

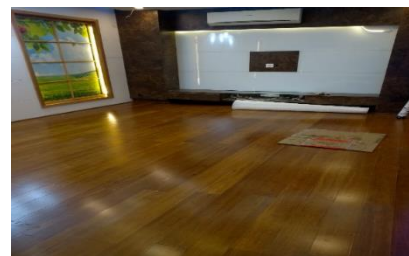
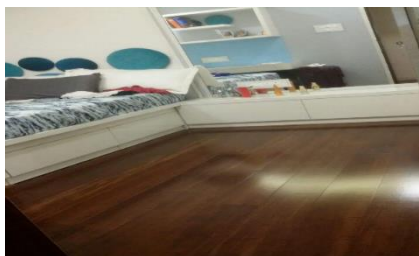


BAMBOOWOOD FLOORING

User should check the validity of the Certificate by contacting Member Secretary, BMBA at BMTPC or the Holder of this Certificate.

Name and Address of Certificate Holder:
M/s Inovar Floors India Pvt Ltd.,
 Inovar House, 67/458, Shree Gajanan
 CHS, MHB Colony, Opp. Oberoi Mall,
 Off Film City Road, Malad (East)
 Mumbai
 Tel: 022-28428459/60/61
 Email: customer-care@inovarfloor.com

Performance Appraisal
 Certificate No.
 PAC No.: **1049-P/2020**
 Issue No. **01**
 Date of Issue: **13.01.2020**



Building Materials & Technology Promotion Council
 Ministry of Housing & Urban Affairs
 Government of India
 Core 5A, First Floor, India Habitat Centre,
 Lodhi Road, New Delhi – 110 003

Tel: +91-11-2463 6705, 2463 8097; Fax: +91-11-2464 2849
 E-mail: info@bmtpc.org Web Site: <http://www.bmtpc.org>


PERFORMANCE APPRAISAL CERTIFICATE

FOR

BAMBOOWOOD FLOORING

M/s Inovar Floors India Private Limited, Mumbai

STATUS OF PAC: 1049-P/2020

S. No.	Issue No.	Date of Issue	Date of renewal	Amendment		Valid up to (Date)	Remarks	Signature of authorized signatory
				No.	Date			
1.	2.	3.	4.	5.	6.	7.	8.	9.
1	1	13/01/2020	13/01/2021			12/01/2021	---	

PAC No. 1049-P/2020

Issue No. 01

Date of issue:13/01/2020

CONTENTS

PART-1 CERTIFICATION.....	3
1.1 Certificate Holder	3
1.2 Description of System	3
1.3 Manufacturing Process	6
1.4 Assessment	7
1.5 Uses & Limitation of the System	8
1.6 Conditions of Certification	9
1.7 Certification	9
PART 2 CERTIFICATE HOLDER'S TECHNICAL SPECIFICATION	10
2.1 General	10
2.2 Specifications for the System and Design Information	10
2.3 Installation guidelines	11
2.4 Maintenance guidelines	13
2.5 Sampling	15
2.6 Packing & Marking	16
2.7 Choosing size & thickness	16
2.8 Skills/ training needed for installation	16
2.9 Guarantees/Warranties provided by the PAC holder	16
2.10 Service provided by the PAC holder to the customer	17
2.11 Manuals & guidelines.....	17
2.12 Responsibility	17
PART 3 BASIS OF ASSESSMENT AND BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE	18
3.1 Assessment	18
3.2 Laboratory tests done for assessment	18
3.3 Usage of system.....	23
PART 4 STANDARD CONDITIONS	24
PART 5 LIST OF STANDARDS AND CODES USED IN ASSESSMENT.....	27
CERTIFICATION	29
PART 6 ABBREVIATIONS	30
PERFORMANCE APPRAISAL CERTIFICATION SCHEME – A BRIEF.....	31
ANNEX I.....	32
ANNEX II	34
ANNEX III	36

PART 1 CERTIFICATION

- 1.1 Certificate Holder:** **M/s Inovar Floors India Private Limited,**
Inovar House, 67/458, Shree Gajanan CHS.,
MHB Colony, Opp. Oberoi Mall, Off Film City
Road, Malad (East) Mumbai – 400097, India.
Tel: 022-28428459/60/61
Email: customercare@inovarfloor.com

1.2 Description of System

1.2.1 Name of the System– Bamboo Wood Flooring

1.2.2 Brand Name – Inovar

1.2.3 *Brief Description* – Inovar bamboo wood flooring is made from Strand woven bamboo. It is a conversion of bamboo to wood. Bamboo wood flooring is an eco-friendly product made from bamboo, the fastest growing plant on earth. Bamboo travel through boiling process or burn it under high pressure stream to remove starch and sugar content to make it termite resistant. Further, phenolic resin is used as binder and 9 layers of UV coating is applied on it. Bamboo is one of the natural materials available for flooring and is an alternative to hard wood flooring. Bamboo has a higher fibre rating than any other hard wood which gives it exceptional hard wearing qualities. Flooring and wall paneling are coated with UV coat while decking shall be coated with oil.

1.2.4 Types of Inovar Bamboo Flooring

1.2.4.1 Flooring

It is suitable for the indoor areas. This is shown in Figs. 1 to 3.

1.2.4.2 Decking

It is suitable for the outdoor areas. This is shown in Fig. 4.

1.2.4.3 Cladding (wall paneling)

It is suitable for the walls.

1.2.5 Size & thickness and Accessories of Inovar Bamboo wood are as follows:

1.2.5.1 Size and thickness

S. No.	Description	Thickness (mm)	Size W x L (mm)
1.	Inovar Bamboo wood Flooring	14	125 x 1850
2.	Inovar Bamboo wood Flooring	12	125 x 1850
3.	Inovar Bamboo wood Flooring	10	125 x 1850
4.	Inovar Bamboo wood Decking	20	125 x 1850
5.	Inovar Bamboo wood Cladding	8	125 x 1850
6.	Inovar Bamboo wood Cladding	8	125 x 1850

