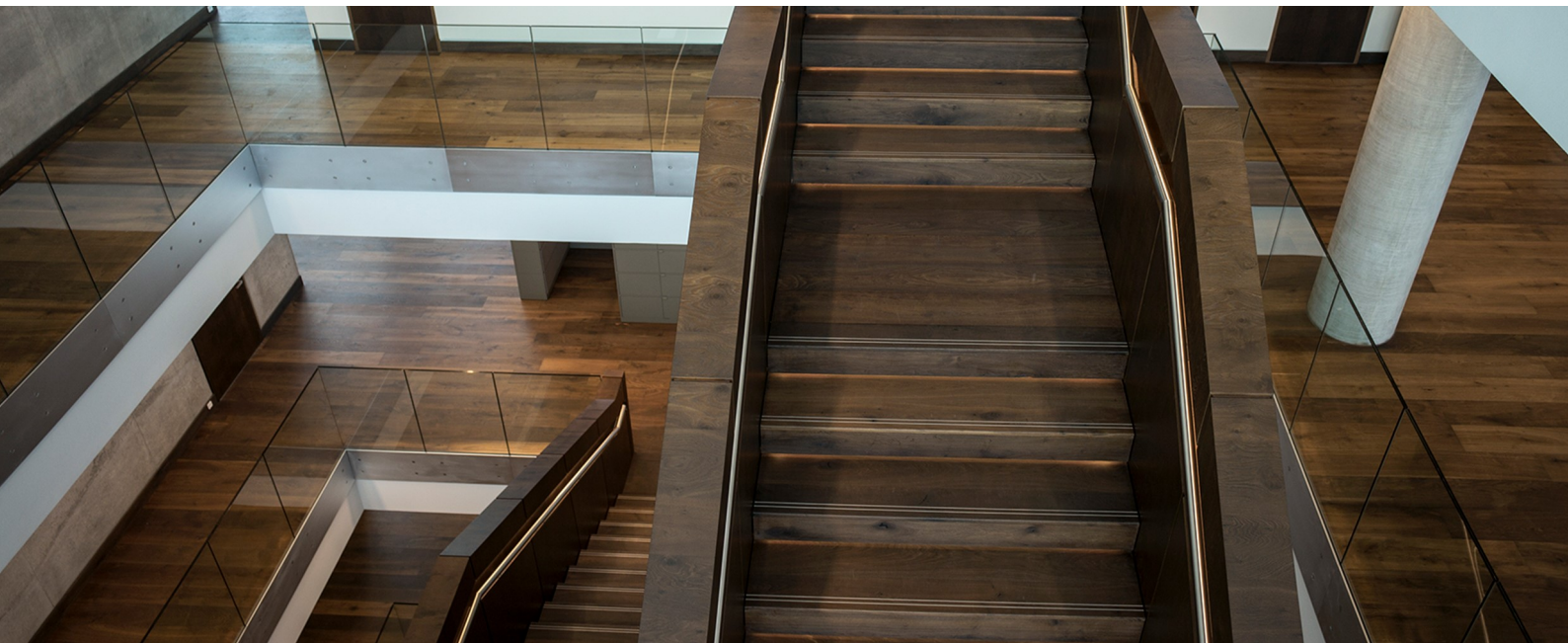


Installation Guide

Solid Planks



Superb quality in long lanes.

A practically infinite number of combinations of widths and lengths, light and dark woods, the possibility of rubber inserts and in contrasting borders along the walls, etc.

Plank flooring from HØRNING gives you free space to create exactly the expression that compliments the room best.

HØRNING planks for example come with an ultra-fine lacquer finish that gives you the appearance of the oil and the lacquer's strength. Finished planks are available on request.

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Receipt of goods and quality control

By the delivery of the material the building must be dry and free of construction humidity, such as bricklaying and painting. Never have the floor delivered until the building is sealed, dry and warm, and the humidity levels are under control.

Carry the material inside immediately after delivery, do not leave them outside under any circumstances.

Carry the floor into the room where it is to be installed – and stored before installation. Make sure to carry out a detailed quality check of the flooring as well as of other related materials that you have received before signing the freight note.

