



AEROSPACE STANDARD	AS85485™	REV. D
	Issued 2004-06 Revised 2021-03 Stabilized 2021-06 Superseding AS85485C	
Cable, Electric, Filter Line, Radio Frequency Absorptive		
FSC 6145		

RATIONALE

AS85485 is being stabilized because the committee does not anticipate future technical changes. Filterline cables are considered well-established products. Qualified suppliers are still maintained. Reference changes noted by the suppliers which results in a product change will be addressed by a new revision.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AE-8D Wire and Cable Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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Full document details: SAE AS85485D

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Documents

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1. SCOPE

1.1 Scope

This specification covers the requirements for radio frequency absorptive component wires and finished cables which function electrically as distributed low-pass filters. Materials and construction details are specified in the detail specification.

1.2 Classification

Products in accordance with this specification shall be of the following types, as specified in the detail specification.

Component wire: A single conductor, insulated as specified in the detail specification.

Finished cable: Constructions other than component wire, utilizing a wire or wires with or without shielding, or with or without an outer jacket.

1.2.1 Current Rating

The current rating shall be determined in accordance with AS50881.

1.2.2 Temperature Rating

The maximum conductor temperature of the component wire or finished cable for continuous use shall be as specified in the detail specification.

1.2.3 Voltage Rating

The AS85485 insulation system has been used in aerospace applications using 115 V (phase to neutral), 400 Hz AC, and 28 VDC. Verification of the suitability of this product for use in other electrical system configurations is the responsibility of the user.

1.2.6 Shielded, Jacketed, Multi-Component Cable Designations

Shielded, jacketed, multi-component cable designations shall be as shown in the following example:

<u>M85485</u>	<u>/8</u>	<u>-22</u>	<u>T</u>	<u>3</u>	<u>A</u>	Component wire marking designation (see Table 3)
						Number of cable component wires (1 through 5)
						Construction type (T, M, U, V, see Table 4)
						T – AS85485/5 with tin coated copper shield
						M – AS85485/6 with silver coated high strength copper alloy shield
						U – AS85485/6 with tin coated copper shield
						V – AS85485/6 with silver coated copper shield
						Conductor size
						Detail specification number
						Part number designation “M” and basic specification number

Table 3 - Jacket and component wire stripe colors as designated by letter “A”

Component Wire Mark	Number of Component Wires ^{2/}					Cable Jacket Color
First wire: Component wire one (no stripe) ^{1/}	1	2	3	4	5	Black
Second wire: Blue stripe						
Third wire: Orange stripe						
Fourth wire: Green stripe						
Fifth wire: Red stripe						

^{1/} Cable designation mark shall be applied to the jacket. Component wire mark is not required, but it is permitted (see construction type).

^{2/} Component type is determined by the cable construction type.

Table 4 - Cable construction types (designated by detail specification number)

Component Detail Specification	Code	Conductor Type	Shield Type
AS85485/5	T	Tin-coated copper	Tin-coated copper
AS85485/9			
Unassigned	S	Silver-coated copper	Silver-coated copper
Unassigned	N	Nickel-coated copper	Nickel-coated copper
AS85485/6	M	Silver-coated high-strength copper alloy	Silver-coated high-strength copper alloy
AS85485/10			
Unassigned	P	Nickel-coated high-strength copper alloy	Nickel-coated high-strength copper alloy
AS85485/6	U	Silver-coated-high-strength copper alloy	Tin-coated copper
AS85485/10			
AS85485/6	V	Silver-coated-high-strength copper alloy	Silver-coated copper
AS85485/10			
Unassigned	W	Nickel-coated high-strength copper alloy	Nickel-coated copper

