

Wire, Electrical, Polyvinyl Chloride Insulated,
PVC-Glass-Nylon, Tin-Coated Copper Conductor, 600-Volt, 105°C

FSC 6145

NOTICE

This document has been taken directly from U.S. Military Specification MIL-W-5086/2C, Amendment 1 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-W-5086/2C, Amendment 1. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this technical report.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2007 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)

Tel: 724-776-4970 (outside USA)

Fax: 724-776-0790

Email: CustomerService@sae.org

<http://www.sae.org>

SAE AS50861/2

The complete requirements for acquiring the wire described herein shall consist of this document and the latest issue of Specification MIL-W-5086.

From date of issue of this revision, wire of this specification sheet shall not be used in aerospace applications. See "Non-Use" note on page 5.

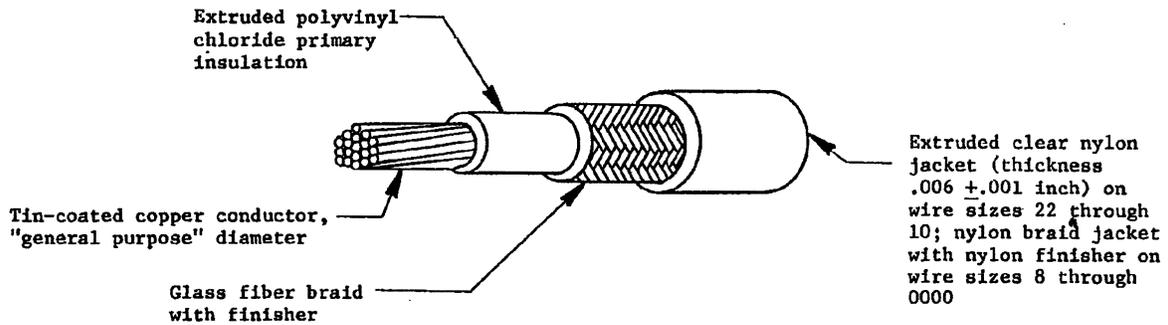


TABLE I. Construction details.

Part no. ^{1/}	Wire size	Stranding (Number of strands X AWG gage of strands)	Diameter of stranded conductor (inches)		Finished wire		
			(min)	(max)	Resistance at 20°C (68°F) (ohms/1000 ft) (max)	Diameter (inches)	Weight (lbs/1000 ft) (max)
M5086/2-22-*	22	19 x 34	.029	.033	16.2	.075 ± .005	4.70
M5086/2-20-*	20	19 x 32	.037	.041	9.88	.085 ± .005	6.80
M5086/2-18-*	18	19 x 30	.046	.051	6.23	.095 ± .005	9.50
M5086/2-16-*	16	19 x 29	.052	.058	4.81	.105 ± .005	11.90
M5086/2-14-*	14	19 x 27	.065	.073	3.06	.125 ± .007	18.30
M5086/2-12-*	12	37 x 28	.084	.090	2.02	.143 ± .007	26.0
M5086/2-10-*	10	37 x 26	.106	.114	1.26	.189 ± .007	44.0
M5086/2-8-*	8	133 x 29	.158	.173	.701	.240 ± .007	70.0
M5086/2-6-*	6	133 x 27	.198	.217	.445	.293 ± .007	110.0
M5086/2-4-*	4	133 x 25	.250	.274	.280	.355 ± .010	165.0
M5086/2-2-*	2	665 x 30	.320	.340	.183	.425 ± .010	250.0
M5086/2-1-*	1	817 x 30	.360	.380	.149	.470 ± .010	305.0
M5086/2-01-*	0	1045 x 30	.395	.425	.116	.525 ± .015	400.0
M5086/2-02-*	00	1330 x 30	.440	.475	.091	.590 ± .015	500.0
M5086/2-03-*	000	1665 x 30	.500	.540	.071	.650 ± .015	620.0
M5086/2-04-*	0000	2109 x 30	.565	.605	.056	.720 ± .015	785.0

^{1/} Part no.: The asterisks in the part number column, Tables I through III, shall be replaced by color code designators in accordance with MIL-STD-681. Examples: Size 20, white - M5086/2-20-9; white with orange stripe - M5086/2-20-93.

