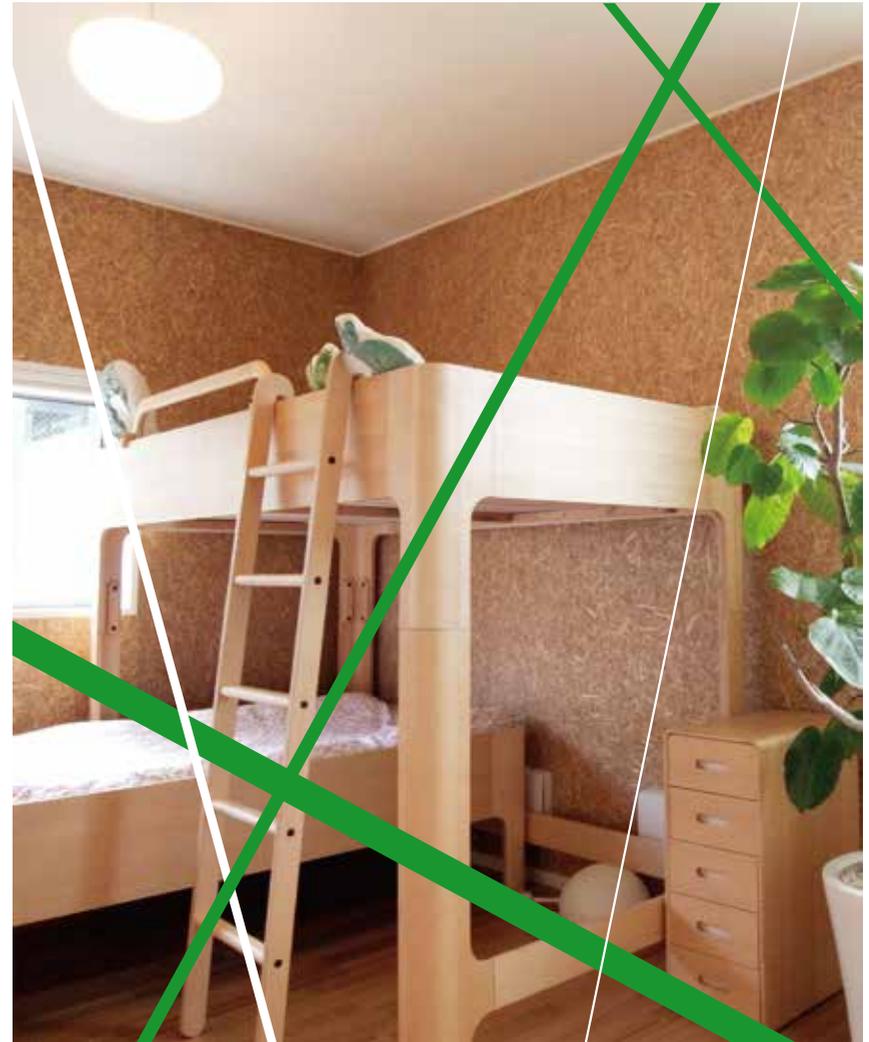


NOVOFIBRE



SPECIAL NOTE

Novofibre panels are a new kind of artificial panel. There is also a large variety of coating products available on the market. Therefore, customers should carry out testing (e.g. the application of surface coatings such as filler, paint and adhesives) on sample panels. Once they are satisfied that the selected materials and processes are appropriate for their project, they can carry out large scale installation work. The regular thickness of Novofibre panels are 11.1mm, 15mm and 18mm. The description in this manual is for the mentioned three thickness of panels.

NOVOFIBRE PANELS

Novofibre panels are innovative artificial panels made of 100% high-quality natural straw with formaldehyde-free adhesive. They are produced in a continuous hot-pressing process. They are healthy, environment-friendly, low-carbon products that can be used for construction, indoor decoration, interior finish, furniture, floor, and packaging applications.

- Construction applications include floors, roofing, walls and stiffening.
- Indoor decorative applications include decorative panels for interior walls, roofs and ground decorations.
- Interior finish applications include base panels used for interior walls, roof and ground finishing.
- Furniture applications include base and decorative panels used to make furniture and cabinet doors.
- Floor applications include base panels and decorative panels used to make new and composite floors.
- Packaging applications include large crates, trays, decorative packages, etc.

PRODUCT CLASSIFICATION

OSSB-1: Used for non-load-bearing interior decoration applications as well as furniture in dry conditions.

OSSB-3: Used for construction, packaging, furniture and interior decoration applications with load-bearing requirements in dry conditions.

OSSB-DECO: Used for non-load-bearing interior decoration applications, furniture and flooring in dry conditions.

- The Novofibre floor series is used for flooring applications.
- The Novofibre acoustic series is used for wall decoration and acoustic applications.
- The Novofibre decorative series is used for interior decoration and furniture applications.
- The Novofibre design series is used for interior decoration and furniture applications.

Drying conditions include indoor or outdoor environments using precautionary measures. Often, this refers to an environment condition where the temperature is 20 C and the relative humidity does not exceed 65% for more than several weeks a year.

In the case of buildings in regions with high levels of humidity due to climatic conditions, it may be useful to provide added protection against mold. We will be happy to send you our special information sheet on request. It is important to ensure that wall structures comply with the latest state of the art concerning building physics.

Be sure to read the Instruction Manual carefully before using or installing Novofibre products. Failure to follow the Instruction Manual correctly will void the warranty in the event of a quality defect.

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8. Novofibre Acoustic installation

9. Novofibre Home installation

10. Novofibre Floor installation

1. CONSTRUCTION APPLICATION

Use OSSB-3 structural panels for load-bearing purposes in dry conditions.

1.1 Saw cutting

- Electric or manual carpenter saws, table saws or compass saws may be used.
- Stress will be released inside the panel during panel cutting, thus leading to panel deformation, which can be addressed by the following means:
Place it level for a period of time; panel deformation will decline and disappear automatically. Cut panels by two sides to achieve both stress balance and reduce deformation inside panels.

1.2 Laying

Structural base requirements

Light gage steel (wood) joists should adhere to construction codes and joist pitches should not exceed 610mm.

Panel laying on light gage steel (wood) joists

Select screw and nail fixing pitches that adhere to the relevant construction codes.

Panels must be staggered during the installation process. The edge joints of adjacent panels must be placed on joists.

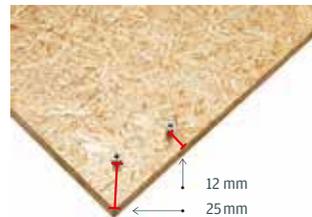
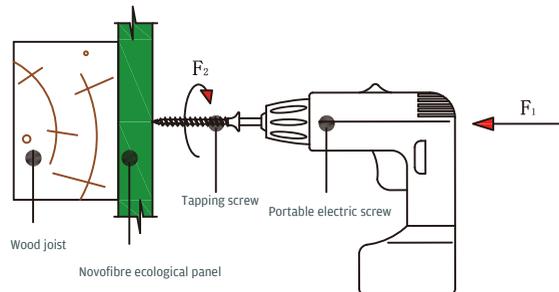
The expansion joint between the panels must be at least 5mm wide.

At least 10mm spacing must be reserved for panels that are attached to the finished floor.

Follow-up work should be done as soon as possible after the face panel installation is completed. This will reduce face-panel exposure time.

1.3 Nail fixing

- Select proper screws. They must meet relevant building construction codes. Nail fixing positions on the panel side should be no less than 12mm. They should not be less than 25mm from corners.
- Never over-drill when using tapping screws. The nail head may go 0.5mm deep into the panel at the most.
- vertical to the panel surface. Press it with force the whole time to drive selftapping screws into the panel. Make sure the nail head goes 0.5mm deep into the panel.



