



**उत्पाद मैनुअल**  
**Specification for Structural Weather Resistant Steel**  
**IS 11587:1986 के अनुसार**

**PRODUCT MANUAL**  
**FOR Specification for Structural Weather Resistant Steel**  
**ACCORDING TO IS 11587:1986**

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में अभ्यास और पारदर्शिता के संचालन में पारदर्शिता सुनिश्चित करने 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 लाइसेंस/प्रमाणपत्र 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 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. | उत्पाद<br>Product                                 | : | IS 11587:1986                                                                              |
|    | शीर्षक<br>Title                                   | : | Specification for Structural Weather Resistant Steel                                       |
|    | संशोधनों की संख्या<br>No. of amendments           | : | 1                                                                                          |
| 2. | नमूना दिशानिर्देश<br>Sampling Guidelines          |   |                                                                                            |
| a) | कच्चा माल<br>Raw material                         | : | No specific requirement.                                                                   |
| b) | समूहीकरण दिशानिर्देश<br>Grouping Guidelines       | : | Please refer Annex – A                                                                     |
| c) | नमूने का आकार<br>Sample Size                      | : | For mechanical test: 1 meter<br>For chemical test: 5 pieces of 50 mm X 50 mm/100g drilling |
| 3. | परीक्षण उपकरणों की सूची<br>List of Test Equipment | : | Please refer Annex – B                                                                     |

|    |                                                                                        |                                                                                         |                        |
|----|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------|
| 4. | निरीक्षण और परीक्षण की स्कीम<br><b>Scheme of Inspection and Testing</b>                | :                                                                                       | Please refer Annex – C |
| 5. | एक दिन में संभावित परीक्षण<br><b>Possible tests in a day</b>                           |                                                                                         |                        |
|    | All tests (chemical composition testing through instrumental method)                   |                                                                                         |                        |
| 6. | लाइसेंस का दायरा / <b>Scope of the Licence:</b>                                        |                                                                                         |                        |
|    | Licence is granted to use Standard Mark as per IS 11587:1986 with the following scope: |                                                                                         |                        |
|    | Name of the product                                                                    | Structural Weather Resistant Steel                                                      |                        |
|    | Grades                                                                                 | WR-Fe 480A, WR-Fe 480B, WR-Fe 490H, WR-Fe 490C, WR-Fe 500                               |                        |
|    | Form                                                                                   | Plate, Sheet, Strip, Sections, bars etc.                                                |                        |
|    | Shapes and Sizes                                                                       | Range of nominal sizes, e.g. Round bars of diameter from .. m up to and including .. mm |                        |

**BUREAU OF INDIAN STANDARDS**  
**MANAK BHAVAN,9, BAHADUR SHAH ZAFAR MARG,**  
**NEW DELHI-110002**

## ANNEX-A

### GROUPING GUIDELINES

The following grouping based on type of product, shall be followed for considering grant of licence/inclusion as per IS 11587:1986

| Group Number | Group Description                                                                                                                                                                                | Grouping guidelines                                                                                                                                                                     |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Flat Products:<br>Plates, Sheet and Strips<br>Bulb Flats<br>Flat<br>Plate for Ship's hull structure                                                                                              | One sample of any size/type of flat products shall be drawn for testing to cover all sizes/types being manufactured.<br>One sample from each grade to be tested for covering that grade |
| 2            | Sections:<br><br>(1)Beam, Column, Channels and Angles<br>Bulb Angles, Sheet Piling Sections<br>Channel sections<br>(5)Track Shoe Sections<br>(6)Parallel Beam and Column sections<br>(7)Tee Bars | One sample of any size/type of Steel section shall be drawn for testing cover all sizes/types being manufactured.<br>One sample from each grade to be tested for covering that grade    |
| 3            | Hollow Section                                                                                                                                                                                   | One sample of any size/type of Steel section shall be drawn for testing cover all sizes/types being manufactured.<br>One sample from each grade to be tested for covering that grade    |
| 4            | Bars:<br><br>(1)Round and Square Bars                                                                                                                                                            | One sample of any size and shapes of bars shall be drawn for testing cover all sizes and shapes being manufactured.<br>One sample from each grade to be tested for covering that grade  |

While considering grant of licence/inclusion of additional varieties, it shall be ensured that requisite manufacturing facilities, testing equipments are available with manufacturer.

During operation of licence, samples of all varieties covered in the scope of licence shall be drawn for testing in rotation, to the extent possible

## ANNEX – B

### LIST OF TEST EQUIPMENTS

**Major test equipment required to test as per the Indian Standard**

| Sl. No. | Tests Used In With Clause Reference                | Test Equipment/Chemical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Chemical Composition, Cl. 5 and Weldability, Cl. 6 | Instrumental Methods<br>Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry, Spectrophotometer in case of instrumental methods<br><br>Or other chemical methods as below                                                                                                                                                                                                                                                                                                                                                       |
|         | Carbon and Sulphur                                 | Strohlein or Leco apparatus with all attachments<br>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<br>Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash<br>Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes-Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate |
|         | Silicon content                                    | Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace<br><br>Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and 4hydrofluoric acid                                                                                                                                                                                                                                                                                                                                 |
|         | Manganese content                                  | Hotplate, 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                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|         | Phosphorus content                                 | 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<br><br>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 (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                                                                          |
|   | Chromium content                                   | Hot plate, stop watch<br><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.                                                                                                              |
|   | Nickel content                                     | Dilute Ammonium Hydroxide, Acetic Acid, Potassium Iodide, Starch Solution, Sodium Thiosulphate Solution, Ammonium Bifluoride Solution Ashless paper pulp, paper pulp pad, hot plate, desiccator<br><br>Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid |
|   | Copper content                                     | Plate, Muffle Furnace, porcelain or silica crucible,<br><br>Reagents: Hot Wash Solution (dilute sulphuric acid solution 1:99v/v with hydrogen sulphide), dilute sulphuric acid, hydrogen sulphide, Dilute Nitric Acid, Sodium Fluoride, solid,                                                                                                                        |
| 2 | Tensile Test, Cl. 8                                | Universal Testing Machine (UTM/TTM) with necessary attachments                                                                                                                                                                                                                                                                                                        |
| 3 | Bend Test, Cl. 9                                   | Steel Mandrels (for bend tests), Templates (for Bend test), UTM attachments/clamps/vice/Magnifying glass                                                                                                                                                                                                                                                              |
| 4 | Impact Test, Cl. 10                                | Charpy Impact tester, Thermometer, Specimen Inspection (Profile projector/Go & No Go Gauges, dial stand, surface plate, Micrometer), Deep Freezer                                                                                                                                                                                                                     |
| 5 | Flattening Test, Cl. 11                            | UTM with flattening test attachment                                                                                                                                                                                                                                                                                                                                   |
| 6 | Freedom from defects, Cl. 12 and Dimension, Cl. 13 | Magnifying glass, Vernier caliper, Micrometer, Steel Scale, Try-square, Radius gauges, Filler Gauges, Depth gauges, Straight edges, Magnetic V-block, Angle Protractor (combination set), outside and inside calliper, Carbon Paper                                                                                                                                   |
| 7 | Mass, Cl. 16                                       | Weighing machine                                                                                                                                                                                                                                                                                                                                                      |

**The list above is indicative only and may not be considered as exhaustive**

## ANNEX B

### SCHEME OF INSPECTION AND TESTING

**1. LABORATORY:** A laboratory shall be maintained which shall be suitably equipped and staffed, where the tests shall be carried out in accordance with the methods given in the specification.

1.1 All testing apparatus/measuring instruments shall be periodically checked, verified and calibrated as appropriate and records of such checks/verification, calibration shall be maintained.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. PACKING AND MARKING**–The Standard Mark as given in Schedule of the license shall be incorporated on the product and/or the Test Certificate accompanying each consignment of material, provided always that the material thus marked conforms to the requirements of the Indian Standard.

3.1 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, the entire quantity of structural weather resistant steel, of the same grade and form, manufactured from same cast/heat under identical conditions in a day 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 IS 11587:1986, there shall be a test certificate which shall contain the Standard mark, cast number, size, dimensions, and the corresponding test results (as given in Annexure I).

**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 re-salable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/coil number/control unit number, as applicable, relating to all such rejections/defective/sub- standard 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**

| (1)          |                                              |                               |                                                                           | (2)                                                                        | (3)               |                    |                                                                                                                                                                                   |
|--------------|----------------------------------------------|-------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Details |                                              |                               |                                                                           | Test equipment requirement<br>R: required (or)S: Sub-contracting permitted | Levels of Control |                    |                                                                                                                                                                                   |
| Cl.          | Requirement                                  | Test Methods Clause Reference |                                                                           |                                                                            | No. of Sample     | Frequency          | Remarks                                                                                                                                                                           |
| 5, 6         | Chemical Composition (including Weldability) |                               | IS 228 (various parts) or any established chemical or instrumental method |                                                                            |                   |                    |                                                                                                                                                                                   |
|              | Ladle Analysis                               | 5.1                           | -do-                                                                      | R                                                                          | One               | Each Heat          | Applicable for manufacturers with steel making facilities                                                                                                                         |
|              | Product Analysis                             | 5.2                           | -do-                                                                      | R                                                                          | i)Nil             | i)Nil              | i)Applicable for manufacturers with steel making facilities.                                                                                                                      |
|              |                                              |                               |                                                                           |                                                                            | ii)One            | ii)Each Cast       | ii)*Applicable for manufacturers feeding to rolling mills through reheating. Furnace (PI see note 3)                                                                              |
| 8            | Tensile Test                                 | 8.1to 8.3                     | IS 1608 (Part 1)                                                          | R                                                                          | 1                 | Every Control Unit | For WR-Fe 490H steel sheet and strip of under 3 mm in thickness, the tensile strength of 510 N/mm2 or over is applicable by agreement between the purchaser and the manufacturer. |
| 9            | Bend Test                                    | 9.1 to 9.3                    | IS11587 & IS1599                                                          | R                                                                          | 1                 | Every Control Unit | For grade WR-Fe 490C, bend test is optional and shall be performed only when specified by the purchaser (Also see 9.3.1 of IS 11587:1986)                                         |

|        |                         |                      |                                                                                                                                         |   |                     |                    |                                                                                                                                                                                                                                        |
|--------|-------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---|---------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10     | Impact Test             | 10.1 to 10.3 Table-4 | IS11587& IS1757 Part 1                                                                                                                  | R | 3                   | Every Control Unit | For grade WR-480A and WR 480-B the test shall be carried out if agreed to between purchaser and manufacturer<br><br>For grade WR-Fe 490H the impact values and acceptance criteria shall be as agreed between the contracting parties. |
| 11     | Flattening Test         | 11.1 to 11.3         | IS 2328                                                                                                                                 | R | 1                   | Every Control Unit |                                                                                                                                                                                                                                        |
| 12     | Freedom from defects    | 12.1 to 12.2         | IS 11587                                                                                                                                | R | Each item           | Each item          |                                                                                                                                                                                                                                        |
| 13& 14 | Dimensions & Tolerances |                      | IS11587,<br>IS 1852,<br>IS 12779<br>IS 808<br>IS 1173<br>IS 1252<br>IS 1730<br>IS 1732<br>IS 1863<br>IS 2314<br>IS 3954<br>IS/ISO 16162 | R | Adequate inspection |                    |                                                                                                                                                                                                                                        |

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 empanelled 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 for approval by BO Head.

\*Note-3: No testing is required for product analysis (chemical composition) if material is ISI marked and received with test certificate indicating conformity

ANNEXURE-I  
XYZ IRON AND STEEL COMPANY  
(Registered office Address and works address)  
TEST CERTIFICATE FOR **Structural Weather Resistant Steel**

BIS  
STANDARD  
MARK

TEST CERTIFICATE No. \_\_\_\_\_  
TO M/s \_\_\_\_\_  
DATE \_\_\_\_\_

We certified that the material described below fully conforms to 11587:1986 Chemical composition and Physical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks LicenceNo.CM/L\_\_\_\_\_are as indicated below against each order No.

(PLEASE REFER TO IS 11587:1986 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

**TEST RESULTS**

| Order No.&Date | Section (nom Size) | Control Unit No. | Grade & Quality | Quantity in tonnes | CHEMICALCOMPOSITION |   |   |     |    |    |    |    |   |    | MECHANICALPROPERTIES |            |              |           |                 |             | Remarks |
|----------------|--------------------|------------------|-----------------|--------------------|---------------------|---|---|-----|----|----|----|----|---|----|----------------------|------------|--------------|-----------|-----------------|-------------|---------|
|                |                    |                  |                 |                    | C                   | S | P | S i | Mn | Cu | Cr | Ni | V | CE | Tensile strength     | Elongation | Yield Stress | Bend test | Flattening Test | Impact test |         |
|                |                    |                  |                 |                    | %                   | % | % | %   | %  | %  | %  | %  | % | %  |                      |            |              |           |                 |             |         |

REMARKS

WAGON NO.  
TRUCK NO.

FOR XYZ IRON AND STEEL COMPANY