SPECIFICATION FOR

CARBON STEEL WIRE FOR COILED SPRINGS

(BEDDING AND SEATING)

BS 4637 : 1970

AMD 878 Feb 1982 on back

BRITISH STANDARDS INSTITUTION

Incorporated by Royal Charter

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THIS BRITISH STANDARD, having been approved by the Iron and Steel Industry Standards Committee, was published under the authority of the Executive Board on 23rd October, 1970.

SBN: 580 06064 0

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:

BS 443. Galvanized coatings on wire.
BS 4545. Methods for mechanical testing of steel wire.
~~BS Handbook No 19. Methods for the sampling and analysis of iron, steel and other ferrous metals.~~
B.S 6200 Sampling and analysis of iron, steel and other ferrous

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.

AMD 6155 May 1990

BS 6562 Terms used in the iron and steel industry Part 1. Glossary of heat treatment terms.

The following BSI references relate to the work on this standard:
Committee references ~~ISE/26~~ and ~~ISE/26/4~~. Draft for comment 69/1395
ISM/262

CO-OPERATING ORGANIZATIONS

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

Board of Trade
British Cast Iron Research Association
British Constructional Steelwork Association
British Electrical and Allied Manufacturers' Association
British Ironfounders' Association
British Mechanical Engineering Confederation
British Railways Board
*British Steel Industry
Council of Ironfoundry Associations
Council of Iron Producers
Crown Agents for Oversea Governments and Administrations
Department of Employment and Productivity
(H.M. Factory Inspectorate)
*Engineering Equipment Users' Association
Federation of Civil Engineering Contractors
Institute of British Foundrymen
*Institute of Iron and Steel Wire Manufacturers
Institute of Marine Engineers
Institution of Civil Engineers
Institution of Mechanical Engineers (Automobile Division)
Institution of Production Engineers
Institution of Structural Engineers
Joint Iron Council
Lloyd's Register of Shipping
Ministry of Defence
*Ministry of Defence, Army Department
Ministry of Defence, Navy Department
National Association of Drop Forgers and Stampers
National Physical Laboratory (Ministry of Technology)
Oil Companies Materials Association
Royal Institute of British Architects
Shipbuilders and Repairers National Federation
Society of British Aerospace Companies Ltd.
*Society of Motor Manufacturers and Traders Ltd.
Stainless Steel Development Association
Steel Castings Research and Trade Association
Tank and Industrial Plant Association
Tin Research Institute
Water-tube Boiler Makers' Association

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:

Alloy and Stainless Steel Conference
British Bolt, Nut, Screw and Rivet Federation
British Wire Netting Association
Fencing Contractors' Association
Institution of Engineering Inspection
Spring Research Association

BRITISH STANDARD SPECIFICATION FOR

CARBON STEEL WIRE FOR COILED SPRINGS (BEDDING AND SEATING)

FOREWORD

This British Standard is authorized by the Iron and Steel Industry Standards Committee. The wire diameters specified are taken from the preferred series of metric sizes in order to provide reasonable equivalence with present inch sizes which are in common usage. The tensile strengths specified in this standard are in line with industrial practice within the United Kingdom.

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

SPECIFICATION

1. SCOPE

1.1 This British Standard specifies the requirements for patented cold drawn plain carbon steel round wire, suitable for the manufacture of tension or compression coil and helical springs used in the production of spring centre units for beds and seats. Wire to this standard is not intended for use in the manufacture of mechanical springs. The definition of patenting is given in BS 6562 Part 1.

AMD 6155 May 1990.

1.2 The standard lists specific metric sizes of wire and gives a choice of tensile strength ranges.

2. INFORMATION TO BE SUPPLIED BY THE PURCHASER

For ordering purposes, the wire shall be designated by:

(1) the number of this British Standard, i.e. BS 4637;
(2) the nominal diameter;
(3) the tensile strength range.

Example: 1·6 mm bedding and seating wire of tensile strength 1550/1750 N/mm² shall be ordered as 'BS 4637, 1·6 mm, 1550/1750 N/mm²'.

Any requirements for surface coating shall be clearly stated on the order.

3. STEELMAKING PROCESS

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

4. CHEMICAL COMPOSITION

The cast analysis of the steel shall be within the limits specified in Table 1.

TABLE 1. CHEMICAL COMPOSITION

Element	Percentage	
	Min.	Max.
Carbon	~~0·45~~ 0·35	0·80
Silicon	—	0·35
Manganese	0·40	1·00
Sulphur	—	0·050
Phosphorus	—	0·050

5. STANDARD SIZES AND DIAMETER TOLERANCES

5.1 The standard wire sizes are given in Table 2.

5.2 The diameter tolerance and the ovality of the wire shall not exceed the limits given in Table 2. The ovality shall be measured as the difference between the maximum and minimum dimension at any one cross section.

TABLE 2. STANDARD SIZES, TOLERANCES AND OVALITY

Standard size (nominal diameter)	Tolerance on diameter	Maximum ovality
mm	mm	mm
1·18	± 0·02	0·02
1·25	± 0·02	0·02
1·32	± 0·02	0·02
1·40	± 0·02	0·02
1·50	± 0·02	0·02
1·60	± 0·02	0·02
1·70	± 0·02	0·02
1·80	± 0·02	0·02
1·90	± 0·02	0·02
2·00	± 0·03	0·03
2·12	± 0·03	0·03
2·24	± 0·03	0·03
2·36	± 0·03	0·03
2·50	± 0·03	0·03
2·65	± 0·03	0·03
2·80	± 0·03	0·03
3·00	± 0·03	0·03
3·15	± 0·03	0·03
3·35	± 0·03	0·03
3·55	± 0·03	0·03

6. FINISHED WIRE

6.1 Freedom from defects. The finished wire shall be free from harmful surface defects, pipe and segregation.

6.2 Condition. The wire shall be supplied in a smooth, bright drawn condition, unless otherwise specified. The wire may be supplied with a galvanized or other coating, when so specified by the purchaser on his order. The coating requirements shall be the subject of an agreement between the manufacturer and the purchaser. (See 8.2.)

Wire supplied in coil form shall lie dead and shall be free from any corkscrew set.

7. SELECTION OF TEST PIECES

Lengths of wire for all the specified tests shall be taken from both ends of each coil of wire.

8. METHODS OF TESTING

8.1 The methods of carrying out the mechanical tests specified in Clause 9 shall be in accordance with BS 4545*. In routine testing with fixed gear type tensile testing machines, the straining rate shall be preset to give a rate of separation of the grips not greater than 40% of the test length per minute.

8.2 The methods of carrying out any specified tests on a galvanized coating shall be in accordance with BS 443†.

The methods of testing a coating of another type, where this is specified on the order, shall be the subject of an agreement between the manufacturer and the purchaser.

8.3 In case of dispute, when a check analysis is required on the wire, the method of test shall be in accordance with the appropriate method in Handbook No 19‡, account being taken of the heterogeneity normal to the steel.

9. MECHANICAL PROPERTIES

9.1 Tensile test. When tested in accordance with 8.1, the tensile strength, calculated on the nominal diameter of the wire, shall be in accordance with the appropriate tensile strength range given in Table 3.

TABLE 3. TENSILE STRENGTH RANGES

Tensile strength ranges
N/mm²
1400/1600
1500/1700
1550/1750
1600/1800
1700/1900
1850/2050

9.2 Wrapping test. When tested in accordance with 8.1, the wire shall be capable of being wrapped at least two turns around its own diameter, without fracture.

* BS 4545, 'Methods for mechanical testing of steel wire'.
† BS 443, 'Galvanized coatings on wire'.
‡ BS Handbook No 19, 'Methods for the sampling and analysis of iron, steel, and other ferrous metals'.

