

# N4000-11

## Application Bulletin- UL Approval

# UL Approval for N4000-11

October 21, 2004

### Scope

This bulletin describes the UL approval status for N4000-11. Testing has been completed at UL and full Recognition has been granted for this material.

### Status

On October 14, 2004, Nelco, a subsidiary of Park Electrochemical Corporation, received UL Notice of Authorization for Nelco FR-4 Laminate Grade N4105-11 and Prepreg Grade N4205-11. The N4000-11 series of laminate and prepreg materials were introduced to provide printed circuit board fabricators with a next-generation, high-Tg FR-4 product that is designed to meet the difficult performance specifications currently being proposed by a variety of multinational OEM's. The N4000-11 is designed to provide a conductive anodic filament ("CAF") resistant, dimensionally stable material with superior thermal performance. With a nominal Tg of 175 °C, these materials are designed for use in a broad-range of printed circuit board applications requiring very low Z-axis expansion, outstanding thermal stability and superior hole-wall integrity. The N4000-11 also features improved process latitude when compared to similar high Tg dielectric materials currently under investigation for their thermal superiority. This material set is recommended for high density designs in the network storage, telecommunications infrastructure, enterprise server, and internet connectivity market segments.

#### **How does this affect the PWB manufacturer?**

As previously reported, those PWB manufacturers using N4105-11 and N4205-11 prior to February 6, 2004, were not required to submit samples to UL for testing. For those fabricators that purchased N4105/N4205-11 for the first time after February 6, 2004, or that purchase N4105-11 in the future, testing will be required at UL.

#### **What action is required by those PWB manufacturers who purchased N4105-11 and N4205-11 prior to February 6, 2004?**

Users of N4000-11 before February 6, 2004 should contact UL to request that a no-cost change be made to their file.

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**What test will be required for those PWB manufacturers who start using N4105-11 and N4205-11 after February 6, 2004?**

For multilayer construction, standard UL test per UL796 Table 13.7 will be required.

## ***N4105-11 UL Recognition***

***Laminates and ultrathin industrial laminates with copper on one or both sides and prepregs for use in multilayer printed boards.***

Mtl Dsg	ANSI Type	Col	Min Thk		UL94 Flame Class	TI		H W I	H A I	H V T R	C T I	Meets UL746E DSR
			In.	(mm)		Elec	Mech					
<b>Industrial laminates, furnished in sheet, rod or tube form.</b>												
N4105-11	FR-4	NC	0.008	(0.20)	V-0	125	130	0	0	-	-	Yes
			0.015	(0.38)	V-0	130	130	0	0	-	-	Yes
			0.025	(0.63)	V-0	130	140	0	0	-	-	Yes
			0.055	(1.40)	V-0	130	140	0	0	-	3	Yes

Mtl Dsg ##		ANSI Grade	Individual		Min Thk In. (Mics)	Bid-Up		
Lam	Prepreg		Min Thk In. (Mics)	TI		TI	TI	
				Elec	Mech		Elec	Mech
<b>Ultrathin industrial laminates and bonding layers, furnished in sheet form, for use in multilayer printed wiring boards where the thickness is built up to the minimum specified.</b>								
N4105-11	N4205-11	FR-4	0.002(50)	120	-	0.008(200)	125	130
						0.015(380)	130	130
						0.025(630)	130	140
						0.055(1400)	130	140

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Mtl Dsg										Max			Max
Metal		Min		Clad Cond Thk				Area		Sold	Lts	UL94	Oper
Clad Lam	ANSI Type	Thk		Min		Max		Dia		Temp C	Time Sec	Flame Class	Temp C
		In.	(mm)	Mils	(Mics)	Mils	(Mics)	In.	(mm)				
<b>Metal clad industrial laminates for use in printed wiring boards, furnished in the form of sheets, with copper cladding on one or both sides.</b>													
N4105-11	FR-4	0.015	(0.38)	0.17	(4.3)	4.0	(102)	2.0	(50.8)	288	30	V-0	130

		Min	Clad Cond Thk		Max Area				Min Board	
Clad Mtl Dsg	ANSI Type	Thk In. (mm)	Min Mils (Mics)	Max Mils (Mics)	Diam In. (mm)	Sold Lts		Max Oper Temp	Bld-Up In. (mm)	UL94 Flame Class
						Temp F (C)	Time Sec			
<b>Ultrathin industrial laminates with copper on one or both sides and prepregs for use in multilayer printed wiring boards.</b>										
N4105-11	FR-4	0.002	0.17	9.4	2.0	550	30	130	0.015	V-0
		(0.05)	(4.3)	(238)	(50.8)	(288)			(0.38)	

		Clad Cond Thk		Max Area				Min Board	
Clad Mtl Dsg	ANSI Type	Min Mils (Mics)	Max Mils (Mics)	Diam In. (mm)	Sold Lts		Max Oper Temp	Bld-Up In. (mm)	UL94 Flame Class
					Temp F (C)	Time Sec			
<b>Metal clad multilayer package with internal circuitry and solid copper on outside surfaces.</b>									
N4305-11	FR-4	0.17	4.0	2.0	550	30	130	0.015	V-0
		(4.3)	(102)	(50.8)	(288)			(0.38)	