



उत्पाद मैनुअल
पानी और मलजल के लिए इस्पात पाइप (168.3 से 2540 मिमी बाहरी व्यास के)
– विशिष्ट IS 3589:2001 के अनुसार

PRODUCT MANUAL FOR
STEEL PIPES FOR WATER AND SEWAGE
(168.3 TO 2540 MM OUTSIDE DIAMETER) ACCORDING TO IS 3589: 2001

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 3589:2001
	शीर्षक Title	:	Steel Pipes for Water and Sewage (168.3 To 2540 mm Outside Diameter)
	संशोधनों की संख्या No. of amendments	:	07
2.	नमूना दिशानिर्देश Sampling Guidelines	:	
a)	कच्चा माल Raw material	:	No specific raw material 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	:	Prepared pieces for Tensile Strength (cl.9.1.), Flattening Test (cl.9.2.), Guided Bend Test (cl.9.3.) Chemical test: 5 pcs of 5cm x 5cm Hydrostatic Pressure Test (cl.10.) or NDT test, if applied, shall be carried out in factory on full length of Pipes from which samples are drawn for I/T.

			Requirements of Dimensions and Mass per Metre Run of Pipes (cl.11), Tolerances (cl.12.), Visual Inspection, Appearance and Workmanship (cl.14.) and Joints and Ends (cl.17.) (if applicable) shall also be carried out in the factory on full sizes of Pipes 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		1) Method of Manufacture of Pipe 2) Steel grade, Type of Killing of Steel, Addition of Micro-Alloying Elements (if any) 3) Size (Outside Diameter x Wall Thickness) 4) Joints (if any)/Ends of Pipe 5) Coating Type(if any) Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
e)	Additional Guidelines		Please refer Annex- B
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex- C देखें
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex- D देखें
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 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: 3589:2001 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 3589:2001 with the following scope:		
7.	Name of the product		Steel Pipes for Water and Sewage (168.3 To 2540 mm Outside Diameter)
	Method of Manufacture		Seamless,ERW,SAW..
8	Steel Grade		Fe330, ...
9	Size		Outside Diameter (OD) from ...xx... mm to up to and including ...xx... mm, Thickness from 2.6 mm to up to and includingxx. .mm
10	Joints/End of pipe		Plain ended,..

11	Optional	Uncoated (Black), Protective coating(galvanizing) or Any other Coating
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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN,9, BAHADUR SHAH ZAFAR MARG,
NEW DELHI-110002**

ANNEXURE A

GROUPING GUIDELINES

1. For the purpose of GoI/CSoL, the following Grouping Guideline shall be considered:

a) Grouping based upon Method of Manufacture and Steel Designation:

Method of Manufacture	Steel Designation	Grouping
Seamless (S)	Fe 330, Fe 410, Fe 450	For each Method of Manufacture of Pipes, samples of each Steel Designation shall be drawn and tested to cover all those Steel Designation for that Method.
Welded (ERW)	Fe 330, Fe 410, Fe 450	
Welded (SAW)	Fe 330, Fe 410, Fe 450	

b) Grouping based upon Sizes (Outside Diameter, Wall Thickness):

Size(Outside Diameter, Wall Thickness)	Grouping
Outside Diameter from 168.3 mm to 2540 mm or any other Outside Diameter (as agreed to between the manufacturer and purchaser)	To cover a range of Sizes of Outside Diameter and Wall Thickness of Pipes, samples shall be drawn in such a combination so that samples of the minimum and maximum Outside Diameter and the minimum and maximum Wall Thickness of Pipes shall be tested.
Wall Thickness – Min 2.6 mm for each Corresponding Outside Diameter	

- In case Galvanized Pipes or Pipes coated with any other coating (Refer Annexures A to D) are required to be covered in the Scope, the samples to be drawn at a) and b) above shall be of Galvanized or Coated Pipes. If Galvanized or Coated Pipes are drawn and tested, Uncoated (Black) pipes shall automatically be covered in the Scope of Licence. Further, in case more than one type of coating (including Galvanizing) is intended to be covered, samples shall be drawn in such a combination so that samples of all types of coating(s) are tested.
- Scope of licence shall be restricted based on the manufacturing and testing facilities available.
- 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

ADDITIONAL GUIDELINES FOR MANUFACTURERS WHO INTEND TO OUTSOURCE POST BLACK PIPE OPERATIONS

1. The post black pipe operation could be galvanizing.

Action by licensees

- i. The licensee intending to outsource post black pipe operation shall outsource these operations **only to a manufacturer holding a valid BIS licence for IS 3589:2001.**
- ii. **For the purpose of these guidelines, the licensee which is outsourcing the post black pipe operation shall be called Licensee A and the licensee to whom the operation is being outsourced, shall be licensee B.**
- iii. Black pipes shall be dispatched by the licensee A for post black pipe operations to the licensee B, control unit wise. Both the licensee A and B shall maintain records for post black pipe operations as per frequency stipulated in the SIT. These records shall be made available by both licensees for examination to BIS Certification Officers or Agents during surveillance visits or whenever otherwise sought by BIS.
- iv. The responsibility of conformity of the product in respect of all requirements shall lie with both the licensees.
- v. The licensee A shall emboss the Standard Mark (ISI) and its licence number on the black pipes conforming to IS 3589 along with all other details as per the marking clause of the SIT. The pipes shall be sent control unit wise to the licensee B. The licensee B shall employ 'transfix labels' for identification on the pipes; the label shall contain IS No. over Standard Mark and under Standard Mark, its licence number and the phrase 'Only Galvanizing' (See image below); after ensuring conformity of post black pipe operations to the IS 3589.



- i. The licensee A shall issue the test certificate of the ISI marked black pipes as per IS 3589 along with each consignment of the black pipes dispatched to licensee B. The licensee B, after carrying out Galvanizing and testing conformity of galvanizing as per IS 4736, shall issue the final test certificate of Galvanized pipes, incorporating the results of both the black pipes and Galvanizing, and other details such as Batch No./Lot No., Size(s), Grade, Quantity etc. for ensuring traceability to the black pipes.

All such pipes, after Galvanizing, shall be dispatched by Licensee B after enclosing the final test certificate of the Galvanized pipes.

Action by BOs

- i. The post black pipe operations shall be verified by the BO during the next surveillance of the outsourcer licensee unit and the licensee unit to whom this operation is outsourced. During the operation of licence, all such records maintained by the licensee and the outsourced unit shall be verified by the IOs.
- ii. If the licensee and the outsourced unit are under different BOs, the BO receiving the request shall inform the other BO accordingly and the BO under which the outsourced unit is located shall verify the post black pipe operations during the next surveillance and shall provide the necessary information to the BO.

ANNEX – C
LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Major test equipment required to test as per requirements of Indian Standard.

Sl. No.	Tests Used in with Clause Reference	Test Equipment/Chemicals and Identification Numbers (Where applicable)
1	Dimensions (11) Tolerances (12)	Vernier Caliper, micrometer (screw) gauge, Pi- Tape, Steel Scale, Straightedge, String, Concrete platform, Weighing Balance
2	Hydraulic Pressure Test (10)	Hydrostatic testing machine Fitted with calibrated pressure gauges, sealing devices for each end of the pipe of various dia, water injecting/pumping system
3	Tensile Test (9.1)	Universal Testing Machine (UTM)
4	Flattening test (9.2)	UTM with flattening test attachments
5	Guided Bend Test (9.3)	Hydraulic Press or UTM with guided bend test Jig having roller shoulders
6	C,S,P,Mn,Si,Al, Microalloying elements content (8) Mn,S,P,Si	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer
7	C& S -chemical method, alternative to instrumental method (8)	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

8	Phosphorus content- chemical method, alternative to instrumental method (8)	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
9	Manganese content- chemical method, alternative to instrumental method(8)	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
10	Silicon content- chemical method, alternative to instrumental method (8)	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
11	Nitrogen content (8)	Inert gas fusion followed by determination using thermal conductivity detector
12	Uniformity of Zinc Coating (16.2)	Copper carbonate (laboratory grade) or Copper hydroxide (laboratory grade), Copper Sulphate Crystals – Technical grade, Ammonium Hydroxide, Alcohol, Distilled water, Volatile organic solvent such as ether, trichloroethylene, carbon tetrachloride, etc. and other chemicals and reagents applicable, Thermostatically Controlled Freezer (Capable of achieving 15 deg to 20 deg Celsius temp., LC = 1 deg. C)
13	Mass of Zinc Coating (16.2)	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

ANNEX D

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:

For the purpose of this scheme, all steel pipes (plain/beveled ended and/or with joints and /or uncoated/galvanized or coated with any other coating) of the same steel grade, size and manufactured through the same method from the same heat/cast of input material on each tube mill in one go shall constitute a control unit.

1.3.1 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.2 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/empaneled 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 license and Licence Number shall be incorporated on each Pipe and the marking shall be done as per the provisions of the Indian Standard , 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 3589:2001, there shall be a test certificate which shall contain the Standard Mark, the lot/cast 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	
		Clause	Reference				
8	Chemical Composition						
	i)Ladle Analysis	8.1, Table-2	IS 3589:2001 IS 228(various Parts) or any established chem/instr.method	R	1) One	1) Each Heat	1) Applicable only for manufacturers with steel making facilities.
	ii)Check Analysis	8.2, Table-2,3		S	2) One	2) Each Cast	2) Applicable for manufacturers not having steel making facilities. No further testing is required if the input material procured is ISI marked and is received with test

							certificate.
9.1	Tensile Test	9.1 ,13 Table-4	IS 3589:2001 IS 1608 Pt.1 IS 3803 Pt.1 IS 4711	R	One	Each Control Unit	----
9.2.1	Flattening test for ERW pipes	9.2.1,13	IS 3589:2001 IS 4711	R	One	Each Control Unit	-----
9.2.3	Flattening Test for seamless pipes	9.2.3, 13	IS 3589:2001 IS 2328 IS 4711	R	One	Each Control Unit	----
9.3	Guided Bend Test (for SAW Pipes)	9.3, Fig-1,2 13	IS 3589:2001 IS 4711	R	One	Each Control Unit	----

10.	Hydraulic pressure test	10	IS 3589:2001	R	Each pipe	Each pipe	Method for NDT and the acceptance level shall be as agreed to between the manufacturer and the purchaser.
11	Dimensions and Mass per metre run of Pipes	11.1, 11.1.1,11.2 Table 5, Annex E	IS 3589:2001	R	Firm shall exercise adequate in process control to ensure that all pipes are manufactured as per the sizes specified. Wherever required appropriate records shall also be maintained		
12	Tolerances a) Mass b) Outside Diameter c) Thickness d) Ovality e) Length f) Straightness	12.1, 12.2, 12.3,12.4,12.5 Table 6	IS 3589:2001	R	Firm shall exercise adequate in process control to ensure that all pipes are manufactured in accordance with the Tolerances specified as per the standard. Wherever required appropriate records shall also be maintained		
16.1	Protective coating (if required)	16.1 Annex A to D	IS 3589:2001 IS	R	Any type of protective coating, if required, may be agreed to between the manufacturer and the purchaser.		
16.2	Galvanizing (if required)	16.2	IS 4736 :2001 IS 3589:2001	R\$	One	Each Control Unit	---
17	Joints & ends	17, Fig 3A, 3B, 4 Table-7	IS 3589:2001	R	One	Each Control Unit	----
14	Visual inspection, Appearance and workmanship	14.1 to 14.5	IS 3589:2001	R	Firm shall exercise adequate in process controls to ensure that all pipes remain free from harmful defects. Wherever required appropriate records shall also be maintained		

ANNEXURE I
XYZ Company
(Registered office Address and works address)

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

TEST CERTIFICATE FOR Steel Pipes for Water and Sewage (168.3 To 2540 mm Outside Diameter)

TEST CERTIFICATE NO. _____ DATED _____
TO M/s _____

We certified that the material described below fully conforms to 3589:2001 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 3589:2001 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Control Unit No.	Dimensions and Tolerances			CHEMICAL COMPOSITION							PHYSICAL PROPERTIES					Hydraulic test/NDT#	Coating
		OD	Thk	Length	C %	S %	P %	Si %	Mn %	Al %	@ Micro Alloying Elements %	TS	YS	%EL	Bend Test	Flattening test		

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY