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IS 1883 (1983): metal shelving racks (adjustable type) -
Specification [CED 35: Furniture]



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Indian Standard

SPECIFICATION FOR
METAL SHELVING RACKS
(ADJUSTABLE TYPE)

(Third Revision)

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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SPECIFICATION FOR METAL SHELVING RACKS (ADJUSTABLE TYPE)

(Third Revision)

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Indian Standard

SPECIFICATION FOR METAL SHELVING RACKS (ADJUSTABLE TYPE)

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Third Revision) was adopted by the Indian Standards Institution on 30 December 1983, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first printed in 1961 and subsequently revised in 1966 and 1975. In this revision the grade of materials to be used in the components have been specified.

0.3 In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.4 This standard contains clauses which require the purchaser to supply certain technical information at the time of placing orders (*see 10.1*).

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 covers the requirements for adjustable metal shelving racks.

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

2. MATERIALS

2.1 Angles — Mild steel for hot-rolled angle sections shall conform to IS : 226-1975¹. Hot rolled mild steel angles shall conform to IS : 808-1964². Angle sections may also be cold-formed from strip steel conforming to grade 0 of IS : 4030-1973³.

2.2 Bolts and Screws — Bolts and screws used for assembly shall not be less than M6 size. Square or hexagonal nuts and bolts shall conform to IS : 2585-1968⁴ and IS : 1363-1967⁵, respectively. The bolts, screws and nuts shall be zinc plated or galvanized in accordance with IS : 1573-1970⁶ or IS : 5358-1969⁷.

2.3 Blockboards — shall conform to Grade 2 of IS : 1659-1979⁸.

2.4 Hardboards — shall be of tempered type conforming to IS : 1658-1977⁹.

2.5 Mild Steel Sheets — shall conform to grade 0 of IS : 1079-1973¹⁰ or grade 0 of IS : 513-1973¹¹.

2.6 Plywood — shall conform to grade BWR and type BB of IS : 303-1975¹².

2.7 Veneered Particle Boards — shall conform to type EX SO GP of IS : 3097-1980¹³.

2.8 Wood Particle Boards — shall conform to type FPTH of IS : 3087-1965¹⁴.

3. TYPES

3.1 Metal shelving racks shall be of three types, namely, open type, semi-open type and closed type.

¹Specification for structural steel (standard quality) (*fifth revision*).

²Specification for rolled steel beam, channel and angle sections (*first revision*).

³Specification for cold rolled carbon steel strip for general engineering purposes (*first revision*).

⁴Specification for black square bolts and nuts (diameter range 6 to 39 mm) and black square screws (diameter range 6 to 24 mm) (*first revision*).

⁵Specification for black hexagon bolts, nuts and lock nuts (dia 6 to 39 mm) and black hexagon screws (dia 6 to 24 mm) (*first revision*).

⁶Specification for electroplated coatings of zinc on iron and steel (*first revision*).

⁷Specification for hot-dip galvanized coatings on fasteners.

⁸Specification for blockboards (*second revision*).

⁹Specification for fibre hardboards (*second revision*).

¹⁰Specification for hot-rolled carbon steel sheet and strip (*third revision*).

¹¹Specification for cold rolled carbon steel sheets (*second revision*).

¹²Specification for plywood for general purposes (*second revision*).

¹³Specification for veneered particle boards (*first revision*).

¹⁴Specification for wood particle boards (medium density) for general purposes.

3.1.1 Open Type — Racks without side and back sheets.

3.1.2 Semi-open Type — Racks with sides only and no back, or racks with back only and no sides.

3.1.3 Closed Type — Racks fitted with side and back sheets.

4. DIMENSIONS AND TOLERANCES

4.1 Dimensions — The nominal overall dimensions of both the types of shelving racks shall be as given below:

Height	975 to 4875 mm in increments of 300 mm
Width	900 mm
Depth	300, 400, 500 and 600 mm
Ground clearance	45 mm

NOTE — Minimum clearance required for such shelving racks as may be put into recesses or openings shall be as follows:

a) For top of rack	20 mm
b) For each side of rack	10 mm
c) For depth of rack	5 mm

4.2 Tolerances — The dimensions specified in 4.1 shall not vary by more than ± 5 mm.

5. FABRICATION

5.1 Components — Metal shelving racks shall be assembled from the components given in 5.2 to 5.11.

5.2 Angle Posts — The length of angle posts shall correspond to height of racks (see 4.1). The thickness of post when made from steel sheet shall be not less than 3 mm. Rolled steel angle posts shall be of $40 \times 40 \times 3$ mm size. Angle posts shall be free from twist, sharp edges and burrs. Suitable plastic or rubber pads may be provided at the bottom of each angle post if required by the purchaser.

