



उत्पाद मैनुअल
लगातार डाली ब्लूम, बिलेट और स्लैब से उत्पादित फोर्जिंग के लिए स्टॉक के लिए
आईएस 13352:1992 के अनुसार

PRODUCT MANUAL FOR
Stock for forgings produced from continuously cast blooms, billets and slabs
According to IS 13352:1992

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम 2018 की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन में रीति और पारदर्शिता के सुसंगत सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

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.	उत्पाद Product	:	IS 13352:1992
	शीर्षक Title	:	Stock for forgings produced from continuously cast blooms, billets and slabs - Specification
	संशोधन संख्या No. of amendments	:	0
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	As per Clause 6 of ISS-No specific raw material requirement
b)	समूहिकरण दिशा निर्देश Grouping Guidelines	:	Please refer Annex - A

c)	नमूने का परिमाण Sample Size	:	Tests for dimensional, tolerances, Magnetic particle and Ultrasonic test shall be carried out on full forgings selected as sample in factory & conformity shall be reported against the agreed requirements between the manufacturer and purchaser For Chemical tests: i) For instrumental chemical analysis 5 pcs of length 5 cm each in Flat form (bars/rods of dia > 3mm) or 5 pcs of 5cm (L) × 5cm (H) (plates/flats etc..) ii) For Wet Chemical analysis – 50 gm drillings For Physical and metallurgical tests: 1 m No market samples shall be drawn for the product as the product is bulky in nature Sample of Length 1 meter for each Steel Designation
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer Annex - B
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	Please refer Annex - C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	:	All tests are possible to be carried out in a day
6.	लाइसेन्स का कार्यक्षेत्र/Scope of the Licence :		
	IS 13352:1992 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 13352:1992 with the following scope:		
	Name of the product		Stock for forgings produced from continuously cast blooms, billets and slabs - Specification
	Designation		As per Table 2
	Form of Steel/Size		Billets, Blooms, Slabs of sizes fromxx.... mm up to and includingxx..... mm Bars (Round, Square, Hexagonal) of diameter/nominal sizes fromxx.... mm up to and includingxx..... mm Rods (Round, Square) of diameter/nominal sizes fromxx.... mm up to and includingxx..... Flats of Thickness fromxx.... mm to up to and includingxx, Width fromxx.... mm toxx.... mm up to and includingxx..... mm Round Cornered Squares (RCS or Billets) of sizes fromxx.... mm up to and includingxx..... mm
	Supply Condition		As Rolled/As Forged/As Annealed/Normalized/Hardened and Tempered/Improved Machinability/Case Carburized and Hardened

	Optional Requirements	Ultrasonic test and/or Blank hardening test and/or Cleanliness test by 'Blue Fracture Test' and/or Microstructure for machinability including banding or without any optional requirement
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BUREAU OF INDIAN STANDARDS

Manak Bhawan, 9, Bahadur Shah Zafar Marg, New Delhi –
110002

ANNEXURE A
TO PRODUCT MANUAL FOR
**Stock for forgings produced from
continuously cast blooms, billets and slabs**
IS 13352:1992
GROUPING GUIDELINES

Grouping of different steel designations has been done on the basis of chemical composition/alloying elements and condition of supply. Guidelines for drawing of samples from each group are as under:

Group	Steel Designation	Remarks
1	15C8,20C8,25C8,30C8,35C8,45C8,55C8,65C6	Two samples each from the group with one designation of minimum carbon limit and one designation of maximum carbon limit, of any size, any form of steel, for each supply condition may be tested to cover all steel designations, supply conditions, sizes and forms within the group.
2	Steel Designations other than that covered in Group-1	As variety of steels mentioned in the standard can also be supplied in various delivery conditions, it is observed that steel covered is atypical /unique. Therefore, all grades that are required to be included in scope should be tested from any one size offered by the firm. i.e To cover any grade, sample of the grade is required to be tested of any size, any form of steel, for each supply condition offered by the firm.

1. However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the sizes/steel designations /supply conditions/forms of Steel : to be included in the licence.
2. During the operation of licence, BO shall ensure that all the sizes/grade designations/ delivery conditions/finishes covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
Steels for Hardening and Tempering
According to **IS 13352:1992**
LIST OF TESTING
EQUIPMENT

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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.	Rough Polishing Machine, Abrasive Cutting Machine, Fine Polishing Machine, Grinding Machine, Molding machine, Longitudinal cutting machine	Preparation of specimen
2.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. spectro polisher(sample preparation) Spectrophotometer	6. (C,S,P,Mn,Si, Ni, Cr, Mo, V, Al, Cu, B, Sn)
3.	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 Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate	6 (for C& S, chemical method, alternative to instrumental method)
4.	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 Potassium Permanganate (KMnO ₄), Sodium Nitrite (Na ₂ NO ₃), Ammonium Molybdate [(NH ₄) ₂ Mo ₂ O ₇], Ammonium Phosphate [(NH ₄) ₃ PO ₄], Potassium Nitrate (K ₂ NO ₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO ₄), Sulphurous Acid,Hydrobromic Acid (HBr) , other chemicals and reagent as applicable	6 (Phosphorus content , chemical method, alternative to instrumental method)

5.	Hot plate, Conical flask Reagents: silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid	6 (Manganese content , chemical method, alternative to instrumental method)
6.	Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid	6 (Silicon content , chemical method, alternative to instrumental method)
7.	Plate, Muffle Furnace, porcelain or silica crucible, 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	6 (Cu content , chemical method, alternative to instrumental method)
8.	Hot plate, stop watch 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.	6 (Cr content ,chemical method, alternative to instrumental method)
9.	Reagents: Perchloric Acid, Phosphoric Acid, Nitric Acid, Hydrochloric Acid, Dilute sulphuric acid, potassium thiocyanate solution, stannous chloride solution, n-butyl acetate, Iron-Mo free, molybdenum metal (99.9 pc pure) Spectrophotometer, Volumetric flask, conical flask, titration apparatus (burette, pipette etc.), hot plate, thermometer, separating funnel, dry filter paper and other laboratory glassware and apparatus	6 Mo content (for determination of Mo by thiocyanate photometric method) method in low and high alloy steels for Mo 0.01 to 1.50 percent)
10.	Reagents: Dilute sulphuric acid, conc nitric acid, hydrofluoric acid, boric acid solution, potassium bisulphite, ferrous sulphate solution, Alpha-Bentoinoxime Solution, Bromine Water, Sulphuric Acid-Benzoinoxime Wash Solution, Dilute Ammonium Hydroxide Solution, Concentrated Hydrochloric Acid, Dilute Hydrochloric Acid, Tartaric Acid, solid, Hydrogen Sulphide, gas, Hydrogen sulphide Wash Solution, Cinchonine Solution Platinum crucible, Volumetric flask, conical flask, titration apparatus (burette, pipette etc.), hot plate, thermometer, separating funnel, ashless filter paper and other laboratory glassware and apparatus	6 Mo content (for determination of Mo by Alpha-benzoinoxime method in alloy steels for Mo > 1 percent and not containing Tungsten)
11.	Vision-based inspection system(10X magnifying glass), Stereo microscope	5 (Freedom from defects)
12.	<u>Sulphur Print Test</u>	5.3 (Freedom from

