Downloaded from http://www.everyspec.com

INCH-POUND
J-W-1177/36
June 10, 1988

FEDERAL SPECIFICATION SHEET

WIRE, MAGNET, ELECTRICAL, CLASS 200, TYPE PAP, AROMATIC POLYAMIDE-PAPER-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 200; type PAP/2 (bare with 2-mil paper), type PAP/3 (bare with 3-mil paper); round.
Insulating materials:	The insulating material shall be an aromatic polyamide paper. The paper shall be either a nominal 0.002 or 0.003 inches in thickness. The paper covering shall consist of one or more tapes, each wrapped firmly, closely, evenly and continuously around the wire in a configuration necessary to provide the specified number of tape layers (thickness of paper insulation). The paper covering shall consist of at least two thicknesses of paper with not less than 40 percent overlap. If an adhesive is specified, this material shall perform in the applicable insulation system as required by the thermal class designation.
NEMA/ANSI equivalent:	All test requirements are equivalent to MW-61 of NEMA MW 1000.
General requirements:	See J-W-1177 for general requirements, quality assurance provisions, and packaging.

AMSC N/A FSC 6145
DISTRIBUTION STATEMENT A Approved for public release; distribution unlimited

Downloaded from http://www.everyspec.com

Requirements:

Characteristics	Test procedure, see J-W-1177	Wire sizes, AWG	Requirements
Dimensions	4.7.1.2	4/0-9	See tables I and II for wire having two and three thicknesses of paper, respectively. The increase in diameter for coverings more than three thicknesses of paper shall be as specified below: $\left(\begin{matrix}\text{Minimum increase in diameter}\end{matrix}\right) = 2\left(\begin{matrix}\text{Number of paper thicknesses} - 1\end{matrix}\right)\left(\begin{matrix}\text{Nominal tape thickness}\end{matrix}\right)$ $\left(\begin{matrix}\text{Maximum increase in diameter}\end{matrix}\right) = 2\left(\begin{matrix}\text{Number of paper thicknesses} + 1\end{matrix}\right)\left(\begin{matrix}\text{Nominal tape thickness}\end{matrix}\right)$
Adherence and flexibility	4.7.2.2.1	4/0-9	Covering shall not open sufficiently to expose the bare wire, nor shall the covering show any tearing.
	4.7.2.2.2	4/0-9	Covering shall not open sufficiently to expose the bare wire, nor shall it be possible to slide the paper along the wire.
Elongation	4.7.5	4/0-9	Not less than 35 percent for wire sizes larger than 0 AWG or 30 percent for wire sizes smaller than 1 AWG.
Coverage	----	4/0-9	The covering shall not loosen appreciably nor open sufficiently to expose the bare wire after bending around a mandrel having a diameter 6X the thickness of the bare wire.
Dielectric strength	4.7.9	4/0-9	Not less than 300 volts/mil of the minimum thickness of the paper on one side (one-half the minimum increase).
Thermal endurance	----	4/0-9	Class 200. Insulating materials shall meet the thermal class ratings as described above.

TABLE I. Dimensions, two thicknesses of paper.

Dimensions, sizes 4/0 to 9 AWG,
two thicknesses of aromatic polyamide paper

AWG size	Bare wire dimension inch			Nominal tape thickness 0.002 inch (0.051 mm)				Nominal tape thickness 0.003 inch (0.076 mm)				AWG size
				Minimum increase in diameter		Maximum overall diameter		Minimum increase in diameter		Maximum overall diameter		
	Minimum	Nominal	Maximum	inch	mm	inch	mm	inch	mm	inch	mm	
4/0	0.4554	0.4600	0.4646	0.0040	0.102	0.4766	12.106	0.0060	0.152	0.4826	12.258	4/0
3/0	.4055	.4096	.4137	.0040	.102	.4257	10.813	.0060	.152	.4317	10.965	3/0
2/0	.3612	.3648	.3684	.0040	.102	.3804	9.662	.0060	.152	.3864	9.815	2/0
1/0	.3217	.3249	.3281	.0040	.102	.3401	8.639	.0060	.152	.3461	8.791	1/0
1	.2864	.2893	.2922	.0040	.102	.3042	7.727	.0060	.152	.3102	7.897	1
2	.2550	.2576	.2602	.0040	.102	.2722	6.914	.0060	.152	.2782	7.066	2
3	.2271	.2294	.2317	.0040	.102	.2437	6.190	.0060	.152	.2497	6.342	3
4	.2023	.2043	1/ .2053	.0040	.102	.2173	5.519	.0060	.152	.2233	5.672	4
5	.1801	.1819	1/ .1828	.0040	.102	.1948	4.948	.0060	.152	.2008	5.100	5
6	.1604	.1620	1/ .1628	.0040	.102	.1748	4.440	.0060	.152	.1808	4.592	6
7	.1429	.1443	1/ .1450	.0040	.102	.1570	3.988	.0060	.152	.1630	4.140	7
8	.1272	.1285	1/ .1292	.0040	.102	.1412	3.586	.0060	.152	.1472	3.739	8
9	.1133	.1144	1/ .1150	.0040	.102	.1270	3.226	.0060	.152	.1330	3.378	9

