



PM/ IS 11513/ 1/June 2018

**PRODUCT MANUAL FOR
Hot Rolled Carbon Steel Strip for Cold Rolling Purposes
According to IS 11513:2017**

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 11513:2017
	Title	:	Hot Rolled Carbon Steel Strip for Cold Rolling Purposes
	No. of amendments	:	Nil
2.	Sampling Guidelines		
a)	Raw material	:	Strip shall be made from steel manufactured by the open hearth, electric, duplex, basic oxygen or a combination of these processes or any other process agreed between purchaser and supplier
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	For Chemical Test: 5 test pcs of 50 mm x 50 mm size For Physical Test: NA (No physical tests prescribed in IS. Dimensional tests to be done in the factory on full width strip)
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	:	Dimensions and tolerances (Cl.9), Freedom from defects (Cl.8) and Chemical Composition (Cl.6 and Table-1) through instrumental method using a suitable device such as optical spectrometer
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 11513:2017 with the following scope:		
	Name of the product	Hot Rolled Carbon Steel Strip for Cold Rolling Purposes	
	Grades	<i>[Mention grade i.e. CR0, CR1 etc.]</i>	
	Size	<i>[Mention range of width and thickness]</i>	
	Conditions	<i>[Mention whether semi killed, fully killed, rimmed etc and edge condition ie whether mill edges or sheared edges etc..]</i>	

**ANNEXURE A
FOR PRODUCT MANUAL FOR
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GROUPING GUIDELINES

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a) Grouping has been done on the basis of different process used for manufacturing of the product and also taking into consideration % C, P & S

Group	Designations	
1	CR0 CR1 CR2 CR3 CR4 CR5	<p>A. Without addition of micro-alloy elements:</p> <p>One sample of any size of higher formability grade, with lower C%, is to be tested from the group for considering all grades without addition of Micro-alloy elements. If sample is tested for higher formability steel grade then recommendation for grant of licence / inclusion may include lower formability steel grades also. If the firm does not intend to cover micro alloyed grades then the exclusion of the same should be mentioned in the scope of licence.</p> <p>For example CR0 to CR3 is to be covered, then one sample of CR3, the highest formability grade has to be drawn and tested. All lower formability grades CR0, CR1, & CR2 can also be covered.</p> <p>B. With addition of micro-alloy elements:</p> <p>In case the firm intends to cover the grades CR0 to CR4 with addition of ‘micro-alloying’ elements as well then one sample of any grade with micro-alloying and another sample of a grade with</p>

		<p>higher formability & without micro-alloying should be drawn (i.e two samples).</p> <p>If the firm intends to cover the grades CR0 to CR5 with addition of 'micro-alloying' elements as well then testing of one sample of CR5 with micro-alloying would serve the purpose as it is the highest formability Grade within the group and also has permissible micro alloying elements upto 0.15 Max.</p>
2	CR6 CR7	<p>One sample of any size from the group is to be tested for considering the grades CR6 & CR7 for grant of licence/inclusion.</p> <p>For covering the grades CR6 & CR7 in scope of licence , one sample of CR6 or CR7, preferably with high % C , % Mn and micro-alloy elements, is to be tested.</p>
3	CR8 to CR15	<p>One sample of any size from the group of each grade applied for, preferably with high % C, % Mn and micro-alloy elements is to be tested for considering the grades for grant of licence/inclusion.</p>

Manufacturing/testing facilities and capabilities including on-line to be verified with respect to the sizes and accordingly the same may be covered in the scope of licence.

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/varieties applied.

ANNEXURE B
FOR PRODUCT MANUAL FOR
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LIST OF TESTING EQUIPMENT

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

Sl.No.	Test Equipment	Test used in with clause Reference
1.	<p>Device for instrumental chemical analysis such as Optical Spectrometer with all requisite channels</p> <p>OR</p> <ul style="list-style-type: none"> • Carbon Sulphur (Strohlein's type) Apparatus – Complete set consisting of glass parts, combustion furnace, oxygen cylinder , combustion tubes/ boats etc. • Porcelain boat (capable of withstanding 1150 deg. C) • Weighing Balance • Hot plate • Muffle furnace • Induction Furnace • Barometer, Thermometer • Burette, Pipette and Full Range of Lab. Glassware like : Conical Flasks ,Beakers, Funnel, Pipettes Glass rod, watch Glass, Brush etc. • Standard Reference Material • Platinum Crucible for Silicon Test • Dessicator • Filter paper, Whatman Filter Paper & Ash less clippings • Arrangements for nitrogen testing • Drilling machine <p>Chemicals and reagents as applicable</p> <p>(Indicative element wise list of test apparatus, chemicals and reagents is enclosed)</p>	For Chemical Composition (Cl. 6)
2.	Micro meter (Flat Type), Vernier Calipers and Steel Measuring Tape, Weigh bride or weighing scale of appropriate capacity	Dimensions and tolerances (Cl.9) and Weight (Cl. 10)
3.	-----	Freedom from defects (Cl.8)