5.2.1 Holes in Angle Posts — Angle posts shall have 8-mm diameter holes provided at 50-mm centres. The holes shall start at 12.5 mm centres from each end.

5.3 Shelves

5.3.1 Metal Shelves — Metal shelves shall be made from mild steel sheets not less than 1.0 mm in thickness. Shelves shall have lipped flanges, width of flange being 30 mm and depth of lip 15 mm. The size of shelves shall be derived from the dimensions of racks given in 4.1 and the thickness of angles, gussets and sheets where used.

5.3.2 Wood Based Panel Shelves — Shelves may be made from wood particle boards, veneered particle boards, blockboards or plywood not less than 20 mm in thickness with four brackets fixed on the end sides near the corners (see Fig. 1) The brackets shall be made of mild steel sheeting not less than 1.6 mm thick and shall have 8-mm corresponding holes for fixing them to the angle posts.

5.3.3 Holes in Shelves — Shelves shall have 8-mm corresponding holes for fixing them to the angle posts. In addition shelves shall have 8-mm holes for corner gussets and for fitting backs and sides, where necessary. Where partitions have to be fixed, the shelves shall have additional 8-mm diameter holes provided at 50-mm centres.

5.4 Gussets — Minimum 8 gussets, four on each face shall be fitted to the open type racks, that is without sides and back or racks with sides only (see Fig. 2). Gussets to sides may also be provided to give greater rigidity and prevent the racks from becoming out of square. Four gussets on front face shall be fitted to closed type racks, that is, racks fitted with sides and back or racks with back only. Gussets shall be made of 1.0 mm (minimum) thick mild steel sheet and shall be not less than 75 mm long at each end jointing to the shelf and angle post.

5.5 Sides

5.5.1 Metal Sides — The sides shall be made from mild steel sheets not less than 0.8 mm thick. The width of the side sheets shall correspond to the depth of the shelf as given in 5.3.1 but shall be less by 12.5 mm. The sides shall extend between the extreme surfaces of top and bottom shelves but shall stop 50 mm from the floor level.

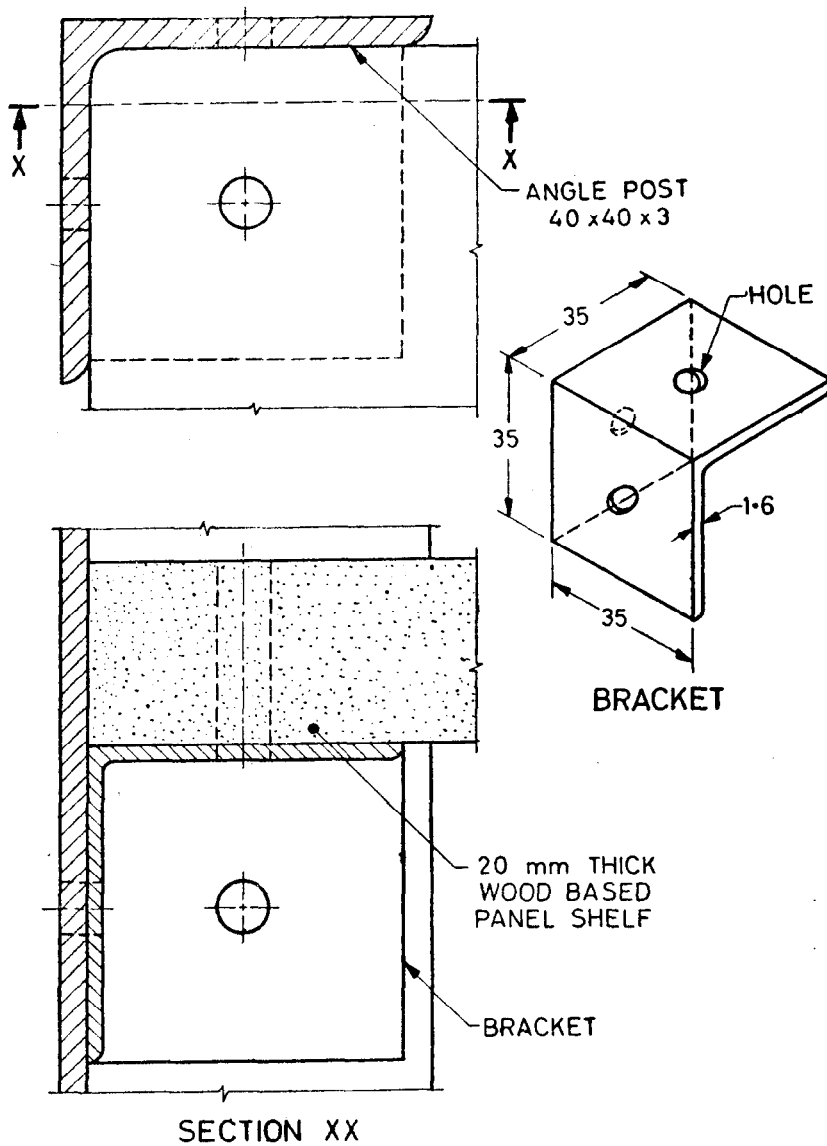
5.5.2 Wood Based Panel Sides — The sides may be made from wood particle boards, veneered wood particle boards, hardboards or plywood not less than 10 mm in thickness.