SAE AS50861/2

TABLE II. Bend test mandrels and test loads.

Part no.	Mandrel diameter (inches) ($\pm 3\%$)			Test load (lbs) ($\pm 3\%$)	
	Life cycle (oven and bend tests) <u>1/</u>	Cold bend test	Wrap test	Life cycle (oven and bend tests) <u>1/</u>	Cold bend test
M5086/2-22-*	4.5	3.0	0.45	.75	2.0
M5086/2-20-*	4.5	3.0	.51	.75	2.0
M5086/2-18-*	4.5	3.0	.57	1.0	2.0
M5086/2-16-*	6.5	3.0	.63	1.0	3.0
M5086/2-14-*	6.5	6.0	.75	1.0	3.0
M5086/2-12-*	6.5	6.0	.86	3.0	3.0
M5086/2-10-*	10.0	6.0	1.13	3.0	5.0
M5086/2-8-*	10.0	6.0	--	3.0	5.0
M5086/2-6-*	10.0	10.0	--	6.0	10.0
M5086/2-4-*	10.0	10.0	--	6.0	10.0
M5086/2-2-*	10.0	18.0	--	6.0	15.0
M5086/2-1-*	10.0	18.0	--	6.0	15.0
M5086/2-01-*	10.0	18.0	--	10.0	20.0
M5086/2-02-*	10.0	18.0	--	10.0	25.0
M5086/2-03-*	10.0	18.0	--	10.0	30.0
M5086/2-04-*	10.0	18.0	--	10.0	30.0

1/ Also for bend tests after immersion.

WIRE RATINGS AND ADDITIONAL REQUIREMENTS

Temperature rating: 105°C (221°F) max conductor temperature

Voltage rating: 600 volts (rms) at sea level

Blocking: 105° \pm 2°C (221° \pm 3.6°F)

Color: In accordance with MIL-STD-104, Class 1; white preferred

Color striping or banding durability:

Sizes 22 through 10: 250 cycles (500 strokes) (min), 500 grams weight

Sizes 8 through 0000: 50 cycles (100 strokes) (min), 250 grams weight

Flammability (Method 1):

30 sec (max) after-flame

1.50 inches (max) flame travel, either direction on wire

No flaming of tissue paper

Humidity resistance:

Sizes 22 through 10: 40 megohms for 1000 ft, min insulation resistance after humidity exposure

Sizes 8 through 0000: Not applicable

Identification durability:

Sizes 22 through 10: 125 cycles (250 strokes) (min), 500 grams weight

Sizes 8 through 0000: 50 cycles (100 strokes) (min), 250 grams weight

Impulse dielectric test:

Primary insulation (when test is used in lieu of spark test): 6.0 kilovolts (peak), 100% test

Finished wire: 8.0 kilovolts (peak), 100% test

Insulation resistance:

Sizes 22 through 10: 40 megohms for 1000 ft (min)

Sizes 8 through 0000: Not applicable

SAE AS50861/2

Life cycle: Oven temperature, $120^{\circ} \pm 2^{\circ}\text{C}$ ($248^{\circ} \pm 3.6^{\circ}\text{F}$)

Low temperature (cold bend): $-55^{\circ} \pm 2^{\circ}\text{C}$ ($-67^{\circ} \pm 3.6^{\circ}\text{F}$)

Shrinkage: 0.125 inch max at $150^{\circ} \pm 2^{\circ}\text{C}$ ($302^{\circ} \pm 3.6^{\circ}\text{F}$)

Smoke: 110°C (230°F)

Spark test of primary insulation:

Sizes 22 through 10: 3000 volts (rms), 60 Hz, 100% test

Sizes 8 through 0000: 4000 volts (rms), 60 Hz, 100% test

Surface resistance:

Sizes 22 through 10: 5 megohm-inches (min), initial and final readings

Sizes 8 through 0000: Not applicable

Thermal shock:

Oven temperature, $105^{\circ} \pm 2^{\circ}\text{C}$ ($221^{\circ} \pm 3.6^{\circ}\text{F}$)

The maximum shrinkage permitted for PVC insulation is .060 inch. Sizes 8 through 0000 gauge wire is permitted to have the braided polyamide outer jacket and glass braid insulation layers shrink .125 inch maximum.

Wet dielectric test: 2000 volts (rms)

Wrap test oven temperature:

Sizes 22 through 10: $95^{\circ} \pm 2^{\circ}\text{C}$ ($203^{\circ} \pm 3.6^{\circ}\text{F}$)

Sizes 8 through 0000: Not applicable

Wrap test specimens: In the selection of MIL-W-5086/2 wire specimens for the wrap test, each sample length from which a specimen is to be taken shall first be subjected to the dye inspection described under the wrap test procedure of MIL-W-5086, in order to detect glass fiber protrusions, if present, which permit dye penetration into the underlying braid. Specimens for the wrap test shall be cut only from those portions of each sample length which are free of such glass fiber protrusions.

Metric conversion note: Data in this specification sheet may be converted to metric as follows:

Linear dimensions $25.40 \times \text{inches} = \text{millimeters (mm)}$

Weight (general) $.4536 \times \text{lbs} = \text{kilograms (kg)}$

Wire weight $1.488 \times (\text{lbs}/1000 \text{ ft}) = \text{kg}/\text{km}$

Conductor resistance $3.281 \times (\text{ohms}/1000 \text{ ft}) = \text{ohms}/\text{km}$

Insulation resistance $.3048 \times (\text{megohms for } 1000 \text{ ft}) = \text{megohms for } 1 \text{ km}$

Surface resistance Where the electrode spacing is 25.0 millimeters in the metric document, the MIL-W-5086 megohm-inches resistance (defined as total megohms resistance times inches wire diameter) may be converted as follows:
 $25.0 \times (\text{megohm-inches diameter}) = \text{megohm-mm diameter}$
 $78.5 \times (\text{megohm-inches diameter}) = \text{megohm-mm circumference}$
 $3.14 \times (\text{megohm-inches diameter}) = \text{megohm-mm circumference per mm of electrode spacing}$

SUPERSESSION DATA: The wire of this specification sheet replaces and supersedes Type II wire of MIL-W-5086A (superseded 19 March 1968) and MS25190 (canceled 29 May 1969). Supersession by part number is in accordance with Table III.

SAE AS50861/2

TABLE III. Supersession by part number.

Size designation, MIL-W-5086A Type II	Part number, MS25190 Type II	Part number, MIL-W-5086/2
AN-22	MS25190-B-22	M5086/2-22-*
AN-20	MS25190-B-20	M5086/2-20-*
AN-18	MS25190-B-18	M5086/2-18-*
AN-16	MS25190-B-16	M5086/2-16-*
AN-14	MS25190-B-14	M5086/2-14-*
AN-12	MS25190-B-12	M5086/2-12-*
AN-10	MS25190-B-10	M5086/2-10-*
AN-8	MS25190-B-8	M5086/2-8-*
AN-6	MS25190-B-6	M5086/2-6-*
AN-4	MS25190-B-4	M5086/2-4-*
AN-2	MS25190-B-2	M5086/2-2-*
AN-1	MS25190-B-1	M5086/2-1-*
AN-0	MS25190-B-01	M5086/2-01-*
AN-00	MS25190-B-02	M5086/2-02-*
AN-000	MS25190-B-03	M5086/2-03-*
AN-0000	MS25190-B-04	M5086/2-04-*

NON-USE AND REPLACEMENT OF MIL-W-5086/2 WIRE IN AEROSPACE APPLICATIONS: Cable or wire with polyvinyl chloride insulation shall not be used in aerospace applications.

Replacement wires for the MIL-W-5086/2 items for aerospace applications should be selected from the lists of approved wires in the latest issue of MIL-W-5088, Wiring, Aerospace Vehicle, with due regard to the weight, dimensional, and functional requirements of the specific project or application.

INTERNATIONAL STANDARDIZATION: Certain provisions of Table I of this specification sheet are the subject of international standardization agreement (ASCC Air Std 12/5). When amendment, revision, or cancellation of this specification sheet is proposed which will affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

PREPARED BY SAE SUBCOMMITTEE AE-8D, WIRE & CABLE