

Ceresit

Ceresit – When flooring excellence is your daily business.

Ceresit partners benefit from a broad product portfolio that meets the highest demands: for substrate preparation, floor levelling and for bonding all kinds of floor coverings. Reliable premium quality paired with perfectly matched system components – this is the hallmark of Ceresit's business. It is therefore no surprise that the

knowledgeable advice of Ceresit flooring experts is much sought after. They not only maintain close contact with all key players in the market, including customers, flooring industry and general building contractors, but also join forces with trade associations in the development of directives and standards.



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Quality for Professionals

Ceresit

The flooring guide. A short handbook of floor technology

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The flooring guide

A short handbook of floor technology

Quality for Professionals

It is a well-known fact that floor constructions and floor coverings have to fulfil a lot of important functions in buildings and rooms as they are often exposed to high mechanical stresses. In contrast to other building components, they must be designed to carry high traffic loads. If the people inhabiting these buildings are to “stand on firm ground”, it is indispensable that the construction and covering of the floor are planned and executed with due consideration of the physical necessities. This includes, in particular, protection from moisture, sound and heat.

Apart from the structural aspect, you as a professional fletcher also need to take the aesthetic aspect of floor installation into account. There is a constant stream of new floor coverings entering the market. A host of design options, complemented by modern high-tech materials, constantly opens up a “limitless” world of fascinating interior decoration to the professional floor installer.

To meet the respective material, structural and customer requirements, the expert

needs to be familiar with the state of the art published in numerous standards, technical information sheets and directives. Ceresit’s practical Flooring Guide contains the essence: it summarizes the most important facts in a practice-oriented way and gives hands-on advice.

Developed by professionals for professionals, you will have access to our expert knowhow – compact and clearly arranged. A reference book for your daily work, covering the whole range from planning the floor construction, preparing the subfloor to installing the floor covering and working with most different materials.

Detailed drawings and state-of-the-art system constructions provide you with the necessary planning safety and ensure that you can deliver expert advice to your customer on site.

Furthermore, our team of flooring experts will be glad to support you and make their expertise available. Contact us if you have specific questions concerning floor installation on site or take part in one of our training courses.



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Subfloors for the installation of floor coverings

The term “subfloor” refers to all floors that are to be newly covered. This not only includes the concrete slab and the existing wearing surface or top flooring but also all of the layers in-between. Floors are among the most important components of a building. They are the structural elements exposed to the highest loads and stresses and also form the basis for all further building activities. Subfloors must be able to carry loads while at the same time providing

excellent protection from unwanted noise. Or they must be particularly easy to care for but at the same time be electrically conductive. One of the more challenging tasks for a professional floor installer is the identification, assessment and installation of an expertly designed floor structure on an existing subfloor. The so-called “SOS principle”, which stands for **S**ubfloor-**O**verlay-**S**tress Factor, is used to illustrate the interdependence of the individual factors.

The Subfloor-Overlay-Stress Factor Principle:



All three elements, i.e. the substrate, the floor covering and the stresses which the entire floor structure must be able to resist, are firmly linked with each other, inter – dependent and form the key element of tenders, quotations and advisory services.

The graph shows that the three elements always overlap in more than one area. For instance, it is not possible to make concrete recommendations for the proper choice of floor installation product if the existing floor covering is known but not the substrate.

On the other hand, it is not sufficient to know the demands to be met by the floor if you do not also have the necessary information on the load- distribution layer.

Early and comprehensive knowledge of the subfloor helps the flooring contractor to submit a qualified, reliable and accurate quotation, within the scope of his duties of inspection, and thus avoid the risk of consequential damage. Expertise and experience are required for the contractor to identify and assess the characteristics

of the different subfloors and to select appropriate and up-to-date products and materials for installing the new floor construction. The following chapter gives an overview of the different subfloor types on which flooring can be installed and also informs about various factors of influence.

New subfloors



Screeds

Screeds form the load-distribution layer. They are usually installed on top of concrete floors. When produced as in-situ screeds, they are made from aggregates (gravel, sand etc.) and suitable binders. Dry screed consists of prefabricated panels or elements. Screeds are produced with

a finer aggregate than used for concrete, thus ensuring layers with a smoother and more even surface. Furthermore, screeds are considerably thinner and less compact than concrete floors. As a result, they are more porous and dry out faster.

