

INCH-POUND

J-W-1177/11B

June 10, 1988

SUPERSEDING

J-W-1177/11A

September 27, 1976

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 155, TYPE LN,
POLYESTER OR POLYESTER-IMIDE OVERCOATED WITH POLYAMIDE, ROUND

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 155; type LN (single), type LN2 (heavy), type LN3 (triple); round.
- Insulating materials: The conductor shall be coated with a dual film. The underlying coating shall be based on a polyester or polyester-imide resin. The superimposed coating shall be based on a polyamide resin.
- NEMA/ANSI equivalent: All test requirements except thermal endurance are equivalent to MW-24 of NEMA MW 1000.
- General requirements: See J-W-1177 for general requirements, quality assurance provisions, and packaging.
- Requirements:

Characteristics	Test procedure, see J-W-1177	Wire sizes, AWG	Requirements
Dimensions	4.7.1.2	10-30	See table I.
Adherence and flexibility	4.7.2.1	10-30	No cracks visible in the film coating.
Elongation	4.7.5	10-30	Not less than the value in table II.
Heat shock	4.7.4	10-30	No cracks visible in the coating after conditioning as shown in table III.

AMSC N/A

FSC 6145

DISTRIBUTION STATEMENT A Approved for public release; distribution unlimited

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Requirements: (Continued)

Characteristics	Test procedure, see J-W-1177	Wire sizes, AWG	Requirements
Scrape resistance	4.7.6	10-30	Lowest grams-to-fail load for any of the three tests and the average of the three tests shall be not less than the values in table IV.
Springback	4.7.7	14-30	Not greater than the value in table V.
Dielectric strength	4.7.9	10-30	Not less than the value in table VI.
Continuity	4.7.11	14-30	The number of discontinuities shall be not greater than the number listed in table VII.
Thermoplastic flow	4.7.8	18	Median not less than 200°C with heavy film coated wire.
Solubility	4.7.12	18	Heavy film coated wire shall not soften sufficiently to expose bare conductor when immersed in xylene or 50/50 parts by volume xylene/ethyl Cellosolve.
Dielectric strength at temperature	4.7.14	18	Heavy film coated wire shall average not less than 3825 volts.
Thermal endurance	4.7.15.1	18	155°C minimum with heavy film coated wire.
	4.7.15.2	10-30	1000 volts/mil minimum after 168 hours at 200°C.
	4.7.15.3	10-30	175°C minimum as shown in table III.

TABLE I. Dimensions, sizes 10 to 30 AWG.

AWG size	Bare wire diameter, inch ^{1/}			Type LN, single		Type LN2, heavy		Type LN3, triple	
	Minimum	Nominal	Maximum	Minimum increase in diameter, inch	Maximum overall diameter, inch	Minimum increase in diameter, inch	Maximum overall diameter, inch	Minimum increase in diameter, inch	Maximum overall diameter, inch
10	0.1009	0.1019	0.1024	---	---	0.0031	0.1061	---	---
11	.0898	.0907	.0912	---	---	.0030	.0948	---	---
12	.0800	.0808	.0812	---	---	.0029	.0847	---	---
13	.0713	.0720	.0724	---	---	.0028	.0757	---	---
14	.0635	.0641	.0644	0.0016	0.0666	.0032	.0682	0.0048	0.0700
15	.0565	.0571	.0574	.0015	.0594	.0030	.0609	.0045	.0627
16	.0503	.0508	.0511	.0014	.0531	.0029	.0545	.0043	.0562
17	.0448	.0453	.0455	.0014	.0475	.0028	.0488	.0041	.0504
18	.0399	.0403	.0405	.0013	.0424	.0026	.0437	.0039	.0452
19	.0355	.0359	.0361	.0012	.0379	.0025	.0391	.0037	.0406
20	.0317	.0320	.0322	.0012	.0339	.0023	.0351	.0035	.0364
21	.0282	.0285	.0286	.0011	.0303	.0022	.0314	.0033	.0326
22	.0250	.0253	.0254	.0011	.0270	.0021	.0281	.0032	.0293
23	.0224	.0226	.0227	.0010	.0243	.0020	.0253	.0030	.0264
24	.0199	.0201	.0202	.0010	.0217	.0019	.0227	.0029	.0238
25	.0177	.0179	.0180	.0009	.0194	.0018	.0203	.0027	.0214
26	.0157	.0159	.0160	.0009	.0173	.0017	.0182	.0026	.0193
27	.0141	.0142	.0143	.0008	.0156	.0016	.0164	.0024	.0173
28	.0125	.0126	.0127	.0008	.0140	.0016	.0147	.0023	.0156
29	.0112	.0113	.0114	.0007	.0126	.0015	.0133	.0022	.0142
30	.0099	.0100	.0101	.0007	.0112	.0014	.0119	.0021	.0128

^{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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TABLE II. Elongation of finished wire.

