

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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## AMS 4360C

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### MAGNESIUM ALLOY FORGINGS AZ80A Precipitation Heat Treated

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

2. FORM: Die forgings, hand forgings, and forging stock.

3. COMPOSITION:

Aluminum	7.8	+ 9.2
Zinc	0.20	- 0.8
Manganese	0.12	min
Silicon	0.30	max
Copper	0.05	max
Nickel	0.005	max
Iron	0.005	max
Other Impurities, total	0.30	max
Magnesium		remainder

4. CONDITION:

4.1 Die and Hand Forgings: Precipitation heat treated, unless otherwise specified. Cooling from forging temperature may be accelerated but shall be no faster than by quenching in 160 F water, and the practice in this respect shall be consistent for each type of forging.

4.2 Forging Stock: As fabricated.

5. TECHNICAL REQUIREMENTS:

5.1 Die Forgings:

5.1.1 Tensile Properties:

5.1.1.1 Forgings Under 2 In. Thick or Weighing Less than 50 Lb: Test specimens machined from forgings after heat treatment with axes approximately parallel to forging flow lines or from prolongations on the heat treated forgings shall conform to the following requirements:

Tensile Strength, psi	42,000 min
Yield Strength at 0.2% Offset or at 0.0132 in. in 2 in. Extension Under Load (E = 6,500,000), psi	30,000 min
Elongation, % in 4D	2 min

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

5.1.1.2 Forgings 2 In. and Over Thick and Weighing 50 Lb or Over: When forgings are cut for examination, not less than 8 specimens shall be cut from thick and thin sections of the forging such that the number of specimens cut parallel to the forging flow lines is equal to the number cut perpendicular to the forging flow lines. Such specimens shall conform to the following individual and average requirements unless otherwise specified:

	Individual	Average
Tensile Strength, psi	34,000 min	40,000 min
Yield Strength at 0.2% Offset or at Extension Indicated, psi	22,000 min	26,000 min
Extension Under Load (E = 6,500,000), in. in 2 in.	0.0108	
Elongation, % in 4D	2 min	3 min

5.1.1.2.1 When a forging does not have a forged hole at the center, individual specimens taken from the center may have yield strength as low as 18,000 psi at 0.2% offset or at 0.0095 in. in 2 in. extension under load. When the size of the forging is such that test specimens cannot be taken and the use of a prolongation is impractical, the method of test shall be as agreed upon by purchaser and vendor.

5.1.2 Hardness: Forgings and tensile test specimens shall have hardness not lower than Brinell 75 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 82 using 1000 kg load and 10 mm ball.

## 5.2 Hand Forgings:

5.2.1 Tensile Properties: Test specimens taken with axes parallel to the forging flow lines in such a manner as to represent the center of the forging shall conform to the following requirements:

Tensile Strength, psi	42,000 min
Yield Strength at 0.2% Offset or at 0.0126 in. in 2 in. Extension Under Load (E = 6,500,000), psi	28,000 min
Elongation, % in 4D	2 min

5.2.1.1 The requirements of 5.2.1 apply to hand forgings 6 in. and under in thickness. Tensile properties in directions other than parallel to the forging flow lines shall be as agreed upon by purchaser and vendor.

5.2.2 Hardness: Forgings shall have hardness not lower than Brinell 65 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 70 using 1000 kg load and 10 mm ball.

### 5.3 Forging Stock:

5.3.1 When a sample of stock is forged to a test coupon and heat treated in the same manner as forgings, a tensile test specimen taken from the heat treated coupon shall have properties not lower than those specified in 5.1.1.1 and 5.1.2. If a test specimen taken from the stock after heat treatment in the same manner as forgings has properties not lower than those specified in 5.1.1.1 and 5.1.2, the test shall be accepted as equivalent to the test of a forged coupon. Neither of these tests is required in routine inspection.

5.2.2 Unless otherwise specified, tolerances shall be in accordance with commercial practice for the class ordered.

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

### 7. REPORTS:

7.1 Unless otherwise specified, the vendor of forgings shall furnish with each shipment three copies of a report stating that the chemical composition, tensile properties and hardness of the forgings conform to the requirements specified. This report shall include the purchase order number, material specification number, size or part number and quantity.

7.2 Unless otherwise specified, the vendor of forging stock shall furnish with each shipment three copies of a report stating that the chemical composition of the stock conforms to the requirements specified. This report shall include the purchase order number, material specification number, size, and quantity.

7.3 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 this 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. IDENTIFICATION:

8.1 Die Forgings: Shall be identified in accordance with the latest issue of AMS 2808.

8.2 Hand Forgings: Shall be stamped AZ80A on each end.

8.3 Forging Stock: Shall be identified as agreed upon by purchaser and vendor.