AEROSPACE STANDARD

AS22759™ REV. E

Issued 2001-07
Revised 2024-07

Superseding AS22759D

Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy

RATIONALE

Revision is required to accommodate additional detail specifications AS22759/59 and AS22759/60.

1. SCOPE

AS22759 specification covers fluoropolymer-insulated single conductor electrical wires made with tin-coated, silver-coated, or nickel-coated conductors of copper or copper alloy as specified in the applicable detail specification. The fluoropolymer insulation may be polytetrafluoroethylene (PTFE), fluorinated ethylene propylene (FEP), polyvinylidene fluoride (PVF_2), ethylene-tetrafluoroethylene copolymer (ETFE), or other Fluoropolymer resin. The fluoropolymer may be used alone or in combination with other insulation materials. These abbreviations shall be used herein. When a wire is referenced herein, it means an insulated conductor (see 7.7).

1.1 Part Numbers

Unless otherwise specified (see 3.1), part numbers are coded as in the following example (see 3.8 for details):

M22759/1 -22 -9 0 1 2

- 2 — Third Stripe (Red, etc.)
- 1 — Second Stripe (Brown, etc.)
- 0 — First Stripe (Black, etc.)
- -9 — Insulation Color Designator (White, etc.)
- -22 — Wire Size (see 3.1)
- M22759/1 — Applicable Detail Specification Designator (see 3.1)

1.2 Temperature Rating of Wire

The maximum conductor temperature of the wire for continuous use is specified in the detail specification (see 7.11).

1.3 Voltage Rating of Wire

The voltage rating of a wire for continuous use is specified in the detail specification (see 7.12).

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For more information on this standard, visit
https://www.sae.org/standards/content/AS22759E

2. 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 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	Deicing/Anti-Icing Fluid, Aircraft, SAE Type I
AIR5717	Mitigating Wire Insulation Damage During Processing and Handling
ARP5607	Legibility of Print on Aerospace Wires and Cables
ARP6400	Recommended Practice for Processing and Handling Wire and Cable with Silver Plated Conductors and Shields
ARP9013	Statistical Product Acceptance Requirements
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS4373	Test Methods for Insulated Electric Wire
AS4461	Assembly and Soldering Criteria for High Quality/High Reliability Soldered Wire and Cable Termination in Aerospace Vehicles
AS5768	Tool, Stripper, Electrical Insulation, General Specification For
AS5768/1	Tool, Stripper, Manually Actuated, Electrical Insulation, Round Wire, Size 10 to 30
AS5768/2	Tool, Stripper, Manually Actuated, Small Grip, Electrical Insulation, Round Wire, Size 16 to 30
AS22759/1*	Wire, Electrical, Fluoropolymer-Insulated, PTFE and PTFE-Coated Glass, Silver-Coated Copper Conductor, 600-Volt
AS22759/2*	Wire, Electrical, Fluoropolymer-Insulated, PTFE, and PTFE-Coated-Glass, Nickel-Coated Copper Conductor, 600-Volt
AS22759/3*	Wire, Electrical, Fluoropolymer-Insulated, TFE-Glass-TFE, Medium Weight, Nickel-Coated Copper Conductor, 600-Volt
AS22759/4*	Wire, Electrical, Fluoropolymer-Insulated, TFE-Glass-FEP, Medium Weight, Silver-Coated Copper Conductor, 600-Volt
AS22759/5*	Wire, Electrical, Fluoropolymer-Insulated, Abrasion Resistant Extruded PTFE, Silver-Coated Copper Conductor, 600-Volt, RoHS
AS22759/6*	Wire, Electrical, Fluoropolymer-Insulated, Abrasion Resistant Extruded PTFE, Nickel-Coated Copper Conductor, 600-Volt, RoHS
AS22759/7*	Wire, Electrical, Fluoropolymer-Insulated, Abrasion Resistant Extruded PTFE, Medium Weight, Silver-Coated Copper Conductor, 600-Volt, RoHS

AS22759/8*	Wire, Electrical, Fluoropolymer-Insulated, Abrasion Resistant Extruded PTFE, Medium Weight, Nickel-Coated Copper Conductor, 600-Volt, RoHS
AS22759/9*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Silver-Coated Copper Conductor, 1000-Volt, RoHS
AS22759/10*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Nickel-Coated Copper Conductor, 1000-Volt, RoHS
AS22759/11*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Silver-Coated Copper Conductor, 600-Volt, RoHS
AS22759/12*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Nickel-Coated Copper Conductor, 600-Volt, RoHS
AS22759/13*	Wire, Electrical, Fluoropolymer-Insulated, FEP-PVF2, Medium Weight, Tin-Coated Copper Conductor, 600-Volt, RoHS
AS22759/14*	Wire, Electrical, Fluoropolymer-Insulated, FEP-PVF2, Light Weight, Tin-Coated Copper Conductor, 600-Volt, RoHS
AS22759/15*	Wire, Electrical, Fluoropolymer-Insulated, FEP-PVF2, Light Weight, Silver-Coated High Strength Copper Alloy Conductor, 600-Volt, RoHS
AS22759/16*	Wire, Electrical, Fluoropolymer-Insulated, Extruded ETFE, Medium Weight, Tin-Coated Copper Conductor, 600-Volt, 150°C, RoHS
AS22759/17*	Wire, Electrical, Fluoropolymer-Insulated, Extruded ETFE, Medium Weight, Silver-Coated High Strength Copper Alloy Conductor, 600-Volt, 150°C, RoHS
AS22759/18*	Wire, Electrical, Fluoropolymer-Insulated, Extruded ETFE, Light Weight, Tin-Coated Copper Conductor, 600-Volt, 150°C, RoHS
AS22759/19*	Wire, Electrical, Fluoropolymer-Insulated, Extruded ETFE, Light Weight, Silver-Coated High Strength Copper Alloy Conductor, 600-Volt, 150°C, RoHS
AS22759/20*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Silver-Coated High Strength Copper Alloy Conductor, 1000-Volt, RoHS
AS22759/21*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Nickel-Coated High Strength Copper Alloy Conductor, 1000-Volt, RoHS
AS22759/22*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Silver-Coated High Strength Copper Alloy Conductor, 600-Volt, RoHS
AS22759/23*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Nickel-Coated High Strength Copper Alloy Conductor, 600-Volt, RoHS
AS22759/24-/27*	MIL-W-22759 detail versions (/24-/27) were canceled without supersession. To maintain harmony between AS22759 and MIL-DTL-22759 the AS22759/24-/27 numbers will not be used
AS22759/28*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Polyimide Coated, Silver-Coated Copper Conductor, 600-Volt, RoHS
AS22759/29*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Polyimide Coated, Nickel-Coated Copper Conductor, 600-Volt, RoHS

AS22759/30*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Polyimide Coated, Silver-Coated High Strength Copper Alloy Conductor, 600-Volt, RoHS
AS22759/31*	Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Polyimide Coated, Nickel-Coated High Strength Copper Alloy Conductor, 600-Volt, RoHS
AS22759/32*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Tin-Coated Copper, 150°C, 600-Volt, RoHS
AS22759/33*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/34*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Tin-Coated Copper, 150°C, 600-Volt
AS22759/35*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt
AS22759/36-/40*	MIL-W-22759 detail versions (/36-/40) were canceled without supersession. To maintain harmony between AS22759 and MIL-DTL-22759 the AS22759/36-/40 numbers will not be used
AS22759/41*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Nickel-Coated Copper, 200°C, 600-Volt
AS22759/42*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Nickel-Coated High Strength Copper Alloy, 200°C, 600-Volt
AS22759/43*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Silver-Coated Copper, 200°C, 600-Volt
AS22759/44*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Silver-Coated Copper, 200°C, 600-Volt, RoHS
AS22759/45*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Nickel-Coated Copper, 200°C, 600-Volt, RoHS
AS22759/46*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Nickel-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/47*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Light Weight, 80 Microinch, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/48*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Light Weight, 80 Microinch, Silver-Coated Copper, 200°C, 600-Volt, RoHS
AS22759/49*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Normal Weight, 80 Microinch, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/50*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Normal Weight, 80 Microinch, Silver-Coated Copper, 200°C, 600-Volt, RoHS
AS22759/51*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Light Weight, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/52*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Light Weight, Silver-Coated Copper, 200°C, 600-Volt, RoHS

AS22759/53*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Normal Weight, Silver-Coated High Strength Copper Alloy, 200°C, 600-Volt, RoHS
AS22759/54*	Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Low Fluoride, Normal Weight, Silver-Coated Copper, 200°C, 600-Volt, RoHS
AS22759/55*	Wire, Electrical, Fluoropolymer-Insulated, Cross Linked Modified ETFE, Lightweight, Silver Coated, Extra High Strength Copper Alloy, 200 °C, 600 Volt, ROHS
AS22759/56*	Wire, Electrical, Fluoropolymer-Insulated, Cross Linked Modified ETFE, Normal Weight, Silver Coated, Extra High Strength Copper Alloy, 200 °C, 600 Volt, ROHS
AS22759/57*	Wire, Electrical, Fluoropolymer-Insulated, Cross Linked Modified ETFE, Normal Weight, Nickel Coated, Extra High Strength Copper Alloy, 200 °C, 600 Volt, ROHS
AS22759/58*	Wire, Electrical, Fluoropolymer-Insulated, Cross Linked Modified ETFE, Lightweight, Nickel Coated, Extra High Strength Copper Alloy, 200 °C, 600 Volt, ROHS
AS22759/59	Wire, Electrical, Fluoropolymer-Insulated, Crosslinked Modified ETFE, Fluoride Controlled, Medium Weight, Silver-Coated Copper, 200 °C, 600 Volt, ROHS
AS22759/60	Wire, Electrical, Fluoropolymer-Insulated Crosslinked Modified ETFE, Fluoride Controlled, Medium Weight, Silver-Coated High Strength Copper Alloy, 200 °C, 600 Volt, ROHS
AS22759/61-/79*	For future detail specifications
AS22759/80*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS
AS22759/81*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Silver Coated, High Strength or Ultra High Strength Copper Alloy, 200°C, 600 Volts, RoHS
AS22759/82*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Nickel Coated, High Strength or Ultra High Strength Copper Alloy, 260°C, 600 Volts, RoHS
AS22759/83*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Over Braid, Normal Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS
AS22759/84*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated Over Braid, Normal Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS
AS22759/85*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated Over Braid, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS
AS22759/86*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS
AS22759/87*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS
AS22759/88*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS
AS22759/89*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Silver Coated, High Strength or Ultra High Strength Copper Alloy, 200°C, 600 Volts, RoHS
AS22759/90*	Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Nickel Coated, High Strength or Ultra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/91* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS

AS22759/92* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS

AS22759/93* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Silver Coated, Extra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/94* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Light Weight, Nickel Coated, Extra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/95* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Silver Coated, Extra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/96* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Nickel Coated, Extra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/97-/179* For future detail specifications

AS22759/180* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS

AS22759/181* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Silver Coated, High Strength or Ultra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/182* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Nickel Coated, High Strength or Ultra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/183* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Over Braid, Smooth Surface, Normal Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS

AS22759/184* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Over Braid, Smooth Surface, Normal Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS

AS22759/185* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Over Braid, Smooth Surface, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS

AS22759/186* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS

AS22759/187* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS

AS22759/188* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts, RoHS

AS22759/189* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Silver Coated, High Strength or Ultra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/190* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Nickel Coated, High Strength or Ultra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/191* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Silver Coated, Copper Conductor, 200°C, 600 Volts, RoHS

AS22759/192* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Nickel Coated, Copper Conductor, 260°C, 600 Volts, RoHS

AS22759/193* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Silver Coated, Extra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/194* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Light Weight, Nickel Coated, Extra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS22759/195* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Silver Coated, Extra High Strength Copper Alloy, 200°C, 600 Volts, RoHS

AS22759/196* Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Smooth Surface, Normal Weight, Nickel Coated, Extra High Strength Copper Alloy, 260°C, 600 Volts, RoHS

AS29606 Wire, Electrical, Stranded, Uninsulated Copper, Copper Alloy, or Aluminum, or Thermocouple Extension, General Specification For

AS9003 Inspection and Test Quality System

AS50881 Wiring, Aerospace Vehicle

* AS22759 detail specifications

2.2 European Committee for Standardization Publications

Available from European Parliament, Bât. Altiero Spinelli, 60 rue Wiertz/Wiertzstraat 60, B-1047 - Bruxelles/Brussels Belgium.