Any complaints regarding visible defects must be made in writing before the floor is installed and no later than 8 days after receipt. A floor which has been installed has also automatically been approved.

General information

Wood will invariably contract/expand due to changes in temperature and humidity. Consequently, it is necessary to use the 10-board rule. The 10-board rule states the anticipated width of 10 planks during the most humid period of time.

The 10-board measurements for HØRNING planks (at a relative humidity of between 35-65% and a temperature of 18-24 °C) are generally as follows:

110 mm = 1104 mm
 135 mm = 1356 mm
 115 mm = 1155 mm
 160 mm = 1607 mm
 120 mm = 1205 mm
 180 mm = 1808 mm



Contractions and expansions

The moisture content in wood floors will always seek to adjust in equal weight with air relative humidity (RH) and temperature. The tree absorbs and releases moisture by changes in the relative humidity. It happens in all the wooden floors, but the movement of wooden floors in form of contractions or expansions (swelling) depends on product type, wood species, thickness and surface treatment.

In practice, it is often necessary to know how much a floorboard or an entire floor contracts or expands. A commonly and internationally used realistic average used wooden floors of oak, douglas, beech, oak, ash, birch and walnut, a mean of 2.2 mm contraction or expansion per meter meters can in practice be calculated for each 1% change in the humidity of the wooden floor.

Preparations

The room temperature must be constantly 18-24 °C and the relative humidity should always be 35-65% (R.H.) before, during and after installation. If the humidity is less than 35% (R. H.), there is a risk of cracks and damage to the wooden

floors, which is not covered by the warranty.

The building must be closed and heating must have been installed and be in operation. The residual humidity in the concrete floor must not exceed 85% (R. H.).

Any and all work, which may expose the building to humidity must have been finished before you start installing wooden floors, such as bricklaying and painting.

Wooden floors and any possible glue must be acclimatized in the rooms where they are to be installed for a minimum of 48 hours or until the temperature of the floors is the same as the room temperature, which may take more than 48 hours.

Underlying sub-floors

The underlying sub-floor must be dry, firm, level, ready to be glued and thoroughly clean. In order to test the solidity of the underlying sub-floor, you may apply the scratch and pull test. HØRNING recommends that you carry out an adhesive test in the form of a pull test with a minimum solidity of 1.5 MPA.

Use a two-metre straight-edge and check the entire area thoroughly. If you find any unevenness of more than 2 mm, the underlying sub-floor must be primed and filled.

The residual humidity in a concrete underlying sub-floor must not exceed 85% (R. H.).

The underlying sub-floor must be damp proofed and rising or penetrating damp must be prevented. In case of uncertainty or residual humidity in the underlying sub-floor in excess of 85% (R. H.), then a suitable moisture barrier must be applied to the floor. Please follow the manufacturer's instructions.

In the case of fully glued wooden floors, please use 'HØRNING MS Flexlim' or a similar type of adhesive, which meets the requirements, on the underlying sub-floor with a residual humidity of up to 85% (R. H.). Please note that 'HØRNING MS Flexlim' is not a moisture barrier! If you use boards, you may use chip-board or plywood of minimum the same thickness as the wooden floor.

Under-floor heating

Today most under-floor heating systems are of a type, which may be used with wooden floors. The system's supply-pipe must be automatic and it must produce an even heat distribution across the entire floor area.

The heating system must be closed down completely at least one week prior to the installation of the wooden floor. The room temperature must be 18-24 °C before, during and after installation.

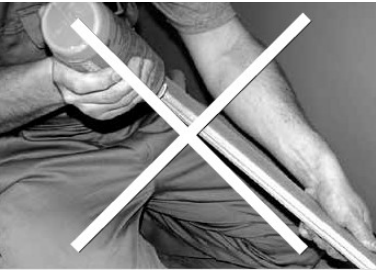
Open the heating system carefully and gradually no earlier than 72 hours after the completion of the installation of the wooden floor in such a manner that the temperature is increased by no more than 3 °C each day.

