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(1983-10)

Indian Standard
SPECIFICATION FOR
CRANE RAIL SECTIONS
(*First Revision*)

(Incorporating Amendment No. 1)

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

Price Group 4

Indian Standard
SPECIFICATION FOR
CRANE RAIL SECTIONS
(*First Revision*)

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(Continued on page 2)

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IS : 3443 - 1980

(Continued from page 1)

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(Continued on page 16)

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Indian Standard
SPECIFICATION FOR
CRANE RAIL SECTIONS
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 4 June 1980, after the draft finalized by the Structural Sections Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1966. In this revision the range of rail sizes has been enlarged to include some of the sections commonly used in the industry.

0.3 A supplementary list of rail sections covering the 125 kg/m rail (earlier designated as CR 140) a few non-metric railway rails and some non-metric and metric crane rails which are in regular use is given in Appendix A.

0.4 In the formulation of this standard assistance has been derived from:

IRS-T12-64 Flat bottom railway rails, Ministry of Railways, Government of India.

GOST 4121-76 Crane rails gosudarstvennyj komitet standartov, Meri Izmeritel'nyh Priborov SSSR (USSR).

0.5 This edition 2.1 incorporates Amendment No. 1 (October 1983). Side bar indicates modification of the text as the result of incorporation of the amendment.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard lays down the dimensions, shape and other requirements of crane rail sections.

*Rules for rounding off numerical values (*revised*).

IS : 3443 - 1980

2. GENERAL REQUIREMENTS FOR THE SUPPLY OF MATERIAL

2.1 General requirements relating to supply of material shall be as laid down in IS : 1387-1967*.

3. DESIGNATION

3.1 Crane rail sections conforming to this standard shall be designated by the letters ISCR followed by the head width of the rail section in millimetres. However, the crane rail sections covered in Appendix A shall be designated by the weight in kg/m.

3.2 For shop marking and drawing office purposes, abbreviated reference symbol CR instead of ISCR may be permitted provided specific understanding exists between the producer, drawing office and fabricator.

4. CHEMICAL COMPOSITION

4.1 The material when analysed in accordance with the appropriate part of IS : 228† and its relevant parts, shall have any of the chemical compositions on the finished product given in Table 1. The location of sample for chemical analysis shall be as shown in Fig. 1.

TABLE 1 CHEMICAL COMPOSITION, PERCENT						
DESIGNATION ACCORDING TO IS : 1762 (Part I)-1974*		C	Mn	Si	S	P
					Max	Max
NEW	OLD					
55C11	C55Mn1	0.50-0.60	0.95-1.25	0.05-0.30	0.060	0.060
50C12	C50Mn1	0.40-0.60	0.90-1.45	0.03-0.30	0.060	0.060

*Code of designation of steel: Part I Based on letter symbols (*first revision*).

5. TENSILE PROPERTIES

5.1 The tensile test specimen shall be located as shown in Fig. 1 when tested in accordance with IS : 1608-1972‡, the steel shall have a minimum tensile strength of 710 MPa (72 kgf/mm²), with a minimum elongation of 14 percent on a gauge length of $5.65\sqrt{S_0}$ where S_0 is the area of cross section of the specimen in the gauge length.

*General requirements for the supply of metallurgical materials (*first revision*).

†Methods of chemical analysis of steels (second revision being issued in parts).

‡Methods for tensile testing of steel products (*first revision*).

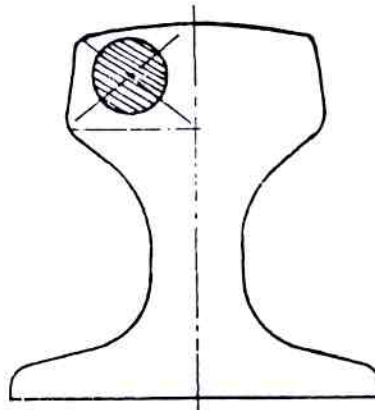


FIG. 1 LOCATION OF SAMPLE FOR CHEMICAL ANALYSIS AND TENSILE TESTING

6. HARDNESS

6.1 The hardness of the rail head when tested in accordance with IS : 1500-1968* shall be not less than 200 HB.

7. SAMPLING

7.1 The number of samples to be tested for chemical analysis, tensile properties and hardness shall be one for every 100 tonnes or part thereof subject to a minimum of one specimen per cast.