i) Installed Images of Inovar Bamboo Flooring

a. BM3600 Bamboo Coffee Installed Image



Fig. 1

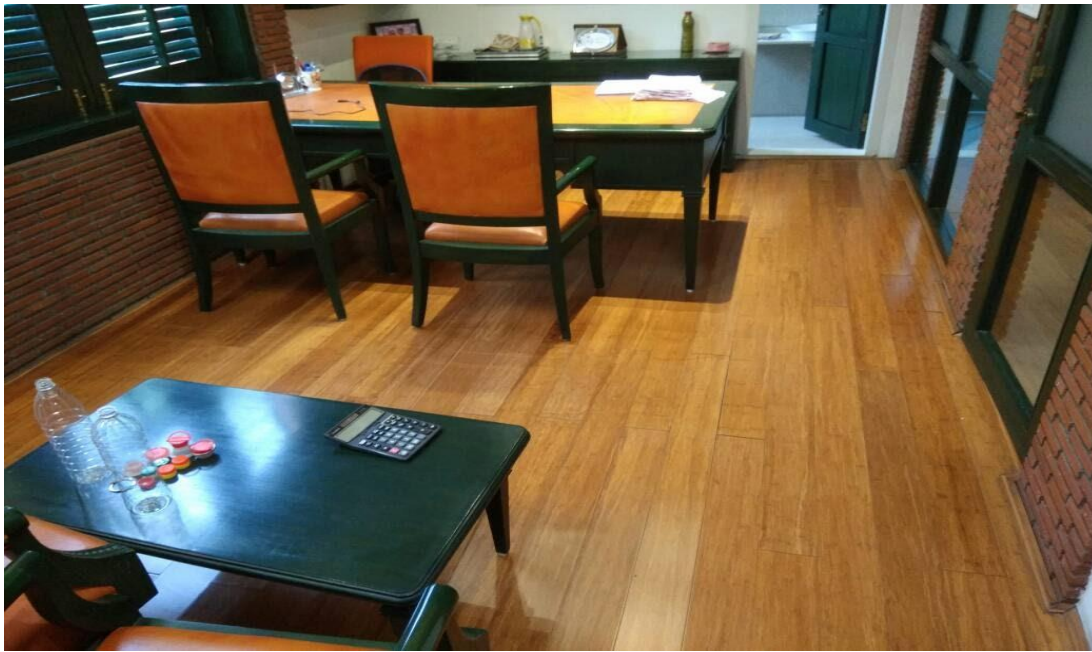


Fig. 2

ii) BM3611 Walnut Naturelle Installed Image

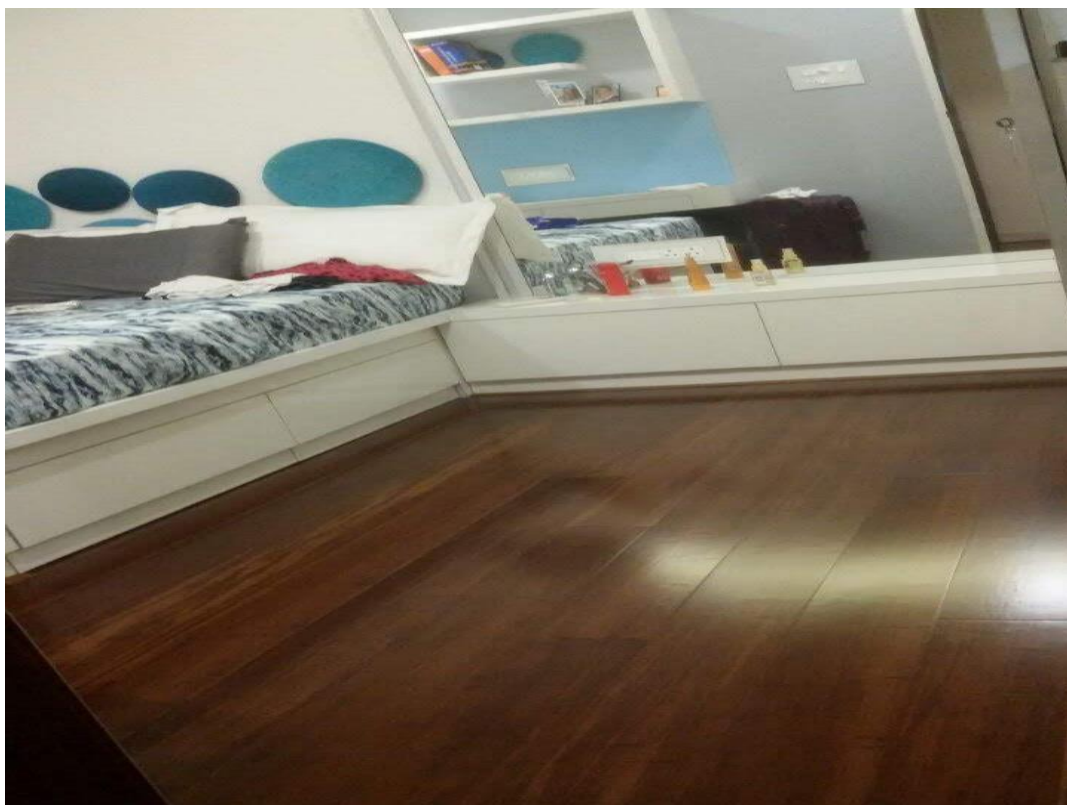


Fig. 3

iii) BM3611 Jungle Wood Installed Image



Fig. 4

1.2.5.2 Accessories

S. No.	Description	Thickness (mm)	Size (mm) W x L
1.	Skirting	16	85 x 1900
2.	Reducer	16	44 x 1900
3.	T- mould	14/12/10/8	44 x 1900
4.	Stair-nose	16	85 x 1900
5.	Quarter Round	16	85 x 1900

1.3 Manufacturing Process

- 1.3.1** We use the innovative strand woven technology to produce a high density bamboo composite which is remarkably durable. Our bamboo floors are created with sophisticated features utilizing its naturally high tensile strength. Also, the anti-scratch overlay makes it wear resistant while the patented glue less interlocking system ensure you of easy installation and worry-free maintenance. Sourced from sustainable bamboo plantations, these floors are extremely eco-

friendly and it can set the perfect backdrop for innovative interior concept and ideas.

1.3.1.1 Primary

The bamboo is cleaned while its skin and knots are removed. It is then sliced into strips and crushed into strands – fibers that will come together for further treatment.

1.3.1.2 Secondary

The bamboo strands are then cured, naturally and artificially, for strength. These strands shall then be compressed to create bamboo wood beams.

1.3.1.3 Tertiary

The beams are then smoothened out and sliced into different thicknesses for flooring, decking or wall cladding. The bamboo wood planks shall return to be seasoned naturally and artificially (kiln dried) for high grade stability.

1.3.1.4 Finishing

The planks are then coated with UV coating. This process is repeated 9 times for ensuring durability and robustness.

The manufacturing process Flow Chart is shown in **Annex. II**. The manufacturing process is shown in Fig. 5.

For detailed Inovar Bamboowood Flooring manufacturing process, reference shall be made to the Standard Operating Procedure of the PAC holder.

1.4 Assessment

1.4.1 *Scope of Assessment*

Scope of assessment included suitability of Inovar Bamboo wood to the specified requirements for use in buildings, houses, offices etc. as:

- i) Flooring
- ii) Decking
- iii) Cladding

1.4.2 *Basis of Assessment*

Assessment of the suitability of Bamboo flooring is based on:

- i) Inspection of the regional office and quality assurance of the product.
- ii) Fire Test Reports of Bamboo flooring tiles for natural, carbonized, satin and wall finish for various characteristics by ATWA Product Testing, Australia. (Test Report Attached)
- iii) Dry Slip Test Reports of Bamboo flooring, Slip resistance classification of new pedestrian surface materials- Dry Floor Friction Test Method done by CETEC, Australia. (Test Report Attached)
- iv) FIRM Test Reports of Bamboo Flooring for Formaldehyde value done by WCTL, FIRM, Malaysia (Test Report Attached)
- v) Test Reports of Bamboowood flooring tiles to determine the formaldehyde content in the board by Perforator method by Centre for Testing & Evaluation of Wood Composites, IPIRTI, Kolkata, India. (Ref: BMT/CPMT/PACS-BF/2019 dt. 16.09.2019)
- vi) Test Reports of Bamboowood flooring tiles for various characteristics by Centre for Testing & Evaluation of Wood Composites, IPIRTI, Kolkata, India. (Ref: BMT/CPMT/PACS-BF/2019 dt. 16.09.2019).
- vii) Quality Assurance Scheme followed by the Certificate holder for process control.

1.5 Uses of the Inovar Bamboo flooring and its Limitations

1.5.1 Uses

Bamboowood flooring shall be suited for the following uses:

1.5.1.1 Indoor

- i) Home, office, mall etc. flooring with accessories
- ii) Sport stadiums, Auditoriums etc. special floors with special installation requirements
- iii) Paneling/cladding etc.

1.5.1.2 Outdoor

- i) Decks of any use
- ii) Canopy, lawn area
- iii) Portico, entrance etc.

1.5.2 Limitations

- i) Indoor products shall not be used for outdoor use and vice-versa

- ii) There shall be difference in kind of finish for indoor and outdoor flooring

1.6 Conditions of Certification

1.6.1 Technical Conditions

- i) Raw materials and the finished flooring shall conform to the requirements of the prescribed specifications.
- ii) The flooring to be installed shall be in accordance with the specifications, manufacturing & installation process prescribed by the manufacturer.

1.6.2 Handling of User Complaints

1.6.2.1 The Certificate holder shall provide quick redressal to consumer/user complaints proved reasonable & genuine and within the conditions of warranty, if provided by it to customer/purchaser.

1.6.2.2 As part of PACS Certification, data shall be maintained on such complaints with a view to assess the complaint satisfaction and suitable preventive measures taken.

1.6.3 Quality Assurance

The Certificate Holder shall implement & maintain a quality assurance system in accordance with Scheme of Quality Assurance (SQA) given in **Annex I** attached with this Certificate.

1.7 Certification

On the basis of assessment given in Part III of this Certificate & subject to the conditions of certification, use & limitations set out in this Certificate and if selected, installed & maintained as set out in Part I & II of this Certificate, the Bamboowood flooring covered by this Certificate is fit for use set out in the Scope of Assessment.

Inovar Bamboo wood is made from Strand woven bamboo. It is a conversion of bamboo to wood. Bamboo has a higher fiber rating than any other hard wood which gives it exceptional hard wearing qualities. Flooring and wall paneling are coated with UV coat while decking shall be coated with oil.

PART 2 CERTIFICATE HOLDER'S TECHNICAL SPECIFICATIONS

2.1 General

- 2.1.1** The PAC holder shall manufacture the Bamboowood flooring in accordance with the specifications, manufacturing & installation process prescribed by the manufacturer.

2.2 Specifications for the Inovar Bamboowood Flooring & Design Information

2.2.1 Technical Specifications

2.2.1.1 Raw Materials

2.2.1.2 Bamboowood

- i. Bamboo shall be matured, fresh, have no pin holes, no decay, no de-colourisation
- ii. Boric acid shall be of 99.5% purity
- iii. Borax shall be of 99.5% purity
- iv. Phenol shall have 99.9% dry mass w/w
- v. Formaldehyde shall be of 37% concentration
- vi. Caustic soda shall have 99.9% dry mass w/w
- vii. Hydrogen peroxide shall be of 50% concentration

2.2.2. Flooring

- i) Density shall be $\geq 1000 \text{ Kg/m}^3$ in accordance with IS 1708 (Part 2):1986
- ii) Modulus of Rupture shall be $\geq 150 \text{ N/mm}^2$ in accordance with IS 1708 (Part 5):1986
- iii) Modulus of elasticity shall be $\geq 17500 \text{ N/mm}^2$ in accordance with IS 1708 (Part 5):1986
- iv) Flammability (time taken for second ignition) shall be ≥ 5 min in accordance with IS 1734 (Part 3):1983
- v) Flame penetration (time taken for flame penetration from bottom to top surface) shall be ≥ 30 min in accordance with IS 1734 (Part 3):1983
- vi) Rate of burning (time taken to lose weight from 70% to 30%) shall be ≥ 10 min in accordance with IS 1734 (Part 3):1983
- vii) Thermal conductivity shall be $\leq 0.25 \text{ W/m-K}$ in accordance with IS EN 12664-2001

2.2.3. Flooring Finish

- (i) Gloss value shall be $30 \pm 5\%$ in accordance with DIN EN ISO 2813:1994
- (ii) Cross cut test shall be \leq GT 2 in accordance with DIN EN ISO 2409:2007
- (iii) Abrasion resistance – initial point shall be > 100 cycle in accordance with DIN EN 438-2:1991 (500g load per wheel S 33)
- (iv) Abrasion resistance – initial point shall be > 6000 cycle in accordance with ASTM D 4060:1995 (500g load per wheel CS 17)
- (v) Scratch resistance (pencil hardness) shall be \geq 1H in accordance with ISO 15184:2012
- (vi) Scratch resistance (coin test) shall be ≥ 20 N in accordance with Hamburger planner
- (vii) Scratch resistance (surface) shall have No scratch as per Steel wool test, Type 2
- (viii) Impact resistance shall be ≥ 2 N in accordance with DIN EN 438 Part 2-12:2005
- (ix) Resistance to indentation shall be ≥ 1 N in accordance with DIN EN 438 Part 2-14:2005
- (x) Chemical resistance shall be 5 in accordance with DIN 68861-1:2011
- (xi) Heat resistance (cigarette test) shall be 6A in accordance with DIN 68861 – 6:2011
- (xii) Inflammability shall be B1 in accordance with DIN 4102 Part 14:1990

2.2.4 Design Parameters

Data design parameters required for design where the product is used:

- Floor plan
- Dimensional details
- Construction type for product required
- Ventilation provisions
- Location
- Weather extreme high & low values of temperature and humidity

2.3 Installation Guidelines

- ### **2.3.1**
- The Inovar Bamboowood flooring shall be installed on the following types of sub-floor:

- i) Concrete sub-floor – The desirable floor base shall be strong, dry and have no open cracks
- ii) Plywood sub-floor - The desirable floor base shall be free from emission and properly installed on graded floor
- iii) Other sub-floor - The desirable floor base shall be standard batten, treated and seasoned sub-floor

The sub-floor level shall be maintained at 'zero level'. There shall be no grease, oil, wax, dust and sand etc. on the sub-floor.

2.3.2 Floating Floor Installation

- i) Floor shall be cleaned
- ii) Underlay or high density foam shall be used
- iii) The sheet shall be unrolled on the longest wall
- iv) The sheet shall not be overlapped
- v) The guide floor piece shall be placed first
- vi) Expansion gap shall be left
- vii) The guide shall be laid by nail down method
- viii) Floor tiles shall be spread to normalize and color sorting
- ix) Rectangular alignment shall be checked
- x) Floor tiles to be used next shall be aligned
- xi) Two tiles shall be locked
- xii) Same process shall be continued for next floor tile
- xiii) The tiles shall be pushed to lock each other well by using controlled force
- xiv) Floor tiles shall be laid & aligned continuously and locking process shall be repeated
- xv) Guide shall be removed and tile placed in last
- xvi) Skirting/moulding/quarter round shall be fixed
- xvii) New floor shall be allowed to acclimatize for 24 hrs
- xviii) The Bamboowood flooring can be fixed now.

2.3.3 Nail Down Floor Installation

- i) Floor shall be cleaned
- ii) Anti-friction poly sheet shall be laid
- iii) Guide line expansion joints shall be marked 6mm from end and 15mm sideways
- iv) Floor tiles shall be spread to normalise and colour sorting
- v) The guide shall be laid by nail down method
- vi) The tiles shall be arranged and laid in regular or other design
- vii) The tiles shall be pushed into each other
- viii) The floor nailer shall be used to nail down tiles
- ix) Expansion guide strips shall be removed
- x) Skirting/moulding/quarter round shall be fixed
- xi) New floor shall be allowed to acclimatize for 24 hrs

- xii) The Bamboowood flooring can be fixed now.

2.3.4 Glue Down Floor Installation

- i) Floor shall be cleaned
- ii) Guide line expansion joints shall be marked 6mm from end and 15mm sideways
- iii) The guide shall be laid by nail down method
- iv) Floor tiles shall be spread to normalise and colour sorting
- v) Glue shall be applied by using trowel
- vi) Glue shall be used below room temperature
- vii) Glue shall be used gradually and tiles shall be laid outwards
- viii) The tiles shall be cleaned/wiped in case any glue mark seen/noticed
- ix) The tiles shall not be cut over glue spread area
- x) Soft roller shall be used to get an even and good bond between subfloor and tiles
- xi) The glue shall be cleaned/wiped if it comes out on top
- xii) Guide shall be removed and tile placed in last
- xiii) Skirting/moulding/quarter round shall be fixed
- xiv) New floor shall be allowed to acclimatize for 24 hrs
- xv) The Bamboowood flooring can be fixed now.

2.3.5 Decking Installation

- i) Floor shall be cleaned
- ii) Battens shall be placed with a gap of not more than 500mm
- iii) Batten shall be nailed down into subfloor
- iv) Clip shall be installed on the back of deck tile by 2.5mm dia. and 10mm long screw
- v) First deck tile shall be installed
- vi) Hole shall be drilled to fix 4mm screw
- vii) Tile shall be fixed with batten by using clip and 2.5mm screw
- viii) Same process shall be repeated to fix next deck
- ix) New floor shall be allowed to acclimatize for 24 hrs
- x) The Bamboowood flooring can be fixed now.

Detailed installation guidelines along with illustrations are given in **Annex III**.

2.4 Maintenance Guidelines

- 2.4.1** Inovar Bamboowood flooring shall be maintained by hardwood floor cleaners as recommended to ensure that floor stays looking good. It shall be ensured that hardwood floor cleaners are water base, non-toxic cleaner which has been designed for finished

hardwood floors. Cleaner shall be used as per manufacturer's instructions.

2.4.2 Types of Drying Methods for the Floors are as follows:

2.4.2.1 Dry mop

Dirt and grit shall always be removed prior to cleaning Bamboowood floors with an electrostatic dust control mop/ soft mop/ vacuum cleaner. Bristle broom shall be avoided.

2.4.2.2 Dry spray

The area of floor or the cleaning pad shall be mist with the hardwood floor cleaner.

2.4.2.3 Wipe

The floor shall be cleaned with a microfiber cloth or mop using a back and forth motion until it is dry. Soiled mop or cloth shall be replaced once it becomes soiled to avoid streaking.

2.4.3 Do's and Don'ts

2.4.3.1 Do's

- i) The floor shall be cleaned regularly. Recommendations for cleaning the floor as a guide shall be as follows:
 - Low frequented area (residential) – about every 2-4 weeks
 - Medium frequented area (offices) – about every 1-2 weeks
 - High frequented area (public places) – about every 1-2 days
- ii) Spills shall be removed promptly
- iii) Mats at exterior and interior doors shall be placed to trap sand and grit from incoming traffic
- iv) Heavy furniture or appliances shall always be picked rather than sliding them across the floor
- v) Any minor scratches or damage shall be repaired using hardwood flooring cleaners

2.4.3.2 Don'ts

- i) Do not steam mop or wet mop floor surface area after installation. Excess water can cause swelling
- ii) Do not let sand, dirt or grit build up. They act like sandpaper and actually abrade and dull the floor finish.

2.5 Sampling

2.5.1 *Lot*

2.5.1.1 In any consignment all the flooring tiles of the same type, shape, size and manufactured from the same raw materials under relatively similar conditions of production shall be grouped together to form a lot for inspection.

2.5.1.2 Samples shall be collected and inspected from each lot separately to ascertain its conformity or otherwise to the requirement of the specification.

2.5.2 *Scale of Sampling*

2.5.2.1 The number of samples to be selected for the sample from a lot shall depend upon the size of the lot and shall be in accordance with the col 1, 2 and 3 of Table 2.

2.5.2.2 All the tiles in the sample shall be selected at random from the lot. In order to ensure randomness of selection, procedures given in IS 4905:1968 may be followed.

2.5.3 Number of tests and criteria for conformity

2.5.3.1 The no. of tiles in the first sample shall first be subjected to the routine tests. If in the first sample the no. of defective tiles i.e. those failing to satisfy any one or more of the acceptance tests is equal to the corresponding acceptance no. a (col 5), the lot shall be considered as conforming to the requirements of the routine tests. If the no. of defective tiles in the first sample is more than or equal to the corresponding rejection no. r (col 6), the lot shall be considered as not conforming. If the no. of defective tiles in the first sample lies between the corresponding values of a & r , a second sample (col 2 & 3), shall be selected and subjected to the routine tests. If in the combined sample, the no. of defective tiles is less than or equal to the corresponding acceptance no. a , the lot shall be considered as conforming and if, the no. of defective tiles is more than or equal to the corresponding rejection no. r , the lot shall be considered as not conforming.

Sample size
(Clause 2.5.3.1)

No. of tiles in the lot	Sample	Sample size	Cumulative Sample size	Acceptance Number	Rejection Number
1)	2)	3)	4)	5)	6)
Up to 100	First Second	5 10	5 15	0 1	0 2

2.6 Packing and Marking

- 2.6.1** Bamboo Flooring planks shall be packed in foam, one set of such planks again wrapped in poly pack and expose to infrared shrinking tunnel for air tight packing. Pre-shrink wrapped planks shall be placed into corrugated box. Each box shall be marked with the following information

Name of the manufacturer or trade mark

- a) Lot or batch number; year of manufacture
- b) Colour
- c) Dimensions
- d) Quantity in no., sqm or sqft

2.7 Choosing Size and Thickness

Appropriate size and thickness of the flooring shall be chosen to suit the requirement of the work.

2.8 Skilled /Training needed for Installation

Inovar Bamboowood flooring shall be installed by experienced carpenters in accordance with the technical literature and installation guidelines of the manufacturer.

2.9 Guarantees/Warranties provided by the PAC Holder

Inovar provide 15years warranty to the Residential use & 5years for commercial use from the date of completion of flooring to the original purchaser provided the flooring is installed strictly in accordance with the applicable specifications, instructions and guidelines of the manufacturer. The bamboo surface will no wear through under normal conditions of were and tear. Gloss reduction and scratches caused by regular traffic are not considered were through and are not covered by this warranty. A brochure giving relevant warrantee details shall be made available to the client.

