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National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

SP-R-0022A
SEPTEMBER 9, 1974

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P. 63

GENERAL SPECIFICATION

VACUUM STABILITY REQUIREMENTS OF POLYMERIC MATERIAL FOR SPACECRAFT APPLICATION

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

SP-R-0022A
ADDENDUM 2

GENERAL SPECIFICATION
VACUUM STABILITY REQUIREMENTS OF POLYMERIC MATERIAL FOR SPACECRAFT APPLICATION

FEBRUARY 24, 1984

The purpose of this addendum is to delete Revision "0" of "The Prefered Materials for Vaccuum Stability" from this document. This data has been replaced by JSC 08962, "Compilation of VCM Data of Non-Metallic Materials".

M. W. Steinthal 2/27/84

M. W. Steinthal

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

SP-R-0022A
ADDENDUM 1

GENERAL SPECIFICATION
VACUUM STABILITY REQUIREMENTS OF POLYMERIC
MATERIAL FOR SPACECRAFT APPLICATION

MAY 16, 1983

THE PURPOSE OF THIS ADDENDUM IS TO ALLOW ADDITIONAL METHODS OF APPROVING HARDWARE FOR FLIGHT, AND TO CORRECT A DOCUMENT REFERENCE.

PAGE 1, PARAGRAPH 4.0. IN THE LAST SENTENCE OF THE FIRST PARAGRAPH, DELETE, "(JSC 08962A)" AND ADD (JSC 08962) IN LIEU THEREOF.

PAGE 2, PARAGRAPH 4.0 ADD A NEW SUBPARAGRAPH "G" AS FOLLOWS:

G. A HARDWARE ITEM (I.E., COMPONENT, ASSEMBLY, ETC.) CONTAINING MATERIALS THAT FAIL THE VCM REQUIREMENT AND/OR HAVING UNIDENTIFIED MATERIALS, MAY BE VACUUM BAKED UNTIL IT HAS AN ACCEPTABLE OUTGASSING LEVEL. THE THERMAL VACUUM CHAMBER USED FOR VACUUM BAKING MUST HAVE INSTRUMENTATION SUCH AS QCM OR MASS SPECTROMETERS, TO DETERMINE WHEN THE HARDWARE ITEM IS ACCEPTABLE. THE THERMAL VACUUM CHAMBER CAPABILITY, BAKING PROCEDURE AND ACCEPTANCE CRITERIA MUST BE APPROVED BY JSC MATERIALS BRANCH (ES5). THE JSC WHITE SANDS TEST FACILITY (WSTF) HAS THE FACILITIES AND THE CAPABILITY TO PERFORM SUCH VACUUM BAKING.

M. W. Steinthal 5/16/83

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GENERAL SPECIFICATION

VACUUM STABILITY REQUIREMENTS OF POLYMERIC MATERIAL FOR SPACECRAFT APPLICATION

SPECIFICATION

VACUUM STABILITY REQUIREMENTS OF POLYMERIC

MATERIAL FOR SPACECRAFT APPLICATION

Prepared by _____
Nonmetallic Materials Technology
Section

Approved by _____
Structures & Mechanics Division

Approved by _____
Engineering & Development
Directorate

This specification has been approved by the Johnson Spacecraft Center and is available for use by JSC and associated contractors.

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1.0 PURPOSE

The purpose of this document is to establish outgassing requirements and test guidelines for polymeric materials used in the space thermal/vacuum environment around sensitive optical or thermal control surfaces.

2.0 REQUIREMENTS

The control and verification of material outgassing to the guidelines of this document are based on the following requirements:

a. The polymeric materials used in the thermal/vacuum environment shall not contaminate the sensitive surfaces within an assembly.

b. 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 percent of the orginal specimen mass and a maximum volatile condensable material (VCM) content of 0.1 percent of the original specimen mass when tested in accordance with the test procedure in paragraph 6.

3.0 SCOPE

The scope of this document covers the control of polymeric materials used near or adjacent to optical or thermal control surfaces that are exposed to the thermal/vacuum environment of space. This document establishes the requirements and defines the test method to evaluate polymeric materials used in the vicinity of these surfaces in space applications.

4.0 SELECTION AND VERIFICATION REQUIREMENTS

Use of polymeric material near optical or thermal control surfaces shall be restricted to those materials which have a maximum volatile condensable material content of 0.1 percent and a total mass loss of 1.0 percent or less when tested in accordance with the test method described in paragraph 6. NASA JSC will provide to the contractor(s) a list of approved materials for use in the thermal/vacuum environment upon request. NASA JSC also maintains a complete file (JSC 08962A) of all materials tested.

The use of materials that have been tested but failed the requirements of this specification may be allowed if the contractor can provide rationale for their use that is approved

by NASA JSC. The following are examples of some considerations for use as rationale for a material that has failed the VCM or mass loss requirements:

a. The material may be brought within vacuum stability limits by vacuum baking for a specified period of time (usually 48 hours at maximum use temperature at a pressure of less than 10^{-6} torr).

b. If material cannot be vacuum baked and its exposed area is 13 cm^2 or less, and the material is out of line-of-sight of payload surfaces and other contamination critical surfaces, total mass loss may be up to 3.0% and volatile condensable material up to 1.0%.

c. If total mass loss is greater than 1.0% and VCM ≤ 0.1% and it can be shown that contributions to TML greater than 1.0% are due to sorbed water vapor, the material may be used.

d. The material is the <u>only</u> satisfactory choice from a functionality viewpoint for the particular application.

e. The total mass of materials selected under 4b and 4d above and used in any given compartment will be monitored and reviewed periodically to insure that compartmental peculiar problems do not evolve.

f. Materials previously tested and found acceptable per MSFC 50M02442 may be used.

5.0 <u>IMPLEMENTATION</u>

The contractor shall provide for NASA JSC approval, a list of all polymeric materials selected for use around sensitive surfaces or in the same defined compartment as optical or thermal control surfaces. The following information is required.

a. Manufacturer's trade name

b. Manufacturer of the material

c. Thermal vacuum stability (VCM and TML) data

d. Rationale for use of material that failed the requirements of paragraph 4.0 and a report of the weight and surface area used.

e. Materials that have not been tested should be submitted to JSC/ES5 for testing utilizing JSC form 2035B.

6.0 TEST PROCEDURES

6.1 PURPOSE. The purpose of this test is to measure total mass loss and volatile condensable material content of polymeric materials under controlled laboratory conditions. The following test procedure outlined below was extracted from NASA White Sands Test Facility Operational Checkout Procedure 200-013 entitled "Determination of Weight Loss and Volatile Condensable Components of Polymeric Material", June 1974. The use of any other test equipment and/or procedure must be approved by NASA-JSC.

6.2 TEST CONDITIONS. The test on polymeric materials shall be conducted under the following conditions:

Pressure	10^{-6} torr or less
Temperature of specimen	125°C ± 1°C
Temperature of condensable plates	25°C ± 1°C
Vacuum exposure time	24 hours

6.3 CRITERIA OF ACCEPTABILITY. The material shall have a volatile condensable material content of less than 0.1 percent of the orginal mass of the specimen. The total mass loss of the material shall not exceed 1.0 percent of the orginal mass of the specimen.

6.4 TEST EQUIPMENT. All laboratory test instrumentation shall be in current calibration and shall reflect appropriate documentation from the applicable calibration laboratory. The test equipment shall consist of the following:

a. A vacuum system capable of maintaining 10^{-6} torr for a period of 24 hours.

b. Specimen holder made of stainless steel or aluminum. The specimen holder shall be nominally 3.8 cm long and 1.25 cm in diameter.

c. Collector plate shall be made of a highly polished stable metal surface. The collector plate shall be 3.8 cm in diameter.

d. The test apparatus shall be made of copper. The apparatus shall be such that multiple specimen holders and collector plates can be accommodated at one time. The sample section shall be capable of maintaining the samples at 125 ± 1°C and maintaining the collector plates at 25 ± 1°C.

6.5 SAMPLE PREPARATION.

6.5.1 Specimen Size. Materials to be tested shall be prepared in 100 to 300 milligram specimen sizes and placed in stainless steel or aluminum holders after preparation as specified below.

6.5.2 Solid Materials. Specimens shall be cut into small pieces having 0.15 cm maximum dimension. Samples shall be placed in a desiccator after preparation and remain there until the samples are placed in the test chamber.

6.5.3 Coatings. Materials that are normally used as coatings shall be applied to aluminum foil or Teflon sheet and prepared as noted in paragraph 6.5.2.

6.5.4 Solvent Containing Materials. Prior to testing solvent containing materials, such as inks and paints or room temperature cured materials, the sample shall be preconditioned for 24 hours at 65 ± 1°C in an air circulating oven to simulate the material exposure up to the time of launch.

6.5.5 Tapes. Tapes shall be tested in the as-applied configuration using aluminum foil or Teflon sheet as an application substrate and prepared in accordance with paragraph 6.5.2.

6.5.6 Liquids. Liquids shall be tested in the as-received state.

6.5.7 Cure Procedures. All material shall be cured or applied in accordance with the manufacturer's procedures or the applicable contractor process specification prior to test.

6.6 TML AND VCM MEASUREMENT.

6.6.1 Initial Mass Determination. The VCM collector plate and specimen holder mass shall be measured. Specimens shall be tested and their mass measured after being desiccated for 24 hours.

6.6.2 Specimen Insertion. The weighed samples shall be placed in the compartments of the heating block and the VCM collector plates shall be fastened to the cooling block of the apparatus.

6.6.3 Pressure. The system shall be evacuated and held at a maximum pressure of 10^{-6} torr.

6.6.4 Application of Heat. When the unit has reached 10^{-6} torr, the specimens shall be heated to 125°C ± 1°C, and maintained for 24 hours. The VCM collector plates shall be maintained at 25°C ± 1°C during the test.

6.6.5 Specimen Removal. The specimens in their holders and the VCM collector plates shall be removed from the apparatus and immediately placed in a desiccator.

6.6.6 Final Mass Determination. Measure the mass of the specimens and the collector plates as soon as possible after removal from the VCM apparatus, and record.

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Prepared by _____
Nonmetallic Materials Technology Section

Approved by _____
Structures & Mechanics Division

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6.2 TEST CONDITIONS. The test on polymeric materials shall be conducted under the following conditions:

Pressure	10^{-4} torr or less
Temperature of specimen	125°C ± 1°C
Temperature of condensable plates	25°C ± 1°C
Vacuum exposure time	24 hours

6.3 CRITERIA OF ACCEPTABILITY. The material shall have a volatile condensable material content of less than 0.1 percent of the orginal mass of the specimen. The total mass loss of the material shall not exceed 1.0 percent of the orginal mass of the specimen.

6.4 TEST EQUIPMENT. All laboratory test instrumentation shall be in current calibration and shall reflect appropriate documentation from the applicable calibration laboratory. The test equipment shall consist of the following:

a. A vacuum system capable of maintaining 10^{-4} torr for a period of 24 hours.

b. Specimen holder made of stainless steel or aluminum. The specimen holder shall be nominally 3.8 cm long and 1.25 cm in diameter.

c. Collector plate shall be made of a highly polished stable metal surface. The collector plate shall be 3.8 cm in diameter.

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February 20, 1970
Revision "0"

PREFERRED MATERIALS FOR VACUUM STABILITY

REQUIREMENTS FOR APOLLO SPACECRAFT APPLICATIONS

APPROVED BY: _____

J. W. Craig
Systems Engineering Division
NASA/MSC

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*These materials meet the intent of the Specification SP-R-0022, "Vacuum Stability Requirements of Polymeric Materials for Spacecraft Applications."

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1.0 ADHESIVES, STRUCTURAL

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Epibond	FPl		0.46	0.02	1.5 at 150	100 grams resin to 15 grams PBW Catalyst
Metlbond 328	WCN		0.12	0.10	90 min. at 329	ARFM**
Metlbond 329	WCN		0.26	0.08	90 min. at 329	ARFM**
Ram Requirement (4%) in Epon (96%)	RAM		0.91	0.02	2 hrs. at 170	Black Pigment about 4% by wt. in 828/2
PLV-101	PEL		0.82	0.02	No further cure necessary	ARFM**
PLV1006-A	PEL		0.52	0.02	No further cure necessary	ARFM**
PLV8704	PEL		0.44	0.02	No further cure necessary	ARFM**
PLV30001	PEL		0.33	0.01	No further cure necessary	ARFM**
PLV3016-B	PEL		0.51	0.02	No further cure necessary	ARFM**
PLV5010-B	PEL		0.38	0.02	No further cure necessary	ARFM**
Eccobond Solder 56C/9	EMC		0.30	0.0[illegible]	16 hrs. at 122	100 parts 56C 5 parts no. 9
Eccobond Solder 57C/9	EMC		0.67	0.06	16 hrs. at 122	100 parts A 100 parts B
Eccobond 104 A/B	EMC		0.30	0.24	3 hrs. at 302	100 parts A 64 parts B

**ARFM - As received from manufacturer
*See Index of Manufacturers

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Eccobond 55/9	EMC	BS502501	0.17	0.07	2 at 150 or 3 at 130	12 PHR catalys #9. Total cure of 16 hours at a minimum of 130°F is required before flight.
Epon 828/A	SCA	BS502620	0.70	0.06	3 at 200	8 PHR curing agent A
Epon 828	SCP		0.97	0.02	2 at 200	Resin Matrix
Epon 828/U	SCA	BS502606	1.42	0.01	10 days at 77 ± 5	25 PHR curing agent U
Epon 901 B-1	SCA	BS502545	1.28	0.04	16 at 125	23 PHR curing agent B-1
Epon 901 B-3	SCA	ZMF-4013-0017	0.19	0.01	0.5 at 240 + 1.5 at 350	11 PHR curing agent B-3
Epon 913 A/B	SCA	BS502530	1.32	0.05	3 at 180	100 parts A to 12 parts B
Epon 917	SCA	BS504189	0.17	0.03	0.25 at 350	Catalyzed as received
Epon 931 A/B	SCA		0.13	0.01	1 at 125	100 parts A to part B
Epon 934 A/B	SCA	BS502[illegible]	0.17	0.01	16 at 125	100 parts A to 33 parts B MMM-A 2
Epon 956 A/B	SCA	BS502534	0.38	0.00	1 at 180	100 parts A to 58 parts B
FM-96U	ACB	BS502532	0.15	0.01	1 at 350	Modified epoxy unsupported film
Epon 828/1[illegible]	SCP		0.2[illegible]	0.02	1 at 150 50-50 1 at 180 90 MNA-1BOMA 4 at 350	On Boron filaments 29% of weight Resin Matrix

*See Index of Manufacturers

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Armstrong A-2-A	APC		0.44	0.00	0.75 hrs. at 165	Resin 100% Catalyst 4%
Armstrong A-2/E	APC		0.26	0.03	45 min. at 200	100 parts A-2 6 parts E
Armstrong A-12A	APC		0.85	0.03	2 hrs. at 185 plus 48 hrs. at 260 and 10^{-5}TORR	JPL Sample
HT-424	ACB		0.18	0.09	30 hrs. at 330°F	ARFM**
Epon 828/Z	SCA	BS502621	0.42	0.03	2 at 200 + 2 at 275	20 PHR curing agent Z

**ARFM - As received from manufacturer
*See Index of Manufacturers

2.0 - ADHESIVES, NONSTRUCTURAL

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
EC-2320	MMA	BS502555			Air dry: 0.5 at 100 Force dry: 0.5 at 150	Structural adhesive primer
Eccobond 56 C/9	EMC	BS592539	0.30	0.03	3.5 at 125 or 16 at 75	2.5 PHR catalyst #9. Total cure of 16 hours at a minimum of 125°F is required before flight
Eccobond 57C A/B	EMC	BS502572	0.67	0.06	16 at 125	1 part A to 1 part B
Epon 828/ Versamid 125	SCP GMC	BS502506/ BS502507			1.5 at 75 + 3.0 at 130	1 to 1 mixing ratio
Eccosorb MF500F116	EMC		0.30	0.04	No further cure necessary	ARFM**
Eccosorb MF116	EMC		0.20	0.02	No further cure necessary	ARFM**
Epiphen ER-825A	BCM		0.84	0.01	100P825A/12P MOD T/40P filler/16P 825A converted 48 hr./170	
EC-2216 B/A	MMA		0.82	0.06	140P A/100PB 2 hr/149	
BR-907	ACB		0.84	0.02	1 hr. at 350°F	ARFM**

**ARFM - As received from manufacturer
*See Index of Manufacturers

3.0 - LAMINATES

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Doryl H-17511	WEM	BS502668	0.44	0.04	No further cure necessary	
Micarta H-2497	WEM	BS502502	0.18	0.00	No further cure necessary	NEMA Type G-11 MIL-P-18177C, Type GEB. Tubing grade is Micarta HY-180-1
Micarta H-5834	WEM	BS592558	0.70	0.03	No further cure necessary	Phenolic-glass. Tubing grade is micarta HY-322
Micarta H-8457	WEM	BS50509	0.80	0.12	No further cure necessary	NEMA Type G-10 MIL-P-18177C, Type GEE Tubing grade is Micarta HY-180
Micarta 20201-2	WEM	BS592500	0.16	0.04	No further cure necessary	Silicone-glass. MIL-P-997B, Type GSG. Tubing grade is Micarta 20,000-2
EPiall 1906L	ACM		0.39	0.06	No further cure necessary	ARFM**
Epiall 1914	ACM		0.55	0.03	No further cure necessary	ARFM**
Micarta H-17690	WEM		0.48	0.07	No further cure necessary	ARFM**
Micoply G-284	TMC		0.49	0.06	No further cure necessary	ARFM**
Scotchply XP-251S	MME		0.58	0.01	0.5 hr. at 300°F	Unidirection fiber glass/ epoxy laminate

**ARFM - As received from manufacturer
*See Index of Manufacturers

3.0 - LAMINATES

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Scotchply 279	MMA		0.96	0.06	No further cure necessary	ARFM**
Phenolic Glass Fiber	GEC		0.53	0.01	No further cure necessary	ARFM**
HY-E-1001	FIB		0.53	0.04	1 hr. at 270°	Graphite Pregreg. 42.17% rosin by Wt.
HY-E-1002	FIB		0.32	0.04	1 hr. at 180°	Graphite Pregreg. 38.05% by Wt.

**ARFM - As received from manufacturer
*See Index of Manufacturers

4.0 - CIRCUIT BOARDS***

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
FF-95	ACF	BS502672	0.48	0.05	No further cure necessary	NEMA FR-5 - Procure to MIL-P-13949C, Type GH
**Micaplay EG-752-T EG-758-T EG-2752-T	TMC	BS592597 (ST 10034)	0.48	0.05	No further cure necessary	MIL-P-13949D, Type GE Epoxy-Glass Fabric Laminate, Copper-Clad
Micaplay EG-824-T	TMC	BS504202	0.40	0.05	No further cure necessary	NEMA FR1-5 - Procure to MIL-P-13949-C, Type GH
Micarta 65M25	WEM	BS502566	0.43	0.00	No further cure necessary	NEMA FR-4 - Procure to MIL-P-13949C, Type GF
EG-2028 Type FL-GE	FLC		0.44	0.01	No further cure necessary	Stripped of copper - ARFM*
EG-2828FR Type FL-GF	FLC		0.33	0.01	No further cure necessary	Stripped of copper - ARFM*
Circuit Board	MCP		0.50	0.00	No further cure necessary	ARFM****
Micaply EG-899T	TMC		0.29	0.03	No further cure necessary	ARFM****
West Howe 65M28	WEI		0.26	0.01	No further cure necessary	ARFM****

*See Index of Manufacturers
**Material used in electronic packaging applications
***See laminates for unclad products
****ARFM - As received from manufacturer

5.0 - CONFORMAL COATINGS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Doryl B-109-4	WEM	BS502623	0.30	0.15	2 at 300 + 2 at 480	No catalyst required
Solithane 113/ 300 Fluorescent	TCC	ZME-1061-0004 Type I	1.22	0.03	2 at 75 + either 3 at 150 or 5 at 130	Contains Fluorescent dye 100 parts 113 - 74 parts 300
Solithane 113/ 300 Non-Fluorescent	TCC	ZME-1061-0004 Type II	0.78	0.03	2 at 75 + either 3 at 150 or 5 at 130	100 parts 113 74 parts 300
Stycast 1217/9	EMC	BS502627	1.74	0.14	15 at 125	13 PHR catalyst #9
Solithane (113/300 with 3% Cabosil)	TCC		0.69	0.10	No further cure necessary	ARFM**
V377-9	PSC		0.33	0.01	No further cure necessary	ARFM**

*See Index of Manufacturers

**ARFM - As received from manufacturer

6.0 - LUBRICANTS, GREASE

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Apiezon L/ Molykote Microsize Powder (JPL formulation)	SOC/ DCC	BS502561			No further cure necessary	Thread lubricant, Apiezon L Grease and MoS_2 Powder
Apiezon L	SOS	BS502618	0.06	0.01	No further cure necessary	ARFM**
G 683	GES	BS504191	0.62	0.07	No further cure necessary	Vacuum grease
DC 20-057	DCC		0.31	0.07	No further cure necessary	ARFM**

*See Index of Manufacturers, page
**ARFM - As received from manufacturer

7.0 - MARKING MATERIALS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
No. 73X Black	IND	BS502643	62.2	0.9	1 at 75	Opaque black
**Cat-L-Ink Series 50-000	WPP	BS502674	26.24	.11	1 at 150 or 3 at 75	

*See Index of Manufacturers
**Material used in electronic packaging applications

8.0 - MICROWAVE MATERIALS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Rexolite 1422	AEC	BS502535	0.18	0.01	No further cure necessary	Thermoset cross-linked styrene copolymer
Rexolite 2200	AEC	BS502536	1.37	0.05	No further cure necessary	Thermoset cross-linked styrene copolymer with glass mat reinforcement

*See Index of Manufacturers

9.0 - ENCAPSULANTS, FOAM

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Stycast 1090/9	EMC	BS502565	0.31	0.07	16 at 125	9 PHR catalyst #9 Cellular filled foam
Stycast 1095/11	EMC		0.01	0.01	24 hrs. at 260	
Stycast 1095/17	EMC	BS502629			3 at 210 + 2 at 300	25 PHR catalyst #17 Cellular filled foam
**Stycast 1090/11	EMC	BS502526	0.63	0.11	12 at 140 + 3 at 180	12 PHR catalyst #11 Cellular filled foam

*See Index of Manufacturers
**Material used in electronic packaging applications

10.0 - ENCAPSULANTS, SOLID

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Epoxylite 295-1 A/B	EPC		1.27	0.17	8 at 235	1 part A to 1 part B
Hyson C7-4248	HYS	BS502669	0.66	0.23	2 at 250 + 16 at 300	Catalyzed as received
Maraset 655/553	MRC	BS504195	0.59	0.00	16 at 180	20 PHR hardener 553
Scotchcast 260	MME	BS502683	0.52	0.03	0.5 at 300	Catalyzed as received
**Scotchcast 281 A/B	MME	BS502547	0.36	0.05	20 at 167	100 parts A to 150 parts B
Stycast 2762/17	EMC	BS502661			3 at 200 + 3 at 300	10 PHR catalyst #17
Stycast 2850 FT/9	EMC	BS502660	0.34	0.04	16 at 125	3 PHR catalyst #9
Stycast 2862 A/B	EMC	BS502659	0.32	0.04	3 at 300	100 parts A to 100 parts B
Stycast 3050/11	EMC	BS502658	0.68	0.06	16 at 170	9.5 PHR catalyst #11
DC-77-002	DCC		0.39	0.06	4 hrs. at 149	10 parts Resin 1 part Catalyst
DC-93-500	DCC		0.22	0.02	172 hrs. RT	
Stycast TPM-4	EMC		0.23	0.08	16 hrs. at 225	
Sylgard 184	DCC		0.24	0.09	16 hrs. at RT	1000 parts Resin 10 parts Catalyst

*See Index of Manufacturers
**Material used in electronic packaging applications

10.0 - ENCAPSULANTS, SOLID

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Furine Type 403	FPI		0.43	0.01	No further cure necessary	ARFM**
Hysol C-94188 Ferro V-780	HYS		0.96	0.03	1 at RT 1 at 120 1 at 340	Dye potting compound
RTV11/Silver T-12	GES		0.08	0.01	24 hrs. at RT	100 parts Resin 2 parts Catalyst
RTV11/T-12	GES		0.33	0.10	24 hrs. at RT	100 parts Resin 2 parts Catalyst
RTV60	GES		0.17	0.05	24 hrs. at RT	100 parts Resin 2 parts Catalyst
RTV566 A/B	GES		0.07	0.04	168 hrs. at RT	Phenyl-Methyl
RTV566 A/B	GES		0.23	0.03	168 hrs. at RT	Dimethyl
Marasett 655/555	MRC		0.41	0.00	16 hrs. at 82°C	100 parts 655 20 parts 553
Rigidite 5505	WCM		0.46	0.01	0.5 hr. at 200	Boron/Epoxy
Stycast 1263/31	EMC		0.12	0.01	16 hrs. at 225 + 24 hrs. at 300	100 parts 1263 3 parts 31
Stycast 2850/ FT9	EMC		0.34	0.04	16 hrs. at 77	100 parts 2850 3.5 parts 9
Stycast 2862 A/B	EMC		0.32	0.04	16 hrs. at 260	100 parts A 100 parts B

*See Index of Manufacturers
**As received from manufacturer

10.0 - ENCAPSULANTS, SOLID

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Stycast 3050/11	EMC		0.68	0.06	16 hrs. at 167°F	100 parts 3050 9.5 parts 11
Stycast 2850 GT/11	EMC		0.85	0.03	16 hrs. at 167°F	4 to 5% Catalyst by Weight
Scotchcast 260	MME		0.52	0.03	0.5 hr. at 300	ARFM**
Scotchcast 281 A/B	MME		0.36	0.05	20 hrs. at 150	100 parts A 150 parts B

*See Index of Manufacturers
**ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Glass Fabric (Volan "A" finish)	**	MIL-G-9084			No further cure necessary	All styles except 108
Style 108 Glass Fabric (Volan "A" finish)	THO	BS50255(			No further cure necessary	

*See Index of Manufacturers
**As qualified by MIL-C-9084

12.0 - FABRICS, COATED

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Armalon 98-101	DUF	BS502581	0.48	0.02	No further cure necessary	Teflon TFE on Nomex Fabric
PYRE-M.L. coated glass fabric	DUF	BS502567	0.50	0.01	No further cure necessary	Polyimide Resin
TB5 PTFE	MMI	BS502583	0.05	0.05	No further cure necessary	Teflon TFE on glass fabric
Fairprene 80-070	DUF		0.30	0.01	No further cure necessary	ARFM**
Fairprene 80-080	DUF		0.30	0.01	No further cure necessary	ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Teflon FEP 500A	DUP		0.05	0.05	No further cure necessary	ARFM**
Teflon FEP 500C	DUP		0.02	0.01	No further cure necessary	ARFM**
Tedlar A-130WH	DUM		0.47	0.00	No further cure necessary	ARFM**
Tedlar 100 BG 30TR	DUM		0.23	0.10	No further cure necessary	ARFM**
Tedlar 100BG30TL	DUM		0.09	0.09	No further cure necessary	ARFM**
FEP Shrink Tubing						
Black	FCC		0.03	0.01	No further cure	ARFM**
Yellow	FCC		0.03	0.01	No further cure	ARFM**
Clear	FCC		0.03	0.01	No further cure necessary	ARFM**
Kapton 200 XH667	DUM		0.14	0.09	No further cure necessary	ARFM**
Kapton 300	DUM		0.54	0.05	No further cure necessary	ARFM**
Mylar Type 500A	DUM		0.24	0.06	No further cure necessary	ARFM**
Mylar H-S	DUM		0.50	0.06	No further cure necessary	ARFM**
RT/Duroid 5870	ROG		0.12	0.02	No further cure necessary	ARFM**
Teflon FEP 100A	DUP		0.06	0.06	No further cure necessary	ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

13.0 - FILMS AND SHEETS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Cronar Ortho S Litho	DUM	BS502685			No further cure necessary	Polyester Photographic Film
P-2300	UCP		0.03	0.01	0.5 hr at 257	Annealed
P-7395-121-2	UCP		0.09	0.02	No further cure necessary	ARFM***
PPO 531-081 (Opaque)	GEC		0.09	0.02	No further cure necessary	ARFM***
PPO 681-111 (Clear)	GEC		0.57	0.07	0.5 hr. at 356	Annealed
Parylene C	UCP		0.12	0.01	No further cure necessary	ARFM***
Parylene N	UCP		0.30	0.01	No further cure necessary	ARFM***
RT/Duroid 5813	ROG		0.22	0.02	No further cure necessary	
RT/Duroid 5600	ROG		0.22	0.03	No further cure necessary	ARFM***
RT/Duroid 5650	ROG		0.28	0.01	No further cure necessary	ARFM***
Kapton XH667	DUM	BS502578	0.14	0.09	No further cure necessary	Polyimide
Kapton XHF	DUM	BS502670	0.54	0.05	No further cure necessary	FEP Fluorocarbon coating on one or both sides of polyimide
Mylar, Type A	DUM	BS592504	0.24	0.06	No further cure necessary	Polyethylene terephthalate

*See Index of Manufacturers
**Material used in electronic packaging applications
***ARFM - As received from manufacturer

