

AEROSPACE MATERIAL SPECIFICATION

MAM 2303E

Issued JAN 1987
Revised OCT 2001
Noncurrent MAR 2003
Cancelled JUL 2007

Superseded by AMS 2303

Steel Cleanliness, Aircraft Quality
Martensitic Corrosion-Resistant Steels
Magnetic Particle Inspection Procedure
Metric (SI) Measurement

RATIONALE

MAM 2303D has been designated cancelled and superseded since equivalent technical requirements are provided by AMS 2303.

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of July, 2007, and has been superseded by AMS 2303. The requirements of the latest issue of AMS 2303 shall be fulfilled whenever reference is made to the cancelled MAM 2303D. 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will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by AMS 2303.

Cancelled specifications are available from SAE.

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AEROSPACE MATERIAL SPECIFICATION



MAM 2303D

Issued JAN 1987
Revised OCT 2001
Noncurrent MAR 2003

Superseding MAM 2303C

Steel Cleanliness, Aircraft Quality
Martensitic Corrosion-Resistant Steels
Magnetic Particle Inspection Procedure
Metric (SI) Measurement

NONCURRENCY NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of March, 2003. It is recommended, therefore, that this specification not be specified for new designs.

AMS 2303 covers the same requirements.

"NONCURRENT" refers to those materials which have been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs.

"NONCURRENT" specifications are available from SAE.

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1. SCOPE:

1.1 Purpose:

This specification covers steel cleanliness requirements in SI (Metric) units for aircraft-quality, ferromagnetic, hardenable, corrosion-resistant steels as determined by magnetic particle inspection methods. This specification contains sampling, specimen preparation, and inspection procedures and cleanliness rating criteria.

1.1.1 AMS 2303 is the inch/pound version of this MAM.

1.2 Application:

This procedure has been used typically for the cleanliness evaluation of blooms, billets, tube rounds, stock for forging or flash welded rings, slabs, bars, sheet, strip, plate, tubing, and extrusions used in fabricating parts subject to magnetic particle inspection, but may be used for qualification of a heat, melt, or lot of steel.

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.

ASTM E 10 Brinell Hardness of Metallic Materials
ASTM E 1444 Magnetic Particle Examination

2.2 ANSI Publications:

Available from American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ANSI B46.1 Surface Texture

3. TECHNICAL REQUIREMENTS:

3.1 Specimen Preparation:

3.1.1 Heat Qualification: Sampling shall be in accordance with 4.3.1. Samples shall be converted into test specimens in accordance with 3.1.3.

- 3.1.2 Product Qualification: Product (See 8.2) from a heat not qualified based on sampling as in 4.3.1 shall be sampled in accordance with 4.3.2. Samples shall be converted into test specimens in accordance with 3.1.3.
- 3.1.3 Working and Rough Machining:
- 3.1.3.1 Solid Product Over 230 cm² Cross-Sectional Area Except Flat Bars, Slabs, and Plates: A quarter-section shall be cut from the sample sufficiently oversize that the center of the original specimen will be approximately on the surface of the specimen after generating to test size. The specimen shall be converted into test size by machining, or forging and machining, to a diameter not larger than 150 millimeters consistent with the machining allowance specified in 3.1.4.1. As an alternate method, when acceptable to purchaser, the full section may be rolled or forged to a 150 millimeters round or square and an oversize quarter obtained as in 3.1.3.2. The identity for specimen surface representing center of original stock shall be maintained throughout machining and testing.
- 3.1.3.2 Solid Product 105 to 230 cm², Inclusive, in Cross-Sectional Area Except Flat Bars, Slabs, and Plates: A quarter-section shall be cut sufficiently oversize that the center of the original specimen will be approximately on the surface of the sample after generating to test size. The specimen shall be converted to test size by machining, or forging and machining, to the largest possible round consistent with the machining allowance specified in 3.1.4.1. The identity for specimen surface representing center of original stock shall be maintained throughout machining and testing.
- 3.1.3.3 Solid Product Under 105 cm² in Cross-Sectional Area Except Flat Bars, Slabs, and Plates: A quarter-section shall be cut from each sample sufficiently oversize that the center of the original sample will be approximately on the surface after generating to test size. The quarter-section shall be converted into a test specimen by machining to a "one-step" straight cylinder nominally 125 millimeters long. Minimum stock removal shall be consistent with the machining allowance specified in 3.1.4.
- 3.1.3.3.1 As an alternate method, a step-down specimen may be generated from the full cross-section in equal length circumferential steps as shown in Table 1, consistent with the machining allowance specified in 3.1.4.

TABLE 1 - Stepdown Specimens

Nominal Diameter or Least Distance Between Parallel Sides Millimeters	Step Length Millimeters	Step Diameter 1	Step Diameter 2	Step Diameter 3	Step Diameter 4	Step Diameter 5
6.25 to 12.50, incl	125.00	D	--	--	--	--
Over 12.50 to 18.75, incl	62.50	D	2/3D	--	--	--
Over 18.75 to 25.00, incl	41.62	D	3/4D	1/2D	--	--
Over 25.00 to 37.50, incl	31.25	D	4/5D	3/5D	2/5D	--
Over 37.50	25.00	D	4/5D	3/5D	2/5D	1/5D

D = Original diameter or distance between parallel sides minus machining stock removed.

3.1.3.4 Flat Bars: The type of test and the location in the section shall be acceptable to purchaser.

3.1.3.5 Slabs or Plates: A straight cylindrical or rectangular specimen shall be machined, or forged and machined, from each slab or plate tested. The specimen shall be taken essentially parallel to the direction of rolling, midway between edge and center of the slab or plate width, shall be nominally 125 millimeters in length, and not more than 100 millimeters in final diameter or thickness.

3.1.3.5.1 Product Up to 100 Millimeters, Inclusive, in Nominal Thickness: A straight cylindrical specimen shall represent the full thickness consistent with the machining allowance specified in 3.1.4.3.

3.1.3.5.2 Product Over 100 to 200 Millimeters, Inclusive, in Nominal Thickness: A straight cylindrical specimen shall represent surface to mid-thickness consistent with the machining allowance specified in 3.1.4.3.

3.1.3.5.3 Product Over 200 Millimeters in Nominal Thickness: A straight cylindrical specimen shall be taken so that the axis is approximately midway between the surface and mid-thickness, and shall have a diameter equal to one-third the nominal thickness of the section, allowing 0.010 inch per side for finish machining after heat treatment.

3.1.3.6 Tubing:

3.1.3.6.1 Up to 250 Millimeters, Inclusive, in Nominal OD: Specimens nominally 125 millimeters in length shall be machined to straight cylindrical sections in accordance with 3.1.4.2.1.

3.1.3.6.2 Over 250 Millimeters in Nominal OD with Nominal Wall Thickness Up to 50 Millimeters, Inclusive: Specimens nominally 125 millimeters in length shall be machined to straight cylindrical sections in accordance with 3.1.4.2.2.