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*Indian Standard*

# METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS

## PART IX ROOF COVERING (INCLUDING CLADDING)

## *( Second Revision )*

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# *Indian Standard*

# METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS

## PART IX ROOF COVERING (INCLUDING CLADDING)

## *( Second Revision )*

## 0. FOREWORD

**0.1** This Indian Standard (Part IX) (Second Revision) was adopted by the Indian Standards Institution on 16 February 1973, after the draft finalized by the Civil Works Measurement Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Measurement occupies a very important place in the planning and execution of any civil engineering work from the time of first estimates to the final completion and settlement of payments for a project. Methods followed for measurement are not uniform and considerable differences exist among practices followed by different construction agencies and also among various Central and State Government departments. While it is recognized that each system of measurement has to be specifically related to administrative and financial organizations within a department responsible for the work, a unification of various systems at technical level has been accepted as very desirable specially as it permits a wider range of operation for civil engineering contractors and eliminates ambiguities and misunderstandings of various systems followed.

**0.3** Among various civil engineering items, measurement of buildings was the first to be taken up for standardization and this standard having provisions relating to building work was first published in 1958 and was revised in 1964.

**0.4** In the course of usage of this standard by various construction agencies in the country, several clarifications and suggestions for modifications were received and as a result of study, the technical committee responsible for this standard decided that its scope besides being applicable to buildings should be expanded to cover method of measurement of civil engineering works like industrial and river valley projects.

**0.5** Since different trades are not related to one another, the Sectional Committee decided that each trade as given in IS:1200-1964* shall be

*Method of measurement of building works (*revised*).

issued separately as a different part. This will also be helpful to users in using the specific standard.

**0.5.1** This part covers method of measurement of roof covering (including cladding) applicable to buildings as well as to civil engineering works.

**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 measurement, 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 (Part IX) covers the method of measurement of roof covering (including cladding) for buildings and civil engineering works.

## 2. GENERAL RULES

**2.1 Clubbing of Items** — Items may be clubbed together provided that the break-up of the clubbed items is agreed to be on the basis of the detailed description of the items stated in this standard.

**2.2 Booking of Dimensions** — In booking dimensions, the order shall be consistent and generally in the sequence of length, breadth or width and height or depth or thickness.

**2.3 Description of Items** — The description of each item shall, unless otherwise stated, be held to include, where necessary, conveyance and delivery, handling, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size.

**2.4 Measurements** — Unless otherwise stated hereinafter all works shall be measured net in decimal system, as fixed in its place, as given in 2.4.1 and 2.4.2.

**2.4.1** Dimension shall be measured to the nearest 0·01 m.

**2.4.2** Areas shall be worked out to the nearest 0·01 $m^2$.

**2.5** Work executed in the snow shall be measured separately.

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

2.6 **Bills of Quantities** — The bills of quantities shall fully describe the materials and workmanship, and accurately represent the work to be executed.

2.7 The superficial area of roof coverings and cladding as laid shall be measured on the flat in square metres without allowance for laps and corrugations, if any.

2.7.1 Portions of roof covering overlapped by ridge or hip, etc, shall be included in the measurements of the roof except where otherwise stated.

2.8 Any opening not exceeding 0·4 $m^2$ shall not be deducted and forming such openings requiring cutting shall be enumerated.

2.9 Any opening exceeding 0·4 $m^2$ shall be deducted and cutting required shall be measured in running metres.

2.10 Cutting across corrugations shall be measured on the flat and not girthed.

2.11 No additions shall be made for laps cut through.

2.12 Sheeting curved or bent to curvature shall be measured separately.

2.13 The woodwork and steelwork shall be measured separately under the relevant part of this standard.

## 3. METAL SHEET ROOFINGS

3.1 The type of sheeting shall be described stating the thickness. The side and end laps shall be stated.

3.2 If the side and end laps are bolted or riveted, it shall be so stated specifying the spacing of the bolts or rivets.

3.3 Nainital pattern sheet-roofing shall be fully described and measured separately and shall include all rolls, clips, etc. Measurements shall be taken on the flat and not girthed.