Screeds must fulfil a variety of tasks:

- Level out the uneven surface of bare concrete floors
- Provide a solid, bendproof subfloor ready to receive floor coverings
- Protect the thermal and acoustic insulation underneath and distribute the loads to a larger surface area
- As a thermal mass: contribute to a better indoor climate
- As heated screed: ensure indoor heating

In order for screeds to fulfil these many and diverse tasks, the industry has developed different types of screed that are particularly well suited to meet the respective requirements.

Today, composite structures are most widely used.

Bonded screeds



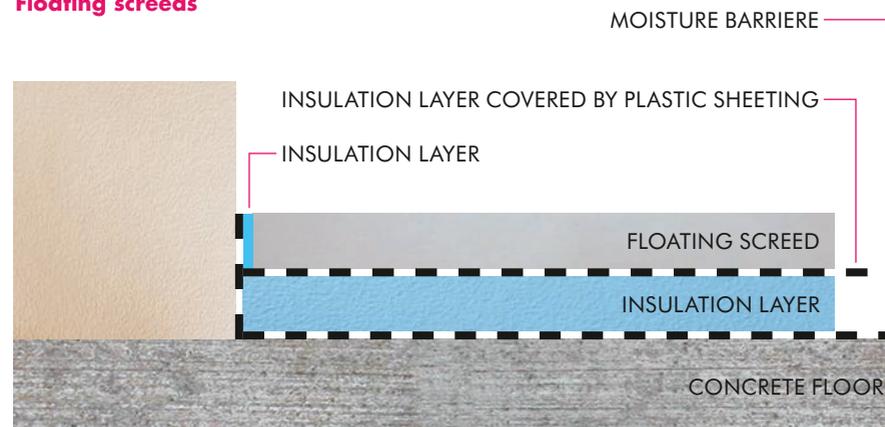
Bonded (or composite) screeds are in-situ screeds, i.e. they are produced at the production site. They are predominantly used for industrial buildings and cast directly on the floor slab or on the concrete base. They are most often used in places where neither ground moisture nor thermal and acoustic insulation play an important role. They can carry high loads.

Typical of bonded screeds is their direct connection to the concrete floor. This is achieved by applying a layer of cement slurry or another suitable adhesion promoter.

What makes this composite structure problematic is the fact that moisture can rise from the bare concrete floor directly into the screed. Therefore due care must be taken when planning to install moisture-sensitive top coverings (e.g. wood flooring) or vapour impermeable materials (e.g. PVC) on this type of screed.

In these cases, it is mostly necessary to apply a moisture barrier (dampproof membrane) made of reaction resin (e.g. Ceresit R 755 Epoxy Safety Primer).

Floating screeds



Floating screeds can either be in-situ screeds or prefabricated screed elements. Here, the load-distribution layer is installed on an insulation layer consisting of materials like polystyrene, polyurethane or mineral wool slabs that provide thermal and impact sound insulation. Depending on the choice of material, both the thermal and the sound insulation of the construction may be higher or lower. These two insulation effects counteract each other, which means that there are physical limits to what is feasible. Furthermore, care must

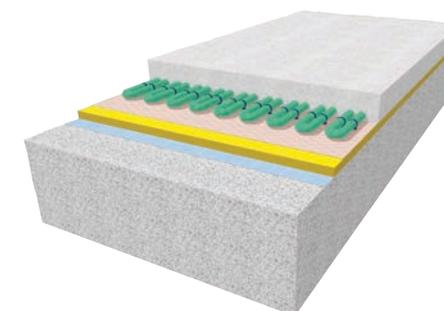
be taken not to reduce the load-bearing strength of the surface. A higher level of sound insulation, for instance, requires the installation of softer insulation materials.

In these cases, it is necessary to increase the layer thickness of the screed. This, in turn, will influence the required drying time: thicker screeds dry much more slowly. The plastic sheet used for covering the concrete floor should be able to block moisture. Otherwise, there is again the risk of ascending moisture (see information on bonded screeds).

