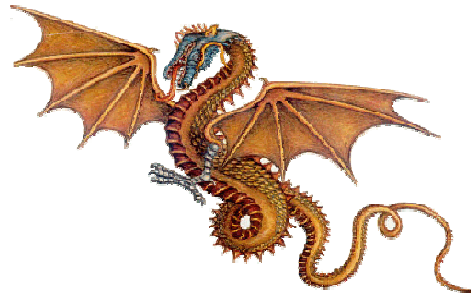


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ACS.LTD

Strategy For High
Tg Materials - China

RoHS CONCERNS FOR PRINTED CIRCUIT BOARD SUPPLIERS

BY: ALL CHINA SOURCING.

RoHS ASSEMBLY PROCESS CHANGES

- Today's Tin/Lead (63/37) solder has a melting point of 183°C, and reflow solder profiles peak at 220° - 230°C
 - RoHS SAC (Sn3.5/Ag0.7/Cu) solder has a melting point of 217°C, and reflow solder profiles peak at 250° - 260°C
 - This equates to a 30°C increase in the peak temperatures that pcb laminates will be subjected to
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CHANGES IN LAMINATE MEASUREMENT

- A more finite set of measurements have been established for RoHS compliant laminates:
 - T_g = Laminate Glass Transition Temperature
 - T_d = Laminate Decomposition Temperature
 - T_{260} = Time to Delamination at 260°C
 - T_{288} = Time to Delamination at 288°C
-

Some Current Available Laminate Ratings

■ Typical Available Materials:

SUPPLIER	MATERIAL TYPE	RESIN SYSTEM	TG (°C DSC)	TD (°C TGA)	LEAD-FREE COMPATIBLE	HALOGEN FREE
Polyclad	FR 226	FR-4	140	320	No	No
	FR 370	FR-4	170	310	No	No
	FR370HR	FR-4 with Phenolic	180	350	Yes	No
	Getek	PPO	180	340	Yes	No
	LD 621	APPE	190	400	Yes	No
Isola	FR 406	FR-4	170	290	No	No
	FR 408	Modified FR-4	180	360	yes	No
	IS 410	FR-4 with Phenolic	180	350	Yes	No
	IS 415	Modified FR-4	220	360	Yes	No
	IS 620	Modified FR-4	205	330	Yes	No
Nelco	N4006-6FC	FR-4	175	300	No	No
	N4000-11	FR-4 with Phenolic	175	360	Yes	No
	N4000-13	Modified FR-4	210	350	No	No
	N4000-12	Modified FR-4	190	370	Yes	No
	N4000-13SI	Modified FR-4	200	350	No	No

UL ASIA RoHS LAMINATE REQUIREMENTS

■ CHART OF UL RoHS LAMINATE ACCEPTANCE REQUIREMENTS:

Table 2: Lead-Free FR-4 Laminate Requirements

Laminate Requirement		Specification
Glass Transition Temperature (Tg)		155°C minimum
Decomposition Temperature (Td)		330°C minimum
Z-Axis	CTE	
a.Alpha	1	a. 60 ppm/°C maximum
b.Alpha	2	b. 300 ppm/°C maximum
c. 50°C to 260°C		c. 3.5%
Time-To-Delamination	Resistance	
a.T260		a. 30 minutes minimum
b.T288		b. 10 minutes minimum
Flammability		V-0 minimum

RoHS COMPLIANT SURFACE FINISHES

■ RoHS COMPLIANT FINAL FINISHES:

Available Final Finishes

- ◆ Hot Air Solder Level (HASL)
 - ◆ Electroless/Electrolytic Nickel Immersion Gold (ENIG)
 - ◆ Immersion Tin (ISn)
 - ◆ Organic Solderability Coatings (OSP)
 - ◆ Immersion Silver (IAg)
-

COST CONCERNS

- COMPARATIVE RoHS LAMINATE COSTS, ROUGH ESTIMATES ONLY AT THIS TIME:

RAW MATERIALS COST COMPARISON

Typical:

NanYa CCL FR-4 Tetra-functional	1.00	
NanYa CCL FR-4 NP170	1.11	
NanYa CCL FR-4 (FR-5 185)	1.26	
Isola FR406 FR-4(170)	2.09	www.isola-usa.com/isolaus.nsf
Nelco-4000-6 FR-4 (180 C)	4.19	www.parknelco.com
Isola FR408 (low Dk & loss)	3.08	www.isola-usa.com/isolaus.nsf
Nelco - 4000-13 (low Dk & loss)	4.19	www.parknelco.com
Getek (low Dk & loss)	4.84	www.geplastics.com/electromaterials/home.htm
Nelco-6000	6.60	www.parknelco.com
Nelco-6000SI	8.72	www.parknelco.com
Rogers R04003 (low Dk & loss)	15.2	www.rogers-corp.com/mwu/
Rogers R04350 (low Dk & loss)	15.62	www.rogers-corp.com/mwu/

PCB SUPPLIER RESPONSIBILITIES

- THE CUSTOMER SHOULD PROVIDE THE SPECIFICATION FOR THE LAMINATE MATERIAL USED ON THEIR ASSEMBLY
 - AS A SUPPLIER, YOU SHOULD SUPPLY SOME ASSISTANCE TO YOUR CUSTOMER AS THIS IS NOW A WHOLE NEW BALL GAME
 - TO PROTECT YOURSELVES, YOU SHOULD ADD A DISCLAIMER TO YOUR PURCHASE ORDER TO THE EFFECT THAT THE LAMINATE MATERIAL HAS BEEN SPECIFIED BY THE CUSTOMER, AND YOU ARE NOT LIABLE IF IT DOES NOT WITHSTAND LEAD FREE PROCESSING
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THANK YOU!

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