



उत्पाद मैनुअल

गैल्वनाइज्ड स्टील स्ट्रिप्स और शीट्स (सादा और नालीदार)
IS 277:2018 के अनुसार

PRODUCT MANUAL FOR Galvanized Steel Strips and Sheets (Plain & Corrugated) According to IS277:2018

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- 1 के तहत प्रमाणन के संचालन में अभ्यास और पारदर्शिता के संचालन में पारदर्शिता सुनिश्चित करने 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 लाइसेंस/प्रमाणपत्र 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 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.	मानक संख्या IS No.	:	IS 277:2018
	शीर्षक Title	:	Galvanized Steel Strips and Sheets (Plain & Corrugated)
	संशोधनों की संख्या No. of amendments	:	1
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Included but not limited to IS 513 Pt.1 & 2(CR Sheet and Strip) and IS 1079(HR Sheet and Strip). Zinc Ingots used for galvanizing shall confirm to any of the grades specified in IS 209 or IS 13229. <i>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</i>
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex - A

c)	नमूने का परिमाण Sample Quantity	:	For mechanical tests: 2 No.s of 0.5mX0.5m For chemical tests: 5 pieces of 5 cm X 5 cm or 50 g drillings <i>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)</i>
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 tests <i>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.</i>
6.	लाइसेंस का दायरा/Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 277:2018 with the following scope:		
	Name of the product	Galvanized Steel Strips and Sheets (Plain & Corrugated)	
	Grade	Ordinary, ...	
	Designation	GP..	
	Class of coating	120,..	
	Coating Finish Type	N,..	
	Surface Treatment	O,..	
	Dimensions	Thickness: from ...mm to....mm, Width: From..... mm to.... mm, Length: fromm tom.	

ANNEXURE A**GROUPING GUIDELINES**

Grouping has been done on the basis of Designation as under:

1. From each Classification of Grades of Galvanized Corrugated Sheets, one sample of highest thickness and highest mass/grade of coating shall be drawn for testing for covering the entire range of thickness and mass/grade of coating of Galvanized Corrugated Sheets, offered for inspection.
2. From each Classification of Grades of Plain Galvanized Steel Sheet and Strip (coils), one sample of highest thickness and highest mass/grade of coating, shall be drawn for testing for covering the entire range of thickness and mass/grade of coating of Plain Galvanized Steel Sheet and Strip (coils), offered for inspection.
3. In order to cover both Galvanized Corrugated Sheets and Plain Galvanized Steel Sheet and Strip (coils) in the licence, one sample from Plain Galvanized Steel Sheet and Strip (coils) shall be drawn for bend testing only, in addition to 1) above.
4. It shall be ensured that manufacturer is having complete manufacturing and testing arrangements required for range of product to be covered in the licence. During operation of licence, sample by rotation shall be drawn for various Classification of Grades covered in the licence.
5. For change in scope of existing licence i.e for additional classification of grades in the existing licence, samples shall be drawn from additional grades, following the same procedure as mentioned above, for grant of licence.

ANNEXURE B

LIST OF TEST EQUIPMENT

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	Chemical Composition for C,S,P,Mn,Si,Al,Cu, N and Microalloying elements content (5.1) Mn,S,P,Si
2.	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	C& S-chemical method, alternative to instrumental method(5.1)
3.	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 (KMnO ₄), Sodium Nitrite (NaNO ₂), Ammonium Molybdate [(NH ₄) ₂ MoO ₇], Ammonium Phosphate [(NH ₄) ₃ PO ₄], Potassium Nitrate (KNO ₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO ₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable	Phosphorus content-chemical method, alternative to instrumental method(5.1)
4.	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-chemical method, alternative to instrumental method(5.1)

5.	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-chemical method, alternative to instrumental method(5.1)
6.	Plate, Muffle Furnace, porcelain or silica crucible, Reagents: Hot Wash 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	Cu content-chemical method, alternative to instrumental method(5.1)
7.	Determination of Nitrogen by Thermal Conductivity Method/By Inert gas fusion followed by thermal conductivity detection/ By Steam Distillation Method	Nitrogen Content (5.1)
8.	Weighing balance, Clean soft cotton cloth, Vernier Caliper, micrometer, Stripping method: Antimony trioxide / Antimony tri chloride, Conc.HCl, soft cotton cloth, solvent naphtha, trichloroethylene, alcohol, Distilled Water, 100 ml glass burette with stopcock, rubber tube, reservoir (for Volumetric method for using below 5mm nominal dia) and other glassware as applicable in addition to the reagents mentioned above.	Mass of Zinc coating(7,10.1)
9.	UTM (0-500kN)	Tensile Test (8.1)
10.	Steel Mandrels (for bend tests), Templates(for Bend test), UTM attachments/clamps/vice/Magnifying glass	Bend test (8.2)
11.	Surface Roughness Tester(in-house Calibration using roughness block)	Surface finish (9)
12.	i) Cord ii) Vernier Caliper iii) Flat bench iv) Measuring Tape; and v) Micrometer	Dimensions & Tolerances (14,15)

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 is defined as Strips or sheets of same dimensions and class of coating manufactured under essentially similar conditions using steel of one cast and zinc Ingots of same cast.**

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/empaneled 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 licence shall be incorporated legibly and indelibly on the top of each bundle or package of Galvanized Steel Sheets and Strips (Plain and Corrugated) or on tag attached to each coil, provided always that the material so marked conforms to each requirement of the specification.

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

4. TEST CERTIFICATE: Each consignment of BIS certified Galvanized Steel Sheets and Strips (Plain and Corrugated) confirming to IS 277:2018 shall be accompanied by a test certificate as given in Annex-1.

5. REJECTIONS – 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	
		Clause	Reference				
5	Manufacture	IS 228 or any other established instrumental/ chemical method					
	a) Product Analysis	5.1, 5.1.1 Table-1	IS 277: 2018 IS 228 (in parts)	R	One	Each Cast	In case the steel sheets/strips obtained for production of galvanized steel sheets/strips are ISI marked and received with test certificate, no further testing is required
	b) Zinc Ingots	5.2	IS 209 IS 13229	R	One	Each Consignment	In case material is received with test certificate of the supplier or test certificate from a NABL accredited lab indicating its conformity to relevant specification, no further testing is required.
6	Mechanical properties a) Yield Stress b) Tensile Strength c) Elongation (If required by the purchaser)	6, 8.1, 8.1.1, 8.1.2, 8.1.3, 8.1.4, Table-2	IS 277:2018 IS 1608 Pt.1	R	One	Each Control Unit	
7	Zinc Coating	7.1,7.2, 7.3,7.4, 7.5,10,	IS 277: 2018	R	One	Each Control Unit	

	a) Mass of Coating	10.1, 10.1.1, 10.2 Table-3, Table-4	IS 6745				
	b) Coating	7.6	IS 277:	R ^s	Adequate inspection to ensure that the galvanized steel strips and sheets(plain and corrugated) conform to the coating finish type and surface treatment they are intended to be supplied in.		
	Finish Type	7.7	2018				
	c)Surface treatment						
8	Mechanical Testing a) Bend test	8.2,8.2. 1,8.2.1. 1,8.2.1. 2,8.2,1. 3,8.3,Ta ble-5	IS 277: 2018	R	One	Each Control Unit	
9	Coating surface	10	IS 277:2018	R	Adequate inspection to ensure that the galvanized steel strips and sheets(plain and corrugated) conform to the coating surface finish classes and designation they are intended to be supplied in.		

	finish classes and designation				
12	Freedom from defects	12.1,12.2	IS 277:2018	R	Firm to execute adequate in-process controls to ensure that the material is free from harmful defects
13	Mass	13.1,13.2 Table-6	IS 277:2018	R	One Each Control Unit
14	Dimensions & Tolerances of plain sheets/strips	14.1, 14.2.1, 14.2.2, 14.2.3, 14.2.4, 14.2.5	IS 277:2018 IS 513 Pt.1 & 2, IS 1079, IS/ISO 16163	R	Adequate inspection to ensure that the Galvanized Steel Sheets and Strips (Plain and Corrugated) conform to the requirements of the specification
15	Dimensions & Tolerances of Corrugated Sheets	15.1, 15.1.1, 15.1.2, 15.1.3, 15.1.3.1, 15.2, 15.2.1, Table-8,9	IS 277:2018 IS 875 Pt.2	R	Adequate inspection to ensure that the Galvanized Steel Sheets and Strips (Plain and Corrugated) conform to the requirements of the specification

ANNEXURE I
(Para 6 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)

BIS
STANDARD
MARK

TEST CERTIFICATE FOR Galvanized Steel Strips and Sheets (Plain and Corrugated)

TEST CERTIFICATE No. _____

DATE _____

To M/s _____ We certified that the material described below fully conforms to IS 277:2018 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 277:2018 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No.	Dimensions	Batch No.	Profile	Quantity (Tonnes)	Chemical Analysis								Weight of coating	Mechanical Properties [#]				Grade of coating	Coating finish type / surface treatment/coating finish designation (If applicable)
					C	Si	Mn	S	P	N	Al	MA		Yield Stress Test	Tensile Stress ₂ (N/mm ²)	Elongation (%)	Bend Test		
					(%)	(%)	(%)	(%)	(%)	(%)	(%)								

@ Micro-alloying element present should be indicated

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY