JS 106: Part 2: 2014
ICS 97.140

Jamaican Standard Specification

for

Furniture

Part 2: Bamboo and indigenous furniture

BUREAU OF STANDARDS JAMAICA

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March 2014

ISBN 978-976-604-581-4

Declared by the Bureau of Standards to be a standard specification pursuant to section 7 of the Standards Act 1969.

First published March 2014.

This standard specification was circulated in draft form for comment under the reference DJS JS106: Part 2: 2013.

Jamaican Standards establish requirements in relation to commodities, processes and practices, but do not purport to include all the necessary provisions of a contract.

The attention of those using this standard specification is called to the necessity of complying with any relevant legislation.

Amendments

No.	Date of issue	Remarks	Entered by and date

Contents

Foreword

This Jamaican standard, JS 106: Part 2: 2013 Bamboo and indigenous furniture, addresses the absence of requirements for bamboo and indigenous furniture outlined in JS 106: 1996.

It was developed by the adaptation of the CARICOM Regional Standard Specification for indigenous furniture (bamboo, rattan, wicker and nibbi) CRS 21: 2010. The CARICOM Regional Standard was developed as part of the CROSQ project entitled *"Promoting the competitiveness of small and medium-sized enterprises through regional standards"*, funded by the Inter-American Development Bank.

The CARICOM Standard, which was approved by the Thirty-first meeting of the Council for Trade and Economic Development on 29 November – 3 December 2010, has been modified by the addition of health and safety requirements as well as the introduction of information on preservation techniques received from the International Network for Bamboo and Rattan (INBAR), in order to produce a Jamaican standard for bamboo and other indigenous furniture which does not presently exist.

This Jamaican standard is being issued as JS 106: Part 2: Bamboo and Indigenous Furniture and therefore this standard does not cover requirements for metal, plastic and upholstered accommodation furniture. The requirements for metal, plastic etc., which are written into JS 106: 1996, will be re-issued as separate parts to this standard. The requirements for wooden furniture will be covered by the issuance of JS 106: Part 1: Wooden furniture.

The provisions of this standard ensures that manufacturers can meet the needs of their customers for culm based bamboo furniture, as well as furniture from other indigenous materials such as wicker and rattan, that are durable, safe and reliable.

Where reference is made to informative and normative appendices the following definitions should be noted:

- Informative Appendix – gives additional information intended to assist in the understanding or use of the document. They do not contain requirements.

- Normative Appendix – gives provisions additional to those in the body of a document. They contain requirements.

This standard is intended to be voluntary.

Committee representation

The development of this standard for the Standards Council, established under the Standards Act 1969, was carried out under the supervision of the Bureau's Furniture Technical Committee which at the time comprised the following members:

Mr M McPherson, Chairman	Jamaica Wooden Furniture Association
Mr O Reeves, Vice-Chairman	Heffes Sales Company Limited
Mr A Baker	VGC Holdings Limited
Mr R Chang	Autocraft
Mrs V Chang	National Consumers League
Mr P Darby	Unicomer
Ms D Douglas	3M Interamerica, Inc. - Jamaica Division
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Mrs J Henry, Recording Secretary	Bureau of Standards Jamaica
Mrs P Lawrence, Recording Secretary	Bureau of Standards Jamaica
Mrs G Bailey, Facilitator	Bureau of Standards Jamaica

Acknowledgment

Acknowledgment is made to the following organizations for permission to reproduce materials:

CARICOM Regional Organization for Standards and Quality (CROSQ)	CRS 21:2010
International Network for Bamboo and Rattan (INBAR)	Transfer of Technology Model /Village Bamboo Preservation Unit

Related documents

This standard makes reference to the following documents:

CRS 21: 2010	Specification for Indigenous Furniture (bamboo, rattan, wicker and nibbi)
DJS 1: Part 11	Labelling of Commodities Part 11: Labelling of Furniture
ISO 2859-1:1999	Sampling procedures for inspection by attributes -- Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspectionTransfer of Technology Model – Village Bamboo Preservation Unit

Jamaican Standard Specification
for
Furniture
Part 2: Bamboo and indigenous furniture

1. Scope

This standard specifies the requirements for indigenous furniture, namely those made from bamboo, rattan, wicker, tibisiri and nibbi materials. This standard also gives consideration to health safety and environmental concerns.

