
British Standard Specification for

Steel tubes for cycle and motor cycle purposes

Tubes en acier pour cycles et motocycles — Spécifications

Stahlrohr für den Fahrrad- und Motorradbau

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Foreword

This revision of BS 1717 has been prepared under the direction of the Iron and Steel Standards Committee. The revised standard lists requirements for cold finished seamless tubes, electric resistance welded induction welded tubes, and cold finished electric resistance welded induction welded tubing for the cycle and motor cycle industry. Opportunity has been taken to rationalize the steel types which may be specified, taking account of changes in usage

and to include new steel types. Appendix D lists designations of steel tubes in relation to BS 1717 : 1951. This standard supersedes BS 1717 : 1951, which is withdrawn.

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

British Standard Specification for

Steel tubes for cycle and motor cycle purposes

Section one. General requirements

1.1 Scope

This British Standard specifies requirements for seamless, and welded steel tubes up to and including 70 mm outside diameter intended for use in cycles and motor cycles. It defines the chemical composition, mechanical properties, dimensions, dimensional tolerances and technical delivery condition for each type of tube specified.

This standard does not specify requirements for tubes with butted ends.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 General

This section covers the general requirements for all steel tubes specified in this British Standard. Each type of tube shall also comply with the specific requirements of the appropriate section.

1.3 Symbols

The following symbols are used in this standard:

<i>a</i>	specified thickness (in mm)
<i>A</i>	percentage elongation on gauge length after fracture
<i>C</i>	constant factor of deformation for the steel grade
<i>D</i>	specified outside diameter (in mm)
<i>H</i>	distance between the platens or outside surfaces (flattening test) (in mm)
<i>L_o</i>	original gauge length of tensile test piece (in mm)
<i>R_e</i>	yield strength (in N/mm ²)
<i>R_{eH}</i>	upper yield stress (in N/mm ²)
<i>R_m</i>	tensile strength (in N/mm ²)
<i>R_{p0.2}</i>	0.2 % proof stress (non-proportional elongation) (in N/mm ²)
<i>R_{t0.5}</i>	0.5 % proof stress (total elongation) (in N/mm ²)
<i>S_o</i>	original cross-sectional area of the gauge length (in mm ²)

1.4 Designations

The tubes shall be designated by:

- the number of this British Standard;
- the reference from table 1, indicating the method of manufacture;
- the reference from table 2, indicating the grade of steel;
- the reference from table 3, indicating the delivery condition.

Examples

- BS 1717 CFS C3 BK designates a cold finished seamless tube in 0.20 % carbon steel in the cold finished/hard condition.
- BS 1717 CEW C1 NBK designates a cold finished electric resistance welded or induction welded tube in 0.13 % carbon steel in the normalized condition.

1.5 Information to be supplied by the purchaser

1.5.1 The purchaser shall state in his enquiry and order:

- the number of this British Standard, i.e. BS 1717, the method of manufacture of tube, the grade of steel, the appropriate delivery condition and where applicable the thickness tolerance (see 3.6.2);
- the tube dimensions, e.g. outside diameter and thickness, inside diameter and thickness or outside and inside diameter preferably selected from appendix A, B or C;
- the quantity in metres or numbers of lengths.

1.5.2 Certain alternatives are permitted by this standard and the purchaser shall have the right to state in his enquiry and order his requirements as follows, but if no such statement is made supply will be at the option of the manufacturer:

- whether a check analysis on the product is required (see 1.8.2);
- any special requirements regarding straightness (see 1.11.3);

Table 1. Designation of steel tubes: method of manufacture

Method of manufacture	Reference	Applicable section of this standard
Cold finished seamless	CFS	Two
Electric resistance and induction welded	ERW	Three
Cold finished electric resistance and induction welded	CEW	Four



Table 2. Designation of steel tubes: grade of steel

Steel	Grade	Applicable section of this standard
<i>Carbon and carbon manganese steels</i>		
0.13 % Carbon maximum 280*	C1	Three and four
0.16 % Carbon maximum 320*	C2	Three and four
0.20 % Carbon maximum 360*	C3	Two, three and four
0.25 % Carbon steel 410*	C4	Two
<i>Micro-alloyed steel</i>		
0.15 % Carbon maximum	C5	Three
<i>Low alloy steels</i>		
Manganese molybdenum 244	C6	Two

* This number relates to the minimum tensile strength in N/mm² in the normalized condition.

(c) whether cold finished tubes are required free from phosphate coating (see 1.10.4);

(d) whether tests are required specifically related to his order or, if not, whether a certificate of compliance is required (see 1.14 and 1.17);

(e) whether other tests are required specifically related to his order (see 1.14 and 1.17.2);

(f) whether a finish other than the manufacturer's normal protective coating or an uncoated finish is required or special protection of the tubes for transit and storage is required (see 1.18);

(g) whether closer tolerances are required (see 2.5, 3.6 and 4.6);

(h) whether the internal weld upset of welded tubes is to be reduced (see 3.6.2).

1.6 Manufacture of the steel

1.6.1 The steelmaking process within the provision of 1.6.2 and the deoxidation practice within the provision of 1.6.3 shall be at the option of the steel manufacturer.

