

Specification for

High conductivity copper tubes for electrical purposes

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British Non-ferrous Metals Technology Centre*	Ministry of Defence*
Copper Development Association*	National Brassfoundry Association
Electric Cable Makers' Confederation	Non-ferrous Metal Stockists*
Institute of British Foundrymen	Post Office
Institution of Mechanical Engineers (Automobile Division)	Royal Institute of British Architects
Institution of Mining and Metallurgy	Society of Motor Manufacturers and Traders Limited
Institution of Production Engineers	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 Gas Corporation	Institution of Heating and Ventilating Engineers
Copper Tube Fittings Manufacturers' Association	Institution of Mechanical Engineers
Department of the Environment	National Association of Plumbing, Heating and Mechanical Services Contractors
Electricity Supply Industry in England and Wales	National Water Council
Engineering Industries Association	Oil Companies' Materials Association
Institution of Gas Engineers	Thames Water Authority, Metropolitan Water Division

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Foreword

This British Standard is the first revision in metric terms of BS 1977 and is one of a series of standards for copper for electrical purposes, the others being BS 1432, BS 1433, BS 1434, BS 4109 and BS 4608.

This standard covers only high conductivity copper tubes for electrical purposes while tubes for general purposes are covered by BS 2871. The tolerances specified in this standard are in line with BS 2871. An extension of the size range of up to 400 mm outside diameter has been made and an additional material designation C110 complying with the requirements of BS 1954 is also included in this revision.

Due regard has been given to the work of the International Organization for Standardization (ISO) on testing requirements, properties etc.

Certification. Attention is drawn to the certification facilities described on the inside back cover of this standard.

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 8, 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 round, square and rectangular solid drawn copper tubes of high conductivity for electrical purposes.

2 References

The titles of the publications referred to in this standard are listed on page 8.

3 Information to be supplied by the purchaser

The purchaser shall state on his enquiry and order the following information.

- a) The chemical composition of the material (see clause 6).
- b) The dimensions of the material (see 8.1).
- c) The condition of the material where required (see clause 7).
- d) Whether mechanical tests are required (see 9.1 and clause 10).
- e) Whether an electrical resistivity test is required (see 9.2 and clause 11).
- f) In the case of oxygen-free material, i.e. C103 and C110, whether a gassing or hydrogen embrittlement test is required (see 9.3 and clause 12).
- g) Whether a supplier's certificate is required (see clause 14).
- h) Whether it is the purchaser's intention to inspect the material at the supplier's works (see clause 15).
- j) If material C110 is specified, whether it is also required to satisfy the requirements of BS 3839 (see clause 12).

4 Freedom from defects

Tubes shall be clean, smooth and free from harmful defects.

5 Manufacture

Tubes shall be solid drawn and in no case shall they be re-drawn from used tubes. Unless otherwise ordered they shall be supplied in straight lengths; the ends shall be cut clean and square with the axis of the tube.

6 Chemical composition

Tubes shall be manufactured from copper complying with the requirements of one of the following British Standards as specified by the purchaser.

BS 1036, material designated C101.

BS 1037, material designated C102.

BS 1861, material designated C103.

BS 1954, material designated C110. When specified by the purchaser, material designated C110 shall also satisfy the requirements of BS 3839.

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 and mechanical properties

The material shall be supplied in one of the following conditions as specified by the purchaser and in accordance with the mechanical properties specified in Table 1.

O Material in the annealed condition.

M Material in the as-drawn condition.

Table 1 — Mechanical properties

Condition	Tensile strength		Elongation on gauge length of 5.	Typical hardness ^a
	min.	max.	$65 \sqrt{S_0}$ min.	
O	N/mm ² (= MPa) 200	N/mm ² (= MPa) 250	% 40	HV 5 50
M	270	—	—	100

NOTE S_0 is the original cross-sectional area.
^a For information only.

Unless otherwise specified by the purchaser, tubes shall be supplied in the as-drawn condition. Such tubes may be subject to a stress-relieving treatment after the final draw at the option of the supplier.

8 Dimensions and tolerances

8.1 Dimensions

8.1.1 Round tubes. Round tubes shall be designated by the outside diameter and wall thickness in millimetres. A list of preferred sizes is given in Table 2.