



PM/ IS 3074/ 1/ April 2020

**PRODUCT MANUAL FOR
Steel Tubes for Automotive Purposes
According to IS 3074:2013**

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 3074:2013
	Title	:	Steel Tubes for Automotive Purposes
	No. of amendments	:	1
2.	Sampling Guidelines		
a)	Raw material	:	The steel tubes shall be manufactured from steel which shall be supplied in killed condition and free from harmful defects. Note: This excludes the use of rimming or semi-killed steel. Generally, for manufacturing ERW/HFIW Steel tubes, Steel Strips, included but not limited to, as per 10748, IS 1079(HR), IS 513 Pt.1 & IS 513 Pt.2(CR) are used.
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	Mechanical Test 2 meter Chemical test : 5 pcs of 5cm x 5cm (for OES) or 50 gm drillings for testing by chemical method
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 3074:2013 with the following scope:		
	Name of the product	Steel Tubes for Automotive Purposes	
	Manufacturing Process	ERW/HFIW,..	
	Grade	ERW-1. ...	
	Sizes	OD up to and including 114.3 mm	
	Condition	As welded,..	

ANNEXURE A
TO PRODUCT MANUAL FOR
Steel Tubes for Automotive Purposes
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GROUPING GUIDELINES

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1. Grouping of steel tubes for automotive purposes is carried out on the basis of method of manufacture and strength as under:

Sl No.	Grade Designation	Type/Class	Condition	Sizes	Group	Remarks
1	CDS-1	Cold Drawn Seamless Tube	a) As Drawn or As Drawn and tempered b) As drawn and Normalized / Annealed c) As drawn and brazed or welded d) As drawn or heat treated e) Oil quenched and tempered	Upto and including outer diameter 114.30 mm	1	One sample of any size and conditions (preferably of higher size) manufactured by same process may be drawn to include all sizes and condition(s) of the process in licence scope. If sample is tested for higher Designation the recommendation may include lower Designation in the group. (Note: Within a group the grades are arranged in ascending order of rank based on strength.)
2	CDS-2					
3	CDS-3					
4	CDS-4					
5	CDS-5					
6	CDS-6					
7	CDS-7					
8	CDS-8					
9	CDS-9					
10	ERW-1	Electric Resistance Welded/ High Frequency Induction Welded Tubes			2	
11	ERW-2					
12	ERW-3					
13	CEW-1	Cold Drawn Electric resistance /High Frequency Induction Welded Tubes			3	
14	CEW-2					
15	CEW-3					

2. As mentioned above, the sample tested may be of any size and condition of a group for higher designation therein. Accordingly, licence can be granted for all the sizes, conditions of that group, for higher Grade Designation tested and can include the lower Designation applied by the applicant/licencee, provided that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of all other sizes, conditions of tubes proposed to be included in the licence.
3. In case no test facilities are available, details may be sought from the applicant with respect to the arrangement proposed for testing of leak tightness. In the absence of facilities to conduct the test in-house/arrangement for testing, the manufacturer shall submit an undertaking that no claim for conformity of the product to the requirement will be made.
4. During the operation of license, BO shall ensure that all Grades & Product types covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
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LIST OF TEST EQUIPMENTS

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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	Straightedge, String, Concrete platform and Vernier calliper	Straightness (6)
2	i) Vernier calliper gauge or any other suitable device ii) Steel scale iii) micrometer (screw) gauge or other suitable device iv) Weighing Balance v) Measuring Tape	Dimensions & Tolerances (9) Condition (21)
3	Hydrostatic Test Equipment Fitted with calibrated pressure gauges (0-10 MPa) or Eddy Current Flaw detector	Leak Tightness Test (23,28)
4	Universal Testing Machine (UTM)	Tensile Test (17,22,27)
5	Crush test equipment	Crush test (8.4,17,22,27)
6	UTM with flattening test attachments	Flattening test (8.3 ,18,22)
7	Variable Speed Press or UTM, Conical Mandrels with angles 30 ⁰ ,45 ⁰ ,60 ⁰ etc	Drift Test (8.5 & 22)
8	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	C,S,P,Mn,Si,Al, Microalloying elements content (7,14,20,25) Mn,S,P,Si
9	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 (7,14,20,25)

10	<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>	Phosphorus content- chemical method, alternative to instrumental method (7,14,20,25)
11	<p>Hot plate, Conical flask</p> <p>Reagents:</p> <p>silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid</p>	Manganese content- chemical method, alternative to instrumental method(7,14,20,25)
12	<p>Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace</p> <p>Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid</p>	Silicon content- chemical method, alternative to instrumental method(7,14,20,25)
13	<p>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</p>	Ni content-chemical method, alternative to instrumental method(7,14)
14	<p>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.</p>	Cr content-chemical method, alternative to instrumental method(7,14)

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

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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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, PACKING –

The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the marking and packing 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.

4. CONTROL UNIT – For the purpose of this scheme of Testing & Inspection, tubes of same size, type, grade designation, processed to same condition, manufactured from the same consignment of material (Cast/Heat of steel) under identical conditions in a shift on each tube mill shall constitute one 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.

