

INCH-POUND

J-W-1177/46

June 10, 1988

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 90, TYPE C,
COTTON-COVERED, 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 90; type C (single) and type C2 (double cotton covered); round.
- Insulating materials: The cotton shall be of good quality and substantially free from knots, ravelings, foreign matter and other irregularities. The fiber covering and application of the covering shall be as specified in J-W-1177.
- NEMA/ANSI equivalent: Dimension, elongation and coverage requirements are equivalent to MW-11 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	4/0-40	See table I.
Elongation	4.7.5	4/0-40	Not less than the values shown in table II.
Coverage	----	4-40	The covering shall not open sufficiently to expose bare copper when the specimen is wound 10 turns around a mandrel having a diameter equal to 10 times the diameter of the bare wire. Normal vision shall be used.

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, AWC	Requirements
Dielectric strength	4.7.9	10-40	Not less than 100 volts/mil (layer-to-layer test).
Thermal endurance	----	4/0-40	Class 90. All insulating materials shall meet the thermal class ratings as described above.

TABLE I. Dimensions.

AWC size	Type C						
	Bare wire diameter, inch			Minimum increase, one layer of cotton		Maximum overall diameter	
	Minimum	Nominal	Maximum	inch	mm	inch	mm
4/0	0.4554	0.4600	0.4646	0.0068	0.173	0.4726	12.004
3/0	.4055	.4096	.4137	.0068	.173	.4217	10.711
2/0	.3612	.3648	.3684	.0068	.173	.3764	9.561
1/0	.3217	.3249	.3281	.0068	.173	.3361	8.537
1	.2864	.2893	.2922	.0068	.173	.3002	7.625
2	.2550	.2576	.2602	.0068	.173	.2682	6.812
3	.2271	.2294	.2317	.0068	.173	.2397	6.038
4	.2023	.2043	$\frac{1}{16}$.2053	.0068	.173	.2133	5.418
5	.1801	.1819	$\frac{1}{16}$.1828	.0068	.173	.1908	4.846
6	.1604	.1620	$\frac{1}{16}$.1628	.0068	.173	.1708	4.338
7	.1429	.1443	$\frac{1}{16}$.1450	.0068	.173	.1530	3.886
8	.1272	.1285	$\frac{1}{16}$.1292	.0068	.173	.1372	3.485
9	.1133	.1144	$\frac{1}{16}$.1150	.0060	.152	.1220	3.099
10	.1009	.1019	$\frac{1}{16}$.1024	.0051	.130	.1084	2.753
11	.0898	.0907	$\frac{1}{16}$.0912	.0047	.119	.0967	2.456
12	.0800	.0808	$\frac{1}{16}$.0812	.0047	.119	.0867	2.202
13	.0713	.0720	$\frac{1}{16}$.0724	.0047	.119	.0779	1.979
14	.0635	.0641	$\frac{1}{16}$.0644	.0047	.119	.0699	1.775
15	.0565	.0571	$\frac{1}{16}$.0574	.0047	.119	.0629	1.598
16	.0503	.0508	$\frac{1}{16}$.0511	.0047	.119	.0566	1.438
17	.0448	.0453	$\frac{1}{16}$.0455	.0047	.119	.0510	1.295
18	.0399	.0403	$\frac{1}{16}$.0405	.0047	.119	.0460	1.168
19	.0355	.0359	$\frac{1}{16}$.0361	.0047	.119	.0416	1.057
20	.0317	.0320	$\frac{1}{16}$.0322	.0047	.119	.0377	0.958
21	.0282	.0285	$\frac{1}{16}$.0286	.0047	.119	.0341	.866
22	.0250	.0253	$\frac{1}{16}$.0254	.0043	.109	.0304	.772
23	.0224	.0226	$\frac{1}{16}$.0227	.0043	.109	.0277	.704
24	.0199	.0201	$\frac{1}{16}$.0202	.0043	.109	.0252	.640
25	.0177	.0179	$\frac{1}{16}$.0180	.0038	.096	.0225	.572

See footnote at end of table.

