



उत्पाद मैनुअल
अर्ध /पूर्ण रूप से प्रक्रमित गैर – दिशात्मक विद्वतीय इस्पात के लिए तप्त- बेल्लित और
अतप्त- बेल्लित इस्पात की चादरें
IS 18316: 2023 के अनुसार

**Product Manual for
Hot-Rolled and Cold-Rolled Steel Strips Intended for Processing of Semi/Fully Processed
Non-Grain Oriented Electrical Steel
According to IS 18316: 2023**

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	भारतीय मानक संख्या IS No.	:	IS 18316:2023
	शीर्षक Title	:	Hot-Rolled and Cold-Rolled Steel Strips Intended for Processing of Semi/Fully Processed Non-Grain Oriented Electrical Steel
	संशोधनों की संख्या No. of amendments	:	01
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific raw material requirement. Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex-A

c)	नमूने का परिमाण Sample Quantity	: For chemical test: 5 pcs of 5 cm x 5 cm The requirements of Freedom from Defects (cl.8.) and Dimensions and Tolerances (cl.9. and cl.10.) shall be carried out in the factory on the coils/strips from which samples are drawn for Independent Testing. Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	: Steel Grade & Designation, Width, Thickness Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	: Please refer to Annex- B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer to Annex- C
5.	एक दिन में संभावित परीक्षण Possible tests in a day All Tests can be carried out in a day Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.	
6.	लाइसेंस का दायरा /Scope of the Licence: IS 18316:2023 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है □Licence is granted to use Standard Mark as per IS 18316:2023 with the following scope:	
7.	उत्पाद का नाम Name of the product	Hot-Rolled and Cold-Rolled Steel Strips Intended for Processing of Semi/Fully Processed Non-Grain Oriented Electrical Steel
	Grade & Designation	LS-Low Silicon/ MS-Medium Silicon / HS-High Silicon/ VHS- Very High Silicon
	Dimensions	Thickness from ...mm upto and including ...mm Width from ...mm upto and including ...mm (Mill Edge/Slit Edge/Trimmed Edge)
	Supply Condition	Hot Rolled , Cold Rolled

ANNEX-A
TO PRODUCT MANUAL FOR
Hot-Rolled and Cold-Rolled Steel Strips Intended for Processing of Semi/Fully
Processed Non-Grain Oriented Electrical Steel
According to IS 18316:2023

GROUPING GUIDELINES

1. IS 18316:2023 covers the general technical conditions for steel strips intended for further processing to produce non-grain oriented electrical steel in semi/fully processed condition. This standard prescribes requirements for steels used for manufacture of electrical steels covered under various Indian Standards such as IS 648, IS15391.

2. The material may be supplied in any one of the following conditions subject to mutual agreement between the supplier and the purchaser:

- a) hot-rolled with or without pickling; and
- b) cold-rolled condition — Full hard/partially annealed

3. Further, steel as per IS 18316:2023 has been classified into the following grades based upon their chemical composition as per Table 2:

- (a) Grade-LS, Designation- Low silicon
- (b) Grade-MS, Designation- Medium silicon
- (c) Grade-HS, Designation- High silicon
- (d) Grade-VHS, Designation- Very high silicon

4. In view of above, the following grouping guideline shall be considered for the purpose of GoL/CSoL:

Group	Designation	Sample to be drawn
1	Grade -LS, Designation- Low silicon	One sample of any size (thickness/width) for each condition (Hot Rolled/Cold Rolled) shall be drawn and tested
2	Grade-MS, Designation- Medium silicon	One sample of any size (thickness/width) for each condition (Hot Rolled/Cold Rolled) shall be drawn and tested
3	Grade-HS, Designation- High Silicon	One sample of any size (thickness/width) for each condition (Hot Rolled/Cold Rolled) shall be drawn and tested
4	Grade-VHS, Designation- Very High Silicon	One sample of any size (thickness/width) for each condition (Hot Rolled/Cold Rolled) shall be drawn and tested

5. During preliminary inspection, before drawing samples for independent testing, it shall be ensured by IO that Strips/Coils from which samples are drawn for independent testing are

tested at factory for the requirements of Dimensions as per cl. 9 & cl. 10 of IS 18316:2023. In case of Inclusion, factory test report for Dimensions as per cl. 9 & cl. 10 of IS 18316:2023 may be accepted.

