



PM/ 2039(Parts 1 to 3)/ 1/June 2020

**PRODUCT MANUAL FOR  
Steel Tubes for Bicycle and Cycle Rickshaws  
According to IS 2039(parts 1 to 3):1991**

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.	<b>Product</b>	:	IS 2039(parts 1 to 3):1991
	<b>Title</b>	:	Steel Tubes for Bicycle and Cycle Rickshaws
	<b>No. of amendments</b>	:	2
2.	<b>Sampling Guidelines</b>		
a)	<b>Raw material</b>	:	The steel tubes shall be manufactured from steel with permissible limits for C, S, Mn, S &P as per Cl 5 of IS 2039 Pt.1:1991.
b)	<b>Grouping Guidelines</b>	:	Please refer Annex - A
c)	<b>Sample Size</b>	:	Mechanical Test :1.5 meter 2 No.s Chemical test : 5 pcs of 5cm x 5cm (for OES) or 50 gm drillings for testing by chemical method
3.	<b>List of Test Equipment</b>	:	Please refer Annex - B
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer Annex - C
5.	<b>Possible tests in a day</b>	:	Chemical Composition, Dimensions, Tensile Test, Flattening Test, Fin Height, Straightness
6.	<b>Scope of the Licence :</b>		
	Licence is granted to use Standard Mark as per IS 2039(parts 1 to 3):1991with the following SCODE:		
	<b>Name of the product</b>	Steel Tubes for Bicycle and Cycle Rickshaws	
	<b>Tube Designation</b>	ERW C1,..	
	<b>Sizes</b>	OD up to and including 44.5 mm	
	<b>Condition</b>	As welded,..	

**ANNEXURE A**  
**TO PRODUCT MANUAL FOR**  
**Steel Tubes for Bicycle and Cycle Rickshaws**  
**According to IS 2039 (Parts 1 to 3): 1991**

**GROUPING GUIDELINES**

1. Grouping of steel tubes for Bicycle and Cycle Rickshaws 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	ERW C1	Electric Resistance Welded/ Induction Welded Tubes	a) As Welded b) As drawn and Normalized / Annealed	Upto and including outer diameter 44.50 mm	1	One sample of any size, condition (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	ERW C2					
3	ERW C3					
4	CEW C1	Cold Finished Electric Resistance Welded/ Induction Welded Tubes			2	
5	CEW C2					
6	CEW C3					

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/licensee, 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**  
**Steel Tubes for Bicycle and Cycle Rickshaws**  
**According to IS 2039 (Parts 1 to 3): 1991**  
**LIST OF TEST EQUIPMENTS**

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, Gauges, Concrete platform and Vernier calliper.	Workmanship (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)
3	Universal Testing Machine, Vernier Calipers, Air Conditioner, Thermohydrometer	Tensile Test(8)
4	UTM with suitable attachments, Air Conditioner, Thermohydrometer, Vernier Calipers	Flattening test(8)
5	Variable Speed Press or UTM, Conical Mandrels with angles 30 <sup>0</sup> ,45 <sup>0</sup> ,60 <sup>0</sup> etc	Drift Expansion Test (8)
8	<b>Instrumental methods</b> 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 Microalloying elements content(5)  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 (5)
10	Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration	Phosphorus content- chemical method, alternative to instrumental method(5)

	<p>Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate</p> <p>Potassium Permanganate (KMnO<sub>4</sub>), Sodium Nitrite (NaNO<sub>2</sub>), Ammonium Molybdate [(NH<sub>4</sub>)<sub>2</sub> MoO<sub>7</sub>], Ammonium Phosphate [(NH<sub>4</sub>)<sub>3</sub> PO<sub>4</sub>], Potassium Nitrate (KNO<sub>3</sub>), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO<sub>4</sub>), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable</p>	
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(5)
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(5)

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

**ANNEXURE C**  
**TO PRODUCT MANUAL FOR**  
**Steel Tubes for Bicycle and Cycle Rickshaws**  
**According to IS 2039 (Parts 1 to 3): 1991**

**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, 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, tubes of same size, type, grade designation, 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 2039 Pt.1:1991.

