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IS 7452 (1990): Specification for hot-rolled steel sections for doors, windows and ventilators [CED 7: Structural Engineering and structural sections]



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भारतीय मानक
दरवाजों, खिड़कियों तथा रोशनदानों के लिए
तप्त वेल्लित सैक्शन – विशिष्ट
(दूसरा पुनरीक्षण)

Indian Standard

**HOT ROLLED STEEL SECTIONS
FOR DOORS, WINDOWS AND
VENTILATORS — SPECIFICATION**

(*Second Revision*)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 1 March 1990, after the draft finalized by the Structural Sections Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1974 in view the importance of hot rolled steel sections in the fabrication of steel doors, windows, ventilators and sashes. Based on the experience gained in the implementation of this standard it was revised in 1982.

In this revision use of concast billets made according to IS 6914 'Cast billet ingots and continuously cast billets for rolling into structural steel (standard quality) (*first revision*)' have been permitted in the rolling of such sections in addition to stipulating mass tolerance of the rolled sections. The tolerance specified on the dimensions of the sections shall nevertheless be strictly adhered to as they are advantageous and necessary for carrying out accurate fabrication work.

In this revision 4 new sections in the F series have been included for use in the outer and inner frames of larger size windows only.

For the guidance of the user of the rolled sections covered in this standard, Annex A may be referred for the recommended use of the various sections based on the situations/intended applications. These sections may also be used for purpose other than those mentioned in the Annex provided their suitability has been established.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HOT ROLLED STEEL SECTIONS FOR DOORS, WINDOWS AND VENTILATORS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard lays down the requirements regarding material, nominal dimensions and mass, dimensional and mass tolerances, surface finish and packing for hot rolled steel sections used for doors, windows, ventilators and sashes.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
1599 : 1985	Method for bend test (<i>second revision</i>)
2830 : 1975	Carbon steel billets, blooms and slabs for re-rolling into structural steel (standard quality)

IS No.

Title

2831 : 1975	Carbon steel billets, blooms and slabs for re-rolling into structural steel (ordinary quality)
6914 : 1978	Cast billet ingots and continuously cast billets for rolling into structural steel (standard quality)

3 TERMINOLOGY

3.1 For the purpose of this standard, the components of doors, windows and ventilators shall be defined as given in 3.1.1 and 3.1.2 and as illustrated in Fig. 1.

