INCH-POUND
J-W-1177/26B
June 10, 1988
SUPERSEDING
J-W-1177/26A
September 27, 1976

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 180, TYPE DgH, POLYESTER-GLASS-FIBER, SILICONE TREATED, RECTANGULAR

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

The requirements for acquiring the wire described herein shall consist of this specification and the latest issue of J-W-1177.

Classification:	Class 180; type Dg2H (bare with double polyester-glass fiber, silicone varnished), type L2DgH and type L2Dg2H (heavy film, single or double polyester-glass fiber, silicone varnished); rectangular.
Insulating materials:	The fiber covering and application of the covering shall be as specified in J-W-1177. If an underlying film coating is used, it shall have a class 155 rating. The varnish used in treating fibrous covered wire shall conform to the requirements of class 180 of MIL-I-24092, or an alternate selected on the basis of equivalent test data. The varnish shall be a modified silicone insulating varnish or silicone compound to provide a tough outer finish. The varnish used shall be identified in the qualification test report.
NEMA/ANSI equivalent:	All test requirements are equivalent to MW-48 of NEMA MW 1000 except thermal rating.
General requirements:	See J-W-1177 for general requirements, quality assurance provisions, and packaging.

AMSC N/A FSC 6145

Requirements:

Characteristics	Test procedure, see J-W-1177	Wire sizes, AWG	Requirements
Dimensions	4.7.1.2	All	Rectangular wire: (a) Conductor dimensions and radii - see table I. (b) Conductor tolerances - see table II. (c) Increase in thickness - see table III (type Dg2H), table IV (type L2DgH) and table V (type L2Dg2H). (d) Increase in width due to the polyester-glass fiber covering shall be equal to or less than the increase in thickness. Square wire: (a) Conductor dimensions, radii and tolerances - see table VI. (b) Increase in thickness and width - see table VI.
Adherence and flexibility	4.7.2.3.1	All	For bare wire, not less than 75 volts/mil of the minimum thickness of the polyester-glass fiber covering on one side of the bare conductor.
	4.7.2.3.2	All	For film coated wire, no cracks visible in the film coating after 20 percent elongation. Examine with normal vision without removal of the polyester-glass fiber covering.
Elongation	4.7.5	All	Not less than 32 percent for thickness of 0.049 inch and greater, or 30 percent for thicknesses less than 0.049 inch.
Dielectric strength	4.7.9	All	Not less than 90 volts/mil of the minimum thickness of the polyester-glass fiber covering on one side (one-half the minimum specified under "Dimensions") plus the minimum breakdown for film coated wire.
Thermal endurance	----	All	Class 155. Insulating materials shall meet the thermal class ratings as described above.

TABLE I. Dimensions and radii for rectangular wire.

Nominal thickness	Nominal width																											
Inch	.079	1/.083	.088	1/.093	.098	1/.104	.110	1/.118	.124	1/.132	.140	1/.148	.157	1/.167	.177	1/.187	.197	1/.209	.220	1/.236	.248	1/.264	.280	1/.295	.315	1/.335	.354	1/.374	.394	1/.417	.441	1/.465	.492
0.025												ROUNDED EDGES																				
.028																																
.031																																
.035																																
.039																																
.044																																
.049																																
.055																																
.063																																
.071																																
.079								0.020																								
.088																																
.098																																
.110												0.025															0.031					
.124																																
.140																																
.157																																
.177																																
.197																																
.220																									0.039							

1/ R-40 series numbers.
Radii tolerances are plus or minus 25 percent.

EXAMPLE - Preferred sizes 55 x 110 (R20 x R20)
Intermediate sizes 55 x 118 (R20 x R40)

TABLE II. Conductor tolerances.

Thickness, inch	Permissible variations in thickness
0.220 to 0.098	± 1 percent
Under 0.098 to 0.025	± 0.001 percent
Width, inch	
0.492 to 0.315	± 0.003 inch
Under 0.315 to 0.098	± 1 percent
Under 0.098 to 0.079	± 0.001 inch

TABLE III. Maximum increase in thickness, inch, due to single-polyester-glass-fiber covering and heavy-film coating over rectangular wire, type L2DgH.

