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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE STANDARD

SAE AS7110/7 Rev A

Issued 1995-03
Revised 1997-11

Submitted for recognition as an American National Standard

NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM REQUIREMENTS FOR FRICTION/INERTIA WELDING

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 friction/inertia welding.

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/MATERIAL CONTROL

4.1 Preweld cleaning of the materials to be welded shall be performed in accordance with applicable customer specification.

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5. EQUIPMENT CONTROL

5.1 Welding machines shall be capable of automatically controlling a preset sequence of events through the complete welding cycle to consistently produce welds meeting the requirements of customer specification.

5.2 Machines shall be equipped with appropriate gauges or recorders for indicating or recording spindle revolutions per minute (RPM) and hydraulic RAM pressure.

5.3 The equipment shall be qualified in accordance with applicable customer specifications if required.

5.4 Control instruments shall be calibrated and maintained on a scheduled basis.

5.5 Control instruments not requiring calibration shall be so identified.

5.6 The rotation of the workpiece shall be controlled by instrumentation to within ±2% of RPM or 2 RPM, whichever is greater.

5.7 Thrust axial pressure shall be controlled by instrumentation to within ±50 psig, unless otherwise specified.

5.8 Machine qualifications shall be achieved through welding performance tests and records shall be posted with traceability for each machine, procedure, and weld joint qualified.

5.9 The machine shall be capable of reaching 85% of the set pressure within the following time limits if required.

PSIG	TIME (sec)
0-1000	0.4
1000-2000	0.5
2000-4000	0.8

6. PERIODIC MAINTENANCE

6.1 Written procedures shall require preventive maintenance of equipment and tooling at a specified frequency by 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 WELD PROCEDURES/SCHEDULES

7.1 Weld procedures/schedules shall identify those parameters specified by applicable customer specifications.

7.2 A qualified welding procedure/schedule shall be established for each production joint.

7.3 Re-qualification shall be accomplished when joint geometry, essential welding parameters, power sources, machine modification, or location changes invalidate the approved procedure.

7.4 Qualification records and approved welding procedures shall be posted at or near welding stations, when required by customer.

8. PROCESS CONTROL

8.1 Adequate information shall be supplied in process instructions.

8.2 Machine operators shall be trained and qualified to produce required production welds.

8.3 Shop travelers shall indicate the following:

a. Base materials and heat condition prior to welding

b. Surface condition and weld joint preparation prior to welding

c. Post weld operations (thermal treatment, machining, post-weld inspection)

d. Performance of NDT, if required

8.4 Upset shall be removed to the level as specified on the drawing or customer specification.

8.5 When required, welds shall be heat treated in accordance with customer specification.

8.6 Production control tests shall be performed in accordance with applicable customer specification.

8.6.1 Test specimen details shall be made from the same alloy and in the same heat treat condition as the production part details.