SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4500H

Issued JAN 1940
Revised JUN 2000

Superseding AMS 4500G

Copper, Sheet, Strip, and Plate
Soft Annealed

UNS C11000

1. SCOPE:

1.1 Form:

This specification covers unalloyed copper in the form of sheet, strip, and plate.

1.2 Application:

These products have been used typically for electrical components and for formed and drawn parts, such as gaskets and washers, 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 form 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 2222 Tolerances, Copper and Copper Alloy Sheet, Strip, and Plate
MAM 2222 Tolerances, Metric, Copper and Copper Alloy Sheet, Strip, and Plate

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 ASTM Publications:

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

ASTM B 193	Resistivity of Electrical Conductor Materials
ASTM B 248	General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar
ASTM B 248M	General Requirements for Wrought Copper and Copper-Alloy Plate Sheet, Strip, and Rolled Bar (Metric)
ASTM E 18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 53	Chemical Analysis of Copper
ASTM E 290	Semi-Guided Bend Test for Ductility of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be electrolytic tough pitch or oxygen-free copper containing not less than 99.90% by weight copper (including silver), determined by wet chemical methods in accordance with ASTM E 53, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

3.2 Condition:

Cold rolled and fully recrystallized, in soft (O60), bright-annealed temper (see 8.2).

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Bending: The product shall withstand, without cracking, bending in accordance with ASTM E 290 at room temperature flat on itself with axis of bend parallel to the direction of rolling.

3.3.2 Hardness: Shall be not higher than shown in Table 1, determined in accordance with ASTM E 18.

TABLE 1 - Maximum Hardness

Nominal Thickness Inch	Nominal Thickness mm	Hardness
0.015 to 0.030, excl	0.38 to 0.76, excl	68 HR15T
0.030 and over	0.76 and over	65 HRF

3.3.3 Electrical Resistivity: Shall be not greater than 0.15328 $\Omega \cdot g/m^2$ at 20 °C ± 2 (68 °F ± 4), determined in accordance with ASTM B 193.

3.4 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.

3.5 Tolerances:

Shall conform to AMS 2222 or MAM 2222.

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 to perform any confirmatory testing deemed necessary to ensure that the product conforms to the specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and shall be performed on each lot.

4.3 Sampling and Testing:

Shall be in accordance with ASTM B 248 or ASTM B 248M.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report stating that the product conforms to the chemical composition, tolerances and showing the results of tests to determine conformance to the other technical requirements. This report shall include the purchase order number, lot number, AMS 4500H, size, and quantity.

4.5 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

The product shall be identified as in 5.1.1 unless line marking as in 5.1.2 is specified by purchaser.

5.1.1 Each sheet, strip, and plate shall be legibly marked near one end, coils being marked near the outside end, with AMS 4500H, lot number, manufacturer's identification, and nominal thickness, using any suitable marking fluid. As an alternate method, individual pieces or bundles shall have attached a durable tag marked with the above information or shall be boxed and the box marked with the same information.

5.1.2 When specified by purchaser, each sheet, strip, and plate shall be legibly marked on one face, in the respective location indicated below, with AMS 4500H, lot number, manufacturer's identification, and nominal thickness. The characters shall be applied using a marking fluid removable in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the product or its performance and shall be sufficiently stable to withstand normal handling. The specification number, manufacturer's identification, and nominal thickness shall be continuously line marked; the lot number may be included in the line marking or may be marked at one location on each piece.

5.1.2.1 Flat Strip 6 Inches (152 mm) and Under in Width: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 feet (914 mm).

5.1.2.2 Flat Sheet, Flat Strip Over 6 Inches (152 mm) in Width, and Plate: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 feet (914 mm), the rows being spaced not more than 6 inches (152 mm) apart and alternately staggered.

5.1.2.3 Coiled Sheet and Strip: Shall be marked near both the outside and inside ends of the coil; the markings shall be applied as in 5.1.2 or shall appear on a durable tag or label attached to the coil and marked with the information of 5.1.2. When the product is wound on cores, the tag or label may be attached to the core.

5.2 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.