



Laminate flooring Troubleshooting

A practical guide to resolving issues

Laminate flooring is the ideal alternative to real wood. Long lasting, robust and available in a wide range of finishes, effects and styles, it is also a practical and cost effective choice.

Kronospan laminate flooring is engineered to last, a high performance floor that can easily deal with the rigours of everyday life, whether in the home or in commercial environments. It is wear resistant, stain resistant, chemical resistant and impact resistant, but of course there are times when even our laminate flooring can have issues.

Uneven substrates, exceptional wear areas, incorrect fitting or extreme atmospheric conditions can all cause problems. This booklet identifies many of the common issues and their causes, and delivers realistic and practical solutions. Illustrated throughout using detailed photographs, step by step fault finding, and a handy Q&A section.

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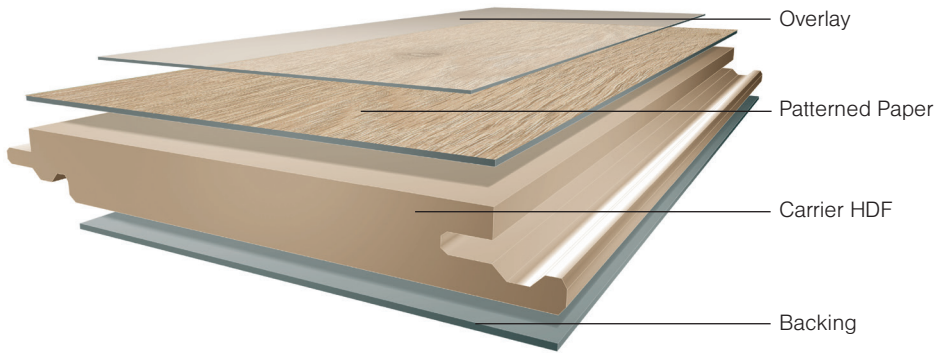
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Understanding the structure

Production techniques

- Direct pressure laminate (DPL)



Composition of laminate flooring.
Laminate is fundamentally composed of several layers.

Layer 1:

First, the uppermost laminate layer consists of an overlay to protect against wear and tear and a design layer, which depending on the production process is made from one or several layers. The surface coating is composed of a special synthetic resin-treated cellulose to give the floor a tough, durable surface. The decorative layer gives the laminate flooring an attractive appearance.

Layer 2:





Under the decorative pattern is the wooden composite core (HDF).

Layer 3:

At the base on the back of the HDF core you will find a watertight layer that improves the structural stability and serves as a moisture barrier. All three layers are permanently bonded with resin, heat and pressure. DPL stands for "Direct Pressure Laminate".



Understanding the structure

Load Classes			
Class	Symbol	Area of use	Description
		Domestic	Areas considered for residential use
23		Heavy	Areas with heavy use
		Commercial	Areas considered for public and commercial use
31		Moderate	Areas with low or intermittent use
32		General	Areas with medium traffic
33		Heavy	Areas with heavy use

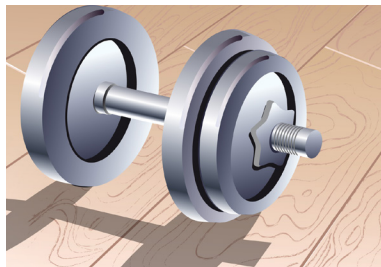


Built to take a battering

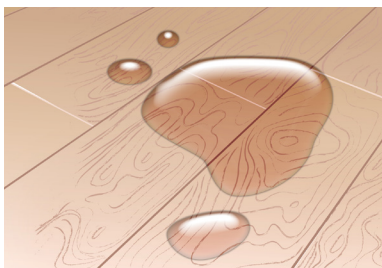
Quality requirements



Wear resistant



Impact Resistant



Insensitive to stains (but not moisture & damp)




Resistant to household chemicals



Suitable for chair casters as defined by the relevant standards. (We recommend using plastic mats to prevent damage by casters)

01

Issues Root
Causes Solutions



What problems could arise in the practical production, processing, use and maintenance of laminate flooring?

Anticipate wear and tear

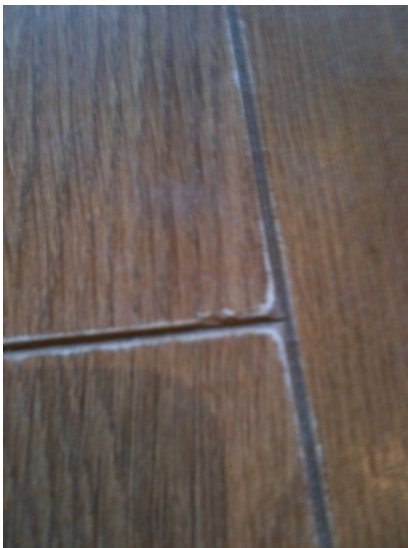
Abrasion and wear			
Damage pattern	Possible causes	Evidence	Rectification
Abrasion on surface, partially near chair casters	<ul style="list-style-type: none"> • Incorrect (hard) chair casters 	<ul style="list-style-type: none"> • Optical/visual 	<ul style="list-style-type: none"> • Change the office chairs (soft casters) • Replace some areas • Plastic mats under chair casters
Abrasion partially in entrance area	<ul style="list-style-type: none"> • No barrier mat 	<ul style="list-style-type: none"> • Optical/visual • Light magnifier test 	<ul style="list-style-type: none"> • Fit barrier mat • Replace floor
Abrasion/wear in edge area	<ul style="list-style-type: none"> • Dishing of elements • Unfavourable climate • Humidity 	<ul style="list-style-type: none"> • Optical/visual • Technical Measurements 	<ul style="list-style-type: none"> • Replace floor • Rectify cause of dishing



Abrasion caused by incorrect chair casters



Abrasion caused by lack of barrier mats



Abrasion caused by dishing (raised edges)

Offset pattern

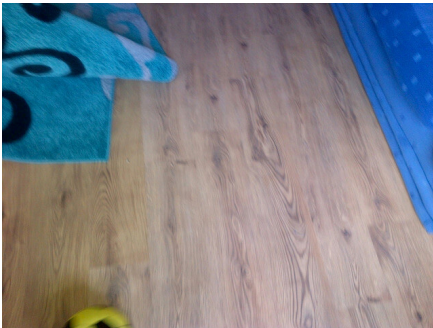
Damage pattern	Possible causes	Evidence	Rectification
Decor offset longitudinally with strip-strip decors	<ul style="list-style-type: none">Standardised specifications	<ul style="list-style-type: none">Technical measurementProduct descriptionTolerances (acc. to manufacturer specifications max. +/-4 mm)	<ul style="list-style-type: none">Reduction in valueNew delivery



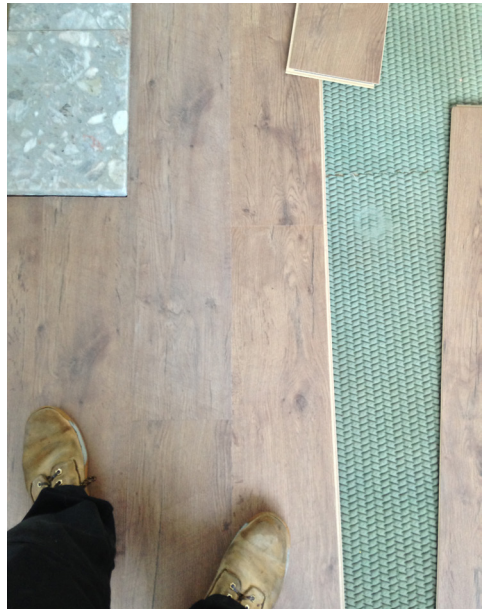
Decor Offset

Different levels of shine

Damage pattern	Possible causes	Evidence	Rectification
Matt and shinning surface areas	<ul style="list-style-type: none"> Production 	<ul style="list-style-type: none"> Visual 	<ul style="list-style-type: none"> Sort before laying Significant = replacement



Different level of shine



Significant difference in level of shine

Eliminate shocks and odours

Electrostatic			
Damage pattern	Possible causes	Evidence	Rectification
Painful electrostatic discharge on people	<ul style="list-style-type: none">• Discharges on people >2000/3000V• Surface resistance >10• Climatic conditions• Low air humidity (≅55% rH)• Clothing• Shoes• No system-related structure acc. to manufacturer specifications	<ul style="list-style-type: none">• Investigate individual people• Establish climate conditions	<ul style="list-style-type: none">• Set climatic conditions (> 55% rH)• Special care• Replace the flooring underlay



Electrostatic

Emissions/odours

Damage pattern	Possible causes	Evidence	Rectification
Odour	<ul style="list-style-type: none">• Laminate has low emissions• Other sources?• Physical construction reasons (e.g. moisture)• Occurs through use e.g. incorrect cleaning and care agents (observe manufacturer specifications)	<ul style="list-style-type: none">• Unacceptable odours• Investigation of material samples	<ul style="list-style-type: none">• Determine climatic conditions• Observe physical construction and ventilation conditions
Emissions	<ul style="list-style-type: none">• See above	<ul style="list-style-type: none">• See above	<ul style="list-style-type: none">• See above



Development of odours (old floor lining was not removed)

Keep beautiful floors beautiful

Care & Maintenance			
Damage pattern	Possible causes	Evidence	Rectification
Smears on the surface and milky layers	<ul style="list-style-type: none"> • Concentration of cleaning agent on surface 	<ul style="list-style-type: none"> • Optical/visual • Cleaning trials 	<ul style="list-style-type: none"> • Cleaning: intensive removal of all layers of cleaning agents
Dark joints, contact dirt remains attached	<ul style="list-style-type: none"> • Too much cleaning agent • Care agent • Excessive wet cleaning • Incorrect cleaning procedure 	<ul style="list-style-type: none"> • Optical • Cleaning trials 	<ul style="list-style-type: none"> • Cleaning: intensive removal of all layers of cleaning agents
Swelling in edge areas	<ul style="list-style-type: none"> • Unsuitable cleaning agent • Cleaned too wet 	<ul style="list-style-type: none"> • Optical • Cleaning trials 	<ul style="list-style-type: none"> • Replacement of laminate flooring



Incorrect care agent/smears



Dark Joints



Swelling from moisture ingress

Formation of smears

Damage pattern	Possible causes	Evidence	Rectification
Smears on the surface of laminate	<ul style="list-style-type: none">• Concentration of cleaning agent on surface• Incorrect cleaning agent	<ul style="list-style-type: none">• Optical/visual• Cleaning trials	<ul style="list-style-type: none">• Cleaning: intensive removal of all layers of cleaning agents



Incorrect cleaning agent/smears on the surface

Colour variances/discolouration

Damage pattern	Possible causes	Evidence	Rectification
Colour variances/ differences	<ul style="list-style-type: none"> Mixing of various batches/ production volumes 	<ul style="list-style-type: none"> Optical/visual; definition of guideline required Mixing various batches/ production volumes 	<ul style="list-style-type: none"> Low = reduction Significant = replacement
White flecks, usually ring-shaped	<ul style="list-style-type: none"> Influence of permanent moisture of terracotta/clay pot placed directly on flooring 	<ul style="list-style-type: none"> Optical/visual 	<ul style="list-style-type: none"> Partial replacement
Discolouration/fading	<ul style="list-style-type: none"> No pigment stability 	<ul style="list-style-type: none"> Flecks from coloured agents, extreme sunshine e.g. Conservatories (glass roof) 	<ul style="list-style-type: none"> Low = reduction Significant = replacement



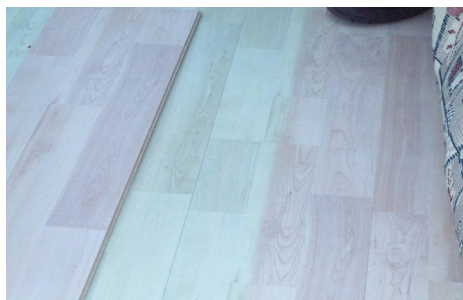
Colour variances/discolouration



White Flecks

Scratches

Damage pattern	Possible causes	Evidence	Rectification
Traces of scratches	<ul style="list-style-type: none"> No barrier mats 	<ul style="list-style-type: none"> Optical/visual Light magnifier 	<ul style="list-style-type: none"> Replace defective planks
Traces of scratches	<ul style="list-style-type: none"> Unsuitable for Vacuum cleaner nozzles 	<ul style="list-style-type: none"> Check Vacuum cleaner etc. 	<ul style="list-style-type: none"> Replace planks
Traces of scratches	<ul style="list-style-type: none"> Unsuitable cleaning agent (e.g. chafing agent) 	<ul style="list-style-type: none"> Check (e.g. light magnifier) Scrutinise 	<ul style="list-style-type: none"> Replace planks
Traces of scratches	<ul style="list-style-type: none"> Mechanical impact 	<ul style="list-style-type: none"> Optical/visual Check (Light magnifier) 	<ul style="list-style-type: none"> Replace planks
Traces of scratches	<ul style="list-style-type: none"> Error in coating Error in overlay 	<ul style="list-style-type: none"> Abrasion Scratch test Optical/visual 	<ul style="list-style-type: none"> Replace defective planks



Fading caused by production technique



Scratches

Ventilation

Damage pattern	Possible causes	Evidence	Rectification
Dishing of elements (convex)	<ul style="list-style-type: none"> Excessive air humidity 	<ul style="list-style-type: none"> Measurement 	<ul style="list-style-type: none"> Provide suitable ventilation Replace flooring
Formation of gaps	<ul style="list-style-type: none"> Insufficient air humidity 	<ul style="list-style-type: none"> Measurement 	<ul style="list-style-type: none"> Provide suitable ventilation Replace flooring



Inappropriate ventilation. Expansion gaps incorrect or lack of DPM (concrete subfloor)



Surface temperature too high

Bulging / distortions

Damage pattern	Possible causes	Evidence	Rectification
Dishing (concave)	<ul style="list-style-type: none"> • Excess residual humidity in base • No vapour barrier laid • Vapour barrier doesn't overlap • Exceeded maximum temperature for laying with underfloor heating • Water damage incident 	<ul style="list-style-type: none"> • Moisture measurement • Foil can be seen in wall area • Moisture measurement protocol • Heating protocol • Mould 	<ul style="list-style-type: none"> • Replace floor • Dry out base
Bulging, in e.g. L-shaped rooms	<ul style="list-style-type: none"> • No joints for movement 	<ul style="list-style-type: none"> • Optical/visual • Check room dimensions 	<ul style="list-style-type: none"> • Fit joint for movement
Dishing (convex)	<ul style="list-style-type: none"> • Excessive air humidity • Cleaning too damp 	<ul style="list-style-type: none"> • Hygrometer • Check laminate 	<ul style="list-style-type: none"> • Replace laminate flooring • Regulate ventilation
Raised edges/tips	<ul style="list-style-type: none"> • Changes in dimensions, upsetting • Insufficient joints at edges/for movement • Machining Tolerances 	<ul style="list-style-type: none"> • Check plank dimensions • Check distances from walls, joints for movement • Check local circumstances 	<ul style="list-style-type: none"> • Re-cut floor
Partial bulging	<ul style="list-style-type: none"> • Moisture Ingress 	<ul style="list-style-type: none"> • Optical/visual 	<ul style="list-style-type: none"> • Replace
Laminate floor arches	<ul style="list-style-type: none"> • Dimensional changes of laminate floor (moisture) • No acclimatisation • Skirting board fitted incorrectly 	<ul style="list-style-type: none"> • Insufficient joints at edges/for movement • Correct fitting of skirting boards 	<ul style="list-style-type: none"> • Re-cut floor