6. The Firm shall declare the sizes of steel strips they intend to cover in the License. The scope of the License may be restricted based on the manufacturing capability and availability of testing facilities of the Manufacturer.

7. During the operation of the License, BO shall ensure that all the varieties covered in the License are tested in rotation, to the extent possible.

ANNEX – B

LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

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

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	Rough Polishing Machine, Cutting Machine, Fine Polishing Machine, Grinder Machine, Lathe	Preparation of specimen
2.	Micrometer, Vernier Calliper, Steel tape, Steel Scale, Flat table/ surface, Cord	Cl.9,10 (Dimensions and Tolerances)
3.	Analytical balance (0-200g, LC:0.1mg)	Cl.7 (Chemical Composition)
4.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	Cl 7.1,7.2, 7.3 for C,S,P,Mn,Si,Al, Nitrogen
5.	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	Cl 7.1, 7.2, 7.3 – C & S (chemical method, alternative to instrumental method)

6.	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 (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	Phosphorus content Cl 7.1, 7.2, 7.3 (chemical method, alternative to instrumental method)
7.	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	Manganese content Cl 7.1,7.2, 7.3 (chemical method, alternative to instrumental method)
8.	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	Silicon content Cl 7.1,7.2,7.3 (chemical method, alternative to instrumental method)
9.	Determination of Nitrogen by Thermal Conductivity Method/ By Inert gas fusion followed by thermal conductivity detection/ By Steam Distillation Method	Cl. 7.1, 7.2 (Nitrogen Content)

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

ANNEX- C SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: material produced continuously from the same cast under uniform conditions to same dimensions in the same mill shall be considered as one control unit.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L...) shall be suitably incorporated on the product and on the Test Certificate issued along with each consignment, provided always that the product thus marked and packed conforms to all the requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 **Additional Marking requirements:** The material shall also be marked with the following additional requirement:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Any other requirement not specified in the Indian Standard

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 18316:2023 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).

5. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

[illegible]

							further testing is required.
8	Freedom from Defects	---	IS 18316	R	Manufacturer shall ensure adequate in process controls to ensure that the material remains free from harmful defects		
9	Dimensions & Tolerances (For Hot Rolled Steel)	9.1	IS 18316 IS 1730				
9.2	Thickness	---	IS 18316 IS/ISO 16160	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		
9.3	Crown	9.3, 9.3.1, 9.3.2	IS 18316	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		
9.4	Permissible Width Variations	---	IS 18316 IS/ISO 16160	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		
9.5	Edge Camber	---	IS 18316	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		
10	Dimensions & Tolerances (For Cold Rolled Steel)						
10.1	Thickness Tolerances	10.1.1, 10.1.2, 10.1.3	IS 18316	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		
10.2	Width Tolerances	10.2.1, 10.2.2	IS 18316	R	Adequate inspection to ensure each strip/coil conforms to the requirement of the specification		

ISI Mark
With IS No.
and CM/L
no.

Annexure-I
(Para 4 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL Company
(Registered office Address and works address)

Test Certificate for Hot-Rolled and Cold-Rolled Steel Strips Intended for Processing of Semi/Fully Processed Non-Grain Oriented Electrical Steel

TEST CERTIFICATE NO. _____

To M/s _____

Dated _____

We certified that the material described below fully conforms to IS 18316:2023 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 18316:2023 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Nominal Size (Thickness/ Width)	Control unit No.	Grade, Designation	Quantity (in tonnes)	Chemical Composition (in %)							Freedom from Defects	Edge Condition (Mill Edge/Slit Edge/Trimmed Edge)	Remarks
					C	S	P	Si	Mn	Al	N			

Remarks
Wagon No.
Truck No.

FOR XYZ IRON AND STEEL COMPANY

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