RoHS Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC by January 1, 2015

2.3 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.

ANSI/ASQC-Z1.4 Sampling Procedures and Tables for Inspection by Attributes

2.4 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 B286 Copper Conductors for Use in Hookup Wire for Electronic Equipment

ASTM D149 Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

ASTM D471 Standard Test Method for Rubber Property

ASTM D770 Standard Specification for Isopropyl Alcohol

ASTM D792 Standard Methods of Test for Specific Gravity and Density of Plastics by Displacement

ASTM D882 Standard Test Methods for Tensile Properties of Thin Plastic Sheeting

ASTM D1153 Methyl Isobutyl Ketone (for Use in Organic Coatings)

ASTM D1655 Standard Specification for Aviation Turbine Fuels

ASTM D2116 Standard Specification for FEP-Fluorocarbon Molding and Extrusion Materials

ASTM D3032 Hook Up Wire Insulation Standard Test Method For

ASTM D3159 Standard Specification for Modified ETFE-Fluoropolymer Molding and Extrusion Materials

ASTM D3222 Standard Specification for Unmodified Poly (Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials

ASTM D4591 Temperature and Heats Determining of Transition of Fluoropolymers by Differential Scanning Calorimetry

ASTM D4814 Standard Specification for Automotive Spark-Ignition Engine Fuel

ASTM D4895 Standard Specification for Polytetrafluoroethylene (PTFE) Resin Produced From Dispersion

2.5 IPC-Association Connecting Electronics Industries Publications

Available from IPC, 3000 Lakeside Drive, 309 S, Bannockburn, IL 60015, Tel: 847-615-7100, www.ipc.org.

J-STD-002 Component Leads, Terminations, Lugs, wires, Solderability Tests For

2.6 NCSL Publications

Available from National Conference of Standards Laboratories 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

2.7 U.S. Government Publications

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

A-A-59921 Cleaning Compound, Aircraft Surface

MIL-STD-104 Limits for Electrical Insulation Color

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-202 Electronic and Electrical Components Parts

MIL-STD-681 Identification Coding and Application of Hookup and Lead Wire

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

SD6 Provisions Governing Qualification

SAM System for Award Management*

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

3. REQUIREMENTS

3.1 Detail Specification (see 2.1)

The product requirements shall be as specified herein and in accordance with the applicable detail specification. In the event of any conflict between the requirements of this specification and the detail specification, the latter shall govern. The detail specification shall be formatted as shown in Appendix A.

3.2 Qualification (see 4.2)

The wire furnished herein shall be a product that has been tested and has passed the qualification tests specified herein and has been listed on or approved for listing on the applicable Qualified Products List (see 9.2).

3.2.1 Conformity to Qualified Sample

Except for changes approved by the purchase order, it is understood that wire supplied under the purchase order shall be the same material formulations, material sources, and manufacturing processes as approved by the Qualifying Activity. Any unapproved changes made after the qualification approval date, unless accepted by the Qualifying Activity, may constitute cause for rejection. All identified unapproved changes must be reported to the Qualifying Activity. Failure of a manufacturer to notify the Qualifying Activity of a change in design, material, manufacturing process (including quality conformance) or plant location shall be reason for adverse action or removal from the Qualified Products List.

3.3 Materials (see 5.1)

Unless otherwise specified in the detail specification, the wire materials shall be as specified herein. The wire 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. When required in the detail specification, the wire shall comply with Restriction of Hazardous Substances Directive (RoHS).

3.3.1 Conductor Material (see 5.1.1)

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 (see 4.3.2 and 4.4.3).

3.3.2 PTFE Coated Fibrous Glass Yarns Material (see 5.1.2)

All fibrous glass yarns used in braiding shall be coated with PTFE resin to the extent of not less than 15% by weight of the coated yarn. In addition, after each braid application, the braid shall be coated with PTFE. This coating shall be a PTFE finisher, PTFE extrusion, or PTFE unsupported tape.

3.3.3 PTFE Coated Fibrous Glass Tapes Material (see 5.1.3)

All fibrous glass tapes used in insulation shall contain not less than 50% of PTFE by weight of the coated tape.

3.3.4 Fluoropolymer (FP)/Polyimide/Fluoropolymer (FP) Tapes Material (see 5.1.4)

FP/Polyimide/FP tapes used as a wrap on a conductor shall be as specified in Table 1.

Table 1 - FP/polyimide/FP tapes

Wire Tape Characteristics	0.00045 (FP)/0.00065 (Polyimide)/0.0001 (FP)	0.0005 (FP)/0.0010 (Polyimide)/0.0005 (FP)
Tensile Strength (min average lb/in^2)	20000	19000
Longitudinal Elongation (min average %)	40	40
Dielectric Strength (min average volts/mil)	4000	4000
Specific Gravity (g/cc)	1.78 nominal	1.81 nominal
Thickness 1/	1.1 mils min - 1.3 mils max	1.85 mils min - 2.15 mils max

1/ Description of the film describe the nominal thickness of each layer. Each film has a polyimide substrate (center) with a modified Fluoropolymer (FP) coating on the outside.

3.3.5 Unsupported PTFE Tape Material (see 5.1.4)

Unsupported PTFE tapes shall be as specified in Table 2. For extruded unsintered PTFE tapes, requirements are only applicable to detail specifications which do not contain a wire insulation state of sinter requirement on the PTFE tape layer.

Table 2 - Unsupported PTFE tapes

	Skived PTFE Tape			Cast PTFE Tape		Extruded Unsintered PTFE Tape
	Tape Thickness (mils)					
Wire Tape Characteristics	0-3.5	3.6-5.5	5.6 min	0-3.5	3.6-5.5	0-5.5
Dielectric Strength (min average volts/mil)	2700	2200	1500	3200	2700	700
Specific Gravity (g/cc)	2.14 min 2.21 max			2.14 min 2.21 max		1.5 min
Tensile Strength (min average lb/in^2)	4000			3000		1300
Longitudinal Elongation (min average %)	300			300		50

3.3.6 Fluoropolymer Insulation Resin Material (see 5.1.5)

Fluoropolymer insulation material properties used for extrusion of wire primary and jacket insulations as well as insulating tapes shall conform to the material controls specified in Table 3.

Table 3 - Fluoropolymer insulation resin properties

Fluoropolymer Insulation Material	Material Specification
Polytetrafluoroethylene (PTFE)	ASTM D4895
Fluorinated Ethylene Propylene (FEP)	ASTM D2116
Polyvinylidene Fluoride (PVF2)	ASTM D3222
Ethylene-tetrafluoroethylene copolymer (ETFE)	ASTM D3159

3.4 Conductor Construction (see 5.2)

3.4.1 Conductor Construction Prior to Insulation Application (see 5.2.1 and 7.4)

The conductor construction prior to the application of the insulation shall be in accordance with AS29606.

3.4.2 Insulated Conductor Splice (see 5.2.2)

Insulated conductor splices shall meet the requirement of AS29606.

3.4.3 Insulated Conductor Tin and Silver Solderability (see 5.2.3)

The insulated conductor with tin coated or silver coated strands shall meet the “Acceptable” solder coverage of the stranded conductor in accordance with J-STD-002. The test is not applicable to wires with nickel coated strands (see 7.2).

3.4.4 Insulated Conductor Geometric Characteristics (see 5.2.4)

The insulated conductor diameter, strand count, and strand diameter shall be in accordance with AS29606 and listed in the detail specification.

3.4.5 Insulated Conductor Strand Blocking - Adhesion (see 5.2.5)

For 19-strand conductor (wire sizes 26 through 12), the total number of unbonded single strands plus the number of metallic bonded pairs and metallic bonded groups of strands in the specimen shall be not less than 13. For all other conductors (7 strands, etc.), the total count of unbonded single strands, metallic bonded pairs of strands, and metallic bonded groups of strands shall not be less than 0.70 times the number of strands in the conductor.

3.4.6 Insulated Conductor Elongation and Tensile Break Strength (see 5.2.6)

The wire conductor elongation and tensile break strength shall be in accordance with AS29606.

3.5 Wire Insulation Properties (see 5.3)

3.5.1 Insulation Construction and Mechanical Properties (see 5.3.1)

The wire insulation/jacket construction (see 5.3.1.1) and mechanical properties (see 5.3.1.2 and 5.3.1.3) shall be as specified in the detail specification and Tables 4 through 6.

Table 4 - PTFE extruded insulation and jacket

Wire Insulation Properties	Wire Size										
	28-20	18-12	10-8	6-4/0	28-14	12-8	6-4/0	28-16	14-12	10-8	6-4/0
Tensile Strength (min average lb/in^2)	4500	4000	3500	N/A							
Longitudinal Elongation (min average %)					250	200	N/A				
Circumferential Elongation (min average)								200	150	100	N/A

Table 5 - Abrasion resistant (mineral filled) PTFE extruded insulation and jacket

Wire Insulation Properties	Wire Size									
	24-20	18-4	2-4/0	28-8	6-4	2-4/0	24-16	14-12	10-4	2-4/0
Tensile Strength (min average lb/in^2)	4000	3500	N/A							
Longitudinal Elongation (min average %)				200	150	N/A				
Circumferential Elongation (min average)							100	75	50	N/A

Table 6 - FEP, ETFE, PVF_2, and XLETFE (cross linked) extruded insulation and jacket

Wire Insulation Properties	FEP	ETFE	PVF_2	XLETFE 1/
Tensile Strength (min average lb/in^2)	2000	5000	5000	5000
Longitudinal Elongation (min average %)	150	150	250	75 1/

1/ Longitudinal Elongation of the inner layer of dual-wall insulations is 125% minimum for size 10 and smaller only.

3.5.2 Primary and Jacket Insulation Tape Splices (see 5.3.2)

Wire splices shall be permitted in the insulation tapes provided the performance characteristics of the wire are not affected. No splice in one layer of insulation tape shall be so positioned on the wire as to overlap any part of a splice in another layer of insulation tape. The measured maximum diameter of the wire at a splice in the insulation tape shall not exceed the measured diameter of the wire where no tape splice is present by more than five times the nominal thickness of the tape in which the splice occurs (seven times for single-tape insulations). Splices of the outer insulation tape shall not be longer than 1 inch and not more than one splice of the outer insulation tape shall occur in any 150 feet of the wire.

