

Specification for

Stainless and heat-resisting steel round wire

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Iron and Steel Standards Policy Committee (ISM/-) to Technical Committee ISM/26, upon which the following bodies were represented:

- Aluminium Federation
- Bicycle Association of GB
- British Cable Makers' Confederation
- British Rubber Manufacturers' Association
- British Steel Industry
- Federation of Wire Rope Manufacturers of Great Britain
- Forestry Commission
- Health and Safety Executive
- Sheffield Stainless Steel Manufacturers' Association
- Society of Chain Link Fencing Manufacturers
- Society of Motor Manufacturers and Traders Limited
- Spring Research and Manufacturers' Association
- Stainless Steel Fabricators' Association of Great Britain
- Stainless Steel Wire Industry Association
- Welding Manufacturers' Association (BEAMA Ltd.)
- Woven Wire Association
- Zinc Development Association

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Foreword

This British Standard has been prepared under the direction of the Iron and Steel Standards Policy Committee. It is a revision of BS 1554:1981 which is withdrawn. In this revision the number of steels specified has been increased to align with current practice and to take account of the needs of the wire weaving industry. Dimensional tolerances appropriate to wire weaving have also been introduced. 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 12, 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 stainless and heat-resisting steel round wire, supplied in coils, on spools or in straight lengths, suitable for general engineering purposes. It is applicable to wire sizes in the range from 0.03 mm diameter up to and including 13 mm diameter. This standard does not specify steel wires intended for springs, gas shielded welding, roping or cold heading.

NOTE 1 The information to be supplied by the purchaser in the enquiry and order is given in Appendix A.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Manufacture and properties

2.1 Steelmaking process

The steel shall be made by an electric furnace process.

2.2 Chemical composition

The chemical composition of the steel, based on cast analysis, shall be as given in Table 1, Table 2, Table 3 and Table 4, as appropriate. Any subsequent analytical checks of composition of the wire shall take into consideration analytical reproducibility and the heterogeneity that is normal to the steel (see Appendix B).

2.3 Condition of finished wire

2.3.1 The wire shall be free from defects to a degree that would be harmful in the further processing or performance of the wire.

NOTE The end use of the wire, therefore, should be the subject of discussion between the purchaser and manufacturer at the time of the enquiry and order (see item d) of Appendix A).

2.3.2 The wire shall be supplied either in the annealed (softened) or cold drawn condition. For austenitic stainless steel wire required in the softened condition, the wire shall be heat treated in the temperature range 1 000 °C to 1 120 °C.

NOTE 1 The condition in which the wire is to be supplied should be agreed between the purchaser and manufacturer at the time of the enquiry and order (see item e) of Appendix A).

NOTE 2 Wire can be supplied with a ground surface in either coils or straight cut lengths. It may be supplied with other surface finishes, e.g. wet drawn reeled, mechanically polished, drawn, to facilitate further fabrication processes. These should be subject to agreement between the purchaser and manufacturer at the time of the enquiry and order (see item f) of Appendix A).

2.4 Tensile strength

The tensile strength of wire in the annealed condition shall be as given in Table 5.

NOTE 1 For wire less than 0.10 mm in diameter, the maximum tensile strength should be agreed between the purchaser and manufacturer at the time of the enquiry and order (see item g) of Appendix A).

NOTE 2 The tensile strength range for wire in the cold drawn condition should be agreed between the purchaser and manufacturer at the time of the enquiry and order (see item h) of Appendix A). The agreed range should be no greater than 200 N/mm² (between the minimum and maximum figures).

3 Method of supply

The wire shall be supplied in coil form, wound on spools or formers, or as straight cut lengths, in bundles appropriate for the diameter of wire. Wire in coils or on a spool shall be supplied in single continuous lengths without knots or tie-ins (see also item i) of Appendix A).

NOTE 1 The acceptability of welds in coils or spools should be agreed between the purchaser and manufacturer at the time of the enquiry and order (see item i) of Appendix A).

NOTE 2 The size of bundles for straight cut lengths should be agreed between purchaser and manufacturer at the time of the enquiry and order (see item j) of Appendix A).

4 Selection of test pieces

4.1 Test unit

For the purpose of selection of test pieces, a test unit shall consist of all the wire from one cast, presented for inspection, in one form of supply, i.e. coils, spools or bundles, manufactured by the process to one finished condition.

4.2 Rate of sampling

Test pieces shall be selected from a minimum of 10 % of the coils, spools or bundles in each test unit. Test pieces shall be taken from one end of each selected coil or spool. From each selected bundle a minimum of one length shall be taken at random.

NOTE By arrangement between purchaser and manufacturer a sampling plan based on BS 6001 may be used (see item k) of Appendix A).

4.3 Intercrystalline corrosion test

For the intercrystalline corrosion test, one test piece shall be taken from each test unit.

5 Methods of testing

5.1 Diameter

The diameter of the wire shall be the mean of two measurements of diameter at right angles at the same cross section of the wire.

NOTE The wire should be straightened prior to measurement.

5.2 Tensile tests

Tensile tests shall be carried out in accordance with BS 4545. The tensile strength shall be calculated on the actual diameter of the wire as measured in accordance with 5.1.

5.3 Intercrystalline corrosion test

When this test is specified by the purchaser it shall be carried out in accordance with BS 5903 (see item l) of Appendix A).

NOTE This test is applicable only to austenitic stainless steel wire.

6 Tolerances on diameter and ovality

Wire to be used for general purposes shall be supplied within tolerances on diameter and ovality as given in Table 6 and as measured in accordance with 5.1.

The ovality shall be defined as the difference between the maximum and minimum dimensions of the wire at the same cross section.

Wire for weaving and special applications shall be supplied within tolerances on diameter and ovality as given in Table 7 and as measured in accordance with 5.1.

NOTE Tolerances on diameter and ovality for ground wire should be agreed between purchaser and manufacturer at time of the enquiry and order (see item m) of Appendix A).

7 Retests

If any test piece fails any of the tests specified in clause 5 the manufacturer may, at his discretion, retain or not retain in the test unit the product sample from which the unsatisfactory test results have been obtained.

- a) If the product sample is withdrawn from the test unit, the manufacturer shall ensure that the inspection representative designates within the same test unit, two other product samples of his choice. Two more tests of the same type shall then be carried out on test pieces from these two product samples, under the same conditions as for the first tests; both new tests shall give satisfactory results.

- b) If the product sample is retained in the test unit, the procedure is as indicated in item a) but one of the new test pieces shall be taken from the product retained in the test unit; both new tests shall give satisfactory results.

NOTE The manufacturer has the right to carry out sorting or reprocessing, e.g. heat treatment, machining, rolling, drawing, of non-conforming products, either before or after the retests, and to submit these products as a new test unit in accordance with clause 4.

8 Packaging and marking

Wire in coils, on spools or bundles of lengths shall be securely tied and each coil, spool or bundle shall be identified by a durable label on which shall be shown the following minimum information:

- a) the supplier's name;
- b) the steel designation;
- c) the number of this British Standard, i.e. BS 1554¹⁾;
- d) the nominal wire diameter or size;
- e) the cast number;
- f) the condition, i.e. annealed, cold drawn;
- g) the range of tensile strength and/or the condition of the wire as ordered, if appropriate.

NOTE Any other packing requirements should be agreed between the purchaser and manufacturer at the time of the enquiry and order (see item n) of Appendix A).

Table 1 — Chemical composition of ferritic stainless steels

Element	Steel designation			
	430S18	430S11	434S20	436S20
	%	%	%	%
C	0.10 max.	0.030 max.	0.12 max.	0.12 max.
Si	1.00 max.	1.00 max.	1.00 max.	1.00 max.
Mn	1.00 max.	1.00 max.	1.00 max.	1.00 max.
S	0.030 max.	0.030 max.	0.030 max.	0.030 max.
P	0.040 max.	0.040 max.	0.040 max.	0.040 max.
Cr	16.0 to 18.0	16.0 to 18.0	16.0 to 18.0	16.0 to 18.0
Ni	1.00 max.	1.00 max.		
Mo			0.75 to 1.25	0.75 to 1.25
Ti				
Nb				5 × C min. 0.70 max.
Cu				
Other				

¹⁾ Marking BS 1554 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.