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## Installation of Laminate Flooring

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## Table of Contents

1.	Introduction .....
2.	Laminate Flooring.....
2.1	Definition and Construction.....
2.2	Storage of Laminate Flooring prior to Installation.....
3.	Room Climate.....
4.	Substrate.....
4.1	Assessment of Substrate.....
4.1.1	Levelness.....
4.1.2	Strength .....
4.1.3	Dryness.....
4.2	Preparation of Substrate.....
5.	Bonding of Laminate Flooring.....
6.	Additional Notes .....

## 1. Introduction

Installation instructions for laminate flooring so far only refer to so-called “floating installation”. With this method, laminate flooring is installed directly on substrate or insulating underlays without creating a bond between the individual layers of the construction. The great majority of laminate flooring types therefore requires a tongue and groove bond in order to protect joint flanks from permeating moisture. There exists laminate flooring with pre-sealed joint flanks or special tongue-groove locking systems which do not require joint glueing.

As an alternative to “floating installation”, a variety of laminate flooring which are tongue and groove bonded or which have edge-protection and are not joint glued, may be fully bonded to the substrate. This installation method is useful in case of high demands regarding sound insulation, load bearing capacity of the flooring area or, in case of underfloor heating systems, high heat transfer requirements. This technical briefing note wants to assist installers regarding proper and professional bonding of laminate flooring to the subfloor.

**Note:** This technical briefing note only applies to laminate flooring for which manufacturers have expressly included full bonding in their installation instructions.

## 2. Laminate Flooring

### 2.1 Definition and Construction

Laminate flooring is a hard floor covering with a decorative, abrasion-resistant top layer, consisting of one or several thin layers of a fibrous material (mostly paper), impregnated with heat-cured aminoplast resins (mainly melamine resin). These layers are then either fused (HPL, CPL, Compact) and in case of HPL and CPL bonded to a carrier

material (mainly wood composite panels) or are directly fused to such carrier. Normally, the carrier is equipped with a stabilizing layer on the back side (sometimes called counter-laminate). Laminate flooring elements are manufactured in pre-fabricated panels of varying sizes and shapes and come with tongues and grooves on the long and narrow sides, always facing each other.

### 2.2 Storage of Laminate Flooring prior to Installation

Laminate flooring is delivered bundled in foil. Prior to installation, the temperature of the elements must adjust to the temperature of the installation room. They are therefore stored in the installation room or in a room with the same temperature, horizontally and still unpacked for a minimum of 48 hours. A clearance of at least 50 cm must be kept between the packages and the walls to prevent negative impact from wall temperature or wall moisture. Right before installation, each element shall be checked for evenness and imperfections.

## 3. Room climate

The following climate conditions must prevail in installation rooms during pre-storage and installation:

- room air temperature: min. 18 °C
- floor temperature: min. 15 °C
- relative humidity: max. 75 %, preferably max. 65 %

These room climate conditions are required for installation and may not necessarily represent the room climate during later use. However, even for later use it is beneficial for conservation of the flooring value to maintain a comfortable living climate with air temperatures between 18 to 23 °C and a relative humidity of 55 to 65 %.

## 4. Substrate

### 4.1 Assessment of Substrate

Condition and proper preparation of the substrate is essential for “floating installation” as well as for bonding of laminate flooring to the subfloor. The substrate shall be checked according to ATV DIN 18365 “Bodenbelagsarbeiten” or ATV DIN 18356 “Parkettarbeiten”. It shall be ensured that substrate is clean, firm, free of cracks, level and dry. If sub-standard conditions are found, reservations must be documented in writing.

Calcium sulfate flow screeds shall generally be sanded and vacuumed (see Technical Information No. 1990/2 of Bundesverband Estrich und Belag e.V. (BEB) “Hinweise zur Beurteilung und

Vorbereitung der Oberfläche von Anhydritfließestrichen" and also see TKB-Technical Briefing Note 8 of Industrieverband Klebstoffe e.V. "Assessment and Preparation of Substrates for Installation of Floor coverings and Parquet").

This measure which is always required for calcium sulfate flow screeds, can be performed by the screed installer as a subsidiary service or as a special service by the laminate flooring installer. The actual strength testing of the substrate shall only be performed after these measures have been executed.

#### 4.1.1 Levelness

In order to prevent hollow areas, strict requirements must be placed on levelness of the substrate according to DIN 18202, table 9, line 4. With a measuring point distance of 1 m, a depth gauge of 3 mm shall not be exceeded at any point. This requirement can be met by levelling the substrate with the proper levelling compounds where necessary.

#### 4.1.2 Strength

To check surface strength, generally a "grid scratch test" is performed. For calcium sulfate flow screeds, an additional "hammer test" might be required (see above mentioned Technical Information No. 1990/2 BEB and above mentioned TKB-Technical Briefing Note 8). Soft surface areas or hard sinter layers are generally considered defects which must be removed by suitable mechanical measures such as grinding, brushing, shot blasting or milling.

#### 4.1.3 Dryness

As with installation of all wooden floor coverings, for laminate flooring as well the residual moisture of the substrate must be checked and sufficient dryness is of the utmost importance. Direct installation on concrete or substrates with direct contact to soil without adequate moisture barriers and thermal insulation is basically not recommended, regardless whether flooring is installed with floating method or fully bonded.