5.5.3 Holes in Sides — Holes 8 mm in diameter shall be provided along each longitudinal edge and shall be spaced at 50-mm centres and shall match with the holes in the corresponding vertical angle posts.

5.6 Backs

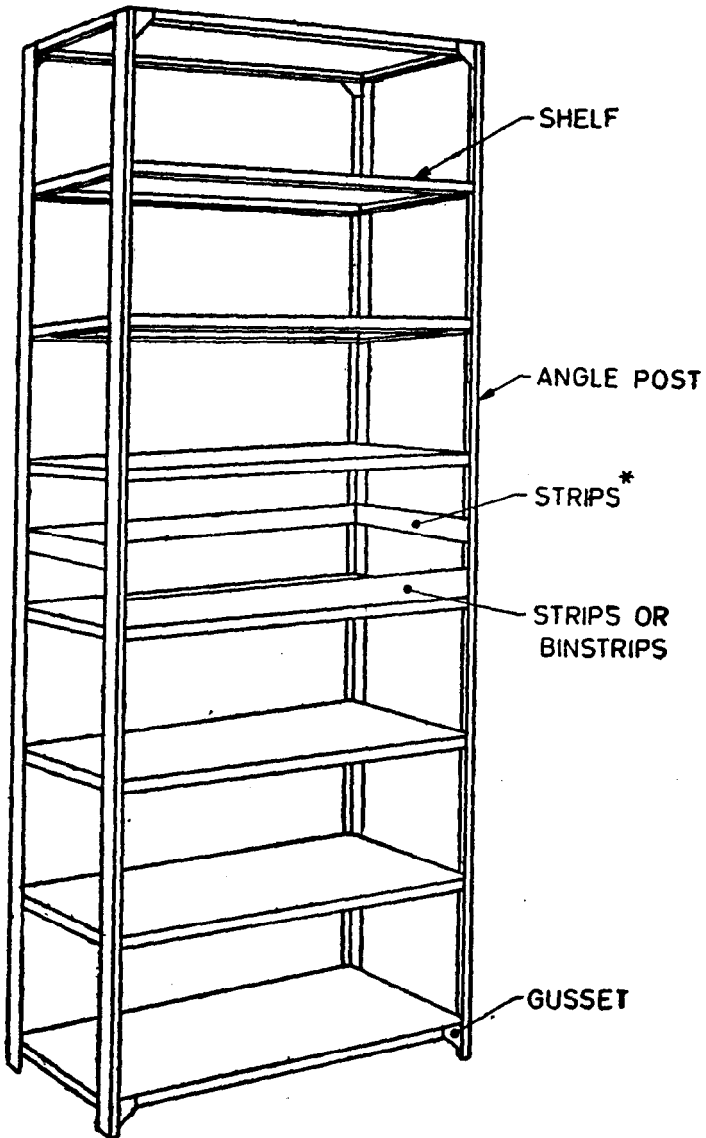
5.6.1 Metal Backs — The backs shall be made from mild steel sheets not less than 1.0 mm thick. The width of back sheet shall correspond to the width of the shelf as in 5.3.1 but shall be less by 12.5 mm. The backs shall extend between the extreme surfaces of the top and bottom shelves but shall stop 50 mm from the floor level.

5.6.2 Wood Based Panel Backs — The back may be made from wood particle boards, veneered wood particle boards, hardboards or plywood not less than 10 mm in thickness.



All dimensions in millimetres.

