SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS5020F

Issued 1967-11
Revised 2005-03
Cancelled 2008-12

Superseding AMS5020E

Steel Bars, Forgings, and Tubing, Free-Cutting 1.5Mn – 0.25Pb (0.32 – 0.39C) (11L37)

RATIONALE

AMS5020F has been designated Cancelled based on results of a survey to aerospace users and producers.

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of December 2008. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications indicating that it has been "CANCELLED".

Cancelled specifications are available from SAE.

Similar but not necessarily identical products are covered in the following specifications. However, this listing is provided for information only and does not constitute authority to substitute these specifications for the "CANCELLED" specification.

ASTM A29 / A29M	Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for
ASTM A519	Seamless Carbon and Alloy Steel Mechanical Tubing
ASTM A668 / A668M	Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM A711 / A711M	Steel Forging Stock

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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5020E

Issued NOV 1967
Reaffirmed SEP 2000
Revised MAR 2004
Superseding AMS 5020D

Steel Bars, Forgings, and Tubing, Free-Cutting 1.5Mn - 0.25Pb (0.32 - 0.39C) (11L37)

(Composition similar to UNS G11374)

1. SCOPE:

1.1 Form:

This specification covers a leaded carbon steel in the form of bars, forgings, mechanical tubing, and forging stock.

1.2 Application:

These products have been used typically for parts on which the amount or complexity of machining warrants use of a free-cutting steel to yield good surface finish, 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, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2231	Tolerances, Carbon Steel Bars
AMS 2253	Tolerances, Carbon and Alloy Steel Tubing
AMS 2259	Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2370	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steels, Wrought Products and Forging Stock
AMS 2372	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Forgings
AMS 2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys
AMS 2808	Identification, Forgings

2.2 ASTM Publications:

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

ASTM E 10	Brinell Hardness of Metallic Materials
ASTM E 350	Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 350, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	min	max
Carbon	0.32	0.39
Manganese	1.35	1.65
Phosphorus	--	0.040
Sulfur	0.08	0.13
Lead	0.15	0.35

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Bars and Mechanical Tubing 2.50 Inches (63.5 mm) and Under in OD or Least Distance Between Parallel Sides: Cold finished, suitable for machining on high speed automatic screw machines.

3.2.2 Bars and Mechanical Tubing Over 2.50 Inches (63.5 mm) in OD or Least Distance Between Parallel Sides: Hot finished and normalized or otherwise heat treated to produce best machining qualities.

3.2.3 Forgings: Normalized or otherwise heat treated to produce best machining qualities.

3.2.4 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Hardness: Shall be as follows, or equivalent, determined in accordance with ASTM E 10 on the surface, except on rounds where a flat, as necessary for Brinell accuracy, may be made (See 8.2).

3.3.1.1 Bars and Tubing: See Table 2.

TABLE 2 - Hardness

Nominal OD or Distance Between Parallel Sides Inch	Nominal OD or Distance Between Parallel Sides Millimeters	Hardness HB
Up to 0.625, incl	Up to 15.88, incl	207 to 255
Over 0.625 to 1.000, incl	Over 15.88 to 25.40, incl	187 to 255
Over 1.000 to 3.000, incl	Over 25.40 to 76.20, incl	170 to 241
Over 3.000	Over 76.20	149 to 217

3.3.1.2 Forgings: 163 to 229 HB.

3.4 Quality:

The product, as received by purchaser, shall be uniform in quality and condition, sound, and consistent with the type of steel involved, free from foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances:

Shall conform to all applicable requirements of the following:

3.5.1 Bars: In accordance with AMS 2231.

3.5.2 Mechanical Tubing: In accordance with AMS 2253.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

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