AEROSPACE MATERIAL SPECIFICATION

AMS4191™	REV. J

Issued 1962-06
Noncurrent 2008-01
Revised 2009-11
Reaffirmed 2015-10

Superseding AMS4191H

Aluminum Alloy, Welding Wire
6.3Cu - 0.30Mn - 0.18Zr - 0.15Ti - 0.10V (2319)
(Composition similar to UNS A92319)

RATIONALE

AMS4191J has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of welding wire.

1.2 Application

This wire has been used typically as filler metal for gas-metal-arc or gas-tungsten-arc welding of aluminum alloys of similar composition where the joint is capable of being heat treated to a strength level comparable to that of the parent metal, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

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

AMS2355	Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
AMS2813	Packaging and Marking of Packages of Welding Wire, Standard Method
AMS2814	Packaging and Marking of Packages of Welding Wire, Premium Quality
AMS2816	Identification, Welding Wire, Tab Marking Method
AMS2819	Identification, Welding Wire, Direct Color Code System
ARP1876	Weldability Test for Weld Filler Metal Wire
ARP4926	Alloy Verification and Chemical Composition Inspection of Welding Wire

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4191J

3. TECHNICAL REQUIREMENTS

3.1 Wire Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

TABLE 1 - COMPOSITION

Element	min	max
Silicon	--	0.20
Iron	--	0.30
Copper	5.8	6.8
Manganese	0.20	0.40
Magnesium	--	0.02
Zinc	--	0.10
Titanium	0.10	0.20
Beryllium	--	0.0008 (8 ppm)
Vanadium	0.05	0.15
Zirconium	0.10	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	Remainder	

3.1.1 Chemical analysis of initial ingot, bar, or rod stock before drawing is acceptable provided the processes used for drawing or rolling, annealing, and cleaning are controlled to ensure continued conformance to composition requirements, and the facility employs procedures to ensure traceability of wire to the originally analyzed source.

3.2 Condition

As drawn, in a temper and with a surface finish which will provide proper feeding of the wire in machine-welding equipment.

3.3 Fabrication

3.3.1 Butt welding is permissible provided both ends to be joined are identified by chemical analysis or the repair is made at the wire processing station. The butt weld shall not interfere with uniform, uninterrupted feeding of the wire in machine welding equipment.

3.3.2 Drawing compounds, oxides, dirt, oil, and other foreign materials shall be removed by processes which will neither result in pitting nor cause gas absorption by the wire or deposition of substances harmful to welding operations.

3.4 Weldability

Melted wire shall flow smoothly and evenly during welding and shall produce acceptable welds. ARP1876 may be used to resolve disputes.

3.5 Quality

Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to welding operations, operation of welding equipment, or properties of the deposited weld metal.

3.6 Sizes and Tolerances

Wire shall be supplied in the sizes and to the tolerances shown in 3.6.1 and 3.6.2.

3.6.1 Diameter

Tolerances shall be as shown in Table 2.

TABLE 2A - SIZES AND DIAMETER TOLERANCES, INCH/POUND UNITS

Form	Nominal Diameter Inch	Tolerance Inch Plus	Tolerance Inch Minus
Cut Lengths	0.047, 0.062, 0.079, 0.094, 0.098, 0.125, 0.156, 0.188, 0.197, 0.250	0.003	0.003
Spools	0.030, 0.035, 0.039, 0.047	0.001	0.002
Spools	0.062, 0.079, 0.094, 0.098, 0.125	0.002	0.002

TABLE 2B - SIZES AND DIAMETER TOLERANCES, SI UNITS

Form	Nominal Diameter Millimeters	Tolerance Millimeter Plus	Tolerance Millimeter Minus
Cut Lengths	1.19, 1.57, 2.00, 2.39, 2.50, 3.18, 3.96, 4.78, 5.00, 6.35	0.08	0.08
Spools	0.76, 0.89, 1.00, 1.19	0.025	0.05
Spools	1.57, 2.00, 2.39, 2.50, 3.18	0.05	0.05

3.6.2 Length

Cut lengths shall be furnished in 36-inch (914-mm) lengths unless 27-inch (686-mm) or 18-inch (457-mm) lengths are ordered, and shall not vary more than +0, -0.5 inch (+0, -13 mm) from the length ordered.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of wire shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), sizes and tolerances (3.6), and alloy verification (5.2) are acceptance tests and shall be performed on each inspection lot.

4.2.2 Periodic Tests

Weldability (3.4) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The vendor of wire shall furnish with each shipment a report stating that the wire conforms to the composition and other technical requirements. This report shall include the purchase order number, inspection lot number, AMS4191J, nominal size, and quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Wire

Wire shall be supplied either on spools in one continuous length for machine welding, or cut in lengths for manual welding as ordered. Wire on each spool or in each package of cut lengths shall be from the same heat of alloy.

5.1.1 Wire furnished on spools shall be closely wound in layers but adjacent turns within a layer need not be necessarily touching, shall be wound so as to avoid producing kinks, waves, and sharp bends, and shall be free to unwind without restriction caused by overlapping or wedging.

5.2 Alloy Verification

Wire on each spool or in each package of cut lengths shall be alloy verified by a method acceptable to purchaser. The alloy verification procedures of ARP4926 are recommended.

5.2.1 An 8-inch (203-mm) length of wire shall be made accessible at one end of each spool for alloy analysis, if required.

5.3 Identification

Shall be by tab marking in accordance with AMS2816 unless color coding in accordance with AMS2819 or other method is specified by customer.

5.4 Packaging and Marking

Shall be by standard method in accordance with AMS2813 unless premium quality method in accordance with AMS2814 or other method is specified by purchaser.

6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Wire not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES

8.1 A change bar (|) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 Terms used in AMS are clarified in ARP1917.

8.3 Dimensions and properties in inch/pound units and the Fahrenheit temperatures are primary: dimensions and properties in SI units and the Celsius temperatures are shown as the approximate equivalents of the primary units and are presented only for information.