2.10 Services provided by the PAC Holder to the Customer

In-house testing of formwork at regular intervals as per the Quality Control Assurance requirement shall be ensured by PAC Holder.

2.11 Manuals & Guidelines

All the manuals and guidelines etc. relating to Operation, Quality, Installation, Maintenance etc. shall be provided by the manufacturer.

2.12 Responsibility

Quality of installation of the flooring on site is the responsibility of the trade persons engaged by the agency.

PART 3 BASIS OF ASSESSMENT AND BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE

3.1 Assessment

3.1.1 The assessment has been done as per provisions of the standards listed in Part V of this Certificate.

3.1.2 The assessment of the system is based on the Bamboowood flooring manufactured, used and installed as per statement given in the PAC. However, assessment of the suitability of flooring manufactured as flooring, decking and cladding in buildings, houses, offices etc. is based on:

- i) Inspection of the regional office and quality assurance of the product.
- ii) Fire Test Reports of Bamboo flooring tiles for natural, carbonized, satin and wall finish for various characteristics by ATWA Product Testing, Australia.
- iii) Dry Slip Test Reports of Bamboo flooring, Slip resistance classification of new pedestrian surface materials- Dry Floor Friction Test Method done by CETEC, Australia.
- iv) FIRM Test Reports of Bamboo Flooring for Formaldehyde value done by WCTL, FIRM, Malaysia
- v) Test Reports of Bamboo wood flooring tiles to determine the formaldehyde content in the board by Perforator method by Centre for Testing & Evaluation of Wood Composites, IPIRTI, Kolkata, India. (Ref:BMT/CPMT/PACS-BF/2019 dt. 16.09.2019)
- vi) Test Reports of Bamboowood flooring tiles for various characteristics by Centre for Testing & Evaluation of Wood Composites, IPIRTI, Kolkata, India. (Ref: BMT/CPMT/PACS-BF/2019 dt. 16.09.2019)

3.2 Laboratory Tests Performed for Assessment

3.2.1 Testing of Samples by ATWA Product Testing, Australia

3.2.1.1 Floor finish -- Natural

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30+ 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	Initial point -- 260 cycle

4.	Abrasion resistance	ASTM D 4060 (500g load per wheel CS 17)	Initial point > 15000 cycle
5.	Scratch resistance--pencil hardness	ISO 15184	7 H
6.	Scratch resistance- Coin test	Hamburger planner	39 N
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch
8.	Impact resistance	DIN EN 438 Part 2-12	3 N
9.	Resistance to indentation	DIN EN 438 Part 2-14	2 N
10.	Chemical resistance	DIN 68861 - 1:2011	5
11.	Heat resistance (cigarette test)	DIN 68861 - 6:2011	6A
12.	Inflammability	DIN 4102-14:1990	B1

3.2.1.2 Floor finish – Carbonized

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30± 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	Initial point -- 240 cycle
4.	Abrasion resistance	ASTM D 4060 (500g load per wheel CS 17)	Initial point > 15000 cycle
5.	Scratch resistance--pencil hardness	ISO 15184	7 H
6.	Scratch resistance- Coin test	Hamberger planner	37 N
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch
8.	Impact resistance	DIN EN 438 Part 2-12	3 N
9.	Resistance to indentation	DIN EN 438 Part 2-14	2 N
10.	Chemical resistance	DIN 68861 - 1:2011	5
11.	Heat resistance (cigarette test)	DIN 68861 - 6:2011	6A
12.	Inflammability	DIN 4102 - 14:1990	B1

3.2.1.3 Floor finish –Stain

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30+ 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	Initial point -- 240 cycle
4.	Abrasion resistance	ASTM D 4060 (500g load per wheel CS 17)	Initial point > 15000 cycle
5.	Scratch resistance--pencil hardness	ISO 15184	7 H
6.	Scratch resistance- Coin test	Hamberger planner	39 N
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch
8.	Impact resistance	DIN EN 438 Part 2-12	3 N
9.	Resistance to indentation	DIN EN 438 Part 2-14	2 N
10.	Chemical resistance	DIN 68861 - 1:2011	5
11.	Heat resistance (cigarette test)	DIN 68861 - 6:2011	6A
12.	Inflammability	DIN 4102 - 14:1990	B1

3.2.1.4. Floor finish –Wall

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30+ 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	NA
4.	Abrasion resistance	ASTM D 4060 (500g load per wheel CS 17)	NA
5.	Scratch resistance--pencil hardness	ISO 15184	7 H
6.	Scratch resistance- Coin test	Hamberger planner	40 N
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch

8.	Impact resistance	DIN EN 438 Part 2-12	3 N
9.	Resistance to indentation	DIN EN 438 Part 2-14	2 N
10.	Chemical resistance	DIN 68861 - 1:2011	5
11.	Heat resistance (cigarette test)	DIN 68861 - 6:2011	6A
12.	Inflammability	DIN 4102 Part 14	B1

3.2.1.5 Lifetime finishing

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30 \pm 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	IP 1000 cycle FP1200 cycle
4.	Abrasion resistance	ASTM D 4060 (500g load per wheel CS 17)	Initial point > 30000 cycle
5.	Scratch resistance--pencil hardness	ISO 15184	4H
6.	Scratch resistance- Coin test	Hamberger planner	35 N
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch/ no marking
8.	Resistance to indentation	DIN EN 438 Part 2-14	\geq 2 N
9.	Chemical resistance	DIN 68861 - 1:2011	No visible change(except black/blue ink)
10.	Heat resistance	EN 12722:1997	120°C / Rating 5
11.	Inflammability	DIN 4102-14:1990	B1

3.2.1.6 Standard finishing

S. No.	Test	Intl. Standard	Result
1.	Gloss value	DIN EN ISO 2813	30 \pm 5%
2.	Cross cut test	DIN EN ISO 2409	GT 0
3.	Abrasion resistance	DIN EN 438-2 (500g load per wheel S 33)	IP - 140 cycle FP-170 cycle
4.	Abrasion resistance	ASTM D 4060 (500g load per	Initial point > 6000 cycle

		wheel CS 17)	
5.	Scratch resistance--pencil hardness	ISO 15184	3H
6.	Scratch resistance- Coin test	Hamberger planner	30 Newton
7.	Scratch resistance-Surface	Steel wool test, Type 2	No scratch/ no marking
8.	Resistance to indentation	DIN EN 438 Part 2-14	>= 2 Newton
9.	Chemical resistance	DIN 68861 - 6:2011	No visible change(except black/blue ink)
10.	Heat resistance	EN 12722:1997	120°C / Rating 5
11.	Inflammability	DIN 4102--14:1990	B1

3.2.2 Testing of Samples by Centre for Testing & Evaluation of Wood Composites, IPIRTI, Kolkata (Ref: BMT/CPMT/PACS-BF/2019 dt. 16.09.2019).

3.2.2.1 *Test to determine the formaldehyde content in the board by Perforator method as per IS 13745:1993*

- i) Nature of Sample : Bamboo Wood Flooring
- ii) Size of Sample : Length – 750 mm – 5 No.
& Length – 300 mm – 6 No.
- iii) Quantity : 11 No.
- iv) Date of Receipt : 23.09.2019
- v) Date of commencement of testing : 07.10.2019
- vi) Date of completion of testing : 18.10.2019

3.2.2.2 *Test to determine the mechanical properties*

S. No.	Tests	Indian Standard	Result #
1.	Density, kg/m ³	IS 1734: 1983	1004
2.	Static Bending Strength (Along the grain). N/mm ² Modules of Elasticity, Average Modules of Rupture, Average	IS 1734: 1983	901 109.77
3.	Moisture content%	IS 1734: 1983	5.16
4.	Flammability, Minutes	IS 1734 (Part 3):1983	25
5.	Rate of Burning, Minutes	IS 1734 (Part 3):1983	24
6.	Flame penetration Minutes	IS 1734 (Part 3):1983	54
7.	Perforator Value (mg formaldehyde/ 100gm dry board)	Clause No. 9.7 of IS 13745: 1933	7.365

3.2.2.3 Test to determine the Termite, Borer and Mould attack

Termite test	Borer test	Mould test	Results		
			Termite	Borer	Mould
Samples were exposed for termite attack near mound for six months	Samples were exposed in plastic boxes for borer attack for three months	Samples were exposed in Incubation chamber for three months	No termite attack was noticed	No borer attack was noticed	Surface mould attack was noticed

3.3 Usage of the System

3.3.1 Details of the Inovar Bamboo wood Flooring supplied by the manufacturer for use as flooring and cladding in buildings, houses, offices etc. is given below:-

S. No.	Agency	Location	Quantity	Period
1.	Hotel Novatel, Goa	Goa	4000 Sqm	April,2013
2.	Hotel Grand Mercure, Goa	Goa	4500 Sqm	November,2013
3.	Future Lifestyle Fashions Ltd, New Delhi	New Delhi	362 Sqm	November,2015
4.	Future Lifestyle Fashions Ltd, Vashi, Navi Mumbai	Vashi, Navi Mumbai	90.34 Sqm	September,2017
5.	Future Lifestyle Fashions Ltd, Hyderabad	Hyderabad	137.59 Sqm	September,2017

PART 4 STANDARD CONDITIONS⁴

This certificate holder shall satisfy the following conditions:

- 4.1** The certificate holder shall continue to have the product reviewed by BMBA.
- 4.2** The product shall be continued to be manufactured according to and in compliance with the manufacturing specifications and quality assurance measures which applied at the time of issue or revalidation of this certificate. The Scheme of Quality Assurance separately approved shall be followed.
- 4.3** The quality of the product shall be maintained by the certificate holder. Complete testing facilities shall be installed for in-process control.
- 4.4** The product user should install, use and maintain the product in accordance with the provisions in this Certificate.
- 4.5** This certificate does not cover uses of the product outside the scope of this appraisal.
- 4.6** The product is appraised against performance provisions contained in the standards listed in Part-V. Provisions of any subsequent revisions or provisions introduced after the date of the certificate do not apply.
- 4.7** Where reference is made in this Certificate to any Act of Parliament of India, Rules and Regulations made there under, statutes, specifications, codes of practice, standards etc. of the Bureau of Indian Standards or any other national standards body and the International Organization for Standardization (ISO), manufacturer's company standards, instruction/manual etc., it shall be construed as reference to such publications in the form in which they were in force on the date of grant of this Certificate (and indicated in Part V to this Certificate)
- 4.8** The certificate holder agrees to inform BMBA of their clients with details of construction on six monthly basis.
- 4.9** The certificate holder agrees to provide to BMBA feedback on the complaints received, the redressal provided, and the time taken to provide redressal on complaint to complaint basis as soon as redressal is provided. BMBA agrees to provide the certificate holder the user feedback received by it, if any.