The floor's surface temperature must never exceed 27 °C – not even under carpets or furniture. Higher temperatures

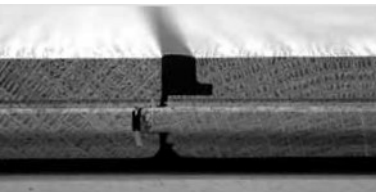
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increase the risk of damage to the wooden floor as a result of shrinkage or expansion movements in the wood and this is not covered by the warranty.

Such wood species as beech, birch, Jatoba, maple and wenge may react to under-floor heating with more vigorous movements than other types of wood, which may result in an increased number of cracks both in and between the individual floor components. This is natural and consequently, it is not covered by the warranty.



Solid planks from HØRNING must not be glued on the long sides, but merely over the ends.



Milled groove for joints or rubber lists.



Milled groove for a wooden list.

Distances to walls etc.

Normally the minimum distance between wooden floors and walls, pipes, stairs, permanent fixtures etc. must be at least 10 mm. However, the minimum distance should be at least 1.5 mm per one metre of flooring. Please use distance floor wedges and leave them in until the glue is completely dry.

Wooden floors expand and shrink depending on the climate in the room. In certain instances, it is necessary to use an expansion joint. This applies, for instance, in the following circumstances:

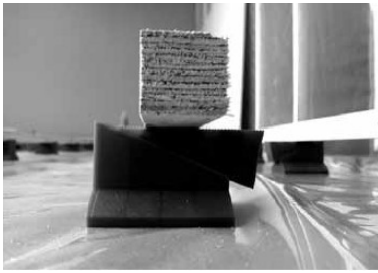
- By doors and permanent walls
- If you are installing a floor covering through several rooms
- In case of climatic deviations across the floor area, for instance, if there is only under-floor heating in parts of the floor area
- If there are expansion gaps in the underlying sub-floor.

Some projects may require an individual specification of distances. Contact HØRNING for further information.

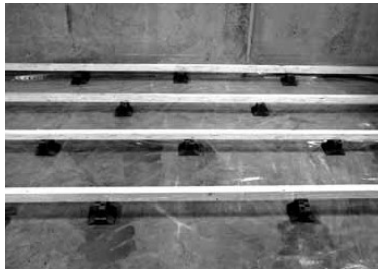
Expansion joints and movement gaps are to be filled with permanently elastic material, such as HØRNING cork expansion strips, joint filler or by using a special profile. Please always follow the manufacturer's instructions.

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Joist constructions



1. Putting joists on chocks may be done by means of plastic blocks or wedges. There is a risk of rising damp from the underlying sub-floor, please use a 0.20 mm plastic foil, which should then be taped with a 20 cm overlap.



2. The chock distances for floor joists depends on the required load bearing capacity, the joist dimensions and the type of joists (sawn/laminated joists). In the case of a residential area, an office area or business area, the chock distance with eg. laminated joists should be 520 mm. The chock distances should be reduced by 10% at the joist ends.



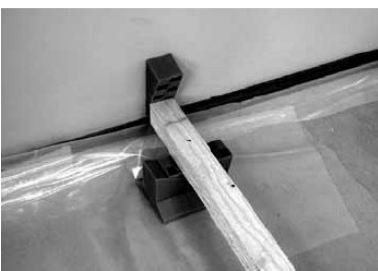
3. The first row of joists should be put down at a distance of 50 mm from the walls. The joists should be put down at a certain distance between centers, which depends on the required load bearing capacity of the floor.



4. The joists must be completely level +/- 2 mm per 2 square meters.



5. The chocks must be secured to the joists by nails. The nails should go into the joist either vertically or on the slant.



6. The distance between the joist ends and walls must be approx. 10 mm.



7. Joists that are joined together must be supported by a chock and be joined together by fish plates of a minimum of 300 mm on both sides of the joist. You may use fish joints of plywood 12x400 mm, which are then screwed in with a minimum of 12 screws in each fish joint. In addition, it is important that the joints in the joist construction are staggered, so as to achieve a stable base. Remember to glue the joints.



8. In order to ensure that the planks are installed in a straight line, please install a guide panel at a distance of approx. 1 plank plus 10-15 mm from the wall.