Floating screeds as heated screeds

Screeds can also be designed to integrate underfloor heating systems.

System with heating pipes integrated into the screed.



Screed classification based on type of binding agent (according to EN 13 813)

Type of screed	Remarks	Abbreviation
Cementitious screed	Water-resistant, tends to shrink/ buckle, offers high strength values, requires joints (depending on floor area and geometry)	CT
Calcium sulphate screed	Not resistant to permanent exposure to moisture, nearly jointless	CA
Calcium sulphate flow screed	Pourable consistency, therefore ergonomic and fast installation, not resistant to permanent exposure to moisture, able to produce very level surfaces, nearly jointless	CAF
Synthetic resin screed	Based on reaction resin and sand, no moisture, immediately load-bearing after curing, high strength values, • for industrial buildings	SR

In addition, mineral screeds are classified according to their compressive and flexural strength.

E.g. CT-C35-F4

CT = cementitious screed

C35 = compressive strength 35 N/mm²

F4 = flexural strength 4 N/mm²

The pull-off strength should be > 1.0 N/mm² for residential and commercial use.

The pull-off strength should be > 1.5 N/mm² for industrial use.

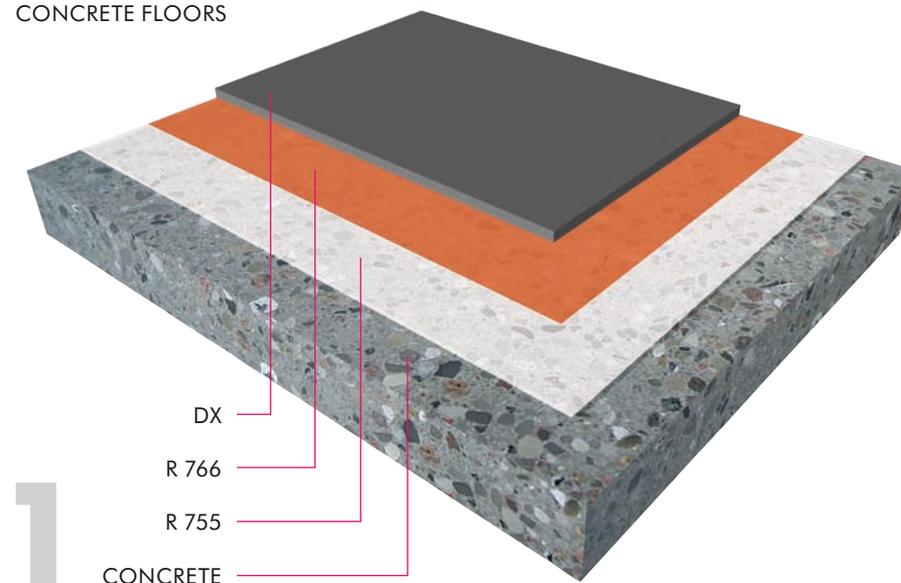
Please note: C= compressive strength • F = flexural strength

If all technical parameters have been duly taken into account, the subfloors can be further treated and prepared. However, the suitability of the products intended for use should be checked by studying the

corresponding technical data sheets and/ or by contacting the product manufacturer. The information given in this Flooring Guide can only be of a very general nature.

