इंटरनेट मानक

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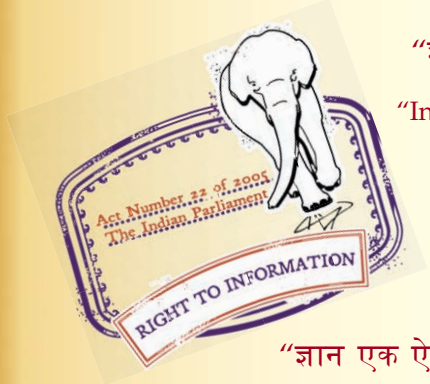
IS 8052 (2006): Steel ingots,billets and blooms for the production of springs, rivets and screws for general engineering applications [MTD 4: Wrought Steel Products]



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Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 8052 : 2006
(Superseding IS 8051 : 1976, IS 8053 : 1976,
IS 8055 : 1976, IS 8056 : 1976, IS 8057 : 1976,
IS 9467 : 1980, IS 9468 : 1980 and IS 9477 : 1980)

भारतीय मानक

सामान्य इंजीनियरी अनुप्रयोगों के लिए स्प्रिंगों, रिवेट एवं पेचों के उत्पादन हेतु इस्पात के इंगट, बिलेट एवं ब्लूम — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

STEEL INGOTS, BILLETS AND BLOOMS FOR THE PRODUCTION OF SPRINGS, RIVETS AND SCREWS FOR GENERAL ENGINEERING APPLICATIONS — SPECIFICATION

(Second Revision)

ICS 77 140.01

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 2006 **Price Group 2**

Wrought Steel Products Sectional Committee, MTD 4

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 1976 and revised in 1990. While reviewing this standard, in the light of experience gained during these years, the Committee decided to revise it to bring in line with the present practices being followed by the Indian industry and overseas standards of structural steels. In this revision, the following changes have been made.

a) The title of this standard has been modified.
b) The scope of the standard has been modified.
c) Clause 2 has been updated
d) The dimensions given in 3.2, 3.3 and 3.4 have been modified.
e) The number of grades have been increased to 20.
f) Clause 5 has been modified.
g) Clause on product analysis has been modified.

While preparing this revision, the requirements of the following Indian Standards have been incorporated:

IS No	*Title*
8051 : 1976	Steel ingots and billets for the production of volute, helical and laminated springs for automotive suspension
8053 : 1976	Steel ingots and billets for the production of steel wire for the manufacture of wood screws
8055 : 1976	Steel ingots and billets for the production of spring washers
8056 : 1976	Steel ingots and billets for the production of hard-drawn steel wire for upholstery springs
8057 : 1976	Steel ingots and billets for the production of wire rod for the manufacture of machine screws (by cold heading process)
9467 : 1980	Steel ingots and billets for the production of rivet bars for structural purposes
9468 : 1980	Steel ingots and billets for the production of mild steel rivet bars for shipbuilding
9477 : 1980	Steel ingots and billets for hot-rolled bars for the production of bright bars

The revision of this standard will supersede the above mentioned eight standards.

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.

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 : 1960 'Rules for rounding off numerical values (*revised*)'. 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

STEEL INGOTS, BILLETS AND BLOOMS FOR THE PRODUCTION OF SPRINGS, RIVETS AND SCREWS FOR GENERAL ENGINEERING APPLICATIONS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers the requirements for steel ingots, cast billet ingots, billets, continuous cast blooms for the production of volute, helical and laminated springs for railway rolling stock, automotive suspension and other general engineering applications for manufacture of wood screws, spring washers, hard-drawn steel wire for upholstery springs, machine screws (by cold heading process), rivet bars for structural/shipbuilding purposes and for bright bars.

1.2 Ingots (including cast billet ingots), billets (including continuous cast billets) and blooms (including continuously cast blooms) covered by this standard shall be used for the manufacture of bars and flats conforming to the requirements of IS 3195 . 1990 and flats conforming to IS 3885 (Part 1) . 1992 and IS 3885 (Part 2) 1992.

2 REFERENCES

The following standards 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 editions of the standards indicated below.

IS No	*Title*
228 (in parts)	Methods of chemical analysis of steel
1956 (in parts)	Glossary of terms relating to iron and steel
2049 : 1978	Colour code for the identification of wrought steels for general engineering purposes (*first revision*)
3848 : 1981	Method for end quench test for hardenability of steel (*first revision*)
4163 : 2004 / ISO 4967 : 1998	Steel — Determination of content of non-metallic inclusions micrographic method using standard diagrams (*third revision*)
8910 : 1978	General technical delivery requirements for steel and steel products
11371 : 1985	Method for microtech test for wrought steel products
12037 : 1987	Micrographic examination by sulphur print (Baumann method)

3 TERMINOLOGY

For the purpose of this standard, the following definitions in addition to those given in the relevant part of IS 1956 shall apply.