3.4 Ridges, hips and valleys shall be measured along the central line in running metres stating the girth and flashings in square metres. The laps, passings and method of fixing shall be described.

3.4.1 The laps along the length of the ridges, hips, valleys or flashing pieces shall not be measured separately.

## 4. ASBESTOS CEMENT ROOFING

4.1 The type of sheeting shall be described stating the thickness.

**4.1.1** The side and end laps shall be stated and the method of fixing described. If required to be fixed in accordance with maker's instructions, it shall be so stated.

**4.2** Ridges and hips shall be described stating the laps and measured in running metres along the central line; where in two pieces, these shall be measured as one length.

**4.3** Ridge finials, cowl type ventilators, curved barge boards for northlight curves, roof lights, expansion joints for ridges and expansion joints for northlight curves shall be described and enumerated. Ridge finials where in two interlocking pieces, shall be measured as one number.

**4.4** Eaves filler pieces, aprons, barge boards, corner pieces, flashings, louvers, northlight and ventilator curves, expansion joints for sheets and other similar specials shall be described and measured for the finished work in running metres stating the laps and the method of fixing.

**4.5** Ventilator sheets and other sheeting of dissimilar material shall be described and enumerated as 'extra over' on ordinary sheeting.

**4.6** Eaves and valley gutters shall be described and measured in running metres along the central line.

**4.7** Accessories, such as drop ends, stop ends, nozzles and angles shall be described and enumerated as 'extra over' gutters.

**4.8** Union clips (loose sockets) shall not be measured separately.

## 5. ROOF SHEETING OTHER THAN METAL AND ASBESTOS CEMENT

**5.1** The method of measurement given in **4** shall also be applicable to roof sheeting of plastic, fibre glass, etc.

## 6. CLADDING (PLAIN, CORRUGATED OR SEMI-CORRUGATED)

**6.1** The type of sheeting shall be described stating the thickness. The side and end laps shall be stated and method of fixing described. If the side and end laps are bolted or riveted it shall be so stated specifying the spacing of bolts or rivets.

## 7. ROOF TILING

**7.1** The description shall state the kind, pattern, quality and size of the tiles, the gauge to which they are to be laid and the method of laying.

**7.2** Single and double tiling shall each be measured separately.

**7.3** Ridges, hips and valleys, shall be measured in running metres. If set in mortar, it shall be so stated specifying the mortar.

**7.4** Special ridge and hip tiles shall be described stating the kind, pattern, quality and size as also the mortar in which bedded and pointed. Coloured mortar (to match the coloured tiling, if required to be used for pointing) shall be described.

**7.5** Hip hooks shall be enumerated stating the size and whether black or galvanized.

**7.6** Eaves tiles bedded in mortar on walls shall be measured in running metres as extra for eaves describing the mortar and width of bedding.

**7.7** Filling ends and spaces between tiles at eaves with mortar shall be measured in running metres and described stating the depth of filling.

**7.8** Filling to single and double tiling shall be measured separately.

**7.9** Screwing eaves tiles to battens shall be measured in running metres stating type, size, spacing of screws and washers. Drilling holes in the tiles shall be included in the description.

**7.10** Half tiles or one and a half tiles at verges shall not be measured separately, but straight cutting and waste at verges shall be allowed for the full length of the verge and measured in running metres.

**7.11** Tiles at verges bedded in mortar on walls shall be measured in running metres as 'extra over' for verges describing the mortar and width of the bedding.

**7.12** Country tiling shall be described as including all cutting and waste.

**7.13** Special ventilating tiles and glass tiles shall be enumerated as 'extra over' only over roof tiling.

## 8. ROOF SHINGLES

**8.1** Wood shingles to roof shall be measured in the same way as in the case of roof tiling (*see* **7**).

## 9. ROOF SLATING

**9.1** Slate roofs shall be measured in the same way as in the case of roof tiling (*see* **7**).

## 10. TERRACED ROOFING

**10.0** The size and quality of burnt bricks, brick tiles, stone slabs and similar materials for terraced roofing, method of laying, jointing, pointing and mix and type of mortar shall be described, stating the number of layers of bricks tiles, etc.

