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

AEROSPACE STANDARD

SAE AS7110/2

Issued 1995-03

Submitted for recognition as an American National Standard

NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM REQUIREMENTS FOR FLASH 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 flash welding.

2. REFERENCES

2.1 SAE Publications:

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

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 Base materials shall be as specified in applicable part drawings.

5. EQUIPMENT CONTROL

5.1 The flash welding equipment shall be capable of consistently producing welds which meet customer specifications.

5.2 Equipment shall be qualified in accordance with applicable customer specifications if required.

5.3 The equipment shall be automatically controlled with respect to the following:

a. Rate and distance of travel of the sections to be welded.
b. The equipment shall be automatically controlled with respect to controlling the secondary voltage and current magnitudes and timing.
c. The equipment shall be automatically controlled with respect to the time of current cutoff.

5.4 The equipment shall be automated so that manually controlled flashing does not exceed 15% of total flashing travel.

5.5 All controls, meters, timers, and recorders used to regulate welding parameters shall have the sensitivity, resolution, response rate, and accuracy necessary to permit control of essential process variables.

5.6 Controls and instrumentation shall be calibrated at a frequency that will assure consistent performance.

5.7 Electrodes shall be of adequate size.

5.8 Electrodes shall be fitted to the parts to be welded so that the necessary current will be uniformly distributed about the contact zone, and shall be conducted from the electrode to the work without damage due to localized overheating.

5.9 The equipment shall be set up by operators under the supervision of a welding engineer or other authorized personnel.

5.10 All equipment shall be inspected periodically as recommended by the manufacturer.

6. QUALIFICATION OF WELD PROCEDURE

6.1 Complete flash welding procedure schedules shall be established and approved before the machine is used in welding.

6.2 Weld procedures/schedules shall identify those parameters specified by the applicable customer specification including:

a. Preparation of parts to be welded
b. Choice of tooling/dyes/fittings
c. Appropriate machine control devices and settings
d. Proper sequence of events

6.3 Welding procedures shall be established by one of the following methods:

a. Machine qualification
b. Additional procedures or modification of existing procedures
c. Individual part qualification
d. The detail of joint preparation shall be included in the welding schedule

6.4 Where sensors are used to monitor the welding process, these sensors shall be in operation during the establishment of welding procedure.

6.5 Charts and electronically stored data shall be retained for future examination.

6.6 Welding procedures shall be established for:

a. Each joint differing in material
b. Contour from joints previously welded
c. For each welding machine over appropriate range of cross-sectional areas, and/or wall thickness

7. PROCESS CONTROL

7.1 General Requirements

7.1.1 A sufficient amount of extruded or upset metal shall be removed from all weld areas in order that no defective or unsound metal remains.

7.1.2 Welds shall be rejected if it is necessary to machine below the level of the surface of the parent metal to remove surface defects unless as allowed by customer specifications.

7.1.3 Preventive maintenance shall be performed in accordance with manufacturer's instructions.

7.1.4 One of the following gases shall be used and, certifications shall be available:

a. When propane is used, it shall be at least 85% propane by volume, with the remainder propylene, ethylene, butane, or mixtures thereof.
b. When Argon is used, it shall be in accordance with CGA-G11.1, Type I or II, Grades C, D, or E.
c. When helium is used, it shall be in accordance with CGA-G9.1, Type I with a dew point -75 °F or lower.
d. When nitrogen is used, it shall be in accordance with CGA-G10, Type I or II, Grades L, M, or Q.
e. When natural gas is used is it at least 75% methane with maximum propane allowable of 5%.

7.1.5 The surfaces of the parts contacting the electrodes and the surfaces at the fusion zones shall be clean and free from oxides, paint, grease, dirt, or foreign matter which would interfere with the flow of current or fusion of the metal.

7.1.6 Chemical cleaning or grit blasting shall be used.

7.1.7 If sandblasting is used, the surfaces shall be treated to remove imbedded sand particles prior to welding.

7.2 Detailed Requirements

7.2.1 Mating parts shall be aligned in such a manner that heat generated by the flow of current is uniformly distributed over the section.

7.2.2 If tubing possessing a ratio of outside diameter to wall thickness is greater than 30:1 is welded, the equipment shall be capable of meeting alignment tolerances specified in applicable specifications.

7.2.3 Flash welded joints shall be evaluated in accordance with customer requirements.

7.2.4 Alignment tolerances shall be maintained within the limits of customer requirements.