NOTE: For direct conversion of inches to millimeters, multiply inches by the factor 25.4 (exact).

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.

Downloaded from http://www.everyspec.com

TABLE II. Dimensions, three thicknesses of paper.

Dimensions, sizes 4/0 to 9 AWG,
three thicknesses of aromatic polyamide paper

AWG size	Bare wire dimension inch			Nominal tape thickness 0.002 inch (0.051 mm)				Nominal tape thickness 0.003 inch (0.076 mm)				AWG size
				Minimum increase in diameter		Maximum overall diameter		Minimum increase in diameter		Maximum overall diameter		
	Minimum	Nominal	Maximum	inch	mm	inch	mm	inch	mm	inch	mm	
4/0	0.4554	0.4600	0.4646	0.0080	0.203	0.4806	12.207	0.0120	0.305	0.4886	12.410	4/0
3/0	.4055	.4096	.4137	.0080	.203	.4297	10.914	.0120	.305	.4377	11.118	3/0
2/0	.3612	.3648	.3684	.0080	.203	.3844	9.764	.0120	.305	.3924	9.967	2/0
1/0	.3217	.3249	.3281	.0080	.203	.3441	8.740	.0120	.305	.3521	8.943	1/0
1	.2864	.2893	.2922	.0080	.203	.3082	7.828	.0120	.305	.3162	8.031	1
2	.2550	.2576	.2602	.0080	.203	.2762	7.015	.0120	.305	.2842	7.219	2
3	.2271	.2294	.2317	.0080	.203	.2477	6.292	.0120	.305	.2557	6.495	3
4	.2023	.2043	1/ .2053	.0080	.203	.2213	5.621	.0120	.305	.2293	5.824	4
5	.1801	.1819	1/ .1828	.0080	.203	.1988	5.050	.0120	.305	.2068	5.253	5
6	.1604	.1620	1/ .1628	.0080	.203	.1788	4.542	.0120	.305	.1868	4.745	6
7	.1429	.1443	1/ .1450	.0080	.203	.1610	4.089	.0120	.305	.1690	4.293	7
8	.1272	.1285	1/ .1292	.0080	.203	.1452	3.688	.0120	.305	.1532	3.891	8
9	.1133	.1144	1/ .1150	.0080	.203	.1310	3.327	.0120	.305	.1390	3.531	9

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.

The maximum overall diameters have been calculated in accordance with the following:

AWG size	Maximum increase due to two thicknesses of paper		Maximum increase due to three thicknesses of paper	
	Tape thickness 0.002 inch (0.051 mm)	Tape thickness 0.003 inch (0.176 mm)	Tape thickness 0.002 inch (0.051 mm)	Tape thickness 0.003 inch (0.076 mm)
4/0-9	0.012 inch (0.305 mm)	0.018 inch (0.457 mm)	0.016 inch (0.406 mm)	0.024 inch (0.610 mm)

NOTE: For direct conversion of inches to millimeter multiply inches by the factor 25.4 (exact).

Downloaded from http://www.everyspec.com

Downloaded from http://www.everyspec.com

Part number: Magnet wire covered by this specification shall be defined by the following part numbering system. Example: M1177/36-02C064.

M1177/36-	02	C	064
Federal specification identifier	Two digit type code	Single letter conductor code	Three digit total insulation build (mils)

The following codes shall apply:

Type	Type code	Conductor	Conductor code
PAP/2	01	Copper	C
PAP/3	02	Aluminum	A
		Nickel-coated copper	N
		Silver-coated copper	S

Intended use: Type PAP round magnet wire is intended for use in 200°C applications.

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 6145-1111-32)

Downloaded from http://www.everyspec.com