

**PRODUCT MANUAL FOR  
HOT – ROLLED BARS AND RODS FOR PRODUCTION OF BRIGHT BARS AND  
MACHINED PARTS FOR ENGINEERING APPLICATIONS  
According to IS 7283:1992**

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.	<b>Product</b>	:	<b>IS 7283:1992</b>
	<b>Title</b>	:	Hot – Rolled Bars and Rods for Production of Bright Bars and Machined Parts for Engineering Applications
	<b>No. of amendments</b>	:	2
2.	<b>Sampling Guidelines</b>		
a)	<b>Raw material</b>	:	No specific requirement
b)	<b>Grouping Guidelines</b>	:	Please refer Annex – A
c)	<b>Sample Size</b>	:	For physical tests: 1 m For chemical tests : 1 m or 50 gm drillings
3.	<b>List of Test Equipment</b>	:	Please refer Annex – B
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer Annex – C
5.	<b>Possible tests in a day</b>	:	All Physical and Chemical tests
6.	<b>Scope of the Licence :</b>		
	Licence is granted to use Standard Mark as per IS 7283:1982 with the following scope:		
	<b>Name of the product</b>		Hot – Rolled Bars and Rods for Production of Bright Bars and Machined Parts for Engineering Applications
	<b>Dimensions</b>		Round bars & rods of dia from ...mm upto and including ...mm, Square bars & rods of size from ...mm upto and including ...mm
	<b>Grade</b>		2

**ANNEXURE A**  
**To PRODUCT MANUAL for**  
**Hot – Rolled Bars and Rods for Production of Bright Bars**  
**and Machined Parts for Engineering Applications**  
**According to IS 7283:1992**

**GROUPING GUIDELINES**

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Clause 7 of IS 7283:1992 specifies range of sizes, for bars and rods which may be produced by hot rolling, and their dimensional tolerances and Clause 6 & Table-1 of IS 7283:1992 specifies grades of hot-rolled bars based on depth of defects. Accordingly, Hot – Rolled Bars and Rods for Production of Bright Bars and Machined Parts for Engineering Applications according to IS 7283: 1992 are designated as mentioned below:

- Round, Square & Hexagonal Bars and Rods
- Surface Quality
  
- Samples of bars and rods for a given shape shall be drawn for independent testing as follows:

**Round/Hex/Square Bars and Rods**

Group 1: Sizes up to and including 8mm dia or distance across flats

Group 2: Sizes over 8mm & upto and including 32mm dia or distance across flats

Group 3: Sizes over 32mm & upto and including 60mm dia or distance across flats

Group 4: Sizes over 60mm dia or distance across flats

- One sample of each shape (viz. Round, Hexagon, Square ) from each size group as mentioned above shall be tested to cover the entire size groups. In case sample of grade-1 is tested, grade-2 may also be covered within the group.
  
- While considering Grant of licence/inclusion of additional varieties, it shall be ensured that the applicant/licensee has got the complete manufacturing and testing facilities for all the sizes/grades/shapes applied.
  
- During the operation of license, BO shall ensure that all the sizes/grades/shapes covered in the licence are drawn for independent testing on rotation over a period of time.

**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	Macro etchant- 1:1 Hydrochloric Acid, Hot plate, magnifying glass	6 (Freedom from Defects)
2	Vernier Calipers	Table-1 (Depth of Surface defects)
3	Vernier Calipers , Micrometer	7.1,7.2( Dimensions and Dimensional Tolerances)
4	Steel Scale, measuring tape	7.3(Length)
5	Metallurgical Microscope (100 X or better resolution), Heating furnace suitable for normalizing or annealing, sample preparation using compression mounting, 3 % Nital	8(Decarburization) Using Microscopic method
6	Heating furnace and quenching media(non hardened material), Vickers or Knoop Hardness tester	8(Decarburization) Using microindentation hardness traverses
7	Optical microscope	9(Inclusion rating)
8	Heating furnace, hardening apparatus, Rockwell or Vickers hardness tester	10 (Hardenability)
9	Optical microscope , standard charts for the measurement of grain size, nital	11(Grain size)
10	Rough Polishing Machine, Cutting Machine, Fine Polishing Machine, Grinder Machine	Preparation of specimen
11	<b>Instrumental methods</b> Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry.  Spectrophotometer	Cl 5, 5.1, 5.2 for C,S,P,Mn,Si,Ni,Cu,Cr  Mn,S,P,Si

12	<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>	<p>Cl 5, 5.1, 5.2 for C &amp; S (chemical method, alternative to instrumental method)</p>
13	<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 (KMnO<sub>4</sub>), Sodium Nitrite (NaNO<sub>2</sub>), Ammonium Molybdate [(NH<sub>4</sub>)<sub>2</sub> MoO<sub>7</sub>], Ammonium Phosphate [(NH<sub>4</sub>)<sub>3</sub> PO<sub>4</sub>], Potassium Nitrate (KNO<sub>3</sub>), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO<sub>4</sub>), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable</p>	<p>Phosphorus content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)</p>
14	<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>	<p>Manganese content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)</p>
15	<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>	<p>Silicon content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)</p>
16	<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>	<p>Cu content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)</p>

17	ashless paper pulp, paper pulp pad, hot plate, dessicator,  Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid	Ni content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)
18	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.	Cr content Cl 5, 5.1, 5.2 (chemical method, alternative to instrumental method)
19	Inert gas fusion followed by determination using thermal conductivity detector	Nitrogen Content Cl 5, 5.1, 5.2

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

**ANNEXURE C  
TO PRODUCT MANUAL FOR  
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and Machined Parts for Engineering Applications  
According to IS 7283:1992**

**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](http://www.bis.gov.in)”

**4. CONTROL UNIT** – All hot rolled bars and rods representing the same cast and drawn to same dimensions, grade, shape and manufactured under uniform conditions of production.

**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 7283:1992 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.

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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				
5	Chemical Composition (See Note-2)	5.1 5.2	IS 7283: 1992	R	1	Each Heat	i) Applicable for manufacturers with steel making facilities
	i) Ladle Analysis						R
	ii) Product Analysis (See Note-3)						

6	Freedom from defects	6.1, 6.1.1, 6.2, 6.3 & Table-1	IS 7283: 1992	R	1	Every half an hour	
7	Dimensions & Dimensional Tolerances	7.1,7.2, 7.2.1,7.3,7.3.1, 7.3.2	IS 7283: 1992 IS 3739	R	1	Every half an hour	
8	Decarburization	8	IS 6396	R	1	Each Control Unit	
9	Inclusion Rating	9	IS 4163	R	----	-----	If required by purchaser. Records of agreed values for inclusion rating are to be maintained.
10	Hardenability	10	IS 3848	R	----	-----	If required by purchaser. Records of agreed values for the test are to be maintained.
11	Grain Size	11	IS 4748	R	----	-----	If required by purchaser.

Note-1: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Note-2: The chemistry of material shall conform to that of steel specified by purchaser and as agreed to between purchaser and manufacturer. Records of the same shall be maintained.

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

Note-4: ----- means the levels of control in Column(3) of Table-1 are as agreed to between the manufacturer and purchaser.