Bulging / distortions



Bulging / distortions



Non-observance of wall/boarder. No threshold joints between rooms

Bulging / distortions



Restricted Expansion



Fitting too closely to stair railing / components

Building moisture

Damage pattern	Possible causes	Evidence	Rectification
Dishing of elements	<ul style="list-style-type: none">No vapour barrier	<ul style="list-style-type: none">Check	<ul style="list-style-type: none">Replace flooringFit vapour barrier



Dishing of laminate floor elements due to lack of vapour barrier (i.e. No DPM over concrete subfloor)

Base

Damage pattern	Possible causes	Evidence	Rectification
Floor crunches when walked on	<ul style="list-style-type: none">• Base not cleaned sufficiently before laying floor	<ul style="list-style-type: none">• Check base after re-laying	<ul style="list-style-type: none">• Replace or re-lay
Floor crackles when walked on	<ul style="list-style-type: none">• Unsuitable foam film (too thick or too soft)	<ul style="list-style-type: none">• Re-lay and check material	<ul style="list-style-type: none">• Uplift to re-lay and replace underlay
	<ul style="list-style-type: none">• Excess clearance groove/tongue	<ul style="list-style-type: none">• Re-lay and check material	<ul style="list-style-type: none">• Uplift to re-lay and replace underlay



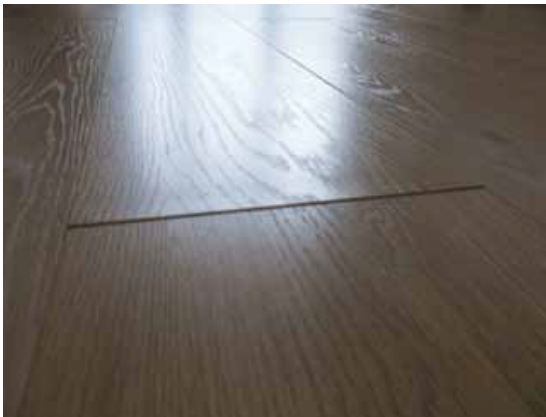
Porous/uneven



Unsuitable insulation material

Raised edges run to rapid wear

Height offsets / lipping			
Damage pattern	Possible causes	Evidence	Rectification
Swelling in edge area	<ul style="list-style-type: none"> Element thickness swelling too great or different 	<ul style="list-style-type: none"> Check acc. to EN 13329 (residual material) 	<ul style="list-style-type: none"> Replace the floor or individual elements if tolerances exceed >0.15 mm
Raised abutting edges	<ul style="list-style-type: none"> Different profiles (groove/tongue) in production (note: obligation to check neglected) 	<ul style="list-style-type: none"> Measurements Optical/visual Tolerances acc. to EN 13329 	<ul style="list-style-type: none"> Replace



Height offset/lipping



Swelling in edge area caused by moisture

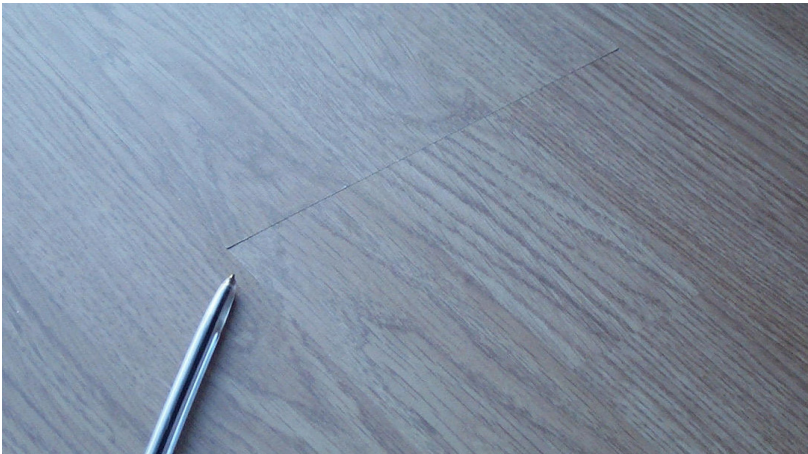
Joins

Damage pattern	Possible causes	Evidence	Rectification
Top joints rising	<ul style="list-style-type: none"> • Unevenness • No solid base • Unsuitable base • Carpeted floor base • No acclimatisation • Ventilation fluctuates • Different dampness of individual elements 	<ul style="list-style-type: none"> • Normal foot traffic • Optical/visual • Light magnifier • Evenness measurement • Establish ventilation 	<ul style="list-style-type: none"> • Replace or re-lay • Create ideal room climate (55-65 % rH – approx. 20 ° C)
Click connection coming loose	<ul style="list-style-type: none"> • Unevenness • Incorrect groove/spring milling 	<ul style="list-style-type: none"> • Normal foot traffic • Optical/visual • Light magnifier • Evenness measurement • Check bulk density • Check milling pattern 	<ul style="list-style-type: none"> • Re-lay and fill base • Replace laminate flooring
Banana effect	<ul style="list-style-type: none"> • Banana-shaped distortion of individual elements (can be seen when laying) • Obligation to check not satisfied • Stored in damp environment 	<ul style="list-style-type: none"> • Measurement (EN13329) 	<ul style="list-style-type: none"> • Replace the floor or individual elements

Joints



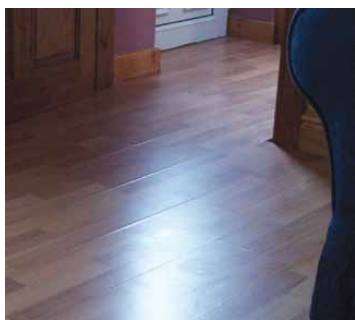
Top joints on laminate flooring elements



Top joints on laminate flooring elements

Delamination / flaking / marginal swelling

Damage pattern	Possible causes	Evidence	Rectification
Swelling of edges	<ul style="list-style-type: none"> • Escaped fluids • Plant pots without saucers • No barrier mats • Physical construction circumstances • Unsuitable cleaning agent • Cleaning too damp 	<ul style="list-style-type: none"> • Optical/visual 	<ul style="list-style-type: none"> • Dry out floor • Partially replace floor • Fit barrier mat
Irregularities in edge areas	<ul style="list-style-type: none"> • Joints machined too tight 	<ul style="list-style-type: none"> • Destructive testing of groove/tongue connection 	<ul style="list-style-type: none"> • Re-lay



Delamination/flaking/edge swelling



02

Installation



What problems could arise in the practical production, processing, use and maintenance of laminate flooring?

