



Forestry Industry Standard of the People's Republic of China

LY/T 2150—2013

Bamboo curtain

竹窗帘

(English Translation)

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Foreword

SAC/TC 263 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in the GB/T 1.1-2009.

This standard was proposed and prepared by SAC/TC 263, National Technical Committee on Bamboo and Rattan of Standardization Administration of China.

Bamboo curtain

1 Scope

This standard specifies the classifications, terms and definitions, dimension, appearance quality, physical and chemical properties requirements, test methods, inspection rules, marking, labeling, packaging, transportation and storage regarding bamboo curtains.

This standard is applicable to bamboo curtains manufactured of bamboo materials, and also applicable to other bamboo products manufactured through same process.

2 Normative references

There are no normative references in this document.

3 Basic terminology

For the purposes of this document, the following terms and definitions apply.

3.1

manual bamboo curtain

made of bamboo strips with round-, rectangular-, or elliptical-shaped cross-section, which are manually assembled and interwoven with plastic, linen, or nylon threads

3.2

machine-made bamboo curtain

made of bamboo strips with round-, rectangular- or elliptical-shaped cross section, with bamboo strips are mechanically assembled and stitched together with plastic, linen, or nylon threads, and with or without terylene/cotton gauze glued on the back; length of the strips is the width of the bamboo curtain

3.3

longitude line/latitude line

the line that parallel to the length direction of bamboo curtain; latitude line is the line perpendicular to the length direction of bamboo curtain

3.4

unit

bamboo strip used for bamboo curtain knitting

4 Classifications

Bamboo curtain can be classified into two categories by manufacturing method: manual bamboo curtain and machine-made bamboo curtain.

5 Dimension requirements

5.1 Dimension

Dimension of bamboo curtain shall be determined by contract between supplier and purchaser.

5.2 Tolerance

5.2.1 Deviation of length and width

Length and width of bamboo curtain shall be measured and rounded to nearest 1 mm, with an accuracy of 0.1% of the width or length.

5.2.2 Tolerance of length and width

± 5 mm.

5.2.3 Diagonal differential length

Diagonal differential length of a bamboo curtain is the difference between two diagonal lengths of a curtain measured with a measuring tape along diagonal direction of the bamboo curtain, reading to the nearest millimeter. The diagonal differential length shall be less than 25 mm.

6 Appearance quality

Appearance quality of a bamboo curtain shall meet the specifications for each grade as described in table 1.

Table 1 Specification of bamboo curtain appearance grading

Item	Grade I	Grade II	Grade III
Face-side	<p>smooth surface and consistent color;</p> <p>no abrasion marks, loose parts, mold, wormhole, corrosion and stains or contaminants;</p> <p>slightly uneven;</p> <p>no standing fibres or minor splits by visual inspection and hand-feel;</p> <p>uniform in shape and size, and arranged into predetermined pattern(s) for bamboo strips.</p>	<p>smooth surface and mostly consistent color;</p> <p>no abrasion marks, loose parts, mold, corrosion and stains or contamination;</p> <p>no more than one (1) wormhole for bamboo strips and its diameter lower than one-fifth (1/5) of strip width;</p> <p>slightly uneven;</p> <p>no standing fibres or minor splits by visual inspection and hand-feel;</p> <p>mostly uniform in shape and size, and arranged into predetermined pattern(s) for bamboo strips.</p>	<p>smooth surface and mostly consistent color;</p> <p>no loose parts;</p> <p>minor abrasion marks;</p> <p>no more than three (3) spots of corrosion, wormhole, mold, stains or contamination for bamboo strips; and diameters lower than one-fourth (1/4) of strip width;</p> <p>slightly uneven;</p> <p>no standing fibres or minor splits by visual inspection and hand-feel;</p> <p>mostly uniform in shape and size, and arranged into predetermined pattern(s) for bamboo strips.</p>
Back-side	<p>smooth and even surface;</p> <p>no abrasion marks, stains or contaminants like grease and water;</p> <p>no standing fibers or minor splits by hand-feel.</p>	<p>smooth and even surface;</p> <p>no abrasion marks, stains or contaminants like grease and water;</p> <p>no standing fibers or minor splits by hand-feel;;</p> <p>Number of strips with minor concave less than 8 per curtain.</p>	<p>smooth and mostly even surface;</p> <p>no abrasion marks;</p> <p>Number of spots with stains or contaminants like water or grease lower than 2 per m²;</p> <p>no standing fibers or minor splits by hand-feel;</p> <p>Number of strips with minor concave less than 20 per curtain.</p>
Sewing quality	<p>The edge band tightly attached to curtain edges and no wrinkles;</p> <p>Stitching lines straight, neat, even and secure with right tension;</p> <p>no skipping or missing stitches.</p>	<p>The edge band tightly attached to curtain edges and no wrinkles;</p> <p>Stitching lines straight, neat, and secure with right thread tension and mostly even;</p> <p>skipping stitches: no more than 2 within 200 mm, no more than 3 per curtain;</p> <p>missing stitches: no more than 20 mm per occurrence, no more than 5 occurrences per curtain;</p>	<p>The edge band tightly attached to curtain edges and no obvious wrinkles</p> <p>Stitching lines straight, neat, and secure with right thread tension and mostly even;</p> <p>skipping stitches: no more than 4 within 200 mm, no more than 5 per curtain;</p> <p>missing stitches: no more than 30 mm per occurrence, no more than 8 occurrences per curtain.</p>
Stitch density	<p>no less than 4 stitches per 50 mm for machine-made curtain with edge banding.</p>	<p>no less than 4 stitches per 50 mm for machine-made curtain with edge banding.</p>	<p>no less than 5 stitches per 50 mm for machine-made curtain with edge banding.</p>

7 Physical and chemical properties requirements

Physical and chemical properties requirements for bamboo curtain are presented in table 2.

Table 2 Requirements of physical and chemical properties

Item	Acceptance standard
Moisture content	6 % - 14 %
Mold resistance	≥ 3 d
Bamboo strip flexibility	≤ 60 mm

8 Test methods

8.1 Moisture content

Moisture content(MC) is the weight difference of water in the sample before and after drying expressed as a percentage of the dry sample weight.

Moisture content can be calculated in compliance with formula (1):

$$MC=(m_0-m_1)/m_1 \times 100\% \quad \dots\dots\dots(1)$$

Where:

MC —moisture content of the sample expressed in percentages;

m_0 — weight of sample before drying expressed in grams;

m_1 —weight of sample after drying expressed in grams.

The weight of dried sample should be measured twice at a 6 h interval with a weight error less than 0.1 wt.% of the sample. Dried sample should be prepared through drying at a temperature of (103±2) °C and cooling down to room temperature in a desiccator. All weight results should be measured and rounded to the nearest 0.01 g.

Sampling methods:

A set of samples can be made by following procedures:

- a) Take 1 bamboo strip from each of upper, middle and lower positions of bamboo curtain, respectively. From each bamboo strip,
- b) Cut a section of 10 cm in length as sample from middle and both ends of bamboo strips with a length of 300 mm or more; or
- c) Cut a section of 10 cm as sample from both ends for bamboo strips with a length of 200mm - 300 mm; or
- d) Cut a section of 10 cm as sample from the middle for bamboo strips with a length of 100mm - 200 mm; or
- e) Use the whole length as sample if the strip is less than 100 mm in length.
- f) Make 3 sets of samples by the same procedures.

8.2 Mold resistance

8.2.1 Apparatus

Apparatus for mold resistance testing include:

- a) Biochemical incubator: environmental chamber or temperature chamber;
- b) Petri dish with a diameter of 140 mm.