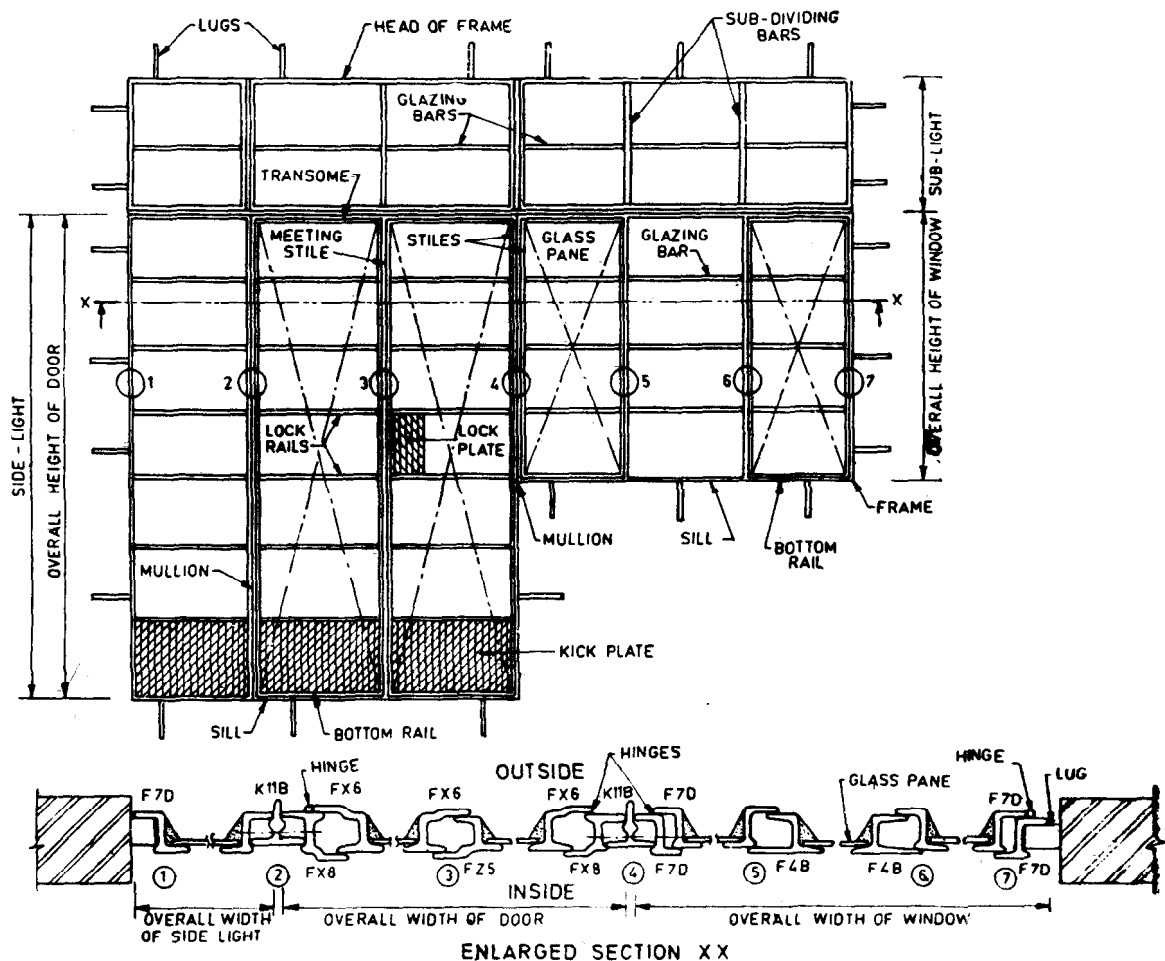


FIG. 1 TERMINOLOGY FOR STEEL DOORS, WINDOWS, SUB-LIGHT AND SIDE-LIGHT

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3.1.1 Sub-dividing Bars

These are vertical bars in a fixed-light or window or ventilator.

3.1.2 Fixed-light

Doors, windows and ventilators where there is no openable shutter.

3.1.2.1 Sub-light

A fixed light above an openable door or window.

3.1.2.2 Side-light

A fixed light of door height to couple with door.

4 DESIGNATION

4.1 Hot rolled steel sections of the profiles given in Fig. 2 shall be designated by letters indicated against each.

5 MATERIAL

5.1 Steel as per IS 2830 : 1975, IS 2831 : 1975 or concast billets conforming to IS 6914 : 1978 shall be used for manufacture of rolled steel sections.

6 DIMENSIONS AND DIMENSIONAL TOLERANCES

6.1 Dimensions

The dimensions of steel rolled sections when measured in accordance with 6.1.1 shall be as given in Fig. 2.

6.1.1 The dimensions of the sections shall be measured at the two ends, leaving 150 mm at the end, and at the centre. The average of three readings shall be taken for conformity. The measurements shall be given to the nearest 0.1 mm.

