TACONIC
Advanced Dielectric Divison

Low Outgassing Characteristics of Taconic Laminates for Spacecraft Applications

Taconic's high performance laminate materials composed of PTFE/woven glass and PTFE/Ceramic/woven glass all exhibit very low outgassing properties.

According to the NASA spec SP-R-0022A (JSC), General Specification, Vacuum Stability Requirements of Polymeric Material for Spacecraft Applications (NASA), polymeric materials used in the thermal/vacuum environment shall not contaminate the sensitive surfaces within the assembly. The polymeric materials used in any application shall not affect the sensitive surfaces of any adjacent equipment. The material shall have a maximum total mass loss (TML) of 1.0% of the original specimen mass and a maximum collected volatile condensable material (CVCM) content of 0.1% of the original specimen mass when tested in accordance with the test procedure.

Taconic materials were tested by independent laboratories in accordance to ANSI/ASTM E595 which follows the test requirements laid out in the NASA SP-R-0022A document. The test conditions call for vacuum (10^{-4} torr or less) heating (125°C +/- 1°C) a specimen of material for 24 hours in a copper enclosure. A collector plate maintained at 25°C +/- 1°C is located 12.7 mm from the export port to collect outgassed by-products.

Part #	Composition	Dielectric Constant	Total Mass Loss (% TML)	Collected Volatile Condensable Materials (% CVCM)	Water Vapor Regain (% WVR)	Verified by NASA*
605	PTFE/Woven Glass	2.17 - 2.33	0.04	0.01	<0.01	
TLY-5A	PTFE/Woven Glass	2.17	0.01	<0.01	0.01	
TLY-5	PTFE/Woven Glass	2.20	0.12	<0.01	0.01	
601	PTFE/Woven Glass	2.45 - 2.65	0.02	<0.01	<0.01	
602	PTFE/Woven Glass	2.45 - 2.65	0.02	0.01	<0.01	
TLX-0	PTFE/Woven Glass	2.45	0.06	0.00	0.00	*
TLX-9	PTFE/Woven Glass	2.50	0.02	0.00	0.01	*
TLX-6	PTFE/Woven Glass	2.65	0.09	<0.01	0.06	
TLC-27	PTFE/Woven Glass	2.70	0.03	0.02	0.01	*
TLG-29	PTFE/Ceramic BT/Woven Glass	2.87	0.08	0.01	0.06	*
TLE-95	PTFE/Woven Glass	2.95	<0.01	0.01	<0.01	

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Part #	Composition	Dielectric Constant	Total Mass Loss (% TML)	Collected Volatile Condensable Materials (% CVCM)	Water Vapor Regain (% WVR)	Verified by NASA*
TLC-30	PTFE/Woven Glass	3.00	0.01	0.00	0.00	*
TSM-30	PTFE/Ceramic Woven Glass	3.00	0.05	0.01	0.01	*
RF-30	PTFE/Ceramic Woven Glass	3.00	0.02	0.00	0.02	*
TLC-32	PTFE/Woven Glass	3.20	0.01	0.00	0.01	*
RF-35	PTFE/Ceramic Woven Glass	3.50	0.04	0.00	0.03	*
RF-35A	PTFE/Ceramic Woven Glass	3.50	0.03	0.00	0.02	*
RF-35P	PTFE/Ceramic Woven Glass	3.50	0.03	0.01	0.02	*
RF-41	PTFE/Ceramic Woven Glass	4.10	0.09	0.01	0.00	*
RF-43	PTFE/Ceramic Woven Glass	4.30	0.01	0.00	0.00	*
RF-45	PTFE/Ceramic Woven Glass	4.50	0.02	0.01	0.01	*
RF-60	PTFE/Ceramic Woven Glass	6.15	0.02	0.01	0.01	*
RF-60A	PTFE/Ceramic Woven Glass	6.15	0.02	0.00	0.01	*
Cer-10	PTFE/Ceramic Woven Glsss	10.0	0.02	0.01	0.01	*
TLT-A	PTFE Woven Glass	N//A	0.01	0.00	0.01	*

*As reported by NASA. See http://outgassing.nasa.gov/og_disclaimer.html. All others values obtained from independant laboratory.

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