2. Terms and definitions

For the purpose of this standard, the following terms and definitions shall apply.

2.1 bamboo. Any of the woody or treelike tropical and semitropical grasses of the genera *Bambusa, Phyllostachys, Dendrocalamus* and allied genera, having woody, usually hollow stems with stalked blades and flowering only after years of growth.

NOTE. The stem of such a plant is used as building material and for making furniture, poles, etc.

2.2 black or loose knot. Knot that has been partially decayed forming a cavity and has a very dark appearance.

2.3 blemish. Dark spot or discoloration in construction materials caused by staining fungi or mineral stains.

2.4 blistering. Discolouration or scarring of the surface of the wood or lumber .

2.5 blue stain. Bluish discolouration of the sapwood and growth root resulting from fungal infection.

2.6 boxed heart. When the heart is enclosed within the four surfaces of a hewn or sawn timber through its entire length and reasonably well centred at both ends.

2.7 break. Separation of the fibres, which extends through a piece of the material from one surface to the other and is usually perpendicular or at right angle to the direction of the grain.

2.8 burr. Rough edge left on cut wood.
2.9 caster. Small wheel on a swivel , attached under a piece of furniture or other heavy object to make it easier to move or caster is an undriven single double or compound wheel that is designed to be mounted to the bottom of a large object (the vehicle) so as to enable that object to be easily moved. They are available in various sizes and are commonly made of rubber, plastic nylon, aluminum or stainless steel.
2.10 check. Separation of the fibres along the pole forming a crack or fissure in the material, not extending through the piece from one surface to the other.

2.11 dark moon. According to Astronomy, it is the last crescent quarter of the Lunar Cycle.

2.12 dry season. Periods of low rainfall.

2.13 exposed pith. Cavity in the wood or board exposing the pith.

2.14 indigenous furniture. Furniture made from wood or other plant-derived materials native to the people of a country.

2.15 kofa. Parasitic vine, varying in diameter from 6 mm to over 25 mm that hangs from trees in tropical rain forests.

NOTE. It is usually thicker than nibbi and used to build the frames on which the weaving of the nibbi is done and as trimming for the edges of furniture.

2.16 knot. Portion of branch embedded in the wood.

2.17 knot hole. Hole formed on a piece of wood as a result of a decayed knot.

2.18 nibbi. Parasitic vine, growing up to 7.5 m that hangs from trees in tropical rainforests. **NOTE.** It is a much finer vine than the kofa. Nibbi is used for binding joints as well as for weaving that gives a wicker-like appearance to some of the pieces.

2.19 rattan flat core. Flat-shaped material, with size ranging from 2 mm to 10 mm in width, processed from the core of a pole and used for weaving and binding.

2.20 rattan peel or 'rattan split'. Flat-shaped material, stripped from the skin of a rattan pole, with size ranging from 2 mm to 10 mm or wider in width, usually for weaving and binding.

2.21 rattan pole. Long, tough and slender stem from the genera *Calamus* and *Daemonorops* of the family Palmae, used for making furniture.

2.22 rattan round core or 'wicker'. Round-shaped material, with size ranging from 2 mm to 10 mm in diameter, processed from the core of the rattan pole, usually used for weaving.

2.23 seasoned. Reduction of initial moisture content of timber to the required moisture content.

2.24 seasoning. Process of reducing initial moisture content of timber to the required moisture content.

2.25 shake. Separation of the fibres along the pole, caused by stress developed in the gathering and cutting, or by improper processing.

2.26 sliver. Splinter or strip torn off from a piece of wood or lumber.

2.27 sound. Structurally sturdy.

2.28 sound bright. Free from discolouration.

2.29 split. Separation of the fibres along the grain forming a crack or fissure extending through the piece from one surface to another.

2.30 splits. Natural separation of the wood due to the tearing apart of the wood cells.