8. DIMENSIONS, TOLERANCES AND SECTIONAL PROPERTIES

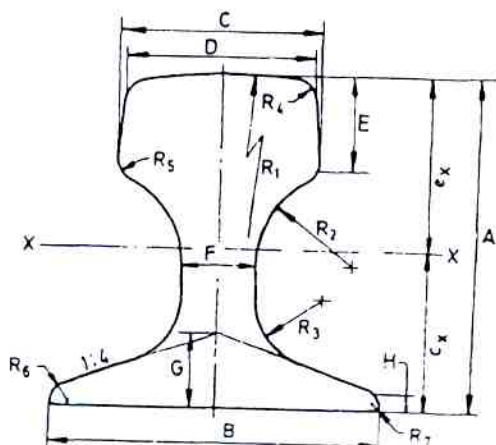
8.1 The dimensions of crane rail sections shall be as given in Table 2. Calculated sectional properties based on these dimensions are given in Table 3.

8.2 The tolerances on various dimensions of crane rail sections shall be as given in Table 4.

8.3 The dimensions of some of the rail sections commonly used in the country are covered in Appendix A along with relevant tolerances and sectional properties.

*Method for Brinell hardness test for steel (*first revision*).

TABLE 2 DIMENSIONS OF CRANE RAILS
(Clause 8.1)

DESIG-
NATION

DIVERSITY AS RICHNESS

	A	B	C	D	E	F	G	H	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
ISCR 50	90	90	55	50	25	20	20	9.70	300	26	18	6	6	5	1.5
ISCR 60	105	105	65.5	60	27.5	24	22	9.82	350	32	20	6	6	5	1.5
ISCR 80	130	130	87	80	35	32	26	9.75	400	44	26	8	8	6	1.5
ISCR 100	150	150	108	100	40	38	30	11.2	450	50	30	8	8	8	2
ISCR 120	170	170	129	120	45	44	35	15.3	500	56	34	8	8	8	2
ISCR 140	170	170	150	140	50	60	40	20.6	700	60	40	10	10	10	3

9. FREEDOM FROM DEFECTS

9.1 The rails should be reasonably free from twist and the camber shall not exceed 0.2 percent of the length.

9.2 The asymmetry of the rail cross section with respect to the vertical axis shall not exceed 2 mm and 0.6 mm in the rail flange and head respectively.

Bill L. Harrison (harrisonb@earthlink.net)
Date: 27 Feb 2008 Time: 14:48:05

TABLE 3 SECTIONAL PROPERTIES OF CRANE RAIL SECTIONS

(Clause 8.1)

DESIG- NATION	CROSS SECTIONAL AREA	WEIGHT*	POSITIONS OF CENTRE OF GRAVITY		MOMENTS OF INERTIA		SECTION MODULI		
			c_x	e_x	I_x	I_y	Z_{x1} $= I_x/c_x$	Z_{x2} $= I_x/e_x$	Z_y $= I_y/b_2$
(1)	(2) cm ²	(3) kg/m	(4) cm	(5) cm	(6) cm ⁴	(7) cm ⁴	(8) cm ³	(9) cm ³	(10) cm ³
CR 50	38.0	29.8	4.32	4.68	357.5	111.4	82.8	76.4	24.8
CR 60	51.0	40.0	4.83	5.67	654.6	195.9	136	116	37
CR 80	81.8	64.2	6.47	6.53	1 524	468.6	233	233	72.1
CR 100	113	89.0	7.63	7.37	2 806	920	368	381	123
CR 120	151	118	8.69	8.31	4 794	1 672	552	577	197
CR 140	187	147	8.75	8.25	5 528	2 609	632	670	307

*On the basis of density of steel = 7.85 kg/dm³.

TABLE 4 TOLERANCES

(Clause 8.2)

All dimensions in millimetres.

DIMENSION	RAIL SECTION		
	ISCR 50, 60 and 80	ISCR 100	ISCR 120 and 140
Head width	± 2	± 2	+ 2 - 3
Thickness of head	± 1	± 1	± 1
Flange width	± 2	+ 2 - 3	+ 2 - 4
Web thickness	± 2	± 2	± 2
Height	± 1	± 1.5	± 2
Length	+ 100 0	+ 100 0	+ 100 0
Weight	+ 3 - 2 percent	+ 3 - 2 percent	+ 3 - 2 percent

10. MARKING

10.1 Crane rail sections shall be marked with the following details:

- Manufacturer's identification mark, and
- Designation (see 3.1 and Tables 2 and 3).

