Society of Automotive Engineers, Inc.
485 LEXINGTON AVENUE, NEW YORK, N.Y. 10017

AEROSPACE MATERIAL SPECIFICATION

AMS 4147

Issued 5-1-68
Revised

ALUMINUM ALLOY FORGINGS
5.6Zn - 2.5Mg - 1.6Cu - 0.30Cr (7075-T7352)
Stress Relief Compressed

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

2. FORM: Die forgings and hand forgings.

3. APPLICATION: Primarily for structural machined parts subject to warpage during machining and requiring improved stress corrosion resistance but with lower strength than 7075-T652.

4. COMPOSITION:

	min	max
Zinc	5.1	6.1
Magnesium	2.1	2.9
Copper	1.2	2.0
Chromium	0.18	0.40
Iron	--	0.70
Silicon	--	0.50
Manganese	--	0.30
Titanium	--	0.20
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

5. CONDITION: Solution heat treated, stress relieved by compression to produce a permanent set of not less than 1% nor more than 5% and precipitation heat treated to develop the required mechanical properties and resistance to stress corrosion cracking. The direction and method of compression shall be as agreed upon by purchaser and vendor.

6. TECHNICAL REQUIREMENTS:

6.1 Tensile Properties:

6.1.1 Die Forgings, Parallel to Grain Flow: When test specimens are machined from die forgings not over 3 in. in thickness with the axis approximately parallel to the forging flow lines, the tensile properties shall conform to the following requirements:

Tensile Strength, psi	66,000 min
Yield Strength at 0.2% Offset or at 0.0149 in. in 2 in. Extension Under Load (E = 10,300,000), psi	56,000 min
Elongation, % in 2 in. or 4D	7 min

6.1.2 Die Forgings, Across Grain Flow: When test specimens are machined from forgings not over 3 in. in thickness so that the axis is other than approximately parallel to the forging flow lines, the tensile properties shall conform to the following requirements:

Tensile Strength, psi	62,000 min
Yield Strength at 0.2% Offset or at 0.0139 in. in 2 in. Extension Under Load (E = 10,300,000), psi	51,000 min
Elongation, % in 2 in. or 4D	3 min

6.1.3 If the section thickness of the forgings is greater than 3 in., the tensile properties shall be as agreed upon by purchaser and vendor.

6.1.4 If any individual specimen fails to meet the requirements of 6.1.1 or 6.1.2, two additional specimens shall be cut from a forging in the lot represented. Should either of these specimens fail to meet the requirements of 6.1.1 for specimens cut parallel to the forging flow lines or 6.1.2 for specimens cut other than parallel to the forging flow lines, the entire lot shall be subject to rejection.

6.1.5 The elongation requirement shall not apply to test specimens having a gage length diameter less than 0.25 in., or located in immediate proximity to an abrupt change in section thickness, or located so that any part of the specimen gage length is located within 1/8 in. of the trimmed flash line.

6.2 Hand Forgings: When specimens are machined from hand forgings the tensile properties shall conform to the following requirements:

Nominal Thickness Inches	Grain Direction	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,300,000)		Elongation % in 2 in. or 4D, min
			psi, min	Extension Under Load in. in 2 in.	
Up to 3.000, incl	Longitudinal	66,000	54,000	0.0145	7
	Long Transverse	64,000	52,000	0.0141	4
	Short Transverse	61,000	50,000	0.0137	3
3.001 to 4.000, incl	Longitudinal	64,000	53,000	0.0143	7
	Long Transverse	63,000	50,000	0.0137	3
	Short Transverse	60,000	48,000	0.0133	2
4.001 to 5.000, incl	Longitudinal	62,000	51,000	0.0139	7
	Long Transverse	61,000	48,000	0.0133	3
	Short Transverse	58,000	46,000	0.0129	2
5.001 to 6.000, incl	Longitudinal	61,000	49,000	0.0135	6
	Long Transverse	59,000	46,000	0.0129	3
	Short Transverse	57,000	44,000	0.0125	2

6.3 Hardness:

6.3.1 Die Forgings and Hand Forgings Up to 3.000 In., Incl, Thick: Should have hardness not lower than Brinell 125 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 130 using 1000 kg load and 10 mm ball, but shall not be rejected on the basis of hardness if the other technical requirements are met.

6.3.2 Hand Forgings Over 3.000 In. Thick: Should have hardness as agreed upon by purchaser and vendor but shall not be rejected on the basis of hardness if the other technical requirements are met.

6.4 Conductivity:

6.4.1 If the conductivity is below 38% IACS (International Annealed Copper Standard), the material is considered unsatisfactory and must be reprocessed, regardless of property level.

6.4.2 If the conductivity is 40% IACS or higher and tensile properties meet specified requirements, the forgings are considered to be satisfactory.