2.31 tibisiri. Straw extracted from the young shoot of the Ite palm species and fashioned into a chord-like material that is woven into backs of chairs and to tables.

2.32 wane. Defect on a piece of wood that lack square corners.

2.33 wicker. Round-shaped material, ranging from 2 mm to 10 mm in diameter, processed from the core of the rattan pole, usually used for weaving.

3. Material requirements

3.1 General

The materials selected for rattan, wicker and nibbi furniture shall be characterized by lightness, flexibility, durability, smoothness and shall have no hair-like strands hanging out.

3.2 Rattan poles

3.2.1 The rattan used in the construction of furniture shall be of good grade; mature, clean, scraped and thoroughly seasoned.

3.2.2 Rattan poles shall be treated against fungi and insect infestations, and be free from mineral and fungal blemishes, scars, bruises and especially pinholes.

3.2.3 All poles shall be treated with copper-8-quinolinolate, boric acid/borax solution or saline solution to safeguard against insect-borers.

3.3 Bamboo

3.3.1 *Bamboo harvesting*

The bamboo selected for cutting shall be mature (3-5 years) and selected from dry areas. The bamboo is best harvested when the sap in the bamboo is at its lowest point in the column (dark moon, or dry season) when the incidence of insect boring is at its lowest. The materials selected shall be mature and located away from river courses and other water sources to ensure maximum dryness.

3.3.2 *Curing of bamboo*

When curing bamboo one of the three solutions mentioned in clause **3.2.3** shall be used.

The following shall be performed in accordance with Appendix B and C.

(a) The bamboo selected shall be scraped and treated for fungi and insects and left to cure for a minimum of 5 days.

(b) The bamboo shall be treated immediately after cutting. If storage is necessary it shall not exceed 10 days and, before treatment, the bamboo shall be left upright for a minimum of 3 days.

NOTE. When using boric acid, the treatment shall aim at replacing the sap with a boric acid solution, through capillary action such as a vertical soak diffusion treatment.

(c) After treatment, drying shall be for a period of 4-6 weeks.

3.4 Checks, shakes and breaks

Checks and shakes shall be permitted provided that they do not exist in close proximity to holes and grooves so as to affect the strength of the material. Breaks shall not be permitted.

3.5 Rattan core and peel

The rattan core and peel used for weaving and binding furniture shall be of good quality and shall be processed from good rattan poles. Rattan core or peel used shall be of uniform diameter or width.

3.6 Wood

All wooden materials used or incorporated into rattan furniture such as seat frames, doors, cabinet, shall:

(a) have a density of 480 kg/m^2 to 640 kg/m^2;

(b) have between 5 and 20 growth rings per 20 mm measured at right angles to the ring system;

(c) be seasoned to a moisture content of not more that 8% for temperate countries and not more that 12% for tropical countries. Kiln drying and conditioning shall be effected in such a way that case hardening, honey-combing, bow, spring or twist does not occur;

(d) not have knots and knotholes on load-bearing structural timbers. Sound knots may occur elsewhere provided that they are free from signs of decay, sound across the face, at least as hard as the surrounding wood and do not exceed 20 mm or ¼ the width of the face on which they occur, whichever is the smaller. Dead knots are not acceptable;

NOTE. Cluster or pin holes for decorative purposes may occur in non-load bearing components.

(e) be free from checks, splits and shakes; boxed heart, exposed pith; dead, black or loose knots; knot-holes and wane;

(f) be free from signs of decay, and fungal or insect attack; and

NOTE. Timber affected by blue-stain may be used in non-show wood for non-structural components.

(g) be free from sound bright.

4. Construction

4.1 Rattan, wicker and nibbi

4.1.1 All furniture complying with this standard shall be of good workmanship. All components used in construction shall be of a quality in accordance with good practices in the trade.

4.1.2 All finished items shall be uniform in quality, clean and free from any defects that may affect their appearance and or serviceability.

4.1.3 All external surfaces shall be free from sharp edges, slivers, burrs and other safety hazards.

4.1.4 Furniture shall remain in a stable and upright position when empty, with all drawers, doors and other movable parts fully extended and opened.