FIG. 1 ARRANGEMENT FOR FIXING OF WOOD BASED PANEL SHELVES

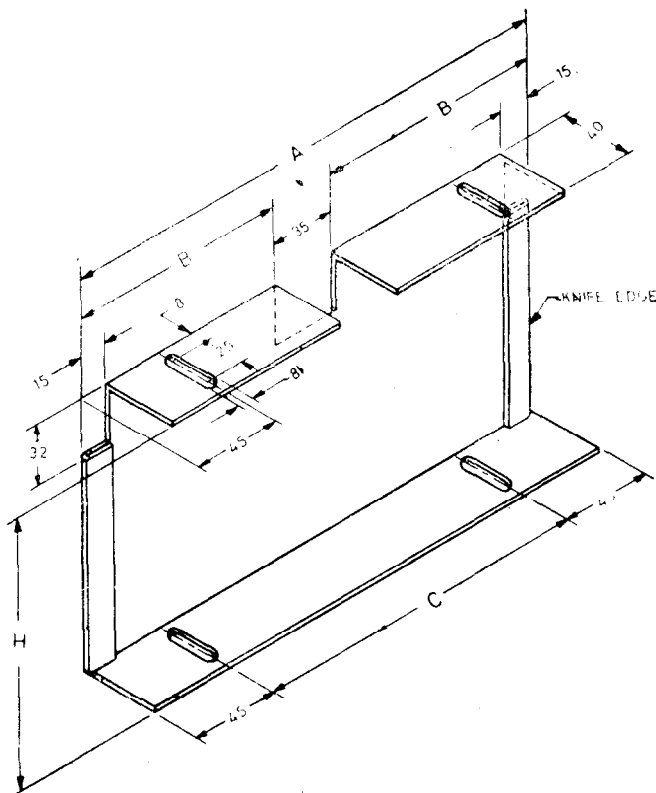


*Arrangement for fitting strips shown in one opening only.

FIG. 2 TYPICAL ARRANGEMENT OF AN OPEN TYPE METAL SHELVING RACK

5.6.3 The requirements of 5.5.3 for sides shall apply the backs also. In addition, there shall be a row of holes 8 mm in diameter in the middle of backs, so as to permit fixing back to the shelves. Corresponding holes shall be provided in the shelves.

5.7 Partitions, if provided to divide the compartment into pigeon holes, shall be made from mild steel sheets not less than 0.8 mm thick. Partitions shall be fixed to shelf by four bolts and nuts (see Fig. 3). Where partitions are fitted one over the other, a common bolt shall hold both the partitions with the shelf.



NOTE 1 — Dimension A is the nominal depth of rack as in 4.1 minus 10 mm, the overall height H of a partition shall be 3 mm less than the centre to centre dimension between the shelves.

NOTE 2 — Dimension $B = \frac{A-35}{2}$ mm.

NOTE 3 — Dimension C = depth of shelf — 100 mm.

NOTE 4 — 35 mm wide opening in the upper flange of partition shall only be provided when the shelves are fitted with a stiffener in the middle underneath. Depth of this opening shall be sufficient to accommodate the stiffener.

All dimensions in millimetres.

FIG. 3 PARTITION

5.8 Strips — For open type of shelving rack, strips may be provided on the sides and back to prevent materials from toppling over. They shall be made from mild steel sheet not less than 1.0 mm thick and 25 mm, 50 mm or 75 mm in height. The longitudinal ends of the strips shall be bent and pressed over to form a knife edge (see Fig. 3).

5.9 Binstrips — Binstrips may be provided on the front face only when the racks are covered on the sides and back. They shall be made from mild steel sheet not less than 0.8 mm thick and shall measure 25 mm, 50 mm, 75 mm or 100 mm in height over the top surface of the shelf.

5.10 Label Holders — Label holders shall be fitted on the front flange of the shelf and shall be 25 mm high.

5.11 Reinforcements and Side Supports — In order to accommodate the requirements for varying types of load, shelf reinforcement and side support may be used.

6. ASSEMBLY

6.1 The various components shall be assembled by means of bolting.

7. FINISH

7.1 Angles and Sheet Metal Components

7.1.1 All dents, burrs and sharp edges shall be removed from the various components. The components shall be individually pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign element.

7.1.2 Immediately after pickling, all the mild steel parts shall be given phosphating treatment conforming the Class C of IS : 3618-1966*. The process for application of phosphate coating shall be in accordance with IS : 6005-1970†.

NOTE — Putty shall be applied to all the surfaces requiring filling and shall conform to IS : 110-1968‡. Aluminium prime shall conform to IS : 5660-1970§.