2. INDOOR DECORATIVE APPLICATIONS

OSSB-DECO panels are used for non-load-bearing interior decorative purposes in dry conditions.

2.1 Saw cutting (See 1.1 for details)

2.2 Coating

The front, back and edges of OSSB-DECO panels are treated with a waterproofing coating.

Never use water-based paints for coating!



- Use abrasive paper or cloth to remove panel surface stains or grease spots. Clean straw surface to achieve best adhesion.
- Select an open or closed coating process according to the customers' requirements.
- When using a closed coating process, first apply paint filler to the prepared sanded panel surface. Secure the easily-removable straw. Fill and level. Then apply the primer and finish coatings separately. The desired coating results will determine the specific coating process.
- When using an open coating process, first secure the easily-removable straw. Then apply the primer and finish coatings separately. The desired coating results will determine the specific coating process.



2.3 Laying

To achieve the best decorative effect and robustness, a hanging installation is recommended.

Substrate requirements

- The base panels should not be less than 15mm thick.
- Properly installed base panels will be level and meet construction requirements.

Apply hangers for installation

- dry hangers



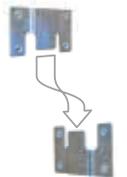
- Installation hangers for wall /substructure (A)



- Installation hangers for panel back (B)



- Fasten hanger A and B during panel installation



Precautions

Made of natural straw, the surface texture of OSSB-DECO panels has natural differences in color. Make sure you can distinguish panel front and back and match them correctly during use.

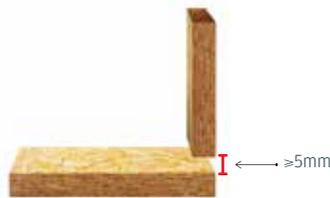
Consider panel expansion, contraction and installation firmness. An entire OSSB-DECO panel should not be installed. And an expansion joint that is at least 5mm-wide must be reserved for every 1m long or wide adjacent panel. Decorative strips may be installed to cover expansion joints according to design requirements.



Internal and external corner treatment

At least 5mm expansion joints should be reserved between adjacent panels at the inside joint. See the drawing for details.

For use with hanging installation: a corner bracket and a prefabricated external angle brace are recommended for the outside joint.

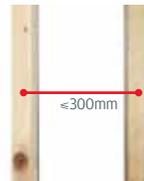


3. INTERIOR FINISH APPLICATION

OSSB-1 panels are used for indoor non-load-bearing purposes in dry conditions.
OSSB-3 panels are used for indoor load-bearing purposes in dry conditions.

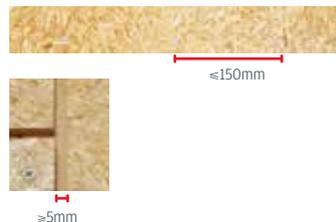
3.1 Substrate requirements

- The wall surface must be completely dry and level. Construction requirements must be met.
- When installing wood (steel) joists, the distance between joist centers should not be more than 300mm. The surface evenness should meet construction requirements.



3.2 Installation on wood (steel) joists

- When using wood joists, apply white emulsion evenly to the contact surface between the wood joist and the base panel before installing the base panel.
- Panels should be staggered during installation. The edge joints of the adjacent panels should be placed on joists. And at least a 5mm expansion joint must be allowed between the panels.



- At least 10mm spacing should be reserved for panels attached to the finished floor.
- Follow-up work should be done as soon as possible after the base panel installation is completed. This will reduce base panel exposure time.



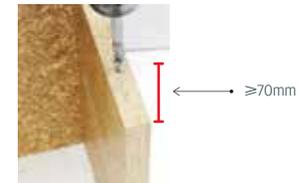
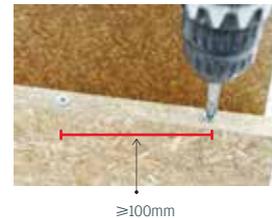
3.3 Nail fixing

- Panel surface nail fixing (See 1.3 for details)
- Panel edge nail fixing

Round steel nails are not recommended. When selftapping screws are used, the holes must be predrilled (drilled hole diameter is around 0.7 times the screw diameter). This will prevent the panel edge from splitting.