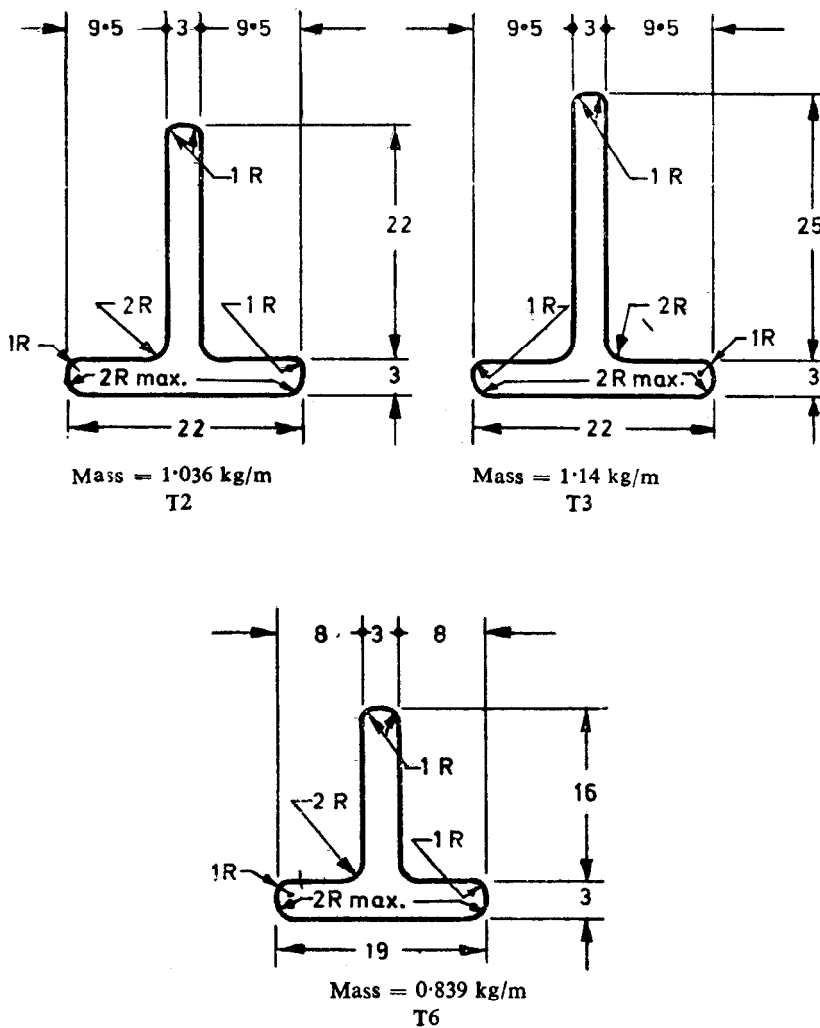
6.2 Dimensional Tolerances

6.2.1 Thickness of the Sections

Rolling tolerances on thickness of section shall be ± 0.2 mm.

6.2.2 Radii of Curvature

A tolerance of ± 0.5 mm shall be permitted on the nominal value of the radii of curvature



All dimensions in millimetres.

FIG. 2 PROFILES OF HOT ROLLED STEEL SECTIONS (Contd)

