



**PRODUCT MANUAL FOR  
Stainless Steel Bars and Flats  
According to IS 6603:2001**

1.	<b>Product</b>	:	<b>IS 6603:2001</b>
	<b>Title</b>	:	<b>Stainless Steel Bars and Flats</b>
	<b>No. of amendments</b>	:	<b>0</b>
2.	<b>Sampling Guidelines</b>		
a)	<b>Raw material</b>	:	<b>No specific requirement for raw material</b>
b)	<b>Grouping Guidelines</b>	:	Please refer Annex - A
c)	<b>Sample Size</b>	:	For Chemical tests: i) For instrumental chemical analysis - 5 pieces of 5 cm ii) For Wet Chemical analysis - 50 gm drillings For Mechanical tests- 1no x 1.5m
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 except Corrosion Resistance tests
6.	<b>Scope of the Licence :</b>		
	License is granted to use Standard Mark as per IS 6603:2001 with the following scope:		
	<b>Name of the product</b>	Stainless Steel Bars and Flats	
	<b>Steel Designation</b>	X04Cr13, X12Cr13 etc..	
	<b>Finish</b>	Hot finished/Cold finished	
	<b>Condition of supply</b>	Annealed/softened/Hardened & Tempered/Cold drawn/ Cold rolled	
	<b>Shape(Type)/Size</b>	Round Bars of Dia from... to ... mm Square Bars of size from... to ... mm Hexagon Bars of size from... to ... mm  Flats(round edge/square edge) of Thickness from ... to ... mm & Width from ... to ... mm	
	<b>Optional Requirements</b>	With or Without Corrosion resistance/Charpy impact test	

**ANNEXURE A**  
**TO PRODUCT MANUAL FOR**  
**Stainless Steel Wire According to**  
**IS 6603:2001**  
**GROUPING GUIDELINES**

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

Group	Steel Designation	Remarks
1	X04Cr12 X07Cr17 (Ferritic)	<p>One sample of any steel designation within the group of any size, shape, may be drawn for a given finish (hot finished/cold finished) and tested for all requirements of the specification, as applicable.</p> <p>In case the applicant/licensee is intended to apply for licence/inclusion of ferritic grades in annealed condition, the above sample drawn shall be of annealed condition.</p> <p>Eg: If licence/inclusion is to be granted for bars/flats for a given size range for hot finish and annealed condition, one sample of bar or flat of any size of hot finish and annealed condition is to be drawn and tested. If cold finish and annealed condition is also intended in scope of licence, then one additional sample of bar or flat of any size of cold finish and annealed condition is to be drawn and tested.</p>
2	X12Cr12 X20Cr13 X30Cr13 X40cr13 X15Cr16Ni2 X108Cr17Mo (Martensitic)	<p>One sample of any steel designation within the group of any size, shape, may be drawn for a given finish (hot finished/cold finished) and tested for all requirements of the specification, as applicable.</p> <p>In case the applicant/licensee is intended to apply for licence/inclusion of Martensitic grades in annealed condition and/or Hardened &amp; Tempered condition, the samples drawn shall include a sample from each of the conditions applied for.</p> <p>Eg: If licence/inclusion is to be granted for bars/flats for a given size range for hot finish and annealed condition, sample of bar or flat of any size of hot finish and annealed condition is to be drawn and tested. If hot finish and Hardened &amp; Tempered condition also is to be intended in scope of licence, then additional sample of bar or flat of any size of hot finish and Hardened &amp; Tempered condition is to be drawn and tested.</p>
3	X02Cr19Ni10 X04Cr19Ni9 X07Cr18Ni9 X04 Cr18Ni10Ti X04Cr18Ni10Nb X04Cr17Ni12Mo2 X02Cr17Ni12Mo2 X04Cr17Ni12Mo2Ti X10Cr17Mn6Ni4N (Austenitic)	<p>One sample of any steel designation within the group of any size, shape, may be drawn for a given finish (hot finished/Cold finished) and tested for all requirements of the specification, as applicable.</p> <p>In case the applicant/licensee is intended to apply for licence/inclusion of Austenitic grades in Softened condition, the above sample drawn shall be of Softened condition.</p> <p>Eg: If licence/inclusion is to be granted for bars/flats for a given size range for hot finish and softened condition, sample of bar or flat of any size of hot finish and softened condition is to be drawn and tested. If cold finish and softened condition also is to be intended in scope of licence, then additional sample of bar or flat of any size of cold finish and softened condition is to be drawn and tested.</p>