- 4.10** If at any time during the validity period, PACH is unable to fulfill the conditions in his PAC, he should on his own initiative suspend using the PAC and notify Chairman, TAC the date from which he has suspended its use, the reason for suspension and the period by which he will be able to resume. He shall not resume without the prior permission of BMBA. He shall also inform, simultaneously, his agents, licensees, distributors, institutional, government, public sector buyers, other buyers and all those whom he has informed about his holding the PAC. He shall also inform all those who buy his product(s) during the period of suspension. He shall provide to BMBA at the earliest the list of who have been so informed by him.
- 4.11** In granting this Certificate, BMBA takes no position as to:
- (a) The presence or absence of patent or similar rights relating to the product;
 - (b) The legal right of the Certificate holder to market, install or maintain the product;
 - (c) The nature of individual installations of the product, including methods of workmanship.
- 4.12** BMTPC and the Board of Agreement of BMTPC (BMBA) take no position relating to the holder of the Performance Appraisal Certificate (PACH) and the users of the Performance Appraisal Certificate (PAC) respecting the patent rights / copy rights asserted relating to the product / system / design / method of installation etc. covered by this PAC. Considerations relating to patent / copy rights are beyond the scope of the Performance Appraisal Certification Scheme (PACS) under which this PAC has been issued. PACH and users of this PAC are expressly advised that determination of the Claim / validity of any such patent rights / copy rights and the risk of infringement of such rights are entirely the responsibility of PACH on the one hand and that of the users on the other.
- 4.13** It should be noted that any recommendations relating to the safe use of the product which are contained or referred to in this Certificate are the minimum standards required to be met with when the product is installed, used and maintained. They do not purport in any way to restate or cover all the requirements of related Acts such as the Factory Act, or of any other statutory or Common Law duties of care, or of any duty of care which exist at the date of this Certificate or in the future, nor is conformity with the provisions of this Certificate to be taken as satisfying the requirements of related Acts.

- 4.14** In granting this Certificate, BMTPC and BMBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the use of this product.
- 4.15** The certificate holder indemnifies BMBA, its officers and officials involved in this assessment against any consequences of actions taken in good faith including contents of this certificate. The responsibility fully rests with the certificate holder and user of the product.
- 4.16** The responsibility for conformity to conditions specified in this PAC lies with the manufacturer who is granted this PAC. The Board (BMBA) will only consider requests for modification or withdrawal of the PAC.
- 4.17** The PAC holder shall not use this certificate for legal defense in cases against him or for legal claims he may make from others.

Place: New Delhi

Date of issue:13.1.2020.....



Chairman TAC & for and on behalf of

Member Secretary, BMBA

Dr. Shailesh Kr. Agrawal

Chairman, TAC

& Member Secretary, BMBA

Building Materials and Technology Promotion Council

Ministry of Housing and Urban Affairs, Govt. of India

Core 5A, 1st Floor, India Habitat Centre

Lodhi Road, New Delhi-110003

PART 5 LIST OF STANDARDS & CODES USED IN ASSESSMENT

5.1	Standards	-	These Standards are referred for carrying out particular tests only and do not specify the requirement for the whole product as such.
5.1.1	IS 1708 (Part 1):1986	-	Method of testing of small clear specimens of timber – Determination of moisture content
5.1.2	IS 1708 (Part 2):1986	-	Method of testing of small clear specimens of timber – Determination of specific gravity
5.1.3	IS 1708 (Part 5):1986	-	Method of testing of small clear specimens of timber – Determination of static bending strength
5.1.4	IS 1708 (Part 10):1986	-	Method of testing of small clear specimens of timber– Determination of hardness under static indentation
5.1.5	IS 1734 (Part 3):1983	-	Methods of test for plywood – Determination of fire resistance
5.1.6	IS 2380:1981	-	Method of test for wood particle boards and boards from other lignocellulosic materials
5.1.7	IS 3346:1980	-	Method of determination of thermal conductivity of thermal insulation materials
5.1.8	IS 13745:1993	-	Methods of determination of formaldehyde content in wood particle board by perforator method
5.1.9	DIN EN 2409:2007	ISO	- Test method for determination of Cross cut adhesion tape
5.1.10	DIN EN 2813:1994	ISO	- Test method for determination of specular gloss of paint film using a reflect meter
5.1.11	DIN EN 438-2:1991	-	Test method for determination of Abrasion resistance:
5.1.12	DIN EN 438 (Part 2 - 12):2005	-	Test method for determination of Impact resistance by impactor drop ball test
5.1.13	DIN EN 438 (Part 2 - 14):2005	-	Test method for determination of Resistance to indentation (water vapour)
5.1.14	DIN 4102 (Part 14):1990	-	Floor covering systems using a radiant heat source
5.1.15	DIN 68861-1:2011	-	Test method for determination of behavior at Chemical influence

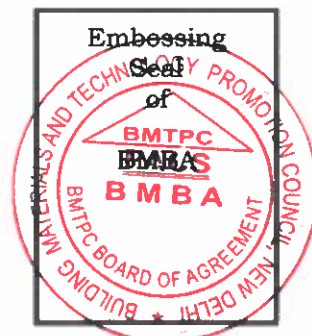
-
- | | | | |
|--------|-------------------------------------|---|--|
| 5.1.16 | DIN 68861-6:2011 | - | Test method for determination of behavior at glowing cigarette |
| 5.1.17 | ASTM D 1037:2006 | - | Standard test method for evaluating properties of wood based fiber and particle panel materials |
| 5.1.18 | ASTM D 4060-10:1995 | - | Standard test method for Abrasion resistance of organic coating by Taber Abraser tester |
| 5.1.19 | ASTM D 4442:2007 | - | Standard test method for direct moisture content measurement of wood & wood base materials |
| 5.1.20 | ISO 15184:2012 | - | Determination of film hardness by pencil test |
| 5.1.21 | EN 12722:1997 | - | Furniture—assessment of surface resistance by dry heat |
| 5.2 | Company Standards of the PAC Holder | - | The branded design & specifications of the raw materials and finished product are as submitted by the manufacturer. The PAC holder has to make available the company standards to the consumers according to which testing have been done. |

CERTIFICATION

In the opinion of Building Materials & Technology Promotion Council's Board of Agreement (BMBA), **Bamboowood Flooring** bearing the mark manufactured by M/s Inovar Floors India Private Limited, Mumbai is satisfactory if used as set out above in the text of the Certificate. This **Certificate PAC No.: 1049-P/2020** is awarded to **M/s Inovar Floors India Private Limited, Mumbai.**

The period of validity of this Certificate is for a period of one year i.e. from 13/01/2020 to 12/01/2021 as shown on Page 1 of the PAC.

This Certificate consists of a cover page and pages 1 to 41.



On behalf of BMTPC Board of Agreement, Chairman, Technical Assessment Committee (TAC) of BMBA & Member Secretary, BMTPC Board of Agreement (BMBA) under Ministry of Housing and Urban Affairs, Government of India

Place: New Delhi, India

Date: 13.1.2020

Dr. Shailesh Kr. Agrawal
Chairman, TAC

& Member Secretary, BMBA

Building Materials and Technology Promotion Council
Ministry of Housing and Urban Affairs, Govt. of India
Core 5A, 1st Floor, India Habitat Centre
Lodhi Road, New Delhi-110003

Dr. Shailesh Kr. Agrawal

PART 6 ABBREVIATIONS

BMBA	Board of Agreement of BMTPC
BMTPC	Building Materials and Technology Promotion Council
CPWD	Central Public Works Department
ED	Executive Director of BMTPC
IO	Inspecting Officer
MS	Member Secretary of BBA
PAC	Performance Appraisal Certificate
PACH	PAC Holder
PACS	Performance Appraisal Certification Scheme
SQA	Scheme of Quality Assurance
TAC	Technical Assessment Committee (of BMBA)

PERFORMANCE APPRAISAL CERTIFICATION SCHEME - A BRIEF

Building Materials & Technology Promotion Council (BMTPC) was set up by the Government of India as a body under the Ministry of Housing & Urban Poverty Alleviation to serve as an apex body to provide inter-disciplinary platform to promote development and use of innovative building materials and technologies laying special emphasis on sustainable growth, environmental friendliness and protection, use of industrial, agricultural, mining and mineral wastes, cost saving, energy saving etc. without diminishing needs of safety, durability and comfort to the occupants of buildings using newly developed materials and technologies.