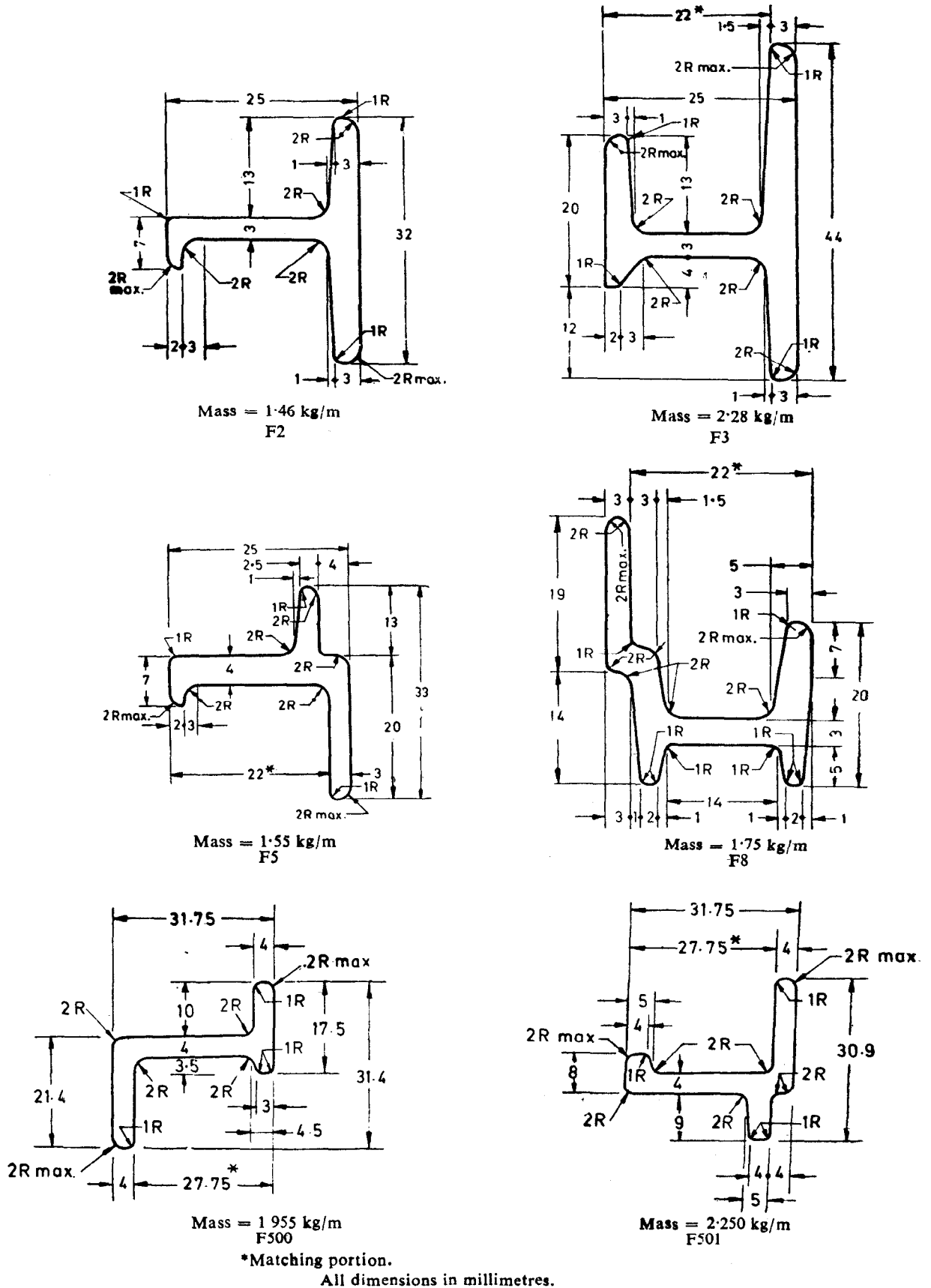
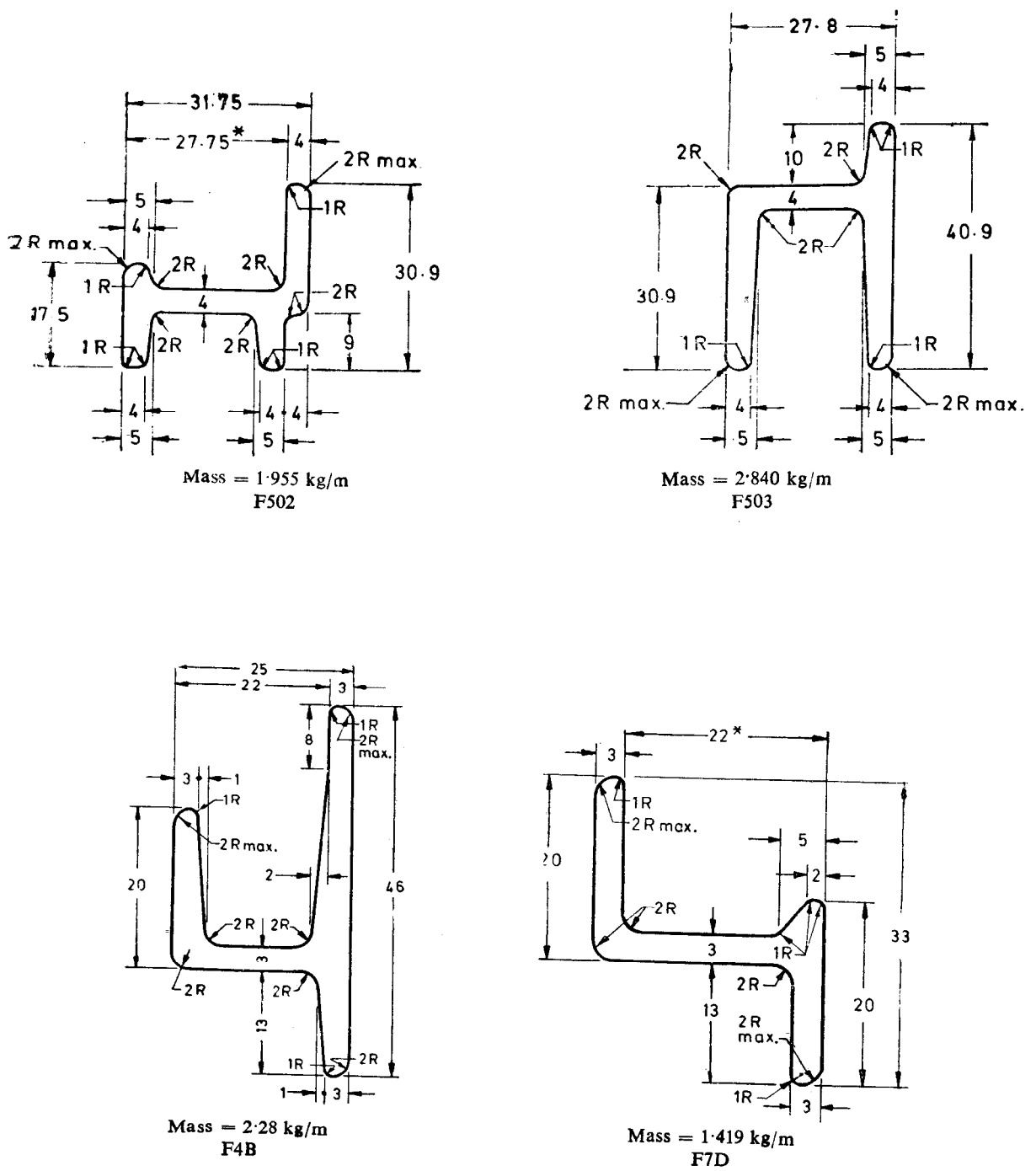