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS1424	Fluid, Aircraft Deicing/Anti-Icing, SAE Type 1
AIR4465	Design and Handling Guide Radio Frequency Absorptive Type Wire and Cables (Filter Line, AS85485)
AIR5717	Mitigating Wire Insulation Damage During Processing and Handling
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS5768/1	Tool, Stripper, Manually Actuated, Electrical Insulation, Round Wire, Size 10 to 30
AS50881	Wiring Aerospace Vehicle
AS29606	Wire, Electrical, Stranded, Uninsulated Copper, Copper Alloy, or Aluminum, or Thermocouple Extension, General Specification for
AS85485/5*	Cable, Electric, Filter Line, Component Wire, Tin-Coated Copper Conductor, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/6*	Cable, Electric, Filter Line, Component Wire, Silver-Coated High Strength Copper Alloy Conductor, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/7*	Cable, Electric, Filter Line, Unshielded, Unjacketed, Multiple-Component, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/8*	Cable, Electric, Filter Line, Shielded, Jacketed, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/9*	Cable, Electric, Filter Line, Small Diameter Component Wire, Tin-Coated Copper Conductor, Radio Frequency, Absorptive, 150 °C, 600-Volt
AS85485/10*	Cable, Electric, Filter Line, Small Diameter, Component Wire, Silver-Coated High-Strength Copper Alloy Conductor, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/11*	Cable, Electric, Filter Line, Small Diameter, Unshielded, Unjacketed, Multiple-Component, Radio Frequency Absorptive, 150 °C, 600-Volt
AS85485/12*	Cable, Electric, Filter Line, Small Diameter Wire, Shielded, Jacketed, Radio Frequency Absorptive, 150 °C, 600-Volt
AS9003	Inspection and Test Quality Systems Requirements for Aviation, Space, and Defense Organizations

*AS85485 detail specification

2.1.2 ASQ Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (United States or Canada), 001-800-514-1564 (Mexico), or +1-414-272-8575 (all other locations), www.asq.org.

ASQC Z1.4	Sampling Procedures and Tables for Inspection by Attributes
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2.1.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B63	Standard Test Method for Resistivity of Metallically Conducting Resistance and Contact Materials
ASTM D471	Rubber Property-Effects of Liquids
ASTM D770	Isopropyl Alcohol
ASTM D1153	Standard Specification for Methyl Isobutyl Ketone
ASTM D1655	Standard Specification for Aviation Turbine Fuels
ASTM D3032	Standard Test Methods for Hookup Wire Insulation
ASTM D4814	Standard Specification for Automotive Spark-Ignition Engine Fuel
ASTM E104	Standard Recommended Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions
ASTM E595	Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment

2.1.4 National Conference of Standards Laboratories (NCSL) Publications

Available from NCSL International, 2995 Wilderness Place, Suite 107, Boulder, CO 80301, Tel: 303-440-3339, www.ncsli.org.

NCSL Z540.3 Calibration of Measuring and Test Equipment, Requirements for

2.1.5 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

A-A-59921	Cleaning Compound, Aircraft Surface, Type I
FED-STD-228	Methods of Testing Cable and Wire, Insulated
MIL-DTL-915	Cable and Cord Electrical, for Shipboard Use, General Specification for
MIL-DTL-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-DTL-12000	Cable, Cord, and Wire, Electric, Packaging of
MIL-DTL-83133	Turbine Fuel, Aviation, Kerosene Types, NATO F-34 (JP-8) and NATO F-35
MIL-PRF-5606	Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance
MIL-PRF-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-23699	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-87252	Coolant Fluid, Hydrolytically Stable, Dielectric
MIL-PRF-87937	Cleaning Compound, Aerospace Equipment

MIL-STD-104	Limits for Electrical Insulation Color
MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-681	Identification Coding and Application of Hook Up and Lead Wire
SAM	System for Award Management*
SD-6	Provisions Governing Qualification

*Available from <https://www.sam.gov/portal/public/SAM/>.

2.2 Definitions

2.2.1 CRITICAL DEFECTS

A critical defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product, or a defect that judgment and experience indicate is likely to prevent performance of the actual function of a major end item such as a ship, aircraft, tank, missile, or space vehicle.

2.2.2 DEFECT

A defect is any nonconformance of the unit of product with specified requirements.

2.2.3 MAJOR DEFECT

A major defect is a defect, other than critical, that is likely to result in failure, or to reduce the usability of the unit of product for its intended purpose.

2.2.4 MINOR DEFECT

A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

2.2.5 AS85485 FILTER LINE APPLICATIONS

AS85485 requirements are specifically designed for aircraft application (refer to AS50881), but may be used in other applications to address signal noise problems.

3. REQUIREMENTS

3.1 Basic and Detail Specifications (see 5.13)

The requirements for the component wire and finished cable furnished under this specification shall be as specified herein and in accordance with the detail specification. In the event of discrepancy between this specification and the requirements of the detail specification, the requirements of the detail specification shall govern.

3.2 Qualification

The component wire or finished cable furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list (see 4.6 and 7.6). The provisions of 4.9 for retention of qualification are included in this requirement.

3.3 Materials

Unless otherwise specified in the detail specification, the wire or cable materials shall be as specified herein. The wire or cable insulation shall contain no additives except those required as wetting agents in suspensoids, pigmentation for colors, and lubricants used in extrusion. Fillers shall be added only when required. The use of reclaimed or recycled insulation material is not prohibited, but if used, the recycled materials shall not have been degraded, shall be free of contaminants, and shall be identical with the original materials in performance.

3.3.1 Conductor Material (see 5.2)

All conductors shall meet the material requirements of AS29606. The wire supplier is responsible for all quality assurance and compliance requirements imposed on the conductor per AS29606. Conductor material data shall be maintained for a minimum of 6 years.

3.3.2 Braided Round Wire Strand Shield Material

Braided round wire strands shall meet all the applicable conductor material requirements of AS29606 prior to braiding (see 3.3.1).

3.3.3 Insulation Material

All insulating and filter layer materials shall be in accordance with the detail specification and shall meet all applicable requirements of Table 9 and the detail specification.

3.4 Construction

Construction of the component wire and finished cable shall be as specified herein and in the detail specification.

3.4.1 Uninsulated Conductor Construction (see 5.2)

The conductor construction prior to the application of the insulation shall be in accordance with AS29606. In the event of a conflict between AS29606 and the detail specification, the detail specification shall take precedence.

3.4.2 Insulated Conductor Splice (see 5.3)

Insulated conductor splices shall meet the requirement of AS29606.

3.4.3 Insulated Conductor Elongation and Breaking Strength (see 5.8)

Unless otherwise specified in the detail specification, the insulated conductor elongation and tensile break strength shall be in accordance with AS29606.

3.4.4 Insulated Conductor Construction (see 5.13)

The insulated conductor diameter, strand count, and strand diameter shall be in accordance with AS29606 and as listed in the detail specification. Applicability of the “general purpose” or of the “small diameter” requirements for maximum conductor diameter shall be as indicated in the detail specification.

3.4.5 Shield Construction (see 5.13)

The shield shall be constructed as specified in the detail specification.

3.4.6 Insulation Construction and Stripping (5.13)

The insulating and filter layers shall be constructed as specified in the detail specification. All component insulation shall be readily removable by an AS5768/1 tool without damage to the conductor.

3.4.7 Cable Jacket Construction and Stripping (see 5.13)

The cable jacket shall be constructed as specified in the detail specification and removable without damage to the shield.

3.5 Component Wire and Finished Cable (see 5.13)

The component wire and finished cable shall conform to the requirements of Table 9 and those of the detail specification. The requirements of 3.5.1 through 3.5.31 also apply. Unless otherwise specified, component wire shall conform to all applicable requirements prior to assembly into the finished cable.

3.5.1 Blocking (see 5.6)

Adjacent turns or layers of the component wire or cable jacket shall not stick to one another when tested as specified in 5.6 at the temperature specified in the detail specification.

3.5.2 Cabling (see 5.13)

The required number of component wires as specified in the detail specification shall be cabled together with a left hand lay. For cables having multiple layers, the outer layer shall be left hand and the inner layer or layers may be either right hand or left hand lay. The lay length of the individual component wires shall be not less than eight times nor more than 16 times the diameter of the applicable layer. Fillers and binders shall be used only as specified in the detail specification.

