



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS4004™</b>	<b>REV. E</b>
	Issued 1969-11 Reaffirmed 1995-09 Revised 2009-10 Stabilized 2015-12  Superseding AMS4004D	
Aluminum Alloy, Foil 2.5Mg - 0.25Cr (5052-H191) Strain Hardened (Composition similar to UNS A95052)		

#### RATIONALE

AMS4004E stabilizes this document because it contains mature technology that is not expected to change and thus no further revisions are anticipated.

#### STABILIZED NOTICE

AMS4004E has been declared "STABILIZED" by AMS D Nonferrous Alloys Committee. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because it contains mature technology that is not expected to change and thus no further revisions are anticipated. Previously this document was revised. The last technical update of this document occurred in October, 2009. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification, including exceptions listed on the certification.

NOTE: In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

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## 1. SCOPE

### 1.1 Form

This specification covers an aluminum alloy in the form of foil.

### 1.2 Application

This foil has been used typically for corrugated or expanded honeycomb core material for use in sandwich construction, but usage is not limited to such applications.

## 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

### 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AMS2355      Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings

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## 2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor, Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E 252 Thickness of Foil, Thin Sheet, and Film by Mass Measurement

ASTM E 345 Tension Testing of Metallic Foil

## 3. TECHNICAL REQUIREMENTS

### 3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

TABLE 1 - COMPOSITION

Element	min	max
Iron	--	0.40
Copper	--	0.10
Manganese	--	0.10
Magnesium	2.2	2.8
Chromium	0.15	0.35
Zinc	--	0.10
Silicon	--	0.25
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

### 3.2 Condition

Strain hardened, mill finish.

### 3.3 Properties

Foil shall conform to the following requirements:

#### 3.3.1 Tensile Properties

Shall be shown in Table 2, determined in accordance with ASTM E 345 on foil under 0.006 inch (0.15 mm) in nominal thickness.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	42.0 ksi (290 MPa)
Yield Strength at 0.2% Offset	37.0 ksi (255 MPa)

### 3.4 Quality

Foil, as received by purchaser, shall be uniform in quality and condition, sound, and free from holes, tears, and other discontinuities and from internal imperfections detrimental to usage of the foil. Dents, ripples, kinks, and sharp bends in the foil are acceptable provided they are located within 0.050 inch (1.27 mm) of an edge or are less than 0.030 inch (0.76 mm) deep.

3.4.1 Foil shall be free from grease and dirt and as free from oil as is commercially practicable.

### 3.5 Tolerances

Shall conform to the following:

#### 3.5.1 Thickness

Shall not deviate from the thickness ordered by more than  $\pm 10\%$ , determined by instrument measurement or by the weighing method specified for thin foil in ASTM E 252.

3.5.1.1 When a dispute occurs between purchaser and vendor over thickness, values determined by the weighing method of ASTM E 252 shall apply. For such calculations, density shall be taken as 0.097 pound per cubic inch ( $2.68 \text{ kg/m}^3 \times 10^3$ ).

#### 3.5.2 Width

Shall be within  $\pm 0.032$  inch ( $\pm 0.81$  mm) of the width ordered.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The vendor of foil shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the foil conforms to specified requirements.

### 4.2 Classification of Tests

All technical requirements are acceptance tests and, except for composition (3.1), shall be performed on each inspection lot.

### 4.3 Sampling and Testing

Shall be in accordance with AMS2355 and the following:

#### 4.3.1 Tensile Properties

Specimens shall be cut with axis of specimen parallel to direction of rolling; one specimen shall be selected for each 2000 pounds (907 kg) or fraction thereof from each lot except that not more than one sample will be required from a coil.

#### 4.3.2 Thickness

Two specimens from each nominal thickness.

### 4.4 Reports

The vendor of foil shall furnish with each shipment a report stating that the foil conforms to the composition and showing the results of tests to determine conformance to the tensile properties of each lot. This report shall include the purchase order number, inspection lot number, AMS4004E, size, and quantity.

### 4.5 Resampling and Retesting

Shall be in accordance with AMS2355.