



उत्पाद मैनुअल
अतप्त बेल्लित गैर - दिशात्मक विद्युत इस्पात की चददर एवं पतियाँ- विशिष्ट
IS 648:2022 के अनुसार

Product Manual for
Cold Rolled Non-Oriented Electrical Steel Sheet and Strip —Fully Processed Type
According to IS 648: 2022

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 648:2022
	शीर्षक Title	:	Cold Rolled Non-Oriented Electrical Steel Sheet and Strip —Fully Processed Type
	संशोधनों की संख्या No. of amendments	:	01
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific 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	:	1. 40 pieces Epstein test strips (of 280-300 mm length & 30 mm width)

		2. 250 mm x 100 mm piece (10 pieces) 3. 20 pieces (280-300mm length & 30 mm width) Dimensional requirements on full width sample are usually tested in factory 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	Grade, Dimensions : 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 Physical, Mechanical and Magnetic properties excluding specific core loss (on aged test pieces) 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 648: 2022 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 648: 2022 with the following scope:	
7.	उत्पाद का नाम Name of the product	Cold rolled non-oriented electrical steel sheet and strip - Fully processed type
	Dimensions	Width uptomm Length upto.....mm (in case of sheets)
	Grade	50C100,....

Annex-A
To Product Manual for
Cold rolled non-oriented electrical steel sheet and strip - Fully processed type
According to IS 648:2022

GROUPING GUIDELINES

1. Non- Oriented Electrical Steel Sheet and Strip according to IS 648: 2022 is classified on the basis of the following:

- Nominal Thickness
- Maximum Specific Total Loss
- No. of bends

2. Accordingly, following grouping based on quality of product, shall be followed for considering grant of licence/inclusion as per IS 648:2022: -

Group	Grades	Remark
1	35C210 to 35C440	Grade Designations of one thickness is considered as one group. The grades are thickness specific and in each case grade with the minimum of (max) core loss is considered to be superior to the other grades. Accordingly, if one sample of grade with lower Maximum Specific Total Loss is drawn and tested, all other grades within the group having higher Maximum Specific Total Loss alongside the grade of lower Maximum Specific Total Loss, can also be covered in scope of licence. In addition, within a group, one sample of any other grade having maximum number for the requirement of bend test should also be drawn and tested. Eg: Samples of 35C210 and 35C440 are to be drawn and tested to all grades in group-1.
2	50C250 to 50C1000	
3	65C310 to 65C1000	
4	100C600 to 100C1300	

3. For grades not covered under Table 1, declaration with regards to the properties of such grades as per cl.6.1.3 and Note 3 under Table 1 shall be submitted. For such grades, separate samples for each grade needs to be drawn and tested as per the declared properties.

4. It shall however be ensured that firm has necessary manufacturing capabilities and testing facilities for the entire grades/conditions proposed to be covered under scope of BIS Certification.

5. During the operation of license, BO shall ensure that all sizes / grades covered in the license are drawn for independent testing on rotation over a period of time.

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	Weigh Bridge	Conditions of Delivery (6.1)
2	Depth gauge, Vernier Caliper, Bend tester with bend former radius of 5mm	Surface Condition (6.3)
3	Epstein Test Frame, Tesla meter (0-2.0T), Timer, Vernier Calipers, Frequency meter, Flux Volt meter, RMS Volt meter, Watt meter, RMS Ammeter , Ageing oven, Micrometer, Thermometer, Air conditioner with Heater Shearing machine, Punching m/c, lab stress relieving furnace (reducing or neutral atmosphere) with Temp indicator, Weighing balance	Magnetization test (7.1.1) & Core Loss (7.1.2)
4	Franklin tester with Test Head, Press, Pressure Gauge ,Ammeter, Voltmeter, Hot Plate, Weighing machine, Vernier callipers, thermometer, Lab. Oven	Surface Insulation characteristics (7.2 to 7.2.7)
5	Hot Plate, Vernier calipers, Thermometer, Trough, Trichloroethylene or Xylene	Resistance to solvents and cleanliness (7.2.7)
6	Measuring tape, measuring scale, Micrometer, Long arm digital gauge, Straight edge, Depth gauge, Steel scale Taper Gauge/Dial Gauge, Surface plate, Vernier callipers,	Geometric Characteristic and Tolerances (8)
7	Compression device/CTM Pressure gauge Vernier calipers, dial gauge, Weighing machine Rigid metal plates	Stacking factor (9.1)
8	Bend tester(Capable of bending 90° & 180°), Test mandrels (for each Thickness/width), Measuring tape, Micrometer, Steel scale	Bend Test (9.2)