You may install the floor with gaps and spacers, if the room is large or if the floor has a width of 300 mm or more (2 mm gaps.)

The use of joists in general

The joist construction may be build up by, for instance, laminated joists of a minimum of 40x39 mm or 45x45 mm joists made from approved pinewood with a moisture content of no more than 12%. If you use under-floor heating in between the joists, they ought to have the same moisture content as the wooden floor, which is to say 8% (+/- 1%). As an alternative to plastic wedges, the chocks may consist of 3 mm rubber granulate as well as a waterproof board made of plywood, which is then pushed down into concrete. Another option is a system with adjustable legs.

The joints in the joist construction must be staggered in order to achieve a stable base. You may put cardboard on the joists to avoid any squeaking. Insulation may be included in between the joists in accordance with the manufacturer's instructions. HØRNING planks may be either nailed or screwed directly on to the joists. Please consult the guidance below.



1. The first thing you need to do is to install the first plank against a straight-edge. The planks are nailed with a nail gun at an angle of 45 degrees. Glue all of the end joints. Spring a nail of 2.8x65 mm when doing the nailing by hand and 65 mm nails if you are using a nail gun.

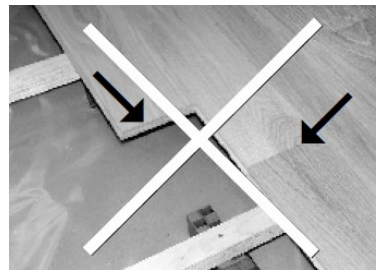


2. The 10-board rule must be adhered to and you may use spacers of a thickness of 0.3 or 0.6 mm. This is done in order to ensure that the flooring can expand during the humid season. You may opt to rough-bore and join the floor with floor screws instead of nails.

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3. Each plank is rough-bored once you have marked out a line in the floor by means of a chalked line across the center of each joist.



9. Try to avoid joints in between the joists in as far as possible. Joints should not be between the same joists unless they are at least 600 mm apart. You have to have at least two through-going planks after each jointing in between the joists.



4. Make sure you drill accurately and keep the same distance to the edge. Ensure that the drill is sharp. Drill down 10 mm for plugs, 25 mm from the edge using a 15 mm plug center bit.



10. Please always glue over the ends. Do not glue the tongue and groove. Do not glue onto the joists.



5. Now that you have drilled the holes you may start to screw on the floor.



11. Please always use a wooden block or a crowbar. Mind the wall during the installation process.



6. Install the floor by using a 45 mm wood screw.



7. Glue the plugs – ensuring that you apply glue all the way around the plug – leave it to dry and then sand it. Do not use a wood chisel, as you will risk damaging both the plug and the wood surrounding the plug.

Joist installations in general

Please always use a good wooden block or a chisel. If the boards have warped slightly, it may be necessary for you to wedge the planks in place during the installation. If you screw them on, you may have to rough-bore each plank at a 45 degree angle with a suitable drill before screwing the planks in place. Carry out a test first.

Concrete or thin plaster

The planks may be fully glued on to underlying sub-floors made of concrete or thin plaster. The underlying sub-floor must be completely level. That is to say a maximum of +/- 2 mm over 2 square meters, as measured by a straight-edge. In order to achieve the correct flattening you may adjust the floor by filling it or possibly by using a board (chip-board or plywood).



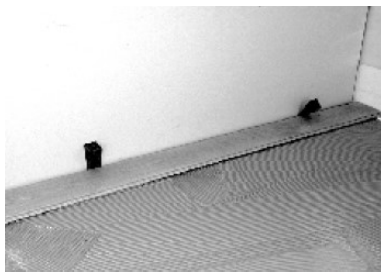
8. Please use wooden blocks during the installation.