13.	1) Photographic Paper 2) Sulphuric Acid 3) Sodium Thiosulphate 4) Machining/Sample Preparation Set Up 5) Cotton Wool <u>Macroetch test</u> Machine grinding unit with metallographic polish paper No. 00, 000 for finer finish, etchant (see Table 1&2 of IS 7739 Pt.3), glycerin, photographic paper, 2 percent aqueous solution of sulphuric acid, hypo, ammonium molybdate (5 g per 100 ml of water), nitric acid (r.d. 1.2) , developer-made up of 5 ml of saturated stannous chloride solution, 50 ml hydrochloric acid, 100 ml water and 1 g alum. Caustic resistant filter paper, 5 percent caustic soda, 5 percent sodium sulphide solution, distilled water	Defects)
12.	Vernier Calipers , Micrometer, steel tape, steel scale, depth gauge, radius gauge	12 (Dimensions and Dimensional Tolerances) cl.9.2.(Seam)
13.	UTM Machine (LC 0.1KN, Range:0-400KN)	7(Tensile Test)
14.	Unit having Quenching fixtures, arrangement for keeping specimen in place wait water jet emerging from cone at the bottom to touch the lower end of the sample. Muffle furnace, safety equipment, Rockwell hardness tester	11 (Hardenability),cl.15.1 (Blank Hardening Test for Core Strength Guarantee)
15.	Brinell Hardness Tester with Tungsten Carbide Indenter	7 (Hardness)
16.	Metallurgical Microscope with image analyzer or Metallurgical Microscope (100 X or better resolution), Heating furnace suitable for normalizing or annealing, sample preparation using compression mounting, 3 % Nital as etchant Band saw machine, Belt grinder, micro polisher, sample polishing machine, auto mount,	8 (Grain Size), 10.1 (Cleanliness of steel) 15.1 (Microstructure for machinability including banding)
17.	Equipment for specimen preparation by machining, magnifying glass(15X), Surface Roughness Tester (in-house Calibration using roughness block), Air Oven	15.1(Cleanliness Test by 'Blue- fracture Test')
19	Ultrasonic flaw detector with amplifier/attenuator calibrated in steps of at least 2dB, CRT/Monitor, Double Crystal probes, calibration blocks	15.1(Ultrasonic test)

20.	Upset Machine Heating furnace and quenching media	9.3 (Hot upset for forgeability)
21.	Izod Impact Machine consisting of a pendulum with a determined weight scale and pointer, fixed base to cantilever test specimen, V-notch maker	7.1 (Impact Test)
22.	Magnifying Glass(10X), Lathe machine for Sample Preparation (Step Formation), Vernier Calliper	10.2 (Step Machined test Method)
23.	Magnifying Glass(10X), Equipment for sample preparation by machining, grinding, Magnetization Test Set Up (as per IS 3703), Cleaning Solvent, Air Jet/Drying Solvent	10.2 (Magnetic Particle Inspection Method)

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

ANNEXURE C
To PRODUCT MANUAL FOR
Stock for forgings produced from continuously cast blooms, billets and slabs
According to IS 13352:1993

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 and implement 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 – The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L.....) shall be stamped or suitably marked at the end with material designation, heat number and indicating the source of manufacturer, on all bars of 40 mm or equivalent section and above. Bars of smaller section shall be tied in suitable bundles which will carry metal tags or labels giving the information. The bars, billets, etc. shall be suitably colour coded at the ends to mark the grade of the material. The colour scheme followed shall be in accordance with IS 2049 or as per purchaser's requirement; ~~provided always that~~ the product thus marked 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", on metal tags tied to bundles.

4. CONTROL UNIT – For the purpose of this Scheme, a control unit is defined as material of same cast, form and processed to same dimensions under uniform conditions (heat treatment, if any) of production in a day in the same place.

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.

5.2 General requirements relating to the supply of material shall conform to IS 1387. Records of order from the Purchasers are to be maintained. Material shall be manufactured as per Cl 4 of IS 13352 and supplied as per in any one of the delivery conditions as given in Table-1 of IS 13352.

6. TEST CERTIFICATE- For each consignment of BIS Certified material conforming to IS 13352:1992 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. The Standard Mark (if already applied) on

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rejected material should be defaced.