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 during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) 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 (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: For the purpose of this scheme, a control unit shall be taken as a single charge of the product of one cast heat treated together with similar quality grading.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in Table 1. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

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.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognised/empanelled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made 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 incorporated suitably 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: Additionally, the following shall also be marked on each package of the material or the test certificate:

- 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 648:2022 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 - 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
(Recommended Levels of Control by BIS- For Guidance Only)

(1)				(3)		(4)
TEST DETAILS				LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		No. of Samples	Frequency	
		Clause	Reference			
6.1	Condition of Delivery	6.1, 6.1.1 to 6.1.8	IS 648:2022	Adequate inspection to ensure each sheet/strip to be free from defects and meet the other general requirements of IS 648:2022.		
6.2	Chemical Composition	6.2	IS 648:2022	As and If agreed to between manufacturer and purchaser		Records shall be maintained.
6.3	Surface Condition	6.3	IS 648:2022	Adequate inspection to ensure each sheet/strip meets the requirements of IS 648:2022.		
7	Magnetic Properties					
	Magnetization Test	7.1.1 to 7.1.1.1 Table 1	IS 648:2022 IS 649	One	Each Control Unit	—
	Core loss	7.1.2 to 7.1.2.2, Table 1		One	Each Control Unit	Test as per clause 7.1.2.4 is to be carried out, if required by the purchaser.
	Anisotropy of losses	7.1.2.3 to 7.1.2.5 Table 1	IS 648:2022	—	—	If required by the purchaser the anisotropy of losses should be tested. The maximum values of Table 1 should be guaranteed.
	Surface Insulation Characteristics	7.2, 7.2.1 to 7.2.5	IS 648:2022 IS 649	Adequate inspection to ensure that each sheet/strip meets the requirements of 7.2.1 to 7.2.3		Coating and Insulated material as specified by the purchaser
		7.2.4		One	Each Control Unit	Material when supplied with insulation, the nature of the

						insulation and its properties shall be subject to mutual agreement between the purchaser and the manufacturer
	Thermal effect on coating	7.2.6		One	Once in a week	If agreed between the purchaser & the manufacturer
	Resistance to solvents and cleanliness	7.2.7		One	Once in a week	
8	Geometric Characteristic & Tolerances					
	i) Thickness Tolerances	8.1 & 8.7	IS 648:2022	Adequate Inspection		i)Thickness Tolerances: - For narrow strip and for materials supplied with as rolled edges, other agreements may be reached while ordering Characteristic
	ii) Width Tolerances	8.2 & Table 2				ii)Width Tolerances: For materials supplied with as rolled edges and/or widths above 1250 mm the tolerance on nominal width be s subject of agreement while ordering.
	iii) Length Tolerances	8.3				iii) Edge Camber: Verification of Edge Camber applies only to a material supplied with trimmed edges, and width greater than 30 mm
	iv) Out of Squareness	8.5.2				iv) Residual Curvature: The verification of residual curvature does not apply to material supplied

	v) Edge Camber	8.5.3					with as rolled edges and material of width less than or equal to 100 mm.
	vi) Residual Curvature	8.5.4					vi) Flatness (Wave Factor): For material supplied with as rolled edges the flatness values shall be subject of agreement while ordering.
	vii) Flatness (Wave Factor)	8.6					vii) Material required to tolerances other than those specified in 8.1 to 8.6 shall be subject to agreement between the purchaser and the manufacturer
9	Stacking Factor	9.1 Table 1	IS 648:2022 IS 649	One	Each Unit	Control	—
	Bend	9.2, 9.2.1 Table-1		One	Each Unit	Control	—

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

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

Test Certificate for Cold rolled non-oriented electrical steel sheet and strip - Fully processed type
According to IS 648:2022

TEST CERTIFICATE NO. _____

To M/s _____

Dated _____

We certified that the material described below fully conforms to IS 648:2022. 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 648:2022 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Nominal Thickness and Size	Control Unit No.	Grade	Qty. (in tonnes)	No. of coils/sheets	Core loss	Magnetization Test	Stacking factor	No. of bends	Delivery Cond.	Optional (anisotropy, resistance to solvents, adherence, thermal effect)	Surface Insulation Characteristics

Remarks
Wagon No.
Truck No.

FOR XYZ IRON AND STEEL COMPANY

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