Standard preparation of new subfloors

CONCRETE FLOORS



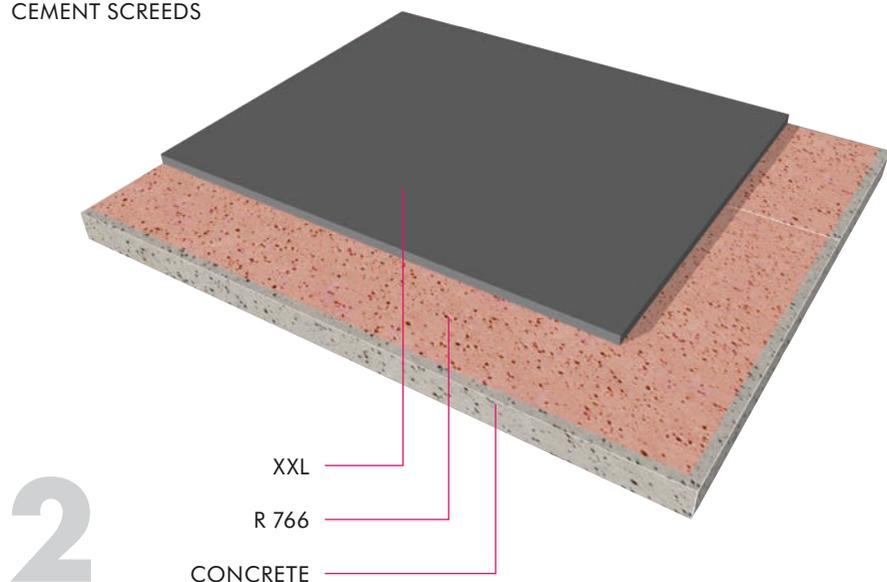
Preparation: Remove slurry layers by grinding or milling/shot-blasting (if necessary), then vacuum off dust and particles.

Primer: In most cases, a moisture barrier consisting of a water-free 2-component epoxy resin primer is required. Use Ceresit R 755 in the case of high residual moisture.

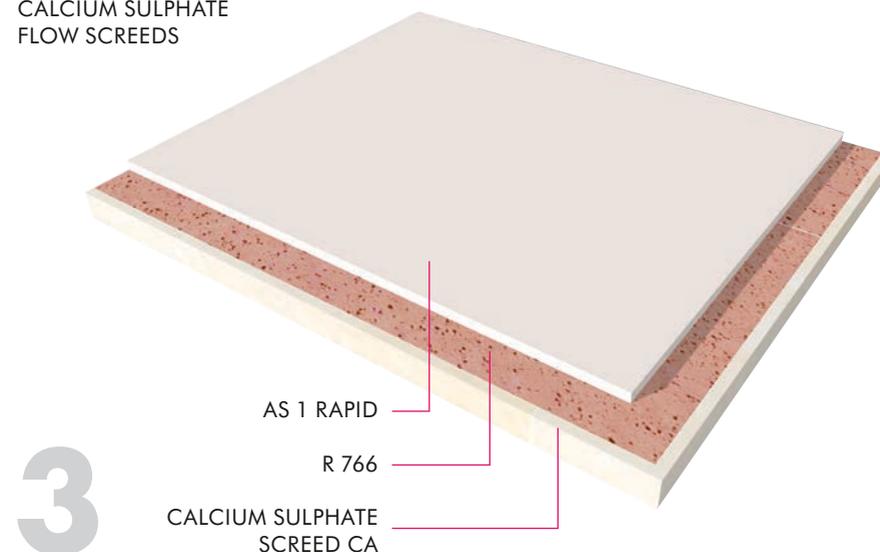
Levelling compound: Suitable products are e.g. Ceresit XXL, Ceresit DX, Ceresit DA, Ceresit DD, Ceresit DD+. For thicker layers up to 40 mm use Ceresit DH Maxi. When subject to pallet truck or forklift traffic, preferably use Ceresit XXL.

Adhesive: Basically, all adhesives are suitable for use. The proper choice depends on the top covering and the expected stress. Wood flooring can be bonded directly on the unlevelled (dry!) surface if the concrete floor is sufficiently even. All adhesives are suitable for this purpose.