3.5.3 Color (see 5.13)

The color of component wire shall be light violet, designated by 7L, unless otherwise specified. All solid colors and the colors of all striping shall be in accordance with MIL-STD-104, Class 1. Color stripes shall conform to MIL-STD-681.

3.5.4 Crosslinking Proof Test and Life Cycle (see 5.11)

When samples are tested in accordance with 5.11, there shall be no cracking of the insulation or jacket and no dielectric breakdown, as applicable.

3.5.5 Electrical Conductor and Shield Continuity (see 5.13)

One hundred percent of all finished cable shall be tested for electrical continuity prior to shipment. There shall be no indication of electrical discontinuity in any of the component wires or shields.

3.5.6 Continuous Lengths (see 5.10)

The individual continuous lengths of component wire or finished cable in each inspection lot shall be of such footage that, when inspected in accordance with 5.10, the inspection lot shall conform to the continuous length requirements of Table 5. Unless otherwise specified in the contract or order, the footage of the individual continuous lengths in each spool or reel shall be marked on the spool or reel in the sequence in which the lengths will be unwound by the user.

Table 5 - Minimum continuous lengths

Product Description	Required Minimum Percent of the Total Inspection Lot Footage in Continuous Lengths Greater Than		
	250 feet	100 feet	50 feet
Component Wire	85%	100%	--
Finished Cable	--	85%	100%

3.5.7 Identification of Product (see 5.13)

The identification of product printed mark shall consist of the following information:

- a. Detail specification part identification number (PIN) as shown in 1.2.4 through 1.2.6, unless otherwise specified.
- b. Manufacturer's identification in accordance with the manufacturer's commercial and government entity (CAGE) listed in "SAM."
- c. For finished shielded and jacketed cable, the words "FILTER LINE" shall follow the manufacturer's code.

3.5.8 Part Identification Number (PIN) Mark Application (see 5.13)

The PIN application shall consist of the following:

- a. The component wire or jacket and shielded cable shall be identified by a printed PIN mark applied to the outer surface, or visible through the outer surface, of the wire or cable insulation.
- b. PIN marking of unshielded, unjacketed cable shall be located on component number 1.
- c. PIN marking of components of shielded and jacketed finished cable shall not be required.
- d. Printing of the PIN color code designator on surface of component wire insulation jacket (see 1.2.4) is not required.
- e. Printing of the PIN color code designator on surface of twisted cable or jacket and shielded cable shall be covered by the letter designation "A" (see 1.2.5 and 1.2.6).
- f. For the component wire, the PIN shall be at intervals of 9 to 60 inches, as measured from the beginning of one complete marking to the beginning of the succeeding completed marking.
- g. For unshielded, unjacketed, and jacket shielded cables, the distance between the end of one complete Identification of Product mark and the beginning of the next complete mark shall not be greater than 12 inches.
- h. The Identification of Product printing shall be white in color in accordance with MIL-STD-104, Class 1. Identification printing shall be applied with the vertical axes of the printed characters lengthwise of the component wire or jacket and shielded cable when the nominal diameter is 0.050 inch or smaller. The vertical axes of the printed characters may be either crosswise or lengthwise of the component wire or finished cable when the nominal diameter exceeds 0.050 inch. All printed characters shall be complete and legible.

3.5.9 Durability of Identification of Product and Color Stripe (see 5.12)

Identification of product printing and color stripe, when applied to the outer surface of the component wire or jacket and shielded cable, where applicable, shall be capable of withstanding the durability test specified in 5.12.2 for the number of cycles and with the weight specified in the detail specification.

3.5.10 Insulation and Jacket Flaws (see 5.18)

When required by the detail specification, 100% of the component wire and finished cable shall pass the spark test or the impulse dielectric test of 5.18. Testing of finished component wire or cable shall be performed during the final winding on shipment spools or reels. Component wire intended for finished cable shall be tested prior to cabling.

