



PM/ IS 15962/ 1/ Sep 2019

**PRODUCT MANUAL FOR
Structural Steels for Buildings and
Structures with Improved Seismic Resistance
According to IS 15962:2012**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 15962:2012
	Title	:	Structural Steels for Buildings and Structures with Improved Seismic Resistance
	No. of amendments	:	Nil
2.	Sampling Guidelines		
a)	Raw material	:	Material produced by re-rolling finished products (virgin or used or scrap), or by rolling material for which the metallurgical history is not fully documented or not known, are not acceptable.
b)	Grouping Guidelines	:	Please refer Annex - A
c)	Sample Size	:	For mechanical test: 1 metre + Prepared test pieces for impact test For chemical composition: 50 gm drillings or 5pcs each of length 5 cm for OES
3.	List of Test Equipment	:	Please refer Annex - B
4.	Scheme of Inspection and Testing	:	Please refer Annex - C
5.	Possible tests in a day	:	Freedom from defects, Dimensions, Tensile test , Bend test, Impact (Charpy) Test , Chemical Composition
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 15962:2012 with the following scope:		
	Name of the product	Structural Steels for Buildings and Structures with Improved Seismic Resistance	
	Grade Designation	E250S,..	
	Size	<i>[Mention range of nominal sizes for various steel varieties (flat products/sections/Steel bars..)</i>	

ANNEXURE A
TO PRODUCT MANUAL FOR
Structural Steels for Buildings and Structures with Improved Seismic Resistance
According to IS 15962:2012

GROUPING GUIDELINES

PAGE 1 OF 2

1. Structural Steels for Buildings and Structures with Improved Seismic Resistance steel according to IS 15962: 2012 are designated as per the following:

Higher Grade ↓	Grade Designations
	E250S
	E300S
	E350S
	E450S

2. The following grouping based on type of product, shall be followed for considering grant of licence/inclusion as per IS 15962:2012

Group	Group Description	Grouping guidelines
1	Flat Products: (1)Plates, Strips &Flats (2)Bulb Flats	One sample of any size of any flat product of Higher Grade shall be drawn for testing. On testing of the sample, all other Lower grades of flat products alongside Higher Grade shall be covered in scope of licence.
2	Sections: 1)Beam, Column, Channels and Angles (2)Bulb Angles, (3)Sheet Piling Sections (4)Channel sections (5)Track Shoe Sections (6)Parallel Beam and Column sections (7) Tee Bars	One sample of any size of any Steel section shall be drawn for testing. On testing of sample of Higher Grade, all other Lower grades of the Steel Sections alongside Higher Grade shall be covered in scope of licence.
3	Bars : Round and Square Bars	One sample of any size of bars shall be drawn for testing. On testing of sample of Higher Grade, all other Lower grades of the Steel bars alongside Higher Grade shall be covered in scope of licence.

3. In case applicant/licensee intends to cover grade designations in a group with micro-alloying as well, additionally one sample with micro-alloying also to be tested from the group.
4. In case applicant/licensee intends to cover designations with Cu-bearing quality in a group, additionally one sample with Cu-bearing quality also to be tested from the group.
5. While drawing samples for independent testing, applicable declaration as per Notes given under Table-1 of IS 15962:2012 may be obtained and reflected in the test request appropriately.
6. If the above sample passes, then licence may be granted/inclusion be done for the Grade Designations of the Group. However, it shall be ensured that the firm is having all necessary manufacturing and testing facilities for the Grades/form of carbon Steel to be included in the licence.
7. During the operation of license, BO shall ensure that all Grades & Designations covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
Structural Steels for Buildings and Structures with Improved Seismic Resistance
According to IS 15962:2012

LIST OF TEST EQUIPMENTS

Page 1 of 3

Major test equipment essentially 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.	Vernier Callipers	Cl.13 & 14
2.	Micrometer	Cl.13 & 14
3.	Steel Scale ,Try-square, Radius gauges, Filler Gauges, Depth gauges, Straight edges, MagneticV-block, Angle Protector (combination set), Protector outside and inside calliper, Carbon Paper	Cl.13 & 14
4.	UTM (0-1000kN)	Cl.10
5.	Charpy Impact tester, Thermometer, Specimen Inspection(Profile projector/Go&No Go Gauges, dial stand, surface plate, Micrometer), Deep Freezer, V-notch cutter	Cl.11.1 to 11.4
6.	Analytical balance (0-200g,Lc:0.1mg)	Cl.8
7.	Weigh M/c	Cl.13 & 14
8.	Steel tape	Cl.13 & 14
9.	NDT equipments, Metallurgical microscope with all attachments, Polishing wheel, etching solution.	Cl.12-OTHER TESTS such as non-destructive testing , grain size, directionality, inclusion content.
10.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	Cl 8.1,8.2 for C,S,P,Mn,Si,Al, Cu, Microalloying and alloying elements content Mn,S,P,Si
11.	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	cl.8.1, 8.2 –C& S (chemical method, alternative to instrumental method)

