SAE Aerospace
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# AEROSPACE MATERIAL SPECIFICATION

AMS 5010K

Issued 1940-01
Revised 2006-05
Reaffirmed 2010-10
Superseding AMS 5010J

## Steel Bars Free-Machining Cold Drawn (SAE 1212 or SAE 1215)

(Composition similar to UNS G12120)

RATIONALE

AMS 5010K is a Five Year review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a free-machining carbon steel in the form of bars.

1.2 Application

These products have been used typically for screw stock and other applications where free-machining characteristics are desirable, 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), or www.sae.org.

| | |
|---|---|
| AMS 2231 | Tolerances, Carbon Steel Bars |
| 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 2806 | Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys |





**TO PLACE A DOCUMENT ORDER:** **Tel: 877-606-7323 (inside USA and Canada)**
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**SAE WEB ADDRESS:** **http://www.sae.org**

**SAE values your input. To provide feedback on this Technical Report, please visit**
**http://www.sae.org/technical/standards/AMS5010K**

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, 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 of one of the types 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 | Type 1212 min | Type 1212 max | Type 1215 min | Type 1215 max |
|---|---|---|---|---|
| Carbon | -- | 0.13 | -- | 0.09 |
| Manganese | 0.70 | 1.00 | 0.75 | 1.05 |
| Phosphorus | 0.07 | 0.12 | 0.04 | 0.09 |
| Sulfur | 0.16 | 0.23 | 0.26 | 0.35 |

3.1.1 Unless a specific type is ordered, either type may be supplied.

3.1.2 Check Analysis

Composition variation shall meet the applicable requirements of AMS 2259.

3.2 Condition

Cold drawn.

3.3 Properties

Bars shall conform to the following requirements:

3.3.1 Hardness

Shall be as shown in Table 2, or equivalent (See 8.2), determined in accordance with ASTM E 10.

TABLE 2 - HARDNESS REQUIREMENTS

| Nominal Diameter or Least Distance Between Parallel Sides Inches | Nominal Diameter or Least Distance Between Parallel Sides Millimeters | Hardness HB min | Hardness HB max |
|---|---|---|---|
| Up to 1.00, incl | Up to 25.4, incl | 170 | 255 |
| Over 1.00 to 2.00, excl | Over 25.4 to 50.8, excl | 156 | 201 |
| 2.00 and over | 50.8 and over | 110 | 201 |

3.4 Quality

Bars, 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 bars.

3.5 Tolerances

Shall conform to all applicable requirements of AMS 2231.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of bars 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 bars conform to specified requirements.

4.2 Classification of Tests

All technical requirements of this specification are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with AMS 2370.

4.4 Reports

The vendor of bars shall furnish with each shipment a report showing the results of tests for composition of each heat and hardness of each lot, and stating that the bars conform to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5010K, size, and quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS 2370.

5. PREPARATION FOR DELIVERY

5.1 Sizes

Except when exact lengths or multiples of exact lengths are ordered, straight bars will be acceptable in mill lengths of 6 to 20 feet (1.8 to 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 feet (3 m).

5.2 Identification

Shall be in accordance with AMS 2806.

5.3 Protective Treatment

Bars shall be protected from corrosion prior to shipment.

5.4 Packaging

Bars shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the bars to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.