

Installation of Elastomer Flooring

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1. Introduction

This technical briefing note advises the installer on selection of installation materials for elastomer flooring. It contains information on the different types of elastomer flooring, classified according to the relevant European standards. When installing elastomer flooring, the specific characteristics must be taken into consideration. Adhesive types are classified relative to composition, type of processing and setting behaviour.

General note:

Residual indentations visible under a spotlight, caused by high punctual loads, can never be completely avoided with resilient floor coverings. However, they can be minimized by selecting the right adhesive, application quantity (use of TKB recommended notched trowel with suitable notch sizes), proper processing and choice of appropriate chair/furniture sliders (large and level contact surface, no sharp edges) and/or use of suitable pressure distribution underlays under movable furniture or rollers (type W according to EN 12529). This also includes that future use must comply with floor construction.

2. Classification of Elastomer Flooring

Commonly, elastomer flooring is also called rubber flooring. This type of flooring is available in form of sheets or tiles and is fully bonded during installation.

2.1 Elastomer Flooring with smooth Surface according to DIN EN 1817

Homogenous or heterogenous elastomer flooring in sheets or tiles with smooth surface, including grained or embossed surfaces and smoothed backing. For homogenous floor coverings, the wear layer thickness corresponds to the overall thickness. For heterogenous floor coverings, wear layer thickness shall be at least 1.0 mm. The overall thickness of both types of floor covering shall be at least 1.8 mm.

2.2 Elastomer Flooring with smooth Surface and Foam Backing according to DIN EN 1816

Homogenous or heterogenous elastomer flooring in sheets or tiles with smooth surface, including grained or embossed surfaces and foam backing. Wear layer thickness shall be at least 1.0 mm with an overall thickness of minimum 3.5 mm.

2.3 Relief Elastomer Flooring according to DIN EN 12199

Homogenous or heterogenous relief elastomer flooring in sheets or tiles, e.g. rubber napped flooring. For homogenous floor coverings, wear layer thickness corresponds to the overall thickness. For heterogenous floor coverings, the wear layer thickness shall be at least 1.0 mm.

2.4 Elastomer Flooring with smooth Surface and decorative Layer according to DIN EN 14521

Elastomer floor coverings in form of sheets and tiles with smooth surface with decorative layer, with or without foam backing. The overall thickness for floor coverings without foam backing shall be at least 1.8 mm and with foam backing minimum 2.5 mm.

3. Adhesives for Elastomer Floor Coverings

3.1 Types of Adhesives

3.1.1 Dispersion Adhesives

Dispersion adhesives consist of organic binding materials dispersed in water, inorganic fillers and additives. Setting takes place based on a physical process when the water contained in the adhesive evaporates. The setting properties of dispersion adhesives are mainly influenced by the climatic conditions of the installation environment. High temperatures and/or low humidity accelerate, low temperatures and/or high humidity delay the setting process.

Dispersion adhesives for one-sided application for bonding of elastomer flooring require an absorbent substrate. They are applied with the specified notched trowel on prepared substrate.

Dispersion contact adhesives are processed using the contact bonding method. They are applied to both sides – the prepared substrate and floor covering backing – and must have sufficiently aired before installing the floor covering. They are mostly used for small area installations, e.g. installation of baseboards and flooring on stairs.

3.1.2 Reaction Resin Adhesives

Reaction resin adhesives consist of chemically reactive organic binding materials, inorganic fillers and additives. Reaction resin adhesives for elastomer flooring are mainly 2-component systems based on polyurethane or epoxy resins and cure by chemical reaction. The curing speed of these adhesives is essentially influenced by the temperature of adhesive, substrate and floor covering. 2-component reaction resin adhesives

require exact compliance with prescribed mixing ratio and careful mixing. They only have a limited pot life and open time.

3.1.3 Solvent-based Contact Adhesives

Solvent-based contact adhesives consist of dissolved organic binding materials, highly volatile solvents (up to 80 %), inorganic fillers and additives. From a work safety, consumer and environmental protection perspective, use of these adhesives shall be reduced to the absolute minimum technically necessary. Consequently, their use is restricted to bonding of baseboards and flooring on stairs. For these applications, dispersion contact and dry adhesives are an alternative.

Note:

The German Gefahrstoffverordnung (GefStoffV) (Ordinance on Hazardous Substances) and the German Technische Regeln Gefahrstoffe (TRGS) (Technical Rules for Hazardous Substances) 610 massively restrict use of adhesives with high solvent levels for occupational health and safety reasons. The solvents used are highly volatile, flammable and harmful compounds. In case the existing threshold values can not be safely adhered to, measures prescribed in GefStoffV must be taken.

According to decision No. 1348/2008/EC to amend RL 76/769/EC (Restriction Guideline), neoprene-based contact adhesives containing more than 0.1 % of cyclohexane, shall only be marketed to private consumers in package sizes of maximum 350 gr.

3.1.4 Dry Adhesives

Dry adhesives are sheets or strips which are self-adhesive on both sides and come in rolls of varying width. Dry adhesives are pre-dried by the manufacturer and therefore do not require airing, setting or drying time. After proper installation, they are immediately load-bearing.

3.2 Selection of Type of Adhesive

3.2.1 Selection Criteria

The following criteria apply for selection of an adhesive for installation of elastomer flooring:

- Floor covering characteristics such as thickness, size or backing
- Demands on flooring
 - thermal stress caused by extreme temperature fluctuations or direct exposure to sunlight on surface (glass constructions such as in conservatories or under glass domes)

- mechanical stress caused by forklifts or lift trucks
- moisture on surface (e.g. from cleaning)
- Type of substrate
 - absorbent substrate
 - non-absorbent substrate

3.2.2 Homogenous and heterogenous Elastomer Flooring with smooth Surface, with or without Foam Backing (Flooring according to DIN EN 1816, DIN EN 1817 and DIN EN 14521)

For these floor coverings, suitable dispersion adhesives are recommended.

3.2.3 Relief homogenous and heterogenous Elastomer Flooring (according to DIN EN 12199)

For these floor coverings, suitable dispersion or reaction resin adhesives are recommended depending on floor covering thickness and intended use. Dispersion adhesives are recommended for floor covering thicknesses up to 4.0 mm.

For floor covering thicknesses of more than 4.0 mm and high demands on bond as well as for non-absorbent substrates, 2-component reaction resin adhesives shall be used.

3.2.4 Profiles and Stairtreads

For these moldings, dry adhesive or dispersion contact adhesives are recommended. The use of adhesives with high content of solvents shall be restricted to the absolute minimum technically necessary.

4. Installation of Elastomer Floor Coverings

4.1 Substrate

TKB Technical briefing note 8 “Assessment and Preparation of Substrates for Installation of Floor Covering and Parquet” as well as BEB Technical briefing note “Beurteilen und Vorbereiten von Untergründen. Verlegen von elastischen und textilen Bodenbelägen, Schichtstoffelementen (Laminat), Parkett und Holzpfaster. Beheizte und unbeheizte Fußbodenkonstruktionen” (“Assessment and Preparation of Substrates, Installation of elastic and textile floor coverings, laminated elements (laminat), parquet and wood block. Heated and non-heated floor constructions”) contain detailed instructions and specifications regarding required tests.

4.2. Storage and Conditioning

Elastomer flooring shall be stored in a dry place, tiles in pairs with upper side or underside facing each other, sheets are stored standing in rolls. Before installation, the floor covering shall be conditioned for at least 24 hours at a room temperature of min. 18 °C and a relative humidity not exceeding 75 %. For flooring that comes in tiles, it has been proven beneficial to spread out covering in installation room or in large parts of the room, including cutting of the border tiles.

4.3 Installation Conditions

The relative humidity shall preferably lie between 40 – 65 %, however it shall not exceed 75 %. Ambient air temperature as well as temperature of the installation materials, e.g. floor covering and adhesive shall be at least 18 °C. In departure from DIN 18365, minimum substrate temperature shall be 18 °C in order to keep temperature difference between installation and later use to a minimum.

During curing phase of the adhesive, rising temperatures (e.g. exposure to direct sunlight) may cause dimensional changes to the floor covering. Consequently, floor covering shall be protected from direct sunlight or other thermal effects during and after installation, until adhesive has completely cured. Generally, it's under the customer's purview to ensure these essential measures. Installer may request these measures or perform them himself after having voiced reservations.

4.4 Bonding

4.4.1 Bonding of Elastomer Floor Covering in Sheets

Before applying the adhesive, the seams of elastomer floor covering shall be cut. Both lengths are laid out overlapping for 3 cm, the factory-cut seam overlapping the uncut seam. Using a ruler (max. 1 - 2 cm clearance to cut sheet seam) and an edge cutter or a straight blade (utility blade) the factory-cut seam is straightened and the underlaying sheet is scribed. The width of the cut edge strip shall be approx. 2 cm.

With one-layer floor coverings, the cut edge strip is taken off downwards. This results in a seam slightly open at the bottom. Never remove the strip upwards because this might result in a gaping V-joint .

With two-layer floor coverings, the cut strip of the bottom sheet is removed using a hooked blade. It is not recommended to cut the bottom edge after floor covering is installed.

The floor covering shall always be placed in the fresh adhesive bed free of tension (no press-down installation but narrow joints), then rubbed down

and/or rolled down using a multi-sectional roller. Always observe open time of the adhesive. When placing the floor covering into the adhesive bed, adhesive must still be sufficiently wet to wet the entire backing of the covering. Check wetting.

4.4.2 Bonding of Elastomer Floor Covering in Tiles

When bonding elastomer floor coverings in tiles, it has proven beneficial to lay down the tiles in the entire room or in larger areas of the room, including cutting of border tiles. The floor covering shall always be installed free of tension.

4.4.3 Bonding of Profiles and Stairtreads

Dry or dispersion contact adhesives are recommended for bonding of profiles and stairtreads. When using these adhesives, the elements to be glued must be fitted exactly since subsequent corrections are almost impossible to perform. After installation, the elements must be immediately pressed and tapped down firmly over the entire length.

4.5 Seam Sealing

4.5.1 Thermal Sealing

Elastomer floor coverings with foam backing (DIN EN 1816 and DIN EN 14521) as well as conductive floor coverings shall always be sealed. Principally, for floor coverings without foam backing (DIN EN 1817, DIN EN 14521 and DIN EN 12199) sealing is not necessary. For substrates sensitive to moisture as well as in rooms with intensive water contact, i.e. frequent wet cleaning, seam sealing is an absolute must when dispersion adhesives are used.

Thermal sealing shall only be performed after adhesive has fully cured, as a rule after 24 hours at the earliest, but better yet after 2 - 3 days (see manufacturer's instruction). The joints are opened using a special miller or groover over a width of approx. 3.5 mm. The joint shall be carefully cleaned. The welding cord can either be processed using an automatic fuse machine (cord must pass the machine tension-free) or a hand welder with attached quick-weld nozzle.

Absolutely avoid to exceed or fall short of specified processing temperature. Work at a pace that allows melted cord to easily run into mill groove (2.5 – 3.0 meters/min). Excess material is removed in two steps:

- The first removal step is performed when welding cord has **not yet** cooled down using a sharp quarter moon knife with trim guide attached.

- The second step takes place only after joints have **completely cooled down** – excess is removed flush to flooring surface, also using a quarter moon knife.

If no quarter moon knife is at hand, an appropriate trimming knife can be used which will only work in the joint area when removing excess welding cord.

4.5.2 Sealing with 1 or 2-component Joint Sealers

Special requirements for seam sealing, e.g. in laboratory areas or in the healthcare sector, are met by using 1- or 2-component reaction resin joint sealers. Always observe the relevant instructions specified by manufacturer.

5. Relevant Standards and Technical Briefing Notes

5.1 Industrial Safety

Gefahrstoffverordnung (GefStoffV),
Published December 23, 2004 (BGBl. I S 3758),
amended by article 2 of the ordinance of
December 18, 2008 (BGBl. I S 2768)

TRGS 430
Isocyanate – Gefährdungsbeurteilung und
Schutzmaßnahmen (March 2009); Ausschuss für
Gefahrstoffe (AGS); GMBI No. 18/19 (04.05.2009)

TRGS 610
Ersatzstoffe und Ersatzverfahren für stark
lösemittelhaltige Vorstriche und Klebstoffe für den
Bodenbereich (March 1998); Ausschuss für
Gefahrstoffe (AGS); BArbBl. issue 3/1998

TRGS 900
Arbeitsplatzgrenzwerte (January 2006); Ausschuss
für Gefahrstoffe (AGS); BArbBl. issue 1/2006 last
supplemented and amended GMBI No. 12 - 14
(27.03.2009)

