SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE STANDARD

SAE AS7110/4 | Rev A

Submitted for recognition as an American National Standard

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NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM REQUIREMENTS FOR RESISTANCE WELDING (SPOT, SEAM, PROJECTION)

1. SCOPE

This Aerospace Standard (AS) is to be used to supplement AS7110. In addition to the requirements contained in AS7110, the requirements contained herein shall apply to suppliers seeking NADCAP accreditation for resistance welding (spot, seam, projection).

2. REFERENCES

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15086-0001.

AS7110 National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Requirements for Welding

3. REFERENCE REQUIREMENTS

3.1 Applicable customer specifications shall be available at the facility.

4. MATERIALS AND MATERIAL CONTROL

4.1 When welding aluminum and magnesium alloys, the following information shall apply:

a. The ability of the facility's cleaning process shall be adequately demonstrated.

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4.1 Continued

b. Conformity of materials surface condition shall be checked by surface resistance readings.
c. The contractor shall identify maximum time limits between cleaning and welding.
d. Mating parts shall be designed and processed so that prior to welding parts shall be in contact or can be made to be in contact with manual pressure.
e. One or more surface resistance indicators shall be available for checking the effectiveness of cleaning.

5. EQUIPMENT AND EQUIPMENT CONTROL

5.1 The equipment shall be capable of controlling the welding force, the time of current flow, and when required, electrode cooling.

5.2 Electrode materials and shapes shall be controlled and the same as on the certification.

5.3 The supplier shall have shear testing machines.

5.4 The shear testing machines shall be accurate and calibrated within ± 2% of the indicated reading or as specified by applicable customer specifications.

5.5 Portable spot weld shear test machines shall be checked for accuracy at intervals not to exceed 2 months.

5.6 Tooling and fixtures shall be so designed so that magnetic material is not present in the throat of the machine and will not make contact with the electrodes.

6. PERIODIC MAINTENANCE

6.1 Written procedures shall require preventive maintenance of equipment and tooling at a specified frequency of qualified personnel (employees or vendors) in accordance with customer specifications.

6.2 Records shall indicate that maintenance is performed on equipment and tooling in accordance with the procedures and appropriate standards.

7. QUALIFICATION OF WELDING MACHINES

7.1 The equipment shall be qualified in accordance with applicable customer specifications.

7.2 Weld conditions shall be documented on Machine Qualification Test Reports or equivalent.

7.3 Evidence of Machine Qualification Test Reports, or equivalent, and supporting data, shall be available to machine operators, inspectors, and customer representatives.

7.4 Machines shall be qualified for the material type and thickness for which it is intended to be used in production.

7.5 Welding machines shall be requalified if rebuilt or if significant operational changes are made.

8. CERTIFICATION OF WELD PROCEDURE/SCHEDULE

8.1 Weld procedures/schedules shall be certified to customer requirements.

8.2 Tests shall be conducted and documented for the purpose of weld schedule/procedure certification.

8.3 Certification Test Reports shall be available to customer representatives.

8.4 There shall be a Certification Test Report traceable to each machine and each combination of relevant material conditions, surface conditions, electrode configurations, and thickness combinations.

8.5 Each Certification Test Report shall indicate shear strength data on each weld, the average, the number of specimens with shear values outside set limits, and the nugget diameters for each metallographic specimen as required.

8.6 The Certification Test Report shall indicate the success or failure to meet certification criteria.

9. QUALIFICATION OF PERSONNEL

9.1 Resistance welding shall be performed by operators qualified in accordance with customer requirements. When required, tack welding personnel shall be qualified to customer requirements.

10. PROCESS CONTROL

10.1 There shall be evidence that personnel who are responsible for machine settings and all welding schedules are trained.

10.2 Qualified schedules shall be readily accessible and available for review at any time.

10.3 Welds shall be located as indicated on engineering drawings or other applicable documents.

10.4 Edge distance shall be such that there is no deformation or bulging at the edge of the sheet.

10.5 Location devices shall be used whenever necessary to locate welds.

10.6 All process control test specimens shall conform to the production parts they represent with respect to material, thickness combination, surface condition or preparation, and geometry.

10.7 A daily check of surface resistance shall be made for aluminum and magnesium alloys.

10.8 If acceptable pre-production tests can not be obtained within the permitted schedule latitude adjustment, welding shall be stopped and the machine checked for faulty operation.

10.9 Results of production witness welds shall be maintained in a register near the welding machine, if required.

10.10 Test specimens for production parts shall be identified and performed in accordance with customer specification.

10.11 Whenever specimen test results do not meet specification requirements:

a. Welding shall be stopped and all parts produced since the last acceptable test shall be identified as nonconforming and segregated.

b. The machine and/or tooling is checked and restored prior to continuation of welding.

11. INSPECTION AND ACCEPTANCE CRITERIA

11.1 Production welds shall be examined for conformance in accordance with customer specifications.

11.2 If, under conditions where the recertification weld schedule does not produce acceptable welds within the weld schedule latitude, certification shall be voided and the schedule recertified.