To ensure that the panel edge does not split, the spacing between nails should not be less than 100mm. And the distance from a nail to the panel edge should not be less than 70mm.



Paste veneers

Use abrasive paper or cloth to remove panel surface stains or grease spots. And clean the straw surface to achieve the best adhesion. Apply white emulsion evenly to the prepared sanded panel surface and paste the veneers. Flatten the surface by placing a heavy object on the panel until the white emulsion is completely dry.



4. FURNITURE APPLICATIONS

OSSB-1 panels are used in non-load-bearing indoor furniture.
 OSSB-3 panels are used in indoor furniture for load-bearing applications.
 OSSB-DECO panels are used in indoor furniture for non-load-bearing decoration applications.

4.1 Overlaying

- **Overlay veneers**
 It is recommended that veneers for overlay be no less than 0.6mm thick.
 Use abrasive paper or cloth to remove panel surface stains or grease spots and clean straw surface to get best adhesion.

4.2 Coating (See 2.2 for details)

4.3 Saw cutting (See 1.1 for details)

4.4 Edge sealin

- Select PVC, ABS, wood veneer and metal strip for edge sealing according to the design requirements.



5. STORAGE

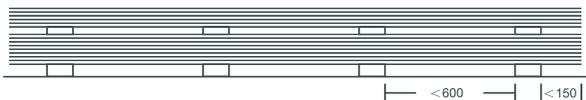
5.1 Storage environment

- Keep the ground level. The environment should be well-ventilated and dry. The relative humidity should not exceed 65%. Keep materials away from rain and direct sunlight.

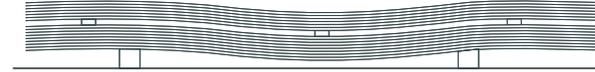
5.2 Stacking method

- Pads for stacking should be level and even in thickness. The axial distance should not exceed 600mm. Spacing between the pad and the panel sheet and between the pad and the stacking edge - should not exceed 150mm.

Correct stacking method:



Wrong stacking method:



5.3 Precautions

- A dust-proof cover should be placed over the top sheet.
- Under humid conditions even pressure should be applied over the entire top sheet to prevent deformation such as damp warping. When panel thickness is less than 10mm, a 18mm-thick plate must be placed below the pads for stacking as a base plate.

6. TRANSPORTATION

6.1 Handling method

- Use a professional lifting device for panel handling. Handling operators should wear protective gloves and proper safety shoes and handle materials face to face.

6.2 Transportation protection

- Waterproof fabric must be provided to cover panels during transportation and protective measures should be taken to protect panel edges from being damaged.

7. CURING

7.1 Curing environment

- The panel curing environment should be in line with the panel service environment (indoor and under dry conditions).

7.2 Curing method and time

- Place panels in the intended service environment and cure them for an appropriate period of time (e.g. until they have adapted to the service environment).
- Curing time depends on panel thickness, environment temperature and relative humidity as well as air circulation conditions.

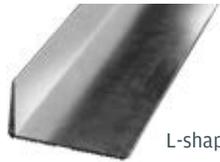
8. NOVOFIBRE ACOUSTIC INSTALLATION

8.1 Installation accessories

- Decorative strips:



U-shaped



L-shaped

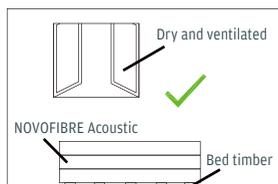
- Wood joists: Joist section is 40 x 60mm, generally dried Korean pine with water content of no more than 12%. Novofibre panels can also be used to make joists by saw cutting and laminating to the same specification.
- Screws: Screw length is 2~2.5 times wood joist thickness.
- Nails: F30.