The residual moisture of substrate is measured using the CM reader. It is recommended not to exceed the following moisture thresholds:

- cement screeds: max. 2.0 CM-%  
anhydrite/calcium sulfate screeds: max. 0.5 CM-%

For heated screeds, the following moisture thresholds shall not be exceeded:

- cement screeds: max. 1.8 CM-%  
anhydrite/calcium sulfate screeds: max. 0.3 CM-%

- anhydrite/calcium sulfate flow screeds:  
max. 0.3 CM-%

For heated screeds, it is important that customer performs proper and professional heating/cooling before flooring is installed (must submit heating protocol). The minimum wait time for screeds until first heat-up is normally 14 days for calcium sulfate flow screeds and 21 days for cement screeds. The heating process must be performed in a way to ensure that screed is mostly dried out (see "Maßnahmenprotokoll für Heizestriche" of Zentralverband Parkett und Fußbodentechnik, Bonn, d. "Kommentar zur DIN 18356"). For this purpose:

- screed is gradually heated by 10 °C per day until maximum flow temperature is reached
- screed is heated for approx. 10 days at maximum flow temperature
- screed is then cooled by 10 °C per day until a flow temperature of 20 °C is reached

For heated screeds type A3, a two-stage dry heating is recommended, where after cool-down and 5 days without heating, the described heat/cool cycle is repeated, however omitting step b).

The check of residual moisture is performed using the CM device at measuring points marked by screed installer. If these measuring points have not been marked, reservations shall be documented in writing. The screed installer or the customer must then later designate measuring points where the CM measurement can be performed without damaging the heating system.

If even this is not feasible, there is an alternative to determine if inadmissible residual moisture levels are present, however, the heat/cool cycle must have already been performed:

Place a 0.2 mm thick PE film on the screed surface in a 1 x 1 m area and tightly attach it with adhesive tape. Hygrometers which have first been checked to show the same reading of the relative humidity in the room are placed one under the film and one on the outside. Then, again the maximum flow temperature is set. Reading is performed one day later. If condensation shows on the underside of the film, e.g. water film or drops or/and the hygrometer under the film will show a significantly higher humidity than the one placed outside, there is clear evidence that the screed has inadmissibly high residual moisture. The heat/cool cycle described above then needs to be repeated.

## 4.2 Preparation of Substrate

The checked substrate shall be cleaned and vacuumed using an industrial cleaner. Again, we expressly point out the special requirements for

calcium sulfate flow screeds according to item 4.1 (sanding before installation). The cleaned substrate is then primed and, if required to create needed levelness, the substrate shall be fully levelled using a levelling compound suitable for parquet and laminate floor coverings. The minimum levelling layer thickness must be 2 mm.

## 5. Bonding of Laminate Flooring

Area adhesives for bonding laminate flooring to the subfloor are exclusively solvent- and water-free polyurethane adhesives (1 or 2 component) specifically recommended for this purpose. This type of adhesives sets very quickly with sufficient strength and elasticity. Laminate flooring installed with this type of adhesive is normally ready for foot traffic after 12 - 24 hours and fully load bearing after 24 - 48 hours.

**Note:** The work process described in the following refers to laminate flooring installed with joint glued tongue and groove system. For laminate flooring where joint glueing is not required, the respective steps can be skipped. However, the actual full area bonding to the subfloor is performed in the same way.

For tongue and groove glueing only a white or cold glue specifically recommended for this purpose shall be used. As a rule, these are wood glues of durability class D2 or D3 according to DIN EN 204.

Before installation is started, a fixed stop point must be established along a reference wall. It is useful to install 3 aligned element rows with grooves facing the wall 1 or 2 days prior to installation. With wedges or adjustable wall spacers a sufficient clearance to wall of 6 - 8 mm is established which will then be adhered to during the remainder of the installation.

If adhesive manufacturer has not issued different instructions, the adhesive is applied to substrate using a notched trowel (size B3) - (consumption 500 – 1000 g/m<sup>2</sup>). Before each laminate element is placed into the adhesive bed, the groove on the long and narrow side is filled with an uninterrupted string of joint glue. Glue applicator bottles with a special slotted nozzle are helpful for this step.

The element with the joint glue applied is placed into the adhesive bed and using an appropriate hammer block and by lightly tapping, grooves are fitted into tongues of neighbouring elements already installed.

For the elements facing the wall, a pulling iron might need to be used.

Always observe open times of the adhesives used and make sure the backs of the elements are fully wetted. If needed, use a notched trowel with larger notches.

When installing and positioning the elements, make sure that no significant amount of adhesive enters into joint area.

Already applied and protruding adhesive, which is not immediately covered with elements, shall be scraped off and removed from substrate while still fresh.

Joint glue protruding from joint on top must be scraped off and removed using a damp cloth while still fresh.

Accidental contaminations with reactive adhesive on laminate surfaces must be completely removed while still fresh. A solvent recommended by the adhesive manufacturer, mostly ethyl alcohol, shall be used because it does not damage the upper laminate layer. Hardened contaminations can only be removed mechanically which bears the risk of damage to the surface.

Partial areas installed within approx. 30 minutes shall be checked for hollow areas. Uneven or deformed elements can be weighed down during this period or immediately after installation in order to ensure even wetting of the back and consequently a force-locked connection with substrate.

## 6. Additional Notes

Over existing expansion joints in substrate also expansion joints in the laminate flooring have to be installed. Depending on instructions given by the respective manufacturers, additional expansion joints may be required for bonded laminate flooring.

The instructions of laminate flooring manufacturers regarding type of joint glueing might vary on account of different tongue and groove geometry and shall always be observed.

The instructions of laminate flooring manufacturers regarding proper cleaning of the flooring shall be communicated to user. In particular it must be noted that with some laminate types, excess water penetrating into the joint during cleaning might result in swelling and optical impairment of the joint appearance.