TRGS 907
Verzeichnis sensibilisierender Stoffe (Notification
BMA according to § 52 Abs. 3
Gefahrstoffverordnung) (October 2002);
Ausschuss für Gefahrstoffe (AGS); BArbBl. issue
10/2002

GISCODE für Verlegewerkstoffe
Gefahrstoffinformationssystem der Berufs-
genossenschaften der Bauindustrie, Frankfurt

EMICODE
Gemeinschaft Emissionskontrollierte Verlegewerk-
stoffe, Klebstoffe und Bauprodukte e. V. (GEV),
Düsseldorf

5.2 Standards for Elastomer Flooring

DIN EN 685

Resilient, textile and laminate floor coverings –
Classification
November 2007

DIN EN 1816

Resilient floor coverings – specification for
homogeneous and heterogeneous smooth rubber
floor coverings with foam backing
May 1998

DIN EN 1817

Resilient floor coverings – specification for smooth
homogeneous and heterogeneous rubber floor
coverings
May 1998

DIN EN 12199

Resilient floor coverings – specification for
homogeneous and heterogeneous relief rubber
floor coverings
May 1998

DIN EN 12466 Resilient floor coverings -
Vocabulary
June 1998

DIN EN 14041 Resilient, textile and laminate floor
coverings – essential characteristics
May 2008

DIN EN 14521

Resilient floor coverings – specification for smooth
rubber floor coverings with or without foam backing
with decorative layer
September 2004

5.3 Standards for Elastomer Flooring Adhesives

DIN EN 14259

Adhesives for floor coverings – requirements for
mechanical and electrical performance
July 2004

DIN EN 1372

Adhesives - Test method for adhesives for floor
and wall covering adhesives – Peel test
October 1999

DIN EN 1373

Adhesives - Test method for adhesives for floor
and wall covering – Shear test
October 1999

DIN EN 1903

Adhesives - Test method for adhesives for plastic
or rubber floor coverings or wall coverings -
Determination of dimensional changes after
accelerated aging
June 2008

DIN EN 13415

Test of adhesives for floor coverings-
Determination of electrical resistance of adhesive
films and composites
August 2002

5.4 Standards for Floor Installation Work

DIN 18365

VOB Vergabe- und Vertragsordnung für
Bauleistungen – Teil C: Allgemeine Technische
Vertragsbedingungen für Bauleistungen (ATV) –
Allgemeine Regelungen für Bauarbeiten aller Art -
Bodenbelagsarbeiten
October 2006

5.5 TKB Technical Briefing Notes

TKB-Technical Briefing Note 6

Trowel notch sizes for floor coverings, wood
flooring and tiles
May 2007

TKB- Technical Briefing Note 8

Assessment and preparation of substrates for
installation of floor coverings and parquet
June 2004

TKB- Technical Briefing Note 9

Technical specification and installation of floor
levelling compounds
April 2008

5.6. Other Standards and Technical Briefing Notes

BEB-Merkblatt

Beurteilen und Vorbereiten von Untergründen.
Verlegen von elastischen und textilen
Bodenbelägen, Schichtstoffelementen (Laminat),
Parkett und Holzpflaster. Beheizte und unbeheizte
Fußbodenkonstruktionen.
October 2008

DIN 1960

VOB Vergabe- und Vertragsordnung für
Bauleistungen - Teil A: Allgemeine Bestimmungen
für die Vergabe von Bauleistungen
May 2006

DIN 1961

VOB Vergabe- und Vertragsordnung für
Bauleistungen - Teil B: Allgemeine
Vertragsbedingungen für die Ausführung von
Bauleistungen
October 2006

DIN18299

VOB Vergabe- und Vertragsordnung für
Bauleistungen - Teil C: Allgemeine Technische
Vertragsbedingungen für Bauleistungen (ATV) -
Allgemeine Regelungen für Bauarbeiten aller Art
October 2006

5.7. Literature and Commentaries

Harald Kaulen, Günter Hahn, Ortwin Baumann
Erläuterungen zur DIN 18365 –
Bodenbelagsarbeiten und DIN 18299, Ausgabe
2002, 6. Auflage 2004

Arbeitskreis Bodenbeläge im Bundesverband
Estrich und Belag e. V.
Kommentar zur DIN 18365 - Bodenbelagsarbeiten