



## **INSTALLATION RECOMMENDATIONS FOR DLW LINOLEUM**

DLW Linoleum is manufactured from predominantly natural and renewable raw materials. These give the linoleum the following material properties that must be taken into account during installation:

### **Drying room film**

After manufacture, linoleum matures in drying rooms. The linseed oil used as a raw material causes what is known as the “drying room film” during the maturation process. This drying room film, which can be seen as a yellow discolouration, recedes when the goods are exposed to light. With direct sunlight, the film recedes after a short period of time, while with artificial light or weak sunlight it may take some days or weeks. Sheets and panels that will be used in the same installation process should therefore be exposed to the same light conditions.

### **Reaction to moisture**

The linoleum reacts to excessively high moisture from the air, substrate or adhesive with dimensional changes.

**Laying DLW Linoleum is easy if the following points are observed:**

### **1 Substrate**

Suitable substrates for laying DLW Linoleum are all those that are flat, sound, free from cracks, dry or stay dry (see also VOB Part C, DIN 18365 flooring work, as well as the respective relevant regulations).

When using dispersion adhesives, dense, non-absorbent substrates, such as mastic asphalt and primed screeds, must be levelled to an adequate thickness (approx. 2 mm recommended). For this the material supplier recommends low-stress levelling compounds. Please observe the detailed product and application recommendations of the manufacturers.

In the case of normal screed thickness, i.e. not significantly above the minimum requirements of DIN 18 560, the following rules of thumb apply for the residual humidity of the various screeds:

<b>Screed type</b>	<b>Acceptable residual moisture in CM %</b>
Calcium sulphate and calcium sulphate flowing screed	< 0.5
Cement screed	≤ 2.0

In the case of insulating substrates, such as mastic asphalt, particle board, and with underfloor heating, etc., we recommend that antistatic floor coverings are also glued with conductive adhesive. This cancels out the capacity-reducing effect of the substrate.

## 2 Measurement and needs assessment

### 2.1 Sheets

The sheet lengths and widths required must be determined for the needs assessment carried out for material in sheet form. Make sure that only one production batch is laid in a given room, in the order of the roll numbers (the same applies for panels and sheets). The direction of laying must therefore be established prior to the measurement. Head seams are permitted with sheets lengths of more than 5 m, with no base length of less than 1 m being accepted. Sheets that run up to door openings, recesses or similar must cover these surface areas. Lateral door openings and recesses may be laid with strips.

### 2.2 Stair treads

Stairs are cut from material in sheet format. In the case of floor coverings with patterns aligned longitudinally, these should run parallel to the stair edge. The same applies to platforms. The need is calculated based on the number of stairs that can be cut from one sheet. With spiral staircases, templates are created for this purpose.

### 2.3 Panels

In general, panels are laid with cross joints in alternating directions. However, on special instructions, they may also be laid in the same direction. With regard to the joint run, parallel and diagonal laying are both possible. For the measurement, the surface area over which the floor covering is to be laid is taken as the basis, with an addition for wastage based on experience. Wastage is higher with diagonal laying than with parallel laying, and higher with lopsided or round surface areas than with straight ones.

## 3 Storage, air conditioning and installation conditions

Proper storage and acclimatisation is the precondition for linoleum that is easy to install.

In principle, linoleum rolls are stored on end in dry rooms at normal temperature. With panels, no more than eight boxes may be stacked one on top of the other.

Store the sheets that have been cut to size, loosely rolled up with the surface to the outside, for at least 24 hours in the room in which they will be laid, heated to at least +18 °C, but not in direct sunlight (see Drying room film). This allows the material to acclimatise, i.e. to adapt to the room humidity and the temperature there. The temperature of the substrate must be at least +15 °C and between +18 °C and +22 °C on under-floor heating. The maximum relative humidity should be 65% (ideally, between 40% and 60%). These climatic conditions should be maintained for 3 days before preparatory work starts and for at least 7 days after completion.

## 4 Laying DLW Linoleum

### 4.1 Adhesives

In general, for all types of adhesive that are suitable for linoleum, the adhesive is applied over the entire surface using the B1 trowel notch size. Please also observe the processing recommendations from the adhesive manufacturers. Adequate wetting of the reverse of the floor covering (jute) must be checked continuously during installation.

In principle, we recommend gluing using dispersion adhesives of the lowest emissions class, which are fast setting with hard joint formation and shear force-resistant properties.

We do not recommend multifunctional adhesives for gluing linoleum.



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Updated: 09/2015

## 9 Manufacturers

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Kiesel Bauchemie Wolf-Hirth-Str. 2 D - 73730 Esslingen, Germany Tel. +49 (0)711 - 93134352 <a href="http://www.kiesel.com">www.kiesel.com</a>	Mapei GmbH Bahnhofsplatz 10 D - 63906 Erlenbach, Germany Tel. +49 (0)9372 - 98950 <a href="http://www.mapei.de">www.mapei.de</a>	UZIN UTZ AG Dieselstr. 3 D - 89079 Ulm, Germa- ny Tel. +49 (0)731 - 4097258 <a href="http://www.uzin-utz.com">www.uzin-utz.com</a>	Wakol GmbH Bottenbacher 30 D - 66954 Pirmasens, Germany Tel. +49 (0)6331 - 8001186 <a href="http://www.wakol.com">www.wakol.com</a>

The adhesive manufacturers mentioned are representative of many others. The adhesives recommended by the adhesive manufacturers and the adhesives for Linoleum Marmorette Acoustic Plus can be requested directly from the manufacturers or from our Technical Customer Service by telephoning +49 (0) 7142 - 71 255.

## 4.2 Laying process

### 4.2.1 Seam cutting

In all cases, seam cutting must be carried out so that a gap of approximately 0.5 mm remains open between the sheets. The cut is carried out vertically or at a slight angle so that the joint is loose, i.e. without the two sheet edges making contact. If the seam areas are not to be sealed using a welding rod, the seam edges must be tight against one another but not pressed together.

It is recommended always to cut both sheet edges, as only the cleanly cut edge of the floor covering guarantees a clean seam joint. The first sheet edge is easily cut using the linoleum edge cutter or strip cutter (approx. 2 cm). There are two possible methods for cutting the second edge:

#### - In small rooms (up to two sheet widths):

Before applying the adhesive, the underlying sheet is scored along the upper sheet edge that has already been cut using the knife and the strip that falls away is then cut off in the opposite direction with the utility knife.

#### - In large rooms (more than two sheet widths):

After application of the adhesive, the uppermost edge of the sheet is scored along the sheet edge that is positioned in the adhesive base and has already been cut, using the marker or the *Linocut* tool, and the strip that falls away is cut off with the utility knife.

### 4.2.2 Head ends

With seam cutting, the possible dimensional changes in the floor covering must be taken into consideration. Consequently, when putting together longer sheets, the head ends are only cut after insertion in the adhesive base.

### 4.2.3 Adapting to door sills

The sheets are laid out, adapted to door sills, radiator recesses, etc. with a bevel, and cut to size. The sheets are then folded back and the adhesive is applied.

### 4.2.4 Panels

Linoleum panels are manufactured to order and should be installed as soon as possible, but no later than 8 weeks after delivery. The panels should be stored in dry rooms. The panels must be glued immediately after their packaging is opened. For recommended adhesives, see Point 4.3 Gluing.

### 4.3 Gluing

In principle, adhesive is applied to the entire area. To wet the rear surface correctly it is essential to select the correct trowel notch size and replace the putty knife blades in good time, as well as to apply the adhesive thoroughly. The wetting of the rear surface must be checked on an ongoing basis by lifting up the material as the work is carried out. For this, please observe the processing guidelines from the adhesive manufacturers.

### 4.4 Sheets

The sheets are folded back and then the adhesive is applied to the floor. One after another, the sheets are inserted into the still open (wet) adhesive base, within the working time recommended by the adhesive manufacturer. The latest insertion point depends on the room temperature and humidity as well as the absorbency and moisture of the substrate. No air may be trapped when inserting the sheets, it must be expelled laterally. Cavities that are detected by running a hammer over the floor covering can be pierced and the air can be driven out.

In hallways laid longitudinally, the sheets are folded back transversally. Head ends are rolled in the opposite direction to relax the floor covering.

### Consumption of adhesive and trowel notch size for gluing DLW Linoleum:

Adhesive	Trowel notch size	Consumption
Dispersion adhesive	B1	300-400 g/m <sup>2</sup>

### 4.5 Panels

Once the adhesive has been applied, installation of the panels that have been positioned as the reference point or line begins. In large rooms, step-by-step laying is recommended in order to avoid any misalignment. In order to wet the reverse surface, the panels must be carefully rubbed or pressed down. Where necessary, this process must be repeated.

### Adhesive consumption and trowel notch size for gluing Linoleum panels:

Adhesive	Trowel notch size	Use
2K dispersion adhesive	B1	400-500 g/m <sup>2</sup>

## 5 Joint sealing

In line with TKB Leaflet 4 from the *Technische Kommission Bauklebstoffe* [German Technical Committee for Construction, TKB], part of the *Fachverband Klebstoffindustrie e.V.* [German Professional Association for

the Adhesives Industry], sealing the joints with welding rod is always recommended. This particularly applies to areas in which frequent wet cleaning and/or thorough cleaning will be carried out, as well as to moisture-sensitive substrates, for example particle board or crushed cork underlay. When laying linoleum in panel form, the seams should always be sealed using a welding rod.

The sealing process itself is carried out either using the hand-held welding torch or the welding machine. In principle, this is done after the adhesive has set, i.e. approximately 48 hours after installation in the case of dispersion adhesives (also refer to the adhesive manufacturer's recommendation).

Sealing the seams too soon may lead to adhesive changes in the seam area due to exposure to heat and impair the gluing effect here.

The joint in the floor covering is milled out to a depth of at 2/3 of the covering thickness using a seam groover and gouging torch. The groove must then be cleaned carefully. The joint width should be approximately 3.5 mm.

DLW welding rods can be worked using the hand-held welding torch and attached speed welding nozzle (d = 5 mm). The processing temperature is approximately 400- 450 °C, and the work takes place at a speed of around 2.5 – 3 m per minute.

The projecting part of the welding rod is removed in two work steps:

immediately after insertion, the still-warm welding rod is cut off using the quarter moon knife and attached blades; after the welding rod cools down, the welding rod is cut flush to the upper edge of the floor covering using the quarter moon knife.

Tip: With linoleum that has not been exposed to the light (see Drying room film), colour differences may arise between the sheets and the welding rod. The colour of the floor covering will adjust to that of the welding rod after the drying room film recedes.

## 6 DLW Korkment crushed cork as underlay

In order to ensure that the guaranteed technical properties of our linoleum floor coverings are retained, only DLW Korkment crushed cork underlay is recommended as insulating underlay for DLW linoleum. DLW Korkment crushed cork underlay can be laid on all prepared substrates. It should only be combined with floor coverings without PUR surface protection. Here the linoleum should be at least the same thickness, or preferably thicker, than the crushed cork underlay.

The sheet direction may be the same as that of the upper covering, and in this case the seams must be positioned with at least 50 cm offset. However, the crushed cork underlay can also be laid transversally to the linoleum sheet. With crushed cork underlay, the seam cut can be carried out as a "double cut" with the hooked blade or trapezoidal blade along the ruler.

Linoleum dispersion or 2K dispersion adhesives are used for gluing DLW Korkment crushed cork underlay and also the linoleum. Only once the adhesive has completely set can the process of laying the upper floor covering begin.

Where there are increased loads, for example in hospitals, the crushed cork underlay may also be laid with the reverse side/jute facing upwards.

**Adhesive consumption for laying DLW Korkment crushed cork underlay:**

Adhesive	Trowel notch size	Consumption
2K dispersion adhesive	B1	400-500 g/m <sup>2</sup>

Adhesive	Trowel notch size	Consumption
Dispersion adhesive	B1	300-400 g/m <sup>2</sup>

**7 Laying on underfloor heating**

In principle, DLW Linoleum can be glued to substrates with hot-water underfloor heating; the thermal resistance is so low that it is of almost no significance for operation of the heating (technical information: Interface coordination in underfloor heating structures. Publisher: Zentralverband Sanitär Heizung Klima) [German central association of the sanitary, heating and air-conditioning industries].