During the years government, public and private sector organizations independently or under the aegis of BMTPC have developed several new materials and technologies. With liberalization of the economy several such materials and technologies are being imported.

However, benefits of such developments have not been realized in full measure as understandably the ultimate users are reluctant to put them to full use for want of information and data to enable them to make informed choice.

In order to help the user in this regard and derive the envisaged social and economic benefits the Ministry of Housing & Urban Poverty Alleviation has instituted a scheme called Performance Appraisal Certification Scheme (PACS) under which a Performance Appraisal Certificate (PAC) is issued covering new materials and technologies. PAC provides after due investigation, tests and assessments, amongst other things information to the user to make informed choice.

To make the PACS transparent and authentic it is administered through a Technical Assessment Committee (TAC) and the BMTPC Board of Agreement (BMBA) in which scientific, technological, academic, professional organizations and industry interests are represented.

The Government of India has vested the authority for the operation of the Scheme with BMTPC through Gazette Notification No. 1-16011/5/99 H-II in the Gazette of India No. 49 dated 4th December, 1999.

Builders and construction agencies in the Government, public and private sectors can help serve the economic, development and environmental causes for which the people and Government stand committed by giving preference to materials and technologies which have earned Performance Appraisal Certificates.

Further information on PACS can be obtained from the website: www.bmtpc.org

ANNEX I
(Clause 1.6.3)

BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL

Quality Assurance Plan for Bamboowood Flooring

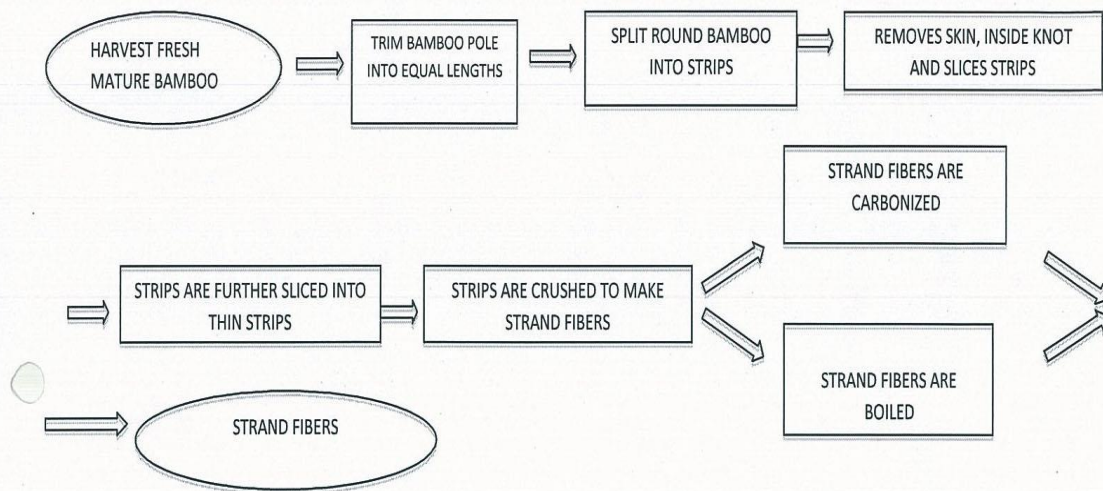
S. No.	Parameters to be inspected	Requirement Specified	Test Method	Frequency of Testing
I. Bamboowood Routine Test				
1.	Raw Bamboo Inspection	Freshly harvested	Physical & measured	Daily/load basis
2.	Raw Material General	As per material quality report	Physical & measured	Daily/load basis
II. Phenol Formaldehyde Resin Routine Test				
1.	Specific gravity	1.14-1.15	Sp. Gr. meter	Every charge basis
2.	Flow time	20-30 sec	B-4 Cup	Every charge basis
3.	Ph	10 -11.5	Ph digital meter	Every charge basis
4.	Solid content	42 - 50%	Oven dry method	Every charge basis
III. Flooring: Routine Test				
1.	Density	$\geq 1100 \text{ Kg/m}^3$	IS 1708 (Part 2): 1986	Weekly
2.	Modulus of Rupture (MOR)	$\geq 150 \text{ N/mm}^2$	IS 1708 (Part 5): 1986	Weekly
3.	Modulus of Elasticity (MOE)	$\geq 17500 \text{ N/mm}^2$	IS 1708 (Part 5): 1986	Weekly
4.	Hardness Test	$\geq 800 \text{ Kg}$	IS 1708 (Part 10): 1986/ASTM D 1037	Weekly
5.	Moisture Content (oven dry method)	$\leq 12\%$	IS 1708 (Part 1): 1986/ASTM D 4442	Weekly
Type Test				
1.	Thermal Conductivity	$\leq 0.50 \text{ W/m-K}$	IS 3346:1980	Half yearly/ yearly/ need basis
2.	Volatile organic compound (oven dry method)	$\leq 6.00 \text{ mg/100g}$	IS13745:1993	Half yearly/ yearly/ need basis
3.	Termite test	No termite attack	Lab test--6 months in termite mound	Yearly/ need basis
4.	Borer test	No borer attack	Lab test -- 3 months in borer box	Yearly/ need basis
5.	Flame penetration	$\geq 30 \text{ min}$	IS 1734 (Part 3) : 1983	Yearly/ need basis

6.	Water absorption	$\leq 4\%$ (2 hrs), $\leq 8\%$ (24 hrs)	IS 2380:1981	Weekly
7.	Swelling due to general absorption	$\leq 8\%$	IS 2380:1981	Weekly
8.	Swelling due to surface absorption	$\leq 4\%$ (2 hrs), $\leq 8\%$ (24 hrs)	IS 2380:1981	Weekly
9.	Screw withdrawal resistance (Flat face)	≥ 250 Kg	IS 2380:1981	Weekly
10.	Screw withdrawal resistance (Edge)	≥ 200 Kg	IS 2380:1981	Weekly
11.	Flammability	≥ 5 min	IS 1734 (Part 3) : 1983	Yearly/ need basis
12.	Rate of burning	≥ 10 min	IS 1734 (Part 3) : 1983	Yearly/ need basis
IV. Flooring Finish: Routine Test				
1.	Gloss value	$30 \pm 5\%$	DIN EN ISO 2813	Daily/load basis
2.	Scratch resistance	No scratch	Coin test	Daily/load basis
3.	Heat resistance (Cigarette test)	6A	DIN 68861 Part 6	Daily/load basis
Type Test				
1.	Cross cut test	\leq GT 2	DIN EN ISO 2409	Half yearly/ yearly/ need basis
2.	Scratch resistance (Coin test)	≥ 20 N	Hamburger planner	Half yearly/ yearly/ need basis
3.	Abrasion resistance	IP > 100 cycle	DIN EN 438-2 (500 g load per wheel S 33)	Half yearly/ yearly/ need basis
4.	Abrasion resistance	IP > 6000 cycle	ASTM D 4060 (500 g load per wheel CS 17)	Half yearly/ yearly/ need basis
5.	Scratch resistance (pencil hardness)	≥ 1 H	ISO 15184	Half yearly/ yearly/ need basis
6.	Scratch resistance (surface)	No scratch	Steel wool test, Type 2	Half yearly/ yearly/ need basis
7.	Impact resistance	≥ 2 N	DIN EN 438 Part 2-12	Half yearly/ yearly/ need basis
8.	Resistance to indentation	≥ 1 N	DIN EN 438 Part 2-14	Half yearly/ yearly/ need basis
9.	Chemical resistance	5	DIN 68861 Part 1	Half yearly/ yearly/ need basis
10.	Inflammability	B1	DIN 4102 Part 14	Half yearly/ yearly/ need basis

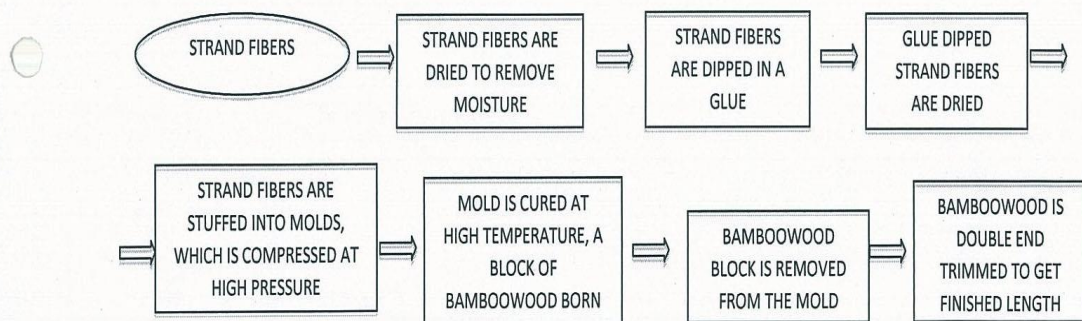
ANNEX II (Clause 1.6.3)