TABLE I. Dimensions. - Continued

AWG size	Type C						Maximum overall diameter	
	Bare wire diameter, inch			Minimum increase, one layer of cotton				
	Minimum	Nominal	Maximum	inch	mm	inch	mm	
26	0.0157	0.0159	<u>1/0.0160</u>	0.0038	0.096	0.0205	0.521	
27	.0141	.0142	.0143	.0038	.096	.0188	.478	
28	.0125	.0126	.0127	.0038	.096	.0172	.437	
29	.0112	.0113	.0114	.0038	.096	.0159	.404	
30	.0099	.0100	.0101	.0038	.096	.0146	.371	
31	.0088	.0089	.0090	.0038	.096	.0135	.343	
32	.0079	.0080	.0081	.0038	.096	.0126	.320	
33	.0070	.0071	.0072	.0038	.096	.0117	.297	
34	.0062	.0063	.0064	.0038	.096	.0109	.277	
35	.0055	.0056	.0057	.0038	.096	.0102	.259	
36	.0049	.0050	.0051	.0037	.094	.0094	.239	
37	.0044	.0045	.0046	.0037	.094	.0089	.226	
38	.0039	.0040	.0041	.0037	.094	.0084	.213	
39	.0034	.0035	.0036	.0037	.094	.0079	.201	
40	.0030	.0031	.0032	.0037	.094	.0075	.190	
	Type C2							
4/0	.4554	.4600	.4646	.0136	.345	.4806	12.207	
3/0	.4055	.4096	.4137	.0136	.345	.4297	10.914	
2/0	.3612	.3648	.3684	.0136	.345	.3844	9.764	
1/0	.3217	.3249	.3281	.0136	.345	.3441	8.740	
1	.2864	.2893	.2922	.0136	.345	.3082	7.828	
2	.2550	.2576	.2602	.0136	.345	.2762	7.015	
3	.2271	.2294	.2317	.0136	.345	.2477	6.292	
4	.2023	.2043	<u>1/</u> .2053	.0136	.345	.2213	5.621	
5	.1801	.1819	<u>1/</u> .1828	.0136	.345	.1988	5.050	
6	.1604	.1620	<u>1/</u> .1628	.0119	.302	.1768	4.491	
7	.1429	.1443	<u>1/</u> .1450	.0119	.302	.1590	4.039	
8	.1272	.1285	<u>1/</u> .1292	.0119	.302	.1432	3.637	
9	.1133	.1144	<u>1/</u> .1150	.0102	.259	.1270	3.226	
10	.1009	.1019	<u>1/</u> .1024	.0094	.239	.1134	2.880	
11	.0898	.0907	<u>1/</u> .0912	.0081	.206	.1077	2.558	
12	.0800	.0808	<u>1/</u> .0812	.0081	.206	.0907	2.304	
13	.0713	.0720	<u>1/</u> .0724	.0081	.206	.0819	2.080	
14	.0635	.0641	<u>1/</u> .0644	.0081	.206	.0739	1.877	
15	.0565	.0571	<u>1/</u> .0574	.0081	.206	.0569	1.699	
16	.0503	.0508	<u>1/</u> .0511	.0081	.206	.0606	1.539	

See footnote at end of table.

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TABLE I. Dimensions. - Continued

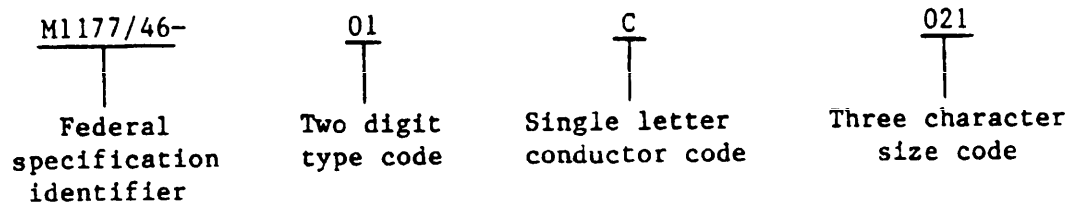
AWG size	Type C2					Maximum overall diameter,	
	Bare wire diameter, inch			Minimum increase, one layer of cotton			
	Minimum	Nominal	Maximum	inch	mm	inch	mm
17	0.0448	0.0453	$\frac{1}{0}$.0455	0.0081	0.206	0.0550	1.397
18	.0399	.0403	$\frac{1}{1}$.0405	.0081	.206	.0500	1.270
19	.0355	.0359	$\frac{1}{1}$.0361	.0081	.206	.0456	1.158
20	.0317	.0320	$\frac{1}{1}$.0322	.0081	.206	.0417	1.059
21	.0282	.0285	$\frac{1}{1}$.0286	.0081	.206	.0381	0.968
22	.0250	.0253	$\frac{1}{1}$.0254	.0077	.196	.0344	.874
23	.0224	.0226	$\frac{1}{1}$.0227	.0077	.196	.0317	.805
24	.0199	.0201	$\frac{1}{1}$.0202	.0077	.196	.0292	.742
25	.0177	.0179	$\frac{1}{1}$.0180	.0072	.183	.0265	.673
26	.0157	.0159	$\frac{1}{1}$.0160	.0072	.183	.0245	.622
27	.0141	.0142	.0143	.0072	.183	.0228	.579
28	.0125	.0126	.0127	.0072	.183	.0212	.538
29	.0112	.0113	.0114	.0072	.183	.0199	.505
30	.0099	.0100	.0101	.0072	.183	.0186	.472
31	.0088	.0089	.0090	.0072	.183	.0175	.444
32	.0079	.0080	.0081	.0072	.183	.0166	.422
33	.0070	.0071	.0072	.0072	.183	.0157	.399
34	.0062	.0063	.0064	.0072	.183	.0149	.378
35	.0055	.0056	.0057	.0072	.183	.0142	.361
36	.0049	.0050	.0051	.0068	.173	.0131	.333
37	.0044	.0045	.0046	.0068	.173	.0126	.320
38	.0039	.0040	.0041	.0068	.173	.0121	.307
39	.0034	.0035	.0036	.0068	.173	.0116	.295
40	.0030	.0031	.0032	.0068	.173	.0112	.284

1/ The maximum bare wire dimensions may be exceeded up to the NEMA/ANSI maximum bare wire limit, provided the minimum increase is maintained and the maximum overall diameter specified is not exceeded.

TABLE II. Elongation of the finished wire.

AWG size	Minimum elongation, percent
4/0-1	35
2-9	30
10-23	25
24-34	20
35-40	15

Part number: Magnet wire covered by this specification shall be defined by the following part numbering system. Example:
M1177/46-01C021.



The following codes shall apply:

Type	Type code	Conductor	Conductor code
C	01	Copper	C
C2	02	Aluminum	A
		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 C magnet wire is intended for 90°C applications in the rebuilding of rotating machinery, transformers and similar equipment where an alternative insulation is not available.

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 6145-1111-42)