Quick and easy installation

Installing laminate flooring

Tips on how to lay laminate flooring

Installing laminate flooring is very easy. However, it is important that you prepare all materials and steps in the procedure well. In the following, you will find step-by-step instructions for laying laminate flooring and a checklist that will make the preparation easy!

First, you should decide on top of what sort of underlay you wish to install your Krono Original® laminate flooring; because not all laminate flooring is appropriate for every subfloor.

Installing laminate on stone screed

The floor must be absolutely even, dry, clean and able to take a load. Uneven areas of more than two millimetres to a metre should be stripped and levelled without fail. As a moisture barrier you must use a PE film.

Installing laminate on wooden floorboards

Loose planks must be fixed, uneven areas evened out – there must be a solid, even subfloor. Lay the Krono Original® laminate floor across the length of the floorboards long ways. You may not use a PE film with wooden subfloors.

Laminate on chipboard

Loose chipboard must be affixed and unevenness smoothed out. The chipboard must be tightly attached to the subfloor so that no rattling noises develop.

Installing laminate on PVC or linoleum floors

You should not install laminate flooring over this type of floor. Floor coverings of this type should be removed without fail before laying your laminate flooring.

Installing laminate flooring on warm water or electrical under floor heating

Please consult a heating specialist you trust to heat your floor until it is dry. He or she has the appropriate abilities and necessary protocols.

A surface temperature of 25 degrees Celsius is recommended; 28 degrees Celsius should never be exceeded. Old flooring must be removed.

Before laying laminate

Check-lists for your preparation

The following tools should be kept within arms reach at all times during the installation of your Kronospan laminate floors:

- Spacer wedges
- Circular saw with changeable carbide metal tooth saw blade or jigsaw with a fine saw blade or handsaw
- Angle for undercutting the door frames
- Folding ruler, pencil
- Assembly aid (tapping block or hammer) - for hard to reach areas
- Footfall sound insulation (for floors without sound insulation or S.A.S.)
- Check-lists: Materials and accessories for laminate flooring installation

Check-lists: Materials & Accessories for laminate flooring installation

- Exact measurements of room
- Kronospan laminate floor
- Clickguard™ / one tube is adequate for ten square metres of laminate floor
- Skirting board
- Levelling, transition and end profiles
- Vapour barrier film (if required)
- Foam underlay film (if required)

Please also take note that you will possibly need a footfall sound insulation as well as Clickguard™ or a similar joint sealant.

Residual Moisture

Stone floor should not exceed the following values for residual moisture:

- Cement stone screed: With underfloor heating 1.8 % CM; Without underfloor heating 2 % CM
- Anhydrite screed: With underfloor heating 0.3 %; Without underfloor heating 0.5 % CM

1 clic 2go pure+ installation

Important notice: prior to and during the flooring installation, please read the installation instructions completely! The flooring procedure is accomplished according to ATV DIN 18365

Follow these instructions precisely, in order to retain full rights to claims under the guarantee.

Various possibilities for installation are offered depending on the surface area to be used:

- 1. Quick and easy installation without glue**
- 2. Installation with Clickguard™:** for the installation of laminate flooring in commercially-utilized rooms, a sealing procedure must be carried out **[11]**. Clickguard™ protects the flooring from the top down for the long-term against the effects of moisture. The floor lamination can be removed later and newly installed. When using Clickguard™, please follow the installation instructions. In the event that a sealant is to be used, sufficient quantities of Clickguard™ are to be applied to the tonguespring side **[11]** (1 layer lengthwise and 1 layer for the width). The excess Clickguard™ should be scraped off from the surface with a plastic spatula after max.15 – 20 minutes. Eventual remnants (residue) can be removed with household solvent cleanser.

Preparation: Please store the packets 48 hours prior to installation under the same climatic conditions (temperature and moisture) as the actual installation process **[1]**. Important pre-condition for proper fitting and long-term durability of the laminated flooring is a room temperature of 15 – 30°C / 59 – 86°F and a relative humidity of around 40 – 70%.

Necessary Materials and Tools: polyethylene-foil, aluminium jointing tape, tap block, hammer, separation shims, footfall sound insulation, saw, pencil, folding ruler **[2]** If necessary: spacers, Clickguard™ joint sealant.

The sub-surface that the laminate flooring will be applied to must be furnished in such a way that the laminate flooring can be installed as required by the manufacturer's instructions. Appropriate sub-surfaces are, among others, mineral sub-surfaces (such as floor screed, concrete, asphalt), particle-board sheets and timber floor boards. The sub-surface must be absolutely even, dry, clean and stable. Floor irregularities measuring more than 3 mm per 1 meter / 0.12" per 39.37" length must be evened out by a professional (according to DIN 18202) [3]. The evenness of the sub-surface can be best ascertained by means of a straight edge or a spirit level. When installing onto a mineral sub-surface such as concrete, cement-screed, anhydrite-screed or flagstone (among others), a moisture measurement must first be carried out.

The following remnant-moisture levels in the screed may not be exceeded, prior to installation:

Cement-screed:	without underfloor heating	<	2,0% CM
Calcium sulfate screed:	without underfloor heating	<	0,5% CM

No offsets, steps or similar unevenness must be present. Construction rubble such as plaster residue or similar must be removed completely. Cracks in the ground must also be considered as critical. In order to assert full claims for damages, the provisions of ATV DIN 18365 and § 4 para. 3 VOB/B must be observed.

Check the panels under good lighting conditions for irregularities. Boards with visible defects outside the applicable tolerances, such as deviations in height, gloss, dimensional and color, must be sorted out and replaced free-of-charge **[4]**. For already-fitted or previously-worked panels, a reclamation claim from you is no longer possible. Lamination flooring is installed under "floating" conditions and may not be glued, screwed, nailed, or in any other fashion fixed to the floor!

The placement of very heavy objects, such as fitted kitchens, also has a fixing effect. It is recommended to install fitted kitchens and cupboards before laying and to lay laminate floor only up to behind the plinth panel. In the event of failure to comply with these requirements any claims for damages shall be excluded [5]!

Carpet flooring must be removed and is not suitable as a sub-surface for the lamination flooring. Due to the carpeting lying under the lamination, problems arise when the laminate is walked on in that a spring-motion occurs and considerable pressure is exerted on the lamination edges. This destroys the groove-tongue connection and leads to the formation of a gap. The carpet flooring must also be removed for hygienic reasons. Resulting moisture may result in mold and bacteria forming [6].

Please note that this laminate flooring is not suitable for wet-rooms (e.g. bath or sauna) [7].