3.1 Ingots — Castings of suitable shape and size intended for subsequent hot working.

3.2 Cast Billet Ingot — For the purpose of this standard, cast billet ingot shall be defined as ingot, generally of cross-section not more than 200 mm^2 which can be rolled directly into merchant products. Cast billet ingot is also sometimes known as 'pencil ingot'.

3.3 Billet — A semi-finished product obtained by forging, rolling or continuously casting, usually square and not exceeding 125 mm × 125 mm in cross-section with rounded corners and is intended for further processing into suitable finished product by forging or re-rolling.

3.4 Bloom — A semi-finished forged, rolled or continuously cast product. The cross-section is square or nearly rectangular (excluding slab) and the cross-section is generally more than 125 mm × 125 mm (or equivalent cross-sectional area).

4 SUPPLY OF MATERIAL

4.1 The general requirements relating to the supply of steel shall conform to IS 8910.

4.2 The size of ingots, billets or blooms for any given size of finished steel product shall be such that a minimum reduction ratio of 16 : 1 from the minimum

cross-sectional area of the ingots, billet or bloom to the maximum cross-sectional area of the product is ensured However, reduction ratio other than that specified may be agreed to subject to mutual agreement between the purchaser and the manufacturer

5 MANUFACTURE

Any commercial process of steel making adopted by the supplier is acceptable. It is recommended but not essential that this should be followed by the suitable secondary refining

6 CHEMICAL COMPOSITION

6.1 The ladle analysis of the steel, when carried out by the method specified in the relevant parts of IS 228 or any other established instrumental/chemical method, shall be as given in Table 1. In case of dispute the procedure given in IS 228 and its relevant parts shall be the referee method. However, where the method is not given in IS 228 and its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer

6.2 Product Analysis

Product analysis shall be carried out on the finished product as one sample/cast from the standard position as shown in Fig 1 Permissible limit of variation in case of product analysis from the limit specified in Table 1 shall be as given in Table 2

6.3 *Permissible variation in case of product analysis* from the limits specified in 6.1 shall be as given in Table 2.

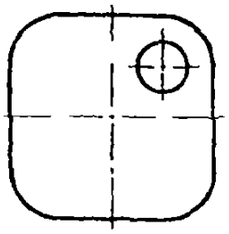

FIG 1 LOCATION FOR TAKING DRILLING FOR CHECK ANALYSIS

6.4 Incidental Elements

Elements not quoted in Table 1 shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat All reasonable precautions shall be taken to prevent the addition from scrap or other materials used in hardenability, mechanical properties and applicability.

7 SAMPLING

7.1 At least one ladle sample shall be taken per cast.

7.2 If required, the samples for product analysis shall be prepared by forging or rolling down to 30 mm round section.

7.2.1 In case of wire rods, the test piece size shall be the size of wire rods.

7.2.2 Drilling shall be taken from anywhere in the billets or blooms.

8 FREEDOM FROM DEFECTS

8.1 The billets, blooms and continuous cast billets or blooms shall be free from harmful defects, such as pipe, lamination, segregation, inclusions and cracks.

8.1.1 Subject to agreement between the purchaser and the manufacturer, the billets, blooms and continuous cast billets or blooms may be supplied with suitable surface dressing.

8.2 Ingots shall either be supplied free from harmful segregation, piping, cracks, inclusions, discard and dressing or supplied with suitable surface dressing only without top and bottom discard if agreed to between the purchaser and the manufacturer, to ensure the requirements of freedom from defects specified in the relevant product specifications.

9 TESTS

If agreed to between the purchaser and the manufacturer the following tests may be carried out from the sample prepared under 7.2:

a) Macro examination (IS 11371),
b) Sulphur print (IS 12037),
c) Hardenability (IS 3848), and
d) Inclusion content (IS 4163).

10 DIMENSIONS

10.1 The size and tolerance of ingots shall be subject to agreement between the purchaser and the manufacturer. However, the following nominal sizes of ingots generally supplied are given below for guidance only:

Width Across Flats, mm		*Length*, mm
Wide End	Narrow End	
110	76	1 500
115	90	1 200
125	105	1 500
150	120	1 300
150	130	1 500

10.2 The preferred sizes of billets shall be 50 mm, 63 mm, 71 mm, 80 mm, 90 mm, 100 mm and 125 mm. In case of continuous cast billets, additional preferred size shall be 130 mm.