**10.1 Madras Terrace Roofing** — It shall be fully described and plaster finish on the top and underside included in the item.

**10.2** Flat brick tile roofing shall be fully described stating the thickness and number of layers.

**10.3** Hollow roof with brick on edge bridging courses in between two layers of tiles shall be fully described and measured separately.

**10.4** Flush pointing to tiles on top and underside of roof shall be described and included in the item of roofing.

**10.5** Tiles laid in *CHAJJAS* and sun shades shall be measured separately.

**10.6** The type of stone, quality and its dressing for stone slab roofing shall be described stating the thickness of slabs and spacing of battens or joists. If the size of slabs is required to be uniform, it shall be so stated.

**10.7** Jack arch roofing including provision of centering shall be measured flat overall in square metres. The clear span, rise and thickness of arch, method of laying, jointing and pointing shall be described. The finish to top and underside shall also be stated and included in the description.

## 11. ROOF TREATMENT

**11.1** Lime concrete in terracing shall be described and measured in square metres stating consolidated average thickness.

**11.2** Mud terraced roof shall be described stating average consolidated thickness.

**11.3** Each type of waterproofing treatment shall be fully described (including type, quality and quantity of materials, side and end laps, where necessary) and shall be measured in square metres. All cutting, waste, forming of openings and wedging and pointing edges in masonry work shall be included in the description. Turn-ups and trun-downs at eaves, verges, abutment, etc, shall be measured along with waterproofing treatment.

**11.4** The primer where provided shall also be measured separately as in **11.3.**

**11.5** The waterproofing treatment in flashings, aprons, gutters, hips, ridges, valleys, etc, shall be fully described (*see* **11.3**), and measured net separately in square metres.

**11.6** The waterproofing treatment between laps of corrugated sheeting shall be fully described including the method of securing and measured in running metres stating the width.

## 12. THATCHING, MATTING AND BAMBOO WORK

**12.1** The materials shall be described stating the kind of fibre or straw and the finished thickness. The description shall include bamboo or wood securing fillers, tying string and trimming to eaves and verges.

**12.2** Thatched capping to ridges and hips shall be described and measured along central line in running metres stating the girth. Matting, material, number of layers, laps and the method of fixing shall be described and all cutting and waste shall be included.

**12.3** Cover strips and cross bracings of split bamboos or wooden laths shall be measured in square metres as 'extra over' matting and the method of fixing shall be described.

**12.4** Bamboos laid one-way or two-way *JAFFRI* work shall each be measured separately in square metres stating the size of bamboos and their spacing. Framing shall be included with the item.

**12.5** Split bamboo work and whole bamboo work shall be measured separately.

**12.6** Whole bamboos fixed independently as support to matting shall be measured in running metres stating the mean girth. The description shall state the method of fixing and application of preservatives, if required.

## 13. RAIN WATER GOODS

**13.1** Gutters and pipes shall be described and measured in running metres including all short lengths, cutting and waste. The material, protective coating, if any, the pattern, the method of jointing and fixing shall be described. The length shall be measured along the central line. The length of all fittings, such as bends, junctions angles and the like shall be included.

**13.2** Brackets for gutters shall be measured separately under the relevant part of this standard.

**13.3** Angles (internal or external), drop ends and stopped ends shall be enumerated as 'extra over' the length of gutters and shall include extra joints, cutting and waste.

**13.4** Pipe rails, distance pieces and holder bats shall be described and included with the fixing of the pipes.

**13.5** Bends, elbows, offsets, shoes, branches, swan necks and heads shall be enumerated as 'extra over' the length of pipe and shall include for extra joints, cutting and waste.

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