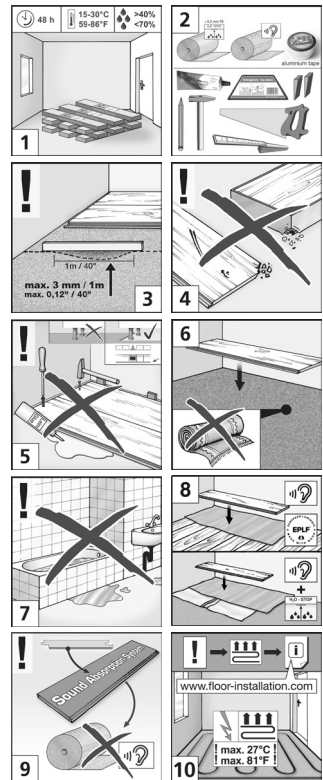
In the case of a wooden sub-surface such as installed sheets or floorboards, no polyethylene foil may be installed. Prior to installing the laminate flooring on a mineral-based sub-surface, (concrete, screed, etc.) it is crucial that a suitable vapour barrier sheet

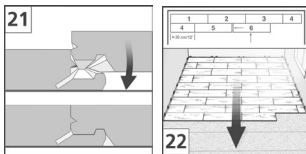
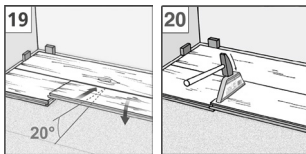
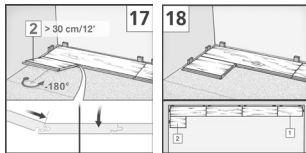
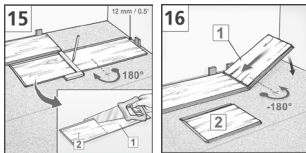
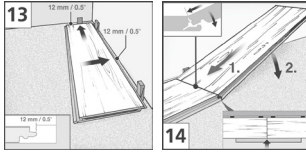
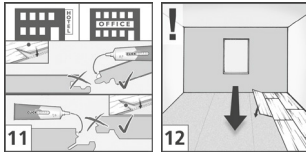
(PE-foil) is put down (with 1 - 2 centimetre / 0.40"-0.80" 90° edging at the sides- like a shallow tub) as a protection against moisture. The tile channels are installed next to one another and overlapping each other by about 50 mm / 2", and fixed with special aluminium jointing tape. On all substrates, a system-based insulation underlay is recommended to improve sound minimization. The insulation underlay is installed edge to edge, i.e. is not overlapping [8]. Make sure that the insulation underlay joints are not directly under the laminate joints. If the laminate flooring already has an integrated insulation inlay, no additional insulation material is necessary [9].

The use of underfloor heating (hot water / electric) is only possible if expertly laid and provided that the heating operates properly [10]. The supply and installation of the underfloor heating system must be state of the art and it must be commissioned by a specialist company in accordance with the relevant heating criteria. Accordingly, a signed heating-up and cooling-down protocol must be in place. Underfloor heating must be laid and operated across the full area of the room. Partial underfloor heating is not permitted. A temperature of 27°C on the surface adjacent to the underside of the flooring should not be exceeded at any time anywhere over the area. Any complaints in connection with the operation or the installation of a floor heating system is excluded if the requirements described above are not met. Claims can be asserted solely within the scope of our general warranty and guarantee provisions. For underfloors with or without underfloor heating, the specialist installer must perform and record the necessary CM measurement prior to installing the floor.

The following limit values apply to residual humidity:

- with cement screed < 1.8% CM with underfloor heating
- with calcium sulfate screed < 0.3% CM with underfloor heating





For floating installation, the thermal resistance of the laminate floor and the insulating substrate must be observed. The total of the thermal resistance of all components must be $\leq 0.15 \text{ m}^2 \text{ K/W}$ in accordance with the requirements of DIN EN 14041. When using the insulating materials which do not come as part of the range of accessories, any warranty is excluded in the case of floating installation on heating screeds with regard to compliance with the effective maximum permissible thermal resistance of the overall construction.

It is recommended that the panels be sorted according to the desired pattern lines and (if necessary) colour nuances prior to installation. You should start working with packages of laminate flooring immediately after opening!

Installation: It is recommended that you lay out the panels in the direction of the length and the source of light **[12]**.

For unusual wall angles, you must first transfer the profile of the wall-line to the first row of panels and saw the panels accordingly. Measure the spatial dimensions of the room prior to installation. In the event that the first row of panels proves to have a width of less than $5 \text{ cm} / 2''$, you must then evenly partition the remaining length (excess length) among the first and last row of panels in such a manner that both rows are cut to size with the same (symmetrical) panel-width.

A hammering block and a hammer must be used for the secure transverse joint locking **[20]**.

Begin your installation in the left corner of the room. Lay out the first panels with the tongue-spring side facing the wall and secure the edge separation (gap) with shims. It is important to retain a $12\text{-}15 \text{ mm} / 0.5''\text{-}0.6''$ edge distance (expansion gap) from the wall, heating pipes, posts, doorstop, etc. **[13]**. Insert a second panel with the facing edge (short side) at an angle of 30° into the groove profile of the previously laid panel **[14]** and then lay flat on the floor. Make sure that the longitudinal edges are aligned. Ensure that they are not offset and form a straight line. This is necessary to insert the panels without gaps into the longitudinal profile when laying the second row of panels.

Click in further panels until the end of the first row in the same manner.

Turn the last panel in the row **[15]** by 180° for adjustment / trimming; place the decorated side up next to the existing row (groove cheek to groove cheek) on the right side of the wall. Take an edge distance of $12\text{-}15 \text{ mm} / 0.5''\text{-}0.6''$ on the facing side into account. Mark and cut the panel lengths. The last panel of the 1st row is also inserted at an angle of 30° into the groove profile of the previously laid first panel and then laid. Make sure that the longitudinal edges are aligned. Ensure that they are not offset and form a straight line.

In order to avoid splintering of the edges, the decorated side should face down when using electrical jigsaws or hand-held circular saws. Otherwise, cut down from the top of the panel. Begin each new row with the remnants (at least 30 cm / 12" in length) of the previous row.

Begin the second row with a half panel (length < 95 cm / 37.40") or with a remnant panel (length < 30 cm / 12") [17, 18]. Insert the panel section length-wise in the groove profiling in the first row and lock it in place / bend it [19]. The transverse joint must be offset by at least 30 cm / 12" from row to row.

Place a second panel length-wise in the groove profiling of the panel area and push it to the left at an angle of 20° to the panel already in place [19]. Then push it downwards and press from above until you hear an audible click [19, 20, 21]. In doing so, ensure that the panel is inserted and guided cleanly through the longitudinal profile. Use a hammering block and a hammer [20] to lock the two panels.

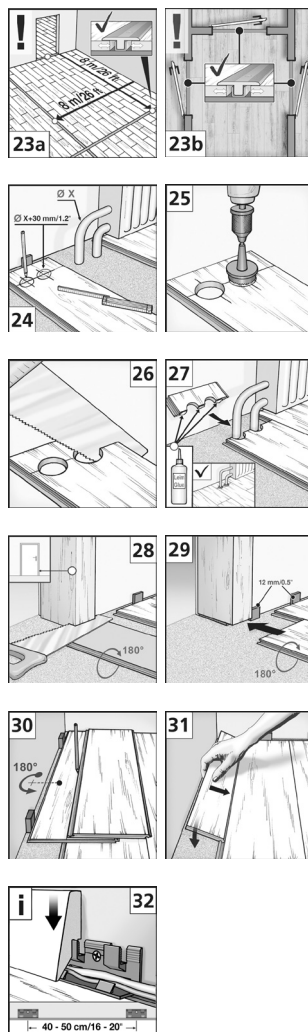
For installation surfaces with more than 8 metres / 26 ft length or width, and for considerably angled rooms, expansion joints (at least 2 cm / 0.8" wide) are necessary [23a]. This allows the floor to respectively expand or contract during climatic changes. Keep this in mind when installing flooring through one room to another. In this case, the surfaces in the area of the door frame must be interrupted [23b]. Expansion joints can be properly masked with corresponding profiles. The movement gaps may not be filled with cables or other materials. Please observe the requirements of the ATV DIN 18365. The floor screed joints from the ground need to be adopt. The design of the movement joints must allow for the same movement options.