8.2 Environment inspection

- Use a 2m guiding rule to test wall surface levelness and to keep the level variance within a maximum 3mm.
- Test the wall surface humidity. It should not exceed 12%.

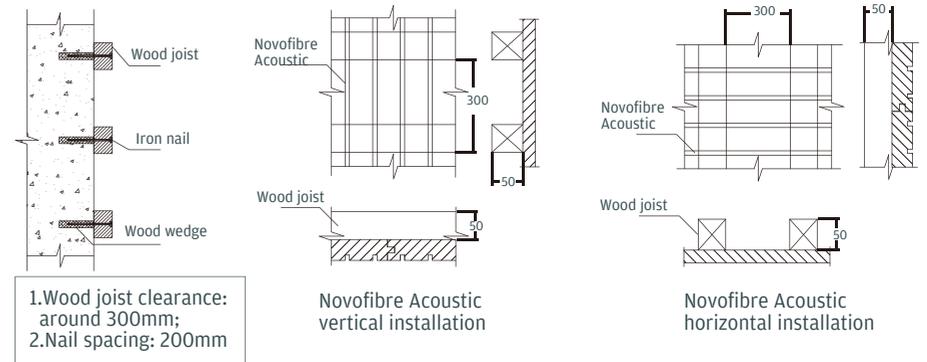
8.3 Materials delivered to the site

- The stacking height should not exceed 2~3-cases.
- Store and cure at a properly ventilated and dry installation site for five days.
- Start installation after panel cases have been opened and panels have been cured at the site for 48 hours.

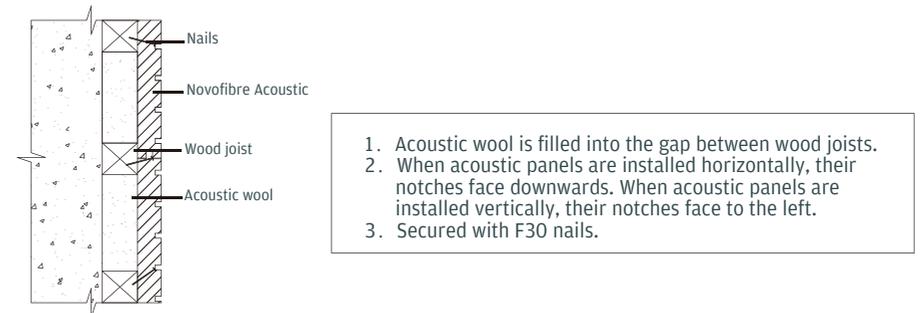


8.4 Installation

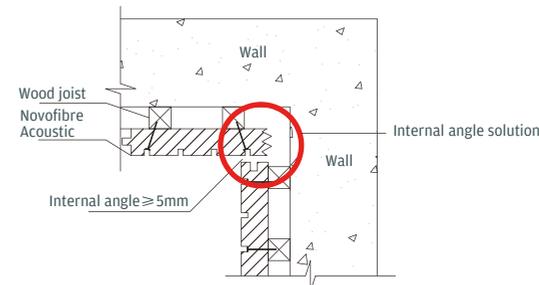
- Fix wood joists:



- Install acoustic wool and acoustic panels:



- Internal and external angle solution:



L-shaped or U-shaped external decorative parts can be used for decoration in external angle installations. External corner solutions of the same color and material as Novofibre panels may also be installed. These can be customized and pre-ordered from Novofibre.

Contact Novofibre immediately in the event of any quality defect. A product cannot be replaced once it has been installed or used!

9. NOVOFIBRE HOME INSTALLATION

9.1 Installation accessories

- Special installation accessories for Novofibre panels: H-shaped aluminum joists and U-shaped aluminum joists (only used in dry hanging).