3.5.3 Wire Primary Insulation Flaws (see 5.3.3)

The primary insulation shall be subjected to the spark test, impulse dielectric test, or the high frequency spark test. This evaluation shall be performed before the application of any additional layers to the wire. Any portion showing insulation breakdown shall be cut out of the primary insulation at least two inches on each side of the failure. Unless otherwise specified in the detail specification, the test voltage shall be as specified in Table 7.

Table 7 - Primary insulation flaw voltages

Test Type	Voltage Requirement
Spark (see 5.3.3.1)	1.5 kV (rms)
Impulse Dielectric (see 5.3.3.2)	6.0 kV (peak)
High Frequency Spark (see 5.3.3.3)	4.2 kV (rms)

3.5.4 Wire Final Insulation Flaws (see 5.3.3)

One hundred percent of the wire shall pass either the impulse dielectric test or the preferred high frequency spark test. The test shall be performed during the final winding of the wire on shipment spools or reels. Unless otherwise specified, the test voltage shall be as specified in Table 8.

Table 8 - Wire final insulation flaw voltages

Test Type	Voltage Requirement
Impulse Dielectric (see 5.3.3.2)	8.0 kV (peak)
High Frequency Spark (see 5.3.3.3)	5.7 kV (rms)

3.5.5 Insulation State of Sinter (see 5.3.4)

Layers of insulations shall meet the state of sinter requirement as specified in the detail specification.

3.5.6 Tape Overlap (see 5.3.5)

The minimum (and maximum if applicable) percent overlap in applying each layer of insulation tape shall be as indicated in the detail specification.

3.5.7 Outer Insulation Tape Layer Surface Smoothness (see 5.3.6)

The difference in the wall thickness of the outer insulation layer at the discernible tape edge shall not exceed the limits in Table 9.

Table 9 - Smooth surface tape wall thickness percent different

Wire Size	Percent Difference (%)
26 thru 10	10.0
8 thru 6	7.0
4 thru 4/0	5.0

3.5.8 Fluoride Off-Gassing (see 5.3.7)

Unless otherwise specified in the detail specification, the fluoride extraction level, when required, shall not exceed 20 parts per million.

3.5.9 Lamination Sealing (see 5.3.8)

When lamination sealing is required in the detail specification, there shall be no evidence of tape separation or lifting.

3.5.10 Polyimide Topcoat Cure (see 5.3.9)

When polyimide topcoat cure is required in the detail specification, the topcoat shall have no visible cracks.

3.5.11 Insulation Proof Test (Crosslink Proof/Accelerated Aging/Short-Term Thermal Stability - see 5.3.10)

When the insulation proof test is required in the detail specification, the exposure temperature shall be 300 °C ± 3 °C (572 °F ± 5.4 °F) and the change in marking, color, or conductor pitting (see 7.4.2) shall not be considered. There shall be no observed cracks or splits when subjected to the bend test and no dielectric breakdown of the insulation.

3.5.12 Insulation Blocking (see 5.3.11)

Adjacent turns or layers of the wire shall not stick to one another.

3.5.13 Insulation Shrinkage (see 5.3.12)

Insulation shrinkage shall not exceed the values specified in the detail specification. Unless otherwise specified in the detail specification insulation expansion is not required.

3.5.14 Insulation Layer Wicking (see 5.3.13)

Wicking between the insulation layers shall not travel beyond dye length specified in the detail specification.

3.6 Wire Electrical Properties (see 5.4)

3.6.1 Wire Conductor Electrical Resistance (see 5.4.1)

The wire conductor electrical resistance shall be in accordance with the detail specification.

3.6.2 Wire Electrical Insulation Resistance (see 5.4.2)

Unless otherwise specified in the detail specification, the insulation resistance shall be 5000 MΩ minimum for 1000 feet.

3.6.3 Wire Electrical Surface Resistance (see 5.4.3)

The wire surface resistance shall be in accordance with the detail specification.

3.6.4 Electrical Dielectric Resistance - Wet Dielectric Voltage (see 5.4.4)

The wire electrical dielectric resistance shall be in accordance with the detail specification following the specified test conditioning.

3.7 Wire Physical Properties (see 5.5)

3.7.1 Wire Diameter (see 5.5.1)

The wire diameter shall be as specified in the detail specification.

3.7.2 Wire Weight (see 5.5.2)

The wire weight shall be as specified in the detail specification.

3.7.3 Wire Insulation Stripping (see 5.5.3)

All insulation shall be readily removable by conventional wire stripping devices without damage to the conductor. The insulation of wire size 10 or smaller shall be removed in accordance with the required stripping tool specified in AS5768/1 or /2 and the wire shall be found “acceptable” as defined by AS5768.

3.7.4 Wire Insulation Strip Force (see 5.5.4)

When specified in the detail specification, the pull off force (strip) for wire size 26 through 14 shall be as specified using the required AS5768/1 or AS5768/2 stripper blades.

3.7.5 Wire Insulation Concentricity and Wall Thickness (see 5.5.5)

The insulation concentricity shall be 70%. The concentricity requirement shall apply to both the wire primary insulation and the wire construction. The concentricity requirement shall not apply to tape-wrap primary insulation layer or tape jackets. When required in the detail specification, the minimum wall thickness shall be as specified.

3.7.6 Workmanship (see 5.5.6)

The insulation shall be free of cracks, splits, irregularities, and embedded foreign material.

3.7.7 Continuous Lengths (see 5.5.7)

The individual continuous lengths of wire in each lot shall be of such footage that when inspected the lot shall conform to the Schedule A continuous length requirements of Table 10 or to the Schedule B continuous length requirements of Table 11, as applicable. Unless the contract or order that was used to produce the lot specifies otherwise, 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 from the spool. The applicable schedule shall be as specified in the detail specification.

Table 10 - Minimum continuous wire lengths (Schedule A requirements)

Wire Size Range	Required Minimum Percent of the Total Inspection Lot Footage in Continuous Lengths Greater Than			
	300 feet	100 feet	50 feet	25 feet
30-20	50%	80%	100%	--
18-14	30%	80%	100%	--
12-10	--	50%	80%	100%
8-4	--	20%	50%	100%
2-1	--	--	50%	100%
0-0000	--	--	30%	100%

Table 11 - Minimum continuous wire lengths (Schedule B requirements)

Wire Size Range	Required Minimum Percent of the Total Inspection Lot Footage in Continuous Lengths Greater Than				
	500 feet	250 feet	100 feet	50 feet	25 feet
30-6	85%	--	100%	--	--
4-2	--	85%	--	100%	--
1-0000	--	--	85%	--	100%

3.8 Wire Identification (see 5.6)

3.8.1 Wire Identification Printed Marking and Location (see 5.6.1)

Unless otherwise specified in the detail specification, the wire shall be identified by a printed marking applied to the outer surface of the wire for wire sizes 24 and larger. Wire sizes 26 and smaller do not require identification print marking. For ink marking (see 3.8.1.1) the printed identification shall be at intervals of 6 to 60 inches, as measured from the end of one complete marking to the beginning of the succeeding complete marking. For UV Laser marking (see 3.8.1.2), the interval shall be at 7, 11, or 13 inches. The identification mark shall not be applied by hot stamp marking or other methods that significantly penetrate the insulation. The printed marking on the wire shall be as follows:

M22759/1 -22 -9012 12814 REV A
- -22: Applicable Detail Specification Designator (see 3.1)
- -9012: Wire Size (see detail specification)
- 12814: Insulation Color Designators (Optional see 3.8.1.c.)
- REV A: Manufacturer Identification CAGE Code (see 3.8.1.b.)
- REV A: Detail Specification Revision Letter (see 3.8.1.a.)

a. The wire shall be marked with the latest revision letter specified for the detail specification (see 10.2). If the detail specification has no revision letter, the revision letter is not required.

b. The wire shall be marked with the manufacturer's identification in accordance with the manufacturer's Commercial and Government Entity (CAGE) listed in "SAM."

c. The insulation color designator (wire color, stripes, bands, or tracers) is not required in the printed marking but is required in all reference documentation. At the option of the wire supplier, the color code portion of the part number (see 1.1) may be included but, if included, it shall be included in its entirety, not in part.

3.8.1.1 Identification Printed Ink Marking Characteristics and Color

Unless otherwise specified in the detail specification, the ink printing shall be green in color in accordance with MIL-STD-104, Class 1, except that when the wire is any color against which green is difficult to distinguish, the ink printing shall be white. Identification printing shall be applied with the vertical axes of the printed characters lengthwise of the wire when the nominal diameter of the wire is 0.050 inch or smaller. The vertical axes of the printed characters may be either crosswise or lengthwise of the wire when the nominal diameter of the wire exceeds 0.050 inch. All printed characters shall be complete and legible. Ink printing shall comply with the requirements of 3.8.3.

3.8.1.2 Identification Printed UV Laser Marking Characteristics

As an alternate method to ink marking identified in 3.8.1.1, UV laser marking may also be used to apply the wire identification mark as noted in 3.8.1. The identification printing shall be applied with the vertical axes of the characters lengthwise on the wire when the nominal diameter of the wire is 0.050 inch or smaller. The vertical axes of the printed characters may be either crosswise or lengthwise on the wire when the nominal diameter of the wire exceeds 0.050 inch. All printed characters shall be complete and legible. Wire processors may want to refer to ARP5607 when establishing the appropriate character font and size to improve legibility. UV laser printing shall comply with the requirements of 3.8.4 and 3.9.17.

3.8.2 Wire Color Designators and Munsell Limits (see 1.1 and 5.6.2)

The colors of the wire shall be as indicated by the insulation color designator (see 1.1) of the wire part number. The first digit of the designator shall indicate the background insulation color and the succeeding digits, if any, shall indicate the colors of the stripes, bands, or tracers as indicated in 1.1.

3.8.2.1 Background Insulation Color Designator

The background insulation color designator of the wire shall be listed in MIL-STD-681, System I (differentiation color coding for chassis wiring). Unless otherwise specified in the detail specification, the preferred background insulation color designator shall be white (-9). Any applicable restrictions on available colors shall be indicated in the detail specification. Unless otherwise specified in the detail specification, the Munsell color limit of the background insulation shall be in accordance with MIL-STD-104, Class 1. When detail specification requires minimum UV Laser marking contrast levels, the Munsell limits shall be as specified in Table 12.

Table 12 - Munsell color limits for UV laser mark-able wire

Color	Hue		Value		Chroma	
	From	To	From	To	From	To
Black	2.5N		7	8.5	N/A	
Gray						
Blue	5PB	7.5PB		8	4	6
Violet	2.5P	7.5R				8
Red	10RP	5R				6
Green	2.5G	7.5G		9	2	6
Brown	2.5YR	7.5R			2	4
Yellow	5Y	10Y	8		4	6
Orange	10R	2.5YR	6	7	8	10

3.8.2.2 Color Stripes, Bands, or Tracers Designation

The requirements and color designators for stripes and bands shall be in accordance with MIL-STD-681. The color limits for stripes, bands and tracers shall be in accordance with MIL-STD-104, Class 1.

