

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

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 277:2018
	Title	:	Galvanized Steel Strips and Sheets (Plain & Corrugated)
	No. of amendments	:	0
2.	Sampling Guidelines		
a)	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.
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	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
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	:	All tests
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 277:2018with 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
TOPRODUCT MANUAL FOR
Galvanized Steel Strips and Sheets (Plain and Corrugated)
According to IS 277:2018

GROUPING GUIDELINES

PAGE 1 OF 1

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
TOPRODUCT MANUAL FOR
Galvanized Steel Strips and Sheets (Plain and Corrugated)
According to IS 277:2018

LIST OF TEST EQUIPMENTS

Page 1 of 2

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.	<p>Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry.</p> <p>Spectrophotometer</p>	<p>Chemical Composition for C,S,P,Mn,Si,Al,Cu, N and Microalloying elements content (5.1)</p> <p>Mn,S,P,Si</p>
2.	<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>C& S-chemical method, alternative to instrumental method(5.1)</p>
3.	<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 reagent as applicable</p>	<p>Phosphorus content-chemical method, alternative to instrumental method(5.1)</p>
4.	<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-chemical method, alternative to instrumental method(5.1)</p>

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)

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

ANNEXURE C
TO PRODUCT MANUAL FOR
Galvanized Steel Strips and Sheets (Plain and Corrugated)
According to IS 277:2018

SCHEME OF INSPECTION AND TESTING

Page 1 of 5

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 equipments.

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

3. LABELLING & MARKING –

The Standard Mark as given in the 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 requirement of the specification. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT – 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

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 277:2018 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)

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
TOPRODUCT MANUAL FOR
Galvanized Steel Strips and Sheets (Plain and Corrugated)
According to IS 277:2018
SCHEME OF INSPECTION AND TESTING

Page 2 of 5

TABLE 1: LEVELS OF CONTROL

(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 is 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's own lab 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	500 sheets or part thereof or one coil	Each Control Unit	If any test sample fails to meet test requirements given in two more set of test samples shall be taken for the specific test requirements from the same lot. If any of the retest sample fails to meet the requirements of this standard, the entire control unit represented by the sample shall be deemed as not conforming to the standard.

7	Zinc Coating a) Mass of Coating	7.1,7.2, 7.3,7.4, 7.5,10, 10.1, 10.1.1, 10.2 Table-3, Table-4	IS 277: 2018 IS 6745	R	500 sheets or part thereof or one coil	Each Control Unit	If any test sample fails to meet test requirements given in two more set of test samples shall be taken for the specific test requirements from the same lot. If any of the retest sample fails to meet the requirements of this standard, the entire control unit represented by the sample shall be deemed as not conforming to the standard
	b) Coating Finish Type c) Surface treatment	7.6 7.7	IS 277: 2018	R ^s	As agreed between the supplier and the purchaser. Also, see Note-3		
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,Table-5	IS 277: 2018	R	500 sheets or part thereof or one coil	Each Control Unit	If any test sample fails to meet test requirements given in two more set of test samples shall be taken for the specific test requirements from the same lot. If any of the retest sample fails to meet the requirements of this standard, the entire control unit represented by the sample shall be deemed as not conforming to the standard
9	Coating surface finish classes and designation	10	IS 277:2018	R	As agreed between the supplier and the purchaser.		
12	Freedom from defects	12.1,12.2	IS 277:2018	R	As agreed between the supplier and the purchaser.		
13	Mass	13.1,13.2 Table-6	IS 277:2018	R	500 sheets or part thereof or one coil	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 513Pt.1 &2, IS 1079, IS/ISO 16163	R	-do-	-do-	

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	500 sheets or part thereof or one coil	Each Control Unit	On agreement between the purchaser and the manufacturer sheets of other profile, depth and pitch of corrugation may also be supplied subject to fulfilment of required condition for imposed load on roofs as per 4.2 of IS 875 (Part 2).
----	----------------------------------------------	-----------------------------------------------------------------	----------------------------	---	----------------------------------------	-------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

^sNote-3: Test equipments to be possessed by the manufacturer only for the Coating Finish Type/Surface treatment in which they intend to supply the material.

ANNEXURE I

Page 5 of 5

(Para 6 of the Scheme of Inspection and Testing)

XYZ IRON AND STEEL COMPANY

(Registered office Address and works address)



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 LicenceNo.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		

[#]If required by purchaser

[@] 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