INCH-POUND
MIL-I-24768/17
25 February 1992
SUPERSEDING
MIL-P-997D
23 November 1966

MILITARY SPECIFICATION SHEET

INSULATION, PLASTIC, LAMINATED, THERMOSETTING, GLASS-CLOTH, SILICONE-RESIN (GSG)

This specification is approved for use by all departments and agencies of the Department of Defense.

The requirements for acquiring the insulation material described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-I-24768.

REQUIREMENTS:

Construction: The material shall consist of a glass cloth impregnated and coated with a silicone-resin compound or binder and processed to conform to this specification.

Intended use: The laminated material covered by this specification is a rigid plastic laminate designed for electrical applications up to 180 degrees Celsius (°C). The material has especially low dielectric losses suitable for use in transformers, radio transmitter parts, motor slot wedges, slot liners, and low loss high frequency radio and radar insulators. It has excellent flame and arc resistance.

Forms: Sheets and rolled tubes are recommended forms of laminated material covered by this specification.

Temperature indices: The laminated material covered by this specification has a mechanical strength test index of 220, and an electrical strength test index of 170.

Dimensions and part numbers:

Thickness of sheets: The thickness of laminated sheets, permissible variations, and the applicable part number shall be as specified in table I.

Length and width: Manufacturer's standard sizes of sheets between 11.5 and 19 inches in width and 20.5 and 36 inches in length will be acceptable. Each sheet shall contain at least 365 square inches and not more than 432 square inches.

AMSC N/A FSC 5970

TABLE I. *Thickness of laminated sheets.*

Part number	Nominal thickness (inches)	Permissible variations (± inch)
M24768/17-S-1	0.010	0.002
M24768/17-S-2	0.015	0.003
M24768/17-S-3	0.020	0.004
M24768/17-S-4	0.025	0.005
M24768/17-S-5	0.031	0.0065
M24768/17-S-6	0.047	0.0075
M24768/17-S-7	0.062	0.0075
M24768/17-S-8	0.094	0.009
M24768/17-S-9	0.125	0.012
M24768/17-S-10	0.156	0.015
M24768/17-S-11	0.188	0.019
M24768/17-S-12	0.219	0.021
M24768/17-S-13	0.250	0.022
M24768/17-S-14	0.312	0.026
M24768/17-S-15	0.375	0.030
M24768/17-S-16	0.438	0.033
M24768/17-S-17	0.500	0.036
M24768/17-S-18	0.625	0.040
M24768/17-S-19	0.750	0.043
M24768/17-S-20	0.875	0.046
M24768/17-S-21	1.000	0.049
M24768/17-S-22	1.125	0.053
M24768/17-S-23	1.250	0.055
M24768/17-S-24	1.375	0.058
M24768/17-S-25	1.500	0.061
M24768/17-S-26	1.625	0.064
M24768/17-S-27	1.750	0.067
M24768/17-S-28	1.875	0.070
M24768/17-S-29	2.000	0.073
M24768/17-S-30	2.125	0.079
M24768/17-S-31	2.500	0.085
M24768/17-S-32	2.750	0.091
M24768/17-S-33	3.000	0.097
M24768/17-S-34	3.500	0.110
M24768/17-S-35	4.000	0.122
M24768/17-S-36	4.500	0.134
M24768/17-S-37	5.000	0.142
M24768/17-S-38	5.500	0.156
M24768/17-S-39	6.000	0.172
M24768/17-S-40	6.500	0.180
M24768/17-S-41	7.000	0.195
M24768/17-S-42	7.500	0.210
M24768/17-S-43	8.000	0.216
M24768/17-S-44	8.500	0.232
M24768/17-S-45	9.000	0.240
M24768/17-S-46	9.500	0.255
M24768/17-S-47	10.000	0.270
M24768/17-S-48	–[1]	–[2]

See footnotes on next page.

[1]For part numbers of sheets not listed in this table, the thickness shall be included after the part number. Example of this for a 0.8125 inch thick sheet is: M24768/17-S-48-0.8125.
[2]On sheets of nominal thickness not listed in this table, the permissible variations shall be the same as for the next greater thickness.

Diameter of rolled round tubes: The range of sizes for rolled round tubes shall be as specified in table II. The inside diameter and outside diameter shall be included in the part number. An example of a part number for a rolled round tube with an inside diameter of 0.375 inch and an outside diameter of 0.437 inch is: M24768/17-TRR-0.375/0.437. The wall thickness tolerances for rolled round tubes with an inside diameter up to 4 inches shall be as specified in table III.