4.1.5 Joints for main parts and stress joints shall be snugly fitted and secured to adjoining parts by nails, screws or bolts and bound with rattan flat peel or core, or other binding materials glued on to the rattan, so as to withstand normal daily wear and tear.

4.1.6 All main parts and stress joints shall be of the concave-cut, fitted type or dowelled type of construction.

4.1.7 All joints of rattan rings used for the seats or for support purposes shall be the half-lap type nailed and glued together.

4.1.8 All wood joints shall be in accordance with requirements for wooden furniture as outlined in JS 106: Part 1.

4.1.9 Where furniture rests on a base, it shall be screwed on to the base which shall be made of solid

wood. If a swivel base is used, it shall move freely and shall not squeak.

4.1.10 Where furniture rests on a steel frame:

(a) the joints shall be welded securely;
(b) the steel shall be primed to prevent oxidation;
(c) for larger items such as tables, support beams shall be in place to maintain rigidity;
(d) the knots of fastening shall ne on the underside.

4.2 Bamboo

Where applicable, the construction of bamboo furniture shall conform to the requirements above except that nails and metal bolts and screws shall not be used. Main parts and stress joints shall be secured by binding, wrapping or applying wooden or bamboo bolts and screws.

5. Finish

5.1 All rattan and wood surfaces shall be sanded, smooth and all exposed edges and corners shall be eased. All holes, checks and shakes shall be filled and stained or toned to match the colour of rattan parts. Exposed nails, screws and bolts shall be countersunk with the holes filled with plastic wood fillers and or wooden or rattan plugs flushed and sanded smooth before finishing.

5.2 Any of the following finishes shall be used:

(a) lacquer or nitro-based clear finishes;
(b) cellulose acetate butyrate (CAB);
(c) acid catalyst clear lacquers;
(d) polyurethane;
(e) oil or wax; and or
(f) polyester.

5.3 All materials used in the finish of furniture shall be of the nontoxic* type.

5.4 All finished surfaces shall be of good workmanship.

5.5 There shall be no excessive stickiness or surface disfigurement of any type such as blistering, marking or change of colour when the furniture is subjected to dry heat.

6. Sampling and inspection

6.1 Sampling shall be carried out at random manner and in accordance with inspection level II of ISO 2859-1:1999

6.1.2 Representative samples shall be selected from the batch under construction or from each delivery for the purpose of inspection. The total number of units taken shall be in accordance with table1, which is based on an AQL* of 6.5%.

*Average Quality Level

Table 1. Sampling of furniture

Batch Size	Sample Size	Acceptance No.
2 to 8	2	0
9 to 15	3	0
16 to 25	8	1
26 to 50	8	1

6.2 Inspection before testing

Immediately before testing, each sample shall be inspected and any apparent defects noted. A report on such defects shall accompany the report on the performance tests and these shall be taken into account in assessing whether the article has complied with the requirements of this standard.

7. Performance tests

7.1 General

7.1.1 The main objective of these series of tests, outlined in Annex A, is to determine whether the furniture can reasonably withstand loads and related stresses of normal use.

NOTE. All manufacturers are responsible for ensuring that only approved finishes are used.

7.1.2 In cases where the design of the furniture precludes the use of this particular procedure, alternative test procedures derived from the same principle shall be used.

7.1.3 Each sample shall be subjected to the series of tests specified in Appendix A the tests being carried out in that sequence.

7.2 Determination of conformity

7.2.1 Each sample tested shall fulfil the conditions of the test described in Appendix A.

7.2.2 If during or after any of the tests, relative movement is apparent between the members of any joint and it is established that the joint is broken in such a way as to impair its serviceability, the furniture shall be deemed to have failed to pass the performance tests.

7.2.3 If failure of a joint is recorded, or if for any other reason the furniture selected for testing is deemed to have failed to pass the performance tests of this standard, the testing of that article shall be discontinued and no further sections of the test procedure shall be applied to it.

8. Labelling

8.1 All labels shall conform to the requirements of JS 1: Part 11.

Appendix A
(Normative)

A.1 Level test (all items)

Casters or glides shall be removed. Items shall be placed on a flat surface plate. All legs shall simultaneously rest on the surface plate. Any evidence of rocking when light force is applied at any corner shall be cause for rejection.