1.6.2 The steel shall be made by any process except that the air, and mixed air-oxygen bottom blown converter processes shall not be used.

1.6.3 All steels shall be fully killed, except that for welded tubes it is permissible for grade C1 to be semi-killed or rimming steel and grades C2 and C4 to be semi-killed.

1.7 Manufacture of the product

The tubes shall be manufactured by a seamless or welded process as detailed in the appropriate section of this standard.

1.8 Chemical composition

1.8.1 Ladle analysis. The steel shall show on ladle analysis the composition for the steel grade specified given in the tables for chemical composition included in the appropriate section of this standard.

1.8.2 Product analysis. If a check analysis on the product is carried out, the permissible deviations given in table 4 apply to the ladle analysis specified in the appropriate section of this standard for samples taken from the standard position. If a check analysis for acceptance purposes is required, this shall be stated in the enquiry and order together with the number of samples to be taken.

The samples shall be taken either from the test pieces used for the verification of the mechanical properties, or from the tube at the same location as for the mechanical test samples.

In cases of dispute the methods of chemical analysis shall be in accordance with British Standard Handbook No. 19.

1.9 Delivery condition

The tubes shall be supplied in one of the conditions given in the relevant clause of the appropriate section of this standard.

1.10 Mechanical properties

The mechanical properties at room temperature to be obtained on test pieces selected, prepared and tested in accordance with 1.14 and 1.15 shall be in accordance with the relevant clauses of the appropriate section of this standard.

1.11 Appearance and soundness

1.11.1 The tubes shall have a workmanlike finish consistent with their method of manufacture and condition of supply. Small imperfections are permissible and it is permissible for these to be dressed out provided that the tube thickness after dressing remains within the tolerance limit. Peening of surface defects is not permitted.

1.11.2 Tube ends shall be cut nominally square with the axis of the tube and shall be free from excessive burrs.

1.11.3 Tubes shall not depart from straightness by more than 1 in 250 of any length measured at the centre of that length.

NOTE. Special requirements regarding straightness and the method of measurement, should be the subject of an agreement between manufacturer and purchaser.

In cases of dispute the deviation shall be measured relative to a straightedge or taut line.

1.11.4 Cold finished tubes are permitted to have on their internal and external surfaces an adherent layer of residual lubricant originating from the drawing process.

NOTE. If phosphate or other residues are detrimental to subsequent processing, then their removal should be the subject of an agreement between manufacturer and purchaser.

1.11.5 Tubes which are annealed or normalized in a controlled atmosphere, or tempered, may be discoloured but shall be free from loose scale.

Table 3. Designation of steel tubes: delivery condition

Delivery condition	Description	Reference symbol	Applicable section of this standard
Cold finished/hard (cold finished as drawn)	No heat treatment after the last cold finishing process. NOTE. The extent to which the tube can be cold deformed is limited.	BK	Two, four
As welded and sized	No heat treatment after the welding and sizing process. Two categories are specified: Tubes with special finish and thickness tolerance Tubes with normal finish and thickness tolerance not generally suited for plating without further surface preparation	KM1 KM2	Three Three
Annealed	After the final cold-finishing process the tubes are sub-critically annealed in a controlled atmosphere.	GBK	Four
	After welding and sizing, the tubes are sub-critically annealed in a controlled atmosphere. Two categories are specified: tubes with special finish and thickness tolerance tubes with normal finish and thickness tolerance not generally suited for plating without further surface preparation	GKM1 GKM2	Three Three
Normalized	After the final cold finishing process, the tubes are heated to a temperature above the upper transformation point and cooled. Both stages of heat treatment are carried out in a controlled atmosphere.	NBK	Two, three, four
	After welding and sizing, the tubes are heated to a temperature above the upper transformation point and cooled. Both stages of heat treatment are carried out in a controlled atmosphere. Two categories are specified: tubes with special finish and thickness tolerance tubes with normal finish and thickness tolerance not generally suited for plating without further surface preparation.	NKM1 NKM 2	Three Three

Table 4. Permitted deviation from specified composition

Element	Permissible deviation* from the specified composition
	%
Carbon	+ 0.03
Silicon	+ 0.05
Manganese	± 0.10
Phosphorus	+ 0.005
Sulphur	+ 0.005
Molybdenum	± 0.04

* These values apply only to fully killed or semi-killed steels.

NOTE. The deviations, other than when maxima only are specified, apply either above or below the specified limits of the range, but not both above and below for the same element from different sample products from the same cast. When maxima only are specified the deviations are positive only. The values are valid only if the samples were selected in accordance with 1.7.2.

1.12 Dimensions and tolerances

Dimensions and tolerances of tubes shall be in accordance with the relevant clauses of the appropriate section of this standard.

1.13 Inspection

The purchaser, or his representative, shall have access at all reasonable times to those parts of the manufacturer's works engaged on the production and testing of the tubes he has ordered.

1.14 Testing

The manufacturer shall carry out the specified tests applicable to each type of tube to ensure that the tubes comply with this standard.

Where the purchaser requires tests specifically related to his order, the tests as detailed in the appropriate section shall be carried out at the rate of one set of tests per batch of up to and including 1500 m of one size of tube ordered with