1. A declaration shall be obtained from the applicant on each heat treatment process based on the manufacturing capabilities, exercised for each group.
2. If the above sample passes, then licence may be granted/inclusion be done for the Steel designations, for all sizes and varieties of the Group.
3. 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/grade designations /varieties of Stainless Steel bars and Flats to be included in the licence.
4. During the operation of licence, BO shall ensure that all the sizes/grade designations/ varieties covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B  
TO PRODUCT MANUAL FOR  
**Stainless Steel Bars and Flats**  
According to IS 6603:2001  
**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	Vision-based inspection system	6 (Freedom from Defects)
3	<p><b>Instrumental methods</b> Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry.</p> <p>Standard Reference Material with certificate</p>	7, 7.1, 7.2 for C, S, P, Mn, Si, V, Cu, Cr, Ni, Ti, Nb, Mo
4	Inert gas fusion followed by determination using thermal conductivity detector	7, 7.1, 7.2 (Nitrogen content )
5	Tensile Testing Machine	9.1,9.2(Tensile test)
6	UTM configured for bend testing /Mandrels/Templates/ UTM attachments/vice/Magnifying glass	9.3(Bend Test)
7	Hardness Tester (Vickers/Brinell/Rockwell)	9.4(Hardness Test)
8	Pendulum Impact Testing Machine – Charpy for U-notch specimen	9.5 (Charpy Impact test)
6	Vernier Calipers, Micrometer, Scale, Cord, Measuring Tape, Straight Edge, Flat bench	12 ( Dimensions and Dimensional Tolerances)
7	<p>Apparatus for corrosion resistance test</p> <p><b>BY HUEY TEST (IS 10461 (Part1):1994)</b> Oven (0-700Deg C), Stop Watch Corrosive Solution (Aqueous solution of 65+/-2% (m/m) reagent grade HNO<sub>3</sub>, weigh balance, Hot Plate, Conical Flask (1 litre) fitted with cold finger immersion condenser or other type of condenser such as Allihn condenser with at least 4 bulbs, paper indicator to check acid fumes, test piece support Mechanical/chemical preparation and degreasing apparatus and reagents including Grade 120 Abrasive Paper or cloth, Hydrochloric Acid, Nitric Acid, soap, acetone, Water Apparatus for test specimen preparation</p>	14.1(Corrosion resistance)

8	<b>By Money Penny Strauss Test (IS 10461 (Part2):1994)</b> copper sulphate pentahydrate, distilled water, sulphuric acid, Conical flask of one litre fitted with four ball rising condenser weigh balance, Hot Plate, test piece support, copper filings Mechanical/chemical preparation and degreasing apparatus, Grade 120 Abrasive Paper or cloth, Hydrochloric Acid, Nitric Acid, Trichloroethylene or any other suitable solvent. Apparatus for bend test, flattening test.	14.1 (Corrosion resistance)
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Note: The above is an indicative list for the purpose of guidance only

**ANNEXURE C**  
**To PRODUCT MANUAL FOR**  
**Stainless Steel Bars and Flats**  
**According to IS 6603:2001**

**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** – The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the labelling and marking shall be done as per the provisions of the Indian Standard, 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](http://www.bis.gov.in)”.

**4. CONTROL UNIT** – For the purpose of this Scheme, a control unit is defined as material of same cast, finish, condition and shape and processed to same dimensions 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 6603:2001 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 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				
5	Manufacture	5.1 5.2 5.3	IS 6603:2001	R	Each Bar/Flat	Each Bar/Flat	If found defective, item shall be rejected and not be marked.
6	Freedom from Defects	6	IS 6603:2001	R	-do-	-do-	-do-
7	Chemical Composition	Any established instrumental/chemical method. However, records of referee method as agreed to between manufacturer and purchaser shall be maintained.					
	Ladle Analysis	7.1 10.1 13.1 Table-1	IS 6603:2001	R	One	Each Heat	Applicable for primary stainless steel producers only.  Manufacturers without steel making facilities shall maintain records of test certificates for ladle analysis of each heat.
	Check analysis	7.2 10.1 13.1 Table-1,2	IS 6603:2001	R	One	Each Cast	

9	Mechanical Properties						
	Tensile Properties	9.1, 9.2, 10.2.1, 10.2.2, 10.2.3, 10.2.4, 13.2, Fig.1, Table- 3 to 8	IS 6603:2001 IS 1608 (Pt.1) IS 3711	R	----	----	See Note-3
	Bend Test	9.3,10.2.1, 10.2.2, 10.2.4, 13.2, Table-3	IS 6603:2001 IS 1599	R	----	----	See Note-3
	Hardness Test	9.1, 9.4, 10.2.1, 10.2.2, 10.2.4, 13.2& Table-3 to 6	IS 6603:2001 IS 1500(Pt.1) IS 1501(Pt.1) IS 1586(Pt.1)	R	----	----	See Note-3
	Charpy Impact Test	9.4,10.2.1, 10.2.2, 10.2.3, 10.2.4, 13.2& Fig.1	IS 6603:2001 IS 1499	S	----	----	Records of agreed to values between manufacturer & purchaser shall be maintained. Also, See Note-3
12	Dimensional Tolerances	12,Table 9 to 17	IS 6603:2001	R	Adequate inspection to ensure each item to be within the limits of specification.		
14	Corrosion Resistance	14.1	IS 6603:2001 IS 10461(Pt 1) IS 10461(Pt 2)	S	----	----	
	Colour Coding	14.1.1	IS 6603:2001	R	----	----	

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.

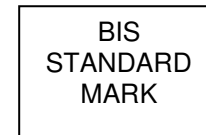
Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

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



**Annexure-I  
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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 SPECIFICATION FOR Stainless Steel Bars and Flats**

TEST CERTIFICATE No. \_\_\_\_\_ DATE \_\_\_\_\_  
 To M/s \_\_\_\_\_

We certified that the material described below fully conforms to IS 6603:2001 Chemical composition and Physical properties of the product, as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L \_\_\_\_\_ are as indicated below against each order No.

(PLEASE REFER TO IS 6603:2001 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

**TEST RESULTS**

Order no and date	Size/ Shape /Type	Designation/ Condition	Cast	Quantity	Chemical Composition										Mechanical Properties #					Corrosion # tests/ Remarks							
					C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Cr	N	Others	YS (Mpa)	TS (Mpa)	Elongation (%)		Impact test	Hardness					

# if required by purchaser

REMARKS  
 WAGON NO.  
 TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY