



PRODUCT MANUAL FOR CRANE RAIL SECTIONS ACCORDING TO IS 3443 : 1980

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 3443 : 1980
	Title	:	Crane Rail Sections
	No. of Amendments	:	1
2.	Sampling Guidelines:		
a)	Raw material	:	NA
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Qty – 1 m x 2 Nos and 50 gm drillings
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:		
	(i) Carbon and Sulphur content (Clause 4) (ii) Tensile strength (Clause 5) (iii) Hardness (Clause 6) (iv) Dimensions and tolerance and sectional properties (Clause 8) (v) Freedom from defects (Clause 9)		
6.	Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 3443 : 1980 with the following scope:		
	Name of the product	Crane Rail Section	
	Designation	As per clause 3/ Appendix A of IS 3443: 1980	
	Chemical Composition Designation		

ANNEX A**Grouping Guidelines**

1. IS 3443: 1980 covers Crane Rail Section as given below:

Designation based on head width of rail section (mm) – Clause 3 of IS 3443	ISCR 50, ISCR 60, ISCR 80, ISCR 100, ISCR 120 and ISCR 140
Designation based on weight (kg/m) - Appendix A of IS 3443	22, 30, 32, 43, 45, 52.1 (52A), 52.2 (52 B), 57, 67, 74, 75, 101 and 125
Chemical Composition Designation - Clause 4 of IS 3443	55C11 and 50C12

2. For the purpose of grouping, Crane Rail Section are further classified as given below:

Group	Designation
1	ISCR 50, ISCR 60, ISCR 80
2	ISCR 100, ISCR 100, ISCR 140

3. Considering the above, following grouping guidelines is developed for GoL/CSoL:

- a) One sample of Crane Rail Section of each Chemical Composition Designation and highest Section Designation from each group shall be tested to cover all Crane Rail Section in that group for the particular Chemical Composition Designation tested.
- b) Sample of Crane Rail Section covered in Appendix A of IS 3443: 1980 which are designated by weight in kg/m shall be tested individually for each Chemical Composition Designation to cover that particular section in the licence.
- c) However, for 3(a) and 3(b) above, if sample of Chemical Composition Designation 50C11 is tested, other Designation 55C12 may also be covered in the licence.

4. The Firm shall declare the varieties they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.

5. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

ANNEX B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sl. No.	Tests used in with Clause Reference	Test Equipment
1	Chemical composition (Clause 4) Carbon & Sulphur content	<ul style="list-style-type: none"> - Analytical balance of L.C 0.1 gm - Strohlein or Leco apparatus with all attachments, - Barometer with chart, - Hot plate, - Muffle furnace, - Complete range of glass wares, measuring cylinder - 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 <p>Reagents for C:</p> <ul style="list-style-type: none"> - Tin granules or pure iron fillings, - Acidulated water/brine water, - Methyl red - Caustic potash <p>Reagents for S:</p> <ul style="list-style-type: none"> - Ceramic boats/crucibles - Desiccators, - Fluxes -Low sulphur copper, tin or iron, - Dilute hydrochloric acid, - Starch Iodide solution, - Potassium iodate

Phosphorus content	<ul style="list-style-type: none"> - 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, - Sodium Nitrite, - Ammonium Molybdate, - Ammonium Phosphate, - Potassium Nitrate, - Phenolphthalein Solution, - Rectified spirit or methyl alcohol, - Sodium Hydroxide, - Hydrofluoric Acid - Perchloric Acid, - Sulphurous Acid - Hydrobromic Acid - other chemicals and reagent as applicable
Manganese content	<ul style="list-style-type: none"> - Hot plate, - Conical flask <p>Reagents:</p> <ul style="list-style-type: none"> - Silver nitrate, - Ammonium Persulphate, - Sodium Arsenite solution, - Dilute Nitric Acid, - Phosphoric Acid, - Dilute Sulphuric Acid, - Concentrated Nitric Acid, - NaCl Solution, - Permanganic acid
Silicon content	<ul style="list-style-type: none"> - Medium textured filter paper, - Porcelain casserole, - Platinum crucible, - filter paper pulp, - hot plate, - hot air oven, - muffle furnace. <p>Reagents:</p> <ul style="list-style-type: none"> - Silver Nitrate solution, - Concentrated Nitric Acid,

		<ul style="list-style-type: none"> - Concentrated Sulphuric Acid, - Dilute Hydrochloric Acid, - Dilute Sulphuric Acid, - Perchloric Acid, - Tartaric acid and - Hydrofluoric Acid
2	Dimension, tolerances and sectional properties, Cl. 8	<ul style="list-style-type: none"> - Vernier calliper - Angle protractor - Steel scale - Steel tape - Radius gauge - Weighing balance
3	Freedom from defects, Cl. 9	<ul style="list-style-type: none"> - Vernier caliper - Steel tape - Strand
4	Tensile properties, Cl. 5	<ul style="list-style-type: none"> - UTM Machine - V-Block, punch, hammer. - Vernier caliper
5	Hardness, Cl. 6	<ul style="list-style-type: none"> - Brinell hardness testing apparatus with indenter.

The above list is indicative only and may not be treated as exhaustive.

ANNEX C

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

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

3. LABELLING AND MARKING – As per the requirement of IS 3443: 1980.

4. CONTROL UNIT – All Crane Rail Sections of same Chemical Composition Designation and other Designation manufactured under similar conditions of manufacturing 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. 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. However, the disposal method should be as much eco-friendly as possible.

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Chemical Composition [C, Mn, Si, S, P]	4.1, Table 1, Fig 1	IS 3443 IS 228 (Relevant part)	R	One sample from a cast/100 MT or part thereof (Whichever is less)		-
5	Tensile properties	5.1, Fig 1	IS 3443 IS 1608 (Part 1)	R	One sample of crane rail of same designation from a cast / lot of 100 T or part thereof (Whichever is less)		-
6	Hardness	6.1	IS 3443 IS 1500 (Part 1)	R	One sample of crane rail of same designation from a cast / lot of 100 T or part thereof (Whichever is less)		-
8	Dimensions, tolerances and sectional properties	8.1, 8.2, 8.3 Table 2, 3 and 4, Appendix A, Table 5, 6 and 7	IS 3443	R	Ten	Each control unit	In case of failure of any sample, each section from the control unit shall be checked and only conforming sections shall be marked
9	Freedom from defects (Twist, camber and asymmetry)	9.1, 9.2	IS 3443	R	Ten	Each control unit	

Note-1: 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.