PROCESS FLOW CHART

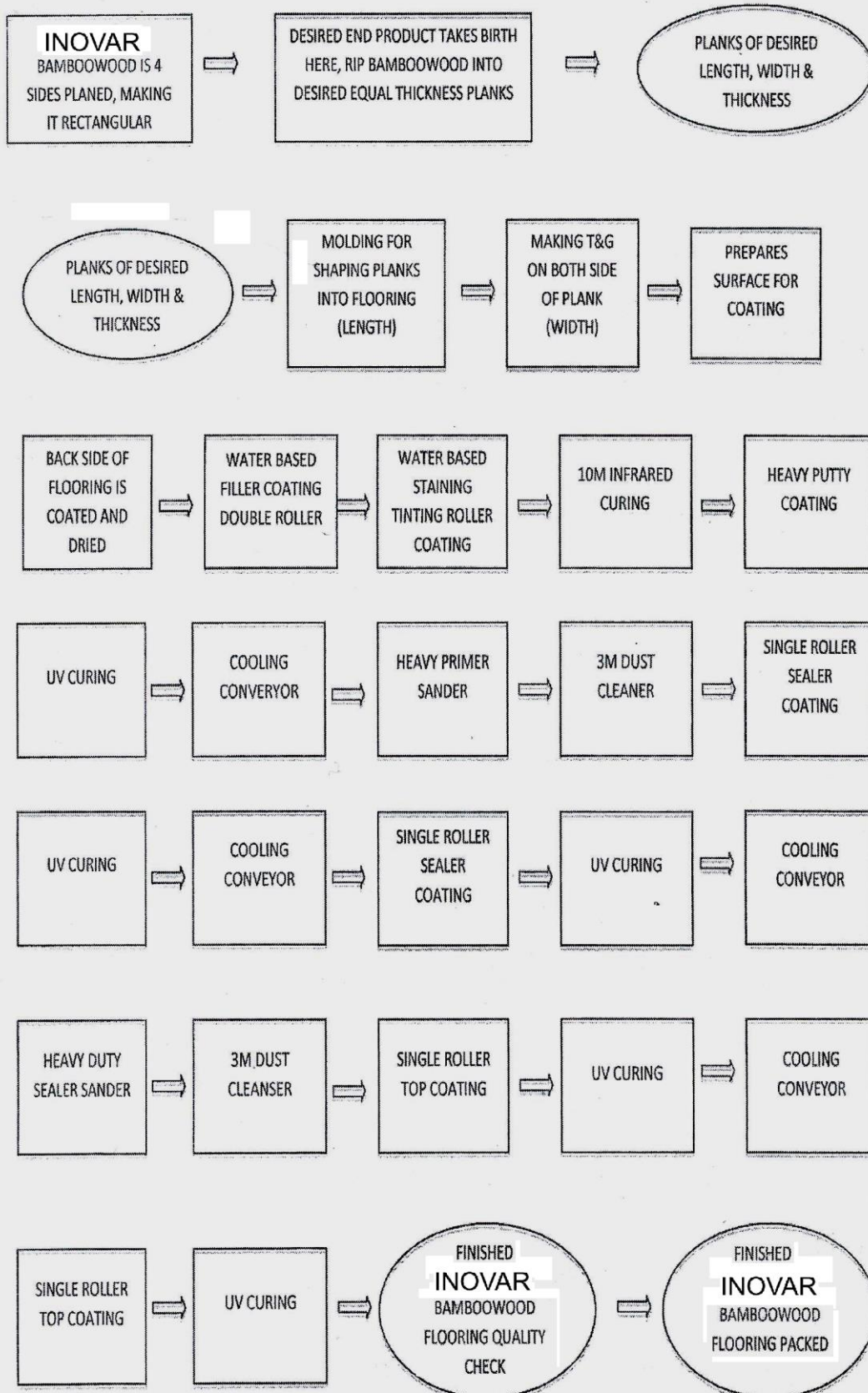
Primary Processing Process Flow Chart -



Secondary Processing Process Flow Chart -



Finishing Processing Process Flow Chart -



ANNEX III (Clause 2.3)

INSTALLATION PROCEDURE

INOVAR FLOOR
Longer Life. Lasting Impressions.



BAMBOO INSTALLATION GUIDE

Read completely before starting installation

All installed boards will be considered as accepted by the installer and/or homeowner. Any defects should be reported to the retailer immediately for inspection and/or replacement. We cannot accept responsibility for flooring installed with visible defects.

General precautions

INOVAR flooring products are inspected for quality before packaging and shipping. Nevertheless, a final jobsite inspection of your flooring should be performed for grade, colour, finish and quality.

Ensure adequate lighting for proper inspection. Room temperature and humidity of the installation area should be consistent with normal, year-round living conditions for at least a week before installation.

Room temperature of 18°-30°C and a humidity range of 40-70% is recommended. It is most important that you install the flooring immediately after you open the cartons, without waiting for several hours or days. Do not store directly on concrete or near outside walls.

General installation notes

ALL BAMBOO FLOORS REACT TO HUMIDITY AND MOISTURE. It is the responsibility of the installer and the owner to install an effective moisture barrier and to maintain correct moisture and humidity percentages.

- The humidity of a room can vary due to many factors – the change of seasons for example. The floor must be able to expand and contract in all directions.
- This bamboo flooring is of natural origin and may have slight variations in shade and grain. It should be installed from several cartons at the same time to ensure good colour and shade mixture.
- When possible, pre-select and set aside boards that blend best with all floor beadings, skirting boards or mounted mouldings used to assure a uniform final appearance. Install these boards adjoining the mouldings.
- Be attentive to staggering the ends of boards in adjacent rows. They should be staggered at mid point when the boards are of equal length.
- Any installation requiring the flooring to exceed 3 meters in width or 12 meters in length will require an expansion or T- moulding. All doorways and adjoining rooms should have expansion joints.
- Always allow a minimum 14mm expansion around all vertical obstructions.
- It is recommended that drywall (gyprock) be undercut to allow further expansion if required.

Subfloor heating

INOVAR BAMBOO IS NOT SUITABLE FOR FLOORS WITH UNDERFLOOR HEATING.

Subfloor preparation

CONCRETE

1) Ensure that your subfloor is dry, clean, flat, smooth and level. Height differences of more than 3mm +/- over 3 meter must be levelled.

Correct any changes in height difference and ensure that the levelling compound has cured prior to starting your installation.

2) Lay INOVARLAY Underlay, taping the edges together using wide adhesive tape.

WOOD AND OTHER SURFACES

1) Ensure that your subfloor is dry, clean, flat, smooth and level. Height differences of more than 3mm +/- over 3 meter must be levelled.

INOVAR FLOOR

Longer Life. Lasting Impressions.



Correct any changes in height difference and ensure that the levelling compound has cured prior to starting your installation.

2) Lay INOVARLAY Underlay (or another approved underlay) taping the edges together using wide adhesive tape, but do not overlap the edges.

Preparing to install

- 1) Clean and sweep.
- 2) Let the opened packages of flooring lie flat on the floor in the room in which the floor is to be installed.
- 3) Check door and door frame clearances to ensure that doors will move freely without contacting the bamboo surface.
- 4) Although an INOVAR Bamboo floor can be installed in any direction, as a rule, bamboo floors are usually installed perpendicular to a window. Installing the floor parallel to the longest wall tends to make a room appear larger. You will get better results by laying two or three rows of INOVAR Bamboo in advance to get an eye pleasing distribution of the plank.

Installation

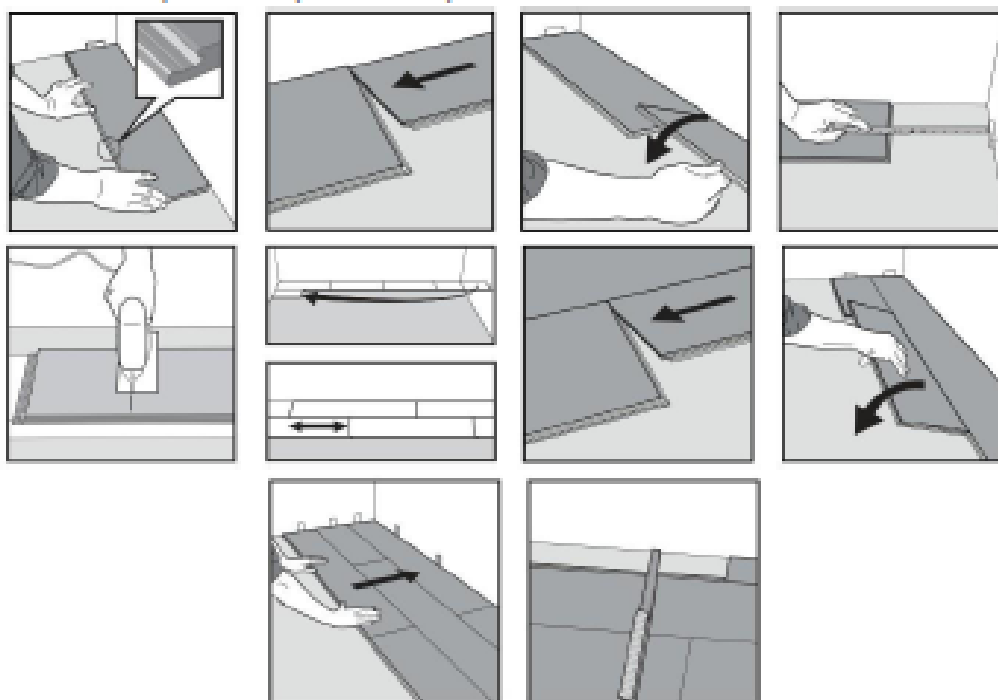
- 1) Measure the room carefully to determine if it is square, and to calculate the width of the last row. For planks less than 50mm in width, re-cutting the first row will be necessary to ensure stability (do not include the tongue of a plank in your measurements, as all exposed tongues must be removed from the perimeter of the floor – i.e. the first row of planks). Should you have an irregular wall for the first row, the plank must be cut to follow the wall's irregularities.
- 2) When preparing to saw a plank (use safety glasses), always ensure that the decorative surface of the plank is facing down.
- 3) Starting in one corner of the room, the flooring should be installed from left to right, with the tongue sides facing the walls. Place spacers between the plank and the wall (spacers provide the necessary space required for expansion around the perimeter of the floor). It is especially important to leave at least 14mm free around the entire floor. To ensure stability, the planks at the end of each row must not be shorter than 300mm. If your last plank is shorter than 300mm, it is advised to re-cut the first plank in the row. The remainder of the plank from your first row can be used as the first plank of the next row. Stagger the planks by cutting the first plank of every other row in half. The pattern will then be repeated until the opposite wall is reached.
- 4) When laying the planks for the first row, place the first plank flat and against the spacers. The next plank being laid can be laid by locating the short side lock of the second and first boards and laying flat or folding downward. This can be continued on all subsequent boards in this row.
- 5) INOVAR Bamboo has a "drop lock profile" which is great for DIY. Every board is easily installed by simply locating the long side locks on the current and previous corresponding row and "drop" down so the short side locks join. Therefore, for the second and consecutive rows, simply locate the long side at a slight angle to the previous row to allow the lock to slip into the groove, locating directly above the short side lock and fold down until flat.
- 6) When you reach the final row, place a loose panel precisely on the last laid panel. Place another panel on top, but with its edge 14mm from the wall. Trace a cutting line along the middle panel and saw it along that line.
- 7) Lay the panel you cut and ease it into position. Insert spacers between the wall and the last panel laid to be sure there is a 14mm expansion gap.
- 8) When going from one room to the other, make sure to separate the rooms with a transition moulding. The floor is ready for use as soon as it is laid.

INOVAR FLOOR

Longer Life. Lasting Impressions.



VISUAL GUIDE (Note not all points covered)



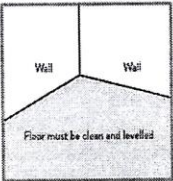
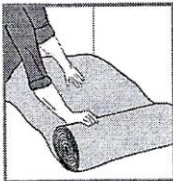
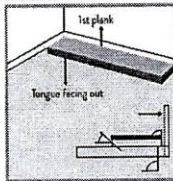
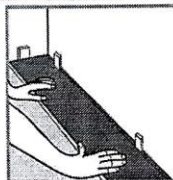
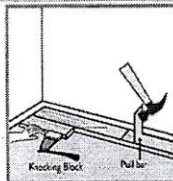

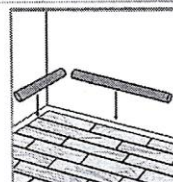
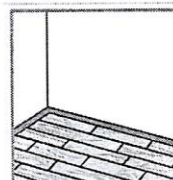
Finishing

- 1) Remove the spacers.
- 2) Cover the expansion joints around the perimeter of the floor with baseboard mouldings and/or quarter rounds. If a vapour barrier was used, do not forget to fold the polyethylene film along the edge of the walls under the baseboards and/or quarter rounds. Fit these products to the walls without attaching them to the floor.
- 3) Install the T-mouldings to hide the expansion gaps where needed (doorways, more than 5 meters, etc.).
- 4) Any remaining boards can be kept for several years, stored flat in a moisture-free area. Furniture can be put back in position right away.

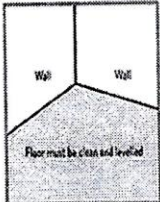
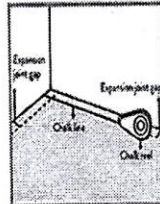
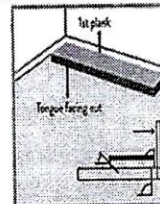
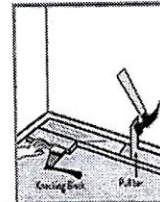
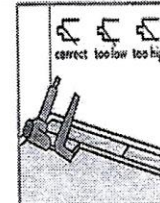
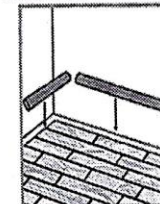
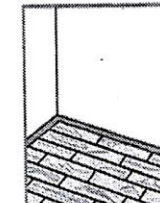
Maintenance

- Sweep or vacuum as often as necessary to remove any loose dirt or grit.
- Use protective mats at all exterior entrances. Do not use rubber-based mats as the rubber may leach into the bamboo.
- Use felt protectors under heavy pieces of furniture.
- Never slide or roll furniture or appliances across your floor. Protect the surface if using a trolley to move heavy objects.
- Spiked heels or shoes in need of repair can severely damage your floor. In areas of excessive traffic and wear, make use of runners or area rugs.
- Damp mop only – avoid excessive amounts of water. Steam mops must not be used. If a spill occurs, soak up the bulk liquid promptly.
- Never use oil, soap, wax or other household products to clean your floor.
- Keep animal nails trimmed.
- Maintain relative humidity levels between 40% and 70%.

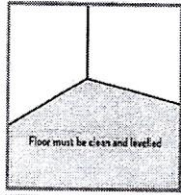
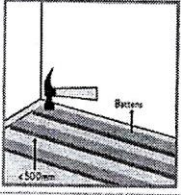
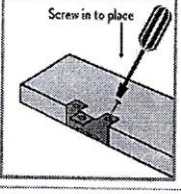
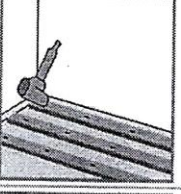
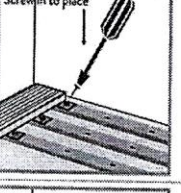
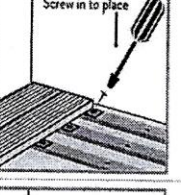
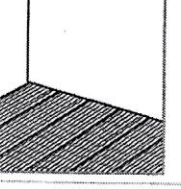
FLOATING FLOOR INSTALLATION :-

	<p>▶ CLEAN FLOOR</p>
	<p>▶ USE UNDERLAY OR HIGH DENSITY FOAM ▶ UNROLL THE SHEET ON THE LONGEST WALL ▶ DO NOT OVERLAP THE SHEET</p>
	<p>▶ PLACE GUIDE FLOOR PIECE FIRST ▶ LEAVE EXPANSION GAP ▶ LAY GUIDE BY NAIL DOWN METHOD</p>
	<p>▶ SPREAD FLOOR TILES TO NORMALIZE AND COLOUR SORTING ▶ MAKE SURE RECTANGULAR ALIGNMENT</p>
	<p>▶ ALIGN NEXT FLOOR TILES ▶ LOCK TWO TILES AS SHOWN ▶ CONTINUE SAME FOR NEXT FLOOR TILE</p>
	<p>▶ PUSH TILES TO LOCK EACH OTHER WELL BY USING CONTROLLED FORCE ▶ CONTINUE LAY AND ALIGN FLOOR TILES AND REPEAT LOCKING PROCESS</p>
	<p>▶ REMOVE GUIDE AND PLACE TILE IN LAST ▶ PLACE SKIRTING/ MOULDING/ QUARTER ROUND</p>
	<p>▶ ALLOW NEW FLOOR TO ACCLIMATIZE FOR 24HRS ▶ INOVAR BAMBOOWOOD FLOORING IS READY TO USE</p>

NAIL DOWN FLOOR INSTALLATION :-

	<ul style="list-style-type: none"> ▶ CLEAN FLOOR ▶ LAY DOWN ANTI FRICTION POLY SHEET
	<ul style="list-style-type: none"> ▶ MARK GUIDE LINE EXPANSION JOINTS 6MM FROM END & 15MM SIDWAYS
	<ul style="list-style-type: none"> ▶ SPREAD FLOOR TILES TO NORMALIZE AND COLOUR SORTING ▶ LAY GUIDE TILE BY NAIL DOWN
	<ul style="list-style-type: none"> ▶ ARRANGE AND LAY TILES IN REGULAR OR CHOICE OF DESIGN ▶ PUSH TILES INTO EACH OTHER
	<ul style="list-style-type: none"> ▶ USE FLOOR NAILER TO NAIL DOWN TILES
	<ul style="list-style-type: none"> ▶ REMOVE EXPANSION GUIDE STRIPS ▶ PLACE SKIRTING/ MOULDING/ QUARTER ROUND
	<ul style="list-style-type: none"> ▶ ALLOW NEW FLOOR TO ACCLIMATIZE FOR 24HRS ▶ INOVAR BAMBOOWOOD FLOORING IS READY TO USE

DECKING INSTALLATION :-

 <p>Floor must be clean and levelled</p>	<ul style="list-style-type: none"> ▶ CLEAN FLOOR
 <p>Battens 500mm</p>	<ul style="list-style-type: none"> ▶ PLACE BATTENS WITH A GAP OF NOT MORE THAN 500MM ▶ NAIL DOWN BATTEN INTO SUBFLOOR
 <p>Screw in to place</p>	<ul style="list-style-type: none"> ▶ INSTALL CLIP ON THE BACK OF DECK TILE BY 2.5MM DIA AND 10MM LONG SCREW
	<ul style="list-style-type: none"> ▶ INSTALLATION OF FIRST DECK TILE ▶ DRILL HOLE TO FIX 4MM SCREW DOWN
 <p>Screw in to place</p>	<ul style="list-style-type: none"> ▶ USE CLIP TO FIX TILE WITH BATTEN DOWN ▶ USE 2.5MM SCREW ▶ REPEAT THE SAME TO FIX NEXT DECK
 <p>Screw in to place</p>	<ul style="list-style-type: none"> ▶ INSTALL NEXT DECK LIKE SHOWN HERE
	<ul style="list-style-type: none"> ▶ ALLOW NEW FLOOR TO ACCLIMATIZE FOR 24HRS ▶ INOVAR BAMBOOWOOD DECKING IS READY TO USE