भारतीय मानक

Indian Standard

IS 9550 : 2024

चमकीले इस्पात की छड़े — विशिष्टि

(दूसरा पुनरीक्षण)

Bright Steel Bars — Specification

(Second Revision)

ICS 77.140.10; 77.140.20; 77.140.45

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Wrought Steel Products Sectional Committee, MTD 04

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1980 and subsequently revised in 2001. While reviewing this standard in the light of experience gained in its usage Committee felt that the standard should be reviewed to bring it in line with the present national and international practices in the field. In this revision, following significant changes have been made:

a) Amendments number 1 and 2 have been incorporated;

b) Scope has been modified;

c) Definition of bright bar has been added;

d) Definition of peeled product, thickness and out of round have been added;

e) Treatment conditions of bars have been specified;

f) Delivery conditions and basis for order have been modified;

g) Clauses on chemical composition and mechanical properties have been modified;

h) Table 1, Table 2, Table 3 and Table 4 have been modified to capture changes in requirements meant for tolerance classes and dimensional tolerances. Table 6 and Table 7 have been added stipulating requirements for deviation from straightness; and

j) Table 8 on surface quality class has been modified.

For all the tests specified in this standard (chemical/physical/others), the method as specified in relevant ISO standard may also be followed as an alternate method.

The composition of the Committee responsible for formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BRIGHT STEEL BARS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers cold drawn, turned, peeled or ground steel bars of grades and cross sections regarded as generally suitable for heat treatment, for machining into component or for use in 'as finished' condition in constructional applications or other similar purposes, such as for the manufacture of threaded and machined components for general engineering purposes.

1.2 This document does not apply to the following steel qualities:

a) Steel for cold heading/cold extrusion applications — Wrought carbon and low alloy steels as per IS 11169 (Part 1);

b) Steel for cold heading/cold extrusion applications — Stainless steels as per IS 11169 (Part 2);

c) Tool steels as per IS 3748; and

d) Stainless steel semi-finished products, bars, wire rods and bright bars as per IS 6603.

2 REFERENCES

The standards listed in Annex A contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 1956 (Part 3) and the following shall apply.

3.1 Bright Bars — Bright bars are drawn or peeled/turned bars with smoother surface quality and better dimensional accuracy in comparison to hot-rolled bars.

3.2 Drawn Products — Products of various cross section shapes obtained, after descaling, by drawing of hot rolled bars or rods on a draw bench (cold deformation without removing material). This operation gives the product special features with respect to shape, dimensional accuracy, surface finish and mechanical properties. In addition, the process causes cold working of the product, which can be eliminated by subsequent heat treatment. Products in lengths are delivered straightened regardless of size.

3.3 Ground Products — Drawn or turned round bars given an improved surface quality and dimensional accuracy by grinding and polishing.

3.4 Out of Round — Difference between the smallest and largest dimension measured across the pairs of opposing points at a common cross-section.

3.5 Peeled/Turned Products — Peeled/turned round bar products produced by peeling or turning where the product can be further processed by straightening and polishing. This operation gives the bar special features with respect to shape, dimensional accuracy and surface finish. The removal of metal is carried out in such a way that the bright product is generally free from rolling defects and surface decarburization.

3.6 Thickness — Nominal dimension of the product, which means:

a) the diameter in the case of rounds;

b) the lateral length in the case of squares;

c) the width over flats in the case of hexagons; and

d) the shorter lateral length in the case of flats (rectangular bars) and wide-flats.

4 SUPPLY OF MATERIAL AND PRODUCT DESIGNATION

4.1 General requirements relating to the supply of material shall be as laid down in IS 8910.

4.2 The treatment condition of the bars shall be as follows:

Sl No.	*Treatment Condition at Delivery*	*Symbol*
(1)	(2)	(3)
i)	As-rolled and peeled/turned[a]	+SH
ii)	Cold drawn	+C
iii)	Soft annealed and peeled/turned	+A+SH
iv)	Soft annealed and cold drawn	+A+C
v)	Treated to ferrite-pearlite structure and hardness range and peeled/turned	+FP+SH
vi)	Treated to ferrite-pearlite structure and hardness range and cold drawn	+FP+C
vii)	Quenched and tempered and peeled or cold drawn and quenched and tempered	+QT+SH, +C+QT
viii)	Quenched + tempered and cold drawn	+QT+C
ix)	Other heat-treated conditions, for example stress relieved (+SR), normalized (+N), cold drawn and annealed or normalized (+C+A, +C+N)	

NOTE — Bright steel products in cold drawn or peeled/turned condition are coated with a light film of grease from processing, for bright steel products in a finally heat treated condition the manufacturer chooses the rust protection after heat treatment.

