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J-W-1177/1A
September 27, 1976
SUPERSEDING
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September 21, 1973

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 105, TYPE E OLEORESINOUS-ENAMEL-COATED, ROUND

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies.

The complete requirements for procuring the wire described herein shall consist of this document and the latest issue of Specification J-W-1177/GEN.

The magnet wire shall be of the following classification: Class 105, type E (single), round.

REQUIREMENTS:

1. Qualification is required.
2. Insulating materials. The film coating shall be composed of natural resins with or without the minor addition of synthetic resins.
3. Thermal evaluation. When tested in accordance with 4.7.18.1, the temperature index of AWG No 18 film coated magnet wire shall be not less than 105. When tested in accordance with 4.7.18.2 for 168 hours at 180°C., the minimum dielectric breakdown strength shall be not less than 1000 volts per mil.
4. Dimensions - increase in diameter. When measured in accordance with 4.7.1 and 4.7.1.2, the bare wire diameter, the minimum increase in diameter due to the film coating and the maximum overall diameter shall be as shown in table I.

TABLE I - Dimensions, sizes 25 to 44 AWG.

AWG size	Bare wire diameter, inch[1/]			Type E, single	
	Minimum	Nominal	Maximum	Minimum increase in diameter, inch	Maximum overall diameter, inch
25	0.0177	0.0179	0.0180	0.0009	0.0194
26	.0157	.0159	.0160	.0008	.0173
27	.0141	.0142	.0143	.0008	.0156
28	.0125	.0126	.0127	.0007	.0139
29	.0112	.0113	.0114	.0007	.0126
30	.0099	.0100	.0101	.0006	.0112
31	.0088	.0089	.0090	.0006	.0099
32	.0079	.0080	.0081	.0006	.0090
33	.0070	.0071	.0072	.0005	.0080
34	.0062	.0063	.0064	.0005	.0071
35	.0055	.0056	.0057	.0004	.0063
36	.0049	.0050	.0051	.0004	.0057
37	.0044	.0045	.0046	.0003	.0051
38	.0039	.0040	.0041	.0003	.0046
39	.0034	.0035	.0036	.0002	.0040
40	.0030	.0031	.0032	.0002	.0036
41	.0027	.0028	.0029	.0002	.0032
42	.0024	.0025	.0026	.0002	.0029
43	.0021	.0022	.0023	.00015	.0025
44	.0019	.0020	.0021	.0001	.0023

[1/] These bare wire diameters may be exceeded, provided:

(a) The maximum diameters specified by QQ-W-343 are not exceeded,
(b) The minimum increases in diameter shown in table I are maintained, and
(c) The maximum overall diameters shown in table I are not exceeded.

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5. Adhesion. When the wire is tested in accordance with 4.7.2.1 and elongated 15 percent or to the breaking point, whichever is less, no cracks shall be visible in the film coating.
6. Elongation. When tested in accordance with 4.7.4.1 the wire shall meet the requirements shown in table II.

TABLE II - Elongation of finished wire.

AWG size	Minimum elongation, percent	AWG size	Minimum elongation, percent
25	28	35	21
26	27	36	20
27	27	37	20
28	26	38	19
29	26	39	18
30	25	40	17
31	24	41	17
32	24	42	16
33	23	43	15
34	22	44	14

7. Springback. When tested in accordance with 4.7.6 the springback shall not exceed the values shown in table III.

TABLE III - Springback of finished wire.

AWG size	Maximum springback, degrees
25	72
26	76
27	50
28	55
29	61
30	66

8. Dielectric strength. When tested in accordance with 4.7.8.2. the breakdown voltage of the wire shall be not less than the values shown in table IV.

TABLE IV - Minimum breakdown voltages.

AWG size	Volts	AWG size	Volts
25	2625	35	1325
26	2550	36	1200
27	2500	37	1075
28	2425	38	950
29	2375	39	850
30	2300	40	775
31	2075	41	700
32	1850	42	625
33	1675	43	550
34	1500	44	500

9. Continuity. When the wire is tested in accordance with 4.7.9 the number of discontinuities shall not exceed the number shown in table V.

TABLE V - Continuity.

AWG size	Maximum number of discontinuities
25-29	10
30-34	10
35-40	15
41-44	20

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10. Thermoplastic flow. When tested in accordance with 4.7.7 the specimens of size 36 AWG heavy-film-coated wire shall not cause the circuit to operate at a temperature below 180°C.
11. Solubility. When the wire is tested in accordance with 4.7.11, the film coating on a specimen of size 36 AWG film coated wire which has been annealed by baking for 10 minutes at 150° +3°C and immersed in petroleum naptha shall not soften sufficiently to expose the bare conductor.

QUALITY ASSURANCE PROVISIONS:

Qualification and quality conformance inspection - Qualification and quality conformance inspection shall consist of the examination and tests shown in table VI.

TABLE VI - Qualification and quality conformance inspection.

Examination or test	Test paragraph	Qualification inspection	Quality conformance inspection (Group)
Visual and dimensional	4.7.1	X	A
Adhesion	4.7.2.1	X	A
Elongation	4.7.4.1	X	A
Springback	4.7.6	X	A
Dielectric strength	4.7.8.2	X	B
Continuity	4.7.9	X	B
Thermoplastic flow	4.7.7	X	C
Solubility	4.7.11	X	C
Thermal evaluation	4.7.18.2	-	C
Temperature index	4.7.18.1	X	-

Intended use. Type E magnet wire is intended for applications where a high space factor is needed and where mechanical abuse is not great.

Custodians:
Army - EL
Navy - SH
Air Force - 80
Review activity:
Army - EL, MI, MU
User Activity:
Army - ME
Navy - AS, CG, MC

Preparing activity:
Navy - SH

Civil Agency Coordinating Activities
GSA - FSS, PBO, PCD
Interior - BPA
DOT - AÇO, FIS, RDS
DCGOVT - DCG
NASA - JFK
HEW - FEC, FDA
COM - NBS

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DOCUMENT IDENTIFIER AND TITLE J-W-1177/1A Wire, Magnet, Electrical, Class 105, Type E Oleoresinous-Enamel-Coated, Round

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

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