

**PRODUCT MANUAL FOR
Carbon Steel Billets, Blooms, Slabs and Bars for Forgings
According to IS 1875:1992**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 1875:1992
	Title	:	Carbon Steel Billets, Blooms, Slabs and Bars for Forgings
	No. of amendments	:	2
2.	Sampling Guidelines		
a)	Raw material	:	No specific requirement
b)	Grouping Guidelines	:	Please refer Annex – A
c)	Sample Size	:	Mechanical: 1m or prepared pieces (above 25 mm thickness/dia) Chemical: 5 pcs of 5cm x 5cm or 50 gm drillings
3.	List of Test Equipment	:	Please refer Annex – B
4.	Scheme of Inspection and Testing	:	Please refer Annex – C
5.	Possible tests in a day	:	All mechanical and chemical tests
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 1875:1992 with the following scope:		
	Name of the product	Carbon Steel Billets, Blooms, Slabs and Bars for Forgings	
	Designation		
	Class		
	Variety(Size)	Bars: dia ..mm upto and including ..mm, .. Billets:..mmx...mm, .. Blooms: :..mmx...mm, .. Slabs: :..mmx...mm, ..	

ANNEXURE A
TO PRODUCT MANUAL FOR
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GROUPING GUIDELINES

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In order to follow a uniform policy in the drawl of samples for independent testing for the purpose of grant of license/ inclusion of additional varieties in the existing license, the procedure as mentioned below is to be followed:

1. One sample of Carbon Steel Billets, Blooms, Slabs and Bars for forgings as given below for Class & Designation (also see Table 1& Table 2) has to be tested for all the requirements of the specification and applicable to the variety tested. If the sample passes, then licence may be granted/inclusion may be done for Class & Designation as per the groupings given below, provided that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the Class of Carbon Steel Billets, Blooms, Slabs and Bars for forgings to be included in the licence.

Class	Designation	No of sample
1	14C6	One sample of any size of any Class& Designation may be drawn. If sample is tested for higher Class & Designation the recommendation may include lower Class & Designation.
1A	15C8	
2	20C8	
2A	25C8	
3	30C8	
3A	33 C8	
4	45C8	
5	55C8	
6	65C6	

2. The sample tested may be any of the size (see Cl.8) from Carbon Steel Billets, Blooms, Slabs and Bars for forgings specified in the specification. However, the licence can be granted for all the sizes of the Carbon Steel Billets, Blooms, Slabs and Bars for forgings specified in the specification and applied by the applicant/licencee, provided that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of all other sizes of the Carbon Steel Billets, Blooms, Slabs and Bars for forgings proposed to be included in the licence.
3. In case the manufacturer is desirous of supplying the product along with supplementary requirements, an undertaking to this effect is to be obtained from applicant/licensee.
4. During the operation of licence, BO shall ensure that all the sizes of the Carbon Steel Billets, Blooms, Slabs and Bars for forgings covered in the license are drawn for independent testing on rotation over a period of time.
5. In case of licensees supplying products along with purchaser's supplementary requirements, BO shall ensure that samples drawn as mentioned at 4) above be tested for supplementary tests as well, provided that samples from same Heat/Batch of Carbon Steel Billets/ Blooms/ Slabs/ Bars for forgings supplied to the purchaser with agreed upon supplementary requirements are available during surveillance.

ANNEXURE B
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LIST OF TEST EQUIPMENTS

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Major test equipment essentially required to test as per requirements of Indian Standard.