CEMENT SCREEDS



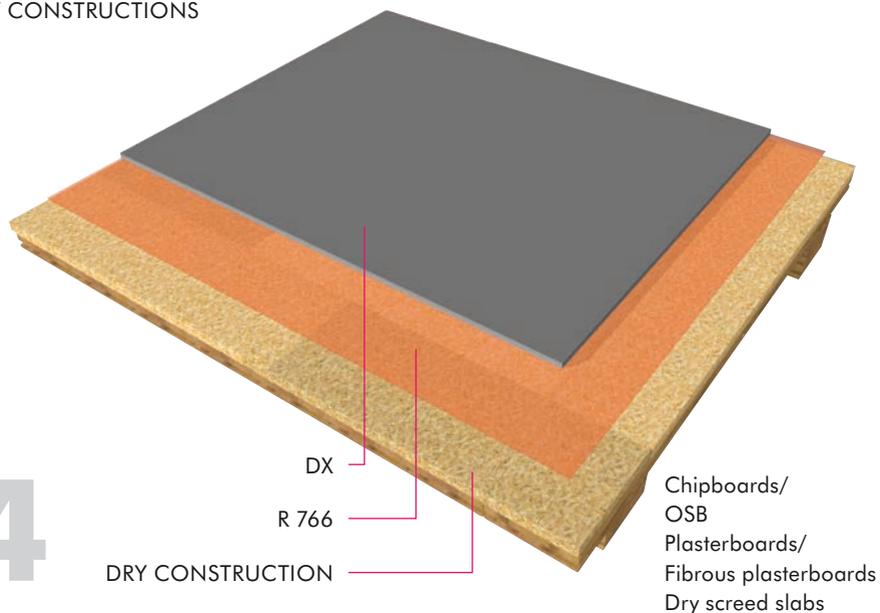
Preparation:	Clean-grind the surface, vacuum off any dust and particles.
Primer:	Ceresit R 766, Ceresit R 777
Levelling compound:	Suitable products are e.g. Ceresit XXL, Ceresit DX, Ceresit DA, Ceresit DD, Ceresit DG. When subject to pallet truck or forklift traffic, preferably use Ceresit XXL.
Adhesive:	Basically, all adhesives are suitable for use. The proper choice depends on the top covering and the expected stress. Wood flooring can be bonded directly on the unlevelled surface if the screed is sufficiently level. All adhesives are suitable for this purpose.

CALCIUM SULPHATE SCREEDS /
CALCIUM SULPHATE
FLOW SCREEDS

Preparation:	Grind off any sinter, slurry or powder layers. Vacuum off the surface.
Primer:	Ceresit R 766, Ceresit R 777 Please note: Application of a moisture barrier on the screed is not possible.
Levelling compound:	Preferably use gypsum-based levelling compounds like Ceresit AS 1 or Ceresit DG. Cementitious Ceresit levelling compounds can also be used. However, thick coats always require pretreatment with a reaction resin primer.
Adhesive:	Basically, all adhesives are suitable for use. The proper choice depends on the top covering and the expected stress. Wood flooring can be bonded directly on the unlevelled surface if the screed is sufficiently level. Only use water-free adhesives for this purpose.

DRY CONSTRUCTIONS

4



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- Preparation:** Clean-grind and vacuum off the surface. Especially with wooden boards, the tongue-and-groove area must be filled with glue to prevent ingress of moisture from the primer/levelling compound. Make sure the dry construction elements are of sufficient thickness.
-
- Primer:**
1. Ceresit R 766: on chipboards/OSB, dry screed slabs
 2. Ceresit R 777: dry screed slabs
- Alternative: If necessary, apply Ceresit R 740 to protect the subfloor against moisture penetrating from above.
-
- Levelling compound:** Chipboards/OSB: Use Ceresit DX. Other dry constructions: Preferably use the gypsum-based levelling compounds Ceresit AS 1. The maximum layer thickness of cement-based levelling compounds must not exceed 5 mm; otherwise there is a risk of substrate deformation.
-
- Adhesive:** Basically, all adhesives are suitable for use. The proper choice depends on the top covering and the expected stress. Wood flooring can be bonded directly on the unlevelled surface if the screed is sufficiently level. The choice of adhesive depends on the type of board; in case of doubt, ask the manufacturer.
-

Old subfloors



Old boarded floor



Residues of old floor installation products



Old wear surfaces

Old subfloors make high demands on the expertise and experience of the professional fitter. Not only is it often difficult to identify the type of floor, but also to assess whether the existing subfloor is fit for all for the intended use. Unfortunately, there is not always a suitable test method for old floors that is able to deliver valid and reliable results.

