

RECOMMENDATIONS FOR INSTALLATION

Armstrong DLW linoleum is manufactured from natural and recyclable raw materials. The properties of linoleum that derive from these materials must be taken into account during installation.

A. Reaction to moisture

Excessive humidity in the air or moisture in the sub-floor or adhesive can cause changes in the dimensions of the linoleum. Therefore, please follow the guidelines regarding sub-floors and adhesives outlined in the sections below.

B. Veiling

The natural veiling caused by the linoleum curing process in the drying chamber and visible as a yellowish discoloration disappears over time from exposure to light. This process takes only a short amount of time when exposed to direct sunlight; it may take several days or even weeks under artificial light or weak sunlight. Therefore, sheets and tiles installed at the same time should be exposed to identical light conditions.

If the instructions are followed closely, Armstrong DLW linoleum is simple to install.

1 SUB-FLOOR

Armstrong DLW linoleum can be installed on all sub-floors that are level, firm, free of cracks and dry (see also VOB Part C, DIN 18365, Floor-covering work, together with other regulations applicable to individual cases).

If dense, non-porous sub-floors, for example, poured asphalt, and primed screeds are used, they must be coated with a sufficient layer of dispersion adhesive (recommended 2 mm). Cement-bound, low-tension compounds recommended by the material's suppliers are suitable for this purpose. Please observe the adhesive manufacturer's detailed product and model recommendations.

The following values apply to residual moisture and drying times for various primed screeds at normal screed thicknesses, i.e. not considerably above the minimum requirements according to DIN 18560:

Screed	Permissible residual moisture (CM-%)
Calcium sulfate floors	< 0.5
Cement floors	≤ 2.0

2 ADHESIVES

Application of all adhesives suitable for linoleum is generally done with a B1 square-notched trowel. Please also observe the adhesive manufacturer's recommendations. Continuously check the back side of the flooring to ensure it is sufficiently covered.

List of manufacturers:

Bostik GmbH A.d.Bundesstr.16 D-33829 Borgholzhausen Tel.: +49 (0) 5425/801222 www.bostik-findley.de	Henkel-Thomsit Bautechnik GmbH Erkrather Str. 230 D-40233 Duesseldorf Tel.: +49 (0) 211/7379256 www.thomsit.de
Kiesel Bauchemie Wolf-Hirth-Str. 2 D-73730 Esslingen Tel.+49 (0) 711/93134352 www.kiesel.com	Mapei GmbH Bahnhofsplatz 10 D-63906 Erlenbach Tel.: +49 (0) 9372/98950 www.mapei.de
Schönox GmbH P. O. Box 1140 D-48713 Rosendahl Tel.: +49 (0) 2547/910234 www.schoenox.com	UZIN UTZ AG Dieselstrasse 3 D-89079 Ulm Tel.: +49 (0) 731/4097258 www.uzin-utz.com
Wakol Chemie GmbH Bottenbacher 30 D-66954 Pirmasens Tel.+49 (0) 6331/8001186 www.wakol.com	WULFF GmbH Wersener Str. 30 D- 49504 Lotte Tel.: +49 (0) 5404/881-0 www.wulff-gmbh.de

We recommend using low-emitting, solvent-free adhesives, which are also free of heavy solvents. The manufacturers list above a merely some examples among many. You may obtain information about suitable adhesives suitable for installing linoleum either direct from the manufactures listed above, or from the DLW Advisory Service at tel. +49 (0) 71 42 / 71 – 735.

3 ESTIMATING REQUIREMENTS

3.1 Rolls

In order to establish requirements for material supplied in rolls, the required lengths and widths of the rolls must be determined. Before taking measurements, the direction in which the material will be laid must be determined. Head seams are only permitted with roll lengths of more than 5 meters, and lengths may not be less than 1 m. Allowances must be made for rolls that run up to door openings, recesses, etc., in order to cover these areas. Strips can be used to cover door openings at the sides, recesses, etc.

3.2 Tiles

Tiles are generally installed with cross-joints in an alternating pattern. However, they can also be laid in a parallel pattern, if desired. With regard to the way the joints run, both parallel and diagonal layouts are possible. In order to estimate the required dimension, the surface to be covered forms the base figure. Based on experience, an extra amount is then added to allow for scrap. The amount of scrap one typically generates is greater when laying diagonally than parallel, and also greater when laying on splay or rounded surfaces than on right-angled surfaces.

3.3 Staircases

Flooring for steps is cut from rolls of material. When laying flooring with patterns that run lengthwise, the patterns should run parallel to the edge of the step. This also applies to platforms. The required amount is calculated from the number of steps that can be cut from each roll. Templates are created for spiraling staircases.