4.3 The Bright bars shall be delivered in and/or a combination of the following surface conditions:

a) Cold drawn, +C;

b) Cold drawn, heat treated, +C+QT, +C+N, +C+SR, +C+A;

c) Peeled/turned, +SH;

d) Ground, + G; and

e) Polished, +PL.

Unless otherwise agreed, bars up to 45 mm in dimensions are normally delivered with sheared ends. The ends of the product shall be as specified by the purchaser at the time of enquiry and order, for example, chamfering, facing, etc.

4.4 Basis for Order

While placing an order for the steels covered by this standard, the purchaser should specify clearly the following:

a) Chemical composition (*see* 6);

b) Mechanical properties (*see* 7);

c) Dimensions (*see* 8.1);

d) Dimensional tolerance (*see* 8.2);

e) Treatment condition of bars (*see* 4.2);

f) Supply surface conditions (*see* 4.3);

g) Surface quality class (*see* Table 8);

h) Decarburization depth (*see* 9.1); and

j) Optional test, if required (*see* 11).

4.5 Product Designation

The product designation shall follow the sequence below:

a) Number of this Indian Standard with prefix IS;

b) Corresponding product standard (CPS) as applicable;

c) Number of corresponding Indian Standard on bars, if any; and

d) Grade/Designation of the bars as per (c) above, if any.

Examples:

1) IS 9550 CPS 2062/E250 BR.

2) IS 9550 XXXX (in case of grade without any CPS, where XXXX is a grade supplied on mutual agreement between the manufacturer and the purchaser).

[a] Peeling is in general possible for diameters of 16 mm and over.

5 MANUFACTURE

5.1 The processes used in making the steel and in manufacturing bright steel products are left to the discretion of the manufacturer.

5.2 Unless specified otherwise, the steel shall be supplied in the rimmed, semi-killed or killed condition, as per mutual agreement between the purchaser and the manufacturer.

6 CHEMICAL COMPOSITION

6.1 The chemical composition of bright bars shall be as per relevant product Indian standard or it may be as agreed between the purchaser and the supplier. The material specification and heat treatment, if any, shall be so selected that the rolled bars used for the manufacture of bright bars will ensure the desired mechanical properties as per the requirements of the purchaser.

6.2 The analysis of steel shall be carried either by the method specified in the relevant parts of IS 228 or any other established instrumental/chemical method. In case of dispute, the procedure given in the relevant part of IS 228 shall be referee method. However, where the method is not given in IS 228 or its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer.

7 MECHANICAL PROPERTIES

The mechanical properties of bright bars shall be as agreed to between the purchaser and the manufacturer. The test method standard shall be the relevant standards depending on the mechanical properties such as IS 1608 (various parts) for tensile test, IS 1500 (Part 1) for Brinell hardness, etc.

8 DIMENSIONS AND TOLERANCES

8.1 Dimensions

Bars shall be supplied as per the dimensions specified in the orders.

8.2 Tolerances

8.2.1 *Diameter, Thickness and Width*

Tolerances on dimensions shall be as specified by the purchaser and shall be in accordance with 1S 919 (Part 2) as given in Table 1.