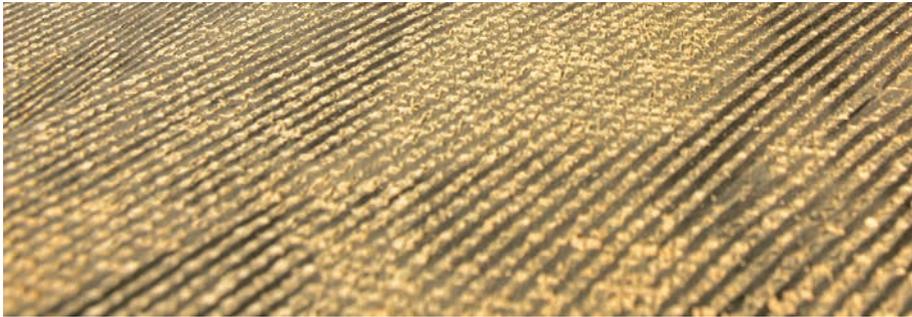
All old subfloors have specific characteristics that must be duly considered when preparing or revamping them. In addition, there are the remains of old floor installation products such as dispersion adhesives, synthetic resin adhesives (for wood and textile flooring), neoprene adhesives, bituminous mastics and so on – to name only the most important ones. There might even be various types of old levelling compounds.

Assessment of the subfloor

? Which residues of floor installation products are still in place?

Dispersion adhesives

Dispersion adhesives are most often found after removing resilient and textile floor coverings. They are of light beige to brownish colour and cannot be covered with hardwood and woodblock flooring. Often, they are found as “chewing gum like” residues. Their layer thickness must be reduced as much as possible so that only a thin film remains.



Otherwise, cracks may occur later when the newly applied levelling layer “moves” on the plastic adhesive residue in the course of drying. Firmly adhering residues can, for example, be pretreated with Ceresit R 766 Multi-Purpose Primer and afterwards covered with a levelling compound.

Synthetic resin adhesives

Synthetic resin adhesives are often encountered when removing old carpeting, tennis court carpeting and/or wood flooring. They are of light-brown colour and always prone to embrittlement. When assessing such residues, the main focus must therefore be on stability. If scratching with a key is enough to “powder” the adhesive, caution should be exercised. To be on the safe side, the entire layer of old adhesive should be ground off. Firmly adhering, stable residues of synthetic resin adhesives can, for example, be pretreated with Ceresit R 766 Multi-Purpose Primer and afterwards covered with a levelling compound.

Neoprene adhesives

The great majority of neoprene adhesives result from bonding PVC flooring and are of yellowish-brown colour. Even after years of use, such adhesive residues remain elastoplastic and may even have a “chewing gum like” consistency. For the removal of residues please refer to the information given above for dispersion adhesives.

Bitumen adhesives

Bitumen adhesives can be identified quite easily by their black colour. About 30 to 40 years ago, they were mainly used under vinyl-asbestos tiles (= rigid PVC covering) or wood flooring. There are soft types (used under wood flooring) and more rigid ones (used under vinyl-asbestos tiles). While the more rigid type can be levelled over, the soft bitumen adhesive must be completely removed. Before taking further steps, however, please check whether the existing bituminous material possibly contains PAH (polycyclic aromatic hydrocarbons) which are harmful to health. Residues of rigid bitumen adhesive must be roughened, afterwards treated with Ceresit R 766 Multi-Purpose Primer and finally covered with levelling compound (min. 2 mm layer thickness).

General information

Old floor installation products can never be fully investigated by measuring devices. For this reason, an element of risk always remains when preparing such floors for new coverings – a risk that planners, ordering and contracting parties must be aware of.

From a purely technical point of view, always follow the instructions given below:

- Remove any loose or dubious surface areas.
- On floors with old coats make sure the new layer of levelling compound is not too thick (max. 5 mm); otherwise, tensile stresses are bound to occur while the levelling compound dries. The following principle applies: The thicker the levelling compound layer, the higher the drying stresses.
- Old levelling compounds can be very sensitive to moisture. Therefore keep the exposure to moisture (e.g. from the primer) to a minimum. If in doubt, make use of water-free reaction resin primers.
- Ensure favourable climatic conditions for the whole time of floor installation work (this already starts when preparing the subfloor). If the drying of primer and levelling compound takes too long, the old adhesive/levelling compound residues may have adverse effects.
- Make sure the mechanical pretreatment is as intensive as necessary but with as little mechanical stress as possible. For instance, a wrongly adjusted screed milling machine is able to destroy a screed of moderate stability. Compared to this, the method of shot-blasting has clear advantages. It is often advisable to work with horizontal milling machines instead of using the vertical face or fly cutters.