4 STORAGE, ACCLIMATIZATION AND INSTALLATION CONDITIONS

Proper storage is essential to ensure that the installation properties of Armstrong DLS linoleum are retained.

Linoleum rolls are generally stored upright in dry rooms at normal room temperatures. No more than eight boxes of tiles may be stacked on each other. Once cut to size, the loosely re-rolled sheets should be stored upright with the top surface facing outward for at least 24 hours in the room where they will be installed at a temperature not less than 18°C, but not in direct sunlight (See section B, Veiling). This allows the material to acclimatize to the ambient humidity and temperature of the room. During installation, it is important that the temperature of both the room and the sub-floor stay above 15°C and the relative humidity nor more than 65 % (40% to 60% is ideal).

Make sure that in each room only one type of flooring (one factory batch number) is installed in the sequence of numbered rolls. This applies to both tiles and sheets.

5 INSTALLING Armstrong DLW LINOLEUM

5.1 Rolls

Even if sheets are to be joined at a later stage, we recommend trimming both edges of the

sheet, because only cleanly trimmed edges guarantee clean seams. The first edge is easily trimmed using a linoleum edge-cutter or strip cutter. There are two methods for trimming the second edge:

a) In small rooms (before applying adhesive):

The lower sheet is scribed with a knife along the trimmed edge of the upper sheet; the resulting strip of scrap is then cut in the opposite direction with a hooded blade.

b) In large rooms (after applying adhesive)

The upper edge is scribed along the already trimmed edge of the adhered bottom sheet with an under-and-over scribe or a lino-cutter; the resulting strip of scrap is then cut in the opposite direction with a hooked blade.

5.1.1 Cutting the seams

In either case, the cut should be done in such a way that a gap of about 0.5 mm is left open between the sheets. The cut should be vertical or slightly diagonal so that the joint is loose, i.e. the two sheets are not in contact.

5.1.2 Top ends

When the seams are cut, possible alterations in the dimensions of the floor must be taken into account. Therefore, when long sheets are being joined it is better to trim the top ends after the linoleum has been placed on the bed of adhesive.

5.1.3 Fitting around door thresholds, radiators, etc.

The acclimatized sheets are laid and cut to fit around door thresholds, radiators, etc. using a recess scribe. Then the sheets are rolled back and the adhesive applied.

5.2 Tiles

Linoleum tiles are manufactured to order and should be installed within a maximum of 8 weeks after delivery. Tiles should be stored in a dry area. See section 6 for recommended adhesives.

6 INSTALLATION

In principle the entire surface is adhered. For this process, please follow the adhesive manufacturer's process guidelines. Selecting the correct notch and the right time to change the spatula blades as well as basic rubbing are all essential for properly coating the underside. Check the underside regularly to ensure that the adhesive is properly spread.

6.1 Rolls

The rolls are folded back and then adhesive is applied to the floor. The rolls are laid one after the other onto the area where the adhesive has been spread within the time specified by the adhesive

manufacturer and then immediately rubbed or rolled on. The latest point in time when the sheets can be laid depends on the room temperature and the humidity as well as the absorbency and dampness of the sub-floor.

When installing lengthwise in hallways, the sheets should be folded back crossways.

When laying the flooring, no air may be trapped under the floor; it should be pushed out the sides. Any hollow spots found when tapping down the flooring with hammer can be pierced and the air pressed out. Top ends are counter-stretched to reduce the tension in the flooring.

6.2 Tiles

After the adhesive has been applied, the tiling begins from the tiles that were laid as the starting point or line. In large rooms, we recommend tiling in stages in order to avoid any misalignment. In order to properly coat the underside, the tiles must be carefully rubbed or pressed on. It may be necessary to repeat this process.

Use of adhesive and trowel notching when installing linoleum tiles:

Adhesive	Trowel notching	Usage
2-component-dispersion adhesive	B1	400 – 500 g/m ²

7 WELDING OF SEAMS

As per Code of Practice 7/98 of the Technical Committee for Architectural Adhesives (TKB) in the Trade Association of the Adhesives Industry in Duesseldorf, sealing up joints with a welding rod must always be recommended. This is particularly applicable for areas where wet cleaning and/or basic cleaning is carried out frequently and with sub-floors that are sensitive to damp conditions such as particle board or korkment.

If the seams are not sealed with a welding rod, the seam edges must, however, lay tightly together.

The welding process itself is carried out with either a hand-welding device or automatic welder. This is generally done after the adhesive has bonded, e.g. in the case of dispersion adhesives approx. 48 hours after installation (see also adhesive manufacturer recommendations).

If the seams are bonded too early, it can lead to variations in the adhesive in the seam area due to thermal influence, which may interfere with the adhesion.

The flooring seams are cut with a grooving machine and corner knife at a depth of 2/3 of

the flooring thickness. The slot must be carefully cleaned afterward. The groove should be approx. 3.5 mm wide.