10. RETESTS

10.1 Should any test piece fail any of the tests, part of the coil may be discarded and the coil retested in accordance with this standard.

10.2 If both of the additional test pieces pass the tests, the coil shall be deemed to comply with the requirements of this standard. If either of the additional test pieces fail any one of the tests, the coil shall be deemed not to comply with the requirements of this standard.

11. PACKING AND IDENTIFICATION

The wire shall be securely tied and shall carry a suitable label or labels on which shall be shown the information indicated in Clause 2. Any other markings shall be agreed between the purchaser and the manufacturer.

APPENDIX A. PRACTICAL EQUIVALENTS OF METRIC VALUES

Wire diameters

mm	in	mm	in
1·18	0·047	2·12	0·084
1·25	0·049	2·24	0·088
1·32	0·052	2·36	0·093
1·40	0·055	2·50	0·098
1·50	0·059	2·65	0·104
1·60	0·063	2·80	0·110
1·70	0·067	3·00	0·118
1·80	0·071	3·15	0·124
1·90	0·075	3·35	0·132
2·00	0·079	3·55	0·140

Tolerances on diameter

mm	in
0·02	0·0008
0·03	0·0012

Tensile strengths

N/mm²	kgf/mm²	tonf/in²
1400/1600	143/163	91/104
1500/1700	153/173	97/110
1550/1750	158/178	100/113
1600/1800	163/183	104/117
1700/1900	173/194	110/123
1850/2050	189/209	120/133

BRITISH STANDARDS

The following are available on application:
YEARBOOK
Including subject index and numerical list of British Standards.
SECTIONAL LIST. Gratis
Acoustics (SL 10)
Aerospace materials and components (SL 25)
Automobile (SL 34)
British Standard Handbooks (SL 27)
Building (SL 16)
Chemical engineering (SL 5)
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BRITISH STANDARDS INSTITUTION

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The principal objects of the Institution as set out in the charter are to co-ordinate the efforts of producers and users for the improvement, standardization and simplification of engineering and industrial materials; to simplify production and distribution; to eliminate the waste of time and material involved in the production of an unnecessary variety of patterns and sizes of articles for one and the same purpose; to set up standards of quality and dimensions, and to promote the general adoption of British Standards.

In carrying out its work the Institution endeavours to ensure adequate representation of all viewpoints. Before embarking on any project it must be satisfied that there is a strong body of opinion in favour of proceeding and that there is a recognized need to be met.

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AMD 878

Amendment Slip No. 1, published 29 February, 1972

to BS 4637 : 1970

Carbon steel wire for coiled springs
(bedding and seating)

Addition

Table 2. Standard sizes, tolerances and ovality. Add a further standard size to the table in the appropriate place as follows:

'Standard size (nominal diameter)	1·85 mm.
Tolerance on diameter	±0·02 mm.
Maximum ovality	0·02 mm.'

AMD 6155

Amendment No. 2
published and effective from 31 May 1990
to BS 4637 : 1970 (1982)

Specification for carbon steel wire for coiled springs (bedding and seating)

Revised text

Page 2. In the paragraph relating to standards referenced delete 'BS Handbook No 19. Methods for the sampling and analysis of iron, steel and other ferrous metals.' and substitute:

'BS 6200. Sampling and analysis of iron, steel and other ferrous metals.

BS 6562. Terms used in the iron and steel industry
Part 1. Glossary of heat treatment terms.'

In the paragraph relating to BSI references at the bottom of the page delete 'ISE/26 and ISE/26/4' and substitute 'ISM/26'.

Clause 1.1 Scope. Insert, 'The definition of patenting is given in BS 6562 : Part 1.', at the end of the existing text.

AMD 7609

Amendment No. 3
published and effective from 15 June 1993
to BS 4637 : 1970

Specification for carbon steel wire for coiled springs (bedding and seating)

Revised text

Table 1. Chemical composition. For the element 'carbon', in the column titled 'Min.' delete '0.45' and substitute '0.35'.