ANNEXURE B
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LIST OF TESTING EQUIPMENT

**INDICATIVE LIST OF TEST APPARATUS, CHEMICALS AND REAGENTS FOR
CHEMICAL ANALYSIS THROUGH CHEMICAL METHODS AS PER IS 228**

1.	<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.8.1, 8.2 – C & S</p> <p>(chemical method, alternative to instrumental method)</p>
2.	<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</p>	<p>Phosphorus content Cl 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>

	reagent as applicable	
3.	<p>Hot plate, Conical flask</p> <p>Reagents: 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 CI 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>
4.	<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,</p> <p>Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid</p>	<p>Silicon content CI 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>
5.	<p>Plate, Muffle Furnace, porcelain or silica crucible,</p> <p>Reagents: HotWash 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 CI 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>
6.	<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>	<p>Ni content CI 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>
7.	<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</p>	<p>Cr content CI 8.1,8.2</p> <p>(chemical method, alternative to instrumental method)</p>

	permanganate solution.	
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Nitrogen content shall be occasionally tested.

Note:

1. This is an indicative list for the purpose of guidance only and may not be treated as exhaustive
2. In case of Test method as per IS 228 is followed, facility/alternate arrangement for Al(in case of Al-killed), Nitrogen testing and Microalloying elements to be verified, accordingly scope of licence to be defined.

**ANNEXURE C
FOR PRODUCT MANUAL FOR
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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 equipment.

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

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

4. **CONTROL UNIT**: Each designation and size manufactured from same lot/cast.

5. **LEVELS OF CONTROL** - The test and inspection indicated in Table 1 attached and at the levels of control specified therein shall be carried out on the whole production covered under this scheme and appropriate records maintained in accordance with paragraph 2 above..

6. **TEST CERTIFICATE**-For each consignment of BIS Certified material conforming to IS 11513 there shall be a test certificate which shall contain the Standard Mark, the lot/cast 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.

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

(1)				(2)	(3)		(4)
TEST DETAILS					<u>LEVELS OF CONTROL</u>		
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Samples	Frequency	REMARKS
		Clause	Reference				
6	Chemical composition		IS 11513:2017(relevant parts of IS 228 or any other established Instrumental/chemical method)				Records of condition supplied shall be maintained No further testing is required if the material received is ISI marked and received with test certificate.
	a) Ladle Analysis	6.1 Table 1	IS 11513:2017 (relevant parts of IS 228 or any other established Instrumental/chemical method)	R	Each heat	Each heat	Applicable for manufacturers with steel making and hot rolling facilities
	b) Product Analysis	6.2 Table 2	IS 11513:2017	R	i)Each Cast	i)Each Cast	i)Applicable for manufacturers with steel making and hot rolling facilities ii) Applicable for Re-rollers.

					ii)Each Cast	ii)Each Cast	No further testing is required if the material received is ISI marked and received with test certificate.
7	Retest	7	IS 11513:2017	-	-		If a test does not give the specified results, two additional tests shall be carried out at random on the same cast/coil, as applicable. Both retests shall conform to the requirements of this standard; otherwise, the cast/coil shall be rejected.
8	Freedom from Defects	8	IS 11513:2017 IS 1730 IS/ISO 16160	R	Adequate inspection to ensure each coil is to be free from defect		
9	Dimensions and Tolerances i)Standard Dimensions ii)Thickness iii)Crown iv) Nominal Width v)Edge Camber	9.1 9.2 9.3 9.4 9.5	IS 11513:2017(relevant parts of IS 228 or any other established Instrumental/chemical method)	R	Each coil	Each Coil	Any special tolerances to suit Specific requirements shall be mutually agreed to between the manufacturer and the customer and records of the same shall be maintained.

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

SCHEME OF INSPECTION AND TESTING

TEST CERTIFICATE FORMAT

ANNEXURE I
XYZ IRON AND STEEL COMPANY

TEST CERTIFICATE FOR HOT ROLLED CARBON STEEL STRIP FOR COLD ROLLING PURPOSES

TEST CERTIFICATE NO. _____ DATED _____
TO M/s _____

It is certified that the material described below fully conforms to 11513:2017. Chemical composition 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. etc.

(PLEASE REFER TO IS 11513:2017 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order no and date	Dimensions	Grade	Cast and Coil No.	Mass of Coil (in Kg/tonnes)	Chemical Analysis (in %)								Crown	Camber	Condition (type of killing/rimmed etc.)
					C	Si	Mn	P	S	Cu*	Al	Microalloying elements			

*For copper bearing quality

The material supplied conforms to specified tolerances

REMARKS

SHIPPING ADVICE NO.

WAGON NOS.

FOR XYZ IRON AND STEEL COMPANY

(It is suggested that size A-4 paper be used for this test certificate)