13.0 - FILMS AND SHEETS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Mylar, Type A,	DUM	BS502505			No further cure necessary	Metallized by Standard Packaging Corporation
Tedlar, Type 30, Modification B, High Gloss, white	DUM	BS502550	0.47	0.000	No further cure necessary	Polyvinyl fluoroide
**Tedlar, Type 30, Modification B, High Gloss, White, Aluminized	DUM	BS502551			No further cure necessary	Metallized by Standard Packaging Corporation
**Teflon FEP, Type A	DUP	BS502542 (ST 10025)	0.06	0.06	No further cure necessary	Fluroinated ethylene - propylene
Teflon FEP, Type A, Aluminized	DUP	BS502543			No further cure necessary	Metallized by Standard Packaging Corporation
**Cronoflex CFM, PFM, DFM	DUM	BS502614			No further cure necessary	Photosensitized Mylar sheet
Teflon, FEP	DUP		0.07	0.01	No further cure necessary	ARFM***

*See Index of Manufacturers
**Material used in electronic packaging applications
***ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
DC-210	DCC	BS502562			No further care necessary	Silicone fluid for dampers

*See Index of Manufacturers

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Eccofoam SH	EMC	BS502640	1.03	0.01	No further care necessary	Closed cell, rigid
Polystyrene			0.26	0.01	No further cure necessary	

*See Index of Manufacturer.

16.0 HONEYCOMB CORE

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Hexcel HMH	HEX	BS504207	0.18	0.17	No further care necessary	Mylar Polyester
HRP Composite (facing)			0.81	0.01	No further cure necessary	Facing only - ARFM**

**ARFM - As received from manufacturer
*See Index of Manufacturers

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Elco Fluoro Silicone Connectors	EWC		0.26	0.03	No further cure necessary	ARFM**
Boron Nitride	4CC		0.09	0.01	No further cure necessary	ARFM**
SE-3813 (24480)	GES		0.27	0.04	No further cure necessary	ARFM**
SE-4511 (24480)	GES		0.19	0.10	No further cure necessary	ARFM**
Silastic S-9711	DCC		0.27	0.10	No further cure necessary	ARFM**
Viton A4411A-776	DUE		0.29	0.05	No further cure necessary	ARFM**
Viton A4411A-777	DUE		0.27	0.03	No further cure necessary	ARFM**
Viton A4411A-778	DUE		0.35	0.01	No further cure necessary	ARFM**
Viton A4411A-990	DUE		0.54	0.03	No further cure necessary	ARFM**
Viton B	DUE		0.46	0.01	No further cure necessary	ARFM**
Flex-Viton	RCC		0.85	0.15	No further cure necessary	ARFM**

*See Index of Manufacturers
**As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
G.E. 615 A/B	GES		0.58	0.29	4 Hrs. @ 150°F	+23 PBW SIC powder filler silicone elastomer
High K707 K-15	GES		0.70	0.08	No further cure necessary	ARFM**
High K707 K-12	GES		0.41	0.01	No further cure necessary	ARFM**
L-449-6	PSC		0.53	0.07	No further cure necessary	ARFM**
L-608-6	PSC		0.55	0.03	No further cure necessary	ARFM**
Parce 1050-70	PRP	BS 502666	0.50	0.03	No further cure necessary	Fluorosilicone
SE-3604 (24480)	GES		0.51	0.12	No further cure necessary	ARFM**
SE-3713 (24480)	GES		0.20	0.09	No further cure necessary	ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Hadbar 4000 - 80/Varox	PPH	BS502675	0.54	0.14	No further cure necessary	Silicone, Procure to ZZ-R-765 Class 11A, Grade 80
Hadbar 5000-50/Varox	PPH	BS502676			No further cure necessary	Silicone
SE-3604/Varox	GES	BS502538	0.51	0.12	Postcured 24 at 480	Silicone Rubber, ZZ-R-765 Class 11B, Grade 60
Parco 1050-70	PRP	BS502666	0.50	0.03	No further cure necessary	Fluorosilicone
JPL No. 10	DUE	BS502523	0.32	0.01	No further cure necessary	Fluorelastomer
L608-6	PSC	BS502678	0.55	0.03	No further cure necessary	Fluorosilicone
Parker 77-545	PSC	BS504186	0.24	0.03	No further cure necessary	Fluoroelastomer 70 shore
Parker V377-9	PSC	BS504187	0.33	0.01	No further cure necessary	Fluoroelastomer 90 shore

*See Index of Manufacturers

18.0 - LUBRICANTS, SOLID FILM

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Lube-Lok No. 2396	EFI	BS502557	0.21	0.16	2 at 180 + 16 at 400	Sodium Silicate/MoS_2
Lube-Lok No. 4306	EFI	BS502546	0.67	0.09	16 at 375	Phenolic/MoS_2
Molykote Microsize Powder	DCC	BS502619	0.55	0.01	As recommended by manufacturer	MoS_2
Electrofilm 4306	EFI		0.67	0.09	16 hrs. at 374	

*See Index of Manufacturers

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
**Diall 52-40-40	ACM	BS502518	0.70	0.06	As recommended by Manufacturer	Diallyl phthalate-glass MIL-M-19833A, Type GDI-30 or GDI-30F
**Delrin 100 NC-10	DUP	BS502503	0.58	0.06	As recommended by Manufacturer	Acetal
Epiall 1961 (formerly 1906L)	ACM	BS502519	0.39	0.06	As recommended by Manufacturer	Epoxy-mineral glass
Epiall 1914	ACM	BS502642			As recommended by Manufacturer	Epoxy-glass
**KEL-F 81	MMA	BS502560	0.03	0.01		
**Kynar 200,200 400	PCC	BS504194	0.21	0.15	As recommended by Manufacturer	Fluorocarbon. All grades approved
Lexan	GEC	BS502527	0.08	0.01	As recommended by Manufacturer	Polycarbonate. All grades approved
Polysulfone P-1700 P-3500	UCP	BS502603	0.09	0.02	As recommended by Manufacturer	
PPO 531-801	GEC	BS504198	0.09	0.02	As recommended by Manufacturer	Polyphenylene oxide
Vespel SP-1	DUP	BS502655	1.24	0.01	As recommended by Manufacturer	Aromatic polyimide. DuPont supplies basic shapes and machined items under the tradename "Vespel"

