SAE Aerospace
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# AEROSPACE STANDARD

| AS7110/10 | REV. A |
|---|---|
| Issued 1995-03<br>Cancelled 2007-03<br><br>Superseding AS7110/10 | |

## National Aerospace and Defense Contractors Accreditation Program Requirements for Foundry In-Process Welding of Castings

RATIONALE

AS7003 at Revision C removed the requirement for AS standards. The Nadcap Weld Task Group have revised their checklists and per AS7003 have not re-written associated standards. The AS standards, therefore, require cancellation.

CANCELLATION NOTICE

This document has been declared "CANCELLED" as of March 2007. By this action, this document will remain listed in the Numerical Section of the Aerospace Standards Index.





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## National Aerospace and Defense Contractors Accreditation Program Requirements for Foundry In-Process Welding of Castings

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 foundry in-process welding of castings.

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

4.1.1 Ordering

a. Purchasing instructions shall specify wire specification, size, and identification requirements.
b. Low hydrogen electrodes shall be procured in hermetically sealed containers.
c. Titanium wire shall be procured in argon purged and sealed containers or it shall be stored and cleaned with provisions in place to assure the absence of contamination.

4.1.2 Receiving

a. Chemistry certs 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.

4.1.3 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 commingling of different filler metal specification numbers.
e. Access to storage crib shall be limited to authorized personnel.

4.1.4 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.

4.1.5 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 type (chemical composition) of filler metal in weld booth.

4.1.5 Continued

c. If filler metal identification markings are lost, missing, or destroyed, the material shall be scrapped.
d. Wipe tests shall be performed in shop prior to using filler material (cut length wire).
e. After welding, filler metal stubs shall be discarded according to disposal procedures.

4.1.6 Identification

a. Each covered electrode shall have a distinguishable color code, type designation, or classification number marking.
b. Filler metal and flux shall be properly identified.
c. Each spool or coil of bare welding wire or rod shall carry an identifying label or mark.
d. The heat and lot number shall be marked on the filler metal container.
e. The control system shall prevent the mixing of filler material heat numbers.
f. Filler metal identification charts shall be clearly posted in the shop.

4.1.7 Traceability

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

4.1.8 Record Retention

a. The chemistry certs shall be maintained in an accessible filing system for the specified time.

4.2 Gases

4.2.1 Only the gases listed in Table 1 shall be used.

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

TABLE 1 - Gases
(minimum requirements)

| Gases | Specifications | Alternate Specifications |
|---|---|---|
| Argon | MIL-A-18455 | CGA G-11.1 |
| Helium | BB-H-1168 | CGA G-9.1 |
| Oxygen | BB-O-925, Type I or II | CGA G-4.3 |
| Nitrogen | BB-N-411, Type I or II, Class 1, Grade B | CGA G-10.1 |
| Hydrogen | BB-H-886, Type I or II | CGA G-5.3 |
| Acetylene | BB-A-106, Grade B | CGA G-1.1 |
| Carbon Dioxide | BB-C-101, Grade B | CGA G-6.2 |
| Gas Mixtures | The purity of the gases in the mixture shall be as specified for the individual gases listed above. | |



5. EQUIPMENT CONTROL

5.1 Welding equipment shall meet the requirements of applicable customer specification.

5.2 Heating equipment shall show evidence of valid calibration status prior to use if required.

5.3 Welding equipment shall receive a periodic maintenance check to guard against malfunction or breakdown.

5.4 Welding equipment shall be capable of making satisfactory welds when operated by a qualified welder or welding operator as required.

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

5.6 Cooling furnaces shall be provided with suitable means for controlling the cooling rate.

5.7 Furnace control temperature tolerances shall be within ± 25 °F, unless otherwise specified.

6. QUALIFICATION

6.1 Welding shall be performed in accordance with the written procedures/schedules.

6.2 The weld procedures shall include all details required by applicable customer specification.

6.3 Welding operators shall be qualified in accordance with MIL-STD-1595 or approved alternative method.

6.3.1 Welder's requalifications shall be conducted in accordance with customer specifications.

6.4 The physical requirements for welders and welding operators shall include an annual vision examination in accordance with MIL-STD-1595.

6.5 Prior to welding, records shall indicate that each welder has passed the capability test for each alloy or alloy group in accordance with customer specification.

7. PROCESS CONTROL

7.1 All nondestructive testing (NDT) operations shall be performed by operators certified as required by applicable specification.

7.2 Welding shall be performed only when authorized in writing by the customer.

7.3 Parts shall be properly cleaned prior to welding in accordance with applicable customer specification.

7.4 Surfaces to be welded shall be free from contaminates such as oxides, oil , dirt, grease, or other surface conditions detrimental to welding process.

7.5 Welding shall be limited to rework of customer specified conditions.

7.6 All welding shall be performed using the customer specified process.

7.7 Titanium castings shall be welded in an argon filled welding chamber (flow or vacuum-purge type).