**6. TEST CERTIFICATE**-For each consignment of BIS Certified material conforming to IS 2039 Pt.1 to 3:1991 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**  
**TOPRODUCT MANUAL FOR**  
**Steel Tubes for Bicycle and Cycle Rickshaws**  
**According to IS 2039 (Parts 1 to 3): 1991**

**SCHEME OF INSPECTION AND TESTING**

**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				
5	Chemical Composition	5.1 Table-1	IS 2039 (Part 1): 1991 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.
6	Workmanship	6.1, 6.2	IS 2039 (Part 1): 1991	R	Adequate inspection to ensure conformance to the ISS.		
	Straightness	6.3	IS 2039 (Part 1): 1991	R	One (production of tubes of a control unit)	Every half hour	
9	Dimensions & Tolerances	9,1 9.2	IS 2039 (Part 1): 1991	R	-do-	-do-	
11	Marking	11.1 to 11.2.1.1	IS 2039 (Part 1): 1991	R	Each Tube/bundle	Each Tube/bundle	
12	Protection	12.1	IS 2039 (Part 1): 1991	R	Each Tube	Each Tube	

**Section-2:Electric Resistance Welded and Induction Welded Tubes (ERW )**

(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				
3.2.1	Tensile Test	3.1, 3.1.1, 3.2.1 Table-4	IS 2039 (Part 2): 1991 IS 1608 Pt.1	R	Two (production of tubes of a control unit)	Every Two Hours	Should any sample fails two further samples shall be selected for testing. If both the samples pass, the material represented by test samples shall be deemed to comply with the requirements of the specification for this test.
3.2.2	Drift Expansion Test	3.1, 3.1.1, 3.2.2 Table-2	IS 2039 (Part 2): 1991 IS 2335	R	One (production of tubes of a control unit)	Every Half an Hour	
3.2.3	Flattening Test	3.1, 3.1.1, 3.2.3 Table-3	IS 2039 (Part 2): 1991 IS 2328	R	---do---	---do---	
4	Dimensions and Tolerances	4.1 to 4.2.3 Table-5,6	IS 2039 (Part 2): 1991	R	---do---	---do---	Records shall be maintained. In case of failure production corresponding to that lot shall not be marked. Setting of the mill shall be checked and marking shall be reused on obtaining correct size of tubes.

**Section-3: Cold Finished Electric Resistance Welded and Induction Welded Tubes (ERW)**

(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				
4.2.1	Tensile Test	4.1, 4.1.1, 4.2.1 Table-7	IS 2039 (Part 3): 1991 IS 1608 Pt.1	R	Two (production of tubes of a control unit)	Every Two Hours	Should any sample fails two further samples shall be selected for testing. If both the samples pass, the material represented by test samples shall be deemed to comply with the requirements of the specification for this test.
4.2.2	Drift Expansion Test	4.1, 4.1.1, 4.2.2 Table-8	IS 2039 (Part 3): 1991 IS 2335	R	One (production of tubes of a control unit)	Every Half an Hour	
4.2.3	Flattening Test	4.1, 4.1.1, 4.2.3 Table-9	IS 2039 (Part 3): 1991 IS 2328	R	---do---	---do---	
5	Dimensions and Tolerances	5.1 to 5.2.3 Table-10	IS 2039 (Part 3): 1991	R	---do---	---do---	Records shall be maintained. In case of failure production corresponding to that lot shall not be marked. Setting of the mill shall be checked and marking shall be reused on obtaining correct size of tubes.

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.





**ANNEXURE I**

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

**TEST CERTIFICATE FOR Steel Tubes for Bicycle and Cycle Rickshaws**

TEST CERTIFICATE No. \_\_\_\_\_ DATE \_\_\_\_\_  
 To M/s \_\_\_\_\_ We certified that the material described below fully conforms to IS 2039 (Parts 1 to 3): 1991 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 2039 (Parts 1 to 3): 1991 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

**TEST RESULTS**

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

# as 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 STEEL COMPANY