

AEROSPACE MATERIAL SPECIFICATION

SAE MAM 2355E

Issued	1985-04
Revised	2002-04
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Cancelled	2008-01
Superseded by AMS 2355	

Quality Assurance, Sampling and Testing
Aluminum Alloys and Magnesium Alloys
Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings

RATIONALE

MAM 2355D has been designated Cancelled and Superseded because equivalent technical requirements are provided in AMS 2355.

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of January, 2008, and has been superseded by AMS 2355. The requirements of the latest issue of AMS 2355 shall be fulfilled whenever reference is made to the cancelled MAM 2355D. 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will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by AMS 2355.

Cancelled specifications are available from SAE.

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1. SCOPE:

This specification covers quality assurance sampling and testing procedures used to determine conformance to applicable specification requirements of wrought aluminum alloy and wrought magnesium alloy mill products, except forging stock, including rolled, forged, and flash welded rings, specified in metric (SI) units. Definitions of rings, as applicable to this specification, are presented in 8.3 (Definitions).

1.1 AMS 2355 is the inch/pound version of this MAM.

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 ASTM Publications:

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

ASTM B 557M	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)
ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications
ASTM B 645	Plane Strain Fracture Toughness Testing of Aluminum Alloys
ASTM B 646	Fracture Toughness Testing of Aluminum Alloys
ASTM E 9	Compression Testing of Metallic Materials at Room Temperature
ASTM E 10	Brinell Hardness of Metallic Materials
ASTM E 18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 34-72	Chemical Analysis of Aluminum and Aluminum-Base Alloys
ASTM E 35	Chemical Analysis of Magnesium and Magnesium Alloys
ASTM E 55	Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition
ASTM E 227	Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique
ASTM E 290	Bend Testing of Material for Ductility
ASTM E 399	Plane-Strain Fracture Toughness of Metallic Materials
ASTM E 561	R-Curve Determination
ASTM E 607	Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere
ASTM E 716	Sampling Aluminum and Aluminum Alloys for Spectrochemical Analysis
ASTM E 1004	Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method
ASTM E 1251	Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Argon Atmosphere, Point-to-Plane, Unipolar Self-Initiating Capacitor Discharge

2.1 (Continued):

- ASTM E 1304 Plane-Strain (Chevron Notch) Fracture Toughness of Metallic Materials
- ASTM G 34-72 Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO TEST)
- ASTM G 47 Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Standardization Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

- MIL-STD-1537 Electrical Conductivity Test for Measurement of Heat Treatment of Aluminum Alloys, Eddy Current Method

2.3 Aluminum Association Publications:

The Aluminum Association, Inc., 900 19th Street N.W., Washington, DC 20006.

Aluminum Standards and Data

3. TECHNICAL REQUIREMENTS:

3.1 General:

- 3.1.1 Omission from this specification of confirmatory tests of certain material properties or attributes controlled by the applicable specification for a product does not relieve the vendor of responsibility for furnishing products which conform in all respects to the applicable material specification.
- 3.1.2 In event of conflict between requirements specified herein and requirements of a particular material specification, the following rules shall apply:
 - 3.1.2.1 When requirements of the material specification are more stringent, they shall take precedence.
 - 3.1.2.2 When requirements of this MAM are more stringent, they shall take precedence except as noted in 3.1.2.3.
 - 3.1.2.3 If any tests mentioned in 3.3.2 are not required by the material specification, they shall not be considered a requirement.
 - 3.1.2.4 When instructions are issued by purchaser regarding quality assurance sampling procedures, such instructions shall take precedence over requirements of either this specification or the particular specification in which this specification is invoked.
- 3.1.3 Properties of the delivered product shall meet those of the specified (ordered) product.

3.2 Responsibility for Tests:

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for the performance of all specified tests.

3.3 Detail Requirements:

3.3.1 Inspection Lot:

3.3.1.1 Wrought Alloy Products Including Forged or Rolled Rings, but Excluding Die and Hand Forgings and Flash Welded Rings:

3.3.1.1.1 Heat Treated Tempers: An inspection lot shall be an identifiable quantity of product of the same mill form, alloy, temper, section, and size traceable to a heat treat lot (See 8.3.3), and submitted for vendor's inspection at one time. All sheet and plate of the same thickness is considered to be of the same size.

3.3.1.1.2 Non-Heat-Treated Tempers: An inspection lot shall be an identifiable quantity of material of the same mill form, alloy, temper, section, and size submitted for vendor's inspection at one time.

