SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4168	REV. K

Issued	1960-06
Revised	2003-07
Reaffirmed	2008-05
Cancelled	2012-01

Superseded by AMS4154

Aluminum Alloy, Extrusions
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T6510)
Solution Heat Treated, Stress Relieved by Stretching, and Precipitation Heat Treated, Unstraightened

(Composition similar to A97075)

RATIONALE

AMS4168K has been designated Cancelled and Superseded because equivalent technical requirements are provided by other specifications.

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of January 2012 and has been superseded by the specification listed beow. The requirements of the latest issue of the specification listed below shall be fulfilled whenever reference is made to the cancelled AMS4168. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by the specification listed below.

Cancelled specifications are available from SAE.

Temper	Superseding Material and Specification
T6510	7075-T6510 in accordance with AMS4154 Aluminum Alloy, Extrusions, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T6, 7075-T6510, 7075-T6511) Solution Heat Treated, Stress Relieved by Stretching When Required and Precipitation Heat Treated

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4168K

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, profiles, and tubing.

1.2 Application:

These products have been used typically for parts subject to excessive warpage during machining and for parts requiring high strength and whose fabrication does not involve welding or forming, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged or Flash Welded Rings
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials
ARP823	Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products
AS1990	Aluminum Alloy Tempers

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036 or www.ansi.org.

ANSI H35.2	Dimensional Tolerances for Aluminum Mill Products
ANSI H35.2M	Dimensional Tolerances for Aluminum Mill Products (Metric)

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355.

TABLE 1 - Composition

Element	min	max
Silicon	--	0.40
Iron	--	0.50
Copper	1.2	2.0
Manganese	--	0.30
Magnesium	2.1	2.9
Chromium	0.18	0.28
Zinc	5.1	6.1
Titanium	--	0.20
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Solution heat treated, stress-relieved by stretching to produce a nominal permanent set of 1.5%, but not less than 1% nor more than 3%, and precipitation heat treated to the T6510 temper (see AS1990). Heat treatments shall be performed in accordance with AMS 2772.

3.2.1 Extrusions shall receive no straightening after stretching.

3.2.2 Extrusions shall be supplied with an as-extruded surface finish; light polishing to remove minor surface imperfections is acceptable provided such imperfections can be removed within specified dimensional tolerances.

3.3 Properties:

Extrusions shall conform to the following requirements, determined on the mill produced size in accordance with AMS 2355 or (See 8.2):

3.3.1 Tensile Properties:

3.3.1.1 Longitudinal: Shall be as shown in Table 2.

TABLE 2A - Minimum Longitudinal Tensile Properties, Inch/Pound Units

Nominal Diameter or Least Thickness (bars, rods, wire, profiles) or Nominal Wall Thickness (tubing) Inches	Nominal Cross-Sectional Area Square Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.249, incl	All	78.0	70.0	7
Over 0.249 to 0.499, incl	All	81.0	73.0	7
Over 0.499 to 2.999, incl	All	81.0	72.0	7
Over 2.999 to 4.499, incl	Up to 20, incl	81.0	71.0	7
Over 2.999 to 4.499, incl	Over 20 to 32, incl	78.0	70.0	6
Over 4.499 to 5.000, incl	Up to 32, incl	78.0	68.0	6

TABLE 2B - Minimum Longitudinal Tensile Properties, SI Units

Nominal Diameter or Least Thickness (bars, rods, wire, profiles) or Nominal Wall Thickness (tubing) Millimeters	Nominal Cross-Sectional Area Square Centimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.32, incl	All	538	483	7
Over 6.32 to 12.67, incl	All	558	503	7
Over 12.67 to 76.17, incl	All	558	496	7
Over 76.17 to 114.27, incl	Up to 129, incl	558	490	7
Over 76.17 to 114.27, incl	Over 129 to 206, incl	538	483	6
Over 114.27 to 127.00, incl	Up to 206, incl	538	469	6

3.3.1.2 Long-Transverse: Bars, rods, and profiles, tested in the long-transverse direction, shall meet the requirements of Table 3 and 3.3.1.3.

TABLE 3A - Minimum Long-Transverse Tensile Properties, Inch/Pound Units

Nominal Diameter or Least Thickness (bars, rods, profiles) Inches	Nominal Cross-Sectional Area Square Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.249, incl	Up to 20, incl	76.0	66.0	5
Over 0.249 to 0.499, incl	Up to 20, incl	78.0	68.0	5
Over 0.499 to 0.749, incl	Up to 20, incl	76.0	66.0	4
Over 0.749 to 1.499, incl	Up to 20, incl	74.0	65.0	3
Over 1.499 to 2.999, incl	Up to 20, incl	70.0	61.0	1
Over 2.999 to 4.499, incl	Up to 32, incl	67.0	56.0	1
Over 2.999 to 4.499, incl	Over 20 to 32, incl	65.0	55.0	1

TABLE 3B - Minimum Long-Transverse Tensile Properties, SI Units

Nominal Diameter or Least Thickness (bars, rods, profiles) Millimeters	Nominal Cross-Sectional Area Square Centimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.32, incl	Up to 129, incl	524	455	5
Over 6.32 to 12.67, incl	Up to 129, incl	538	469	5
Over 12.67 to 19.02, incl	Up to 129, incl	524	455	4
Over 19.02 to 38.07, incl	Up to 129, incl	510	448	3
Over 38.07 to 76.17, incl	Up to 129, incl	483	421	1
Over 76.17 to 114.27, incl	Up to 129, incl	462	386	1
Over 76.17 to 114.27, incl	Over 129 to 206, incl	448	379	1

3.4 Quality:

Extrusions, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the extrusions.

3.4.1 When specified, extrusions shall be subjected to ultrasonic inspection in accordance with ASTM B 594.

3.4.1.1 Extrusions, 0.500 to 1.499 inches (12.70 to 38.07 mm), inclusive, in nominal thickness, not exceeding 600 pounds (272 kg) per piece, or a 10 to 1 width-to-thickness ratio, shall meet ultrasonic Class B. Extrusions, 1.500 inches (38.1 mm) and over in nominal thickness, not exceeding 600 pounds (272 kg) per piece, or a 10 to 1 width-to-thickness ratio, shall meet ultrasonic Class A.