Sr. No	Test Equipment/Chemicals	Tests Used in with Clause Reference
1	Visual Inspection System	7(Freedom from Defects)
2	Steel Scale	8(Dimensional Tolerances)
3	Vernier Calipers, measuring tape	8(Dimensional Tolerances)
4	Micrometer	10(Diameter)
5	Tensile Testing Machine	9 (Tensile Strength)
6	Rough Polishing Machine, Cutting Machine, Fine Polishing Machine, Grinder Machine	6 (chemical composition) Preparation of specimen
7	<p>Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry.</p> <p>Spectrophotometer</p>	<p>6.1,6.3,6.3 for C,S,P,Mn,Si,Ni,Cu,Cr</p> <p>Mn,S,P,Si</p>
8	<p>Strohlein or Leco apparatus with all attachments Barometer with chart, Hot plate, Muffle furnace, Complete range of glass wares, measuring cylinders, Desiccator, porcelain boats or ceramic crucibles, Thermometer, Electronic Balance, Distilled Water, Hot air oven, Oxygen - 99.5 percent minimum purity, ether or acetone, Standard Reference Material (NML) with certificate</p> <p>Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash</p> <p>Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate</p>	6.1, 6.2 for C& S (chemical method, alternative to instrumental method)

9	<p>Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate</p> <p>Potassium Permanganate (KMnO₄), Sodium Nitrite (Na₂NO₃), Ammonium Molybdate [(NH₄)₂ Mo₂O₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (K₂NO₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable</p>	6.1,6.2 Phosphorus content (chemical method, alternative to instrumental method)
180	<p>Hot plate, Conical flask</p> <p>Reagents:</p> <p>silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid</p>	6.1,6.2 Manganese content (chemical method, alternative to instrumental method)
11	<p>Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace</p> <p>Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid</p>	6.1,6.2 Silicon content (chemical method, alternative to instrumental method)
12	<p>Plate, Muffle Furnace, porcelain or silica crucible,</p> <p>Reagents: Hot Wash Solution (dilute sulphuric acid solution 1 : 99 v/v with hydrogen sulphide), dilute sulphuric acid, hydrogen sulphide, Dilute Nitric Acid, Sodium Fluoride, solid, Dilute Ammonium Hydroxide, Acetic Acid, Potassium Iodide, Starch Solution, Sodium Thiosulphate Solution, Ammonium Bifluoride Solution</p>	6.3 Cu content (chemical method, alternative to instrumental method)
13	<p>ashless paper pulp, paper pulp pad, hot plate, dessicator,</p> <p>Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid</p>	6.3 Ni content (chemical method, alternative to instrumental method)
14	<p>Hot plate, stop watch</p> <p>Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.</p>	6.3 Cr content (chemical method, alternative to instrumental method)

15	Bending device with two supports and formers of suitable sizes, capable of the bringing legs of the test piece parallel to each other at a specified distance apart by direct pressure.	12.2 (Bend Test)
16	Laboratory Furnace, Metallographic Sample Preparation Equipment, Etching Reagent(either natal or picral), Metallurgical Microscope	12.3(Grain Size)
17	Equipment for specimen by sawing or machining or abrasive wheel cutting or gas cutting. Machine grinding rotating discs with abrasive paper (No. '00' or No. '000') for polishing, etch tank, etchant(table-1 of IS 11371), stiff fibre brush, solvent for cleaning from grease, oil, Lathe/shaper	12.4(Macrostructure)
18	Alternating current (a.c.)/ single phase half-wave rectified alternating current (HW) / three phase full-wave rectified direct current (FWDC) induced magnetization, Magnetic powder suspended in an aqueous or a well refined, light petroleum distillate.	12.6(Magnetic Particle Inspection Test)
19	Equipment for specimen preparation by machining, magnifying glass(15X), Surface Roughness Tester (in-house Calibration using roughness block)	12.7 (Blue-Fracture test)

Note: The above is an indicative list for the purpose of guidance only

**ANNEXURE C
TO PRODUCT MANUAL FOR
CARBON STEEL BILLETS, BLOOMS, SLABS AND BARS FOR FORGINGS
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SCHEME OF INSPECTION AND TESTING

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1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING, MARKING, PACKING –

The Standard Mark as given in Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the marking and packing shall be done as per the provisions of the Indian Standard, provided always that the product thus marked and packed conforms to all the requirement of the specification. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT – For the purpose of this scheme stock representing the same cast, designation and manufactured to same dimensions under uniform conditions of production shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 1875:1992 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit number and the corresponding test results (as given in Annexure-I enclosed)

7. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016. Any rejected material which is potentially re-salable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/coil number/control unit number, as applicable, relating to all such rejections/defective/sub-standard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification.