TABLE 1 LEVELS OF CONTROL
(PARA 5 OF THE SCHEME OF INSPECTION AND TESTING)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or)S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Manufacture	4.1 to 4.3	IS 13352	R	-----	-----	Applicable for all manufacturers including: i) manufacturers with steel making facilities ii) manufacturers without steel making facilities who are producing stock by rolling or forging from Ingots as raw material: Must ensure that Ingots procured by them comply with Cl 4.1 to 4.3 of IS 13352:1992.Accordingly, records in support of the same shall be maintained which shall include raw material certificate indicating steel manufacturing process, freedom from defects etc.
5	Freedom from defects						
5.1	Surface and Sub-Surface Defects	5.1	IS 13352	R	Adequate inspection to ensure that each item conforms to the requirement of the specification		
5.2	Internal Defects	5.2,5.3,5.4, Fig 1	IS 13352 IS 12037/IS 11371	R	i) Adequate inspection to ensure that each item conforms to the requirement of the specification ii) The customer will specify the acceptance criteria by defining the maximum defects permissible as per plate 1 and plate 2 of Fig 1		
6	Chemical Composition	IS 228(in parts) or any other established instrumental/ chemical method. However, records of referee method in case of no referee method in IS 228 and as agreed to between manufacturer & purchaser shall be maintained.					
	Ladle Analysis	6.1, 6.1.1,6.1.2 Table-2	IS 13352	R	One	Each Heat	Applicable for manufacturers with steel making facilities

	Check analysis	6.1, 6.1.1, 6.1.2 Table-2 & 3	IS 13352	R	Nil	Nil	Applicable for manufacturers with steel making facilities
				R	One	Each Cast	Applicable for Manufacturers without steel making facilities. No testing for check analysis is required if starting material being subjected to processing is ISI marked and received with test certificate
7	Mechanical properties	7.1, 7.2	IS 1500 Pt.1 IS 1608 (Pt.1) IS 1598 IS 5517/IS 4432/ IS 1875	R	One	Each Control Unit	-----

8	Grain Size	8.1 to 8.3	IS 13352 IS 4748	R	One	Each Control Unit	-----
9.1	Surface Defects	9.1	IS 13352	R	Adequate inspection to ensure that each item conforms to the requirement of the specification		
9.2	Seams	9.2	IS 13352	R	One	Each Item	-----
9.3	Hot Upset Test	9.33	IS 13352	R	As per mutual agreement between manufacturer and purchaser		
10.1	Inclusion Rating	10.1	IS 4163 IS 13352	R	One	Each Control Unit	For vacuum, ESR or secondary refined quality, limits for inclusion rating are subject to mutual agreement
10.2	Step Down Test and Magnetic Particle Test	10.2	IS 10138	R	i) To be carried out when required and ordered ii) The level of acceptance shall be as agreed to between purchaser and supplier at the time of enquiry and order		
11	Hardenability	11.1,11.2	IS 3848	R	One	Each Control Unit	Applicable for steel ordered on the basis of end quench hardenability.
12	Dimensions & Tolerances	12.1 to 12.3	IS 3739 IS 13352	R	Adequate inspection to ensure that each item conforms to the requirement of the specification		

15	Additional tests a) Ultrasonic test Blank hardening test for core strength guarantee c) Cleanliness test by 'Blue Fracture Test d) Microstructure for machinability, including banding	15	IS 13352 IS 11371 IS 10138 IS 3664	S	i) If agreed to between the purchaser and manufacturer at the time of enquiry and order, any or a combination of these test may be carried out to ensure that the steels meet the quality requirements of the purchaser ii) The acceptable level for each or any one of these additional tests shall be mutually agreed to at the time of enquiry and order.
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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 empanelled 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.

ANNEXURE I

BIS STANDAR D MARK

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(Para 6 of the Scheme of Inspection and Testing)

XYZ IRON AND STEEL COMPANY

(Registered office Address and works address)

TEST CERTIFICATE FOR Stock for forgings produced from
continuously cast blooms, billets and slabs

DATE _____

TEST CERTIFICATE No.

To M/s _____

We certified that the material described below fully conforms to **13352:1992** 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 **13352:1992** FOR DETAILS OF SPECIFICATION REQUIREMENTS)**TEST RESULTS**

Order No. & Date	Size	Control Unit No.	Grade	Quantity in tonnes	CHEMICAL COMPOSITION										MECHANICAL PROPERTIES	Freedom from Defects	Grain Size	Hardenability	Cleanliness of the Steel	Surface Defects	Additional tests	Remarks
					C %	Si %	Mn %	Ni %	Cr %	Mo %	V %	W %	S %	P %								
															Hardness TS Elongation 0.2% proof stress Impact							

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY