AERONAUTICAL MATERIAL SPECIFICATION

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

AMS 7493 C

Issued 6-1-51
Revised 2-1-56

RINGS, FLASH WELDED
Non-Austenitic Corrosion Resistant Steels

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. APPLICATION: Primarily for parts such as flanges and rings, requiring corrosion and moderate heat resistance, fabricated by flash welding non-austenitic corrosion resistant steels, usually AMS 5613, AMS 5614, AMS 5615, AMS 5616, or AMS 5627.

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 parts shall be formed from
Ø suitably rolled, extruded, or forged shapes.

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.

4.3 Welding: The ends of the formed rings shall be flash butt-welded together; unless otherwise permitted by purchaser, there shall be only one weld per ring. 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
Ø 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 amount of manual flashing, for purposes of pre-heating, shall be limited to 10% of total flashing distance. 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: The welded rings shall be annealed by heating to 1200-1500 F, holding at heat for not less than 1 hr, and cooling in air. Unless otherwise
Ø specified, rings made of AMS 5613, AMS 5614, AMS 5615, and AMS 5616 shall be austenitized by heating to not lower than 1750 F and not higher than 1850 F and cooled to room temperature before annealing.

4.4.1 For rings less than 0.188 in. in thickness, austenitizing and cooling are not required, and, when permitted by purchaser, annealing may be performed
Ø locally by heating the weld zone to the proper temperature within the range specified in 4.4, holding at heat for 15-30 min., and cooling in air.

4.5 Proof Testing of Welds (Sizing): Unless otherwise specified, each ring, after cooling to room temperature following annealing, shall be tested to determine quality of weld. Flash shall be removed from rings either before or after annealing 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 for such operation.

4.7 Any descaling requirement shall be as agreed upon by purchaser and vendor.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties: Specimens cut from welded rings processed to this specification shall conform to the following requirements:

Tensile Strength	
Through Welded Area	90% min of parent metal in same ring
Elongation, % in 2 in. or 4D	
Through Welded Area	60% min of parent metal in same ring but not less than 15%

5.1.1 When the maximum hardness permitted for the parent metal by the applicable material specification is higher than Brinell 241 or equivalent, the following properties shall be met:

Tensile Strength	
Through Welded Area	90% min of parent metal in same ring
Elongation, % in 2 in. or 4D	
Through Welded Area	50% min of parent metal in same ring but not less than 12%

5.2 Hardness: Rings shall have hardness not higher than Brinell 241 or equivalent, unless otherwise specified in the applicable material specification or on the drawing or purchase order.

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. Any controlled grain size requirement shall be as agreed upon by purchaser and vendor.

6.2 Parts shall be subject to X-ray inspection.

6.3 Parts shall be subject to magnetic particle inspection.

6.4 Parts shall be subject to ultrasonic inspection.