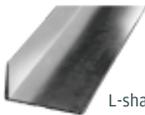


U-shaped



H-shaped

- Decorative strips:



L-shaped



U-shaped



T-shaped

- Wood joists: Joist section is 40 x 60mm, generally dried Korean pine with maximum 12% water content.
- Novofibre panels can also be used to make joists by saw cutting and laminating to the same specification.
- Screws: Screw length is 2~2.5 times wood joist thickness.
- Nails: F30.
- Tack tapping screw: M 4 x 16 (only used in dry hanging).
- Elastic structural adhesive: Glass cement, etc.

9.2 Environment inspection

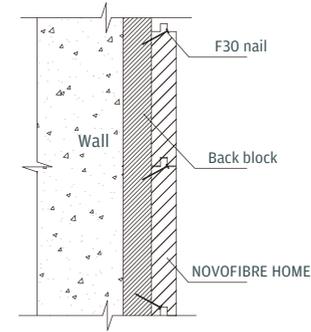
- Use a 2m guiding rule to measure wall surface levelness to keep the level variance within a maximum 3mm.
- Test the wall surface water content. It should not exceed 12%.

9.3 Materials delivered to the site

- The stacking height should not exceed 2~3 cases during.
- Place and cure at a properly ventilated and dry installation site for five days.
- Start installation after panel cases have been opened and panels have been cured at the site for 48 hours.

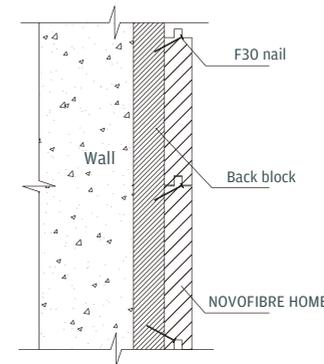
9.4 Installation

- Straight assembling type:



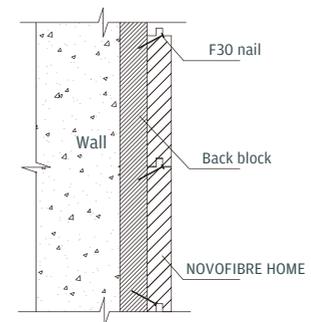
- Back blocks are installed according to the requirements of Novofibre Base Panel Use and Installation Code.
- A 1-2mm expansion joint should be reserved between wall-hanging panels.
- Apply U-shaped or L-shaped decorative strips for edge sealing after assembly.

- Dry-hanging type:
Fix wood joists:



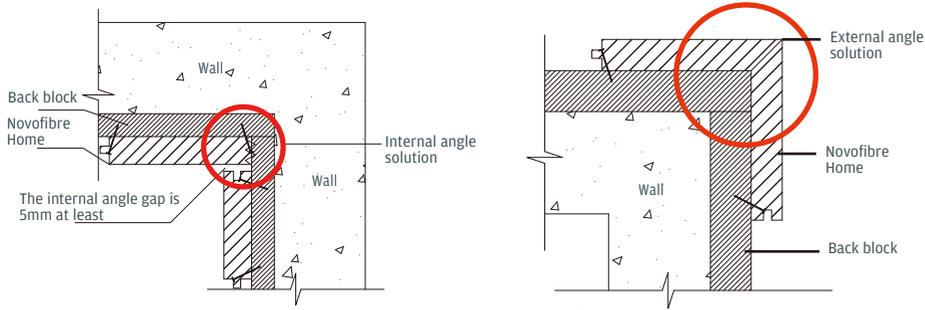
- Wood joist clearance:
500 x 500mm size: 500mm
800 x 1200mm size: 800mm
- Nail spacing: 200mm

- Dry-hanging type:
Install special aluminum joists and wall-hanging panels:



- The M4x16 screw pitch for special aluminum joist fixing is around 300mm.
- The U-shaped special aluminum joists are used for base and top panel edge sealing.

Internal and external angle solution:



L-shaped or U-shaped external angle decorative sections can be used for decoration in external corner installations. External corner solutions of the same color and material as Novofibre panels may also be installed. These can be customized and pre-ordered from Novofibre.

Contact Novofibre immediately in the event of any quality defects. A product cannot be replaced once it has been installed or used!