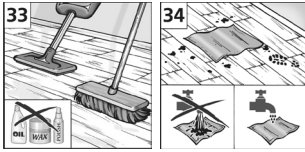
For heating-radiator pipes, holes that are drilled 3 cm / 1.2" larger than the pipe diameter must be avoided. A "fitting piece" should be cut out, glued, fitted in and fixed in place with a wedge until the glue has dried. Then cover the recesses with a radiator-sleeve [24 - 27].

Wooden door frames should be shortened enough that a panel with footfall sound insulation including 2-3 mm / 0.8"-1.2" gap can fit underneath [28,29].

After installation, remove the separation wedges.

Then, for a perfect completion of your project, attach the baseboard cleats in intervals of 40-50 cm / 16"-20" on the wall and put the respectively cut baseboard in place [32].





Cleaning and Maintenance:

Remove dirt by sweeping or with a vacuum suitable for hard floors [33].

For general maintenance, use only the wiping materials recommended by the manufacturer of the laminate. The following are not suitable for the treatment of laminate flooring surfaces: polish and cleanser with treatment additives such as wax or oil. The laminate flooring should not be polished [33].

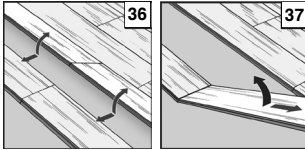
Wipe up foot-prints and dirt with a thoroughly-squeezed and drip-free cloth. Standing water should be avoided in all circumstances [34]!

Special care should be taken regarding flower pots, vases, etc. that are standing on the laminate. Use a water-proof support underneath the object.



Stubborn spots should be selectively cleaned and removed with a suitable cleanser spray or acetone. Do not apply additional sealant onto the laminate flooring surface.

Attention! Protect the flooring from scratches or indentations! Use a sufficiently large doormat around the entry areas.



Furniture feet made of wood, metal or plastic must be furnished with felt-protectors. Office chairs with soft rollers (DIN 12529) are only to be used [35], or lay down a commercial quality protective matt. With consideration of these instructions, you will extend the longevity of your laminate flooring and be able to retain complete claim to the guarantee particulars.

Lifting or removing:

It is possible to replace or remove panels that have been laid as floating flooring in living areas and commercial areas without causing damage by first releasing the whole row along the long side by angling it to free it from the locking mechanism [36]. Next, the panels, while lying flat on the floor on the head side, should be bent on the narrow side and released from the bonding [37]. Please be particularly diligent and careful when undertaking this work in order to avoid damaging the tongue-and-groove sections.

Disassembly:

Disposal has to be made via residual waste.

Twin Clic installation

Important notice:

Please read through the complete laying instructions first! Precisely follow these instructions, in order to retain full warranty and guarantee claims.

Please check the panels in good lighting conditions for defects. Once you have used the panels you can no longer make any claims due to defects.

Please note that this laminate flooring is not suitable for wet rooms, e.g. bathrooms and saunas.

Notes before laying

An important prerequisite for the installation and long preservation of the laminate is a relative air humidity of 50-70%.

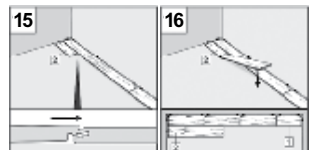
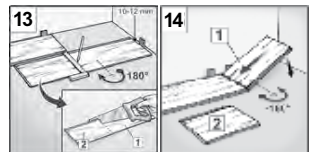
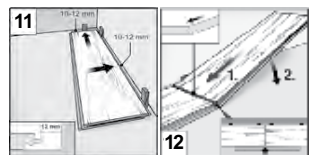
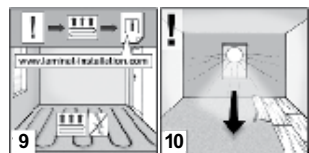
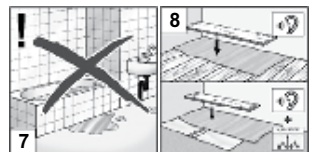
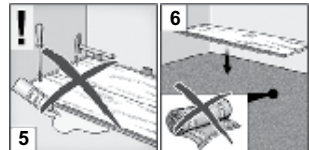
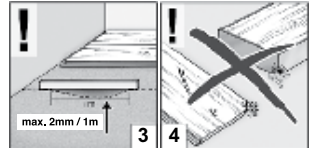
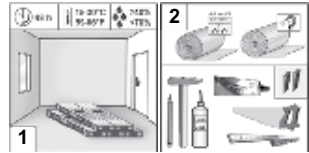
- The sub-floor must be absolutely level, dry, clean and firm.
- When laying on mineral surfaces e.g. concrete, cement screed, anhydrite screed and stone tiles, etc., extra care must be taken.
- Please allow 1 week drying time per cm depth to allow to completely dry out. Fit a Damp Proof Membrane (DPM) between mineral subfloor and underlay/ laminate flooring.
- Laminate flooring is laid "floating" and must not be glued, nailed or fixed to the sub-floor in any other way (e.g. by means of door stoppers)!
- We recommend you sort the panels before laying according to the required grain direction and any colour nuances.
- Use the contents of opened packages immediately! You will need the following to lay the flooring: Impact sound insulation, PE foil, spacing wedges, chock, fitting aid, saw, pencil and folding rule. If required, laminate floor joint sealant, White (PVA) glue D3, jointing compound.

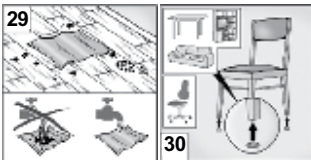
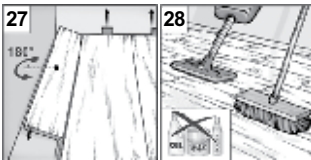
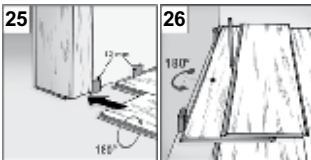
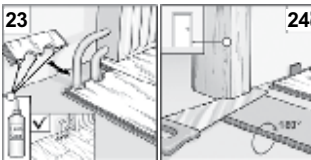
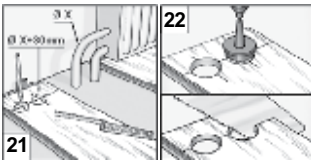
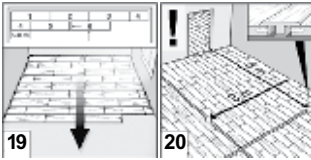
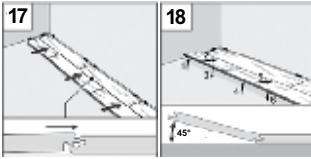
Depending on the area of use, there are three laying possibilities open to you:

- A. Fast, glue-free laying.
- B. Laying with Laminate flooring joint sealant. Laminate flooring sealant permanently protects the floor from moisture effects acting from above. Laminate flooring sealant does not glue panels down or together.
- C. Laying with glue also provides lasting protection against moisture, however the work is more complicated and time consuming and the flooring cannot be dismantled for possible relaying.

Preparation

1. Store unopened packs in the room to be laid for 48hrs to acclimatise.
2. Prepare all tools and underlay.
3. Any unevenness in the sub-floor of more than 2mm over 1m must be evened out.
4. Check for visual damage to the panels, as once laid no claims can be made.
5. The floor must be installed floating, do not glue, nail or screw the floor down.
6. Do not lay on carpet, remove before fitting.
7. Laminate is not suitable for humid or wet areas.
8. If laying over a stone/mineral sub floor, lay a Damp Proof Membrane (DPM); for enhanced noise reduction use a special absorption product or underlay.
9. Under floor heating can be used, to a maximum of 27°C a plastic spatula after max.15 - 20 minutes. Eventual remnants (residue) can be removed with household solvent cleanser.





