



PM/ 4270/ 1
Feb 2020

**PRODUCT MANUAL FOR
Steel Tubes used for Water Wells - Specification
According to IS 4270:2001**

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 4270:2001
	Title	:	Steel Tubes used for Water Wells - Specification
	No. of amendments	:	02
2.	Sampling Guidelines		
a)	Raw material	:	No specific requirement
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	Mechanical test: 3m Chemical test:50mm x 50mm(5 test pieces)
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 4270:2001 with the following scope:		
	Name of the product	Steel Tubes used for Water Wells	
	Grade of Steel	Fe 410, Fe 450	
	Type of Tubes	HFS/CDS/ERW/HFIW	
	Type of joints	Screwed and Socketed butt joints/ screwed flush butt joints/ Plain End	
	End Use	Casing pipe, drive pipe, housing etc.	
	Sizes	Nominal Bore : mm up to and including... mm.	



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ANNEXURE A
TO PRODUCT MANUAL FOR
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GROUPING GUIDELINES

1. The steel tubes as per IS 4270:2001 have been classified based on size, end use (casing pipe, drive pipe), manufacturing process (HFS/CDS/HFW/ERW), type of joints (Screwed and Socketed butt joints/ screwed flush butt joints/ Plain End) and grade of steel (Fe 410, 450).
2. Three samples preferably of minimum, intermediate and maximum size from each type of manufacturing process (HFS/ERW/HFIW), end use (casing pipe/drive pipe/Housing pipe) and each type of joints (Socket shall be drawn as applicable shall be tested for all the applicable requirements of the specification to cover the entire size range intended to cover in the scope of licence.
3. If sample is drawn for higher grade of steel used (i.e. Fe 450) , then recommendation may include lower grade (i.e. Fe 410) also.
4. For the purpose of inclusion of additional sizes of tubes in the existing licences, one sample (preferably maximum for higher sizes or minimum for lower sizes intended to be covered) shall be tested for all the requirements of the specification.
5. While considering grant of licence/ inclusion of additional varieties, BO to ensure that the applicant/ licensee has got the complete manufacturing and testing facilities for all the varieties of tubes to be covered in the licence.
6. During operation of the licence, BO shall ensure that tubes of all varieties covered in the licence are tested in the factory and drawn for independent testing on rotation.



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ANNEXURE B
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LIST OF TESTING EQUIPMENT

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

Sl. No.	Test equipment	Test 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, Standard Reference Material with certificate</p> <p>Chemical methods Laboratory reagents and apparatus as per parts of IS 228</p> <p>i) Sulphur: Strohlein or Leco apparatus with all attachments Barometer with chart, Hot plate, Muffle furnace, Complete range of glass wares, measuring cylinders, Desiccators, 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</p> <p>ii) Phosphorus: 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 (KMnO₄), Sodium Nitrite (Na₂NO₃), Ammonium Molybdate [(NH₄)₂ Mo₂O₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (K₂NO₃), Phenolphthalein Solution, Rectified</p>	Chemical Composition of Tubes, Cl 5.2, Cl 10.2 (Sockets)

	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	
2	Tensile Testing Machine of suitable range fitted with extensometer	Mechanical properties (Tensile Test), Cl 6.1, Cl 10.2
3	Flattening Test apparatus	Flattening Test, Cl 6.2
4	Vernier Calipers, Micrometer, Scale, Cord, Measuring Tape, Straight Edge, Flatbench, surface plate,	Dimensions and Tolerances, Cl 7.1, 7.2 and Straightness, Cl 7.3, Dimensions of sockets, Cl 10.3
5	Hydrostatic test facility with calibrated pressure gauge	Hydrostatic test, Cl 8
6	Bevel Protractor	Pipe tubes/ends, Cl 9
7	Thread gauges	Threads of sockets, Cl 10.4
8	Drift Expansion test setup (Variable speed press/UTM and Conical mandrel)	Drift Expansion test on sockets, Cl 10.5
9	Alignment test apparatus	Alignment test, Cl 11
10	<p>For bituminous coating</p> <p>i. Heating and cooling arrangement (0 to 65 °C)</p> <p>For galvanized tubes</p> <p>i. Weighing balance, Clean soft cotton cloth, Vernier Caliper, micrometer</p> <p>ii. tripping method: Antimony trioxide / Antimony tri chloride, Conc.HCl, soft cotton cloth, solvent naphtha, trichloroethylene, alcohol, Distilled Water.</p> <p>iii. 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.</p>	Protective coating, Cl 12

Least Count and Range should match the values/parameters/tolerances mentioned in the Indian Standard.