8.2.2 Test methods

- a) Randomly sample 20 pieces of bamboo strips, and cut a section of 50 mm in length from middle part of each strip for strips longer than 50 mm in length; or use the whole length if the strips are less than 50 mm in length;
- b) Place filter paper of the same diameter as the petri dish in the petri dish, and wet the filter paper with water;
- c) Mix distilled water well with soil (or fungus sources) at a ratio of 20:1, and remove the solid. The remaining solution is used as the source of fungi.
- d) Place plastic wires on the filter at an interval of approx. 20 mm as supporting rack. Hold one test

samples at a time with tweezers and dip it into the fungus solution and then transfer it onto the supporting rack inside the petri dish. Each petri dish holds 6 samples, which makes 3 dishes.

e) Place the petri dishes in biochemical incubator to culture at a temperature of 25 °C-28 °C. Record fungus growth at 24 h intervals, meanwhile keep the filter paper wet by dripping water into the petri dishes.

8. 2. 3 Determination of mold resistance

A sample shall be ruled as moldy if over 30% of the surface area in the tested sample is covered with mold mycelium;

Samples in a petri dish shall be ruled as acceptable if no more than 3 samples in the petri dish are moldy, otherwise, as unacceptable.

Test shall be discontinued when 2 of the 3 petri dishes turn unacceptable. Record the number of days as mold resistance indicator.

8. 3 Flexibility of bamboo strip

8. 3. 1 Test methods

The flexibility of bamboo strip shall be tested as below:

a) Randomly select 6 intact units (whole bamboo strips) as test samples; Remove backing gauze if there is);

b) Bend a strip and make it into a ring with the face side as the outer surface of the ring and the back side as the inner surface of the ring; Gradually and slowly reduce the diameter of the ring until rupture.

c) Record the final diameter at rupture.

8. 3. 2 Results reporting

Calculate the arithmetic mean value of the 6 units and round the mean to the nearest 0.5 mm.

9 Inspection rules

9.1 Manufacturer shall guarantee product quality in conformity with the requirements in this Standard. Product appearance shall be inspected one by one to determinate quality grade.

9.2 Prior to delivery of bamboo curtains of large quantity, inspection shall performed on products sampled according to the following standards:

9. 2. 1 Appearance grading and dimension

1) Single sampling plan

If quantity of non-conforming items is no more than the quantity of accept(s) in regard to the inspected samples, then the lot shall be adjudged as acceptable; if the quantity is no less than the quantity of reject(s), then the lot shall be adjudged as not acceptable.

Inspection level is referred to the corresponding quantity of inspected products. Acceptance quality limit (AQL) is the quality level that is the worst tolerable for lots being sampled and inspected.

Single sampling inspection is applicable, inspection level is set to II, and acceptance quality limit(AQL) to 4.0, details presented in table 3.

Table 3 Sampling plan for appearance grading

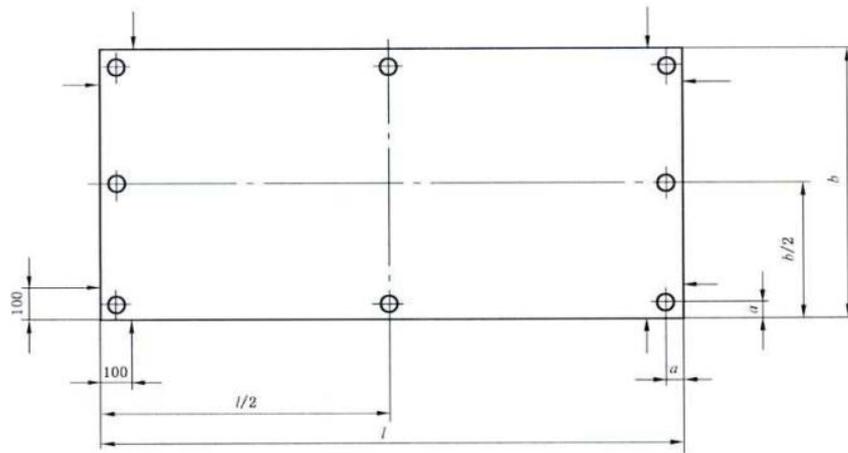
unit: pieces

Lot size	Sample size	Number of Accepts (Ac)	Number of Rejects (Re)
51-90	13	1	2
91-150	20	2	3
151-280	32	3	4
281-500	50	5	6
501-1 200	80	7	8
1 201-3 200	125	10	11
3 201-10 000	200	14	15

2) Product dimension

Product dimension shall be inspected in accordance with GB/T 19367-2009; According to GB/T 2828.1-

2003, single sampling inspection is applicable. (Measure the thickness of a panel at spots with a distance of 25~50 mm from edges. Measuring spots locate in the corner and the middle of each edge, with an amount of 8 in total (see in Fig 2). The measuring accuracy is 1 % of the thickness, and round to nearest 0.1 mm. Gradually and slowly attach the measurement equipment to the panel when measuring the thickness.)