**7.1 Dry construction**

Dry designs can consist of calcium sulphate or gypsum fibreboard panels. After levelling out the joints, DLW Linoleum can be laid.

**7.2 Wet construction (A1 – A3)**

With wet constructions, the heating pipes are embedded in a floating cement or calcium sulphate screed. Before laying the floor covering, the heating system installer should ensure that the moisture, which is driven out by the effect of heat, escapes before laying. The heating engineer must submit the prescribed heating and cooling report on the measures carried out. A moisture test must be carried out only at the locations marked by the screed installer. If no measuring points are available, the floor layer should make the client aware in writing of his concerns.

**8 Conductive laying of DLW Linoleum LCH**

The requirement for a floor with a maximum resistance to earth of  $1 \times 10^8$  Ohm is satisfied by conductive installation of DLW Linoleum LCH. The conductive floor must be earthed by an electrician, who must observe the corresponding VDE regulations. The adhesive used must be homogeneously conductive. Information on the type of adhesive and conduction system must either be obtained directly from the manufacturer, or by telephoning the DLW Flooring Advisory Service on +49 (0) 7142 - 71 845.

**Commonly-used conduction systems are as follows:****8.1 Laying on copper tapes**

A continuous copper tape must be laid under each row of tiles or sheet of floor covering. The copper tapes must be connected transversally by two tapes. Connection points for potential equalisation must be provided in two places within the room, or in multiple places with larger rooms (above 40 m<sup>2</sup>).

We offer copper tape for conductive installation of DLW Linoleum LCH.  
Delivery form: rolls of 50 running metres.

**8.2 Laying on a conductive layer**

The conductive primer is applied in line with the manufacturer's processing guidelines. A piece of copper tape measuring approximately 1 m in length is glued to the substrate at the connection point provided. Please consult the material supplier prior to implementation.

### Frequency of connection points

in two places within the room, or in multiple places with larger rooms (above 40 m<sup>2</sup>). The maximum distance from an earthing point must not be more than 10 m.

### 8.3 Laying with dual requirements

DLW Linoleum LCH is conductive and simultaneously satisfies the requirement for site insulation in line with DIN 57100 / VDE 0100-410. As a matter of principle, due to the issue as a whole, we recommend telephoning our Technical Advisory Service on 49 (0) 7142 – 71 845 to obtain information.

## 9 Cleaning and maintenance

The contractor must give the customer the written maintenance instructions for the floor covering in line with VOB, DIN 18365 Part C, Paragraph 3.1.4. The following information is available free of charge:

Cleaning and care instructions for DLW Linoleum

It can be requested by telephoning +49 (0) 7142 - 71 340.

## 10 Special instructions

### 10.1 Office chairs with casters

For use on resilient floor coverings, office chairs must be equipped with type W casters according to EN 12529, i.e. with soft casters in the prescribed dimensions (50 mm diameter, 20 mm tread 100 mm crown radius of the tread). This must be taken into account when procuring new casters.

### 10.2 Discolouration

*Prolonged contact with rubber can cause discolouration of resilient floor coverings, which cannot be removed.*

*Take, for example, the following possible causes: car tyres, covering materials, casters or feet on washing machines, refrigerators, pushchairs, etc. This discolouration will not arise immediately but rather as a result of the transfer of substances followed by exposure to light. Casters made of polyurethane must be used to avoid such discolouration. If this is not possible, then it is advisable to use protective pads. In the case of light-coloured floor coverings, tar asphalt, mineral oils, fats and coloured floor wax, which can be introduced onto the flooring by footwear, may lead to discolouration in the most frequently used areas. This is, for example, the case in areas which are accessed from asphalted streets, in kitchens or in offices of petrol stations and repair shops.*

### 10.3 Adhesive tapes

*If adhesive tape is used on the flooring, please contact the adhesive tape manufacturer in question for details of compatibility.*



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Updated: 09/2015

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***We will be happy to provide further information:***

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***This issue supersedes all previous issues***