3.8.3 Wire Identification Ink Mark, Stripe, or Band Durability (see 5.6.3)

The wire identification marking and color stripes (see 3.8.1 and 3.8.2.2), when applied to the outer surface of the wire with ink, shall be capable of withstanding the durability test for the number of cycles and with the weight specified in the detail specification. This test shall not be required when the identification marking, stripes, or bands are under a clear jacket, or on braided tracers. If there is a continuous line of erasure or obliteration through the stripe, band, or printed identification marking exposing the insulation, the specimen shall be considered as having failed.

3.8.4 UV Laser Marking (see 5.6.4)

When the UV laser marking is required in the detail specification or used to provide the wire identification mark, the wire outer surface shall be ultraviolet (UV) laser mark-able. Unless otherwise specified in the detail specification, the mark shall meet a minimum contrast level of 55%.

3.9 Insulated Wire Performance Requirements (see 5.7)

3.9.1 Mandrel Bend Mechanical Resistance for Tape/Braid Insulation (see 5.7.1)

Wire with tapes, braids, or both tapes and braids as components of the insulation shall show no insulation cracking or dielectric breakdown after being subjected to bending with the weight and mandrel size specified in the detail specification.

3.9.2 Wrap Back Bend Mechanical Resistance for Extruded Insulation (see 5.7.2)

Wire insulation composed entirely of extruded material or polyimide-coated extruded material shall show no cracking or splitting of the insulation and no dielectric breakdown after being subjected to the wrap back test at the temperature specified in the detail specification.

3.9.3 Insulation Low Temperature Mechanical Resistance/Cold Bend (see 5.7.3)

The low temperature mechanical resistance (cold bend) test shall be performed at -65 °C ± 2 °C (-85 °F ± 3.6 °F) unless otherwise specified in the detail specification with the specified mandrels and weights. The insulation shall have no visible cracks or dielectric breakdown at the specified wet dielectric voltage.

3.9.4 Insulation Thermal Shock Mechanical Resistance (see 5.7.4)

The insulation shall not shrink more than that specified in the detail specification at the specified temperature. There shall be no flaring of the insulation layers. The insulation is defined as all layers of non-conducting material covering the electrical conductor, e.g., primary insulation, all tapes and braids, and the jacket.

3.9.5 Thermal Mechanical Resistance - Life Cycle (see 5.7.5)

The thermal mechanical resistance (life cycle) test shall be performed at the temperature specified in the detail specification with the specified mandrels and weights. There shall be no change in color of the insulation. Change in marking color shall not be considered. There shall be no observed cracks or splits and no wet dielectric breakdown of the insulation when subjected to the ambient mechanical resistance bend test (see 3.9.6).

3.9.6 Ambient Mechanical Resistance - Mandrel Bend Test (see 5.7.6)

The ambient mechanical resistance - mandrel bend test shall be performed with the mandrels and weights specified in the detail specification. There shall be no observed cracks or splits and no wet dielectric breakdown of the insulation.

3.9.7 Fluid Resistance - Immersion (see 5.7.7)

The wire shall not exceed the diameter specified in the detail specification by more than 5%. The wire shall exhibit no cracking or insulation dielectric breakdown after immersion.

3.9.8 Humidity Resistance (see 5.7.8)

The wire shall be in accordance with the insulation resistance value specified in the detail specification.

3.9.9 Smoke Resistance (see 5.7.9)

The wire shall exhibit no visible smoke at the temperature specified in the detail specification.

3.9.10 Flammability (see 5.7.10)

Unless otherwise specified in the detail specification, any flame in the wire insulation shall be self-extinguishing within a maximum of 3 seconds after removal of the external flame source from the insulation. When specified in the detail specification, the flame travel shall not exceed the specified length. See Table 13 for the detailed specifications which require the use of a facial tissue with the requirement of no incendiary drips allowed.

3.9.11 Wet Arc Propagation Resistance (see 5.7.11)

Unless otherwise specified in the detail specification, the wet arc propagation resistance test, when required, shall be a minimum of 67 total size 20 wires for medium weight wire and 64 total size 20 wires for light weight wire shall pass the wet dielectric test. No more than three wires shall fail the wet dielectric test in any one bundle. The actual damage area shall not be more than 3 inches in any one wire.

3.9.12 Dry Arc Propagation Resistance (see 5.7.12)

Unless otherwise specified in the detail specification, the dry arc propagation resistance test, when required, shall be a minimum of 67 total size 20 wires for medium weight wire and 64 total size 20 wires for light weight wire shall pass the wet dielectric test. No more than three wires shall fail the wet dielectric test in any one bundle. The actual damage area shall not be more than 3 inches in any one wire.

3.9.13 Dynamic Cut-through Resistance (see 5.7.13)

When dynamic cut-through is required in the detail specification, the minimum average dynamic cut-through (pounds) at a specified temperature and number of wire specimens shall be listed. The cutting blade edge shall be a 0.005-inch radius ± 0.001-inch radius.

3.9.14 Forced Hydrolysis Insulation Resistance (see 5.7.14)

When forced hydrolysis is required in the detail specification, the insulation shall exhibit no dielectric breakdown after the required exposure at the temperature stated in the detail specification.

3.9.15 Longevity Resistance - Thermal Index (see 5.7.15)

When thermal index is required in the detail specification, the wire shall have the thermal index rating at the time and temperature specified.

3.9.16 Abrasion Resistance - Needle (see 5.7.16)

When needle abrasion is required in the detail specification, the wire shall meet the minimum average abrasion cycles specified.

3.9.17 UV Laser Contrast Marking Resistance after Thermal Aging (see 5.7.17)

When UV laser contrast after thermal aging is required in the detail specification, the wire shall meet a minimum contrast level of 40% after thermal aging.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

Unless otherwise specified herein, the contract or purchase order, the supplier is responsible for the performance of all contract inspection requirements. Except as otherwise specified herein, the contract or purchase order, the supplier may use any facilities suitable for the performance of the inspection requirements. The Qualifying Activity has the right to perform any of the inspections set forth in the standard where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 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.

4.1.2 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.

4.1.3 AS9003 Quality Assurance Compliance

The supplier's quality assurance program for wire production shall comply with the AS9003 Inspection and Test Quality System. Independent certification of the processes is not required. Other established and industry recognized quality assurance standards that assure all products produced conform to the contract requirements are acceptable. However, if used, it is the responsibility of the supplier to provide evidence of compliance to AS9003. The Qualifying Activity (QA) authority reserves the right to monitor, measure, and validate compliance at their discretion.

4.2 Classification of Inspections

The inspections specified herein are classified as follows:

a. Initial Qualification inspection (see 4.3).

b. Retention of Qualification inspection (see 4.4 and 4.5).

c. Quality Conformance Inspection (see 4.6).

4.2.1 Inspection Conditions

Unless otherwise specified herein or in the detail specification, all measurements and tests shall be made at temperatures of 15 to 35 °C (59 to 95 °F) at air pressure of 650 to 800 mm of mercury, and a relative humidity of 45 to 75%. Whenever these conditions must be closely controlled in order to obtain more reproducible results, the temperature, relative humidity, and atmospheric pressure conditions of 25 +0, -2 °C (77 +0, -3.6 °F), 50% ± 12% Relative Humidity, and 650 to 800 mm of mercury shall be used.

4.3 Initial Qualification Inspection

Initial qualification inspection shall be in accordance with Table 13. Sequential testing is not required except as specified by a test method. Unless otherwise specified in the detail specification, the Qualifying Activity shall perform or witness the tests specified in Table 13 and the supplier shall perform the remaining tests. All test laboratories require Qualifying Activity approval.

4.3.1 Initial Qualification Inspection Procedure

A request for qualification shall be made to the Qualifying Activity (see 9.1) prior to initiating testing. Testing cannot begin until the supplier has received an authorization letter. The supplier is recommended to provide the Qualifying Activity a test plan based on the authorization letter to ensure the supplier and Qualifying Activity maintain communication and document changes as needed. The Qualifying Activity shall not approve a component that does not meet the requirements specified herein. The Qualifying Activity has the authority to impose specific specification test requirements to resolve test failures/discrepancies and to waive testing to verify specific product manufacturing changes or qualifications by similarity (see 4.3.3). Any change in the supplier's process control inspections, quality conformance inspections, or manufacturing control drawings (editorial changes are acceptable) without the express approval of the Qualifying Activity may result in loss of qualification for that product.

4.3.2 Initial Qualification Test Reports

The Qualifying Activity shall provide the supplier a data package of all tests performed in accordance with Table 13. The Qualifying Activity test method procedures shall be made available to the supplier upon request. The supplier shall provide a test report to the Qualifying Activity for the tests specified in Table 13. The test report shall be signed by the manufacturing authority responsible for ensuring compliance with the specification requirements. The supplier may combine the Qualifying Activity test data with the supplier's test data into one final test report. The final test report and/or data package shall remain on file with the supplier for a minimum period of 6 years and be available to the Qualifying Activity upon request. The supplier test report shall contain as a minimum the following information.

a. Copy of all certifications specified herein.

b. The quantitative results for tests specified in Table 13 and the authorization letter.

c. A tabulated comparison between the insulation and conductor construction herein and each manufacturing control drawing for components qualified by similarity.

d. Corrective Action Reports (as applicable).

Table 13 - Initial and retention of qualification tests

Inspection Tests	Applicable Detail Specification	Req. Paragraph	Test Method Paragraph
Materials	All (as Applicable)	3.3	5.1
Conductor Construction Prior to Insulation	All	3.4.1	5.2.1
Insulated Conductor splices	All	3.4.2	5.2.2
Insulated Conductor Tin and Silver Solderability 1/	/16-/19, /32-/35, /43-/44, /47-/56, /59-/60, /81, /83, /86, /89, /91, /93, /95, /181, /183, /186, /189, /191, /193, /195	3.4.3	5.2.3
Insulated Conductor Geometric 1/	All	3.4.4	5.2.4
Insulated Conductor Strand Blocking – Adhesion 1/	/5-/9, /11, /20, /22, /28, /30, /80-/81, /85-/86, /88-/89, /91, /93, /95, /180-/181, /185-/186, /188-/189, /191, /193, /195	3.4.5	5.2.5
Insulated Conductor Elongation 1/	All	3.4.6	5.2.6
Insulated Conductor Tensile Break Strength 1/	/15, /17, /19-/23, /30-/31, /33, /35, /42, /46-/47, /49, /51, /53, /55-/58, /60, /81-/82, /89-/90, /93-/96, /181-/182, /189-/190, /193-/196	3.4.6	5.2.6
Insulation Construction and Mechanical Properties 1/	All	3.5.1	5.3.1.1
Insulation Tensile Strength and Elongation 1/	/4-/23, /29-/35, /41-/60	3.5.1	5.3.1.2
Circumferential Elongation (PTFE extruded) 1/	/5-/12, /19-/23, /28-/31	3.5.1	5.3.1.3
Insulation State of Sinter	/80-/82, /86-/96, /180-/182, /186-/196	3.5.5	5.3.4
Tape Overlap	/80-/96, /180-/196	3.5.6	5.3.5
Outer Insulation Tape Layer Surface Smoothness 1/	/180-/196	3.5.7	5.3.6
Fluoride Off-gassing	/47-/54, /59-/60	3.5.8	5.3.7
Lamination Sealing	/80-/96, /180-/196	3.5.9	5.3.8
Polyimide Topcoat Cure 1/	/28-/31	3.5.10	5.3.9
Insulation Proof Test (Crosslink Proof/Accelerated Aging/Short-Term Thermal Stability) 1/	/16-/19, /32-/35, /41-/60 (as applicable)	3.5.11	5.3.10
Insulation Blocking 3/	All	3.5.12	5.3.11
Insulation Shrinkage 1/	All	3.5.13	5.3.12
Insulation Layer Wicking	/1-/8, /34-/35, /41-/43, /49-/50, /53-/54, /56-/57, /59-/60	3.5.14	5.3.13
Wire Conductor Electrical Resistance	All	3.6.1	5.4.1
Wire Electrical Insulation Resistance	All	3.6.2	5.4.2
Wire Electrical Surface Resistance	/1-/23, /28-/35, /41-/60	3.6.3	5.4.3
Electrical Dielectric Resistance - Wet Dielectric Voltage 4/	All (as applicable)	3.6.4	5.4.4
Wire Diameter 1/	All	3.7.1	5.5.1
Wire Weight	All	3.7.2	5.5.2
Wire Insulation Stripping 1/	All	3.7.3	5.5.3
Wire Insulation Strip Force 1/	/80-/82, /86-/96, /180-/182, /186-/196	3.7.4	5.5.4
Wire Insulation Concentricity and Wall Thickness 1/	/1-/23, /28-/35, /41-/60	3.7.5	5.5.5
Workmanship	All	3.7.6	5.5.6
Continuous Lengths	All	3.7.7	5.5.7
Wire Identification Printed Marking and Location 1/	All	3.8.1	5.6.1
Wire Color Designators and Munsell Limits 1/	All	3.8.2	5.6.2
Wire Identification Mark, Stripe, or Band Durability 1/	All	3.8.3	5.6.3
UV Laser Marking 2/	/47-/54, /59-/60, /180-/182, /186-/196	3.8.4	5.6.4
Mandrel Bend Mechanical Resistance for Tape/Braid Insulation 1/	/1-/4, /80-/96, /180-/196	3.9.1	5.7.1
Wrap Back Bend Mechanical Resistance for Extruded Insulation 1/	/5-/23, /28-/35, /41-/60	3.9.2	5.7.2

Table 13 - Initial and retention of qualification tests (continued)

Inspection Tests	Applicable Detail Specification	Req. Paragraph	Test Method Paragraph
Insulation Low Temperature Mechanical Resistance/ Cold Bend 1/	All	3.9.3	5.7.3
Insulation Thermal Shock Mechanical Resistance 1/	All	3.9.4	5.7.4
Thermal Mechanical Resistance - Life Cycle 1/	All	3.9.5	5.7.5
Ambient Mechanical Resistance– Mandrel Bend Test 4/	All (as applicable)	3.9.6	5.7.6
Fluid Resistance - Immersion 2/	All	3.9.7	5.7.7
Humidity Resistance 3/	/1-/8, /13-/19, /32-/35, /41-/60, /80-/96, /180-/196	3.9.8	5.7.8
Smoke Resistance 3/	All	3.9.9	5.7.9
Flammability 3/ Facial Tissue Required	/32-/33, /44-/46	3.9.10	5.7.10
Wet Arc Propagation Resistance 1/, 3/	/49, /50, /53-/54, /59-/60, /80-/96, /180-/196	3.9.11	5.7.11
Dry Arc Propagation Resistance 3/	/49-/50, /53-/54, /59-/60, /80-/96, /180-/196	3.9.12	5.7.12
Dynamic Cut-through Resistance 1/, 3/	/49-/50, /53-/54, /59-/60, /80-/82, /86-/96, /180-/182, /186-/196	3.9.13	5.7.13
Forced Hydrolysis Insulation Resistance 2/	/80-/82, /86-/96, /180-/182, /186-/196	3.9.14	5.7.14
Longevity Resistance - Thermal Index 2/	/80-/96, /180-/196	3.9.15	5.7.15
Abrasion Resistance - Needle 1/, 3/	/49-/50, /53-/54, /59-/60, /180-/182, /186-/196	3.9.16	5.7.16
UV Laser Contrast Marking Resistance after Thermal Aging 1/, 3/	/47-/54, /59-/60, /180-/182, /186-/196	3.9.17	5.7.17

1/ Qualification tests shall only be performed by the Qualifying Activity unless otherwise specified in the detail specification (see 4.3).
2/ Initial qualification only unless the material has been changed. Initial qualification approval shall not be withheld during the thermal index test period. At the request of the Qualifying Activity, the supplier will provide a summary of results at regular intervals.
3/ Retention of Qualification for the designated tests shall be performed every 6 years rather than the required 3 years after initial qualification unless materials have been changed (see 2/).
4/ Capability required for all wire lengths, but not performed for qualification except as specified after test conditioning.

4.3.3 Initial Qualification by Similarity

Qualification by similarity is applicable where a group of two or more detail specifications cover wires which are identical in materials and construction except that the conductor is different in each detail specification. In such event, the qualification applicant may select the samples specified in Table 14 for any size range or ranges of any detail specification in the similar group listed in Table 14. Approval of the wire qualification sample shall also qualify the same wire size range or ranges in each of the other detail specifications for which only the conductor is different. When a requirement is more rigorous for a wire being qualified by similarity than for the wire undergoing complete test, the sample undergoing complete test must meet the more rigorous requirement of the similar wire in order to qualify the similar wire (e.g., if the wire sample is a 150 °C rated wire and the wire being qualified by similarity is rated at 200 °C, the wire sample must pass the thermal shock test at 200 °C in order to qualify the 200 °C wire). Changes in the properties of the less rigorous conductor construction shall not be considered as part of the more rigorous test results. Similarity groups not defined in Table 14 shall be coordinated with the Qualifying Activity prior to testing.

Table 14 - Wire qualification similarity groups

Group	Detail Specification	Group	Detail Specification	Group	Detail Specification
1	/1-/2	9	/18-/19	17	/180-/182, /191-/194
2	/3-/4	10	/28-/31	18	/183-/190, /195-/196
3	/5-/6	11	/32-/33, /44-/46, /55, /58	19	/59-/60
4	/7-/8	12	/34-/35, /41-/43, /56-/57		
5	/9-/10, /20-/21	13	/47-/48, /51-/52 1/		
6	/11-/12, /22-/23	14	/49-/50, /53-/54 1/		
7	/13-/15	15	/80-/82, /91-/94		
8	/16-/17	16	/83-/90, /95-/96		

1/ Certification of in-process control of the 80-microinch silver-coating is required.

For purposes of determining identity of construction in detail specifications under the similarity provision, small differences in specified wire diameter or weight that are obviously due to differences in the specified conductor shall not be considered as constituting differences in the construction of the wires.

4.3.4 Initial Qualification Sample

For each wire tested the supplier shall use the same materials, manufacturing procedures, and methods of inspection as would be used to provide the wire to a purchaser. A wire length shall be obtained from the continuous length qualification lot (see 4.6). Except as provided under qualification by similarity in 4.3.3, a wire sample of the required length shall be selected from Table 15 for each size range for which qualification is desired in the applicable detail specification. The sample may be any size wire within the specified size range. Unless otherwise specified, three wire specimens shall be tested for each required test.

Table 15 - Qualification wire length requirements

Wire Size Range	Feet
30 through 28	200
26 through 20	200
18 through 14	200
12 through 10	100
8 through 4	100
2 and larger	100

4.3.4.1 Initial Qualification Qualifying Activity Sample

A duplicate group of qualification samples from the same lot as required for supplier tests shall be submitted to the Qualifying Activity for the Qualifying Activity tests. The samples shall be identified by securely attached durable tags marked with the information listed below. The tags must be stamped by the supplier's and/or Qualifying Activity designated Quality Assurance Representative (QAR) inspector as representative samples of the manufacturer's normal production capability. Samples submitted without the stamp will not be accepted.

a. Sample for qualification tests: WIRE, ELECTRICAL, FLUOROPOLYMER-INSULATED, COPPER OR COPPER ALLOY

b. Detail specification part number:

c. Manufacturer's name and code number (Publication SAM):

d. Manufacturer's part number:

e. Place and date of manufacture of sample:

f. Submission information: Submitted by (name) (date) for qualification tests in accordance with the requirements of AS22759 under authorization (reference authorizing letter).

g. Material composition: When specifically requested, a comprehensive description and prime manufacturer's name and formulation number of the base materials from which the product is made shall be provided (This information will not be divulged by the Qualifying Activity).

4.4 Retention of Qualification

Unless otherwise noted retention of qualification inspection shall occur every 36 months after the initial qualification date and shall consist of the Qualifying Activity tests specified in Table 13 for Initial Qualification. Qualification cannot begin until an authorization letter for testing has been issued by the Qualifying Activity. The Qualifying Activity may shift the reporting date to accommodate testing schedules, but no later than 18 months from the retention of qualification due date. Failure of the supplier to submit retention of qualification test report or certification within 30 days after the end of the reporting period may result in the removal of the product or products from the Qualified Products List (QPL).

4.4.1 Retention of Qualification No Production Certification

If no production of the qualified products has occurred for the entire reporting period, the Supplier may provide a certification to the Qualifying Activity that no changes in the product materials, manufacturing processes, or site of production has occurred since the initial Qualification Inspection (see 4.3). Certification for more than one reporting period shall not be permitted. The Supplier shall contact the Qualifying Activity to determine the conditions of the Certification. The Supplier may be required to submit the Certification on a specified form provided by the Qualifying Activity.

4.4.2 Retention of Qualification Sample

One wire size from each initial qualification approved similarity group listed in Table 14 shall be tested. The sample shall be from a current production run. For each wire tested the supplier shall use the same materials, manufacturing procedures, and methods of inspection as would be used to provide the wire to a purchaser. Unless otherwise specified, three wire specimens shall be tested for each required test.

4.4.3 Retention of Qualification Test Report

The Qualifying Activity shall provide the supplier a data package of all tests performed in accordance with Table 13. The Qualifying Activity test method procedures shall be made available to the supplier upon request. The supplier shall provide a test report to the Qualifying Activity for the tests specified in Table 13. The test report shall be signed by the manufacturing authority responsible for ensuring compliance with the specification requirements. The supplier may combine the Qualifying Activity test data with the supplier's test data into one final test report. The final test report and/or data package shall remain on file with the supplier for a minimum period of 6 years and be available to the Qualifying Activity upon request. The supplier test report shall contain as a minimum the following information.

a. A summary of Quality Conformance Inspection pass or fail results for tests specified in Table 16 and the authorization letter. The results shall include detail data from the Group 5 test.

b. A tabulated comparison between the insulation and conductor construction herein and each manufacturing control drawing for components qualified by similarity.

c. Corrective Action Reports (as applicable)

If a failure occurs in the tests for retention of qualification, no wire represented by the sample, nor any other wire manufactured with the same materials and processes, which has not already been submitted for quality conformance inspection, shall be offered for acceptance until the cause for failure has been determined and concurred with by the Qualifying Activity as not affecting the ability of the wire to meet qualification inspection requirements.

4.5 Material and Process Changes during Retention of Qualification Intervals (see 7.6)

Except for changes approved by the purchase order, the wire supplied under purchase order shall be the same material formulations, material sources, and manufacturing processes as approved by the Qualifying Activity. It is the responsibility of the wire manufacturer to notify the Qualifying Activity when materials, material formulations, and manufacturing processes need to be changed. The wire supplier is responsible for verifying and documenting all performance characteristics including quality conformance and qualification requirements. The changes are categorized as minor and major.

4.5.1 Minor Change

To address a minor change, the wire supplier will provide written notification of the change to the Qualifying Activity and maintain documentation of compliance. The Qualifying Activity may request results of product testing to confirm compliance and approve the change under the existing qualification. A minor change includes modification of processing additives, colorants, braids, finishers, coatings, and inks. It also includes manufacturing process parameters, integrating processes and relocating equipment within the qualified manufacturing site.

4.5.2 Major Change

To address a major change, a request for change will be submitted to the Qualifying Activity. The Qualifying Activity will provide authorization to proceed and define the qualification submittal and third-party testing in accordance with Table 13. All qualification tests identified shall be performed, either by the wire supplier, the Qualifying Activity or an approved third-party laboratory at the discretion of the Qualifying Activity. A major change includes the conductor source and formulation and the modification of insulating material to include resin change, source change (new resin producer) or alternate production location for the resin.

4.6 Quality Conformance Inspection

For purposes of this specification, the following shall apply:

a. Lot: The Inspection lot shall include all wire of one part number subjected to inspection at one time.

b. Unit of product: The unit of product for determining lot size for sampling shall be one continuous length of wire as offered for inspection.

c. Suppliers demonstrating statistical product acceptance requirements (refer to ARP9013) may waive specific individual quality conformance inspection tests shown in Table 16 when justified and approved by the Qualifying Activity (see 4.6.4.5). For initial or retention of qualification, all tests must be performed. In no case shall Group 3 or 4 be waived. The Qualifying Activity authority reserves the right to monitor, measure, and validate compliance at their discretion.

4.6.1 Quality Conformance Process Control Inspection Tests

Quality conformance process control inspection comprises quality conformance tests and examinations of such a nature that the tests are impossible or impractical to perform on the wire and are therefore conducted at the most appropriate stage of the receiving or manufacturing operations. Process control tests are listed under “In-process” in Table 16 and shall be performed on every lot of wire acquired under this specification. For quality conformance of conductors prior to insulation application use AS29606.

4.6.2 Samples for Quality Conformance Process Control Inspection

a. A conductor material sample prior to insulation shall be three 10-foot lengths of conductor selected in such manner as to be representative of the material to be used in each inspection lot of wire (see 3.3.1).

b. A coated glass yarn (see 3.3.2), coated glass tape (see 3.3.3), and unsupported tapes (see 3.3.5) material sample shall be three specimens’ representative of each inspection lot and shall be selected before application to the conductor.

c. All conductor samples and insulation tape splices performed during the final insulation process shall be examined for conformity of splices (see 3.4.2 and 3.5.2).

d. A tensile strength and elongation extrusion insulation sample (see 3.5.1) shall be three specimens of extruded insulation on the wire representative of each inspection lot.

e. The circumferential elongation of Polytetrafluoroethylene (PTFE) or abrasion resistant (mineral filled) PTFE insulated wire sample shall be five specimens’ representative of each inspection lot (see 3.5.1). Circumferential elongation testing is not required for other insulation types.

f. A primary insulation flaw sample shall be 100% of the lot prior to the application of additional layers (jacket or protected coating), when required (see 3.5.3).

g. Material certification and tracking numbers are required for each lot.

h. Tape overlap can either be certified as an in-process inspection or quality conformance inspection (see 3.5.6).

4.6.3 Rejection and Retest in Process Control Inspection

4.6.3.1 Rejection of Conductor and Insulation Materials (see 4.6.2.a., b., c.)

If conductor or material samples (prior to insulation) fail, the lot shall be rejected. The supplier shall determine corrective action acceptance.

4.6.3.2 Rejection and Retest of Process Control Insulated Wire (see 4.6.2.d., e., f., and h.)

When a process control sample selected during a production run fails to meet the specified requirements, further processing of that lot shall cease until the extent and cause of the failure have been determined and resolved. If corrective action is taken on the same lot in which the failure occurred, the appropriate process control tests shall be repeated. Corrective actions taken on failing lots shall be communicated to the purchaser or the Qualifying Activity if the lot is being submitted for qualification.

a. If the tensile strength and elongation extrusion insulation sample fails, the lot shall be rejected with no corrective action.

b. The failed portions of the primary insulation flaw sample that shows dielectric breakdown shall be cut out or removed and testing of the balance of production shall be resumed.

4.6.4 Quality Conformance Inspection of Insulated Wire

The quality conformance inspection of wire shall consist of the examinations and tests listed in Table 16 (Groups 1 through 5). Unless otherwise specified herein or in the detail specification or by the Qualifying Activity, the inspection shall be performed on every lot of wire acquired under the specification. The Group 5 test shall be performed on the first lot produced in any 3-month period, regardless of part number.

4.6.4.1 Samples for Quality Conformance Inspection of Insulated Wire

a. The sample unit for Groups 1, 2, and 5 tests, except for the Group 1 insulation resistance test, shall consist of a single piece of wire chosen at random from the inspection lot and of sufficient length to permit all applicable examinations and tests. Unless otherwise specified, the length of the sample unit for Group 1 and 5 tests other than insulation resistance shall be 20 feet and the length of the sample unit for Group 2 tests shall be 25 feet. Not more than one sample unit for each group of tests shall be taken from a single unit of product. Unless otherwise specified, three wire specimens shall be tested for each required test.

b. The sample unit for the Group 1 insulation resistance test shall be a specimen at least 26 feet in length selected at random from wire which has passed the Group 3 dielectric test. It is optional whether the specimen is tested on the reel or removed from the reel for the test, provided the length of the specimen can be determined.

4.6.4.2 Wire Inspection Levels and Acceptable Quality Levels (AQL) (as applicable)

a. For Group 1 characteristics, including the insulation resistance test, the inspection level shall be S-2 and the AQL shall be 6.5% defective units in accordance with ANSI/ASQC-Z1.4 and the AQL defect types herein (see 7.14).

b. For Group 2 and Group 5 characteristics, the inspection level shall be S-3 and the AQL shall be 1.5% defective units in accordance with ANSI/ASQC-Z1.4 and the AQL defect types herein (see 7.14).

c. For Group 3 insulation flaws, one hundred percent of the wire and every length of the wire shall be subjected to the impulse or spark tests. Insulation breakdowns resulting from the test and ends or portions not subjected to the test shall be marked or cut out of the wire. When specified in the contract or order, dielectric failure, untested portions, or portions that have been exposed to fewer or more than the specified number of pulses or cycles are permitted to be marked by stripping the insulation or any other method specified in the contract in lieu of being cut out from the wire length.

d. For Group 4 continuous length characteristics the inspection level and acceptable quality level for this examination shall be as required for the applicable procedure of 5.5.7.

4.6.4.3 Effect of a Quality Conformance Inspection Failure on Wire

Quality conformance testing of the wire may be continued during the investigation of a quality conformance inspection failure on a wire sample, but there shall be no final acceptance of the finished product until it is determined that the lot meets all the quality conformance requirements of Table 16. If a Group 5 failure occurs, the Supplier is required to perform the test on the next five production lots in the 3-month period for which it failed (see 4.6.4).

4.6.4.4 Nonconforming Inspection Lots

Disposition of inspection lots found unacceptable under quality conformance inspection shall be in accordance with ASQC Z1.4.

4.6.4.5 Quality Conformance Inspection Repeatability of Results (see 4.6.c.)

When a qualified supplier can demonstrate to the Qualifying Activity consistent repeatable results for a specific quality conformance inspection property by tight process controls (statistical, etc.), the supplier can recommend and be approved by the Qualifying Activity to move tests from Group 2 to Group 1 or test from Group 1 to Retention of Qualification only, Consideration can also be given to reduced inspection times or sampling as well as alternative In-process inspections. For qualification submittal samples all inspections shall be performed as required.

Table 16 - Quality conformance inspection tests

Quality Conformance Inspections		Inspection Tests	Applicable Detail Specification	Requirement Paragraph	Test Method Paragraph
In-process	Groups				
4.6.2.a.	--	Conductor Material	All	3.3.1	5.1.1
4.6.2.b.	--	Yarn and Tape Material	/1-/4, /80-/92, /180-/192	3.3.2 thru 3.3.6	5.1.2 thru 5.1.5
4.6.2.c.	--	Conductor and Tape Splices	All conductors and /1-/4, /80-/92, /180-/192	3.4.2 & 3.5.2	5.2.2 & 5.3.2
4.6.2.d.	--	Extruded insulation tensile and elongation	/4-/23, /28-/35, /41-/60	3.5.1	5.3.1.2
4.6.2.e.	--	Circumferential Elongation	/5-/12, /19-/23, /28-/31	3.5.1	5.3.1
4.6.2.f.	--	Primary Insulation Flaws	/13-/15, /28-/31, /34-/35, /41-/43, /49-/50, /53-/54, /56-/57, /59-/60	3.5.3	5.3.3
4.6.2.g.	--	Material Verification	All	3.3	5.1
--	1	Conductor Construction Prior to Insulation 1/	All	3.4.1	5.2.1
--	1	Conductor Tin & Silver Solderability	/16, /18, /32, /34, /43-/44, /47-/56, /59-/60, /81, /83, /86, /89, /91, /93, /95, /181, /183, /186, /189, /191, /193, /195	3.4.3	5.2.3
--	1	Conductor Geometric 1/	All	3.4.4	5.2.4
--	1	Conductor Elongation	All	3.4.6	5.2.6
--	1	Conductor Tensile Break Strength	/15, /17, /19-/23, /30, /31, /33, /35, /42, /46-/47, /49, /51, /53, /55-/58, /60, /81-/82, /89-/90, /93-/96, /181-/182, /189-/190, /193-/196	3.4.6	5.2.6
--	1	Insulation Construction 1/	All	3.5.1	5.3.1.1
		Tensile Strength & Elongation	/4-/23, /29-/35, /41-/60		5.3.1.2
		Circumferential Elongation	/5-/12, /19-/23, /28-/31		5.3.1.3
--	1	Insulation State of Sinter 1/	/80-/82, /86-/96, /180-/182, /186-/196	3.5.5	5.3.4
4.6.2.h.	1	Tape Overlap	/80-/96, /180-/196	3.5.6	5.3.5
--	1	Tape Layer Surface Smoothness	/180-/196	3.5.7	5.3.6
--	1	Lamination Sealing 1/	/80-/96, /180-/196	3.5.9	5.3.8
--	1	Polyimide Topcoat Cure 1/	/28-/31	3.5.10	5.3.9
--	1	Conductor Electrical Resistance	All	3.6.1	5.4.1

Table 16 - Quality conformance inspection tests (continued)

