AEROSPACE MATERIAL SPECIFICATION

AMS6382™ REV. S

Issued 1939-12
Reaffirmed 2006-02
Revised 2023-10

Superseding AMS6382R

Steel, Bars, Forgings, Rings, and Stock for Forging or Flash Welded Rings Aircraft Quality 0.95Cr - 0.20Mo (0.38 - 0.43C) (4140) Annealed

(Composition similar to UNS G41400)

RATIONALE

AMS6382S is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope and include product quality, adds composition reporting (see 3.1.2), revises macrostructure requirements (see 3.3.1 and 8.9), updates hardenability testing (see 3.3.3), revises decarburization testing requirements (see 3.3.4.4), incorporates requirements for periodic testing per AMS2301 (see 4.2.1 and 4.4.4), adds options for forging stock (see 4.4.3 and 8.9), adds note on bar stock quality (see 8.7), and updates the prohibition on product exceptions (see 8.8).

1. SCOPE

1.1 Form

This specification covers an aircraft-quality, low-alloy steel in the form of bars, forgings, flash-welded rings, and stock for forging or flash-welded rings.

1.2 Application

These products have been used typically for parts 0.50 inch (12.7 mm) and under in nominal section thickness at time of heat treatment, requiring a through-hardened steel capable of developing hardness as high as 50 HRC when appropriately heat treated and for parts of greater thickness but requiring proportionately lower hardness, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking after heat treatment; ARP1110 recommends practices to minimize such conditions.

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.

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS6382S

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2251 Tolerances, Low-Alloy Steel Bars

AMS2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels

AMS2301 Steel Cleanliness, Aircraft Quality, Magnetic Particle Inspection Procedure

AMS2370 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock

AMS2372 Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Forgings

AMS2806 Identification Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels, and Corrosion and Heat-Resistant Steels and Alloys

AMS2808 Identification, Forgings

AMS7496 Rings, Flash Welded, Carbon and Low-Alloy Steels

ARP1110 Minimizing Stress Corrosion Cracking in Wrought Forms of Steels, and Corrosion Resistant Steels and Alloys

AS1182 Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel, Bars and Mechanical Tubing

AS7766 Terms Used in Aerospace Metals Specifications

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 A255 Determining the Hardenability of Steel

ASTM A370 Mechanical Testing of Steel Products

ASTM A751 Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

ASTM E112 Determining Average Grain Size

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

ASTM E381 Macroetch Testing Steel Bars, Billets, Blooms, and Forgings

ASTM E1077 Standard Test Methods for Estimating the Depth of Decarburization of Steel Specimens

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.38	0.43
Manganese	0.75	1.00
Silicon	0.15	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.80	1.10
Molybdenum	0.15	0.25
Nickel	--	0.25
Copper	--	0.35

3.1.1 Aluminum, vanadium, and columbium (niobium) are optional grain refining elements and need not be determined or reported unless used to satisfy the average grain size requirements of 3.3.2.

3.1.2 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2259.

3.2 Condition

The product shall be supplied in the following condition; hardness and tensile strength shall be determined in accordance with ASTM A370:

3.2.1 Bars

3.2.1.1 Bars 0.500 inch (12.70 mm) and under in nominal diameter or least distance between parallel sides shall be annealed and cold finished having tensile strength not higher than 125 ksi (862 MPa) or equivalent hardness (see 8.2).

3.2.1.2 Bars over 0.500 inch (12.70 mm) in nominal diameter or least distance between parallel sides shall be hot finished and annealed, unless otherwise ordered, having hardness not higher than 229 HBW, or equivalent (see 8.3). Product ordered annealed and cold finished shall have hardness not higher than 241 HBW, or equivalent (see 8.3).

3.2.1.3 Bar shall not be cut from plate (see 4.4.2).

3.2.2 Forgings and Flash-Welded Rings

Forgings and flash-welded rings shall be as ordered.

3.2.2.1 Flash-welded rings shall not be supplied unless specified or permitted on the purchaser’s part drawing. When supplied, rings shall be manufactured in accordance with AMS7496.

3.2.3 Stock for Forging or Flash-Welded Rings

Stock shall be as ordered by the forging or flash-welded ring manufacturer.