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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TABLE 1: LEVELS OF CONTROL

(1)		(2)	(3)		(4)		
TEST DETAILS			LEVELS OF CONTROL		REMARKS		
Clause	Requirements	Test Method	Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Samples		Frequency	
		Clause	Reference				
6	Chemical Composition						
	Ladle Analysis	6.1, 6.3, 10.1, 12.1.1 & Table 1	IS 1875: 1992 IS 228 (various parts) or any other established instrumental /chemical method	R	1	Each Cast	Applicable for manufacturers with steel making facilities.
	Check Analysis	6.2, 6.2.1, 11.1, 12.1.1 & Table 1		R	Nil	Nil	i) Applicable for manufacturers with steel making facilities
				R	1	Each Cast	ii) Applicable for manufacturers without steel making facilities (See Note-3)
7	Freedom from defects	7.1	IS 1875: 1992	R	1	Each Piece	
8	Dimensional Tolerances	8.1, 8.2, 8.2.1 & 8.3	IS 1875: 1992 IS 1852 IS 3739 IS 9684	R	Adequate Inspection to ensure the product to be within the limits of the specification.		

9	Mechanical Test						
	Tensile Test	9.1, 10.2, 11.2 & Table-2	IS 1875: 1992 IS 1608				
	Hardness Test	9.2, 10.2, 11.2 & Table-2	IS 1875: 1992 IS 1500				
12	Supplementary Requirements						
	Bend Test	12.2, 12.2.1, 12.2.2, 12.2.3	IS 1875: 1992 & IS 1599	S	----	-----	Applicable only when specified by the purchaser. Also See Note- 5
	Grain Size	12.3	IS 1875: 1992 IS 4748	S	-----	-----	See Note-4 & 5
	Macrostructure	12.4	IS 1875: 1992 IS 11371	S	----	-----	
	Ultrasonic Test	12.5	IS 1875: 1992	S	-----	-----	
	Magnetic Particle Test	12.6	IS 1875: 1992 IS 10138	S	----	-----	
	Blue Fracture Test	12.7	IS 1875: 1992 IS 4075	S	-----	-----	

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Note-3: No testing for check analysis is required if material fed to rolling/forging is ISI marked and received with test certificate.

Note-4: These requirements shall apply only when specified by the purchaser in the inquiry, contract and order. Details of these requirements shall be as agreed to between the manufacturer and purchaser. Records of agreed upon values shall be maintained.

Note-5: ----- means the levels of control in Column(3) of Table-1 are as agreed to between the manufacturer and purchaser.

Annexure-I**Page 4 of 4**

(Para 6 of the Scheme of Inspection and Testing)

XYZ IRON AND STEEL COMPANY

(Registered office Address and works address)

BIS
STANDARD
MARK**TEST CERTIFICATE FOR SPECIFICATION FOR ROUND STEEL WIRE FOR ROPES**

TEST CERTIFICATE No. _____

DATE _____

To M/s _____

We certified that the material described below fully conforms to 1875:1992 Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks Licence No. CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 1875:1992 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Section (nom Size)	Control Unit No.	Class & Designation	Qty	CHEMICAL COMPOSITION						MECHANICAL PROPERTIES			Hardness	*Supplementary requirements	Remarks
					C %	S %	P %	Mn %	Al %	Si %	TS	YS	Elongation			

*if required by purchaser

REMARKS

WAGON NO.

TRUCK NO.

FOR XYZ IRON AND STEEL COMPANY

(It is suggested that size A4 paper be used for this test certificate)