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BRITISH STANDARD 241 PAGES 1934

RAILWAY  
ROLLING STOCK  
MATERIAL

PART 1: COPPER



BRITISH STANDARDS INSTITUTION

BRITISH STANDARD SPECIFICATION

RAILWAY  
ROLLING STOCK

MATERIAL

PART 5 : COPPER

B.S. 24 : Part 5 : 1954

4/6  
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BRITISH STANDARDS INSTITUTION

INCORPORATED BY ROYAL CHARTER

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Railway rolling stock material

Part 5 : Copper

Specification No. 12

Copper rod for locomotive stay bolts, rivets, etc.

**Corrigendum**

Clause 2. Definition. In line 4, for 'separate' substitute 'straight'.

**Revision**

Clause 5. Freedom from defects. Delete and substitute:

'The rod shall be clean, smooth and free from piping and other harmful defects. The character of extruded material shall be ascertained by nicking and breaking each end from every complete extruded length per billet. The character of rolled material shall be ascertained by breaking off a small portion from one finished rod in twenty five'.

Clause 6. Tolerances. Amend the opening sentence to read:

'The diameter of the rod shall be uniform and as specified within the following tolerances:'

THIS BRITISH STANDARD, having been approved by the Non-Ferrous Metals Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 9th March, 1954.

First published as part of B.S. 24 in 1906.

First revision in 1907.

First published as B.S. 24: Part 5, December, 1911.

First revision, February, 1925.

Second revision, May, 1943.

Third revision, March, 1954.

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 2000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 12s. 6d.

This Standard makes reference to the following British Standards:—

- B.S. 18 Tensile testing of metals.
- B.S. 1173 Tough pitch arsenical copper.
- B.S. 1174 Phosphorus deoxidized arsenical copper.
- B.S. 1420 Glossary of terms applicable to wrought products in copper, zinc, brass and other copper alloys.
- B.S. 1499 Sampling non-ferrous metals.
- B.S. 1800 Methods for the analysis of raw copper.

*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.*

NFE/11  
NFE/17

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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:—

- \*Admiralty
- Aluminium Development Association
- Aluminium Industry Council
- Association of Bronze and Brass Founders
- Association of Consulting Engineers Incorporated
- \*Association of Non-Ferrous Metals Stockists
- Brass and Copper Tube Association
- Brass Wire Association
- British Bronze and Brass Ingot Manufacturers' Association
- \*British Electrical and Allied Manufacturers' Association
- \*British Non-Ferrous Metals Research Association
- Cable Makers' Association
- \*Cold Rolled Brass and Copper Association
- \*Copper Development Association
- Crown Agents for the Colonies
- General Post Office
- \*High Commission of India
- High Conductivity Copper Association
- Institute of British Foundrymen
- \*Institute of Metals
- Institution of Mechanical Engineers (Automobile Division)
- Institution of Mining and Metallurgy
- Institution of Structural Engineers
- Lead Sheet and Pipe Manufacturers' Federation
- Light Metal Founders' Association
- London Metal Exchange
- \*Manufactured Copper Association
- \*Ministry of Supply
- National Brassfoundry Association
- Nickel Silver Association
- Royal Institute of British Architects
- Sheet-Makers' Conference
- Society of British Aircraft Constructors
- 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 Electricity Authority and Area Boards
- British Railways, The British Transport Commission
- Copper Tube Fittings Manufacturers' Association
- Distributors of Builders' Supplies Joint Council
- Gas Council
- Institution of Gas Engineers
- Institution of Mechanical Engineers
- Lloyd's Register of Shipping
- Ministry of Works
- National Physical Laboratory
- Oil Companies Materials Committee
- Society of British Gas Industries
- Individual manufacturers

BRITISH STANDARD SPECIFICATION FOR  
RAILWAY ROLLING STOCK MATERIAL  
PART 5 : COPPER

FOREWORD

This British Standard is one of a series of standards for railway rolling stock material first published in 1906, Part 5 of which specifies requirements for copper in the following forms:—

Specification No. 11, 'Copper plate for locomotive fireboxes'.

Specification No. 12, 'Copper rod for locomotive stay bolts, rivets, etc.'.

Specification No. 13, 'Copper tubes for locomotives'.

In this revision, the requirements previously covered separately by Specifications Nos. 12 and 12a for rolled and extruded rod respectively, are incorporated in the one specification No. 12, and those for copper tubes and pipes for locomotive boilers previously covered by Specifications Nos. 13 and 15 respectively have been incorporated in Specification No. 13 under the title 'Copper tubes for locomotives'.

Specification No. 14, 'Brass tubes for locomotive boilers', which was included in the earlier edition of the standard has been omitted, as the small demand for brass tubes for locomotive boilers is met by the existing British Standard 885, 'Brass tubes for general purposes'.

Details of chemical composition have not been included, but reference has been made to B.S. 1173, 'Tough pitch arsenical copper', and B.S. 1174, 'Phosphorus deoxidized arsenical copper', where appropriate, and copper complying with the latter standard has been permitted as an alternative to the former for rod material. In some cases tolerances and mechanical properties have been modified and a gassing or hydrogen embrittlement test has been added for deoxidized material in the form of plate and rod. Wherever possible the individual specifications have been modelled on the corresponding general purpose standards but the main requirements are substantially unaltered from the earlier edition.

SPECIFICATION No. 11  
COPPER PLATE FOR LOCOMOTIVE  
FIREBOXES

SCOPE

1. Specification No. 11 of this British Standard specifies requirements for copper plate in the annealed condition for locomotive fireboxes.

DEFINITION\*

2. For the purposes of this British Standard the following definition shall apply:—

*Plate.* Flat material over  $\frac{3}{8}$  in. thick and over 12 in. in width.

QUALITY OF MATERIAL

3. The plate shall be manufactured from copper complying with the requirements of either of the following British Standards as specified by the purchaser in his enquiry and order:—

B.S. 1173. Tough pitch arsenical copper.

B.S. 1174. Phosphorus deoxidized arsenical copper.

When required, the manufacturer shall supply, free of charge, a copy of his works analysis† of the material.

MANUFACTURE

4. The plate shall be produced by rolling and shall be supplied in the annealed condition.

FREEDOM FROM DEFECTS

5. The material shall be clean, smooth, and free from surface and other defects.

DIMENSIONS AND TOLERANCES

6. *a. Tolerances on length and width.* The plate shall be sheared to the specified dimensions subject to a plus tolerance not exceeding  $\frac{3}{8}$  in.

*b. Tolerances on weight and thickness.* The following tolerances shall be permitted on the weights and thicknesses of the plate:—

*Weight.* The weight of the plate shall not exceed the calculated weight by more than the appropriate amount specified in Columns 3

\* Abstracted from B.S. 1420, 'Glossary of terms applicable to wrought products in copper, zinc, brass and other copper alloys'.

† A 'works analysis' is defined as the routine analysis taken by or for the manufacturer in order to control the quality of the material.