AEROSPACE RECOMMENDED PRACTICE

ARP4926™ REV. B

Issued 1994-05
Revised 2011-06
Reaffirmed 2021-08

Superseding ARP4926A

Alloy Verification and Chemical Composition Inspection of Welding Wire

RATIONALE

ARP4926B has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) covers procedures for welding wire verification and conformance to specification composition.

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 the 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 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 E 34 Chemical Analysis of Aluminum and Aluminum-Base Alloys

ASTM E 350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel Iron Alloys

ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

ASTM E 539 X-Ray Fluorescence Spectrometric Analysis of 6Al-4V Titanium Alloy

ASTM E 1251 Analysis of Aluminum and Aluminum Alloys by Atomic Emission Spectroscopy

ASTM E 1409 Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by the Inert Gas Fusion Technique

ASTM E 1941 Determination of Carbon in Refractory and Reactive Metals and Their Alloys

ASTM E 2371 Analysis of Titanium and Titanium Alloys by Atomic Emission Plasma Spectrometry

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

For more information on this standard, visit
https://www.sae.org/standards/content/ARP4926B/

2.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 or www.ansi.org.

EN 14242 Aluminium and aluminium alloys. Chemical analysis. Inductively coupled plasma optical emission spectral analysis

3. TECHNICAL REQUIREMENTS

3.1 Chemical Composition Tests

3.1.1 Chemical analysis to determine conformance of titanium wire to applicable procurement specification requirements shall be in accordance with ASTM E 1941 for carbon, ASTM E 1447 for hydrogen, ASTM E 1409 for oxygen and nitrogen, and other elements in accordance with ASTM E 2371 (and ASTM E 539 for Ti6Al-4V) or by other analytical methods acceptable to purchaser. Wire shall be in the finished diameter form when analyzed. See 6.1.

3.1.2 Chemical analysis to determine conformance of other than titanium wire to applicable procurement specification requirements shall be by wet chemical methods in accordance with ASTM E 34, ASTM E 350, ASTM E 353, or ASTM E 354, by spectrochemical methods in accordance with ASTM E 1251 or EN 14242, or by other analytical methods acceptable to purchaser. Wire shall be in the finished diameter form when analyzed. See 6.1.

3.2 Alloy Verification Tests

Thermoelectric, eddy current, or comparative spectroscopy shall be used to determine that the welding wire has not been mixed or misidentified. See 6.1. The alloy verification test method shall be capable of distinguishing the alloy from all other alloys processed within the facility. Testing shall be performed at receiving inspection, during any in-process welding, and at final inspection operations. See 4.3.2 through 4.3.5.

3.2.1 Calibration and operation standards for alloy verification test methods shall be in accordance with the apparatus manufacturer's requirements and shall be acceptable to purchaser of the wire.

3.2.2 When multiple tests are used to distinguish the desired alloy from other alloys, tests shall be performed on the same samples utilizing the same sampling plan.

4. QUALITY ASSURANCE REQUIREMENTS

4.1 Responsibility for Inspection

The supplier of the welding wire shall be responsible for the performance of all required tests and to ensure that alloy verification and composition have been maintained in accordance with an established quality system.

4.2 Identification Controls

4.2.1 Records of work performed, such as work instructions and travelers, shall be kept throughout the manufacturing process to maintain lot identity through all operations.

4.2.2 Records shall account for the disposition of the material during all stages of manufacturing, including subcontract operations, to the extent necessary to preclude misidentification.

4.2.3 Wire stock and finished wire shall be identified at all times with the alloy specification number, heat and/or lot number, and the work order number or control number. Identification methods shall be selected and controlled to prevent the loss of identification at all times throughout processing, transportation, handling, and storage.

4.3 Sampling and Testing

4.3.1 Chemistry Conformance Testing

One or more samples from each heat shall be tested for conformance to the chemical composition limits of the applicable welding wire specification at final diameter. When processing may affect chemical composition, one or more samples from each lot shall be tested after that processing is completed. A lot shall be all wire from a common heat which is processed to finished size at one time.

4.3.2 Receiving Inspection Verification

Both ends of all incoming raw materials received as coils or spools to be used in the manufacture of welding wire shall be alloy verified in accordance with 3.2. Material received as bar or cut lengths shall be sampled in accordance with Table 1.

TABLE 1 – ACCEPTANCE SAMPLING PLAN (1)

Lot Size	Sample Size	Lot Size	Sample Size
Up to 5	All	501 to 1200	19
6 to 50	5	1201 to 3200	23
51 to 90	7	3201 to 10,000	29
91 to 150	11	10,001 to 35,000	35
151 to 280	13	35,001 and over	40
281 to 500	16		

(1) Reject the lot if any of the samples do not meet the specified requirements.

4.3.3 In-Process Verification

During the wire manufacturing process, whenever wire is to be welded together, alloy verification (3.2) shall be performed on both wire ends prior to being welded. The only exception to this is when breakage occurs during the drawing process of a single reel or spool of wire where the break ends are trimmed and welded back together.

4.3.4 Finished Wire Verification

When the wire is at final diameter, verification shall be performed on a sample taken at each end of each spool or coil in the lot. This verification shall be performed prior to spooling or straightening and cutting operations, as applicable.

4.3.5 Final Inspection Verification

The Table 1 sampling plan may be used provided it can be documented that traceability was maintained for all operations subsequent to finished size alloy verification. If material identity is not maintained, each affected length of wire in the lot shall be verified in accordance with 3.2.

4.3.5.1 For finished spooled wire, alloy verification (3.2) shall be performed on both ends of each spool.

4.3.5.2 For cut length wires, alloy verification shall be required in accordance with Table 1 sampling plan.

4.4 Reports

In addition to the reports required in the procurement specification, the supplier of welding wire shall furnish a certification stating that all requirements of this document have been satisfied.

4.5 Alloy verification procedures shall be available for review and approval by purchaser.