



उत्पाद मैनुअल
घिसाव और घर्षण प्रतिरोधी इस्पात की चदर और प्लेट - विशिष्टि
IS 18809:2024 के अनुसार

Product Manual for
Wear and Abrasion Resistant Steel Sheet and Plate
According to IS 18809: 2024

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 18809: 2024
	शीर्षक Title	:	Wear and Abrasion Resistant Steel Sheet and Plate
	संशोधनों की संख्या No. of amendments	:	01
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Steel used for manufacturing the product shall conform to IS 14650 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:

		i) For instrumental chemical analysis- 5 pieces of 5 cm x 5 cm ii) For Mechanical tests- 1 pc of 500 mm x 500 mm Prepared Pieces for Hardness (and Tensile Test, Bend Test, Impact Test (if applicable)) shall be drawn in case of higher thicknesses wherein a sheet sample (of 500 mmx 500 mm) may become bulky for transport The requirements of Dimensions and Tolerances (cl.12.) shall be tested in the factory during F/T on the full length of plates/sheets from which samples are drawn for I/T. 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, Heat Treated Condition, Form & 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 Tests	
	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 18809: 2024 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 18809: 2024 with the following scope:	

7.	उत्पाद का नाम Name of the product	Wear and Abrasion Resistant Steel Sheet and Plate
	Grade	ISAR 400, ISAR 450.....
	Heat Treated Condition	Quenched (Q) / Quenched and Tempered condition (Q and T) or any other Heat Treatment Condition as per mutual agreement between manufacturer and purchaser
	Form/Size	Sheet/Plate Length from..... mm to up to and includingmm, Width from mm to up to and including mm, Thickness from.....mm to up to and including mm

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

Annex-A
To Product Manual for
Wear and Abrasion Resistant Steel Sheet and Plate
According to IS 18809:2024

GROUPING GUIDELINES

1) For the purpose of GoL/CSoL, the following Grouping Guidelines shall be considered:

A) Grouping based upon Steel Grades:

A.1 Manufacturer shall declare the Steel Grades intended to be covered in the Scope of Licence.

Steel Grades	Hardness	Grouping
ISAR 400	360 to 430	One sample of each Steel Grade, among the Steel Grades intended to be covered in the Scope of Licence, shall be drawn and tested to cover them in the Scope of Licence
ISAR 450	410 to 490	
ISAR 500	450 to 550	
ISAR 550	500 to 580	
ISAR 600	550 to 650	

B) Grouping based upon Heat Treated Condition:

Heat Treated Condition	Grouping
Quenched (Q)	Samples of different Grade Designations, drawn at A above, shall be drawn in such a way (combination) that samples of all Heat-Treated conditions, intended to be covered in the Scope of Licence, are tested.
Quenched and Tempered (Q and T)	
Any other Heat Treatment Condition as per mutual agreement between manufacturer and purchaser	

C) Grouping based upon Form/Size:

Form/Size	Grouping
Plate	Samples, drawn at A & B above, may be of any Form and Size. However, recommendation of Scope of Licence with regards to Forms and Sizes shall be restricted based upon Manufacturing Capability.
Sheet	

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

3) During operation of licence, samples of each variety covered in the scope of licence, shall be 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	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer Standard Reference Material with certificate	Clause 7.1 and 7.2 C, Mn, Si, P, S, Cr, Mo, Ni, B, Al, Nb, V, Ti, Cu, N
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 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	Clause 7.1 and 7.2 C& S -chemical method, alternative to instrumental method
3	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	Clause 7.1 and 7.2 Manganese content -chemical method, alternative to instrumental method
4	Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot airoven, 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	Clause 7.1 and 7.2 Silicon Content -chemical method, alternative to instrumental method
5	Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman)	Clause 7.1 and 7.2

	filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate Potassium Permanganate (KMnO_4), Sodium Nitrite (Na_2NO_3), Ammonium Molybdate $[(\text{NH}_4)_2 \text{Mo}_2\text{O}_7]$, Ammonium Phosphate $[(\text{NH}_4)_3 \text{PO}_4]$, Potassium Nitrate (K_2NO_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
6	Hot plate, stop watch Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.	Clause 7.1 and 7.2 Chromium Content -chemical method, alternative to instrumental method
7	Reagents: Perchloric Acid, Phosphoric Acid, Nitric Acid, Hydrochloric Acid, Dilute sulphuric acid, potassium thiocyanate solution, stannous chloride solution, n-butyl acetate, Iron-Mo free, molybdenum metal (99.9 pc pure) Spectrophotometer, Volumetric flask, conical flask, titration apparatus (burette, pipette etc.), hot plate, thermometer, separating funnel, dry filter paper and other laboratory glassware and apparatus	Clause 7.1 and 7.2 Mo Content -chemical method, alternative to instrumental method
8	Ashless paper pulp, paper pulp pad, hot plate, dessicator, Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid	Clause 7.1 and 7.2 Ni Content -chemical method, alternative to instrumental method
9	Inert gas fusion followed by determination using thermal conductivity detector	Nitrogen Content (Clause 7.1 and 7.2)
10	Brinell Hardness Tester, Standard Hardness Blocks	Hardness Test, Cl 8.
11	Universal Tensile Test Machine (UTM) with extensometer and strain/stress rate control	Tensile Test, Cl 8.2
12	Bend Test Equipment/ Mandrels/Templates/UTM attachments/ clamps/vice/Magnifying Glass	Bend Test, Cl 8.3.
13	Pendulum Impact Testing Machine – Charpy for V- notch specimen, V-notch Cutter, Cryogenic Chamber	Charpy V Notch Impact Test, Cl 8.4
14	Visual	Freedom from defects cl.11.
15	Vernier Calipers, Steel Scale, Measuring Tape, Micrometer	Dimensions and Tolerances (Clause 12)

16	Eddy Current Tester, Magnetic Particle Inspection, Macro-Etch/Macro Etch	Non-Destructive Test cl.9.
17	Rough Polishing Machine, Cutting Machine, Micro Polisher, Grinder Machine, Automatic Mount Press, Surface grinder to remove burr	Sample preparation

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 is defined as material of same designation, form and size, subjected to same heat treatment condition and manufactured from the same cast of raw material on the same line in one go.

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 legibly and indelibly on the metal tag or adhesive label/sticker attached to each Plate or bundle 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.

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 18809:2024 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	Manufacture	6.1	IS 18809	Steel used for manufacturing the product shall conform to IS 14650		
7	Chemical Composition	Relevant Parts of IS 228 or IS 8811 or any other established International instrumental/chemical method				
	Ladle Analysis	7.1	IS 18809	One	Each Heat	Applicable for manufacturers having steel making facilities
	Product Analysis	7.2	IS 18809	1) Nil 2) One	1) Nil 2) Each Cast	1) Applicable for manufacturers having steel making facilities 2) Applicable for manufacturers not having steel making facilities and are procuring raw material slabs for further rolling. No further testing is required if the raw material slabs procured are ISI marked and are received with Test Certificate.
8	Mechanical Properties					
	Hardness Test	8.1 & Annexure-B	IS 18809 IS 1500 (Part-1)	One	Each Control Unit	Minimum core hardness shall be 90 percent of the guaranteed minimum

						surface hardness for plates with thickness greater than 20 mm.
	Tensile Test (Optional)	8.2	IS 18809 IS 1608 (Part-1)	Testing for mechanical properties such as tensile, bend and impact for wear and abrasion resistance steels covered in this standard is an optional requirement. However, if required, these tests and their values may be mutually agreed between the manufacturer and purchaser at the time of order.		
	Bend Test (Optional)	8.3	IS 18809 IS 1599			
	Charpy V Notch Impact Test (Optional)	8.4	IS 18809 IS 1757 (Part-1)			
9	Non Destructive test	9	IS 18809	The material may be subjected to any non-destructive testing to determine the internal soundness of material subject to mutual agreement between the manufacturer/supplier and purchaser at the time of order		
11	Freedom from Defects	11	IS 18809	Firm shall exercise adequate in-process controls to ensure that the material remains free from harmful defects		
12	Dimension and Tolerance	12	IS 18809 IS 1852	Firm to have adequate in-process controls to check compliance of this parameter as per the tolerances given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity.		

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 Wear and Abrasion Resistant Steel Sheet and Plate
According to IS 18809:2024
TEST CERTIFICATE NO. _____

To M/s _____ Dated _____

We certified that the material described below fully conforms to IS 18809:2024. 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 18809:2024 FOR DETAILS OF SPECIFICATION REQUIREMENTS)
TEST RESULTS

Order No. & Date	Form/ Size	Steel Grade	Heat/ Cast No.	Qty.	Chemical Composition (%)										Hardness	Freedom from defects	Mechanical Properties (TS/Bend/Impact) [#]
					C	Mn	Si	P	S	Cr	Mo	Ni	B	CE			

if required by purchaser
Remarks
Wagon No.
Truck No.

FOR XYZ IRON AND STEEL COMPANY

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