Nominal thickness	Nominal width																					Nominal thickness
Inch	0.079	.083 1/	.088	.093 1/	.098	.104 1/	.110	.118 1/	.124	.132 1/	.140	.148 1/	.157	.167 1/	.177	.187 1/	.197	.209 1/	.220	.236 1/	.248	.264 1/	.280	.295 1/	.315	.335 1/	.354	.374 1/	.394	.417 1/	.441	.465 1/	.492	Inch
0.025	0.010								0.011								0.012								0.013								0.025
.028																																		.028
.031																																		.031
.035																																		.035
.039																																		.039
.044																																		.044
.049																																		.049
.055																																		.055
.063																																		.063
.071																																		.071
.079																																		.079
.088																																		.088
.098																																		.098
.110																																		.110
.124																																		.124
.140																																		.140
.157																																		.157
.177																																		.177
.197																																		.197
.220																																		.220

1/ R-40 series numbers. Radii tolerance is plus or minus 25 percent.

EXAMPLE - Preferred sizes 55 x 110 (R20 x R20)
Intermediate sizes 55 x 118 (R20 x R40)

NOTES:

1. The maximum increase due to the polyester-glass-fiber covering may be exceeded provided the overall dimension of the covered wire does not exceed the sum of the maximum thickness of the bare wire plus the maximum increase due to the polyester-glass-fiber covering.
2. The increase due to the polyester-glass-fiber covering for wire having dimensions not shown in table III shall be the same as those for the next larger thickness or width.
3. The minimum increase shall be 70 percent of the maximum increase shown in table III, rounded off to the nearest 0.001 inch.

TABLE IV. Maximum increase in thickness, inch, due to double-polyester-glass-fiber covering over rectangular wire, type Dg2H.

Nominal thickness	Nominal width																									
Inch	0.079	1/.083	.088	1/.093	.098	1/.104	.110	1/.118	.124	1/.132	.140	1/.148	.157	1/.167	.177	1/.187	.197	1/.209	.220	1/.236	.248	1/.264	.280	1/.295	.315	1/.335	.354	1/.374	.394	1/.417	.441	1/.465	.492	Inch
0.025																																	0.025
.028																																	.028
.031																																	.031
.035																																	.035
.039																																	.039
.044					0.011					0.012			0.013									0.015											.044
.049																																	.049
.055																																	.055
.063																																	.063
.071																																	.071
.079																																	.079
.088																																	.088
.098																																	.098
.110										0.013			0.014					0015							0.016								.110
.124																																	.124
.140																																	.140
.157																																	.157
.177																0.015																	.177
.197																																	.197
.220																																	.220

1/ R-40 series numbers. Radii tolerance is plus or minus 25 percent.

EXAMPLE - Preferred sizes 55 x 110 (R20 x R20)
Intermediate sizes 55 x 118 (R20 x R40)

NOTES:

1. The maximum increase due to the heavy-film coating and single-polyester-glass-fiber covering may be exceeded provided the overall dimension of the covered wire does not exceed the sum of the maximum thickness of the bare wire plus the maximum increase due to the heavy-film coating and single-polyester-glass-fiber covering.
2. The increase due to the heavy-film coating and single-polyester-glass-fiber covering for wire having dimensions not shown in table IV shall be the same as those for the next larger thickness or width.
3. The increase in thickness due to the heavy-film coating, if any, shall be for film-coated wire.
4. The increase in thickness due to the single-polyester-glass-fiber covering shall be determined by subtracting 0.005 inch (maximum thickness of film coating) from the maximum increase in thickness given in table IV.

TABLE V. Maximum increase in thickness, inch, due to double-polyester-glass-fiber covering and heavy-film coating over rectangular wire, type L2Dg2H.

Nominal thickness	Nominal width																									Nominal thickness
Inch	0.079	1/.083	.088	1/.093	.098	1/.104	.110	1/.118	.124	1/.132	.140	1/.148	.157	1/.167	.177	1/.187	.197	1/.209	.220	1/.236	.248	1/.264	.280	1/.295	.315	1/.335	.354	1/.374	.394	1/.417	.441	1/.465	.492	Inch
0.025																																	0.025
.028																																	.028
.031																																	.031
.035																																	.035
.039																																	.039
.044				0.016						0.017			0.018										0.020										.044
.049																																	.049
.055																																	.055
.063																																	.063
.071																																	.071
.079																																	.079
.088																																	.088
.098																																	.098
.110										0.016			0.019						0.020					0.021									.110
.124																																	.124
.140																																	.140
.157																																	.157
.177																	0.020																.177
.197																																	.197
.220																																	.220

1/ R-40 series numbers.
Radii tolerance is plus or minus 25 percent.

EXAMPLE - Preferred sizes 55 x 110 (R20 x R20)
Intermediate sizes 55 x 118 (R20 x R40)

NOTES:

1. The maximum increase due to the polyester-glass-fiber covering may be exceeded provided the overall dimension of the covered wire does not exceed the sum of the maximum thickness of the bare wire or film-coated wire plus the maximum increase due to the polyester-glass-fiber covering.
2. The increase due to the polyester-glass-fiber covering for wires having dimensions not shown in table IV shall be the same as those for the next larger thickness or width.
3. The increase in thickness due to the heavy-film coating, if any, shall be for film-coated wire.
4. The minimum increase shall be not less than 70 percent of the maximum increase shown in table III, rounded off to the nearest 0.001 inch.
5. Because it is impossible to separate accurately the polyester-glass-fiber covering from the film coating, the total minimum increase in the thickness of film-coated double-polyester-glass-fiber-covered rectangular wire shall be 70 percent the maximum increase given in table V rounded off to the nearest 0.001 inch.

TABLE VI. Minimum increase and maximum overall dimensions of glass-fiber-covered square wire.

AWG size	Bare wire dimension, inch			Radii, inch1/	Type Dg2H		Type L2DgH		Type L2Dg2H	
	Min	Nom	Max		Minimum increase, inch	Maximum overall dimension, inch	Minimum increase, inch	Maximum overall dimension, inch	Minimum increase, inch	Maximum overall dimension, inch
0	0.3219	0.3249	0.3279	0.040	0.012	0.344	0.009	0.341	0.015	0.349
1	.2864	.2893	.2922	.040	.012	.308	.009	.305	.015	.313
2	.2550	.2576	.2602	.040	.012	.276	.008	.272	.015	.281
3	.2271	.2294	.2317	.040	.012	.248	.008	.244	.015	.253
4	.2023	.2043	.2063	.040	.012	.222	.008	.219	.015	.227
5	.1801	.1819	.1837	.040	.011	.199	.008	.196	.014	.204
6	.1604	.1620	.1636	.032	.011	.179	.008	.175	.014	.184
7	.1429	.1443	.1457	.032	.010	.160	.008	.157	.013	.165
8	.1272	.1285	.1298	.032	.009	.143	.008	.141	.012	.148
9	.1133	.1144	.1155	.026	.009	.129	.008	.127	.012	.134
10	.1009	.1019	.1029	.026	.008	.115	.007	.113	.011	.120
11	.0897	.0907	.0917	.020	.008	.103	.007	.102	.011	.108
12	.0798	.0808	.0818	.020	.008	.093	.007	.092	.011	.098
13	.0710	.0720	.0730	.016	.008	.084	.007	.084	.011	.089
14	.0631	.0641	.0651	.016	.008	.076	.007	.076	.011	.081

1/ Tolerance is plus or minus 25 percent.

NOTES:

1. The increase due to the heavy coating or glass-fiber covering for wires having dimensions not shown in table VI shall be the same as those for the next larger size.
2. The increase in thickness due to the heavy film coating, if any, shall be for film-coated wire.

Part number: Magnet wire covered by this specification shall be defined by the following part numbering system. Example: M1177/26-02CXXX.

M1177/26-	02	C	XXX
Federal specification identifier	Two digit type code	Single letter conductor code	Rectangular wire code

The following codes shall apply:

Type	Type code	Conductor	Conductor code
Dg2H	01	Copper	C
L2DgH	02	Aluminum	A
L2Dg2H	03	Nickel-coated copper	N
		Silver-coated copper	S

Intended use: Type DgH rectangular magnet wire is intended for use in 180°C applications similar to those for which type GV magnet wire is used where increased toughness and nonfraying properties are required.

Revision letters are not used to denote changes due to the extensiveness of the changes.

MILITARY INTERESTS:

Custodians:
Army - CR
Navy - SH
Air Force - 85

Review activities:
Army - AR, ER, MI
DLA - IS

User activities:
Army - ME
Navy - AS, CG, MC, OS

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS, PBO, PCD
INTERIOR - BLM
HHS - FDA
DCGOVT - DCG
NASA - JFK
COMMERCE - NBS
TRANSPORTATION - APM, FAA

Preparing activity:
Navy - SH
(Project 6145-1111-22)

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