The Armstrong DLW welding rod can be processed with a hand welder and attached speed welding nozzle (d = 5 mm). In order not to damage the PUR surface, we recommend using **speed welding nozzles**, which have a **very small air exit**. The welding temperature is approx. 350-400 °C; the operating speed is approx. 2-2,5 m/min. The excess welding material will be trimmed off in two steps. Immediately after the groove is filled, the welding rod, which is still warm, is trimmed with the quarter moon knife and attached slide; after it has cooled, the excess welding material is trimmed flush with the finished flooring surface using the quarter moon knife.

Note: With linoleum that is not exposed to light (see section B, Veiling), differences in color may develop between the rolls and the welding rod. The flooring color will match the color of the welding rod after the veiling disappears.

8 ARMSTRONG DLW KORKMENT AS AN UNDERLAY

Korkment is the only insulated underlay recommended for Armstrong DLW linoleum. Armstrong DLW korkment can be installed on all prepared sub-floors. Please note that the linoleum should be at least as thick, and best if thicker, than the korkment underlay.

The direction of the sheet can be the same as that of the surface layer; the seams should then be offset by at least 50 cm. Korkment may also be installed across the linoleum sheet. Seams may be formed by a so-called double-cut, using a hooked or tapered blade run along the straight edge.

Linoleum dispersion, powder or two-component adhesives are used to adhere Armstrong DLW korkment as well as linoleum. The top layer can only be laid after the adhesive has fully bonded.

For floors subject to heavy wear (e.g. hospitals), korkment can be installed with the jute backing facing upwards.

Adhesive usage for installing Armstrong DLW korkment

Adhesive	Trowel notching	Usage
Powder adhesive	B1/B2	400-600 g/m ²
2-component dispersion adhesive	B1	400-500 g/m ²
Dispersion adhesive	B1	300-400 g/m ²

9 ARMSTRONG DLW LINOLEUM WITH UNDERFLOOR HEATING

Armstrong DLW linoleum can be installed on sub-floors with floor heating; the heat conductivity resistance is so small, that it practically has no effect on the performance of the heating system (see leaflet: interface coordination on heated floor constructions. Issued by the Germany Sanitation, Heating and Air Conditioning Association).

9.1 Dry constructions

Dry constructions can consist of calcium sulfate or brick plates. The flooring can be installed once the seams have been smoothed over.

9.2 Wet constructions (A1 – A3)

In the case of wet constructions, the heating pipe or cables are embedded into a floating cement or calcium sulfate screed. Before the flooring is installed, care must be taken to ensure that any residual moisture generated by the thermal influence is removed **before** the floor is laid. This is generally the responsibility of the heating engineer, who should report the required heating and cooling measured he/she completed. A moisture test may only be conducted where the sub-floor installer marked measuring points. If there are no measuring points, the floor installer must indicate his/her concern to the customer in writing.

11 CLEANING AND MAINTENANCE

The contractor will provide the customer with maintenance instructions for the flooring in writing according to "Contract Procedures for Building Works" (DIN 18365, Part C, Paragraph 3.1.4).

The following publication is available at no charge:

- Cleaning and Maintenance of Armstrong DLW Linoleum and Vinyl PUR

Please call +49 (0) 71 42 / 71 – 340 to request this publication.

12 SPECIAL INFORMATION

12.1 Office chairs

Office chairs must be equipped with type W casters as per EN 12529 for use on elastic flooring, i.e. with soft casters of prescribed dimensions (50 mm diameter, 20 mm tread surface, 100 mm ball diameter of the tread surface). This must be taken into account when procuring new chairs.

12.2 Discolorations

After long periods of contact, rubber can leave discolorations on all elastic floorings, which cannot be removed.

These discolorations can be caused by, for example:

Car tires, cover material, the castors or feet of washing machines, refrigerators and stroller wheels. The discoloration in this case does not appear immediately, but is the result of substances penetrating the flooring and their subsequent exposure to light.

To avoid such discoloration, polyurethane casts must be used. If this is not possible, we recommend using protective plates.

Substances such as tar asphalts, mineral oils, grease, and colored waxes, which shoes can track onto floors, can cause discolorations in highly-traveled areas of light-colored flooring. For instance, this is the case in rooms which are entered from tarred streets, in kitchens or in the offices of gas stations and repair shops.

12.3 Adhesive tapes

When Adhesive tapes are used on the flooring please ask the tape manufacture about the digestibility to the flooring.

For technical questions regarding installation at Armstrong DLW AG:

Mr. Brendel Tel. +49 (0) 71 42 / 71 -735
 Fax +49 (0) 71 42 / 71 - 1 46.
 e-mail: service_germany@armstrong.com

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