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IS 3443 (1980): Crane rail sections - [CED 7: Structural Engineering and structural sections]
Indian Standard

SPECIFICATION FOR
CRANE RAIL SECTIONS

(First Revision)

Fifth Reprint JULY 2001)

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March 1981
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CRANE RAIL SECTIONS
(First Revision)

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(Continued on page 16)
AMENDMENT NO. 1 OCTOBER 1983

TO

IS:3443-1980 SPECIFICATION FOR CRANE RAIL SECTIONS

(First Revision)

Alterations

(Page 11, Fig.3, dimension) - Substitute '13.89' for '19.89' and '20.64' for '2.84'

(Page 11, Fig.4, dimension) - Substitute 'R8' for 'R23.8'

(SMDC 6)

Printed at Printograph, New Delhi, Ph.: 5726847
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.
COST 4121-76 Crane rails gosudarstvennyj komitet standartov, Meri Izmeritel'nyh Priborov SSSR (USSR).

0.5 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).
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 : 2281 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>
<thead>
<tr>
<th>DESIGNATION ACCORDING TO IS : 1762 (Part I)-1974*</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>S</th>
<th>P</th>
<th>Max</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55C11</td>
<td>0.50-0.60</td>
<td>0.95-1.25</td>
<td>0.05-0.30</td>
<td>0.060</td>
<td>0.060</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50C12</td>
<td>0.40-0.60</td>
<td>0.90-1.45</td>
<td>0.05-0.30</td>
<td>0.060</td>
<td>0.060</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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√So where So 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).
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.

### TABLE 2 DIMENSIONS OF CRANE RAILS

(Clause 8.1)

![Diagram of Crane Rail Dimensions](image)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Dimensions, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>ISCR 50</td>
<td>90</td>
</tr>
<tr>
<td>ISCR 60</td>
<td>105</td>
</tr>
<tr>
<td>ISCR 80</td>
<td>130</td>
</tr>
<tr>
<td>ISCR100</td>
<td>150</td>
</tr>
<tr>
<td>ISCR120</td>
<td>170</td>
</tr>
<tr>
<td>ISCR140</td>
<td>170</td>
</tr>
</tbody>
</table>

### 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.
TABLE 3 SECTIONAL PROPERTIES OF CRANE RAIL SECTIONS
(Class 8.1)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Cross Sectional Area</th>
<th>Weight*</th>
<th>Positions of Centre of Gravity</th>
<th>Moments of Inertia</th>
<th>Section Moduli</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm²</td>
<td>kg/m</td>
<td>cm × cm</td>
<td>cm⁴</td>
<td>cm³ × cm⁴</td>
</tr>
<tr>
<td>(1) CR 50</td>
<td>98.0</td>
<td>29.8</td>
<td>4.92 4.98</td>
<td>337.5 111.4</td>
<td>82.8 76.4</td>
</tr>
<tr>
<td>(2) CR 60</td>
<td>31.0</td>
<td>40.0</td>
<td>4.83 5.67</td>
<td>654.6 195.6</td>
<td>136116.0</td>
</tr>
<tr>
<td>(3) CR 80</td>
<td>81.8</td>
<td>64.2</td>
<td>6.47 6.53</td>
<td>1524.8 468.6</td>
<td>233233.0</td>
</tr>
<tr>
<td>(4) CR 100</td>
<td>113</td>
<td>89.0</td>
<td>7.63 7.97</td>
<td>2806.9 920.0</td>
<td>368381.0</td>
</tr>
<tr>
<td>(5) CR 120</td>
<td>151</td>
<td>118</td>
<td>8.85 9.21</td>
<td>4794.1 1672.0</td>
<td>552577.0</td>
</tr>
<tr>
<td>(6) CR 140</td>
<td>187</td>
<td>147</td>
<td>8.75 8.25</td>
<td>5328.2 2609.0</td>
<td>632670.0</td>
</tr>
</tbody>
</table>

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

TABLE 4 TOLERANCES
(Class 8.2)

All dimensions in millimetres.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>ISCR 50, 60 and 80</th>
<th>ISCR 100</th>
<th>ISCR 120 and 140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Width</td>
<td>±2</td>
<td>±2</td>
<td>±2</td>
</tr>
<tr>
<td>Thickness of head</td>
<td>±1</td>
<td>±1</td>
<td>±1</td>
</tr>
<tr>
<td>Flange Width</td>
<td>±2</td>
<td>+2</td>
<td>+2</td>
</tr>
<tr>
<td>Web Thickness</td>
<td>±2</td>
<td>±2</td>
<td>±2</td>
</tr>
<tr>
<td>Height</td>
<td>±1</td>
<td>±1.5</td>
<td>±2</td>
</tr>
<tr>
<td>Length</td>
<td>+100</td>
<td>+100</td>
<td>+100</td>
</tr>
<tr>
<td>Weight</td>
<td>+3</td>
<td>+3</td>
<td>+3</td>
</tr>
</tbody>
</table>

10. MARKING

10.1 Crane rail sections shall be marked with the following details:
   a) Manufacturer's identification mark, and
   b) Designation (see 3.1 and Tables 2 and 3).
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
(Clause 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 3.

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>AREA</th>
<th>WEIGHT</th>
<th>MOMENT OF INERTIA</th>
<th>SECTION MODULUS</th>
<th>RADIUS OF GYRATION</th>
<th>DISTANCES OF NEUTRAL AXIS</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm²</td>
<td>kg/m</td>
<td>lb/in² ft</td>
<td>lb/in² ft²</td>
<td>in</td>
<td>in</td>
<td>Fig/Table</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td>22</td>
<td>28.3</td>
<td>22.2</td>
<td>91</td>
<td>27.5</td>
<td>1.79</td>
<td>3.31</td>
<td>Table 6</td>
</tr>
<tr>
<td>30</td>
<td>38.0</td>
<td>29.8</td>
<td>681</td>
<td>116</td>
<td>4.23</td>
<td>5.87</td>
<td>Fig. 2</td>
</tr>
<tr>
<td>32</td>
<td>40.7</td>
<td>22.0</td>
<td>182</td>
<td>46.9</td>
<td>2.11</td>
<td>3.88</td>
<td>Table 6</td>
</tr>
<tr>
<td>43</td>
<td>53.4</td>
<td>43.5</td>
<td>327</td>
<td>73.7</td>
<td>2.42</td>
<td>4.44</td>
<td>Table 6</td>
</tr>
<tr>
<td>45</td>
<td>51.7</td>
<td>44.5</td>
<td>1584</td>
<td>212</td>
<td>5.30</td>
<td>7.48</td>
<td>Fig. 3</td>
</tr>
<tr>
<td>52-1</td>
<td>66.0</td>
<td>52.1</td>
<td>1204</td>
<td>190</td>
<td>4.27</td>
<td>6.64</td>
<td>Fig. 4</td>
</tr>
<tr>
<td>52-2</td>
<td>66.5</td>
<td>52.2</td>
<td>1270</td>
<td>198</td>
<td>4.97</td>
<td>6.43</td>
<td>Fig. 5</td>
</tr>
<tr>
<td>57</td>
<td>72.1</td>
<td>56.6</td>
<td>543</td>
<td>109</td>
<td>2.74</td>
<td>5.00</td>
<td>Table 6</td>
</tr>
<tr>
<td>67</td>
<td>85.4</td>
<td>67.0</td>
<td>2703</td>
<td>311</td>
<td>5.63</td>
<td>8.70</td>
<td>Fig. 6</td>
</tr>
<tr>
<td>74</td>
<td>94.8</td>
<td>74.4</td>
<td>893</td>
<td>170</td>
<td>3.07</td>
<td>5.21</td>
<td>Fig. 7</td>
</tr>
<tr>
<td>75</td>
<td>95.6</td>
<td>75.2</td>
<td>888</td>
<td>170</td>
<td>3.03</td>
<td>5.21</td>
<td>Table 6</td>
</tr>
<tr>
<td>101</td>
<td>129</td>
<td>101</td>
<td>1420</td>
<td>249</td>
<td>3.32</td>
<td>5.70</td>
<td>Table 6</td>
</tr>
<tr>
<td>125</td>
<td>138</td>
<td>122</td>
<td>3715</td>
<td>492</td>
<td>4.87</td>
<td>7.60</td>
<td>Fig. 8</td>
</tr>
</tbody>
</table>
### TABLE 6 DIMENSIONS OF 22, 32, 63, 57, 75 AND 101 KG/M CRANE RAIL SECTIONS

*(Clause A-1)*

<table>
<thead>
<tr>
<th>Designation</th>
<th>D</th>
<th>B</th>
<th>b</th>
<th>F</th>
<th>f₁</th>
<th>f₂</th>
<th>H</th>
<th>A</th>
<th>E</th>
<th>h</th>
<th>r₁</th>
<th>r₂</th>
<th>r₃</th>
<th>r₄</th>
<th>r₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>22</td>
<td>45</td>
<td>125</td>
<td>54</td>
<td>24</td>
<td>14.5</td>
<td>11</td>
<td>8</td>
<td>55±1</td>
<td>24</td>
<td>20</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(2)</td>
<td>32</td>
<td>55</td>
<td>150</td>
<td>66</td>
<td>31</td>
<td>17.5</td>
<td>12.5</td>
<td>9</td>
<td>65±1</td>
<td>28.5</td>
<td>23</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(3)</td>
<td>43</td>
<td>65</td>
<td>175</td>
<td>78</td>
<td>38</td>
<td>20</td>
<td>14</td>
<td>10</td>
<td>75±1</td>
<td>34</td>
<td>30</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(4)</td>
<td>57</td>
<td>75</td>
<td>200</td>
<td>90</td>
<td>45</td>
<td>15.4</td>
<td>11</td>
<td>8</td>
<td>85±1</td>
<td>39.5</td>
<td>35</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>(5)</td>
<td>75</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>60</td>
<td>23</td>
<td>16.5</td>
<td>12</td>
<td>95±1.5</td>
<td>45.5</td>
<td>40</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>(6)</td>
<td>101</td>
<td>120</td>
<td>220</td>
<td>120</td>
<td>72</td>
<td>30</td>
<td>20</td>
<td>14</td>
<td>105±1.5</td>
<td>55.5</td>
<td>47.5</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

### 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.
### TABLE 7 TOLERANCES

(Clause A-2.1)

All dimensions in millimetres.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>22, 32, 43 and 57 kg/m</th>
<th>30, 45 kg/m</th>
<th>75 kg/m</th>
<th>52-1, 52-2, 67, 74 and 125 kg/m</th>
<th>101 kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head width</td>
<td>±2</td>
<td>+0·80</td>
<td>±2</td>
<td>+2</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>-0·40</td>
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All dimensions in millimetres.

**FIG. 2 30 kg/m CRANE RAIL SECTION**
Fig. 4. 52.1 kg/m Crane Rail Section

All dimensions in millimetres.

Fig. 3. 43.5 kg/m Crane Rail Section

All dimensions in millimetres.
All dimensions in millimetres.

**FIG. 5** 52.2 kg/m **CRANE RAIL SECTION**
All dimensions in millimetres.

**FIG. 6** 67 kg/m CRANE RAIL SECTION
All dimensions in millimetres.

**Fig. 7** 74 kg/m Crane Rail Section
Fig. 8 125 kg/m Crane Rail Section

All dimensions in millimetres.
(Continued from page 2)

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