3.3.1.2 Die, Hand, and Ring Forgings: An inspection lot shall be all forgings of the same alloy and nominal cross-section and configuration heat treated in the same batch furnace or quenched from a continuous furnace consecutively during an eight-hour period. Maximum lot size for forgings heat treated in a continuous furnace and charged consecutively during continuous furnace operation shall be 1000 kg for forgings weighing 2.5 kg and under, and shall be 3000 kg for forgings weighing over 2.5 kg.

3.3.1.3 Flash Welded Rings: An inspection lot shall consist of all rings of the same alloy, cross-sectional configuration, size, and heat treated in the same batch furnace load or in a continuous furnace during a period of eight consecutive hours, and presented for vendor's inspection at one time.

3.3.2 Sampling and Testing:

3.3.2.1 Chemical Analysis: Sampling shall be in accordance with ASTM E 55 and/or ASTM E 716.

3.3.2.1.1 Cast Unit: Producer shall take at least one control sample before and at least one additional sample during the casting of each cast unit (units, if cast simultaneously from the same molten metal source). Complete analysis records shall be available for review at producer's plant (See 8.2). Analysis is required for those elements having specified limits.

3.3.2.1.2 Finished Product (Excluding Forgings and Flash Welded Rings): When compliance with 3.3.2.1.1 cannot be established, sampling shall be as follows: one sample shall be taken for each 1000 kg, or fraction thereof, of each cast unit in an inspection lot; however, not more than one sample is required from a piece.

- 3.3.2.1.3 Forgings and Rolled Rings: When compliance with 3.3.2.1.1 cannot be established, sampling shall be as follows: one sample shall be taken for each 1000 kg, or fraction thereof, in a lot of forgings having a nominal weight of 2.5 kg and under; one sample shall be taken for each 3000 kg, or fraction thereof, in a lot of forgings having a nominal weight greater than 2.5 kg.
- 3.3.2.1.4 Flash Welded Rings: Unless a report showing conformance of chemical composition to the applicable material specification is available on stock used for flash welded rings, one sample shall be taken for each 3000 kg, or fraction thereof, in a lot; however, not more than one sample is required from a piece.
- 3.3.2.2 Tensile Properties: The location from which the sample is taken shall be as specified in 3.3.3 for the type of test and type of product being tested. The orientation with respect to direction of predominant grain flow shall be as specified in the applicable material specification or shall be taken from randomly selected pieces of the product. A minimum of one tensile specimen shall be taken in any one direction from any one piece when more than one piece is available. The number of samples shall be as specified herein for the type of product being tested.
- 3.3.2.2.1 Sheet: One sample shall be taken from each end of each parent coil but not more than one sample for each 1000 kg, or fraction thereof, in a lot shall be required.
- 3.3.2.2.2 Plate: One sample shall be taken from each end of each parent plate but not more than one sample for each 2000 kg, or fraction thereof, in a lot shall be required.
- 3.3.2.2.3 Wire, Rod, Bar, Shapes, Tube, and Pipe: For products having a nominal of 1.5 kg per linear meter, one sample shall be taken for each 500 kg, or fraction thereof, in a lot. For products having a nominal weight of 1.5 kg or greater per linear meter, one sample shall be taken for each 300 meters, or fraction thereof, in a lot.
- 3.3.2.2.4 Die Forgings: For die forgings having a nominal weight of 2.5 kg and under, one sample shall be taken in each specimen orientation specified for each 1000 kg, or fraction thereof, in a lot. For die forgings having a nominal weight over 2.5 kg, one sample shall be taken similarly for each 3000 kg, or fraction thereof, in a lot.
- 3.3.2.2.5 Hand Forgings: One sample shall be taken for each 3000 kg, or fraction thereof, in a lot in each grain direction for which properties are specified.
- 3.3.2.2.6 Flash Welded Rings: One sample shall be taken from parent metal, not including the heat-affected zone of the weld, of a flash welded ring representing the lot.
- 3.3.2.2.7 Forged or Rolled Rings: One sample shall be taken from one ring or prolongation ring representing the lot. For multi-lot production of large rings, one ring from the run may be cut into segments and one such segment, if heat treated with the production lot, shall be considered to be the sample for that lot.
- 3.3.2.2.7.1 For multiple lot production of large rings, when mechanical stress relief is not required, one ring from the forged or rolled run may be cut into segments and one such segment, if heat treated with the production lot, shall be considered to be the sample from that lot.