5.2 General requirements relating to the supply of material shall conform to IS 1387. The steel to be used in production of steel tubes shall be manufactured as per Cl 4 and Cl 5 of IS 3074:2013. Steel tubes shall be manufactured as per Cl 14, 19, 24 of IS 3074:2013 , as applicable.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 3074:2013 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.

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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TABLE 1: LEVELS OF CONTROL

Section-1: General Requirements

(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				
4	Material	4.1 4.2	IS 3074:2013	S	One	Each Cast in a consignment	No testing is required if material is ISI marked and received with test certificate.
5	Workmanship	5.1 to 5.3	IS 3074:2013	R	Each tube	Each tube	
6	Straightness	6	IS 3074:2013	R	Each Tube	Each Tube	
9	Dimensions & Tolerances	9	IS 3074:2013 IS 5429	R	One (from Tubes of each size, type and grade designation)	Every Hour of Production	
10	Surface protection	10	IS 3074:2013	R	Each tube	Each tube	
11	Marking	11.1 11.2	IS 3074:2013	R	Each Tube/bundle	Each Tube/bundle	

Section-2: COLD DRAWN SEAMLESS STEEL TUBES (CDS)

(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				
14	Chemical Composition	7, 7.1,7.1.1 14 Table-1, 2	IS 3074:2013 IS 228(various Parts) or any established chem/instr.method	S	One	Each Cast in a consignment	No testing is required if material is ISI marked and received with test certificate.
17	Tensile Test	8.2 17 Table-3 8.6	IS 3074:2013 IS 1608 Pt.1	R	Two (One shift production of tubes of one size, type & grade designation)	Each Shift	
18	Flattening Test	8.3 & 18 8.6	IS 3074:2013 IS 2328	R ^s	One (One hour's Production of each size, type&grade designation)	Every Hour	See Note-3
8.4	Crushing Test	8.4 & 17,8.6	IS 3074:2013	R ^s	---do---	---do---	See Note-3
15	Condition	Table 3	IS 3074:2013	R ^s	Each tube	Each tube	See Note-3

Section-3: ELECTRICAL RESISTANCE WELDED/HIGH FREQUENCY INDUCATION WELDED STEEL TUBE (ERW/HFIW)

(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				
20	Chemical Composition	7,7.1,7.1.1 20 Table-1,4	IS 3074:2013 IS 228(various Parts) or any established chem/instr.method	S	One	Each Cast in a consignment	No testing is required if material is ISI marked and received with test certificate.
22	Tensile Test	8.2 22 8.6 Table-5	IS 3074:2013 IS 1608 Pt.1	R	Two (One shift production of tubes of one size, type &grade designation)	Each Shift	
22	Flattening Test	8.3 & 22 Table-5 8.6	IS 3074:2013 IS 2328	R ^s	One (One hour's Production of each size, type&grade designation)	Every Hour	See Note-3
22	Drift Test	8.5 & 22 Table-5 8.6	IS 3074:2013 IS 2335	R ^s	---do---	---do---	See Note-3
23	Leak Tightness Test	23.1, 23.2	IS 3074:2013	S	Each tube	Each tube	
21	Condition	21, Table-5	IS 3074:2013	R ^s	Each tube	Each tube	See Note-3

Section-4:COLD DRAWN ELECTRIC RESISTANCE WELDED/HIGH FREQUENCY INDUCATION WELDED STEEL TUBE (CEW)

(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				
25	Chemical Composition	7,7.1, 7.1.1, 25 Table-1,6	IS 3074:2013 IS 228(various Parts) or any established chem/instr.method	S	One	Each Cast in a consignment	No testing is required if material is ISI marked and received with test certificate.
27	Tensile Test	8.2, 8.6 27 Table-7	IS 3074:2013 IS 1608 Pt.1	R	Two (One shift production of tubes of one size, type &grade designation)	Each Shift	
27	Crushing Test	8.4, 8.6 & 27 Table-7	IS 3074:2013	R ^s	One(One hour's Production of each size, type & grade designation)	Every Hour	See Note-3
28	Leak Tightness Test	28	IS 3074:2013	S	As and if agreed between manufacturer and purchaser.		
26	Condition	26, Table7	IS 3074:2013	R ^s	Each tube	Each tube	See Note-3

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: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification.

^sNote-3: Test equipment(s) to be possessed by the manufacturer only for type(s) and condition(s) in which they intend to supply the material.

ANNEXURE I

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(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 for Automotive Purposes



TEST CERTIFICATE No. _____

DATE _____

To M/s _____ We certified that the material described below fully conforms to IS 3074:2013 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 3074:2013 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Nominal Size				CHEMICAL COMPOSITION							PHYSICAL PROPERTIES					#Leak tightness	Remarks	
	OD	ID	Thk	Length	C %	S %	P %	Si %	Mn %	Al %	@Micro Alloying Elements %	TS	YS	%EL	Drift test	Crushing test			Flattening test

#If agreed between

@ 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