Quality Conformance Inspections		Inspection Tests	Applicable Detail Specification	Requirement Paragraph	Test Method Paragraph
In-process	Groups				
--	1	Insulation Resistance 1/	All	3.6.2	5.4.2
--	1	Wire Diameter	All	3.7.1	5.5.1
--	1	Wire Weight 1/	All	3.7.2	5.5.2
--	1	Insulation Stripping	All	3.7.3	5.5.3
--	1	Insulation Strip Force	/80-/82, /86-/96, /180-/182, /186-/196	3.7.4	5.5.4
--	1	Workmanship	All	3.7.6	5.5.6
--	1	Wire Identification	All	3.8	5.6
--	1	Color Designators and Munsell Limits	All	3.8.2	5.6.2
--	1	Mark, Stripe, or Band Durability	All	3.8.3	5.6.3
--	1	UV Laser Wire Identification Marking	All	3.8.4	5.6.4
--	1	UV Laser Marking	/47-/54, /59-/60, /180-/182, /186-/192	3.8.4	5.6.4
--	2	Conductor Strand Blocking – Adhesion 1/	/5-/9, /11, /20, /22, /28, /30, /80-/81, /85-/86, /88-/89, /91, /93, /95 /180-/181, /185-/186, /188-/189, /191, /193, /195	3.4.5	5.2.5
--	2	Insulation Proof Test (Crosslink Proof/Accelerated Aging/Short-Term Thermal Stability)	/16-/19, /32-/35, /41-/60 (as applicable)	3.5.11	5.3.10
--	2	Insulation Shrinkage	All	3.5.13	5.3.12
--	2	Insulation Layer Wicking	/1-/8, /34-/35, /41-/43, /49-/50, /53-/54, /56-/57, /59-/60	3.5.14	5.3.13
--	2	Concentricity and Wall Thickness 1/	/1-/23, /28-/35, /41-/60	3.7.5	5.5.5
--	2	Bend, Mandrel (Tape/Braid)	/1-/4, /80-/92, /180-/192	3.9.1	5.7.1
--	2	Bend (Wrap Back)	/5-/23, /28-/35, /41-/60	3.9.2	5.7.2
--	2	Bend (Cold)	All	3.9.3	5.7.3
--	2	Thermal (Shock)	All	3.9.4	5.7.4
--	3	Wire Insulation Flaws	All	3.5.4	5.3.3.2 & 5.3.3.3
--	4	Continuous Lengths	All	3.7.7	5.5.7
--	5	Fluoride Off-gassing	/47-/54, /59-/60	3.5.8	5.3.7

1/ Performed test on one insulated conductor specimen.

5. TEST METHODS

Unless otherwise specified all samples shall be examined carefully to determine conformance to the specification herein and to the applicable detail specifications with regard to requirements not covered by specific test methods (i.e., Workmanship, AS9003 compliance, etc.). Certification to the requirements not covered by specific test methods herein is required for qualification. The Qualifying Activity reserves the right to request documentation to substantiate the certification.

5.1 Materials (see 3.3)

5.1.1 Conductor Material (see 3.3.1)

Tests shall be performed in accordance with AS29606 or by control processes used to demonstrate compliance with conductor material requirements. Certification data from the original material supplier may also be used as an alternative to performing the tests.

5.1.2 PTFE Coated Fibrous Glass Yarns Material (see 3.3.2)

A weighed specimen of the coated fibrous glass yarn shall be ignited for 4 hours in a muffle furnace at 700 °C. The residue shall be cooled and weighed and the loss in weight calculated as PTFE content of the coated tape yarn. Certification by the material supplier may be used as alternative to the test method (see 3.3.2). Certification to a PTFE layer added after each braid application is required.

5.1.3 PTFE Coated Fibrous Glass Tapes Material (see 3.3.3)

Certification data from the original material supplier shall be used to verify the 50% PTFE weight requirement.

5.1.4 Fluoropolymer (FP)/Polyimide/Fluoropolymer (FP) and Unsupported PTFE Tapes Material (see 3.3.4 and 3.3.5)

Certification by the material supplier may be used as alternative to the test methods specified.

5.1.4.1 Tensile strength and longitudinal elongation tape samples shall be subjected to the tensile strength tests and elongation tests of ASTM D882, except that there shall be no limitation as to width of the tape.

5.1.4.2 Dielectric strength tape samples shall be subjected to the short-time test of ASTM D149. Stainless steel electrodes 1/4 inch in diameter and having edges rounded to 1/32-inch radius shall be used. The radius must be accurate and should be checked on an optical comparator. Voltage shall be increased at approximately 500 V per second. Tapes shall be tested with oil as the medium. The oil shall be as specified in MIL-PRF-23699.

5.1.4.3 Specific gravity tape samples shall be subjected to test Method A of ASTM D792. A suitable wetting agent shall be added to the water to assist in complete wetting of the surfaces of the specimen.

5.1.4.4 Tape thickness shall be measured on the first 10 feet of the tape spool every 12 inches with a microscope or comparator equipped with devices capable of making measurements reproducible to at least 0.0005 inch.

5.1.5 Fluoropolymer Insulation Resin Material (see 3.3.6)

Certification data provided by the material supplier shall be used to verify these requirements.

5.2 Conductor Construction (see 3.4)

5.2.1 Conductor Construction Prior to Insulation Application (see 3.4.1)

The conductor construction prior to insulation application shall be tested in accordance with AS29606. Tests may be performed by the conductor supplier, but the detail results shall be provided to the insulation supplier upon request. Conductor supplier certification may be used as an alternative to the tests results.

5.2.2 Insulated Conductor Splice (see 3.4.2)

Conductor splices in the wire shall be certified in conformance with AS29606.

5.2.3 Insulated Conductor Tin and Silver Solderability (see 3.4.3 and 7.2)

Conductor tin and silver solderability on the wire shall be performed in accordance with AS4373 Method 105 using the soldering pot method and test condition C. Unless otherwise specified in the detail specification, five specimens, size 10 and smaller, shall be tested. The soldered area shall be examined in accordance with J-STD-002.

5.2.4 Insulated Conductor Geometric Characteristics (see 3.4.4)

Conductor geometric characteristics on the wire (conductor diameter, strand diameters and strand count) shall be performed in accordance with AS4373 Method 401. Strands may be counted with 2X magnification.

5.2.5 Insulated Conductor Strand Blocking - Adhesion (see 3.4.5)

Conductor strand blocking (adhesion) of a wire shall be performed in accordance with AS4373 Method 404.

5.2.6 Insulated Conductor Elongation and Tensile Break Strength (see 3.4.6)

Conductor elongation and tensile break strength shall be performed in accordance with AS4373 Method 402. Only elongation shall be performed on soft or annealed copper conductor. The results of three specimens shall be recorded and the average determined.

5.3 Wire Insulation Properties (see 3.5)

5.3.1 Insulation Construction and Mechanical Properties (see 3.5.1)

5.3.1.1 Insulation Construction

Examine the wire insulation construction with 2X magnification.

5.3.1.2 Insulation Tensile Strength and Elongation

Tensile strength and elongation specimens shall be carefully removed from the conductor and tested in accordance with AS4373 Method 705, except that the rate of travel of the power-actuated grip of the tensile machine shall be 10 inches ± 2 inches per minute for the PVF_2 specimens. The average of three specimens shall be recorded.

5.3.1.3 Circumferential Elongation (PTFE extruded)

Circumferential elongation specimens of extruded PTFE or Mineral Fill PTFE primary insulation or jacket shall be carefully removed from the conductor and tested in accordance with AS4373 Method 713.

5.3.2 Primary and Jacket Insulation Tape Splices (see 3.5.2)

Certification of conformity to the insulation tape splicing requirements is required. Test data or control processes used to demonstrate compliance with insulation splice requirements shall be provided to the Qualifying Activity or purchaser upon request.

5.3.3 Wire Primary and Final Insulation Flaws (see 3.5.3 and 3.5.4)

One of the following methods shall be used to determine the presence of faulty areas in the primary insulation and final insulation. One hundred percent of the wire shall be tested. Unless otherwise specified in the detail specification, the test voltage shall be as specified in Table 7 or 8.

5.3.3.1 The spark test on the primary insulation shall be performed after the application of the primary insulation and prior to the application of any other material. The 60-Hertz spark test shall be performed in accordance with AS4373 Method 505, Method 2 except it shall be performed as an in-process test.

5.3.3.2 The impulse dielectric test shall be performed in accordance with AS4373 Method 503.

5.3.3.3 The high frequency spark test shall be performed in accordance with AS4373 Method 505, Method 1.

5.3.4 Insulation State of Sinter (see 3.5.5)

The insulation state of sinter shall be performed in accordance with AS4373 Method 813.

5.3.5 Tape Overlap (see 3.5.6)

Tape overlap shall be performed in accordance with detail specification and AS4373 Method 109.

5.3.6 Outer Insulation Tape Layer Surface Smoothness (see 3.5.7)

The outer insulation tape layer surface smoothness shall be performed in accordance with AS4373 Method 110.

5.3.7 Fluoride Off-gassing (see 3.5.8)

The fluoride off-gassing shall be performed in accordance with AS4373 Method 608.

5.3.8 Lamination Sealing (see 3.5.9)

Lamination sealing shall be performed in accordance with detail specification and AS4373 Method 809. Three samples shall be tested.

5.3.9 Polyimide Topcoat Cure (see 3.5.10)

The polyimide topcoat cure shall be performed in accordance with AS4373 Method 810.

5.3.10 Insulation Proof Test (Crosslink Proof/Accelerated Aging/Short-Term Thermal Stability - see 3.5.11)

The test(s) shall be performed in accordance with AS4373 Method 811. The mandrel sizes and weights shall be as specified in the detail specification. The bend test shall be performed in accordance with 5.7.6. The dielectric test shall be performed in accordance with 5.4.4.

5.3.11 Insulation Blocking (see 3.5.12)

The blocking test shall be performed in accordance with AS4373 Method 808. The temperature shall be as specified in the detail specification.

5.3.12 Insulation Shrinkage (see 3.5.13)

The shrinkage test shall be performed in accordance with AS4373 Method 104. The shrinkage of the insulation shall be measured as the greatest additional distance that any layer of the insulation, including jacket if present, has receded from either end of the conductor. Measuring expansion is not required.

5.3.13 Insulation Layer Wicking (see 3.5.14)

Wicking shall be performed in accordance with AS4373 Method 607.

5.4 Wire Electrical Properties (see 3.6)

5.4.1 Wire Conductor Electrical Resistance (see 3.6.1)

The Direct Current (DC) resistance of the conductor on a wire shall be measured in accordance with AS4373 Method 403.

5.4.2 Wire Electrical Insulation Resistance (see 3.6.2)

The insulation resistance test shall be performed in accordance with AS4373 Method 504.

5.4.3 Wire Electrical Surface Resistance (see 3.6.3)

The surface resistance test shall be performed in accordance with AS4373 Method 506.

5.4.4 Electrical Dielectric Resistance - Wet Dielectric Voltage (see 3.6.4)

The dielectric test shall be performed in accordance with AS4373 Method 510 at the specified withstand voltage.

5.5 Wire Physical Properties (see 3.7)

5.5.1 Wire Diameter (see 3.7.1)

The wire diameter shall be measured in accordance with AS4373 Method 901. For a qualification submittal, an in-process method for measuring the diameter maybe used and a summary of the results submitted to the Qualifying Activity.

