SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS7110/7

REV. C

Issued 1995-03
Revised 2003-12

Superseding AS7110/7B

Nadcap
Requirements for Rotational Friction/Inertia Welding

1. SCOPE:

   This Aerospace Standard (AS) is to be used to supplement AS7110, and/or any other Nadcap recognized quality system. In addition to the requirements contained in AS7110, the requirements contained herein shall apply to suppliers seeking Nadcap accreditation for Rotational Friction/Inertia Welding.

2. REFERENCES:

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS7110 Nadcap - Requirements for Welding/Brazing

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.

4.2 Surfaces of the part details and representative test specimens shall be properly cleaned and free from contaminants such as oxides, scale, oil, dirt, ink, or other surface conditions that are detrimental to the welding process.

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

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 instruments for indicating or recording spindle revolutions per minute (rpm), hydraulic ram pressure, time, displacement and parameters as applicable.

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 in accordance with customer requirements.

5.7 Thrust axial pressure shall be controlled by instrumentation in accordance with customer requirements.

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, when required.

5.9 The machine shall be capable of reaching the minimum set pressure within the specified time limits, if required.

6. PERIODIC MAINTENANCE:

6.1 Written procedures shall require preventive maintenance of equipment and tooling at a specified frequency.

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 PROCEDURES/SCHEDULES:

7.1 Welding 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.

7.2.1 Qualified welding procedures/schedules shall be approved by the customer, when required.

7.3 Re-qualification shall be accomplished in accordance with customer requirements.

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, to meet customer requirements.

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

8.3 Travelers/Routers shall indicate the operation sequence for cleaning, machining, weld joint preparation prior to welding and post-welding operations, when required

8.4 Upset/Flash 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.

8.6.2 Nominal dimensions and tolerances of test specimen details at the weld mating surface shall be the same as specified for the production part details.

9. INSPECTION AND ACCEPTANCE CRITERIA:

9.1 Welded parts shall be traceable to the welding machine, approved procedure, and operator.

9.2 Production parts shall be visually examined for compliance with the applicable customer specification.

9.3 Upset shall be measured/verified in accordance with customer requirements within the range as specified on the qualified welding schedule.