



DuPont *i*Technologies

Printed Circuit Materials

VACREL® 8140 Outgassing in a Vacuum

VACREL® Photopolymer Film Solder Mask

Technical Bulletin TB-0059

SUMMARY

Printed wiring boards (PWBS) coated with cured VACREL® 8140 film solder mask were tested for Total Mass Loss (TML) and Collected Volatile Condensable Material (CVCM) per ASTM E-595 to determine the film's suitability for space and other high vacuum applications.

Circuit Image Systems, a DuPont Electronics distributor in Orange, California had conditioned PWBs tested by Silicone Technology, McGhan NuSil Corporation, an independent laboratory. The McGhan NuSil laboratory confirmed that UV-cured and preconditioned VACREL® 8140 film passed all phases of the tests.

DETAILS

The 0.027-inch (0.7 mm) thick, 4-inch (102 mm) square test boards were manufactured by Cirtech Inc. in Orange, California. Circuit Image Systems applied VACREL 8140 to the boards using their standard laminating and UV-curing process. The University of California, Los Angeles (UCLA) conditioned the boards with a thermal bake at 75°C for 72 hours and vacuum at 1×10^{-5} Torr for 168 hours. UCLA had determined that this conditioning was in accordance with the requirements for hardware tests for previous space flights. The test boards were then individually packaged in dry bags to assure a moisture-free environment before testing.

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Replaces H-455499

Outgassing in a Vacuum VACREL® 8140 Photopolymer Film Solder Mask Tests Conducted by Silicone Technology, McGhan NuSil Corporation In accordance with: ASTM E-595 NASA SP-R-0022A ESA PSS-01-702			
Test Conditions			
Date	12/07/90		
Material Tested	Printed Wiring Board		
Pressure, Torr	3.0 ⁻⁶		
Property	Test Material	Specification	
Total Mass Loss (TML)	0.53	1.0%	
Collected Volatile Condensable Material (CVCM)	0.00	0.1%	
Water Vapor recovered (WVR)	0.29	None	
Observations			
Visible Condensate	Yes	Transparent	Yes
Percent Covered	10% - 20%	Opaque	N/A
Thin	Yes	Interference Fringes	Yes
Heavy	N/A	Color of fringes	Purple
Comments			
N/A			
Specimen change After Test			
No Change			

McGhan NuSil's test E-595 was run in compliance to ASTM E-595, "Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment" It also meets NASA specification SP-R-0022A, Vacuum Stability Requirements of Polymeric Material for Spacecraft Applications."

The results of these tests are reported as Total Mass Loss and Collected Volatile Condensable Material. The boards coated with VACREL 8140, UV-cured, and preconditioned as described above, passed both TML and CVCM tests versus the ASTM specifications. In addition, they registered a very acceptable Water Vapor Recovered (WVR) measurement for high vacuum applications.



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