



AEROSPACE MATERIAL

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

SPECIFICATION

AMS 2694

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Revised

REPAIR WELDING OF AEROSPACE CASTINGS

1. SCOPE:

- 1.1 Form: This specification defines the requirements for welds made on castings for aerospace use.
- 1.2 Purpose: The purpose of this specification is to provide a means for purchasers of castings to specify weld repair of castings.
2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2635 - Radiographic Inspection
AMS 2640 - Magnetic Particle Inspection
AMS 2645 - Fluorescent Penetrant Inspection

3. TECHNICAL REQUIREMENTS:

- 3.1 Repair welding shall be performed on rough castings only in the condition, appropriate to the alloy, which will cause the repair weld to meet the requirements of this specification.
- 3.2 Areas and extent of repair welding shall be as shown on the casting drawing or as otherwise agreed upon by purchaser and vendor.
- 3.3 All repairable defects shall be removed by a method that does not damage the base metal until the casting meets the metal quality standards. Only the following defects may be repair welded:

Gas holes	Cuts	Cracks
Porosity	Inclusions	Hot Tears
Non-fills	Pits	Shrinkage

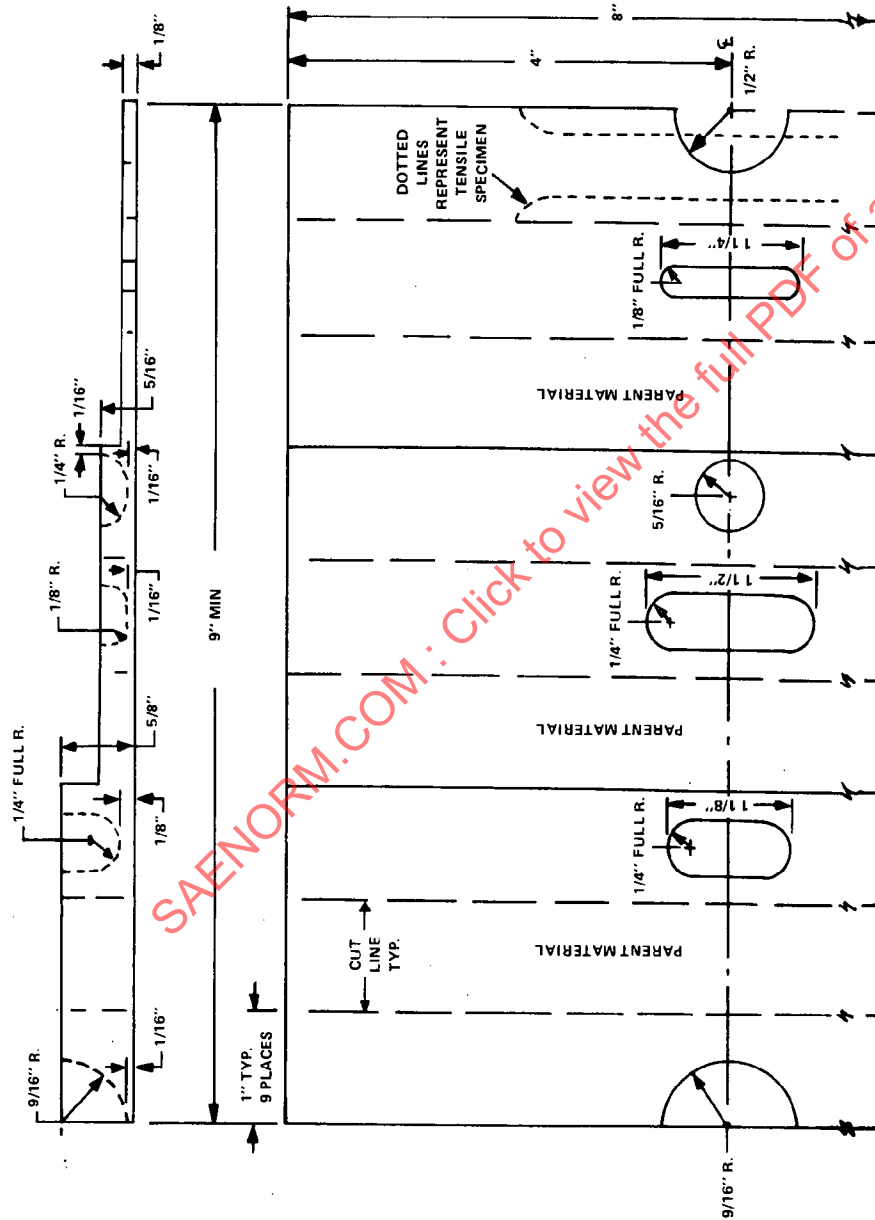
- 3.4 The prepared areas shall be of a shape that permits easy filling by weld metal and thoroughly cleaned to remove dirt, grease, scale, or any other foreign material which might affect the quality of the weld.

3.5 Repair Welding:

- 3.5.1 Castings may be preheated as required to provide good weld quality. Castings may also be stress-relieved if required to reduce stresses inherent from the casting process.
- 3.5.2 Gas-tungsten-arc welding processes shall be used, unless use of another process is approved by purchaser.

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- 3.5.3 Welding filler metal shall be of the same nominal composition as the casting composition and shall produce properties in the repair weld area comparable to those of the parent metal. Filler metal used shall be of as large a diameter as practicable in order to minimize the number of passes needed to fill the cavity.
- 3.5.4 Unless otherwise approved by purchaser, repair welding shall be performed only by welding operators qualified to weld the test specimen shown in Fig. 1.
- 3.5.5 Repair welded areas shall be properly dressed or blended flush with parent metal to conform to drawing requirements.
- 3.5.6 All repair welded areas shall be identified on the castings until reinspection by the same procedures used to find the defect has shown that the repair has met all quality requirements for the base metal.
- 3.5.7 When specified, welded castings shall be marked with a symbol of the type and in the place specified by the purchaser.
- 3.6 Inspection of Welded Castings: Repair welds shall be subjected to the same inspection procedures and acceptance standards required of the casting. Regardless of such standards, all weld repairs shall be inspected in accordance with AMS 2635, AMS 2640, or AMS 2645 as appropriate; no linear indications will be acceptable.
- 3.7 Any repair welded area which, after inspection as in 3.6, indicates defects requiring additional repair shall be reworked, rewelded, and reinspected in accordance with 3.5 and 3.6 only one time. Any re-repair beyond that must be specifically approved by purchaser.
- 3.8 Repair welded castings shall be stress relieved as appropriate to the alloy unless the material specification requires the castings to be normalized, solution treated, annealed, or otherwise heat treated in which case the castings shall be given such heat treatment following inspection and acceptance of their repair. Acceptance inspection shall be after all such heat treatments.
- 3.9 Certifications sent the purchaser for shipments containing weld repaired castings shall contain the following notation:
- "All in-process repair welding of castings so identified has been performed in accordance with AMS 2694. In-process records and inspection results are on file at this facility and are available to purchaser on request."
4. QUALITY ASSURANCE PROVISIONS: Shall be as specified in Section 3.
5. PREPARATION FOR DELIVERY: Not applicable.
6. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
7. REJECTIONS: Castings not repaired in accordance with this specification or with modifications authorized by purchaser will be subject to rejection.
8. NOTES: None.



- NOTES:** (1) Cut and machine welded specimens per ASTM E8 standard sheet-type rectangular tensile test specimens.

- (2) Dimensions are in inches; tolerances $\pm 1/32$ except as otherwise specified.

WELD CAPABILITY TEST SLAB

Figure 1