

Specification for

Copper for electrical purposes —

Rolled sheet, strip and foil

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Co-operating organizations

The Non-ferrous Metals Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments, and scientific and industrial organizations:

- Aluminium Federation
- Association of Bronze and Brass Founders
- Association of Consulting Engineers, Incorporated
- Board of Trade
- British Bronze and Brass ingot Manufacturers' Association
- British Electrical and Allied Manufacturers' Association*
- British Lead Manufacturers' Association
- British Non-ferrous Metals Federation*
- British Non-ferrous Metals Research Association*
- Copper Development Association*
- Crown Agents for Oversea Governments and Administrations
- Electric Cable Makers' Confederation*
- Institute of British Foundrymen
- Institute of Metals*
- Institution of Mechanical Engineers (Automobile Division)
- Institution of Mining and Metallurgy
- Institution of Production Engineers
- Institution of Structural Engineers
- Lead Development Association
- Light Metal Founders' Association
- London Metal Exchange
- Magnesium Industry Council
- Ministry of Defence (Army Dept)
- Ministry of Defence (Navy Dept)
- National Brassfoundry Association
- Non-ferrous Metal Stockists*
- Post Office*
- Royal Institute of British Architects
- Society of Motor Manufacturers and Traders Limited*
- Tin Research Institute
- Zinc Development Association
- Individual manufacturers

The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- British Railways Board
- Electricity Supply Industry in England and Wales
- Institute of Sheet Metal Engineering
- Ministry of Technology
- Ministry of Technology (National Physical Laboratory)

This British Standard, having been approved by the Non-ferrous Metals Industry Standards Committee, was published under the authority of the Executive Board on 25th June, 1970

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Foreword

This British Standard is one of a series of standards for copper for electrical purposes, the others in the series being as follows:

BS 1432, *Copper for electrical purposes — Strip with drawn or rolled edges.*

BS 1433, *Copper for electrical purposes — Rod and bar.*

BS 1434, *Copper for electrical purposes — Commutator bars.*

BS 1977, *Copper for electrical purposes — Tubes.*

BS 4109, *Copper for electrical purposes — Wire for general electrical purposes and for insulated cables and flexible cords.*

This British Standard has been published as a partial replacement for BS 899 which was first issued in 1940 to cover material for general purposes and revised in 1952, when its scope was extended to include material for electrical purposes also. This, the first metric revision, covers only material for electrical purposes, while rolled sheet and strip for general purposes is covered by BS 2870, *“Rolled copper and copper alloys, sheet, strip and foil”*. The wording and general arrangement of clauses and the tolerances specified in this standard are in line with BS 2870. The chemical compositions of materials covered herein are to be found in BS 2870.

In this revision due regard has been given to the work of the International Organization for Standardization (ISO) on testing requirements, properties, etc. and, wherever possible and appropriate, their recommendations or expected recommendations have been followed.

NOTE Attention is drawn to certification facilities offered by BSI; see the back cover of this standard.

This standard makes reference to the following British Standards:

BS 18, *Methods for tensile testing of metals — Part 1: Non-ferrous metals.*

BS 1036, *Electrolytic tough pitch high conductivity copper.*

BS 1037, *Fire refined tough pitch high conductivity copper.*

BS 1639, *Methods for bend testing of metals.*

BS 1861, *Oxygen-free high conductivity copper.*

BS 1954, *Oxygen-free high conductivity copper for special applications.*

BS 2870, *Rolled copper and copper alloys, sheet strip and foil.*

BS 3239, *Determination of resistivity of metallic electrical conductor materials.*

BS 3839, *Oxygen-free high conductivity copper for electronic valves and semi-conductor devices.*

BS 4391, *Recommendations for metric basic sizes for metal wire, sheet and strip.*

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for rolled copper sheet, strip and foil in the annealed, half hard and hard conditions, for electrical purposes, in thicknesses up to and including 10 mm.

2 General

The sheet, strip and foil shall comply with the general requirements specified in Clauses 5 to 8, with the requirements of the tests specified in Clauses 10 to 13 and with the appropriate requirements given in Table 2 to Table 7.

3 Definitions

For the purposes of this British Standard the following definitions apply:

Sheet

flat material of exact length, over 0.15 mm up to and including 10 mm thick and over 450 mm in width

Strip

material over 0.15 mm thick, up to and including 10 mm thick, of any width, and generally not cut to length. Usually in coil, but may be flat or folded

Foil

a material of 0.15 mm thick and under, of any width, flat or in coil

4 Information to be supplied by the purchaser

The purchaser shall supply the following information when placing the order:

- 1) The designation of the material required and whether a silver content is required (see Clause 6).
- 2) The condition of the material (see Clause 7).
- 3) Whether special tolerances are required (see Clause 8).
- 4) Whether tests are required (see Clause 9).
- 5) Whether a certificate of compliance is required (see Clause 14).
- 6) Whether it is the purchaser's intention to inspect the material at the supplier's works (see Clause 15).

5 Freedom from defects

The material shall be clean, smooth and free from harmful defects.

6 Chemical composition

The sheet, strip and foil for electrical purposes shall be manufactured from copper complying with the requirements of BS 1036¹⁾ (designated C101), BS 1037²⁾ (designated C102), BS 1861³⁾ (designated C103) or BS 1954⁴⁾ (designated C110), as specified by the purchaser.

When specified by the purchaser, material complying with the requirements of BS 1954⁴⁾ shall also satisfy the requirements of BS 3839⁵⁾.

If no British Standard is stipulated by the purchaser, the supplier shall be at liberty to supply at his discretion material complying with the requirements of any one of the above standards.

7 Condition

The sheet and strip shall be supplied in one of the following conditions as specified by the purchaser:

- 0 material in the annealed condition
- $\frac{1}{2}$ H, H the various harder tempers produced by cold rolling.

8 Dimensions and tolerances

8.1 Thickness, width and length. The thickness, width and length shall be as ordered within the tolerances specified in Table 3 to Table 6 as appropriate.

If sizes are required for which tolerances are not given in these tables, the tolerances shall be agreed between the supplier and the purchaser. Reference should also be made to BS 4391⁶⁾.

8.2 Straightness (edgewise curvature). When required, tolerances on straightness (edgewise curvature) shall be the subject of agreement between the supplier and the purchaser.

8.3 Edgewise bending. When the strip is required for edgewise bending, the degree of bending shall be stated in the enquiry or order, and any special test requirements shall be agreed between the supplier and the purchaser.

¹⁾ BS 1036, "Electrolytic tough pitch high conductivity copper".

²⁾ BS 1037, "Fire refined tough pitch high conductivity copper".

³⁾ BS 1861, "Oxygen-free high conductivity copper".

⁴⁾ BS 1954, "Oxygen-free high conductivity copper for special applications".

⁵⁾ BS 3839, "Oxygen-free high conductivity copper for electronic valves and semi-conductor devices".

⁶⁾ BS 4391, "Recommendations for metric basic sizes for metal wire, sheet and strip".