



**PRODUCT MANUAL FOR
BAMBOO MAT CORRUGATED SHEETS
ACCORDING TO IS 15476 : 2004**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

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|----|--|--|---|
| 1. | Product | : | IS 15476:2004 |
| | Title | : | BAMBOO MAT CORRUGATED SHEETS |
| | No. of Amendments | : | 4 |
| 2. | Sampling Guidelines: | | |
| a) | Raw material | : | Bamboo – Clause 4.1 of IS 15476 : 2004 Bamboo mats – Clause 4.1.1 of IS 15476 : 2004 Adhesive – Clause 4.2 of IS 15476 : 2004 (BWP Grade) |
| b) | Grouping guidelines | : | Please refer ANNEX – A |
| c) | Sample Size | : | Qty - 2 Nos |
| 3. | List of Test Equipment | : | Please refer ANNEX – B |
| 4. | Scheme of Inspection and Testing | : | Please refer ANNEX – C |
| 5. | Possible tests in a day : | | |
| | i) Bamboo mat (Clause 4.1) ii) Dimension and tolerance (Clause 6) iii) Finish (Clause 7) iv) Load bearing capacity – Dry state (Clause 8.1) | | |
| 6. | Scope of the Licence : | | |
| | “Licence is granted to use Standard Mark as per IS 15476 : 2004 with the following scope: | | |
| | Name of the product | BAMBOO MAT CORRUGATED SHEETS | |
| | Variety | Bamboo mat corrugated sheets (BMCS)/ Bamboo mat ridge caps (BMRC) | |
| | Size (Length × Width) | | |

ANNEX A
Grouping Guidelines

1. IS 14933:2001 covers Bamboo mat corrugated sheets which are classified as below:

| Sl No | Variety | Sizes (Length × Width) mm |
|-------|-------------------------------------|---------------------------|
| a | Bamboo mat corrugated sheets (BMCS) | 1800 × 1050 |
| | | 2140 × 1050 |
| | | 2440 × 1050 |
| b | Bamboo mat ridge caps (BMRC) | 430 × 1050 |

(Any other dimension as agreed to between the manufacturer and the purchaser may also be permitted)

2. Considering the above following grouping guidelines developed for GoL/CSoL

One sample of each variety i.e Bamboo mat corrugated sheets (BMCS) and Bamboo mat ridge caps (BMRC) shall be tested for all requirements to cover all sizes of that variety.

3. The Firm shall declare varieties they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of the Licence, BO shall ensure that all varieties of hoses covered in the Licence are tested in rotation, to the extent possible.

ANNEX A
List of Test Equipment

Major test equipment required to test as per the Indian Standard

| Sl. No. | Tests used in with Clause Reference | Test Equipment |
|-----------------|---|--|
| 1 | Bamboo Mat (Clause 4.1.1) | - Micrometer - Vernier calliper |
| 2 | Adhesive (Clause 4.2) | - Sample preparation hot press with veneers as required - Thermostatically controlled water bath - Hot air oven - Knife - pH meter - Distilled water - Glass sheet - Grinding mill - Test sieves 450 micron - Glass flask. |
| 3 | Manufacture (Clause 5) | - Moisturemeter |
| 4 | Dimension and Tolerance (Clause 6.1, 6.1.1 & 6.2) | - Micrometer - Vernier calliper - Measuring tape - Depth gauge - Radius gauges |
| FOR BMCS | | |
| 5 | Density, g/cm ³ [Clause .8.1, Table 2(Sr No (i))] | - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of 65 ± 5% - weighing balance - Micrometer - Vernier calliper |
| 6 | Load bearing capacity [Clause .8.1, Table 2(Sr No (ii)) a) Dry state and b) Wet state | - Load bearing test arrangement or UTM with loading beam and supports as per Fig 2 of IS 15476 : 2004 - Water bath |
| 7 | Impermeability [Clause 8.1, Table 2(Sr No (iii))] | - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of 65 ± 5% - weighing balance - Frame as per Fig 3 of IS 15476 : 2004 - Vernier caliper - Air conditioner and humidity controlled laboratory room - Hygrometer - Thermometer |