*Specification for phosphate treatment of iron and steel for protection against corrosion.

†Code of practice for phosphating of iron and steel.

‡Specification for ready mixed paint, brushing, grey filler for enamels for use over primers (*first revision*).

§Specification for ready mixed paint, brushing, aluminium red oxide primer.

7.1.3 Coat/coats of enamel paint shall then be applied as follows:

- a) Finish coat with enamels conforming to IS : 151-1950* and IS : 2932-1974† or IS : 2933-1974‡; and
- b) In case of stoving enamel the components shall thereafter be baked at a specified temperature in an oven heated uniformly. The finish shall be smooth and uniform with a hard and tough film of enamel strongly adhering to the surface. The finish shall be free from all visible defects and shall not chip when tapped lightly with a dull pointed instrument.

7.2 Wood Based Panel Components — These components may either be painted or polished.

7.2.1 Wood putty conforming to IS : 419-1967§ shall be applied to all wood based surfaces requiring filling, followed by a suitable primer paint before the finishing coat of paint is applied [see also IS : 2338 (Part 1) - 1976||].

7.2.2 Wood based panels may be polished either with transparent glossy french polish or stained dark polish.

7.3 All other components shall be finished in colour as agreed to between the purchaser and the manufacturer.

8. PERFORMANCE REQUIREMENTS OF FINISH

8.1 Scratch Hardness Test — A sample of mild steel plate 150 × 50 mm in size and thickness of 0.315 mm and finished as given in 7 shall be subjected to scratch hardness test in accordance with 15.1 of IS : 101-1964¶. A scratch showing the bare metal shall not be produced on the test sample.

8.2 Pressure Test — Samples prepared from mild steel plates of thickness 0.315 mm and finished as given in 7 shall be subjected to pressure test in accordance with 15.2 of IS : 101-1964¶. The metal surface shall not be rendered visible when the test pieces are separated after the test.

8.3 Flexibility and Adhesion Test — A sample of mild steel plate 150 × 50 mm in size and thickness 0.315 mm and finished as given in 7 shall be subjected to flexibility and adhesion test in accordance with 16 of IS : 101-1964¶. The paint film on the test piece shall not show damage, detachment or cracking when examined under ×10 magnification.

*Specification for ready mixed paint, spraying, finishing, stoving, enamel, for general purposes, colour as required.

†Specification for enamel, synthetic exterior, (a) undercoating (b) finishing (first revision).

‡Specification for enamel, exterior (a) undercoating, (b) finishing (first revision).

§Specification for putty, for use on window frames (first revision).

||Code of practice for finishing of wood and wood-based materials: Part 1 operations and workmanship.

¶Methods of test for ready mixed paints and enamels (second revision).

8.4 Stripping Test — A sample of mild steel plate 150×50 mm in size and thickness 0.315 mm and finished as given in 7 shall be subjected to stripping test in accordance with 17 of IS : 101-1964*. The scratch produced after the test shall be free from jagged edges.

8.5 Test for Protection Against Corrosion Under Conditions of Condensation — A mild steel panel of size 150×100 mm and thickness 1.25 mm and finished as given in 7 shall be subjected to test for protection against corrosion under conditions of condensation in accordance with 18 of IS : 101-1964*. The metal surfaces shall show no signs of corrosion after the test.

9. LOADING

9.1 The maximum static load uniformly distributed and applied on the shelves may not exceed 150 kg. The load may be taken as a guide in ordering shelves.

10. INFORMATION TO BE SUPPLIED BY THE PURCHASER

10.1 The purchaser shall supply alongwith his order the following information to the supplier:

- a) Number of steel shelving racks;
- b) Type of racks (open, semi-open or closed);
- c) Size of rack (*see 4.1*);
- d) Number of shelves;
- e) If partitions are required, the number of compartments required in the height and the height of the individual compartments (centre to centre of adjacent shelves);
- f) Number and location of partitions in each compartment, where required;
- g) Whether binstrips are required for each compartment;
- h) Whether label holders are required for each compartment, if so specify width;
- j) Colour required; and
- k) If open, number and location of strips.

11. MARKING

11.1 All metal shelving racks shall be marked with a suitable mark identifying the manufacturer.

*Methods of test for ready mixed paints and enamels (*second revision*).

11.2 BIS Certification Marking

The product may also be marked with Standard Mark.

11.2.1 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 details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12. PACKING

12.1 All angles, shelves, gussets, sides, partitions, backs, bolts and nuts shall be suitably packed in such a way so as not to be damaged during transit.

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