Table 1 Tolerance Class According to Finished Conditions

(*Clauses* 8.2.1 *and* 8.2.1.1)

Sl No.	Surface Condition at Delivery	Symbol	Tolerance Class to IS 919 (Part 2)[a]			
			Rounds	Squares	Hexagons	Drawn Flats Special Sections
(1)	(2)	(3)	(4)	(5)		(6)
i)	Cold drawn or heat-treated and cold drawn	+C	h10 (h9 to h12) *see* Table 3	h11 for $d \leq 80$ mm, h12 for $d > 80$ mm (h11 or h12); *see* Table 3		h11, h12 *see* Table 4
ii)	Cold drawn, heat treated	+C+QT [c] (+C+N) (+C+SR) (+C+A)	h11 *see* Table 3	– [b]	– [b]	–
iii)	Peeled/turned	+SH	h10 (h9 to h12) *see* Table 3	–	–	–
iv)	Ground	+G	h9 (h6 to h12) *see* Table 3	–	–	–
v)	Polished	+PL	h9 (h6 to h12) *see* Table 3	–	–	–

[a] Standard tolerance classes unless otherwise specified. In brackets: other possible tolerance classes according to IS 919 (Part 2) if required at the time of enquiry and order.

[b] To be agreed at the time of enquiry and order.

[c] stress relieved (+SR), normalized (+N), annealed (+A), quenched and tempered (+QT).

8.2.1.1 Unless specified otherwise, tolerances on dimensions shall be as follows:

a) For drawn round bars other than those under (e), or turned bars: h10 to Table 3;

b) For hexagonal and square drawn bars: h11 for dimensions up to and including 80 mm, h12 for dimensions over 80 mm according to Table 1 and Table 3;

c) For drawn flats: in accordance with Table 4 and Table 5;

d) For ground products: in accordance with Table 1 and Table 2; and

e) For drawn round bars in the heat treated condition: h11.

8.2.2 *Length*

Unless otherwise agreed at the time of enquiry and order, the length and the tolerance on length shall be as specified in Table 2.

8.2.2.1 The ends of the bars shall be cut square without disturbing the dimensional tolerances.

8.2.3 *Straightness Tolerance*

8.2.3.1 Unless otherwise agreed, the permissible deviations for straightness given in Table 6 and Table 7 shall apply. The methods for evaluating straightness are given in Annex B.

8.2.3.2 Any other details regarding measuring and sampling method for straightness tolerance of bright bars shall be agreed upon at the time of inquiry and order.

8.2.4 *Out of Shape*

Maximum deviation from 'out of shape' shall be not more than half of the specified tolerance.

8.2.5 *Edges of Non-Round Bars*

Non-round bars, that is, square, hexagon and flat in widths up to and including 150 mm shall have sharp corners without radius. For widths over 150 mm the corner profile may be undefined within a distance of 0.5 mm of the hypothetical edge, unless sharp corners have specifically been ordered.

Table 2 Types of Length and Length Tolerances

(*Clause* 8.2.2)

Sl No.	Type of Length	Length mm	Length Tolerances mm	To be Stated in Order
(1)	(2)	(3)	(4)	(5)
i)	Manufacturing length[a]	3 000 to 9 000	± 500	Length
ii)	Stock length[a]	3 000 or 6 000	0, + 200 0, + 200	for example, stock 6 000
iii)	Cut to length	Up to 9 000	Corresponding to specifications with ± 5 minimum	Length and tolerance

NOTES

1 Dimensions ≤ 25 mm: the percentage is 5 percent maximum, the length of these short bars being at the minimum two thirds the nominal length ordered.

2 Dimensions > 25 mm: the percentage is 10 percent maximum, with the same restriction on the minimum length.

3 If agreed at the time of enquiry and order bright products are delivered without any short bars.

[a] Short bars: each bundle may contain a percentage of short bars.

Table 3 Tolerance Classes for Rounds, Squares and Hexagons

(*Clause* 8.2.1.1)