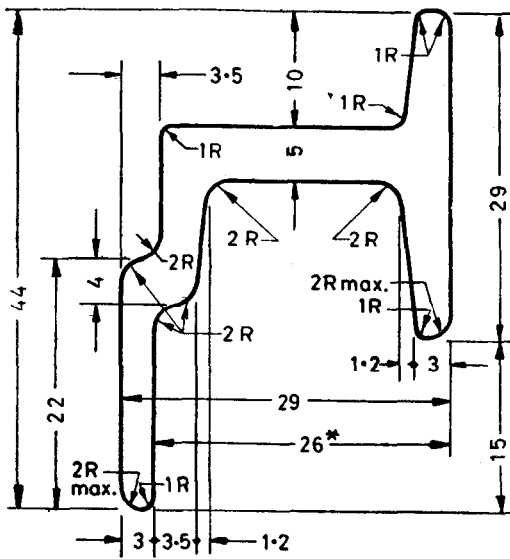
FIG. 2 PROFILES OF HOT ROLLED STEEL SECTIONS (Contd)



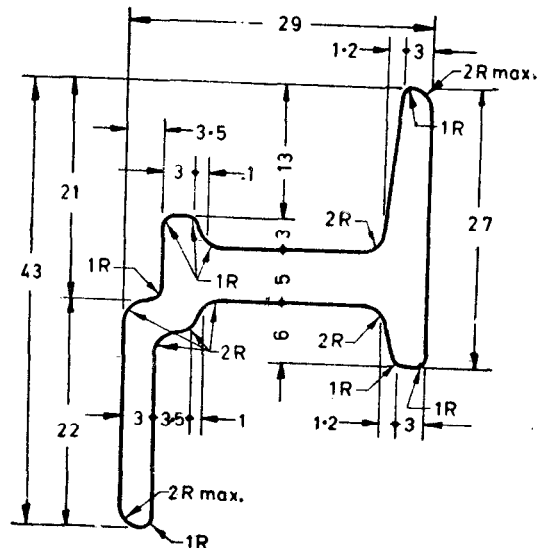
*Matching portion.

All dimensions in millimetres.

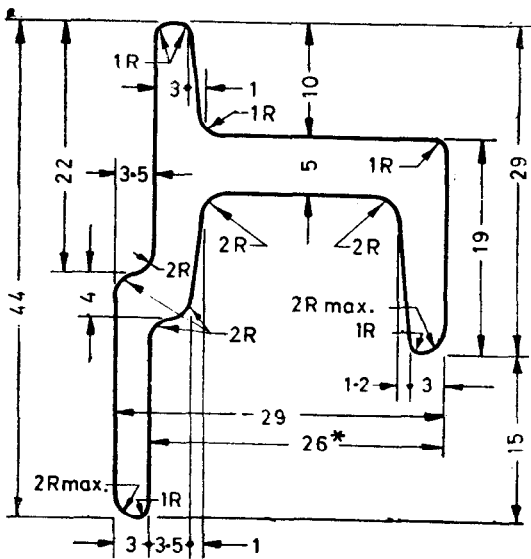
FIG. 2 PROFILES OF HOT ROLLED STEEL SECTIONS (Contd)



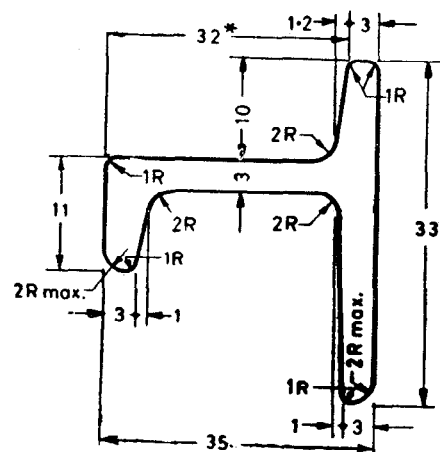
Mass 2.52 kg/m
FX6



Mass = 2.31 kg/m
FX8



Mass = 2.52 kg/m
FZ5

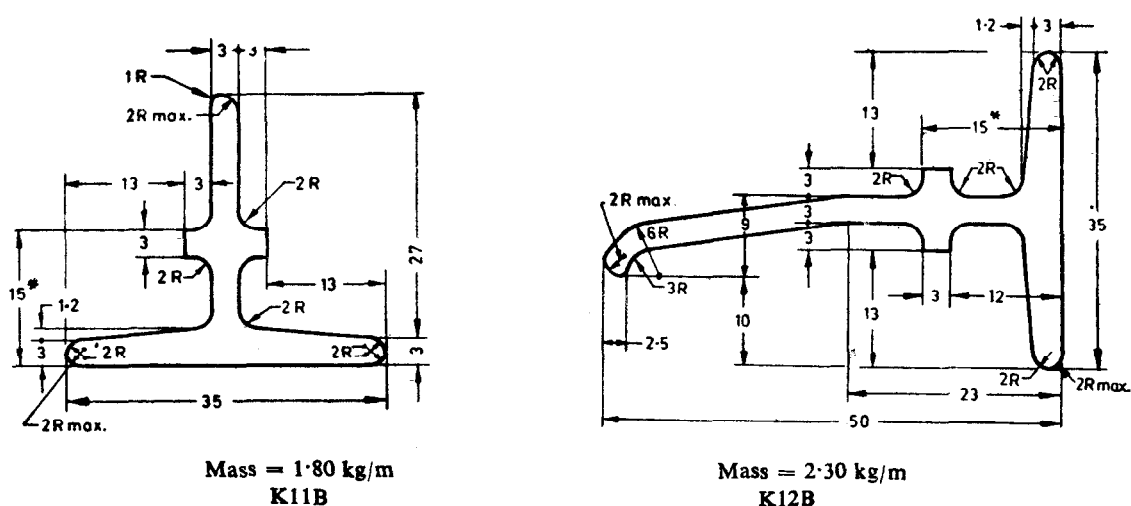


Mass = 1.90 kg/m
EZ7

*Matching portion.

All dimensions in millimetres.

FIG. 2 PROFILES OF HOT ROLLED STEEL SECTIONS (Contd)



*Matching portion.

All dimensions in millimetres.

FIG. 2 PROFILES OF HOT ROLLED STEEL SECTIONS

except where the maximum radii has been indicated.

6.2.3 Other Dimensions

Rolling tolerances on dimensions of the sections other than those covered in 6.2.1 and 6.2.2 shall be as under:

Dimension (mm)	Tolerance (mm)
Up to 10	± 0.2
Over 10 and up to 25	± 0.4
and over 25	± 0.6

6.2.3.1 Dimensions of the matching portion shown with an asterik (*) in Fig. 2, shall be within ± 0.4 mm tolerance.

6.2.3.2 The flanges of the sections shall be parallel to obtain correct matching.

7 MASS AND MASS TOLERANCE

7.1 Mass

Mass of the various sections per running meter shall be as given against each of the section in Fig. 2.

NOTE — Mass of the section as given have been arrived keeping in view the nominal dimensions of the sections and assuming density of the steel as 7.85 gm/cm³.

7.2 Mass Tolerance

Mass tolerance per meter length for the various profiles shall be ± 5 percent of the nominal mass specified for the section.

8 SURFACE FINISH

8.1 The rolled steel section shall be free from rolling defects, such as knot, steep bends, overlaps, waviness on edges, unparallel flanges, rolling marks and shall be suitable for punching and welding or both. The section shall be

straightened by roller straightening machine or any other suitable machine ensuring that twist will not be more than 5 degree over a length of 3 m. The section shall be packed in such a way as to avoid damage in transit.

9 BEND TEST

9.1 Frequency of Test

Bend test shall be conducted at the rate of one test per cast or part thereof rolled continuously. One additional test shall be made for each class of product and for each variation in thickness.

9.2 Selection and Preparation of Test Sample

9.2.1 Test samples shall be prepared from the finished product and full particulars regarding cast number, size and mass of section, in each cast shall be recorded.

9.2.2 The points from which test samples are taken shall be so located in the production as to yield the clearest possible information regarding properties in the cross-sectional and longitudinal planes.

9.2.3 Wherever practicable, the rolled surface of the steel shall be retained on the two opposite sides of the test samples.

9.2.4 In case of sections, bend tests are to be carried out on rectangular test samples which, as far as possible, should be of the full thickness of the product. The rolled surface of the test piece shall be on the outer side of the bend during the test.

9.2.5 Test samples shall be cut in such a manner that deformation is avoided as far as possible. If quilloting or cutting by hand or power hacksaw is employed an adequate allowance shall be left for removal by machining.

9.2.6 Test samples taken from rolled steel which have undergone deformation through bending or twisting shall in all cases be straightening cold. If the deformation is too severe to allow cold-straightening, it is permissible, in the case of materials to be delivered in the annealed or normalized condition, to carry out straightening under the application of heat provided the temperature does not exceed 650°C. When straightening test samples, care shall be taken to avoid any rise in temperature due to cold working as it may alter the properties of the samples as compared with the finished product which they represent.

