

**SPECIFICATION FOR
COPPER AND
COPPER ALLOYS

WIRE**

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BS 2873 : 1969

BRITISH STANDARDS INSTITUTION
INCORPORATED BY ROYAL CHARTER

UDC 669.3-426

THIS BRITISH STANDARD, having been approved by the Non-ferrous Metals Industry Standards Committee, was published under the authority of the Executive Board on 28 March, 1969.

First published, September, 1963.

First revision, March, 1969.

SBN: 580 05048 3

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards and to those listed in Appendix C.

BS 18. Methods for tensile testing of metals.

BS 1559. Reels and wooden drums for bare wire, stranded conductors and trolley wire, for use in the United Kingdom.

BS 1957. Presentation of numerical values (fineness of expression; rounding of numbers).

BS 2870, BS 2871, BS 2872, BS 2874, BS 2875. Specifications for copper and copper alloys.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee reference NFE/15 Draft for comment 68/10791

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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 British Aerospace Companies
 *Society of Motor Manufacturers and Traders Ltd.
 Tin Research Institute
 Zinc Development Association
 Individual manufacturers

The Government departments 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 Clock and Watch Manufacturers' Association
 Electronic Engineering Association
 Institute of Sheet Metal Engineering
 National Physical Laboratory (Ministry of Technology)
 Spring Research Association
 Telephone Manufacturers Technical Development Committee
 Individual manufacturers

BRITISH STANDARD SPECIFICATION FOR
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WIRE

FOREWORD

This British Standard is the first revision in metric terms of one of a series for copper and copper alloy in various wrought forms, the preparation of which was authorized by the Non-ferrous Metals Industry Standards Committee. Others in the series are:

- BS 2870. Copper and copper alloys. Sheet, strip and foil.
- BS 2871. Copper and copper alloys. Tubes.
- BS 2872. Copper and copper alloys. Forging stock and forgings.
- BS 2874. Copper and copper alloys. Rods and sections.
- BS 2875. Copper and copper alloys. Plate.

In preparing the metric standard only materials for general engineering purposes have been included and all references to electrical properties have been deleted. Where materials included in this standard are required with specified electrical properties the appropriate references have been quoted in Appendix C.

In the case of material NS110 the demand has dropped to a point where inclusion is no longer warranted and it has, therefore, been withdrawn. Alloys not covered by this standard which are available in other product forms have been included in Appendix A.

Attention is drawn to the fact that existing individual standards (listed in Appendix C) will not be revised in metric terms but will be retained in imperial units during the transition period from imperial to metric units. It is anticipated that these individual standards will be progressively withdrawn, so that by not later than 1975, all these standards will have been withdrawn.

In this revised specification, metric units of the *Système International d'Unités* (SI) have been used with the exception of values for tensile strength and proof stress, for which the hbar has been used ($1\text{hbar} = 10\text{MN/m}^2$). These have been adopted by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). It is expected that they will become the generally accepted metric units throughout the world and their adoption in the United Kingdom at the present time will thus avoid the necessity for two separate changes, first from traditional imperial units to metric technical units, and then later to SI units. In the case of tensile strengths and proof stresses,

conversion factors and direct comparisons between the three sets of units have been included in Appendix B.

Particular attention has been paid to the recommendations issued by the International Organization for Standardization in respect of chemical compositions. Where the technical committee has agreed to accept the ISO recommendations the appropriate requirements have been written in, and in the case of alloys which comply with, or fall within, ISO recommended ranges, the comparable ISO designation has been included.

Some reduction in size of this standard has been achieved by tabulation of chemical composition and mechanical properties instead of setting out each individual alloy on separate pages as in the previous issue.

All tables of tolerances have been reviewed, and revised values in accordance with the latest agreed practice have been inserted.

Throughout this standard, and the others in the series, a unified system of symbols has been used to designate the alloys and suffix letters have been used to indicate the temper or condition of heat treatment in which the materials are available.

SPECIFICATION

1. SCOPE

This British Standard specifies requirements for copper and copper alloy wire for general purposes supplied in forms other than straight lengths.

2. GENERAL

The wire shall comply with the general requirements set out below and with the requirements of Tables 4–9.

3. DEFINITIONS

For the purposes of this British Standard the following definition applies:

Wire. A solid product, other than strip, rod or foil, supplied in coils or on spools, reels or drums.

4. INFORMATION TO BE SUPPLIED BY THE PURCHASER

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

- (1) The designation of the material required (selected from Tables 4–9).
- (2) The condition of the material (selected from Tables 4–9).
- (3) For other than round, square and hexagonal wire the tolerances required (see 9.3).
- (4) Whether mechanical or embrittlement tests are required (see 10.1 and 10.2).
- (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).
- (7) The method of packaging (see Clause 18).

5. FREEDOM FROM DEFECTS

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

6. CHEMICAL COMPOSITION

The chemical composition shall comply with the requirements given in Tables 4–9.

7. CONDITION

The material shall be supplied in one of the following conditions as specified by the purchaser and selected from Tables 3–9.

0	Annealed (soft)	
1/2H	1/2 Hard	} The various harder tempers produced by cold working. For certain of the materials in this standard these tempers may be produced by partial annealing.
H	Hard	
EH	Extra hard	
W	Material which has been solution-heat-treated and will respond effectively to precipitation treatment.	
W(H)	Material which has been solution-heat-treated and subsequently cold-worked to various harder tempers.	
WP	Material which has been solution-heat-treated and precipitation-treated.	
W(H)P	Material which has been solution-heat-treated, cold-worked to hard temper and then precipitation-treated.	

8. JOINTS

There shall be no joints in the wire except those made in the base rod or wire before final drawing.

9. DIMENSIONS AND TOLERANCES

9.1 Round wire. The diameter of round wire determined by means of a suitable micrometer and by taking the mean of the two measurements at right angles made at the same cross section of a sample taken from any part of a coil, reel, spool or drum, shall be as ordered within the tolerances specified in Table 1 and Table 2.

The difference between the maximum and minimum measurements, taken at the same cross section, shall not exceed the amount specified in Table 1 and Table 2.

9.2 Square and hexagonal wire. For square and hexagonal wire the tolerances shall be as specified in Table 3.

9.3 For wire other than round, square and hexagonal. The tolerances shall be agreed between the purchaser and the supplier and shall be stated on the enquiry and the order.

10. SELECTION OF TEST SAMPLES

10.1 Mechanical tests. When tests are specifically called for by the purchaser the selection of test samples and the number of tests to be made shall be agreed between the purchaser and the supplier.

10.2 Gassing or hydrogen embrittlement test. Materials C103, C106. When a gassing or hydrogen embrittlement test is required the selection of test samples and the number of tests to be made shall be agreed between the purchaser and the supplier.