



DuPont *i*Technologies

VACREL[®] 8100 Series End Use Properties and Test Data

Vacrel[®] Photopolymer Film Solder Mask

Technical Bulletin TB-0060

Specification/ Test/Examination	Test Method	Typical Test Requirement	Result	Typical Value
Physical				
Visual	IPC-SM-840B Paragraph 3.4.7	No scratches, pinholes or other voids	Pass	—
Dimensional (Circuit coverage)	IPC-SM-840B IPC-TM- 2.1.1	0.0175mm (0.7 mil)	Pass	Dependent upon film thickness and circuit height
Abrasion resistance -Pencil hardness	IPC-SM-840B IPC-TM 2.4.27.2	F hardness	Pass	4H
Adhesion (before and after soldering)	IPC-SM-840B IPC-TM 2.4.28.1	Class 3 limits: Copper 0% Gold or Nickel ¾5% Melting Metal ¾10%	Copper-Pass Gold-Pass Tin/Lead-Pass	—
Density Raw Film After cure	Wt. density	Informational only	---	3.27 mg/cm ² per mil of thickness 1.35 g/cc after cure
Tg	DMA	Informational	---	70-74°C dependent on processing
CTE	DSC	Informational	---	69 ppm < Tg 86-89 ppm > Tg
Modulus	Instron	Informational	---	2.1-3.3 GPa
Ultimate Strain	Instron	Informational	---	1.8%
Ultimate Strength	Instron	Informational	---	47.6 MPa
Poissons Ration	Instron	Informational	---	0.34
Moisture Absorption	Wt. Gain	Informational	---	1.4% @45°C and 95% RH for 24 hr
Thermal Conductivity	ASTM-C-518	Informational	—	0.204 W/M/Deg. K
Chemical				
Solder mask cure	IPC-SM-840B	No visual degradation	Pass	No damage
Resistance to solvents and fluxes	IPC-SM-840B, Paragraph 4.8.6	No visual surface degradation	Pass	No damage
Flammability	IPC-SM-840B, UL 94	UL 94 V number may not be raised	Pass V-O on .059" FR4 laminate	See UL Flammability Rating Table
Solderability/ Resistance to solder 260°C (500°F) /10 secs	IPC-SM-840B, Paragraph 4.8.9.1 and 4.8.9.2	Visual	Pass	No defects
Soldering/desoldering	IPC-SM-840B, Paragraph 4.8.9.3	No visual defects	Pass	No defects
Non-nutrient	IPC-SM-840B, Paragraph 4.8.1.1, MIL-P-13949F	No support of, or attack by, selected fungi	Pass	No growth or attack
Hyrdolytic stability 97±2°C/90-98% RH/28 days	IPC-SM-840B	No visual degradation IPC-TM 2.6.11	Pass	No degradation

Test/Examination	Specification/ Test Method	Requirement	Typical Test Result	Typical Value
Electrical				
Insulation resistance at 25°C, 50% RH	IPC-SM-840B, IPC-TM 2.6.3.1	5 x 10 ⁸ ohms	Pass	5 x 10 ¹⁴ ohms
Moisture and insulation resistance at 25-65°C (cycling), 90+% RH, 7 days	IPC-SM-840B, IPC-TM 2.6.3.1	5 x 10 ⁸ ohms	Pass	1.2 x 10 ⁹
After 2-hour recovery		Informational		2.5 x 10 ¹³ ohms
After 24-hour recovery		Informational		3.0 x 10 ¹³ ohms
Dielectric constant at 25°C, 50% RH, 1 MHz	ASTM D-150	Informational	—	3.8
Dielectric loss factor at 25°C, 50% RH, 1 MHz	ASTM D-150	Informational	—	4.2 x 10 ²
Dissipation factor at 25°C, 50% RH, 1 MHz	ASTM D-150	Informational	—	1.1 x 10 ²
Surface resistivity at 25°C, 50% RH	ASTM D-257	Informational	—	3.6 x 10 ¹³ ohms/square
Volume resistivity at 25°C, 50% RH	ASTM D-257	Informational	—	9 x 10 ¹⁴ ohm-cm
Dielectric strength	IPC-SM-840B, IPC-TM 2.5.6.1	500 VDC Peak/mil	Pass	2829 volts/mil
Electromigration	IPC-SM-840B, IPC-TM 2.6.1.4	No electromigration	Pass	No electromigration
Mechanical				
Thermal shock at -65°C to +125-C	MIL-P-55110D, Method 107D, IPC-SM-840B	100 cycles	Pass with and without conformal coating	—
Machinability	IPC-SM-840B, Paragraph 3.5.3	No visual ¹ cracking or tearing	Drilling-Pass Routing-Pass Punching -See Note 2	

1. Visual examinations are without magnification, corrected to 20/20

2. Punching through solder mask is NOT normally recommended. Solder Mask should be imaged 50 mils back from a punched edge.

**Flammability Ratings
February 1989**

	Film Type	
	8130	8140
.059" FR-4	94 V-0	94 V-0
.047" FR-4	94 V-0	94 V-0



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