



AEROSPACE STANDARD	AS81824™	REV. F
	Issued 1998-08 Reaffirmed 2024-01 Revised 2025-10 Superseding AS81824E	
Splice, Electric, Crimp, Copper, Environment Resistant		FSC 5940

RATIONALE

Addition of new detail specification; editorial corrections from Five-Year Review of the document for clarifications and format correction.

1. SCOPE

The AS81824 specification covers environment-resistant, permanent crimp type splices having heat shrinkable insulating sleeve and meltable environmental seals or heatless sealing sleeves. The splices may be used with tin, nickel, and silver-plated conductors in applications where the total temperature of the splice application does not exceed 200 °C or as specified in the detail specification.

- 1.1 The splice is designed to accommodate single and multiple wire combinations in one or more sealant openings. See detail specifications for guidance.

2. REFERENCES

2.1 Applicable Documents

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

2.1.1 SAE Publications

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

AMS1424	Fluid, Aircraft Deicing/Anti-Icing, SAE Type 1
AMS-QQ-N-290	Nickel Plating (Electrodeposited)
AIR1351	Manufacturers' Identification of Aerospace Electrical and Electronic Wiring Devices and Accessories
AS7928	Terminals, Lug: Splices, Conductor: Crimp Style, Copper, General Specification For

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SAE WEB ADDRESS:

Full document details: SAE AS81824F

For more information on this standard, visit
<https://www.sae.org/standards/content/AS81824F/>

Documents

Standard, visit Sharing Hub

AS22520	Crimping Tools, Wire Termination, General Specification For
AS22759	Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy
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
AS23053	Insulation Sleeving, Electrical, Heat Shrinkable, General Specification For
AS50861	Wire, Electric, Polyvinyl Chloride Insulated, Copper or Copper Alloy
AS81044	Wire, Electrical, Crosslinked Polyalkene, Crosslinked Alkane-Imide Polymer, or Polyarylene Insulated, Copper or Copper Alloy
*AS81824/1	Splice, In-Line, Electric, Crimp, SN/CU, Environmental, Heat-Shrinkable Sleeve (150 °C), 1 x 1 Sealing Opening
*AS81824/3	Splice, Coaxial Cable, Electric, Permanent, Crimp and Solder Style Copper, Insulated, Environment Resistant, 150 °C
*AS81824/4	Splices, Electric, Permanent, Crimp Style, Copper, Insulated, Environment Resistant, Splice, Shield, Solder Type, Insulated, 150 °C
*AS81824/5	Splices, Electric, Permanent, Crimp/Solder Style, Copper, Insulated, Environment Resistant, Kit, Shielded Cable, 150 °C
*AS81824/6	Splice, Electric, Permanent, Crimp, Nickel Plated Insulated Wires, Environmental Class 1, 175 °C
*AS81824/7	Splice, In-Line, Electric, Crimp, SN/CU, Environmental, Heat-Shrinkable Sleeve (150 °C), 1 x 3 Sealant Opening
*AS81824/8	Splice, In-Line, Electric, Crimp, NI/CU, Environmental, Heat-Shrinkable Sleeve (175 °C), 1 x 3 Sealant Opening
*AS81824/9	Splice, In-Line, Electric, Crimp, SN/CU, Environmental, Heat-Shrinkable Sleeve (150 °C), 3 x 3 Sealant Opening
*AS81824/10	Splice, In-Line, Electric, Crimp, NI/CU, Environmental, Heat-Shrinkable Sleeve (175 °C), 3 x 3 Sealant Opening
*AS81824/11	Splice, Electric, Permanent, Crimp Style, NI/CU, Insulated, Environment Resistant, Class 1, 200 °C Max, 1x1 Sealant Opening
*AS81824/12	Splice, Electric, Permanent, Crimp Style, Tin-Coated Copper, Insulated, Environment Resistant, Class 1, 150 °C, Heatless Sealing
*AS81824/13	Splice, Stub, Electric, Permanent, Crimp Style, Nickel/Copper, Insulated, Environment Resistant, 175 °C Max

- *AS81824/14 Splice, Electric, Permanent, Crimp Style, Nickel-Coated Copper, Insulated, Environment Resistant, Class 1, 175 °C, Heatless Sealing
- *AS81824/15 Splices, Electric, Permanent, Crimp Style, Copper, Insulated, Flexible, 150 °C, Environment Resistant, Splice Pack, Shielded Cable, Class I
- *AS81824/16 Splices, Electric, Permanent, Crimp Style, Copper, Insulated, Flexible, 200 C, Environment Resistant, Splice Pack, Shielded Cable, Class I

*AS81824 detail specifications

2.1.2 ASQ Publications

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

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

2.1.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9500, www.astm.org.

- ASTM B1 Wire, Copper, Hard-Drawn
- ASTM B75/B75M Tube, Seamless Copper
- ASTM B152/B152M Copper Sheet, Strip, Plate, and Rolled Bar
- ASTM B272 Copper Flat Products with Finished (Rolled or Drawn) Edges (Flat Wire and Strip)
- ASTM B280 Tube, Copper, Seamless, for Air Conditioning and Refrigeration Field Service
- ASTM B339 Standard Specification for Pig Tin
- ASTM B545 Tin, Electrodeposited Coatings of
- ASTM D1974/D1974M Fiberboard Boxes, Methods of Closing, Sealing, and Reinforcing, Standard Practice for
- ASTM D2671 Standard Test Methods for Heat-Shrinkable Tubing for Electrical Use
- ASTM D5118/D5118M Standard Practice for Fabrication of Fiberboard Shipping Boxes
- ASTM D5486/D5486M Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing

2.1.4 ISO and IEC Publications

Available from International Organization for Standardization, ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, Tel: +41 22 749 01 11, www.iso.org/store.

Available from IEC Secretariat, 3 rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland, Tel: +41 22 919 0211, www.iec.ch.

ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories

2.1.5 U.S. Government Publications

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

A-A-3174	Plastic Sheet, Polyolefin
MIL-DTL-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-DTL-81381	Wire, Electric, Polyimide-Insulated, Copper or Copper Alloy
MIL-DTL-83133	Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34) and JP-8+100 (NATO F-37)
MIL-PRF-5606	Hydraulic Fluid, Petroleum Base, Aircraft, Missile and Ordnance
MIL-PRF-7808	Lubricating Oil, Aircraft Turbine Engine Synthetic Base
MIL-PRF-22191	Barrier Materials, Transparent, Flexible, Heat-Sealable
MIL-PRF-23699	Lubricating Oil, Aircraft Turbine Engines, Synthetic Base, NATO Code Number 0-156
MIL-PRF-87937	Cleaning Compound, Aerospace Equipment
MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-2073-1	Military Packaging, Standard Practice for
P-D-410	Dishwashing Compound, Hand (Synthetic Detergent, Solid and Liquid Form)
PPP-B-566	Boxes, Folding, Paperboard
SD-6	Provisions Governing Qualification

2.2 Definitions

2.2.1 CRITICAL DEFECTS

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

2.2.2 DEFECT

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

2.2.2.1 MAJOR DEFECT

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

2.2.2.2 MINOR DEFECT

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

3. REQUIREMENTS

3.1 Detail Specification

The splice 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.

3.2 Qualification

A qualified component shall be a splice that has been tested and passed the requirements listed herein and on detail specification and has been listed or approved for listing on the applicable Qualified Products List (see Section 4 and 6.3).

Application for qualification shall be made in accordance with provisions governing qualification in SD-6 (see 6.3).

3.3 Materials

The materials used shall be specified herein:

3.3.1 Metals

The metal crimp splice shall be fabricated from copper conforming to ASTM B280, ASTM B75/B75M, ASTM B272, ASTM B152/B152M, or ASTM B1, or as specified in the detail specification.

3.3.2 Plating

The metal crimp splice shall be plated with tin or nickel over its entire surface in accordance with ASTM B545, ASTM B339, or AMS-QQ-N-290, respectively. Mercury shall not be used in the fabrication of the metal crimp splice.

3.3.3 Sealing Sleeve

3.3.3.1 Insulation Material

The insulation sleeve shall be as specified by the detail specification and be a translucent, heat shrinkable, cross-linked thermoplastic in accordance with the applicable AS23053 detail specification, except when heatless sealing method is used (refer to AS81824/12). In case of any dimensional conflict with the applicable AS23053 detail specification, the detail specification of this specification shall govern.

3.3.3.2 Sealing Material

Unless otherwise specified in the detail specification, the sealing material shall be a thermally stabilized thermoplastic, homogeneous, and essentially free from flaws, defects, pinholes, seams, cracks, and inclusions. The material shall have a melt viscosity suitable to meet the performance requirements when using an air convection heat source.

3.3.3.3 Insulation and sealing materials may vary as defined in the detail specification.

3.4 Design and Construction

Unless otherwise specified (refer to AS81824/12), the splice assembly shall consist of a sealing sleeve and a metal crimp splice. The sealing sleeve shall be heat shrinkable and shall contain the insulation sleeve and the sealing material. The splice shall conform in all respects to the design, dimensions, and construction specified herein and on the applicable detail specification. Each splice size shall be designed for attachment to the wire size range specified on the applicable detail specification by having the metal crimp splice reshaped around the conductor or conductors using an AS22520 tool and the sealing sleeve recovered over the spliced assembly with a manufacturer's recommended heating tool - convection air, infrared, or equivalent. The metal crimp barrel and the AS81824/12 assembled splice shall be capable of being crimped on an installed wire mounted in any direction, and the metal crimp barrel shall exhibit no evidence of fracturing, splitting, or protruding sharp edges as a result of the reshaping operation.

3.4.1 Wire Acceptance

Each size splice shall be designed for attachment to one or multiple conductor diameters specified on the applicable detail specification. The wire(s) insertion shall be facilitated by bell mouth or chamfer on the metal splice barrel.

3.4.2 Insulation

The sealing sleeve shall exhibit no evidence of splitting as a result of the heating or sleeve crimping operation.

3.5 Performance

The splice shall conform to the following requirements:

3.5.1 Sleeve and Adhesive Materials

3.5.1.1 Dimensions (see 4.7.1)

The sealing sleeve component of the splice assembly shall conform to the dimensions of the applicable detail specification.

3.5.1.2 Copper Mirror Corrosion (see 4.8.9)

Unless otherwise specified in the detail specification, the sealing sleeve component shall show no corrosion on the copper mirror.

3.5.1.3 Fungus Resistance (see 4.8.10)

Unless otherwise specified in the detail specification, the sleeving component shall be fungus resistant in accordance with AS23053.

3.5.1.4 Sleeve without Adhesive Unrestrictive Recovery (see 4.7.2)

The sleeve shall be in accordance with the unsupported sleeve or manual supported requirement.

- a. Unsupported sleeve requirement: The maximum ID dimension of the sleeving shall be considered acceptable when the wall of the sleeving is expanded by the insertion of the gage rod, when there is no visible air space between the end of the sleeving and the rod, or when the gage rod cannot be inserted in the sleeving.
- b. Manual supported sleeve requirement: The maximum ID dimension of the sleeving shall be considered acceptable only if the sleeving is snug on the mandrel and there is no air space between the mandrel and the sleeving.

3.5.1.5 Sleeve Longitudinal Change (see 4.7.3)

The longitudinal change shall be within +5% and -15% after unrestricted recovery.

3.5.2 Splice Assemblies

The splice assemblies shall conform to the following requirements when attached to each of the specified wire size combinations with the applicable tooling specified (see 3.4).

3.5.2.1 Voltage Drop (see 4.8.1)

- a. Single wire splices (the same wire size): The millivolt drop across the splice shall not exceed the millivolt drop of an equivalent length of wire by more than the value specified in Table 1.
- b. Multiple wire splices (various wire sizes): The millivolt drop across the splice shall not exceed the millivolt drop of the average reference voltage when tested in accordance with the Multiple Wire Voltage Drop Test (see 4.8.1.b.).

3.5.2.2 Current Cycling (see 4.8.2)

- a. Single wire splices (the same wire sizes): The voltage drop shall be as specified in 3.5.2.1.a.
- b. Multiple wire splices (various wire sizes): The voltage drop shall be as specified in 3.5.2.1.b.

3.5.2.3 Insulation Resistance (see 4.8.3)

The insulation resistance shall be not less than 5000 MΩ.

3.5.2.4 Dielectric Withstanding Voltage (see 4.8.4)

The splice shall show no evidence of damage, arcing, or breakdown, and the leakage current shall be less than 2 mA.

3.5.2.5 Tensile Strength (see 4.8.5)

The smallest wire in a wired crimp joint shall not break or separate from the splice to which it is attached before the minimum tensile strength specified in Table 1 is reached.

Table 1 - Test requirements

Wire Size (nominal)	Test Current (amperes)	Tensile Strength Pounds (minimum)	Maximum Voltage Drop (millivolts) Millivolt Drop of Equivalent Length of Wire Plus Splice (see 4.8.1)	
			Initial	After Test
26	3	7	6	10
24	4.5	10	4	8
22	9	15	2	4
20	11	19	2	4
18	16	38	2	4
16	22	50	2	4
14	32	70	2	4
12	41	110	2	4

3.5.2.6 Environmental Conditioning (see 4.8.6)

Splice assemblies shall meet the applicable performance requirements listed, when tested in accordance with Tables 3 and 4. Discoloration of the sealing sleeve materials during these tests shall not be cause for rejection (see 4.8.6). During the environmental conditioning, the sealant shall not flow more than 0.25 inch from the end of the sealing sleeve (see 4.8.6.7 and Figure 1).

3.5.2.7 Flammability (see 4.8.7)

The splice shall be self-extinguishing within 5 seconds after removal from the flame.

3.5.2.8 Blocking (see 4.8.8)

The individual splices in the test bundle shall not stick together.

3.6 Identification of Splice (see 4.7.1)

The splice shall be color coded in accordance with the applicable detail specification for identification purposes. Color coding shall be readily discernible though the insulation sleeve after installation. The crimp barrel shall be marked with the supplier symbol in accordance with AIR1351.