Sl No.	Nominal Thickness mm	Tolerances Class to IS 919 (Part 2)[a]						
		h6	h7	h8	h9	h10	h11	h12
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	1 < t ≤ 3	0.006	0.010	0.014	0.025	0.040	0.060	0.100
ii)	3 < t ≤ 6	0.008	0.012	0.018	0.030	0.048	0.075	0.120
iii)	6 < t ≤ 10	0.009	0.015	0.022	0.036	0.058	0.090	0.150
iv)	10 < t ≤ 18	0.011	0.018	0.027	0.043	0.070	0.110	0.180
v)	18 < t ≤ 30	0.013	0.021	0.033	0.052	0.084	0.130	0.210
vi)	30 < t ≤ 50	0.016	0.025	0.039	0.062	0.100	0.160	0.250
vii)	50 < t ≤ 80	0.019	0.030	0.046	0.074	0.120	0.190	0.300
viii)	80 < t ≤ 120	0.022	0.035	0.054	0.087	0.140	0.220	0.350
ix)	120 < t ≤ 180	0.025	0.040	0.063	0.100	0.160	0.225	0.400
x)	180 < t ≤ 250	0.029	0.045	0.072	0.115	0.185	0.290	0.460

Table 4 Width Tolerances for Drawn Flats

(*Clause* 8.2.1.1)

Sl No.	Width	Deviation		IS 919 (Part 2)
	mm	mm	mm	Class
(1)	(2)	(3)	(4)	(5)
i)	w ≤ 18	–	–	h 11
ii)	18 < w ≤ 30	+ 0	- 0.13	h 11
iii)	30 < w ≤ 50	+ 0	- 0.16	h 11
iv)	50 < w ≤ 80	+ 0	- 0.19	h 11
v)	80 < w ≤ 100	+ 0	- 0.22	h 11
vi)	100 < w ≤ 150	+ 0.50	- 0.50	–
vii)	150 < w ≤ 200	+ 1.00	- 1.00	–
viii)	200 < w ≤ 300	+ 2.00	- 2.00	–
ix)	300 < w ≤ 400	+ 2.50	- 2.50	–
x)	400 < w ≤ 500	+ 1 %	- 1 %	–

[a] The above deviation values are negatively disposed about the nominal dimension. For example, a 20 mm nominal diameter having a tolerance class h9 has 20 mm – 0.052/+ 0 mm or 19.948/20.000 mm.

Table 5 Thickness Tolerances for Drawn Flats

(*Clause* 8.2.1.1)

Sl No.	**Thickness**[b]	**Deviation**[a]		**IS 919 (Part 2)**
	mm	mm	mm	Class
(1)	(2)	(3)	(4)	(5)
i)	$3 < t \leq 6$	+ 0	– 0.075	h 11
ii)	$6 < t \leq 10$	+ 0	– 0.090	h 11
iii)	$10 < t \leq 18$	+ 0	– 0.11	h 11
iv)	$18 < t \leq 30$	+ 0	– 0.13	h 11
v)	$30 < t \leq 50$	+ 0	– 0.16	h 11
vi)	$50 < t \leq 60$	+ 0	– 0.19	h 11
vii)	$60 < t \leq 80$	+ 0	– 0.30	h 12
viii)	$80 < t \leq 120$	+ 0	– 0.35	h 12
ix)	$120 < t \leq 140$	+ 0	– 0.40	h 12

Table 6 Deviation from Straightness for Rounds, Squares and Hexagons [c]

(*Foreword and clause* 8.2.3.1)

Sl No.	**Product Form**	**Steel Group**[d]	**Nominal Dimension**	**Deviation** *Max* mm
(1)	(2)	(3)	(4)	(5)
i)	Rounds	Non-alloy steels < 0.25 % C	–	1.0
		Non-alloy steels ≥ 0.25 % C, alloy steels, quenched and tempered steels	–	1.5
ii)	Squares and hexagons	Non-alloy steels < 0.25 % C	t ≤ 75 mm	1.0
		Non-alloy steels ≥ 0.25 % C, alloy steels, quenched and tempered steels	t ≤ 75 mm	2.0
		Non-alloy steels < 0.25 % C	t > 75 mm	1.5
		Non-alloy steels ≥ 0.25 % C, alloy steels, quenched and tempered steels	t > 75 mm	2.5

[a] The tolerances in this table apply to low carbon (C ≤ 0.20 %) and low carbon free-cutting steels only. For all other steels, deviation may increase to 150 % of the mentioned tolerance class.

[b] For w > 150 mm and t ≤ 18 mm the tolerance of the thickness is h12.

[c] For the method of evaluating straightness (*see* Annex B).

[d] *see* IS 7598.

Table 7 Deviation from Straightness for Flats [a]

(*Foreword* and *clause* 8.2.3.1)

Sl No.	Product Form	Steel Group	Nominal Dimension mm	Deviation *Max* mm	
				for w/t ≥ 10 : 1	for w/t < 10 : 1
(1)	(2)	(3)	(4)	(5)	(6)
i)	Flats	Non-alloy steels < 0.25 % C	$w < 120$	2	1.5
			$w \geq 120$	2.5	2
		Non-alloy steels ≥ 0.25 % C, alloy steels, quenched and tempered steels	$w < 120$	2.5	2
			$w \geq 120$	3	2.5

9 SURFACE CONDITION

The surface quality of the steel product shall be one of the classes according to Table 8. Drawn products shall have a smooth, scale free surface. Products in the final heat treated condition shall be free from loose surface scale, but may have surface discoloration or darkening.

NOTES

1 Drawn products may have minor surface imperfections, for example, pores, pits, scoring.

2 Non-circular sections will not have the same quality of surface finish as round sections.

3 Products in drawn and turned condition are not supplied with a specified surface finish.

4 Longitudinal surface cracks cannot be entirely eliminated from surfaces of drawn products without removal of material.

5 Products in the 'technically crack free by testing' condition are only available in the turned or turned and ground condition.

6 Bars shall be reasonably free from harmful internal defects.

9.1 Decarburization

9.1.1 No surface decarburization shall be permitted for turned and ground bars.

9.1.2 In cold drawn bars, complete decarburization shall not be permitted. The maximum extent of partial decarburization that can be permitted for cold drawn bars will be guided by the maximum depth of defects bars as given in Table 8. It however, a lower depth of decarburization is required, it shall be mutually agreed to between the purchaser and the manufacturer. For cold drawn and heat-treated delivery condition, requirements relating to the permissible depth of decarburization may be agreed at the time of enquiry and order.

9.1.3 The depth of decarburization shall be determined as given in IS 6396.

10 SAMPLING

10.1 Sampling for Chemical Analysis

If the product analysis is required by the purchaser, at least one sample product shall be taken from each cast/lot.

10.1.1 For product analysis, the selection of sample shall be carried as per mutual agreement between the purchaser and the supplier. Product analysis shall not be applicable for rimming steel.

[a] For the method of evaluating straightness (*see* Annex B).

Table 8 Surface Quality Classes

(*Foreword*, *Clauses* 4.4, 9 *and* 9.1.2)

Sl No.	Condition	Class			
		1	2	3	4
(1)	(2)	(3)	(4)	(5)	(6)
i)	Permissible depth of discontinuities	0.3 mm *Max* for $t \leq 15$ mm; 0.02 *t Max* for $15 < t \leq 100$ mm	0.3 mm *Max* for $t \leq 15$ mm; 0.02 *t Max* for $15 < t \leq 75$ mm; 1.5 mm *Max* for $t > 75$ mm	0.2 mm *Max* for $t \leq 20$ mm; 0.01 *t Max* for $20 < t \leq 75$ mm; 0.75 mm *Max* for $t > 75$ mm	Technically crack free by manufacture [e]
ii)	Maximum percentage of delivered weight with discontinuities in excess of specified level	4 %	1 %	1 %	0.2 %
iii)	Product form[a]				
	Rounds	+	+	+	+
	Squares	+	+ (for $t \leq 20$ mm)[c]	-	-
	Hexagons	+	+ (for $t \leq 50$ mm)[c]	-	-
	Flats	+[b]	-	-	-
	Special Sections	+[d]	-	-	-
	t = nominal thickness that means diameter of bars and distance across flats of squares and hexagons.				

10.2 Sampling for Mechanical Tests

For the purpose of Mechanical tests, samples shall be selected on the following basis:

Sl No.	*Condition*	*Number of Samples*
(1)	(2)	(3)
i)	Peeled/turned, polished or ground	One of every 20 tonnes or part thereof with a minimum one per cast
ii)	Cold drawn	One of every cast
iii)	Cold drawn, heat-treated	One of every batch (not over 20 tonnes) with a minimum of one per cast

[a] + indicates available in these classes, - indicates not commonly available in these classes.

