

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 7488

Issued 3-1-55

Revised

RINGS, FLASH WELDED Aluminum and Aluminum Alloys

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for parts such as flanges and rings fabricated by flash welding roll-formed strip or shapes of aluminum, non-heat treatable aluminum alloys, and heat treatable aluminum alloys with low copper and zinc contents.
3. **MATERIAL:** Material from which rings are made shall be as specified on the drawing.
4. **FABRICATION:**
 - 4.1 **Forming:** Rings as applicable for the particular part shall be formed from suitably rolled, extruded, or forged shapes in the annealed or as-fabricated condition.
 - 4.2 **Preparation for Welding:**
 - 4.2.1 Formed rings shall be clean and free from foreign materials in the area of electrode contact and at the surfaces to be welded.
 - 4.2.2 Formed rings may be pre-heated, before welding, as agreed upon by purchaser and vendor.
 - 4.3 **Welding:** The ends of the formed rings shall be flash butt-welded together. Welding shall be performed on a machine provided with accurate control of feed of joint during flashing, rate and distance of travel of sections to be welded, secondary voltage and current magnitude, and timing and current cut-off. The flash shall be maintained during the flashing interval of the welding operation. The machine shall be capable of repeating the sequence of operations independently of the skill of the operator. A record of all machine settings and sequence of operations for welding each different ring shall be kept by the vendor and be made available to the purchaser upon written request.
 - 4.4 **Annealing:** Unless otherwise specified, the welded rings shall be annealed by heating to the proper temperature and for the proper time and cooling.
 - 4.5 **Proof Testing of Welds (Sizing):** Unless otherwise specified, each ring, after cooling to room temperature following annealing or other heat treatment, shall be tested to determine quality of weld. Flash shall be removed from rings either before or after annealing or other heat treatment but before sizing. Preliminary sizing may be done before cooling, but final sizing shall be done at room temperature. The stress applied for final sizing shall be sufficient to provide an increase in circumference of not less than 1% after the load is released. Testing shall be performed in such a way as to provide uniform stress distribution throughout the ring.

4.6 Restoration to Shape: If it is necessary to restore shape of rings following sizing, such operation shall be done on suitable presses and not by localized blows as from a hammer. Rings may be reheated to a temperature below the annealing temperature for such operation except that rings furnished solution heat treated or solution and precipitation heat treated shall not be heated to over 400 F nor for more than 30 minutes.

5. TECHNICAL REQUIREMENTS: Rings shall conform to the following requirements and, in the case of heat treatable alloys, shall be capable of meeting the following requirements after proper solution and precipitation heat treatment.

5.1 Tensile Properties: If finished welded rings are cut for examination, tensile test specimens shall conform to the following requirements:

Tensile Strength, Through Welded Area	95% min of parent metal
Elongation, Through Welded Area	
Heat Treatable Alloys	25% min of parent metal
Non-Heat Treatable Alloys	60% min of parent metal

5.2 Hardness: Hardness of heat treatable alloy rings shall conform to the applicable material specification.

6. QUALITY:

6.1 Parts shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or performance.

6.2 Parts shall be subject to X-ray inspection.

6.3 Parts shall be subject to fluorescent penetrant inspection.

7. REPORTS: Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of the applicable material specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

8. APPROVAL:

8.1 To assure adequate performance characteristics, sample parts shall be approved, unless such approval be waived.