Table 1 Chemical Composition

(*Clause* 6.1)

Sl No.	Grade Designation	Constituent Percent							
		C	Si	Mn	S	P	Cr	Mo	V
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	12C5	0 17 *Max*	0 15-0 35	0 30-0 65	0 040 *Max*	0 040 *Max*	—	—	—
ii)	17C5	0 22 *Max*	0 15-0 35	0 30-0 65	0 040 *Max*	0 040 *Max*	—	—	—
iii)	12C8S12	0 17*Max*	0 15-0 35	0 65-0 95	0 08-0 15	0 040 *Max*	—	—	—
iv)	55C6	0 50-0 60	0 15-0 35	0 40-0 70	0 040 *Max*	0 040 *Max*	—	—	—
v)	65C6	0 60-0 70	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
vi)	70C6	0 65-0 75	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
vii)	75C6	0 70-0 80	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
viii)	80C6	0 75-0 85	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
ix)	98C6	0 90-1 05	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
x)	113C6	1 05-1 20	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	—	—	—
xi)	38Si7	0 35-0 42	1 50-1 90	0 60-0 80	0 040 *Max*	0 040 *Max*	—	—	—
xii)	40Si7	0 35-0 45	1 50-2 00	0 80-1 00	0 040 *Max*	0 040 *Max*	—	—	—
xiii)	50Si7	0 45-0 55	1 50-2 00	0 80-1 00	0 040 *Max*	0 040 *Max*	—	—	—
xiv)	55Si7	0 50-0 60	1 50-2 00	0 80-1 00	0 040 *Max*	0 040 *Max*	—	—	—
xv)	60Si7	0.55-0 65	1 50-2.00	0 80-1 00	0 040 *Max*	0 040 *Max*	—	—	—
xvi)	65Si7	0 60-0 70	1 50-2 00	0 80-1 00	0 040 *Max*	0 040 *Max*	—	—	—
xvii)	50Cr4V1	0 47-0 55	0 15-0 35	0 80-1 10	0 035 *Max*	0 035 *Max*	0 90-1 20	—	0 07-0 12
xviii)	50Cr4V2	0 45-0 55	0 15-0 35	0 50-0 80	0 040 *Max*	0 040 *Max*	0 90-1 20	—	0 15-0 25
xix)	60Cr4V2	0 55-0 65	0 15-0 35	0 80-1 00	0 040 *Max*	0 040 *Max*	0 90-1 20	—	0 15 *Min*
xx)	52Cr4Mo2V1	0 48-0 56	0 15-0 40	0 70-1 10	0 035 *Max*	0 035 *Max*	0 90-1 20	0 15-0 25	0 07-0 12

Table 2 Permissible Limits of Variations

(*Clauses* 6.2 *and* 6.3)

Sl No.	Constituent	Variation Over the Specified Maximum or Under the Minimum Limits Percent
(1)	(2)	(3)
i)	Carbon	
	a) Up to and including 0 30	±0 02
	b) Over 0 30	±0 03
ii)	Silicon	
	a) Up to and including 0 40	±0 03
	b) Over 0 40	±0 05
iii)	Manganese	±0 04
iv)	Sulphur	±0 005
v)	Phosphorus	±0 005
vi)	Chromium	±0 03
vii)	Vanadium	±0 02
viii)	Molybdenum	±0 03

NOTE — Variations shall not be applicable both over and under the specified limits in several determinations in a heat

10.3 The sizes of blooms shall be agreed upon between the manufacturer and the purchaser.

10.4 The sizes other than those specified may be supplied by agreement between the purchaser and the manufacturer.

11 TOLERANCES

11.1 In case of billets and blooms the following tolerances shall apply:

Width Across Flats, mm	*Tolerance*, mm
Up to 75	±1.5
Over 75 up to and including 100	±2
Over 100 up to and including 160	±4
Over 160	±5

11.2 A tolerance of ±150 mm shall be permitted on the specified length of ingots, billets and blooms.

12 BASIS FOR ORDER

While placing an order for ingots, billets or blooms covered by this standard, the purchaser should specify the following:

a) Steel grade;
b) Size of ingot, billet or bloom;
c) Size and dimensions of end product;
d) End use;
e) Tests and test reports required; and
f) Special requirements, if any.

13 MARKING

13.1 Unless agreed otherwise, the material shall be marked as prescribed in **13.1** and **13.2**. The ends of ingots and billets shall be painted with a suitable colour code conforming to IS 2049.

13.2 Each ingot, billet and bloom shall be legibly stamped or painted with the cast number, grade and identity of the source of manufacture.

13.2.1 *BIS Certification Marking*

The material may also be marked with the Standard Mark.

13.2.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Amendments Issued Since Publication

Amend No	Date of Issue	Text Affected

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