TABLE II. *Range of sizes for rolled round tubes.*

Inside diameter (inches)		Outside diameter (inches)		Wall thickness (inch)		Maximum ratio of wall thickness to inside diameter
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
0.375	6.000	0.437	6.750	0.031	0.375	1/2

TABLE III. *Wall thickness tolerances.*

Wall thickness (inch)	Tolerances (± inch)
0.016 to 0.030	
0.031 to 0.061	0.008
0.062 to 0.124	0.009
0.125 to 0.249	0.011
0.250 to 0.375	0.013

Performance requirements: Performance requirements for laminated materials shall be as specified in tables IV and V.

The following performance requirements do not apply to this plastic laminate:

a. Flammability
b. Surface resistance
c. Volume resistivity
d. Silicone content
e. Tracking resistance.

Testing: The laminated material covered by this specification shall be tested under qualification inspection requirements.

TABLE IV. *Performance requirements for sheets.*

Requirement	Cond.	Test para.	Unit	Thickness (inches)[1]									
				0.031	0.062	0.094	0.125	0.188	0.250	0.500	0.750	1.000	1.001 – Max.
Dielectric breakdown voltage[2]	A D-48/50	4.6.4	Min. kV	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	32.0 15.0	25.0
Dielectric constant	A D-24/23	4.6.6	Max.	4.20 4.50	4.20 4.40	4.20 4.30	4.20 4.20	4.20 4.20	4.20 4.20	4.20 4.20	4.20 4.20	4.20 4.20	4.20 4.20
Dissipation factor	A D-24/23	4.6.6	Max.	0.003 0.070	0.003 0.050	0.003 0.035	0.003 0.022	0.003 0.022	0.003 0.022	0.003 0.022	0.003 0.022	0.003 0.022	0.003 0.022
Volume resistivity	C-96/35/90	4.6.7	Min. megohm cm										
Surface resistance	C-96/35/90	4.6.8	Min. megohm										
Arc resistance[2]	D-48/50	4.6.9	Min. seconds				180	180	180	180	180	180	180
Impact strength[2] Lengthwise: Crosswise:	E-48/50	4.6.11	Min. ft-lbs. per inch				6.5 5.5	6.5 5.5	6.5 5.5	6.5 5.5	6.5 5.5	6.5 5.5	6.5 5.5
Flexural strength Lengthwise: Crosswise:	A	4.6.12	Min. psi	10,000 8,000	20,000 18,000	20,000 18,000	20,000 18,000	18,000 15,000	18,000 15,000	16,000 13,000	16,000 13,000	14,400 11,700	14,400 11,700
Thermal endurance Flexural strength:	E-1/250: T-250	4.6.13	Min. psi		4,500		4,000			3,300			
Bonding strength[2]	A D-48/50	4.6.15	Min. pounds							650 550	650 550	650 550	650 550

See footnotes at end of table.

TABLE IV. *Performance requirements for sheets – Continued.*

Requirement	Cond.	Test para.	Unit	Thickness (inches)[1]									
				0.031	0.062	0.094	0.125	0.188	0.250	0.500	0.750	1.000	1.001 - Max.
Water absorption	D_1-24/23	4.6.17	Max. percent	0.68	0.55	0.45	0.35	0.30	0.25	0.20			
Silicone content	E-168/185	4.6.18	Max. ppm										
Flame resistance													
Ignition time:	A	4.6.19	Min. sec.										
Burning time:			Max. sec.										

[1]For intermediate thicknesses, the value for the next smaller thickness shall apply.
[2]Maximum thickness tested shall be 2.000 inches.

TABLE V. *Performance requirements for rolled tubes.*

Requirement	Cond.	Test para.	Unit	Inside diameter (inches)	Wall thickness (inches)						
					0.031–0.047	0.048–0.062	0.063–0.094	0.095–0.125	0.126–0.188	0.189–0.250	0.251–0.375
Dielectric strength	A	4.6.5	Min. volts per mil	0.375–6.000	100	100	125	125	115	115	100
Compressive strength[1]	A	4.6.14	Min. psi	0.375–0.999 1.000–6.000			6,000 6,000	6,000 6,000	6,000 6,000	6,000 6,000	6,000 6,000
Specific gravity	A	4.6.16	Min.	0.375–0.999 1.000–6.000	1.55 1.58	1.55 1.58	1.55 1.58	1.55 1.58	1.55 1.58	1.55 1.58	1.55 1.58
Water absorption	D_1-24/23	4.6.17	Max. percent	0.375–6.000	1.0	1.0	1.0	0.8	0.8	0.8	0.8

[1]Values apply to inside diameters of 0.375 inch and over and to outside diameters of 2.000 inches and less.

Custodians:
Army – ER
Navy – SH
Air Force – 20

Review activities:
Army – MI, AR, EA
Navy – EC, OS
Air Force – 85

User activities:
Army – ME
Navy – MC, AS

Preparing activity:
Navy – SH
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