all copper foil >17µm [0,669 mil]	0,78 [4,50]	0,70 [4,00]	0,78 [4,50]	0,70 [4,00]	N/mm [lb/in]	2.4.8	3.9.1.1
	B. Standard profile copper foil							
	1. after thermal stress (35 µm)	1,40 [8,00]	0,80 [4,57]	1,40 [8,00]	1,05 [6,00]	N/mm [lb/in]	2.4.8.2	3.9.1.1.1
	2. at 125 °C [257 °F]	0,78 [4,50]	0,70 [4,00]	0,88 [5,00]	0,70 [4,00]	N/mm [lb/in]	2.4.8.3	3.9.1.1.2
	3. after process solutions	0,70 [4,00]	0,55 [3,14]	0,88 [5,00]	0,80 [4,57]	N/mm [lb/in]	2.4.8	3.9.1.1.3
	C. all other foil - composite	-	AABUS	-	AABUS			
Volume Resistivity, minimum	A. C-96/35/90	5,0*10 ⁹	10 ⁶	5,0*10 ⁹	-	MΩcm	2.5.17.1	3.11.1.3
	B. after moisture resistance	-	-	-	10 ⁴			
	C. at elevated temperature E-24/125	7,4*10 ⁹	10 ³	5,3*10 ⁹	10 ³			
Surface Resistivity, minimum	A. C-96/35/90	5,0*10 ⁸	10 ⁴	5,0*10 ⁸	-	MΩ	2.5.17.1	3.11.1.4
	B. after moisture resistance	-	-	-	10 ⁴			
	C. at elevated temperature E-24/125	6,1*10 ⁸	10 ³	6,1*10 ⁸	10 ³			
Dielectric Breakdown, minimum		60	-	60	40	kV	2.5.6	3.11.1.6
Electric Strength, minimum		40	30	-	-	kV/mm	2.5.6.2	3.11.1.7
(laminate & prepreg as laminated)		[1000]	[750]	-	-	[V/mil]		3.11.2.3
Arc Resistance, minimum		120	60	120	60	s	2.5.1	3.11.1.5
Comparative Tracking Index (CTI)		3 / 175 - 249	-	3 / 175 - 249	-	PLC / V	ASTM D3638	-
Permittivity, spec. maximum	A. @ 1MHz	4,45	5,40	4,70	5,40	-	2.5.5.2	3.11.1.1
(laminate & prepreg as laminated)	B. @ 100MHz	4,25	-	4,45	-	-	2.5.5.3	3.11.2.11
	C. @ 1 GHz	4,10	-	4,30	-	-	2.5.5.9	
	D. @ 2 GHz	4,08	-	4,20	-	-	2.5.5.5	
	E. @ 5 GHz	-	-	-	-	-	-	
Loss Tangent, spec. maximum	A. @ 1MHz	0,020	0,035	0,019	0,035	-	2.5.5.2	3.11.1.2
(laminate & prepreg as laminated)	B. @ 100MHz	0,019	-	0,018	-	-	2.5.5.3	3.11.2.2
	C. @ 1 GHz	0,014	-	0,015	-	-	2.5.5.9	
	D. @ 2 GHz	0,013	-	0,013	-	-	2.5.5.5	
	E. @ 5 GHz	-	-	-	-	-	-	
Flexural Strength, minimum	A. Length direction	-	-	515	415 [60190]	N/mm ² [lb/in ²]	2.4.4	3.9.1.3
	B. Cross direction	-	-	440	345 [50040]			
Flexural Strength at elevated temperature, length direction, minimum		-	-	-	-	N/mm ² [lb/in ²]	2.4.4.1	3.9.1.4
Dimensional stability x/y-axis E-0,5/170(R)/E-4/105(TL)		0,01 - 0,03	< 0,05	0,01 - 0,03	< 0,05	%	2.4.39	3.9.1.2
Moisture Absorption, maximum		0,30	-	0,10	0,50	%	2.6.2.1	3.12.1.1
Flammability (laminate & prepreg as laminated)		V-0	V-0 minimum	V-0	V-0 minimum	rating	UL94	3.10.1.1
Density (50 % resin content)		1,90	-	1,90	-	g/cm ³	-	-

PREPREG DATA SHEET

Prepreg Requirements	Typical Value	Specification	Unit	Test Method	Ref. Para.
1. Shelf Life, minimum (Condition 1/ Condition 2)	meets requirements	180 / 90	Days	AABUS	3.17
2. Reinforcement	woven E-glass	as per IPC-4412 or AABUS	-	-	-
3. Volatile content maximum	1,50	1,50	%	2.3.19	3.9.2.8
4. Prepreg Parameters	-	-	AABUS	AABUS	1.1.7
5. Flammability (as laminated)	V-0	V-0 minimum	rating	UL94	3.10.2.1
6. Other					

Data shown are nominal values for reference only, no review according MIL-S-13949

*AABUS = As Agreed upon Between User and Supplier.

all Nan Ya laminates are in conformance with RoHS regulations

NP-175F

Prepreg NP-175FB

Glass Fabric	Resin Content	Resin Flow	Gel Time @ 170 °C [s]	Thickn. after lamination per ply [μm] ¹⁾	@ 1 MHz ²⁾		@ 1 GHz ²⁾	
	[%]	[%]			Dk	Df	Dk	Df
106	70 ± 3	42 ± 5	170 ± 20	48 ± 8	4,20	0,019	4,02	0,011
106MR	74 ± 3	47 ± 5		51 ± 8	4,38	0,018	4,29	0,011
106HR	76 ± 3	54 ± 5		53 ± 8	4,28	0,018	4,13	0,013
1080	64 ± 3	40 ± 5		67 ± 8	4,68	0,017	4,62	0,011
1080MR	67 ± 3	45 ± 5		75 ± 8	4,66	0,016	4,50	0,011
1080HR	70 ± 3	50 ± 5		85 ± 8	4,66	0,017	4,50	0,011
2112	62 ± 3	40 ± 5		97 ± 8	4,72	0,016	4,50	0,011
2113	58 ± 3	35 ± 5		94 ± 10	4,78	0,016	4,50	0,011
2116	52 ± 3	28 ± 5		108 ± 10	4,85	0,016	4,59	0,011
2116MR	56 ± 3	34 ± 5		121 ± 10	4,85	0,016	4,59	0,011
2116HR	60 ± 3	40 ± 5		137 ± 10	4,82	0,016	4,52	0,011
1506	50 ± 3	27 ± 5		163 ± 10	4,73	0,016	4,47	0,011
1506MR	54 ± 3	34 ± 5		181 ± 10	4,89	0,016	4,64	0,011
7628	45 ± 3	21 ± 5		186 ± 10	4,81	0,016	4,53	0,011
7628MR	49 ± 3	28 ± 5		206 ± 10	4,74	0,015	4,51	0,011
7628HR	52 ± 3	31 ± 5		223 ± 10	4,84	0,015	4,49	0,011

¹⁾ acc. recommended press cycle, 75 % remaining copper, 1 oz

²⁾ data shown are actual values and are not guaranteed

Revision date: September 2011

Recommended press cycle

