

# AEROSPACE MATERIAL SPECIFICATION



AMS 5069F

Issued 1959-01  
Revised 2001-06  
Reaffirmed 2011-05

Superseding AMS 5069E

## Steel Bars, Forgings, and Tubing 0.15 - 0.20C (SAE 1018)

(Composition similar to UNS G10180)

### 1. SCOPE:

#### 1.1 Form:

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

#### 1.2 Application:

These products have been used typically for parts requiring low strength and high ductility, 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 canceled 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.

- AMS 2231 Tolerances, Carbon Steel Bars
- MAM 2231 Tolerances, Metric, Carbon Steel Bars
- AMS 2253 Tolerances, Carbon and Alloy Steel Tubing
- MAM 2253 Tolerances, Metric, 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 Steel 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

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2011 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)  
Tel: +1 724-776-4970 (outside USA)  
Fax: 724-776-0790  
Email: CustomerService@sae.org  
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/AMS5069F>**

## 2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

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:

Element	min	max
Carbon	0.15	0.20
Manganese	0.60	0.90
Silicon	0.15	0.35
Phosphorus	--	0.040
Sulfur	--	0.050

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; hardness shall be determined in accordance with ASTM E 10:

3.2.1 Bars: Hot finished and annealed, unless otherwise ordered, having hardness not higher than 229 HB, or equivalent. Bars ordered cold finished may have hardness as high as 241 HB, or equivalent (See 8.2).

3.2.2 Forgings: As ordered.

3.2.3 Mechanical Tubing: Cold finished having hardness not higher than 241 HB, or equivalent (See 8.2).

3.2.4 Forging Stock: As ordered by the forging manufacturer.

### 3.3 Quality:

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

### 3.4 Tolerances:

Shall conform to all applicable requirements of the following:

3.4.1 Bars: AMS 2231 or MAM 2231.

3.4.2 Mechanical Tubing: AMS 2253 or MAM 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 the performance of all required tests. Purchaser reserves the right to sample and perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

### 4.2 Classification of Tests:

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

### 4.3 Sampling and Testing:

Shall be as follows:

4.3.1 Bars, Mechanical Tubing, and Forging Stock: In accordance with AMS 2370.

4.3.2 Forgings: In accordance with AMS 2372.

### 4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and the hardness of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5069F, size and quantity. If forgings are supplied, the size and melt source of stock used to make the forgings shall also be included.

#### 4.5 Resampling and Retesting:

Shall be as follows:

4.5.1 Bars, Mechanical Tubing, and Forging Stock: In accordance with AMS 2370.

4.5.2 Forgings: In accordance with AMS 2372.

#### 5. PREPARATION FOR DELIVERY:

##### 5.1 Sizes:

Except when exact lengths or multiples of exact lengths are ordered, straight bars and tubing 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 as follows:

5.2.1 Bars and Mechanical Tubing: In accordance with AMS 2806.

5.2.2 Forgings: In accordance with AMS 2808.

5.2.3 Forging Stock: As agreed upon by purchaser and vendor.

##### 5.3 Protective Treatment:

Bars and tubing ordered cold drawn, cold rolled, ground, turned, or polished shall be protected from corrosion prior to shipment.

##### 5.4 Packaging:

The product 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 product 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.

#### 7. REJECTION:

Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.