9.2.7 Test samples shall not be annealed or otherwise subjected to heat treatment unless the material from which they are cut is similarly treated, in which case the test samples shall be similarly and simultaneously treated with the material before testing. Any slight straightening of test samples which may be required shall be done cold.

9.3 Bend Test Piece

9.3.1 The test pieces shall be cut lengthwise.

9.3.2 In all bend test pieces, the rough edge or arris resulting from shearing may be removed by filing or grinding or machining, but the test pieces shall receive no other preparation.

9.3.3 The test pieces shall not be annealed or otherwise subjected to heat treatment unless the material from which they are cut is similarly treated, in which case the test pieces shall be similarly and simultaneously treated, with the material before testing.

9.4 Bend test on the test piece shall be conducted in accordance with IS 1599 : 1985.

The test piece when cold shall without fracture be doubled either by pressure or by blows from a hammer until the internal diameter is not greater than three times the thickness of the test piece and the sides are parallel.

9.5 Re-test

Should any one of the test pieces first selected fail to pass bend test specified in this standard two further samples shall be selected for testing. Should the test pieces from both these additional samples pass, the material represented by the test samples shall be deemed to comply with the requirements of bend test. Should the test pieces from either of these additional samples fail, the material represented by the test samples shall be considered as not having complied with this standard.

10 PACKING

10.1 The rolled sections shall be supplied in bundles, each carrying a metal tag with the following information:

- Indication of the source of manufacture,
- Designation of the section,
- Number of pieces in the package, and
- Batch number.

10.2 Each bundle shall weigh not more than 100 kg and the variation of any two bar lengths in a bundle shall not be more than 150 mm.

11 MARKING

11.1 Each length of section shall be indelibly marked at intervals of not more than one metre and shall carry the indication of the source of manufacture.

ANNEX A

(Foreword)

PURPOSE OR RECOMMENDED USE OF SECTIONS

<i>Designation of Sections</i>	<i>Situation of Uses</i>	<i>Designation of Sections</i>	<i>Situation of Uses</i>
T ₂ , T ₃	Vertical and horizontal glazing bars for doors and sashes; windows; ventilators glazing bars for door side-lights; sub-dividing bars for fixed-lights; sash bars for doors, windows and ventilators where steel, aluminium or wooden beading is used for fixing glasses.		b) F5 is sometimes used as inner frame for open-out windows. Also used as inner frame for bottom-hung ventilators.
T ₆	Vertical and horizontal glazing bar for windows and ventilators.	F500, F501, F502	Outer or inner frames of large size windows only (more than 600 mm width).
F ₂	Inner frames for open-in windows.	F503	Outer frame for large size fixed glazing only.
F ₃	Outer frames for open-in frames.	F4B	Central mullion (meeting bar for shutters) for windows and ventilators, outer frame for open-in
F ₅ , F ₆	a) Inner and middle frames in centre-hung ventilators.		c) F8 is also used as outer frame for bottom-hung ventilators.

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<i>Designation of Sections</i>	<i>Situation of Uses</i>	<i>Designation of Sections</i>	<i>Situation of Uses</i>
	windows in rainy areas, sub-dividing bars for openable windows and top-hung ventilators.	K11B	a) Vertical coupling mullion for all standard windows. b) Can be used as horizontal coupling bar when openable windows are to be coupled above fixed ones or between two fixed windows. c) Can also be used as horizontal coupling mullion where windows are not exposed to weather.
F7D	Inner and outer frames for windows and ventilators, for inner frames for centre-hung ventilators, and outer frames for door side-lights.		
FX6, FZ5	Inner frames for doors.		
FX8	Outer frames for doors.	K12B	Horizontal coupling mullion, also known as weather bar. Especially used when the coupled unit is exposed to rain.
EZ7	Used as outer frame for industrial sashes. Also used for outer frame for wooden doors.		

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard 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 BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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