INCH-POUND
J-W-1177/21B
June 10, 1988
SUPERSEDING
J-W-1177/21A
September 27, 1976

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 200, TYPE GK, GLASS-FIBER-COVERED, SILICONE TREATED, 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 200; type GK and type G2K (bare with single or double glass fiber, silicone varnished), type HGK and type HG2K (single film, single or double glass fiber, silicone varnished), type H2GK and type H2G2K (heavy film, single or double glass fiber, silicone varnished); round.
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 180 rating. The varnish used in treating fibrous covered wire shall conform to the requirements of class 200 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 providing 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-44 of NEMA MW 1000.

AMSC N/A FSC 6145

Requirements:

Characteristics	Test procedure, see J-W-1177	Wire sizes, AWG	Requirements
Dimensions	4.7.1.2	4/0-30	See table I.
Adherence and flexibility	4.7.2.2.1	4/0-30	Covering shall not open sufficiently to expose the bare or underlying film-coated wire after bending 0 AWG and heavier wire on a 15X mandrel and 1-30 AWG wire on a 10X mandrel.
Elongation	4.7.5	4/0-30	Not less than the values shown in table II.
Dielectric strength	4.7.9	4/0-30	Not less than the values shown in table III.
Thermal endurance	----	4/0-30	Class 155. All insulating materials shall meet the thermal class ratings as described above.

TABLE I. Dimensions.

AWG size	Bare wire diameter, inch1/			Minimum increase, inch, glass-fiber covering		Minimum overall diameter, inch, glass-fiber-covered					
						Bare		Single film		Heavy film	
	Minimum	Nominal	Maximum	Single	Double	Type GK	Type G2K	Type HGK	Type HG2K	Type H2GK	Type H2G2K
0000	0.4554	0.4600	0.4646	0.0045	0.0070	0.4716	0.4756	----	----	----	----
000	.4055	.4096	.4137	.0045	.0070	.4207	.4247	----	----	----	----
00	.3612	.3648	.3684	.0045	.0070	.3754	.3794	----	----	----	----
0	.3217	.3249	.3281	.0045	.0070	.3351	.3391	----	----	----	----
1	.2864	.2893	.2922	.0045	.0070	.2992	.3032	----	----	----	----
2	.2550	.2576	.2602	.0045	.0070	.2672	.2712	----	----	----	----
3	.2271	.2294	.2317	.0045	.0070	.2387	.2427	----	----	----	----
4	.2023	.2043	.2053	.0045	.0070	.2133	.2173	----	----	0.2168	0.2208
5	.1801	.1819	.1828	.0045	.0070	.1907	.1947	----	----	.1942	.1982
6	.1604	.1620	.1628	.0045	.0070	.1706	.1746	----	----	.1741	.1781
7	.1429	.1443	.1450	.0045	.0070	.1527	.1567	----	----	.1561	.1601
8	.1272	.1285	.1292	.0045	.0070	.1368	.1408	----	----	.1402	.1442
9	.1133	.1144	.1150	.0045	.0070	.1225	.1265	----	----	.1259	.1299
10	.1009	.1019	.1024	.0040	.0060	.1089	.1119	----	----	.1121	.1151
11	.0898	.0907	.0912	.0040	.0060	.0976	.1006	----	----	.1008	.1038
12	.0800	.0808	.0812	.0040	.0060	.0876	.0906	----	----	.0907	.0937
13	.0713	.0720	.0724	.0040	.0060	.0787	.0817	----	----	.0817	.0847
14	.0635	.0641	.0644	.0040	.0060	.0707	.0737	0.0726	0.0756	.0742	.0772
15	.0565	.0571	.0574	.0040	.0060	.0637	.0667	.0654	.0684	.0669	.0699

See footnote at end of table.

TABLE I. Dimensions. - Continued

AWG size	Bare wire diameter, inch 1/			Minimum increase, inch, glass-fiber covering		Minimum overall diameter, inch glass-fiber-covered					
						Bare		Single film		Heavy film	
	Minimum	Nominal	Maximum	Single	Double	Type GK	Type G2K	Type HGK	Type HG2K	Type H2GK	Type H2G2K
16	0.0503	0.0508	0.0511	0.0040	0.0060	0.0573	0.0603	0.0591	0.0621	0.0605	0.0635
17	.0448	.0453	.0455	.0040	.0060	.0518	.0548	.0535	.0565	.0548	.0578
18	.0399	.0403	.0405	.0040	.0060	.0467	.0497	.0484	.0514	.0497	.0527
19	.0355	.0359	.0361	.0040	.0060	.0423	.0453	.0439	.0469	.0451	.0481
20	.0317	.0320	.0322	.0040	.0060	.0383	.0413	.0399	.0429	.0411	.0441
21	.0282	.0285	.0286	.0040	.0060	.0348	.0378	.0363	.0393	.0374	.0404
22	.0250	.0253	.0254	.0040	.0060	.0316	.0346	.0330	.0360	.0341	.0371
23	.0224	.0226	.0227	.0040	.0060	.0288	.0318	.0303	.0333	.0313	.0343
24	.0199	.0201	.0202	.0025	.0045	.0243	.0263	.0257	.0277	.0267	.0287
25	.0177	.0179	.0180	.0025	.0045	.0221	.0241	.0234	.0254	.0243	.0263
26	.0157	.0159	.0160	.0025	.0045	.0201	.0221	.0213	.0233	.0222	.0242
27	.0141	.0142	.0143	.0025	.0045	.0183	.0203	.0196	.0216	.0204	.0224
28	.0125	.0126	.0127	.0025	.0045	.0167	.0187	.0180	.0200	.0187	.0207
29	.0112	.0113	.0114	.0025	.0045	.0154	.0174	.0166	.0186	.0173	.0193
30	.0099	.0100	.0101	.0025	.0045	.0141	.0161	.0152	.0172	.0159	.0179

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

TABLE II. Elongation of finished wire.

AWG size	Minimum elongation, percent	
	With glass-fiber covering	Glass-fiber covering removed
0000-0	35.0	35.0
1-8	30.0	30.0
9-15	20.0	30.0
16-21	15.0	25.0
22-28	----	20.0
29 and 30	----	15.0

TABLE III. Minimum breakdown voltages.

AWG size	Diameter of mandrel, inches	Minimum breakdown, volts1/	
		Single covering	Double covering
4/0-9	----	170	315
10-23	1.00	360	540
24-30	0.25	225	400

1/ For fiber covered wire having an underlying film coating, add the minimum breakdown voltage for film coated wire.

Part number: Magnet wire covered by this specification shall be defined by the following part numbering system. Example: M1177/21-06C021.

M1177/21-	06	C	021
Federal specification identifier	Two digit type code	Single letter conductor code	Three character size code

The following codes shall apply:

Type	Type code	Conductor	Conductor code
GK	01	Copper	C
G2K	02	Aluminum	A
HGK	03	Nickel-coated copper	N
HG2K	04	Silver-coated copper	S
H2GK	05		
H2G2K	06		

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

Intended use: Type GK magnet wire is intended for use in 200°C applications for solenoids, transformers, and other stationary windings, while type G2K is preferred for coil windings in rotating equipment.

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 6145-1111-17)

☆U.S. GOVERNMENT PRINTING OFFICE: 1988 - 505-033/92151