

MILITARY SPECIFICATION
INSULATION, ELECTRICAL, SYNTHETIC-RESIN
COMPOSITION, NONRIGID

This amendment forms a part of Military Specification MIL-I-631D, dated 15 November 1961, and is mandatory for use by all Departments and Agencies of the Department of Defense.

Page 2

2.1: Delete reference to "I-P-406" and "MIL-S-3136" and under "SPECIFICATIONS, FEDERAL" insert "TT-S-735 - Standard Test Fluids; Hydrocarbon."

2.1: Add the following under "STANDARDS":

"FEDERAL
FED-STD-406 - Plastics: Methods of Testing."

2.2: Delete and substitute:

"2.2 The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
D 150 - A-C Loss Characteristics and Dielectric Constant (Permittivity) of Solid Electrical Insulating Materials, Tests for.
D 876 - Nonrigid Vinyl Chloride Polymer Tubing, Testing.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 West Jackson Boulevard, Chicago, Illinois 60606.)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies."

3.1: Delete and substitute:

"3.1 Qualification. Electrical insulation furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3)."

1/ CHANGES FROM PREVIOUS ISSUE. THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "#" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

FSC 5970

3.2.1, line 3: Delete "Bureau of Ships" and substitute "Naval Ship Engineering Center".

3.3.1.1, first sentence: Delete and substitute "Film is defined as material with a thickness of 0.010 inch or less, in widths greater than 3 inches."

Table I, title: Delete "0.002" and substitute "0.010".

Table I, column 9: For dielectric strength, delete "3,500" through "85" inclusive and substitute "3,500", "3,200", "3,000", "80", "80", and "85". For elongation, insert "50" between "50" and "35".

Table II: Delete and substitute:

"Table II - Property values of synthetic-resin electrical insulation - forms S and T (greater than 0.010 inch in thickness).

Property to be tested	Test reference	Conditioning procedure (see 4.4)	Unit of value	Nominal thickness	Value required for each type of material								
					A	B	C	D	E	F Grade a	G		
Dielectric constant (form S only) At 1 kilo-cycle At 1 mega-cycle	4.6.3	C-96/23/0 C-96/23/96 C-96/23/0 C-96/23/96	Maximum Maximum	Natural colors	Other colors							
					2.5	2.5	4.0	4.5	4.0	5.0	7.0	3.5	
					2.7	2.7	5.0	8.7	5.0	6.0	8.0	3.7	
					2.5	2.5	4.0	4.3	4.0	...		3.3	
					2.7	2.7	5.0	7.0	5.0	...		3.5	
Volume resistivity (form S only)	4.6.4.1	C-96/23/0 C-96/23/96	Ohm-centimeters (min.)		10^{17} 10^{16}		10^{13} 10^{12}	10^{13} 10^{10}	10^{14} 12^{12}	10^{13} 10^{12}	10^{11} 10^{10}	10^{15} 10^{15}	
Tensile strength	4.6.5.1	C-96/23/50	P.s.i. (min.)	..... .014	1,400		5,000	6,000	3,500	3,500	1,800	17,000 16,000
Elongation	4.6.5.1	C-96/23/50 C-96/23/50 E-400/100	Percent (min.)	.010	350		25	10	25	15	200	80	
			Percent (max.)	.014	100
			Percent change (max.)
Elongation		E-400/130	Percent change (max.)	..... .010 .014	..... ..... .....		..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	25 25 30
Percent return	4.6.5.2	C-96/23/50	Percent (min.)	.....	.....		.....	.....	.....	.....	80	.....
Softening temperature (penetration)	4.6.7	C-96/23/50	Degrees centigrade (min.)	.....	65		120	160	110	120	75	200
Lengthwise shrinkage	4.6.8	E-2/100 E-2/150	Percent (max.)	.....	2.0		3.0	3.0	2.0	5.0	10.0	.....
			Percent (max.)	5.0

Table II - Property values of synthetic-resin electrical insulation - forms S and T (greater than 0.010 inch in thickness). (Continued)

Property to be tested	Test reference	Conditioning procedure (see 4.4)	Unit of value	Nominal thickness	Value required for each type of material							
					A	B	C	D	E	F Grade a	G	
Dielectric strength ^{1/}	4.6.2	C-96/23/0	Volts per mil (minimum)	Inch	Natural colors	Other colors						
				0.003	3,100		1,900	1,900	2,600	1,200	.....	2,450
				.005	2,400		1,550	1,550	2,150	1,070	.....	2,000
				.0075	.....		.....	.....	.....	.....	.....	1,600
				.008	1,800		1,300	1,250	1,800	960	1,045	.....
				.010	1,600		1,200	1,150	1,550	920	.....	1,500
				.012	.....		.....	.....	.....	.....	.....	950
				.014	.....		.....	.....	.....	.....	.....	1,400
				.016	1,300		1,000	950	1,200	940	820	.....
				.020	1,100		900	840	1,050	790	700	.....
				.025	960		820	760	920	740	630	.....
				.030	870		760	700	830	700	570	.....
				.040	740		640	620	700	600	480	.....
				.050	660		550	550	610	530	430	.....
.060	600		490	490	540	450	400	.....			
Dielectric strength ^{1/}		C-96/23/96	Percent of dry value obtained on test (min.)	All thicknesses	75	85	75	55	90	90	.....
Dielectric strength ^{1/}		C-96/23/96	Percent of dry value obtained on test (min.)	Inch								
				0.003	.....	.....	.....	.....	.....	.....	85	
				.005	.....	.....	.....	.....	.....	.....	90	
				.0075	.....	.....	.....	.....	.....	.....	90	
				.010	.....	.....	.....	.....	.....	.....	90	
				.014	.....	.....	.....	.....	.....	.....	90	
Dissipation factor (form S only)	4.6.3	C-96/23/0	Maximum	.....	0.0006	0.0025	0.02	0.035	0.015	0.08	0.14	0.006
				.....	.0008	.0040	.03	.070	.03	.08	.16	.0065
				.....	.0006	.0025	.045	.05	.028	.....	.....	.030
				.....	.0008	.0040	.055	.07	.045	.....	.....	.035

^{1/} For thickness not shown, the dielectric strength shall be that given for the nearest thickness shown."

Table IV: Delete and substitute:

"Table IV - Standard thicknesses of film and film tape (form F and subform T_P).

Nominal thickness	Tolerance (±)	
	Type G	Other types
Inch	Inch	Inch
0.0005	0.0001	.....
.0010	.0002	0.0001
.0015	.0004	.0002
.002	.0004	.0002
.003	.0004	.....
.005	.0005	.....
.0075	.0005	.....
.01	.0005	.....

Table V: Opposite ".010" insert ".0016" under type G. Between ".012" and ".016" insert ".014" under nominal thickness and ".0020" under type G.

Page 11

Table VII: Delete and substitute:

"Table VII - Tubing lengths.

Nominal inside diameter	Minimum length
Inch	Feet
0.022 - 0.027	1,200
.034 - .059	1,000
.066 - .166	500
.186 - .330	200
.360 - .600	100
.600 and over	50

Page 14

4.1: Delete and substitute:

"4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements."

4.3 and footnote¹: Delete and substitute:

"4.3 Qualification tests. Qualification tests shall be conducted at a laboratory satisfactory to the Naval Ship Engineering Center. Qualification tests shall consist of the tests specified in table XI. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.3 and 6.4)."

4.3.1: Delete and substitute:

"4.3.1 Samples. Separate samples for each type, form, and subform of material for which approval is requested shall be furnished in sizes and quantities shown in table X (see 4.3.2.2). Qualification for forms U_a and U_b may be obtained separately because of the large number of sizes in these subforms. The same applies to both subforms (T_r and T_s) under form T. If all of the thicknesses or sizes shown in table X are not tested, the qualification will apply only to the thickness or size tested."

Page 24

4.6.12.2, line 1: Delete "Specification L-P-406" and substitute "FED-STD-406".

4.6.12.3, lines 2 and 3: Delete "Specification L-P-406" and substitute "FED-STD-406".

4.6.12.4, line 4: Delete "Specification L-P-406" and substitute "FED-STD-406".

Page 25

4.6.14.2, line 2: Delete "Specification MIL-S-3316" and substitute "TT-S-735".

Page 4
of 5 pages

Page 28

- # 5.2.1, listing: Last line of listing opposite "PPP-B-636", delete "Class 2" and substitute "Class weather resistant".
- # 5.2.2, listing: Last line of listing opposite "PPP-B-636", delete "Class 2" and substitute "Class weather resistant".

Page 30

- # 6.3 and 6.4: Delete and substitute:

"6.3 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in applicable Qualified Products List QPL-631 whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Ship Engineering Center, Department of the Navy, Washington, D. C. 20360, and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.4).

"6.4 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120."

Page 31

- # Notice: Delete.

Custodians:
Army - EL
Navy - SH
Air Force - 11

Preparing activity:
Navy - SH
(Project 5970-0266)

Review activities:
Army - EL, MI, MU
Navy - SH, AS
Air Force - 11, 82