*See Index of Manufacturers

** Material used in electronic packaging applications

19.0 - MOLDING COMPOUNDS AND MOLDED PRODUCTS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
**Teflon FEP	DUP	BS502592	0.06	0.06	As recommended by mfg.	Fluorocarbon. All grades approved
Delrin (FA)			0.47	0.05	No further cure necessary	ARFM***
Diall FA-40	ACM	BS502641	1.0	0.02	No further cure necessary	Diallyl phthalate MIL-M-14F Type SDG
Delrin 150 NC-10	DUP		0.56	0.06	No further cure necessary	
Delrin 500 NC-10	DUP		0.48	0.07	No further cure necessary	ARFM***
Delrin 900 NC-10	DUP		0.56	0.08	No further cure necessary	ARFM***
Dial FS-4	ACM		0.58	0.02	24 hrs. at 302	ARFM***
Dial FS-10	ACM		0.70	0.03	24 hrs. at 302	ARFM***
Dial 52-40-40	ACM		0.70	0.06	No further cure necessary	ARFM***
Doryl H-17511	WEM		0.44	0.04	No further cure necessary	ARFM***
Lexan 100-111	GEC		0.06	0.02	No further cure necessary	ARFM***
Lexan 101-111	GEC		0.08	0.01	No further cure necessary	ARFM***
Lexan 101-112	GEC		0.09	0.04	No further cure necessary	ARFM***
Lexan 103-112	GEC		0.17	0.01	No further cure necessary	ARFM***

*See Index of Manufacturers
**Material used in electronic packaging applications
***ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Lexan 131-111	GEC		0.18	0.01	No further cure necessary	ARFM**
Lexan 131-112	GEC		0.17	0.01	No further cure necessary	ARFM**
Lexan 133-112	GEC		0.20	0.01	No further cure necessary	ARFM**
Lexan 140-111	GEC		0.17	0.03	No further cure necessary	ARFM**
Lexan 141-111	GEC		0.17	0.04	No further cure necessary	ARFM**
Lexan 141-112	GEC		0.17	0.02	No further cure necessary	ARFM**
Lexan 243-112	GEC		0.16	0.01	No further cure necessary	ARFM**
Luvicon M170	BCC		0.31	0.06	No further cure necessary	ARFM**
Teflon FEP	DUP	BS502592	0.06	0.06	No further cure necessary	Fluorocarbon

*See Index of Manufacturers
**ARFM - As received from manufacturer

20.0 - SLEEVING

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Ben-Har Acryl A	BHM	BS502645	0.49	0.05	No further cure necessary	Acrylic resin coated on glass. MIL-I-3190B
Ben-Har Acryl A-FAI	BHM		0.33	0.01	No further cure necessary	ARFM**
Ben-Har Acryl C2	BHM		0.33	0.01	No further cure necessary	ARFM**
Ben-Har Lecton B	BHM		0.09	0.09	24 hrs. at 302	

*See Index of Manufacturers
**ARFM - As received from manufacturer

21.0 - SHRINKABLE MATERIALS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
**Penntube II -SMT	PFC	BS502556	0.00	0.00***	No further cure necessary	Shrink 10 minutes at 350°F
**Thermofit Kynar	RAY	BS502579 (ST 10017)	0.27	0.09***	No further cure necessary	Shrink 10 minutes at 630°F
**Thermofit TFE	RAY	BS502553	0.01	0.00***	No further cure necessary	Shrink 10 minutes at 230°F
**Shrinkable Mylar	STP	BS502644	0.68	0.05	No further cure necessary	Shrink 10 minutes at 230°F
Mylar 0.004 Wall	STP		0.62	0.03	10 min. at 230	
Mylar 0.012 Wall	STP		0.68	0.05	10 min. at 230	
Thermofit TFE-R	RAY		0.01	0.00	1 hr. at 302	

*See Index of Manufacturers
**Material used in electronic packaging applications
***Postcured 1 hour at 300°F

22.0 - TAPES

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Mylar Type T	DUP	BS502577			No further cure necessary	Not pressure-sensitive, polyethylene terephthalate
Mystik 7452	BCM	BS502649	0.37	0.04	No further cure necessary	Pressure-sensitive, aluminum foil, rubber adhesive
**Fibremat-1	MME	BS502588 (ST 10022)	0.19	0.02	No further cure necessary	Dacon Webbing
**Scotch Brand No. 850	MME	BS502609 (ST 10070)	1.34	.11	No further cure necessary	Aluminized polyester, pressure-sensitive
Electrical Tapes X-1170	MMA		0.96	0.47	No further cure necessary	Aluminum foil - 67% of Wt.
Electrical Tapes X-1181	MMA		0.52	0.21	No further cure necessary	Copper foil - 81% of Wt.
Mystic 830	BCM		0.77	0.07	16 hrs. at 302	ARFM**
Mystic 4043	BCM		0.68	0.02	No further cure necessary	ARFM**
Mystic 7341	BCM		0.65	0.01	No further cure necessary	ARFM**
Mystic 7452	BCM		0.15	0.06	No further cure necessary	ARFM**
Mystik 7420	BCM		0.84	0.02	No further cure necessary	ARFM** Tape, Copper backing
Mystik 7453	BCM		0.64	0.04	No further cure necessary	Tape - Aluminum backing
Mystik 4052	BCM		0.50	0.02	No further cure necessary	ARFM** Tape

*See Index of Manufacturers
**ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Scotch Tape No. 850 Transparent	MMA		0.79	0.06	No further cure necessary	Polyester film tape - ARFM** pressure - sensitive adhesive
Scotch Pak No. 8	MME		0.19	0.06	No further cure necessary	Polyester Film - ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

23.0 - TEMPERATURE CONTROL COATINGS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Cat-A-Lac Flat Black	FPC	BS501403	13.00	1.52	16 at 75	1 hour dry time between coats
**Laminar X-500 Gloss Black	MCC	BS502653	18.45	0.05	16 at 75	1 hour dry time between coats
**Laminar X-500 Clear	MCC	BS501405	20.44	0.10	16 at 75	1 hour dry time between coats
Laminar X-500 Flat Green	MCC	BS501406			16 at 75	1 hour dry time between coats
**PV-100 Gloss White	VVP	BS501404	2.48	0.30	16 at 75	1 hour dry time between coats
S-13, S-13G	***	BS502617			16 at 75	1 hour dry time between coats