Laying

10. For best results lay floor in the direction of the light source.
11. Begin laying in a corner with the tongue against the wall using spacers to maintain the 10-12mm expansion gaps.
12. Lay the next panel using a 45° angle folding action on the short edge. Continue this manner to complete the first row. It is essential that the panels are perfectly in line, as any misalignment will be exaggerated over subsequent rows.
13. For ease of measuring rotate the last panel 180°, offer up to space (don't forget the expansion gap) and mark and cut.
14. Rotate the cut piece and lay as before at a 45° angle.
15. Begin the next row using the off-cut from the end of the previous row. At this stage offer the long edge profile up to the previous row, so it just rests on top.
16. Continue to lay as before, folding the short edges together, using the long edge of the previous row as a straight edge guide to ensure alignment.
17. Once row is complete offer up in its entirety to previous row and fold in the long edge profile using a similar 45° angle and gently push down (take care not to use excessive force which may damage the profile).
18. Use a zipper type action to move down the row until panels are level and flush.
19. Continue this process to lay the entire room.
20. If the floor exceeds 8m x 8m expansion breaks in the floor are required, using relevant profiles.

Tips & Tricks

21. When cutting around heating pipes, place the panel in line both in front and along side to ascertain accurate marks. Include an additional 30mm on top of the pipe diameter for expansion.
22. Use a hole saw for accurate cutting then cut the panel across the short edge through the centre of the hole.
23. Fit the large piece as normal, and then insert the smaller piece gluing contact areas to hold in place. If space is at a premium, and you are unable to fold down, trim the profile flush using a wood chisel and glue in place.
24. To fit floor neatly around door frames and architraves, turn over a panel, offer up to the frame to use as a thickness guide. Using a hand saw flush with the underside of the panel, cut the frame/architrave, and, remove the cut piece.
25. Slide the panel under the frame, not forgetting to leave room for expansion.
26. When measuring the width for the final row, rotate the panel 180° so the tongue faces the wall, not forgetting space for expansion gaps.
27. Once the panel is cut, lay as normal. The space left for expansion will also allow space to fold the panels down.

Care & Cleaning

28. Use a soft brush or vacuum cleaner to remove any surface dust. Do not use abrasive cleaners, steel wool or scouring pads, as they will damage your floor.
29. For regular cleaning use a cloth, ensuring it is well wrung, it is important not to apply excess moisture to the floor. We do not recommend steam cleaning this product or using any polishes or chemicals that may damage the laminate surface.
30. We recommend to protect your floor, you use felt pads under furniture. Moveable furniture/chairs should be on soft castors or placed on a plastic mat.

Furthermore, any single piece of furniture placed on the floor should not exceed 115kg in weight.

Doormats should be used inside and outside of all external doorways to prevent grit from being carried across the floor, protecting the surfaces from excessive wear and tear.

Installation of warm water subfloor heating

Warm water under floor heating

The concrete sub-floor must be laid in accordance with the relevant building regulations and heating manufacturer's instructions. After the sub-floor has been laid it has to be allowed to dry completely before the floor covering is installed.

- Cement floor <1.5% CM
- Anhydrite (cast) Plaster <0.5% CM
- Floor: Ideally a value of <0.3 CM should be aimed for.

1. Starting with the 22nd day after the concrete installation, increase the water temperature by 5°C every day until the max surface temp of 45°C is reached.
2. Heat for 7 days at Max temp without interruption.
3. Then reduce by 5°C per day until 15 to 18°C concrete temp is reached.
4. Switch off the heating for 7 days.
5. Repeat the above heating up 5°C per day to full temperature then heat down to 27°C

The floor should now meet the moisture content requirement and therefore be ready for the laminate floor to be fitted at a constant temperature of 27°C Please note the relative humidity in the room must be between 50-65% prior, during and after installation.

A DPM and sound insulation underlay must be installed under the laminate as you would with an solid sub-floor. After installation the maximum surface temperature of 27°C should not be exceeded.

Electrical under floor heating systems

Historically it is generally not recommended to use electrical under floor heating systems in combination with laminate flooring, because they heat up and cool down more quickly, this can cause cupping, gapping and deformation of the boards.

However we can recommend a system by a company called "Warm Up" as they have carried out controlled tests on their system and it performed well.

We are well aware that there are many other electrical systems on the market so we would suggest you get confirmation from the manufacturer that the system is suitable for laminate before installation.

General instructions

Please note these are necessary steps to minimise possible strong reactions by the laminate flooring.

- Any deformation is caused by the wrong use of under floor heating systems and is not a product fault.
- Whatever the time of year the floor must be heated up during installation.
- A maximum surface temperature of 27°C must not be exceeded.
- Gaps are more likely to develop if the floor is covered with a rug or large items of furniture because of the higher surface temperature that then prevails.
- The floor boards must be heated up evenly any gaps or overlaps in the under floor heating will result in varying surface temperature and stress to the laminate flooring.

03



All your
questions
answered



What problems could arise in the practical production, processing, use and maintenance of laminate flooring?

All your questions answered

Q: What is laminate flooring?

A: Laminate Flooring is a High Density Fibreboard (HDF) based product designed to be a cheaper, easier to install alternative to traditional wood flooring. What appears to be a natural wood grain pattern is in fact a decorative paper overlaid with a hard wearing film. Both sheets are impregnated onto the top surface of a thin HDF making it a homogeneous product.

Laminate flooring is laid as a floating floor. This means it is not fixed directly to the subfloor.

Instead the panels are fitted together gluelessly using the profiles that have been machined into the edges of the laminate flooring boards.

Q: What is it made from?

A: 80-85% Virgin Wood, usually softwoods such as Spruce and Pine. 15-20% Organic U/F & M/U/F Resins. 3 layers of impregnated paper, a decorative top layer, an overlay (for wear resistance) and a balance paper for the bottom surface of the laminate flooring.

Q: How is it made?

A: Laminate flooring core is made from virgin wood, refined to wood fibre. The resins are added to the fibre before it is dried to approx 6.5% moisture content. The fibre is then laid onto a continuous mat and fed into the press where heat and pressure bond the resin to the fibre to create a HDF board.

This board is then cut into large sheets, cooled, before the top and bottom surface of the HDF is sanded off. The large HDF panel is then cut to smaller sizes in order for further processing.

The HDF is then fed onto the Melamine Facing press where the decorative paper, the hard wearing overlay and bottom balance paper are pressed onto the board, again using heat and pressure to impregnate the papers into the surface of the HDF board.

For the final step of manufacture, the impregnated boards are sent to the laminate flooring line where the boards are cut into the exact size panels. The profiles are then machined into the edges of the board (to allow them to be fitted together gluelessly), and finally the panels are boxed up and stacked into large pallets ready for distribution.

Q: Where can I install my laminate flooring?

A. Our laminate flooring is an extremely versatile flooring product. It can be installed in virtually any room of your home as well as commercial environments such as high traffic areas and places where hygiene is paramount including:

- Bedroom
- Living Room
- Children's Room
- Hall
- Kitchen
- Office (12mm products only)

There are some areas that we do not recommend installing laminate flooring such as bathrooms, wet rooms and saunas.