| | | |
|----|---|--|
| 8 | Water absorption, Percent (after 24 h soaking) [Clause 8.1, Table 2(Sr No (iv))] | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of $65 \pm 5\%$ - weighing balance - Weighing balance - Thermostatically controlled water bath |
| 9 | Cyclic test [Clause .8.1, Table 2(Sr No (v))] | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of $65 \pm 5\%$ - Hot water bath - Hot air oven. |
| 10 | Resistance to falling weight [Clause 8.1, Table 2(Sr No (vi))] | <ul style="list-style-type: none"> - Steel scale/Measuring tape - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of $65 \pm 5\%$ - Falling weight test arrangement as per Clause G-2, Fig 4 of IS 15476 : 2004 with weight ball of 6.36 kg |
| 11 | Resistance to fire: [Clause .8.1, Table 2(Sr No (vi))] | |
| | I)Flame penetration | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of $65 \pm 5\%$ - Steel scale - Blow pipe/Welding torch - Flame penetration test apparatus meeting requirement of clause H-1.2 and Fig 5 of IS 15476 : 2004 |
| | Rate of burning | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of $65 \pm 5\%$ - Steel scale - Weighing balance - Blow pipe/Welding torch - Flame penetration test apparatus meeting requirement of clause H-2.2 and Fig 6 of IS 15476 : 2004 - Stop watch |

| | | |
|----|--|---|
| | Surface spread of flame, maximum area of char in mm ² | <ul style="list-style-type: none"> - Specimen support arrangement as per Clause H 3.1.1 of IS 15476 : 2004 - Flame support arrangement as per Clause H 3.1.2 of IS 15476 : 2004 - Ethyl alcohol - Vernier caliper - Pipette - Stop watch - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of 65 ± 5% |
| 12 | FOR BMRC | |
| | Water absorption, Percent (after 24 h soaking) [Clause 8.2, Table 2 (Sr No (iv))] | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of 65 ± 5% - weighing balance - Weighing balance - Thermostatically controlled water bath |
| | Cyclic test [Clause 8.2, Table 2(Sr No (v))] | <ul style="list-style-type: none"> - Vernier caliper - Conditioning chamber for maintaining temperature of 27 ± 2 °C humidity of 65 ± 5% - Hot water bath - Hot air oven. |

The above list is indicative only and may not be treated as exhaustive.

ANNEX B

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirement of IS 15476 : 2004.

4. CONTROL UNIT – All mats i.e. BMCS or BMRC of similar construction produced from the same materials and on the same day in one press from same batch of adhesive (if adhesive procured from outside) or same lot of adhesive prepared at a time in house shall constitute a control unit.

Note - Sheets in which the arrangement of slivers is similar as regards thickness shall be considered to be of similar construction.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

| (1) | | | | (2) | (3) | | |
|-------------------------------|---|--------------------|--------------------|---|-------------------------------|-------------------|--------|
| Test Details | | | | Test equipment requirement R: required(or) S: Sub-contracting permitted | Recommended Levels of Control | | |
| Cl | Requirement | Test Methods | | | No. of Sample | Frequency | Remark |
| | | Clause | Reference | | | | |
| 4.1 | Bamboo Mat | 4.1.1 and 4.1.2 | IS 15476 | R | Each mat/cap | - | - |
| 4.2 | Adhesive | 4.2 | IS 15476 IS 848 | R | One | Each batch/Lot | # |
| 6 | Dimensions and tolerances | 6.1, 6.1.1 and 6.2 | IS 15476 | R | Each mat/cap | - | - |
| 7 | Finish | 7.1 and 7.2 | IS 15476 | R | Each mat/cap | - | - |
| TESTS AND REQUIREMENTS | | | | | | | |
| 8.1 and Table 2 | For BMCS | | | | | | |
| i) | Density | 8.1 and Annex - B | IS 15476 | R | One | Each control unit | - |
| ii) | Load bearing capacity 1) Dry state 2) Wet state | 8.1 and Annex - C | IS 15476 | R | One | Each control unit | - |

| | | | | | | | |
|------------------------|--|-------------------|-----------|---|-----|-------------------|---|
| iii) | Impermeability | 8.1 and Annex - D | IS 15476 | R | One | Each control unit | - |
| iv) | Water absorption, | 8.1 and Annex - E | IS 15476 | R | One | Each control unit | - |
| v) | Cyclic test | 8.1 and Annex - F | IS 15476 | R | One | Each control unit | - |
| vi) | Resistance to falling weight | 8.1 and Annex - G | IS 15476 | R | One | Each control unit | - |
| vii) | Resistance to fire: a) Flame penetration b) Rate of burning c) Surface spread of flame, maximum area of char in mm ² | 8.1 and Annex - H | IS 15476 | R | One | Once in a month | - |
| 8.2 and Table 2 | For BMRC | | | | | | |
| iv) | Cyclic test | 8.2 and Annex - E | IS 15476- | R | One | Each control unit | - |
| v) | Water absorption, | 8.2 and Annex - F | IS 15476- | R | One | Each control unit | - |

Further testing is not required, if adhesive received is with ISI mark or accompanied with test certificate of manufacturer. Lot is defined as adhesive manufactured inhouse processed in a kettle.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.