5.5.2 Wire Weight (see 3.7.2)

The weight of each lot of wire shall be determined by Procedure I of AS4373 Method 902 for qualification submittal and for Lot inspection. Inspection Lots failing to meet the wire weight requirement of the applicable detail specification when tested in accordance with Procedure I shall be subjected to Procedure II of AS4373 Method 902. All reels or spools failing to meet the requirements of the applicable detail specification shall be rejected. The quality conformance sampling plans are not applicable when Procedure II is used. For qualification the results of both methods, as applicable, shall be submitted to the Qualifying Activity including any required corrective action.

5.5.3 Wire Insulation Stripping (see 3.7.3)

The insulation shall be removed in accordance with the tool specified in AS5768/1 or AS5768/2. Without touching the conductor after the insulation is removed, the conductor shall be examined in accordance with AS5768. The tool and blade used shall be recorded.

5.5.4 Wire Insulation Strip Force (see 3.7.4)

A 0.25-inch insulation slug shall be stripped from the wire with an AS5768 blade and the pull-off force measured in accordance with AS4373 Method 103.

5.5.5 Wire Insulation Concentricity and Wall Thickness (see 3.7.5)

The concentricity and wall thickness of the primary insulation and of the wire shall be determined in accordance with AS4373 Method 101.

5.5.6 Workmanship (see 3.7.6)

Examine the wire in accordance with 5.3.1, 5.3.3, 5.3.5, 5.3.6, 5.5, and 5.6.1.

5.5.7 Continuous Lengths (see 3.7.7, 6.1, and 7.13)

The requirements for continuous wire lengths shall be satisfied by the supplier's certificate of conformity for the qualification submittal lot (see 4.3 and 4.4) and for the production lot (see 4.6). However, the Qualifying Activity reserves the right to examine wire lots or supplier processes, if deemed necessary to assure that the lengths actually conform to the requirement. In measuring continuous wire lengths where the wire has been marked or stripped of insulation in lieu of being cut to mark insulation failures or identify untested or improperly tested areas, such marking or stripping shall be considered equivalent to complete severance of the wire at the two ends of each marked or stripped area. Unless otherwise specified, the fault or area shall be removed from the wire length and the conductor severed at that location prior to final spooling (see 6.1).

5.6 Wire Identification (see 3.8)

5.6.1 Wire Identification Printed Marking and Location (see 3.8.1)

Visually examine for marking requirements and record wire identification mark. Measure the distance between marks within ± one inch. Verify and record the measuring standard used, marking characteristics and color.

5.6.2 Wire Color Designators and Munsell Limits (see 1.1 and 3.8.2)

Visually compare the background color to MIL-STD-104 limit cards or the UV Munsell color limit cards and verify the color designator. Visually compare the color of the stripes, bands, or tracers to MIL-STD-104 limit cards and color designators. Record the results.

5.6.3 Wire Identification Mark, Stripe, or Band Durability (see 3.8.3)

The durability of product identification and color markings applied to the wire for coding shall be evaluated at 20 to 25 °C (68 to 77 °F) in accordance with AS4373 Method 710. The tolerance of the weight shall be ±0.01 pound. If there is a continuous line of erasure or obliteration through the stripe, band, or printed identification marking exposing the insulation, the specimen shall be considered as having failed. Three specimens shall be tested from each sample unit and failure of any specimen shall constitute failure of the sample unit.

5.6.4 UV Laser Marking (see 3.8.4)

The contrast level shall be determined in accordance with AS4373 Method 1001. Record results as required.

5.7 Insulated Wire Performance Requirements (see 3.9)

5.7.1 Mandrel Bend Mechanical Resistance for Tape/Braid Insulation (see 3.9.1)

The mandrel bend resistance test shall be performed in accordance with AS4373 Method 714 followed by the wet dielectric test (see 5.4.4).

5.7.2 Wrap Back Bend Mechanical Resistance for Extruded Insulation (see 3.9.2)

The wrap back bend resistance test shall be performed in accordance with AS4373 Method 708. The oven conditioning time shall be 2 hours unless otherwise specified in the detailed specification sheet. For wires size 4 and smaller the specimen shall be wrapped back on itself followed by the wet dielectric test. For wire size 2 and larger the mandrel test specified in Method 708 shall be performed followed by the wet dielectric test (see 5.4.4).

5.7.3 Insulation Low Temperature Mechanical Resistance/Cold Bend (see 3.9.3)

The low temperature mechanical resistance (cold bend) test shall be performed in accordance with AS4373 Method 702 followed by a wet dielectric test (see 5.4.4).

5.7.4 Insulation Thermal Shock Mechanical Resistance (see 3.9.4)

The thermal shock mechanical resistance shall be performed in accordance with AS4373 Method 805. Insulation shrinkage shall be measured in accordance with 5.3.12.

5.7.5 Thermal Mechanical Resistance - Life Cycle (see 3.9.5)

The life cycle test shall be performed in accordance with AS4373 Method 807 for 120 hours (unless otherwise specified) at the temperature specified in the detail specification. The specimen shall be examined for color retention (see 5.6.2) prior to the ambient mechanical resistance test - mandrel bend. The mandrel bend test (see 5.7.6) shall be performed followed by the wet dielectric test (see 5.4.4).

5.7.6 Ambient Mechanical Resistance - Mandrel Bend Test (see 3.9.6 and 7.1.5)

The ambient mandrel bend test shall be performed in accordance with AS4373 Method 712 followed by a wet dielectric test (see 5.4.4). The ambient mandrel bend test is typically used as post-performance evaluation tool.

5.7.7 Fluid Resistance - Immersion (see 3.9.7)

The fluid resistance - immersion test shall be performed in accordance with AS4373 Method 601 using the fluids specified in Table 17.

Table 17 - Wire test fluids

Test Fluids	Test Temperature °C	Test Temperature (°F)	Immersion Time (hours)
a. AMS1424 Deicing/Anti-Icing Fluid, Aircraft Fluid, Undiluted	48-50	(118-122)	20
b. AMS1424 Deicing/Anti-Icing Fluid, Aircraft Fluid, Diluted 60/40 (fluid/water ratio)	48-50	(118-122)	20
c. A-A-59921 Cleaning Compound, Aircraft Surface, Type I	48-50	(118-122)	20
d. ASTM D1153 Methyl Isobutyl Ketone (For Use In Organic Coatings)	20-25	(68-77)	168
e. AS1241 Fire Resistant Hydraulic Fluid for Aircraft	48-50	(118-122)	20
f. MIL-PRF-7808 Lubricating Oil, Aircraft, Turbine Engine, Synthetic Base	118-121	(244-250)	0.5
g. MIL-PRF-87937 Cleaning Compound, Aerospace Equipment, Type II or Type IV, undiluted	63-68	(145-154)	20
h. MIL-PRF-87937 Cleaning Compound, Aerospace Equipment, Type II or Type IV, diluted 25/75 (fluid/water ratio)	63-68	(145-154)	20
i. ASTM D471 Standard Test Method for Rubber Property, Fuel A	20-25	(68-77)	168
j. ASTM D471 Standard Test Method for Rubber Property, Fuel D	20-25	(68-77)	168
k. ASTM D471 Standard Test Method for Rubber Property, Oil Number 1	20-25	(68-77)	168
l Silicate ester per MIL-PRF-87252 or equivalent	20-25	(68-77)	168
m. ASTM D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel	20-25	(68-77)	168
n. Lubricating oil, aircraft, turbine engine, synthetic base, MIL-PRF-23699	48-50	(118-122)	20
o. Hydraulic fluid, petroleum base, aircraft missile, and ordnance, MIL-PRF-5606	48-50	(118-122)	20
p. Isopropyl alcohol, ASTM D770	18-20	(64-72)	20
q. Turbine fuel, aviation, Grade JP-4, MIL-DTL-5624 or turbine fuel, aviation, kerosene type, JP-8, MIL-DTL-83133 or Jet A, ASTM D1655 Standard Specification for Aviation Turbine Fuels	18-20	(64-72)	20

5.7.8 Humidity Resistance (see 3.9.8)

The humidity test shall be performed in accordance with AS4373 Method 603 followed by an insulation resistance test (see 5.4.2).

5.7.9 Smoke Resistance (see 3.9.9)

The smoke test shall be performed in accordance with AS4373 Method 513.

5.7.10 Flammability Test (see 3.9.10)

The flammability test shall be performed in accordance with AS4373 Method 801.

5.7.11 Wet Arc Propagation Resistance (see 3.9.11)

The wet arc propagation resistance test shall be performed in accordance with AS4373 Method 509 followed by the wet dielectric test (see 5.4.4).

5.7.12 Dry Arc Propagation Resistance (see 3.9.12)

The dry arc propagation resistance test shall be performed in accordance with AS4373 Method 508 followed by the wet dielectric test (see 5.4.4).

5.7.13 Dynamic Cut-through Resistance (see 3.9.13)

The dynamic cut-through resistance test shall be performed in accordance with AS4373 Method 703. Record the minimum average value.

5.7.14 Forced Hydrolysis Insulation Resistance (see 3.9.14)

The forced hydrolysis resistance test shall be performed in accordance with AS4373 Method 602 followed by a wet dielectric test at 2500 VAC (see 5.4.4).

5.7.15 Longevity Resistance - Thermal Index (see 3.9.15)

The longevity resistance - thermal index test shall be performed on a size 20 wire in accordance with AS4373 Method 804.

5.7.16 Abrasion Resistance - Needle (see 3.9.16)

The abrasion resistance-needle test shall be performed in accordance with AS4373 Method 301. Record all results and calculate the average abrasion cycle value.

5.7.17 UV Laser Contrast Marking Resistance after Thermal Aging (see 3.9.17)

The UV laser contrast marking resistance after thermal aging shall be performed in accordance with AS4373 Method 815.

6. PACKAGING (see 8.2)

The packaging of materials ready for shipment shall be examined to determine conformity to the requirements herein. When a test report is specified by the purchase order, the test report shall include all applicable inspection results for quality conformance Groups 1 through 3 in Table 16. The quality conformance in-process and Group 4 tests in Table 16 shall be satisfied by the supplier's certificate of conformity for the production lot. Group 5 test results shall be made available upon request. It shall also include the most recent qualification test results when specifically requested. All exposed wire ends shall be sealed to prevent fluid or humidity ingress into the conductor stranding which may facilitate corrosion. Unless otherwise specified, wire packaging containers shall be marked as follows:

a. Part Number: M22759/1-22 - 9

b. Manufacturer's identification code: 12814

c. Detail specification Revision: A

d. Detail specification date: 2001-07

6.1 Continuous Length Package (see 4.6.4.2.d.)

Unless otherwise specified by contract or purchase order, the applicable schedule for continuous length shall be as specified in the detail specification and 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. In measuring continuous wire lengths where the wire has been marked or stripped of insulation in lieu of being cut to mark insulation failures or identify untested or improperly tested areas, such marking or stripping shall be considered equivalent to complete severance of the wire at the two ends of each marked or stripped area.

6.2 United States Government Acquisition

The packaging requirements shall be as specified in MIL-DTL-12000 unless otherwise specified in the contract or order. Unless otherwise specified the barrel diameter of the spools shall be in accordance with Table 18. When actual packaging of material is to be performed by military personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.