3.5.11 Workmanship (see 5.13)

All details of workmanship shall be in accordance with high grade wire and cable manufacturing practice. The insulation shall be free of cracks, splits, irregularities, and imbedded foreign material.

3.5.12 Wrap Test (5.29)

There shall be no cracking or splitting of the insulation when tested in accordance with 5.29 at the temperature and for the time specified in the detail specification.

3.5.13 Jacket Resistivity (see 5.1)

When tested in accordance with 5.1, the jacket resistivity value for conductive jackets shall be 150 Ω -cm, maximum.

3.5.14 Attenuation or Insertion Loss Component Wire Only (see 5.4)

When specified in the detail specification, attenuation (insertion loss) shall be performed in accordance with 5.4.

3.5.15 Low Temperature - Cold Bend (see 5.20)

When samples are tested in accordance with 5.20, there shall be no cracking of the insulation or jacket and no dielectric breakdown.

3.5.16 Bend Test - Post-Environmental (see 5.5)

When sample is tested in accordance with 5.5, there shall be no cracking of the insulation or jacket.

3.5.17 Component and Cable Jacket Concentricity and Wall Thickness (see 5.7)

When specified in the detail specification, the concentricity and wall thickness shall be performed in accordance with 5.7.

3.5.18 Conductor Resistance (see 5.9)

The conductor resistance value shall be in accordance with the detail specification when tested in accordance with 5.9.

3.5.19 Flammability (see 5.14)

The length of flame travel and time of burning shall be as specified in the detail specification when tested in accordance with 5.14.

3.5.20 Humidity Resistance (see 5.15)

The component wire insulation resistance value shall be in accordance with the detail specification after exposure to the humidity in accordance with 5.15.

3.5.21 Immersion (see 5.16)

After fluid exposure in accordance with 5.16, the component wire or finished cable diameter percent change shall be 5% maximum. There shall be no cracking or splitting of the insulation material. The component wire and cable shall have no dielectric breakdown.

3.5.22 Insulation and Jacket Elongation and Tensile Strength (see 5.17)

The insulation elongation and tensile strength value shall be in accordance with the detail specification when tested in accordance with 5.17.

3.5.23 Insulation Resistance (see 5.19)

The insulation resistance value shall be in accordance with the detail specification when tested in accordance with 5.19.

3.5.24 Shield Coverage (see 5.21)

The shield coverage value shall be in accordance with the detail specification when tested in accordance with 5.21.

3.5.25 Shrinkage (see 5.22)

The shrinkage value shall be in accordance with the detail specification when tested in accordance with 5.22.

3.5.26 Voltage Withstand (see 5.27)

When applicable, the voltage withstand value (volts) shall be specified in the detail specification and performed in accordance with 5.27.

3.5.27 Smoke (see 5.23)

The component wire shall show no indication of visible smoke at the conductor temperature specified in the detail specification when tested in accordance with 5.23.

3.5.28 Surface Resistance (see 5.24)

The surface resistance value shall be in accordance with the detail specification when tested in accordance with 5.24.

3.5.29 Thermal Shock Resistance (see 5.25)

The thermal shock resistance oven temperature and the maximum change in insulation movement shall be as specified in the detail specification when tested in accordance with 5.25.

3.5.30 Thermal Stability (See 5.26)

The thermal stability test shall be performed in accordance with 5.26. The voltage withstand test value and stop band attenuation test value shall be in accordance with the detail specification.

3.5.31 Weight (see 5.28)

The component wire or cable shall not exceed the weight specified in the detail specification when tested in accordance with 5.28.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the qualifying activity. The qualifying activity reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Responsibility for Compliance

All items must meet all technical requirements of the product standard. The inspection set forth in this standard shall become a part of the supplier's overall inspection system or quality program. The absence of any inspection requirements in the standard shall not relieve the supplier of the responsibility of assuring that all products comply with all requirements of the contract or purchase order. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the purchaser to acceptance of defective material.

4.3 Test Equipment and Inspection Facilities

Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the supplier. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with NCSL Z540-3 or equivalent standards.