10. NOVOFIBRE FLOOR INSTALLATION AND OPERATING INSTRUCTIONS

10.1 What to do after flooring materials are delivered to the site

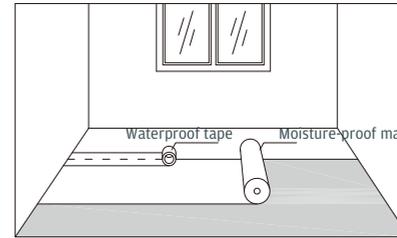
- Case stacking should not exceed a height of three-cases. Do not place cases near a radiator or other heat source.
- Do not install flooring materials until they have acclimatized to the installation site for at least 5 days.
- Store flooring materials in a dry, well ventilated area.

10.2 Installation environment inspection

- Ensure that the ground is level. The maximum cord height should not exceed 3mm every two meters.
- Inspect ground moisture. It should not exceed 12%.
- Inspect air temperature and relative humidity (the temperature must be 18-28 C and the relative humidity must be 45-65%).
- Fill in the Floor Installation Environment Inspection List. See Attachments for details. After this list has been signed by the flooring materials' owner and the builder, it must be returned to the seller. It is the basis for after-sales service and the quality warranty.

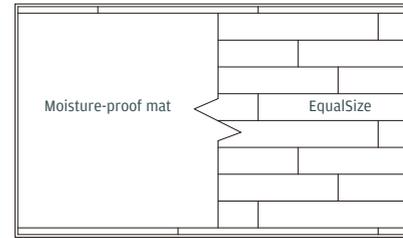
10.3 Installation

Lay moisture-proof mats:



1. The moisture-proof mat consists of a foam polyethylene surface and a plastic film on the back.
2. The moisture-proof mat is at least 2mm thick.
3. The adjacent moisture-proof mat should not be overlaid and the joint should be sealed with a waterproof tape.

Lay floors:



1. When the floor is laid the length of adjacent floor panels must be staggered by at least 150mm.
2. A 10-12mm expansion joint is required between the floor and the wall.
3. The transition area of floors between different rooms must be separated by a 10-12mm expansion joint.
4. When the floor installation length reaches 8m, a 10-12mm expansion joint is required.
5. When applying spring leaves to lock floors in the floor capping process use 2-3 leaves on the long side and 1 leaf on the short side.

- **When floors are installed above a floor heating system, please pay attention to the following four factors:**
 - First conduct a floor-heating test. During this test the supply water temperature should reach at least 50 C. And the heat must be maintained for more than 24 hours. Generally speaking, floors should not be installed if it is not possible. to carry out the required floor-heating test.
 - Drilling or hammering nails into the floor is prohibited. This can damage the heating duct.
 - A special mat is required for floor heating installations.
 - Adjust the temperature so it will rise or fall gradually. The hourly and 24-hour temperature fluctuation should not exceed 1 C and 5 C respectively. The floor surface temperature should not exceed 27 C.
- **Floor use and maintenance:**
 - Protective pads should be placed under furniture and the legs of heavy objects.
 - Thoroughly remove floating dust, sand and other corrosive impurities on the floor with a duster.
 - Do not use any abrasive cleaning products. Do not use oil products, soap, wax or corrosive materials.
 - Do not clean the floor with a detergent of any kind.
 - Ensure air permeability through the back of the mat. This will prevent water from accumulating under the mat.
 - Do not allow the floor to be covered in water or other liquids.
 - Only clean the floor with a moist mop.
 - Keep edged or sharp items away from the floor.
 - Do not walk on the floor with any type of shoe that could damage the floor surface (e.g. high-heeled shoes or shoes with nails under the sole).
 - Lay the ground mat securely on the floor. This will prevent the floor surface from being scratched when moving furniture.
 - Normal environment requirements for the floor: indoor temperature 18-28 C, relative humidity 45-65%.

Please log on to the Novofibre website to download and read detailed floor-installation instructions. Follow these instructions carefully!