*See Index of Manufacturers
**Material used in electronic packaging applications
***Recommended Supplier: ITR

24.0 - TIE CORD (LACING TAPE)

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Pre-shrunk Temp-Lace 256	GBE	BS502651	0.60	0.05	No further cure necessary	Fluorocarbon fabric
Astro-Tex	IWC		0.58	0.07	No further cure necessary	ARFM**
Temp-Lace H256H	GBE		0.60	0.05	No further cure necessary	ARFM**
Temp-Lace 256	GBE		0.12	0.03	No further cure necessary	ARFM**
Temp-Lace 256H	GBE		0.64	0.10	No further cure necessary	ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

25.0 - WIRE ENAMELS

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
Formex	GEN		0.06	0.03	No further cure necessary	Acetal, procured, already applied to conductor
**PYRE-M.L.	DUP	BS504211	1.12	0.00	As recommended by Mfg.	Polyimide
Copper Wire 38 AWG with Gripeze #2	PHD		0.16	0.02	No further cure necessary	ARFM***
Magnet Wire (Format)	GEW		0.06	0.03	No further cure necessary	ARFM***
Magnet Wire (Urethane)	GEW		0.22	0.09	No further cure necessary	ARFM***
PYRE-M.L. Varnish	DUP		0.07	0.02	No further cure necessary	ARFM***

*See Index of Manufacturers
**Material used in electronic packaging applications
***ARFM - As received from manufacturer

Product Designation	Mfg*	Material Specification	Outgassing		Cure Cycle (hours at °F)	Remarks
			Total Weight Loss (%)	VCM(%)		
CT 505 Extruded Glass filled Teflon rod	CPC		0.01	0.01	No further cure necessary	ARFM**
Gylon Gasket	CLI		0.04	0.04	No further cure necessary	ARFM**
Hycar 520-67-108-5	HFG		0.95	0.03	No further cure necessary	ARFM**
Rexolite 1422	AEC	BS502535	0.18	0.01	No further cure necessary	Thermoset, cross-linked Styrene Copolymer
Trucast			0.38	0.02	No further cure necessary	ARFM**
1050-70	PRP		0.50	0.03	No further cure necessary	ARFM**

*See Index of Manufacturers
**ARFM - As received from manufacturer

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Code	Manufacturer
AAC	Ablestik Adhesive Company
ACB	American Cyanamid Company, Bloomingdale Department
ACF	American Cyanamid Company, Formica Corp.
ACM	Allied Chemical Corporation, Mesa Products, Plastics Division
AEC	American Enka Corp.
APC	Armstrong Products Company
ARP	American Reinforced Plastics Company
BCC	BASF Colors and Chemicals, Inc.
BCM	The Borden Company, Mystik Tape, Inc.
BFG	B. F. Goodrich Chemical Company
BIW	Boston Insulated Wire
CAR	Carter's Ink Company
CHR	Connecticut Hard Rubber Co.
CVC	Consolidated Vacuum Corporation
DCC	Dow-Corning Company
DUE	E. I. DuPont de Nemours and Company, Elastomer Chemicals Department
DUF	E. I. DuPont de Nemours and Company, Fabrics and Finishes Department
DUM	E. I. DuPont de Nemours and Company, Film Department
DUP	E. I. DuPont de Nemours and Company, Plastics Department
EFI	Electrofilm, Inc.
EKC	Eastman Kodak Company
EMC	Emerson and Cuming, Inc.
ENJ	Enjay Chemical Company
EPC	Epoxylite Corporation

Index of Manufacturers (sheet 2 of 3)

Code	Manufacturer
FLC	Fortin Laminating Corporation
FPC	Finch Paint and Chemical Company
FPI	Furane Plastics, Inc.
FRC	Fargo Rubber Corporation
GBE	Gudebrod Brothers Silk Company, Inc., Electronics Division
GEC	General Electric Company, Chemical Materials Department
GES	General Electric Company, Silicone Products Department
GEW	General Electric Company, Wire and Cable Department
GMC	General Mills, Chemical Division
HCC	Hughson Chemical Company
HEX	Hexcel Products, Inc.
HYS	Hysol Corporation
IBM	IBM Corporation
IND	Independent Ink Company
ITR	Illinois Institute of Technology Research Institute
MCC	Magna Coatings and Chemical Corporation
MMA	3M Company, Adhesives, Coatings, and Sealers Division
MMC	3M Company, Chemical Division
MME	3M Company, Electrical Products Division
MMI	3M Company, Irvington Division
MRC	The Marblette Corporation
PER	Permacel
PFC	Pennsylvania Fluorocarbon Company
PKA	Park Avenue
PPH	Purolator Products, Inc., Hadbar Division
PRC	Products Research and Chemical Corporation

Index of Manufacturers (sheet 3 of 3)

Code	Manufacturer
PRP	Plastic and Rubber Products Company
PSC	Parker Seal Company
PTI	Product Techniques, Inc.
RAY	Raycla·l Tubes, Inc.
REM	Rembrandt
SAN	Sanford's Ink Company
SOC	Shell Oil Company
SCA	Shell Chemical Company, Adhesives Department
SCP	Shell Chemical Company, Plastics and Resins Department
SIS	Sargent Industries, Stillman Rubber Division
SPT	Stone Paper Tube Company
TCC	Thiokol Chemical Corp.
THO	Thalco
TMC	The Mica Corporation
UCC	Union Carbide Chemicals Company
UCP	Union Carbide Corporation, Plastics Division
VVP	Vita Var Paint Company
WCN	Whittaker Corporation, Narmco Division
WEI	Westinghouse Electric Corporation, Insulating Materials Division
WEM	Westinghouse Electric Corporation, Micarta Division
WPP	Wornow Process Paint Company