A.2 Sand bag drop test (chairs and sofa frames)

A.2.1 A 29.5 kg (65 lbs) sandbag, with a diameter of 30.48 cm (1 ft) is allowed to drop from a height of 106.68 cm (3.5 ft) onto a piece of furniture, at each of the following locations:

(a) directly over a leg;
(b) midway between the legs on the side frame members; and
(c) on front frame rail at midpoint.

A.2.2 The furniture should withstand six impacts.

A.3 Impact test

The chair shall be lifted at an angle of 12 ° diagonally across the plane of the feet (to ensure that one leg receives the initial impact) and dropped from a height of 91.44 cm (3 ft) above a concrete floor. The chair shall withstand 12 drops.

A.4 Diagonal load test

The chair shall be laid back in such a way that the front edge of the seat is directly above the feet or the rear legs. A vertical load of 68.04 kg (150 lbs) shall be applied to the front edge of the seat 20 times for not less than 5 s each time.

A.5 Static load test

A static load of a 136.36 kg (300 lbs) sand bag shall be applied vertically over a 30.48 cm (1 ft) diameter area in the centre of the deck and allowed to remain for 15 min. Upon removal of the load, there shall be no evidence of breakage or loosening or separation of frame joints.

NOTE. Applies to chair frame with deck.

A.6 Static load test (tables)

The height of the table shall be measured accurately. A static load of 45.36 kg (100lbs) shall be applied vertically over a 30.48 cm (1 ft) diameter area in the centre of the table top and allowed to remain for 30 min. Upon removal of the load, the height shall not have decreased by more than 0.31 cm (1/10 inch) and there shall be no evidence of breakage or separation of joints.

Appendix B
(Informative)
Treatment of bamboo, nibbi and rattan poles

B.1 Tissue of rattan, wicker and nibbi may be infected by certain fungus that causes blemishes and discoloration. Soon after harvesting, materials should be treated with an approved anti-stain chemical solution.

B.2 Materials (poles) are dipped into pesticide solution in tank (or container) which is then covered to protect the materials from the rain.

B.3 The poles to be treated are hauled to the treating depot, scraped, and then dipped for one to two minutes in the solution.

B.4 Clean and sanitary conditions are maintained in the treating depot. Rattan trimmings or scrapings or other debris should be disposed of appropriately. This waste should be incinerated or subjected to another treatment process which does not result in open fires, to prevent the harbourage and propagation of the staining fungi.

B.5 Treated poles are air dried by end-racking. While being air dried, the poles should be protected from rain to prevent the removal of the anti-stain-chemical solution. When the poles are thoroughly dried, they are smoothed by sanding and subsequently subjected to an anti-stain-chemical treatment.

B.6 During the last treatment, an insecticide may be added to the anti-stain-chemical solution to protect the pole from both stain and insect attack. The poles are dried in a well-ventilated and sheltered storage place by the end-racking method for about a month, until the moisture content is below 20 %. The poles should be kept dry, especially when they are in transit.

B.7 All poles are treated with an approved pesticide or saline solution to safe-guard against insect borers.

Appendix C
(Informative)
Preservation methods for bamboo

C.1 Non pressure methods

C.1.1 *Green Bamboo*. It is very convenient to treat bamboo in the green condition. Sap displacement methods are easily adaptable for treating small quantities of bamboo. These methods have the advantage that no expensive equipment is required and bamboo can be treated immediately after felling. Only water-soluble preservative formulations are suitable for such treatment. Important formulations with established performance are: boric acid: borax, copper chrome arsenic (CCA), copper chrome boric (CCB) and acid copper chrome (ACC).

(i) Steeping: Freshly cut bamboo culms are immediately placed upright in containers of concentrated solutions of water-borne preservatives (5-10%). The basal end is immersed up to 25 cm deep in the preservative solution. During treatment drops of preservative solution may be observed emerging at the nodes. The treatment takes between 7 and 14 days, depending on the length of the culm and the quantity of solution in the container must be constantly topped-up. Bamboo can be satisfactorily treated by this method without any equipment or technical skill.

(ii) Sap displacement: Round, half, quarter and 1/8 split fresh bamboos are immersed vertically up to 25 cm deep in 10% aqueous solutions of water-borne wood preservatives in a small bucket. The preservative solution rises by wick action and the solution level is maintained by adding fresh quantities as required. Adequate absorption is obtained in a two metre long bamboo in just six days. The remaining solution should be carefully disposed of. In many cases, these two treatments are not favoured because of the danger of environmental pollution from the waste chemicals.

(iii) Diffusion process: In the diffusion process, freshly felled bamboo culms with high moisture content (above 50%) are kept submerged in solutions of water- borne preservatives for a period sufficient to attain the required preservative loading. A diffusion period of 10 to 20 days is satisfactory in round bamboo, while split bamboo can be treated in about seven days. Absorption and penetration of the chemicals is greater in split than in round bamboo as the outer layer of bamboo is more or less impervious but the inner cuticle is permeable to diffusing ions. Therefore, boring holes near the nodes or increasing the diffusion time results in better penetration and absorption of round culms. An alternative is to puncture the inner diaphragm of the nodes, or make small notches near them to allow free access of the solution to the inner epidermal layer of the bamboo, and also to enable subsequent drainage of the preservative solution from the internode. Preservatives that fix slowly, or have high diffusion coefficients like boron-based preservatives, penetrate better. Those based on ammoniacal solutions not only diffuse faster, but can also be heated for better penetration and more rapid loading. Ammoniacal-copper-arsenite can be used for treating green bamboo by diffusion, taking advantage of the better penetration of ammoniacal solutions.

(iv) Boucherie process: This is a widely recognized process which has been recently adopted on commercial scale in Costa Rica. The basal end of the freshly felled bamboo is attached to a hose-pipe fixed to a reservoir of water-borne wood preservative solution. This process is suitable for freshly felled green bamboo with branches and leaves intact. Even one-day-old felled bamboo can be treated by just chopping off the basal 15 cm of the culm. In this process, the preservative is pushed through the bamboo by gravity from a container placed at a height. This method has been modified by using a simple hand operated cycle pump to apply a pressure of 1.0 to 1.4 kg/cm^2 to the preservative in a container at ground level. This reduces the period of treatment significantly. The penetration and absorption of the preservative depends upon several factors such as concentration of solution, treatment time, nature of chemicals used, dimensions of the bamboo, its age and moisture content.

It usually takes 30-60 min to treat short bamboo lengths using pressures of up to 2 kg/cm^2. The equipment is simple and the technique can be used to treat a number of bamboos at a time, by using an air-compressor to better control the pressure at the delivery end. In order to obtain uniform distribution of preservative from bottom to top, it is recommended to initially use a concentrated solution (6%) until the solution drips out of the apical end. This should be followed by pumping in a solution of a lower concentration (2%) for the same period of time.

C.1.2 *Air-dry bamboo*. Bamboo culms should be stacked horizontally to dry quickly for treatment. Both non-pressure or pressure methods can be adopted for treating dry bamboo.

(i) Soaking: Air-dried bamboo is merely submerged in the preservative solution (solvent type) for a period that depends upon the species, age, thickness and the required absorption. Penetration is predominantly by capillary action. The soaking method requires minimal equipment and technical knowledge. Dip treatments are considered safe as these are applied to finished products and generate no toxic dust or residues. However, proper care should be taken to avoid spillage and contamination of soil. Recommended preservatives for such treatment are copper/zinc apthenates/abietates/ soaps suitably blended with insecticides like Lindane/chloripyrifos. A 2% copper solution blended with 1% insecticide is recommended for total protection against fungus and insects.

(ii) Hot and cold process: The hot and cold process is also known as the open tank process. It is often used for treating wood with creosote and has been adopted for treating bamboo. Air-dried material is loaded into a tank that is fitted with steam coils or some other heating arrangement. Split bamboo requires no preparation, but holes should be drilled near the nodes of round bamboo to allow the preservative to pass into the inner surface of each internode. The tank is then filled with hot creosote: fuel oil mixture and heating is continued to raise the temperature to about 900 C. This is maintained for a period of about 2-3 hours. The preservative is then allowed to cool, after which the oil is drained out. The round bamboo culms are then left erect in the tank to allow the preservative to drain from the internodes. The performance of creosote treated bamboo is better than the salt treated material and this treatment should be adopted where possible.

C.2 Pressure treatment methods

Pressure treatment is universally used for treating wood and has been adopted for treating bamboo as well. Pressure processes may be employed with any type of preservative. In the case of creosote preservative, a temperature of 80 to 900 C should be maintained during the pressure period.

(i) Full cell or Bethel process: This process is used when maximum absorption of the preservative is desired (ground contact use). The bamboo is introduced into the pressure cylinder. The door is tightly closed and a vacuum of at least 56cm of mercury is created and maintained for half an hour. The purpose of this operation is to remove as much air as possible from the cells. At the end of the vacuum period, the preservative is introduced into the cylinder. When the cylinder has been filled with preservative, the vacuum pump is stopped and the cylinder is subjected to pressure of 3.5 to 7.0 kg/cm^2. The pressure is held until the desired absorption is obtained, after which the preservative is withdrawn from the cylinder. Finally a vacuum of 38 to 56 cm of mercury is applied for about 15 minutes to free the material from the dripping preservative. Specified retention of toxic chemicals during treatment may be obtained by a proper selection of the concentration of the toxic material in the treatment solution and a suitable absorption of the preservative solution, which is controlled by the duration of pressure and vacuum periods.

(ii) Empty-cell processes: These processes aim at a maximum penetration of the preservative with the minimum of net absorption. The Lowry process is suitable for treating bamboo. In this process, the cylinder is loaded with the material and the door is closed. It is then filled with the preservative solution and a pressure of

3.5 to 7.0 kg/cm^2 is applied until the required absorption is obtained. The pressure is then released and a portion of the preservative in the material is expelled due to the expansion of the entrapped air in the cells. The cylinder is then drained and a final vacuum is applied to remove unabsorbed preservative.

Pressure treatment is best suited for quick/large scale production of treated bamboo. Such equipment has the advantage of producing material of uniform quality with very little risk of chemical spills.

Standards Council

The Standards Council is the controlling body of the Bureau of Standards and is responsible for the policy and general administration of the Bureau.

The Council is appointed by the Minister in the manner provided for in the Standards Act, 1969. Using its powers in the Standards Act, the Council appoints committees for specified purposes.

The Standard Act, 1969 sets out the duties of the Council and the steps to be followed for the formulation of a standard.

Preparation of standards documents

The following is an outline of the procedure which must be followed in the preparation of documents:

a) The preparation of standards documents is undertaken upon the Standard Council's authorization. This may arise out of representation from national organizations or existing Bureau of Standards' Committees of Bureau staff. If the project is approved it is referred to the appropriate sectional committee or if none exists a new committee is formed, or the project is allotted to Bureau staff.

b) If necessary, when the final draft of a standard is ready, the Council authorizes an approach to the Minister in order to obtain the formal concurrence of any other Minister who may be responsible for any area which the standard may affect.

c) With the approval of the Standards Council, the draft document is made available for general public comment. All interested parties, by means of a notice in the Press, are invited to comment. In addition, copies are forwarded to those known to be interested in the subject.

d) The Committee considers all the comments received and recommends a final document to the Standards Council

e) The Standards Council recommends the document to the Minister for publication.

f) The Minister approves the recommendation of the Standards Council.

g) The declaration of the standard is gazetted and copies placed on sale.

h) On the recommendation of the Standards Council the Minister may declare a standard compulsory.

i) Amendments to and revisions of standards normally require the same procedure as is applied to the preparation of the original standard.

Overseas standards documents

The Bureau of Standards maintains a reference library which includes the standards of many overseas standards organizations. These standards can be inspected upon request,

The Bureau can supply on demand copies of standards produced by some national standards bodies and is the agency for the sale of standards produced by International Organization for Standardization (ISO) members.

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