



उत्पाद मैनुअल
Cold Rolled Grain Oriented Electrical Steel Strip and Sheet
Delivered in Fully Processed State
IS 3024:2015 के अनुसार

PRODUCT MANUAL FOR
Cold Rolled Grain Oriented Electrical Steel Strip and Sheet
Delivered in Fully Processed State according to IS
3024:2015

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.	मानक संख्या IS No.	:	IS 3024:2015
	शीर्षक Title	:	Cold Rolled Grain Oriented Electrical Steel Strip and Sheet Delivered in Fully Processed State
	संशोधनों की संख्या No. of amendments	:	3
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	:	<u>For Conventional Grades</u> A) Approx. 50 Nos strips of 305 mm x 30 mm cut along the grain direction (Minimum 400 grams weight is required for Magnetic Properties)

		B) 10 Nos strips of 280 mm x 30 mm cut along the grain direction for Ductility/Bend Test C) 10 Nos of strips of 280 mm x 30 mm cut along the grain direction for Surface Insulation <u>For High Permeability Domain Refined Grades (not amenable for Heat Treatment)</u> A) One sheet of 500 mm x 500 mm for Core Loss and Polarization B) Approx 50 Nos strips of 305 x 30 mm cut along the grain direction for Stacking Factor C) 10 Nos strips of 280 mm x 30 mm cut along the grain direction for Ductility/Bend Test D) 10 Nos of strips of 280 mm x 30 mm cut along the grain direction for Surface Insulation <u>For High Permeability domain refined grades (amenable for Heat Treatment) and for non-domain refined grades</u> A) Approx. 50 Nos strips of 305 mm x 30 mm cut along the grain direction (Minimum 400 grams weight is required for Magnetic Properties) B) 10 Nos strips of 280 mm x 30 mm cut along the grain direction for Ductility/Bend Test C) 10 Nos of strips of 280 mm x 30 mm cut along the grain direction for Surface Insulation The requirements of Forms of Supply (cl.7.2), Surface Condition (cl.7.4.), Suitability for Cutting (Cl.7.5), Dimensions and Tolerances as per cl.11. (Thickness, Width, Length, Edge Camber (Full Width Coils) , Flatness (Wave Factor), Burr Height, Residual Curvature) and Workmanship, Finish and Appearance (cl.12) shall be tested on Full Width Coils during 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 (incase 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	1) Grade (as per Table 1/Table 2) 2) Condition/Surface Type (as per Table 4) 3) Method of Test for Magnetic Properties (Single Sheet Method/Epstein Method) 4) Method of Test for Ductility (as per cl.10.2.1 or as per cl.10.2.2) 5) Requirement of Stress Relief Annealing of Epstein Test Specimen (as per cl.14.4) 6) Requirement of Ageing of Test Pieces (as per cl.14.6)

			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 Annex – B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer 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 readyreference 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:		
	Licence is granted to use Standard Mark as per IS 3024:2015 with the following scope:		
	Name of the product	Cold Rolled Grain Oriented Electrical Steel Strip and Sheet Delivered in Fully Processed State	
	Dimensions	Width upto ...mm Length upto ...mm (in case of sheets)	
	Grade	18CG100,23CG110,..	
	Condition	NF,..	

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

ANNEXURE A

GROUPING GUIDELINES

1. Cold Rolled Grain Oriented Electrical Steel Strip and Sheet Delivered in Fully Processed State according to IS 3024: 2015 is classified on the basis of the following:

- Conventional grade or High permeability grade
- Nominal Thickness
- Maximum Specific Total Loss
- Domain Refinement (in case of High permeability grades)
- Delivery Condition

2. Accordingly, following grouping based on quality of product, shall be followed for considering grant of licence/inclusion as per IS 3024:2015: -

A. Conventional Grades

Group	Grades	Remarks
1	18CG100	One sample of the Grade shall be drawn and tested. If sample with higher insulation characteristic is tested eg F , then the lower insulation characteristics eg NF, PQ may also be included in scope of licence.
1	23CG110,23CG120 23CG127	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.
2	27CG120, 27CG130	
3	30CG130, 30CG140 30CG150	
4	35CG145, 35CG155 35CG165	If sample with higher insulation characteristic is tested eg F , then the lower insulation characteristics eg NF, PQ may also be included in scope of licence.

B. High Permeability Grades

Group	Grades	Remarks
1	20HP70, 20HP75	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. If sample with higher insulation characteristic is tested eg F , then the lower insulation characteristics eg NF, PQ may also be included in scope of licence.
1	23HP75,23HP80 23HP85,23HP90 23HP95,23HP100	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.
2	23HP75,23HP80 23HP85 ,23HP90 23HP95 ,23HP100	
3	27HP85, 27HP90 27HP95, 27 HP 100, 27 HP 110	If sample with higher insulation characteristic is tested eg F , then the samples with lower insulation characteristics eg NF, PQ may also be included in scope of licence.
4	27HP85 , 27HP90 27HP95	
5	30HP95, 30HP100 30HP105, 30HP110 30HP120	

6	35HP110, 35HP115 35HP125, 35HP135
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3. Grades (indicated with Suffix 'd' in the Table) may be delivered in domain or non-domain refined condition. In case if they are delivered with domain refinement then it is necessary to apply suffix 'd'. Suffix 'd' indicates use of test method to certify a grade, in line with test method's as defined in 15.4.

4. In case insulation characteristics are substantially different than those listed in Table 3 of IS 3024:2015, declaration on specific requirement including procedure for evaluating them shall be obtained from the manufacturer.

5. Scope of licence shall be restricted based on the manufacturing and testing facilities available.

6. During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

ANNEXURE B

LIST OF TEST EQUIPMENTS

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl. No.	Tests Used in with Clause Reference	Test Equipment/Chemicals and Identification Numbers (Where applicable)
1.	Core Loss (8.1) & Magnetic Polarization(8.2), 14.1(using 25cm Epstein frame)	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
2.	Core Loss (8.1) & Magnetic Polarization(8.2), 14.5 (For domain refined grades)	Single Sheet tester, 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
3.	Surface Insulation characteristics (9)	Franklin tester with Test Head, Press, Pressure Gauge , Ammeter, Voltmeter Hot Plate, Weighing machine, Vernier callipers, thermometer
4.	Stacking factor (10.1)	Compression device/CTM Pressure gauge Vernier caliper/dial gauge, Weighing machine Rigid metal plates
5.	Dimensions and Tolerances(11)	Measuring tape, measuring scale, Micrometer, Long arm digital gauge, Straight edge, Depth gauge, Steel scale Taper Gauge, Surface plate, vernier callipers,
6.	Ductility (10.2)	Bend tester/Thinner brake with apron brake & with hand folder Measuring tape
7.	Packaging(18)	Weigh Bridge

ANNEXURE 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 : For the purpose of this scheme a (control unit), shall be taken as single charge of the product of one or more casts heat-treated together with similar quality grading up to maximum weight of 5 tonnes or one mother coil whichever is higher.

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/empaneled 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 Column (1) of the First Schedule of the license and Licence Number (i.e. CM/L) shall be incorporated on one end of each coil/package of sheets and on the Test Certificate, 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.

4. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 3024:2015 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)

(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	
7	General Requirement s and surface conditions	7.1	IS 3024: 2015	R	As agreed between manufacturer and purchaser		Records shall be maintained.
		7.2 to 7.5	IS 3024: 2015	R	Firm shall exercise adequate in-process controls to ensure that each coil/sheet conforms to the specification. Wherever required, appropriate records shall be maintained by the manufacturer for evidence of conformity.		
8	Magnetic Properties						
	Core loss	8.1,13, 14, 17	IS 3024: 2015	R	One	Each control unit	
	Magnetic Polarization	8.2, 13, 14, 17	IS 649	R	One	Each control unit	
9	Surface Insulation Resistivity	9.1 to 9.4,13, 17 Table-3	IS 3024: 2015 IS 649	R	One	Each control unit	
10	Physical & Mechanical Properties						
	Stacking Factor	10.1 , 13, 17 Table-4	IS 3024: 2015 IS 649	R	One	Each control unit	
	Ductility	10.2 to 10.2.2, 13, 17		R	One	Each control unit	
11	Dimensions & Tolerances	11.1 to 11.7,13, 17 Table-5	IS 3024: 2015	R	Firm shall exercise adequate in-process controls to ensure that each coil/sheet conforms to the requirements given in the Indian Standard. Wherever required, appropriate records shall be maintained by the manufacturer for evidence of conformity.		

12	Workmanship, Finish and Appearance	12.1 to 12.1.2	IS 3024: 2015	R	Firm shall exercise adequate in-process controls to ensure that each coil/sheet remains free from harmful defects.
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ANNEXURE I
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)
TEST CERTIFICATE FOR Cold Rolled Grain Oriented Electrical Steel Strip and Sheet Delivered in Fully Processed State



TEST CERTIFICATE No. _____
TO M/s _____

DATE _____

We certified that the material described below fully conforms to IS 3024:2015 Magnetic, Physical and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks LicenceNo.CM/L_____are as indicated below against each order No.

(PLEASE REFER TO IS 3024:2015 FOR DETAILS OF SPECIFICATION REQUIREMENTS)
TEST RESULTS

Order No. & Date	Nominal Thickness and Size	Control Unit No.	grade	Qty in tonnes	No. of coils	Core loss at 50 Hz / 60Hz , 1.7 T (W/Kg)	Polarization in Tesla at a field strength of 800 A/m	IR (Ohm.-cm2/La)	Stacking factor	Ductility (Class/Minimum No. of Bends)	Delivery Condition	Optional	Remarks

REMARKS
WAGON NO.
TRUCK NO.
(It is suggested that size A4 paper be used for this test certificate)

FOR XYZ IRON AND STEEL COMPANY