[b] Maximum depth of discontinuities refers to respective section (width or thickness).

[c] Crack detection with eddy current device not possible for $t > 20$ mm or $t > 50$ mm as indicated.

[d] Reference dimensions to be agreed at the time of enquiry and order.

[e] The surface quality class shall be better than class 3. The requirements and the kind of verification are to be agreed at the time of enquiry and order.

10.2.1 Test pieces for mechanical properties shall be taken in the direction of the fibre, the rolling direction.

10.3 Selection and preparation of samples and test pieces shall be done in accordance with IS 3711.

11 OTHER TESTS

11.1 If required and mutually agreed to between the purchaser and the manufacturer, the following tests may be carried out and test certificates furnished by the manufacturer:

a) Hardenability (*see* IS 3848);

b) Inclusion content (*see* IS 4163)

c) Grain size (*see* IS 4748);

d) Microstructure [*see* IS 7739 (Part 1), IS 7739 (Part 2) and IS 7739 (Part 5)];

e) Crack testing (*see* IS 2595, IS 3658, IS 3664 and IS 3703);

f) Microscopic examination for depth of defects; and

g) Any other tests (that is, surface roughness in micron); etc.

11.1.1 Acceptance values and details of tests in absence of any Indian Standard shall be as agreed to between the purchaser and the manufacturer.

12 RETEST

Should any one of the test pieces first selected fail to pass any of the tests specified in this standard, two further samples shall be selected from the same lot for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material represented by the test samples shall be deemed to comply with the requirement of that particular test. Should the test pieces from either of these additional samples fail, the material represented by the test samples shall be deemed as not conforming to this standard.

13 SURFACE PROTECTION AND PACKING

A suitable clear temporary rust preventive shall be applied on all the bars to avoid rust during transit (*see* IS 1153 and IS 1154). The material shall be suitably packed in bundles-hessian wrapped to prevent sagging, corrosion and damage during transit.

14 MARKING

14.1 Each bar over 50 mm in diameter or of equivalent cross-sectional area shall be stamped at one end with the cast identification and supplier's identification mark/code. Bars of 50 mm in diameter or of equivalent cross-sectional area and below shall be bundled together and tied with suitable steel strappings at 3 to 4 places along the length of the bars. The metal tag shall be securely attached to each bundle and shall bear the information such as supplier's name, cast heat number, size and mass, order no., etc.

14.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed there under, and the product(s) may be marked with the Standard Mark.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 228 (Various Parts)	Methods for chemical analysis of steels
IS 919 (Part 2) : 1993/ISO 286-2 : 2010	Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes: Part 2 Tables of standard tolerance classes and limit deviation for holes and shafts (*second revision*)
IS 1153 : 2021	Temporary corrosion preventives, hard film, solvent deposited — Specification (*third revision*)
IS 1154 : 2022	Temporary corrosion preventive fluid, soft film, solvent deposited, water displacing — Specification (*second revision*)
IS 1956 (Part 3) : 2019	Glossary of terms relating to iron and steel: Part 3 Long products (including bars, rods, sections and wires) (*second revision*)
IS 2595 : 2008	Industrial radiographic testing — Code of practice (*second revision*)
IS 3658 : 1999	Code of practice for liquid penetrant flaw detection (*second revision*)
IS 3664 : 1981	Code of practice for ultrasonic pulse echo testing by contact and immersion methods (*first revision*)
IS 3703 : 2023	Recommended practice for magnetic particle flaw detection (*third revision*)
IS 3711 : 2020/ ISO 377 : 2017	Steel and steel products — Location and preparation of samples and test pieces for mechanical testing (*third revision*)
IS 3848 : 2024/ ISO 642 : 1999	Steel — Hardenability test by end quenching (Jominy test) (*second revision*)
IS 4163 : 2021/ ISO 4967 : 2013	Steel — Determination of content of non-metallic inclusions — Micrographic method using standard diagrams (*fourth revision*)
IS 4748 : 2021/ ISO 643 : 2019	Steel — Micrographic determination of the apparent grain size (*third revision*)
IS 6396 : 2023/ ISO 3887 : 2017	Steels — Determination of the depth of decarburization (*third revision*)
IS 7598 : 1990	Classification of steels (*first revision*)
IS 7739	Code of practice for preparation of metallographic specimens
(Part l) : 1975	General feature
(Part 2) : 1975	Electrolytic polishing
(Part 5) : 1976	Iron and steel and their examination
IS 8910 : 2022/ ISO 404 : 2013	Steel and steel products — General technical delivery requirements (*second revision*)