12.	<p>Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate</p> <p>Potassium Permanganate (KMnO₄), Sodium Nitrite (NaNO₂), Ammonium Molybdate [(NH₄)₂MoO₇], Ammonium Phosphate [(NH₄)₃PO₄], Potassium Nitrate (KNO₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable</p>	Phosphorus content Cl 8.1,8.2 (chemical method, alternative to instrumental method)
13.	<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 Cl 8.1,8.2 (chemical method, alternative to instrumental method)
14.	<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 Cl 8.1,8.2 (chemical method, alternative to instrumental method)
15.	<p>Plate, Muffle Furnace, porcelain or silica crucible,</p> <p>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</p>	Cu content Cl 8.1,8.2 (chemical method, alternative to instrumental method)
16.	<p>ashless paper pulp, paper pulp pad, hot plate, dessicator,</p> <p>Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid</p>	Ni content Cl 8.1,8.2 (chemical method, alternative to instrumental method)
17.	<p>Hot plate, stop watch</p> <p>Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.</p>	Cr content Cl 8.1, 8.2 (chemical method, alternative to instrumental method)

18.	Determination of Nitrogen by Thermal Conductivity Method/ By Inert gas fusion followed by thermal conductivity detection/ By Steam Distillation Method	Nitrogen Content Cl. 8.1
-----	--	--------------------------

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

ANNEXURE C
TO PRODUCT MANUAL FOR
Structural Steels for Buildings and Structures with Improved Seismic Resistance
According to IS 15962:2012

SCHEME OF INSPECTION AND TESTING

Page 1 of 4

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 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. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT – All structural steel hot rolled to same dimensions and form (Angle or Channel or Flat or Round etc.), representing the same cast & grade designation, manufactured under uniform conditions of production in a day in the same place.

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 15962:2012 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. 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.

ANNEXURE C
TO PRODUCT MANUAL FOR
Structural Steels for Buildings and Structures with Improved Seismic Resistance
According to IS 15962:2012

SCHEME OF INSPECTION AND TESTING

Page 2 of 4

TABLE 1: LEVELS OF CONTROL

(1)				(2)	(3)		(4)
TEST DETAILS				Test equipment requirement R: required (or) S: Sub-contracting permitted	LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method	No. of Samples		Frequency		
		Clause	Reference				
6	Freedom from defects	6.1 6.2	IS 15962	R	Adequate inspection to ensure each item to be free from surface defects.		
7 & 8	Chemical Composition		IS 15962 & IS 228 (Various Parts) Or any established Chemical/ Instr. method				
	Ladle Analysis	7, 8.1,15 Table-1	-do-	R	One	Each Heat	Applicable for manufacturers with steel making facilities
	Product Analysis	7, 8.2,15 Table-2	-do-	R	i) Nil ii)One	i)Nil ii) Each Cast	i)Applicable for manufacturers with steel making facilities. ii)*Applicable for manufacturers feeding to rolling mills through reheating furnace (see Note-3)

10	Tensile Test	10.1 to 10.3.2, 15 & Table-3	IS 15962 , IS 1608 Pt.1 & IS 3803 (Pt.1)	R	2	Every Control Unit	
11	Impact Test	11.1 to 11.4 ,15& Table-3	IS 15962 & IS 1757	R	3	-do-	
12	Other Tests- Non destructive testing, Metallurgical tests	12	IS 15962	S	Subject to mutual agreement between the purchaser and the manufacturer/supplier.		
13 & 14	Dimensions & Tolerances	13,14 , 15 & Table 4	IS 15962, IS 1852, IS 12779 IS 808 IS 1173 IS 1730 IS 1732 IS 1863 IS 2314 IS 3954 IS 10182 (Parts 1 and 2) & IS 12778	R	Adequate inspection to ensure each item conform nominal dimensions and tolerances stipulated in relevant standard.		

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Note -3: No testing for product analysis is required if material fed to rolling mills is ISI marked and received with test certificate

ANNEXURE I

Page 4 of 4

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



TEST CERTIFICATE FOR Structural Steels for Buildings and Structures with Improved Seismic Resistance

TEST CERTIFICATE No. _____

DATE _____

TO M/s _____

We certified that the material described below fully conforms to IS 15962:2012 Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks Licence No. CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 15962:2012 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Section (nom Size)	Control Unit No.	Grade	Quantity in tonnes	CHEMICAL COMPOSITION								MECHANICAL PROPERTIES					Optional	Delivery			
					C %	S %	P %	Si %	Mn %	*Cu %	@Micro Alloying Elements %	Al %	CE	Tensile strength	Elongation	Yield Stress	Bend test			Impact Strength		

* For copper-bearing quality

@ Micro-alloying element present should be indicated

REMARKS

WAGON NO.

TRUCK NO.

(It is suggested that size A4 paper be used for this test certificate)

FOR XYZ IRON AND STEEL COMPANY