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INTERNATIONAL
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AEROSPACE STANDARD

SAE AS7110/5 REV. B

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Superseding AS7110/5A

NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM REQUIREMENTS FOR FUSION 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 fusion 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 / Brazing.

3. REFERENCE REQUIREMENTS

3.1 Applicable customer specifications shall be available at the facility.

4. FILLER MATERIAL/FILLER MATERIAL CONTROL

4.1 There shall be a documented filler metal control system that addresses the following:

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4.2 Ordering

a. Purchasing instructions shall specify wire specification, size and identification requirements.
b. Low hydrogen electrodes shall be procured in hermetically sealed containers.

4.3 Receiving

a. Chemistry certifications shall accompany the weld filler metal.
b. The filler metal chemistry shall meet the specification requirements.
c. The marking on bare welding wire or rod shall comply with the requirements of applicable customer specifications, or other methods acceptable to the cognizant engineering organization.
d. Filler metal containers shall be stamped with material release stamp or other positive identification prior to placing material in storage crib.
e. Receiving inspection tests shall be performed as specified by customer.

4.4 Storage

a. After low hydrogen electrodes are removed from hermetically sealed containers, they shall be stored in an oven at a temperature to prevent moisture contamination.
b. Bare wire and rod shall be stored in a clean, dry environment.
c. If used, SAW flux shall be stored in a clean, dry environment.
d. Filler metal shall be segregated by specification number in the storage crib in such a manner to prevent co-mingling of different filler metal specification numbers.
e. Access to storage crib shall be limited to authorized personnel.

4.4.1 Release to Shop

a. If requisition cards are used to remove filler metal from storage, they shall be filled out properly.
b. The crib attendant shall verify that the wire being released from storage match the type required for the job.

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4.5 Control in Shop

a. The exposure of low hydrogen electrodes after removal from containers or ovens shall be suitably limited based on electrode classification.
b. There shall be only one chemical composition of filler metal in weld booth.
c. If filler metal identification markings are lost, missing, or destroyed, the material shall be scrapped.
d. Weld wire shall be sufficiently clean prior to use, such that no discoloration is evident when wiped with a suitable solvent and clean cloth.
e. The disposal of filler metal stubs shall be addressed in a procedure.
f. After welding, filler metal stubs shall be discarded according to disposal procedures.

4.6 Identification

a. Each covered electrode shall have a distinguishable color code, type designation, or classification number marking.
b. Filler metal shall be properly identified
c. Welding flux containers shall be properly identified.
d. The heat and lot number shall be marked on the filler metal container for positive traceability.
e. Filler metal identification charts shall be clearly posted in the shop, when used.

4.7 Traceability

a. If required, the heat number of the filler material shall be traceable to the component that was welded with that filler material.

4.8 Gases

4.8.1 The gases used shall be in compliance with customer requirements.

4.8.2 If alternate specification gases are used, there shall be written authorization from the customer.

5. EQUIPMENT CONTROL

5.1 The welding equipment shall meet the customer's requirements.

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

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5.3 Furnaces shall be provided with a suitable means to control the temperature, if used.

5.4 Furnace control temperature tolerances shall be within ± 25 °F (14 °C), unless otherwise specified, if used.

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

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

6. QUALIFICATION OF WELD PROCEDURES/SCHEDULES

6.1 Welding procedures/schedules shall be qualified in accordance with applicable customer specifications.

6.2 Preheat and interpass temperatures shall be included in the qualified schedule/procedure, if used.

6.3 Filler metal requirements shall be specified on drawings or weld procedures/schedules.

6.4 When used, weld starts and run-off tabs shall be composed of the same alloy as the detail parts and welded with the same filler metal as required by the part.

6.5 When required, stress relief of weldments shall be performed in accordance with welding procedure or drawing.

7. PROCESS CONTROL

7.1 Fixtures, backing materials and hold-down bars shall be kept clean and free from contaminants during use.

7.2 If required, surface finish requirements of fusion faces shall be specified on drawings or in the welding procedure.

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7.3 All faying surfaces shall be free from slag, visible surface oxides, scale, protective finishes, oils, grease, dirt, or other foreign materials.

7.4 Welders and welding operators shall identify their work by interim marking adjacent to the weld joint or by marking a sign-off sheet.

7.5 For automatic/semi-automatic welding, qualified weld settings shall be monitored and maintained within ± 10%, unless otherwise specified.

7.6 When required for automatic and semi-automatic welding, the reproducibility of qualified machine settings shall be verified with sample.

7.7 The filler metal used for tacking shall be the same as that specified for the weld, unless otherwise specified.

7.8 Tacking criteria shall be specified such as, tack size, spacing, sequence, and location and it shall be performed by qualified operators to an approved operation sheet.

7.9 Prior to the deposition of each pass in a multiple pass weld, the welder or welding operator shall perform interpass cleaning and shall visually examine the previous pass for contamination and defects.

7.10 Contamination or defects shall be removed prior to the deposition of subsequent passes.

8. INSPECTION AND ACCEPTANCE CRITERIA

8.1 General

8.1.1 All welds shall be inspected to customer requirements.

8.1.2 Weld configuration shall be in accordance with applicable customer specifications.

8.1.3 When nonconformities are corrected, the corrections shall be in accordance with applicable customer specifications.

8.1.4 In-process corrections shall be documented when required.

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