The above list is meant only for guidance and may not be treated as exhaustive.



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ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

1. 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 AND MARKING –The Standard Mark, as given in the Schedule of the license shall be marked on each tube, provided that each tube thus marked conforms to the requirement of the specification.

3.1 Marking shall be done as per the provisions of the standard. In addition, lot/batch number, details of BIS Certification i.e. BIS Licence Number CM/L—and BIS website shall be marked on each tube as follows “For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT – For the purpose of this scheme , all the tubes of the same size, steel grade, type of joint, end use and manufactured through the same process (HFS/EFW/ERW/HFIW) in the same production line in a single shift shall constitute a Control Unit.

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.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to this specification there shall be a test certificate which shall contain the Standard Mark, the lot/batch 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 resalable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose. A separate record shall be maintained giving information on quantity and batch number/control unit number, as applicable, relating to all such rejections/defective/substandard 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.

TABLE 1
LEVELS OF CONTROL
(Clause 5 of SIT)

(1)				(2)	(3)		
TEST DETAILS				Test Equipment R: required S: Sub Contracting	LEVELS OF CONTROL		
Cl.	Requirement	Test Methods			No. of samples	Frequency	Remarks
		Clause	Reference				
5.2	Chemical composition		IS 228 Or Instrumental methods	S	One	Each heat in consignment	No testing is necessary if the consignment of the steel is received with manufacturer's test certificate indicating conformity to requirements of the IS
5.3	Weld seam check (check for untempered martensite formation)	5.3	IS 4270	S	One	Once in six months for each welding process	Also to be done whenever welding process or flux is changed
6.1	Tensile Test		IS 1608 (Part 1)	R	One	Each control unit	In case the sample fails in any one or more of the tests specified, two further samples shall be drawn from the control unit and tested for that requirement. If both the samples pass, the pipes shall be accepted. In case of failure of either of the samples, all the pipes in that control unit shall not be marked.

6.2	Flattening test		IS 2328	R	-do-	-do-	-do-
7	Dimensions (Outside diameter, thickness, weight, length, Straightness)	7.1 to 7.3	IS 4270	R	-do-	Each hour's production of the same size of pipes	-do-
8	Hydrostatic test	8	IS 4270	R	Each tube	Each tube	
9	Pipe tube/ends	9.1 to 9.3	IS 4270	R	-do-	Each hour's production of the same size of pipes and same type of ends	
10	Sockets	10.1 to 10.5	IS 4270	S	As per IS 4711	Each consignment	
11	Alignment test	11	IS 4270	R	One	Each control unit	Not applicable to plain end pipe
12	Protective Coating	12.1 and 12.2	IS 4270	R	One	Each control unit	Those found not conforming shall not be marked.
13	Protection of ends	13.1 to 13.3	IS 4270		Adequate inspection to ensure protection of ends		

14	Workmanship	14.1, 14.2	IS 4270	R	Each tube	
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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.

ANNEXURE I

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

**TEST CERTIFICATE FOR
Steel Tubes used for Water Wells - Specification
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TEST CERTIFICATE No. _____

DATE _____

To M/s _____

We certify that the material described below fully conforms to IS 4270:2001

. 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 4270:2001 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. and date	Control Unit/lot/batch number.	Nominal Size	Type of tubes (based on welding process, joints and end use)	Quantity (tonnes)	Tensile strength (N/mm ²)	Flattening test	Chemical composition (%S, %P)	Workmanship Dimensions and straightness	Hydrostatic test	Ends	Sockets	Alignment test	Protective coating	Steel Grade	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