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IS : 3443 - 1980

10.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

APPENDIX A

(Clauses 0.3 and 8.3)

SUPPLEMENTARY LIST OF CRANE RAIL SECTIONS

A-1. The dimensions of 22, 30, 32, 43, 45, 52A, 52B, 57, 67, 74, 75, 101 and 125 kg/m crane rail sections are given in Table 6 and Fig. 2 to 8. The sectional properties are given in Table 5.

TABLE 5 SECTIONAL PROPERTIES OF NON-METRIC CRANE RAIL SECTIONS

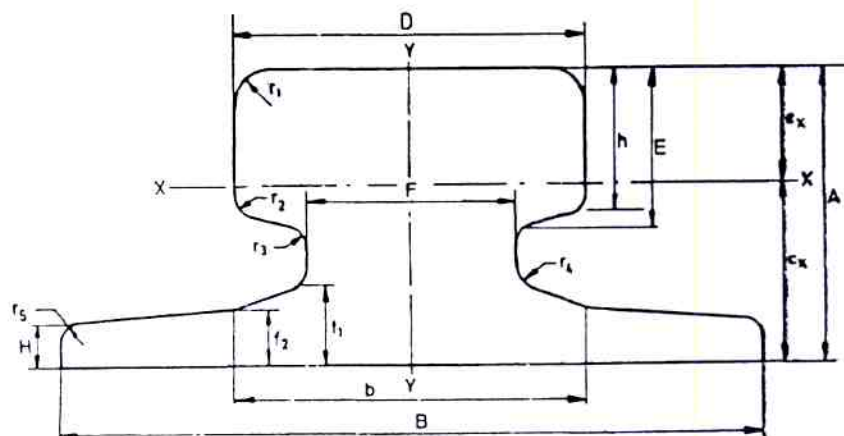
DESIGNATION	AREA	WEIGHT	MOMENT OF INERTIA	SECTION OF MODULUS	RADIUS OF GYRATION	DISTANCES OF NEUTRAL AXIS	REFERENCE TO FIG./TABLE
(1)	(2)	(3)	I_{xx} (4)	Z_{xx} (5)	r_{xx} (6)	e_x (7)	(8)
kg/m	cm ²	kg/m	cm ⁴	cm ³	cm	cm	
22	28.3	22.2	91	27.5	1.79	3.31	Table 6
30	38.0	29.8	681	116	4.23	5.87	Fig. 2
32	40.7	32.0	182	46.9	2.11	3.88	Table 6
43	55.4	43.5	327	73.7	2.42	4.44	Table 6
45	56.7	44.5	1 584	212	5.30	7.48	Fig. 3
52.1	66.0	52.1	1 204	199	4.27	6.64	Fig. 4
52.2	66.5	52.2	1 270	198	4.37	6.43	Fig. 5
57	72.1	56.6	545	109	2.74	5.00	Table 6
67	85.4	67.0	2 705	311	5.63	8.70	Fig. 6
74	94.8	74.4	895	170	3.07	5.21	Fig. 7
75	95.6	75.2	888	170	3.05	5.21	Table 6
101	129	101	1 420	249	3.32	5.70	Table 6
125	158	122	3 745	492	4.87	7.60	Fig. 8

to 5) by

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Date: 27-09-2008 Time: 13:38:05

TABLE 6 DIMENSIONS OF 22, 32, 43, 57, 75 AND 101 KG/M
CRANE RAIL SECTIONS

(Clause A-1)

DESIG-
NATION

DIMENSIONS, mm

	<i>D</i>	<i>B</i>	<i>b</i>	<i>F</i>	<i>f</i> ₁	<i>f</i> ₂	<i>H</i>	<i>A</i>	<i>E</i>	<i>h</i>	<i>r</i> ₁	<i>r</i> ₂	<i>r</i> ₃	<i>r</i> ₄	<i>r</i> ₅
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
22	45	125	54	24	14.5	11	8	55 ± 1	24	20	4	3	4	5	4
32	55	150	66	31	17.5	12.5	9	65 ± 1	28.5	25	5	5	5	6	5
43	65	175	78	38	20	14	10	75 ± 1	34	30	6	5	5	6	5
57	75	200	90	45	22	15.4	11	85 ± 1	39.5	35	8	6	6	8	6
75	100	200	100	60	23	16.5	12	95 ± 1.5	45.5	40	10	6	6	8	6
101	120	220	120	72	30	20	14	105 ± 1.5	55.5	47.5	10	6	10	10	6

A-2. TOLERANCES

A-2.1 The tolerances on the dimensions and weight of crane rails covered in this appendix shall be as given in Table 7.