AWG size	Minimum elongation percent	AWG size	Minimum elongation, percent
10	35	21	30
11	35	22	29
12	34	23	29
13	34	24	28
14	33	25	28
15	33	26	27
16	33	27	27
17	32	28	26
18	32	29	26
19	31	30	25
20	30		

TABLE III. Heat shock.

AWG size	Minimum elongation, percent	Mandrel diameter	Minimum temperature °C
10-13	25	5X	175
14-30	20	3X	175

TABLE IV. Scrape resistance.

AWG size	Type LN single coating		Type LN2 heavy coating		Type LN3 triple coating	
	Average grams-to-fail	Minimum grams-to-fail	Average grams-to-fail	Minimum grams-to-fail	Average grams-to-fail	Minimum grams-to-fail
10	---	---	1490	1270	---	---
11	---	---	1490	1270	---	---
12	---	---	1490	1270	---	---
13	---	---	1490	1270	---	---
14	840	715	1490	1270	1735	1475
15	780	665	1400	1190	1620	1375
16	735	625	1310	1115	1525	1295
17	690	585	1230	1045	1425	1210
18	645	550	1150	980	1335	1135
19	600	510	1070	910	1255	1065
20	560	475	1000	850	1180	1000
21	525	445	940	800	1115	945
22	490	415	880	750	1045	890
23	460	390	820	700	975	830
24	430	365	770	655	910	770
25	400	340	720	615	850	720
26	380	325	675	575	795	675
27	355	300	635	540	735	625
28	335	285	595	510	690	585
29	310	265	560	480	645	550
30	295	250	525	450	605	515

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TABLE V. Springback of finished wire.

AWG size	Maximum springback, degrees		AWG size	Maximum springback, degrees	
	Types LN and LN2	Type LN3		Types LN and LN2	Type LN3
14	42	46	23	62	64
15	46	49	24	67	69
16	50	53	25	72	74
17	54	58	26	76	80
18	58	62	27	50	55
19	62	66	28	55	60
20	66	70	29	61	65
21	53	53	30	66	70
22	58	58			

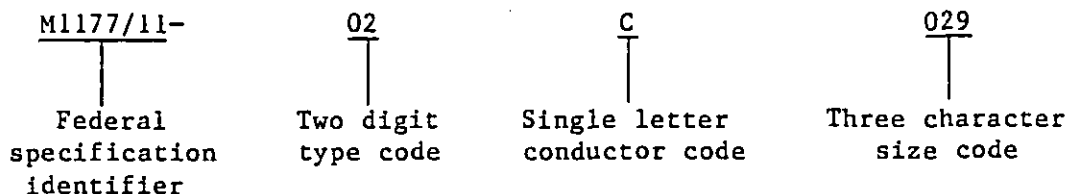
TABLE VI. Minimum breakdown voltage.

AWG size	Volts		
	Type LN	Type LN2	Type LN3
10	—	5575	—
11	—	5400	—
12	—	5225	—
13	—	5050	—
14	3175	5700	7600
15	3075	5550	7400
16	3000	5400	7200
17	2925	5275	7025
18	2850	5125	6850
19	2775	5000	6675
20	2700	4850	6475
21	2625	4725	6325
22	2575	4625	6175
23	2500	4500	6000
24	2425	4375	5850
25	2375	4250	5700
26	2300	4150	5525
27	2250	4050	5400
28	2175	3950	5275
29	2150	3825	5125
30	2075	3725	5000

TABLE VII. Continuity.

AWG size	Maximum number of discontinuities		
	Type LN	Type LN2	Type LN3
14-24	25	5	3
25-30	25	7	5

Part number: Magnet wire covered by this specification shall be defined by the following part numbering systems. Example:
M1177/11-02C029



The following codes shall apply:

Type	Type code	Conductor	Conductor code
LN	01	Copper	C
LN2	02	Aluminum	A
LN3	03	Nickel-coated copper	N
		Silver-coated copper	S

The size code shall be the bare wire dimension. AWG wire size shall be used.

Intended use: Type LN magnet wire is intended for use in 155°C applications similar to those for which type T is used and where good windability is desired.

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 6145-1111-08)