ANNEX B

(*Clause* 8.2.3.1)

METHODS FOR EVALUATING STRAIGHTNESS

B-1 This annex specifies two methods for the evaluation of the straightness of the bright steel bars as provided for in **8.2.3**. The method specified in **B-2** is the preferred method and **B-3** is an alternative method. The choice of method shall be as agreed at the time of enquiry and order.

B-2 PREFERRED METHOD

B-2.1 The bar shall be supported on a suitably so as to eliminate or minimize sagging.

B-2.2 A 1-m long straight edge shall be placed on the surface of the bar at any position along its length. No part of the straight edge shall be within 150 mm of the ends of the bar.

B-2.3 Straightness shall be determined by measuring the maximum gap between the bar and the straight edge by suitable means, for example, feeler gauge. The bar shall be deemed straight where the maximum gap does not exceed the values specified in **8.2.3.1**.

B-3 ALTERNATIVE METHOD FOR ROUND BARS

B-3.1 The round bar shall be supported on centres placed 1 m apart and capable of being rotated.

B-3.2 Straightness shall be measured by means of a suitable dial or indicator gauge placed at any position between the supporting centres.

B-3.3 The bar shall be deemed straight when rotating the bar through 360° the indicated reading is not greater than twice the deviation specified in **8.2.3.1.**

ANNEX C

(*Foreword*)

COMMITTEE COMPOSITION

Wrought Steel Products Sectional Committee, MTD 04

Organization	*Representative(s)*
SAIL, Research & Development Center for Iron & Steel, Ranchi	SHRI NIRVIK BANERJEE **(*Chairperson*)**
AM/NS Steel Hazira, Surat	SHRI DEEPAK GUPTA SHRI KALPESH DAVE (*Alternate*)
Bharat Heavy Electrical Ltd, Bhopal	SHRI S. K. MAHAJAN SHRI ARUN KHARE (*Alternate*)
Cold Rolled Steel Manufacturers Association of India, New Delhi	SHRI SHIVAJEE PATHAK SHRI N. K. SOOD (*Alternate*)
Jindal Steel and Power, New Delhi	SHRI MORESHWAR BORKAR SHRI JOY DUTTA (*Alternate*)
Indian Steel Association, Delhi	SHRI RAVINDER KUMAR BHAN SHRI ANUP KASHAYAP (*Alternate*)
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JSW Steel Ltd, Salem	SHRI B. M. HASAN SHRI S. SIVAKUMAR (*Alternate*)
JSW Steel Coated Products Ltd, Tarapur	SHRI CHANCHAL KUMAR KARMAKAR SHRI AMIT KUNDU (*Alternate*)
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Ministry of Steel (Government of India), New Delhi	SHRI PARMJEET SINGH SHRI BHAGIRATHI PRADHAN (*Alternate*)
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SAIL, Research & Development Center for Iron & Steel, Ranchi	SHRI P. PATHAK SHRI S. SRIKANTH (*Alternate*)
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Steel Authority of India Limited, IISCO Steel Plant, Barddhaman	SHRI SAIKAT DE SHRI PREETI DEWANGAN (*Alternate*)
Tata Blue Scope Steel Ltd, Pune	SHRI VED PRAKASH
Tata Motors Ltd, Pune	SHRI LOKESH PALIWAL SHRI TUSHAR BAVISKAR (*Alternate*)
Tata Steel Ltd, Jamshedpur	SHRI AVTAR SINGH SAINI SHRI SUDIPTO SARKAR (*Alternate*)
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Field Master, Mumbai	SHRI PARESH GUPTE
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