$a=25\text{mm}-50\text{ mm}$; b : width; l : length

Fig 2: Thickness, width and length measuring spots for a panel

3) Determination of width and length

Measure the width and length of a panel along the direction parallel to an edge and with a distance of 100 mm from it (see in Fig 2). The measuring accuracy is 0.1 % of the width or length, and results round to nearest 1 mm.

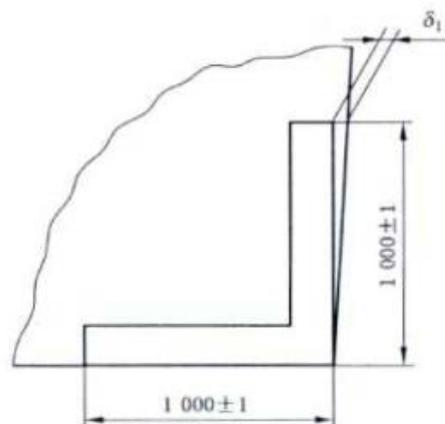


Fig 3: Application of a try square for perpendicularity determination

4) Determination of perpendicularity

A try square is used to determinate the perpendicularity of a panel through one blade attaching to an edge of the panel.

5) Determination of edge straightness

Use a straightedge or metal wire straightly and tightly attach to the panel edge, then measure its length using a ruler. The difference between the ruler-measured length and directly measure length is determined as the edge straightness. The difference result shall be rounded to the nearest 0.5 mm.

6) Determination of smoothness

Place the panel horizontally without exterior load affection, measure the distances between the entire panel surface and tightened metal wire, and find out the distance at maximum deformation spot and measure it by ruler, the result shall be rounded to nearest 0.5 mm.

6) single sampling inspection is applicable. Inspection level is set to S-4, and acceptance quality limit(AQL) to 6.5, details are presented in table 4.

Table 4 Sampling plan for product dimension inspection

unit: pieces

Lot size	Sample size	Number of Accepts (Ac)	Number of Rejects (Re)
51-90	5	1	2
91-150	8	1	2
151-280	13	2	4
281-500	13	2	3
501-1 200	20	3	4
1 201-3 200	32	5	6
3 201-10 000	32	5	6

9. 2. 2 Physical and chemical properties

One curtain shall be randomly selected as sample for testing physical and chemical properties of a product lot prior to delivery. The whole lot is acceptable when all physical and chemical properties of the tested sample meet the requirements specified in this Standard; otherwise the whole lot is unacceptable (rejects). A re-inspection shall be conducted on doubled sampling size for the same lot.

9. 2. 3 Determination of overall quality

If all of quality properties meet the requirements of corresponding grades in appearance, dimensions and physical and chemical properties, the product shall be classified as accepts and assigned to that grade; otherwise, as rejects and shall not be assign to that grade.

For rejects or some properties items that failed to meet the requirements, such as appearance grades, a second full inspection or product downgrade may be allowed.

9. 3 Inspection shall be performed upon request in accordance with this standard.

9. 4 Delivery of bamboo curtain products shall come with certification of quality provided by the quality inspection department of manufacturer. The certification shall contain product information such as lot number, classification, dimension, grade, etc.

10 Marking, Labeling, Packaging, Transportation, and Storage

10. 1 Packaging shall bear marking and labeling that indicating the manufacturer, address, and applied standard. Certification of quality shall be included in the packaging.

10. 2 Use shrink wrap for packaging, or package upon request.

10. 3 Avoid exposure to heavy pressure, stain or contamination, moisture or damage during transportation.

10. 4 Store in dry and ventilated place free of flammables and contaminants.