You need to carry out the fully gluing on a clean and stable surface. Check the solidity of the underlying sub-floor by means of a scratch and pull test resulting in a minimum solidity of 1.5 MPA and check that the residual humidity (R. H.) in the concrete is less than 65% (R. H.). If using 'HØRNING'S MS Flexlim', you may allow a residual humidity

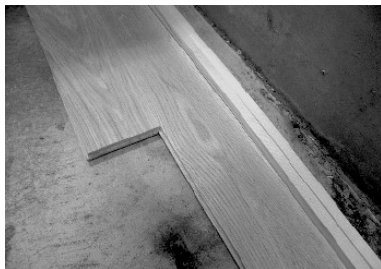
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ty of up to 80%. Use adhesive trowel no. 6. Use 1 liter of glue per square meter.

Installation directly on top of concrete, a filled floor or a floating floor



1. Use wedges to adjust the direction of the planks in the first row.



2. You may also screw a guide panel to the base (the width of a plank plus 10-15 mm's distance to the wall). Consequently, the first row is the last one to be installed in order to achieve a straight line against the wall.



3. You may install the floor by using gaps and spacers if the room is large or if the width of the floorboards are 300 mm or more (2 mm gaps). The 10-board rule must be adhered to, so that the floor may shrink and expand without being warped.



4. Apply 'HØRNING MS Flexlim' by using adhesive trowel no. 6. You need to use 1 liter per square meter. Do not pour glue on a larger area than what you can cover within 20 minutes. Install the floor in the wet glue. Please ensure that you press down the planks carefully, so as to avoid getting any excess glue in between the planks and do not glue the tongue and groove.



5. It is important that the planks are being held down by some weight during the installation and gluing process in order to ensure optimal sticking to the base. 'HØRNING MS Flexlim' must dry for 48 hours before you possibly sand the floor or start any surface treatments.

Installation on an existing wooden floor

The underlying sub-floor must be leveled by flattening, filling or possibly by means of a board in order to obtain the correct level of planeness. The planks may be either screwed or glued. Please make sure that the floor area is completely free from any grease and dirt before the planks are installed.



1. The underlying sub-floor must be stable and without any squeaking. Screw up the floor if necessary.



2. The underlying sub-floor must be level +/- 2 mm per 2 square meters as measured by a straight-edge. In case the floor is uneven: Plane or fill it or put down a board (plywood or chip-board).



3. Remember to put down floor felt between the two floors (if you are screwing it on) in order to avoid squeaking. The planks should be installed in the opposite direction of the existing floor.



4. If you glue the planks on, it is essential that you apply weight to hold in order to ensure optimal sticking to the base. 'HØRNING MS Flexlim' must dry for 48 hours before any possible sanding or surface treatment is commenced.

Installation of plank flooring on boards

HØRNING plank flooring may be installed on top of both suitable chip-board and plywood. The underlying sub-floor must be completely level, i.e. no more than +/- 2 mm per 2 square meters as measured by a straight-edge. If the underlying sub-floor is made of wood, the planks may be either fully glued or screwed on. If you install a board directly on to the joists, the joist distance must not exceed 520 mm (from middle to middle). Please use plywood of 21 mm in thickness or chip-board of 22 mm in thickness. If you install your floor on top of an existing concrete floor, please use chip-board of at least 22 mm in thickness.

Make sure that you follow the manufacturer's instructions when you install a board floor. In order to minimize squeaking and resonance, use 0,5 kilo floor felt or another type of

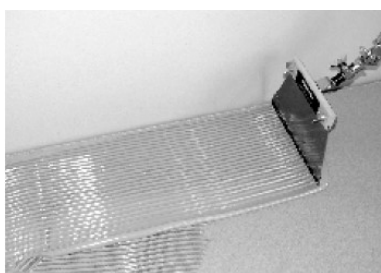
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sound absorption between the underlying sub-floor and the existing floor (if screwing it on).

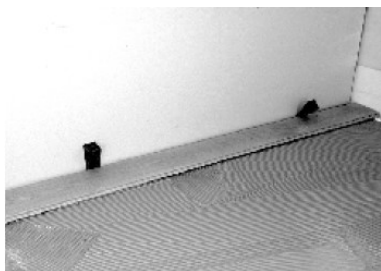
Gluing on top of a board floor



1. The 10-board rule must be followed and you may use spacers of 0.3 or 0.6 mm in thickness. This will ensure that the floor has enough room in which to expand during the humid season.



2. 'HØRNING MS Flexlim' should be applied by using adhesive trowel no. 6. You need to use 1 liter per square meter. Do not pour out any more glue than covering an area, which you can cover in flooring within 20 minutes. Install the floor in the wet glue. Please ensure that you press down the planks carefully, so as to avoid getting any excess glue in between the planks and do not glue the tongue and groove.



3. You may wish to use wedges to adjust the direction of the planks in the first row.



4. Please also consider screwing a guide panel on to the base (the distance from the wall should equal the width of one plank + 10-15 mm). Consequently, the first row will be the last one to be installed, which results in a straight line against the wall.

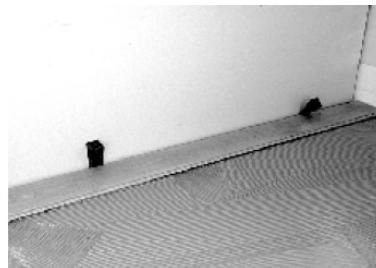


5. If you glue the flooring on, it is important that you use the planks during the installation in order to ensure optimal sticking to the base. 'HØRNING MS Flexlim' must dry for 48 hours before any possible sanding and surface treatments are commenced.

Screwing on to a board



1. The 10-board rule must be followed and you may use spacers of 0.3 or 0.6 mm in thickness. This will ensure that the floor has enough room in which to expand during the humid season.



2. Please use wedges to adjust the first row, so that it is completely straight.



3. Please also consider screwing a guide panel on to the base (the distance from the wall should equal the width of one plank + 10-15 mm). Consequently, the first row will be the last one to be installed, which results in a straight line against the wall.



4. Screw the groove with floor screws at an angle of 45 degrees. Once the floor has been installed, you may sand it and surface treat it with lacquer or oil.

Installation in general

Make sure that you always use a good wooden block or a chisel. If the planks have expanded a bit, you may have to key on the planks during installation. If you screw on the flooring, it may be necessary to rough-bore each plank at an angle of 45 degrees with a suitable drill before screwing them on firmly. Make sure to carry out a test drill first.

After installation

In the case of fully glued floors or floors, which have been glued in tongue/groove, please do not walk on your new floor for at least 48 hours after installation or until the glue is completely dry.

48 hours after completing the installation of the floor you may remove the distance floor wedges, as the glue should then be completely dry.

When using 'HØRNING MS Flexlim', you must not start sanding any untreated floors until at least 2-4 days after installation depending on the climatic conditions in the room

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For the best result, office chair mats should be laid out under office chairs. All chairs and table legs and other items that can scratch or mark marks on the surface should be fitted with felt. Remember to check the felt continuously and replace them if they get worn. Keep in mind that latex-containing pads, mats and black rubber wheels may leave marks on the surface of the wood floor.

Any oiling or lacquering of the floors after installation must be carried out in accordance with the manufacturer's instructions and you have to ensure that the oil or the lacquer is completely dry before the floor is uncovered or before you start walking on it.

May we suggest that you always cover the floor carefully in floor felt or a similarly appropriate material. If any additional building work is carried out in the room after installation and any surface treatment, the floor must be particularly well protected from dirt and pressure marks.

HØRNING always recommends that oiled floors should be re-treated with maintenance oil in order to achieve the best

possible result. Oiled floors must not be washed or be subjected to water for at least 14 days after installation or the most recent oil treatment, as the oil dries when it comes into contact with air after installation. Please only use small quantities of water!

Wash lacquered floors with a neutral washing detergent and a firmly wrung cloth.

You should always clean the floor thoroughly before you start using it.

Avoid any type of dirt. Use mats by the entrance doors etc.

Avoid any damage to your wooden floor: Use felt or felt caps under chairs and furniture, use chair mats under office chairs etc.

Hoover and clean the floor regularly once you start using it.

The installation guide is based on long-term experiences and accommodates the most normal conditions in most building constructions.

Hørning Parket accepts no legal responsibility in connection with this indicative information. If you are unsure how to install the floor, please contact Hørning Parket.