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INTERNATIONAL
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AEROSPACE RECOMMENDED PRACTICE

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ALLOY VERIFICATION AND CHEMICAL COMPOSITION INSPECTION OF WELDING WIRE

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 specification to the extent specified herein. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM E 34 Chemical Analysis of Aluminum and Aluminum-Base Alloys
ASTM E 120 Chemical Analysis of Titanium and Titanium 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

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

3. TECHNICAL REQUIREMENTS:

3.1 Chemical Composition Tests:

Chemical analysis to determine conformance of the wire to applicable procurement specification requirements shall be by wet chemical methods in accordance with ASTM E 34, ASTM E 120, ASTM E 350, ASTM E 353, or ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser. Wire shall be in the finished diameter form when analyzed.

3.2 Verification Tests:

Thermoelectric, eddy current, or comparative spectroscopy shall be used to determine that the welding wire has not been mixed or misidentified. 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, reduction, and 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 vendor shall be responsible for performing all required tests to ensure that alloy verification and composition have been maintained in accordance with an established quality system.

4.1.1 Records, such as work orders or travelers, of work performed shall be kept throughout the manufacturing process to demonstrate accountability and traceability of material for all operations prior to finished size inspection.

4.2 Material traceability shall be maintained and shall account for the disposition of the material during all stages of manufacturing, including subcontract operations, to the extent necessary to preclude misidentification.

4.2.1 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 MIL-STD-105, Level II, with acceptance number equal to zero and rejection number equal to one.

4.3.3 In-Process Verification: During the wire manufacturing process, alloy verification shall be performed at critical stages of reduction.

4.3.4 Finished Size Verification: When the wire is at final diameter, a sample shall be 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: A sampling plan in accordance with MIL-STD-105, Level II, may be used provided it can be documented that traceability was maintained for all operations subsequent to finished size alloy verification. If maintenance of traceability cannot be established, each length of wire in the lot shall be verified.

4.3.5.1 For finished spooled wire, alloy verification shall be required on both ends of each spool.

4.3.5.2 For cut length wires, alloy verification shall be required in accordance with a sampling plan established in accordance with MIL-STD-105, Level II, with acceptance number equal to zero and rejection number equal to one.

4.3.6 When requested by purchaser, the vendor shall perform additional alloy verification tests using a sampling plan and method agreed upon by purchaser and vendor.

4.4 Reports:

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

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