



संरचनात्मक उद्देश्य के ललए स्टील ट्यूब

IS 1161:2014 के अनुसार

PRODUCT MANUAL FOR  
Steel Tubes for Structural Purposes  
According to IS 1161:2014

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<br>IS No.                       | : | IS 1161:2014                                                                                                                                                                                                                                                                                           |
|    | शीर्षक<br>Title                             | : | Steel Tubes for Structural Purposes                                                                                                                                                                                                                                                                    |
|    | संशोधनों की संख्या<br>No. of amendments     | : | 2                                                                                                                                                                                                                                                                                                      |
| 2. | नमूना दिशानिर्देश<br>Sampling Guidelines    |   |                                                                                                                                                                                                                                                                                                        |
| a) | कच्चा माल<br>Raw material                   | : | Steel tubes shall be manufactured from Hot rolled steel strip as per IS 10748/IS 2062<br><br>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<br>Grouping Guidelines | : | Please refer Annex – A                                                                                                                                                                                                                                                                                 |

|    |                                                                                       |                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c) | <b>नमूने का परिमाण<br/>Sample Quantity</b>                                            | :                                                                                                                                                              | For tubes-Mechanical: 3m, Chemical: 5 pcs of 5cm x 5cm<br>For HR strip- Mechanical: 0.5 sq m, Chemical: 5 pcs of 5cm x 5cm<br><br>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 (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market) |
| 3. | <b>अतिरिक्त दिशानिर्देश<br/>Additional Guidelines</b>                                 | :                                                                                                                                                              | Please refer Annex- B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4. | <b>परीक्षण उपकरणों की सूची<br/>List of Test Equipment</b>                             | :                                                                                                                                                              | Please refer Annex - C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 5. | <b>निरीक्षण और परीक्षण की स्कीम<br/>Scheme of Inspection and Testing</b>              | :                                                                                                                                                              | Please refer Annex – D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 6. | <b>एक दिन में संभावित परीक्षण<br/>Possible tests in a day</b>                         | :                                                                                                                                                              | All tests.<br><br>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.                                                                                                                                                                                                                                                |
| 7. | <b>लाइसेंस का दायरा /Scope of the Licence:</b>                                        |                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | Licence is granted to use Standard Mark as per IS 1161:2014 with the following scope: |                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <b>Name of the product</b>                                                            | Steel Tubes for Structural Purposes                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <b>Manufacturing Process</b>                                                          | Hot Finished Welded (HFW)/ Hot Finished Seamless (HFS)/ Cold Finished Seamless (CDS)/ Electric Resistance Welded (ERW)/ High Frequency Induction Welded (HFIW) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <b>Grade</b>                                                                          | YSt 210, Yst 240, Yst 310, Yst 355, Yst 420, Yst 460                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <b>Size</b>                                                                           | Nominal Bore: 15mm up to and including 1200 mm & Thickness-____mm upto and including ____mm                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <b>Any other aspect required as per the Standard</b>                                  | End Condition: Plain/Bevel Ended<br>Surface Condition: Black/ Galvanized                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**ANNEXURE A**

**GROUPING GUIDELINES**

| <b>Group</b> | <b>Nominal Bore</b>                  | <b>Grouping</b>                                                                                                                                                          |
|--------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | From 15 to up to and including 80    | Samples covering combination of the minimum and maximum Nominal Bore and minimum and maximum wall thickness of tubes shall be drawn to cover all sizes within the group. |
| 2            | Above 80 to upto and including 175   | -do-                                                                                                                                                                     |
| 3            | Above 175 to upto and including 500  | -do-                                                                                                                                                                     |
| 4            | Above 500 to upto and including 750  | -do-                                                                                                                                                                     |
| 5            | Above 750 to upto and including 1200 | -do-                                                                                                                                                                     |

1. Separate samples from each group for each process of manufacture (HFW, HFS, CDS, ERW, HFIW) are required to be drawn.
2. If the above samples drawn within each group are of grade having higher YS, grades having lower YS can also be covered within that group.
3. It shall, however, be ensured that the applicant/licensee has got complete manufacturing as well as testing facilities for the sizes/classes/grades/types of tubes required to be covered in the licence.
4. Scope of licence shall be restricted based on the manufacturing and testing facilities available.
5. 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 1161:2014.**
- 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 1161 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 1161.



- vi. The licensee A shall issue the test certificate of the ISI marked black pipes as per IS 1161 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.

**ANNEXURE C  
LIST OF TEST EQUIPMENT**

**(INDICATIVE LIST, FOR GUIDANCE ONLY)**

| <b>Sl. No.</b> | <b>Tests used in with Clause Reference</b>  | <b>Test Equipment</b>                                                                                                                                                                                                                    |
|----------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.             | Material, Cl. 5 (Chemical composition)      | Device for instrumental chemical analysis such as Optical Spectrometer with all requisite channels, certified reference materials etc.<br><br>OR Equipment, Apparatus and reagents as per list annexed in case of analysis as per IS 228 |
| 2.             | Outside Diameter, Cl 6, Table 1             | Vernier Calliper                                                                                                                                                                                                                         |
| 3.             | Thickness, Cl 6, Table 1                    | Pointed & Ball ended Micrometer and Dial thickness gauge                                                                                                                                                                                 |
| 4.             | Mass ( Kg/m), Cl 6, Table 1 & Weight of lot | Weighing balance of LC 10 gm & Weighing bridge                                                                                                                                                                                           |
| 5.             | Mass of Zn coating ( Cl 8)                  | Weighing balance of LC 0.01gm & Chemicals : Alcohol , Solvent naptha /trichloroethylene, antimony trioxide/ antimony trichloride, HCl ( Sp Gr 1.16)                                                                                      |
| 6.             | Free bore test ( Cl 8)                      | 230 mm long Straight Rod of diameters as per sizes                                                                                                                                                                                       |
| 7.             | Uniformity of coating ( Cl 8)               | Thermometer, Hydrometer & Chemicals: Copper Sulphate, copper carbonate or Copper Hydroxide, distilled water                                                                                                                              |
| 8.             | Adhesion test ( Cl 8)                       | Grooved former, Pivoted hammer and Knife                                                                                                                                                                                                 |
| 9.             | Straightness (Cl 9.1)                       | 1 m long Straight Edge / Tight String with magnetic clamp / flat platform & Filler gauge                                                                                                                                                 |
| 10.            | Length ( Cl 10.1)                           | Measuring Tape                                                                                                                                                                                                                           |
| 11.            | Tensile test ( Cl 11.2)                     | Universal Testing Machine                                                                                                                                                                                                                |
| 12.            | Cold Bend test ( 11.3.1)                    | Tube bending machine, grooved former (with radius at bottom of the groove equal to 6 × O. D. of the tube)                                                                                                                                |
| 13.            | Flattening test (11.3.2.)                   | UTM with flattening test attachments                                                                                                                                                                                                     |

**ANNEXURE TO LIST OF TEST  
EQUIPMENT**

**INDICATIVE LIST OF TEST APPARATUS, CHEMICALS AND REAGENTS FOR  
CHEMICAL ANALYSIS THROUGH CHEMICAL METHODS AS PER IS 228**

|    |                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | C & S<br>(chemical method,<br>alternative to<br>instrumental<br>method)              | 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<br>– desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate                                                                                                                                |
| 2. | Phosphorus content<br>(chemical method,<br>alternative to<br>instrumental<br>method) | 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 <sub>4</sub> ), Sodium Nitrite (Na <sub>2</sub> NO <sub>3</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 (K <sub>2</sub> NO <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 |
| 3. | Manganese content<br>(chemical method,<br>alternative to<br>instrumental<br>method)  | Hot plate, Conical flask<br>Reagents: silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. | Silicon content<br>(chemical method,<br>alternative to<br>instrumental<br>method)    | Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace<br>Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 5. | Cu content<br>(chemical method,<br>alternative to<br>instrumental<br>method)         | Plate, Muffle Furnace, porcelain or silica crucible, Reagents: Hot Wash Solution (dilute sulphuric acid solution 1 : 99 v/v with hydrogen sulphide), dilute sulphuric acid, hydrogen sulphide, Dilute Nitric Acid, Sodium Fluoride, solid, Dilute Ammonium Hydroxide, Acetic Acid, Potassium Iodide, Starch Solution, Sodium Thiosulphate Solution, Ammonium Bifluoride Solution                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6. | Ni content<br>(chemical method,<br>alternative to<br>instrumental<br>method)         | ashless paper pulp, paper pulp pad, hot plate, desiccator,<br>Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid, Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 7. | Cr content<br>(chemical method,<br>alternative to<br>instrumental<br>method)         | Hot plate, stop watch<br>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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**BUREAU OF INDIAN STANDARDS**

## **ANNEXURE 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:**

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is : All the steel tubes of one nominal bore & grade manufactured from same manufacturing process on the same line in one go shall constitute a control unit.

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

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. 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/empanelled 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. However, this relaxation shall not be applicable in case of manufacturers (Licensee B) carrying out “Only Galvanizing” as Post Black Pipe operation (as per Annexure B).**

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](http://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/empanelled 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 First Schedule of the license shall be embossed at a suitable place on the outside of each tube, provided always that the tube thus marked conforms to all the requirement of the specification. Each tube shall carry legibly the manufacturer's name or trade mark. In addition, the following information shall be included in the label attached to each bundle or stencilled on the tube.

- a) The grade of tubes;
- b) Name of the manufacturer or trade mark, if any;
- c) Size,
- d) Identification mark in code or otherwise to enable the date and lot of manufacturer to be traced Back to factory records;
- e) License No.(CM/L.....)

**3.1** Packing and Marking shall be done as per the Indian Standard.

**4. TEST CERTIFICATE** – 1) For each consignment of BIS certified material conforming to IS 1161:2014, a test certificate shall be issued which shall contain the Standard Mark, cast/control unit number, type, class, size of tubes and corresponding test results as given in Annex 1.

**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 LEVELS OF CONTROL**

**(ONLY FOR GUIDANCE PURPOSE)**

| (1)          |                                      |                                      |              | (2)                                                                           | (3)                                                                                                                                                                                                                                 |                   |                                                                                                    |
|--------------|--------------------------------------|--------------------------------------|--------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------|
| Test Details |                                      |                                      |              | Test equipment requirement<br>R: required (or)<br>S:Sub-contracting permitted | Levels of Control                                                                                                                                                                                                                   |                   |                                                                                                    |
| Cl           | Requirement                          | Test Methods<br><br>Clause Reference |              |                                                                               | No. of Sample                                                                                                                                                                                                                       | Frequency         | Remarks                                                                                            |
| 5.           | Material                             | 5.1,<br>Table 3                      | IS 1161      | R                                                                             | One                                                                                                                                                                                                                                 | Each Consignment  | No further testing is required if the material is ISI Marked and is received with Test Certificate |
| 6.           | Dimensions and Weight                | 6.1, 6.2 & Table 1                   | -do-         | R                                                                             | 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 |                   |                                                                                                    |
| 7.           | Workmanship                          | 7                                    | -do-         | R                                                                             | Firm to excercise adequate in-process controls to ensure that the material remains free from harmful defects                                                                                                                        |                   |                                                                                                    |
| 8.           | Galvanizing                          | 8                                    | IS 4736      | R                                                                             | One                                                                                                                                                                                                                                 | Each control unit | ---                                                                                                |
| 9.           | Straightness                         | 9                                    | IS 1161      | R                                                                             | 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 |                   |                                                                                                    |
| 10.          | Length                               | 10                                   | -do-         | R                                                                             | Firm to have adequate in-process controls to check compliance of this parameter as given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity                    |                   |                                                                                                    |
| 11           | Mechanical tests<br>Tensile Strength | 11.2                                 | IS 1608(Part | R                                                                             | One                                                                                                                                                                                                                                 | Each Control unit |                                                                                                    |

|     |                                       |        |               |   |      |                   |
|-----|---------------------------------------|--------|---------------|---|------|-------------------|
|     | and elongation                        |        | 1)<br>IS 4711 |   |      |                   |
|     | Cold bend test<br>(where applicable)  | 11.3.1 | IS 2329       | R | One  | Each Control unit |
|     | Flattening Test<br>(Where applicable) | 11.3.2 | IS 2328       | R | -do- | -do-              |
| 13. | Oiling & Painting                     | 13     | IS 1161       | R | -do- | -do-              |

ANNEXURE -I

(Para 3.1 of the Scheme of Inspection and Testing)

XYZ - IRON AND STEEL COMPANY

(Registered Office Address and works address) TEST CERTIFICATE FOR STEEL TUBES

TEST CERTIFICATE NO. \_\_\_\_\_ DATE \_\_\_\_\_

To M/s \_\_\_\_\_

We certify that the material described below fully conforms to IS 1161:2014. Chemical composition and mechanical 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 1161:2014 FOR DETAILS OF SPECIFICATION REQUIREMENTS} TEST RESULTS

| Order no | Size | Grade | Cast/lot no. | Qty (tonnes) | Chemical Analysis (% by wt) |   |    |   |         | Mechanical Properties |      |                            | Galvanizing                |            | Remarks |
|----------|------|-------|--------------|--------------|-----------------------------|---|----|---|---------|-----------------------|------|----------------------------|----------------------------|------------|---------|
|          |      |       |              |              | C                           | S | Mn | P | CE etc. | TS (Mpa)              | % El | Flattening/ Cold Bend test | Weight (g/m <sup>2</sup> ) | Uniformity |         |
|          |      |       |              |              |                             |   |    |   |         |                       |      |                            |                            |            |         |

Remarks

REMARKS

SHIPPING ADVICE NO/WAGON NO.

FOR XYZ IRON AND STEEL COMPANY