Bathroom installation

Extra care must be taken when using laminate flooring in bathrooms due to the increased risk of water damage. Make sure that any spilt water is wiped from the floor immediately and that you use a bath mat when getting out of the bath/shower. Also ensure that the bath mat is removed from the floor after use and allowed to dry. A wet bath mat must not have prolonged contact with laminate flooring! Bathroom floors can be installed as normal, with polythene and main underlays and with an expansion gap of 10-12mm around the full perimeter of the floor. Important note: Make sure that you apply a laminate flooring joint sealant down the long and the short profile before clicking together-(& wipe away any excess immediately after clicking together!)-in order to achieve optimum moisture resistance. Under no circumstances should the toilet, bath or sink pedestal ever be screwed directly to the floor, instead a 10-12mm expansion gap should be left around the base. After installation, any expansion gaps should be filled with a flexible silicone sealant which can then be covered with skirting, beading or across thresholds with a door-bar. Fixed objects, like kitchen units, should also never be fitted onto laminate flooring.

Q: What do I have to do with the packs before installation?

A: There are several things to consider before you begin to install a laminate floor. Careful preparation before beginning will make installation a quick and easy process:

1. Store unopened packs in the room to be laid for 48hrs to acclimatise
2. Prepare all tools and accessories for laying.
3. Any unevenness in the sub floor of more than 2mm over 1m must be evened out.
4. The floor must be installed floating, do not glue, nail or screw the floor down, and remember to leave expansion gaps around walls and fixed objects.
5. Do not lay on carpet, remove prior to fitting.
6. Laminate is not suitable for humid or wet areas.
7. If laying over a stone/mineral sub floor, lay a Damp Proof Membrane (DPM); and for enhanced noise reduction use a special absorption product or underlay.
8. Under floor heating can be used, at a maximum of 27°C.
9. Check for visual damage to the panels, as once laid no claims can be made.

Q: Can laminate be laid onto carpet?

A: All floor coverings should be removed and a specified laminate flooring underlay used. Carpet underlay should not be used with laminate flooring.

Q: How should I store my laminate flooring?

A: Laminate flooring is hygroscopic, meaning that it is susceptible to reaction to moisture levels in the atmosphere. It is necessary to ensure that flooring is installed in a stable environment.

We recommend the boards are stored and laid in a relative humidity of between 45% - 65% and a room temperature of between 18% and 20%.

All your questions answered

Q: Tips & Tricks for Installation

- A:** When cutting around heating pipes, place the panel in line both in front and along side to ascertain accurate marks. Include an additional 30mm on top of the pipe diameter for expansion.
- Use a hand saw for accurate cutting then cut the panel across the short edge through the centre of the hole.
 - Fit the large piece as normal, and then insert the smaller piece gluing contact areas to hold in place. If space is at a premium, and you are unable to fold down, trim the profile flush using a wood chisel and glue in place.
 - To fit the floor neatly around door frames and architraves, turn over a panel, offer up to the frame to use as a thickness guide. Using a hand saw flush with the underside of the panel, cut the frame/architrave, and, remove the cut piece.
 - Slide the panel under the frame, not forgetting to leave room for expansion.
 - When measuring the width for the final row, rotate the panel 180° so the tongue faces, not forgetting space for expansion gaps.
 - Once the panel is cut lay as normal. The space left for expansion will also allow space to fold the panels down.

Q: How do I determine the direction in which to install my laminate floor?

A: To decide where to begin laying your floor consider incoming light. It is best to install laminate flooring in the direction of the main light source.

Q: What is the best way to clean a laminate floor?

A: Use a soft brush or vacuum cleaner to remove any surface dust. Do not use abrasive cleaners, steel wool or scouring pads, as they will damage your floor. For regular cleaning use a cloth, ensuring it is well wrung, it is important not to apply excess moisture to the floor.

Q: What can I do to maintain the look of my floor?

A: The Krono Original collection is virtually maintenance free. All it needs to restore its lustre after most incidents is a wipe with a damp cloth. To keep your laminated floor in good condition, be sure to use the floor exclusively under the recommended conditions. Put down a mat or rug to eliminate the risk of marks (gravel, soil etc.) inside doorways and around sinks, etc, to protect from spillages. Move furniture carefully to avoid damaging the laminated surface. Felt pads are recommended under chairs and heavy furniture.

Types of stain	Treatment
Fruit, Berries, Juice, Milk, Cream, Soft Drink	Mild cleaning agent
Beer, Wine, Tea, Coffee, Urine	
Rubber, Tar, Ink, Asphalt, Lipstick	White spirit or acetone (wipe with a damp cloth)
Chocolate, Shoe Polish, Oil, Grease	Methylated spirits (wipe with a damp cloth)
Blood	Cold Water

Important Note

Laminate flooring is hygroscopic, meaning that it is susceptible to reaction to moisture levels in the atmosphere. It is necessary therefore to ensure that flooring is installed in a stable environment. We recommend the boards are stored and laid in a relative humidity of between 50%-70% and a room temperature of between 18°C and 20°C.

Q: What can I do to maintain the look of my floor?

A: The Krono Original collection is virtually maintenance free. All it needs to restore its lustre after most incidents is a wipe with a damp cloth. To keep your laminated floor in good condition, be sure to use the floor exclusively under the recommended conditions. Put down a mat or rug to eliminate the risk of marks (gravel, soil etc.) inside doorways and around sinks, etc, to protect from spillages. Move furniture carefully to avoid damaging the laminated surface. Felt pads are recommended under chairs and heavy furniture.

Q: What are the health benefits of laminate flooring?

A: Unlike dense carpet; dust and dirt cannot get a grip on the smooth surface of the laminate floor. Krono Original floors are a healthy alternative, because they are produced from natural raw materials -without using wood preservatives. In addition, they are chloride and PVC free, so that no harmful evaporations arise.

Q: Can I use a steam mop?

A: We do not recommend steam cleaning this product or using any polishes or chemicals that may damage the laminate surfaces.

Q: What are the advantages of laminate flooring?

A: The main advantage with Laminate Flooring is it is easy to install, is very durable and hard wearing and relatively inexpensive compared to real hardwood flooring. It is also a very versatile product which can be used in various areas and low maintenance, and a more natural & healthy alternative to carpets.

Q: Why choose laminate flooring over carpet?

1. Easy to install
2. Cheaper
3. Low maintenance
4. Can be installed fairly quickly and inexpensively
5. More hygienic
6. Scratch resistant and fade resistant
7. Stain Resistant
8. Durable
9. Dust and dirt repellent
10. Aquastop core-suitable for splash areas

Q: What expansion gap do I need to leave?

A: An expansion gap is a necessary part of any successful installation because it allows space for the expansion of the floor as it responds to external influences of temperature and humidity 10mm minimum must be left around the full perimeter and any fixed objects, and threshold strips in all doorways.

Q: How do I repair small scratches?

A: You cannot repair small scratches, therefore it is very important to use felt pads on all furniture. Repair kits are available from most DIY stores, or online such as Color Fill. These can be used to improve minor chips/defects to the laminate surface.

Q: How do I work out how much flooring I will require?

A: Multiply the width by the length in metres then add 10% for cutting waste. If the room has bay windows, archways etc. to be cut around, then increase to 20%. You then divide the result by the square area in the packs.

Q: Is it possible to replace a damaged plank after installation?

A: Yes the boards can be lifted and refitted.

Q: Can laminate flooring be installed over underfloor heating?

A: Sub floors with hot water systems have to be prepared prior to fitting the laminate (special instructions are available). With regards to electrical heating systems we advise contacting the manufacturer; some systems have been tested and approved. The maximum temperature the floor should be heated to is 27°C.

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