Summary

Professional subfloor preparation is much more prone to costly mistakes than it may seem at first glance. For this reason, floor installers are well advised to carefully consider the pros and cons of a preparation method. If in doubt, consult an application expert to obtain specific advice. Far too often, an apparently simple “modus operandi” has produced avoidable damage in the later use of a floor. Neither the laws of physics nor those of chemistry can be bent to realize a building project. When there are problems on site, they can always be solved by obeying these laws and getting expert advice. After all, this is what our Ceresit Flooring Advisors are there for.

? Which type of floor covering is intended for use?



Textile flooring

Textile flooring requires a level subfloor. Carpeting must never be bonded directly on top of old adhesive and levelling compound residues as this is very likely to cause a persistent and unpleasant smell. Separate the “old” from the “new” adhesive by applying a layer of levelling compound. But first remove the existing residues of floor installation products as far as possible – provided they are firmly bonded with the subfloor and form a stable layer.



Resilient flooring

Resilient flooring made of PVC, rubber, linoleum etc. requires a subfloor that is not only as level as possible but also of good absorbency. Since part of the adhesive moisture is trapped under these floor coverings, the levelling compound must be applied with a layer thickness of at least 2-3 mm so as to absorb the moisture. Especially on non-absorbent subfloors (mastic asphalts, reaction resin primers, coatings etc.) this layer thickness is absolutely essential. Rubber materials count among the most impervious floor coverings. Adequate substrate absorbency is therefore of crucial importance. If this fact is ignored, bumps and blisters will form in the flooring.



Wood flooring

Any floor covering made of wood is invariably subject to shear and shrinkage. This is because the wood reacts to variations in indoor temperature and humidity. Wood adapts in particular to changing levels of atmospheric moisture. Dry air causes the wood to shrink whereas humid air causes it to swell. Especially with solid wood flooring, you can therefore expect relatively strong movement and forces acting on the subfloor. Prefinished wood flooring is subject to lower forces due to its multiple bonded layers. The tendency to move also depends on the wood species. Beech, maple and ash count among the “nervous” types that tend to react much faster to changes in humidity and temperature by changing their dimensions.

Wood’s tendency to move therefore calls for a stable and solid subfloor. This applies above all to shear-resistant bonding where high demands are made on the stability of the old subfloor. Remains of old carpet/resilient flooring adhesive can definitely not be considered as stable. Such materials are unfit for the installation of wood flooring and must therefore be completely removed.

In some cases, the removal of the old floor installation products can be avoided. This is always the case when these are sufficiently sound and stable or when a decoupling membrane or elastic parquet adhesive is used. Whether a planned construction can be realized in practice, however, must be inquired with the floor installation product manufacturer.

Special recommendations apply for woodblock flooring with its strong tendency and capability to swell. Please consult the respective manufacturer. In general, it can be said that when planning to bond woodblock/end grain woodblock flooring, it is indispensable to remove all old layers. This is due to the wood cutting direction of the woodblocks which causes them to strongly change their dimensions in reaction to variations in indoor climate.

Duties of inspection

According to DIN 18 365 "Flooring Work", DIN 18 356 "Laying Parquet Flooring" as well as the British Standards BS 8203 "Code of Practice for the Installation of Resilient Floor Coverings", BS 5325 "Code of Practice for the Installation of Textile Floor Coverings", BS 8204 "Screeds, Bases and In-Situ Floorings" and BS 8201 "Code of practise for flooring of timber, timber products and wood based panel products", the contractor has to comply with defined duties of inspection and notification. These concern the subfloors but also certain boundary conditions. The following list gives an overview of these inspections and explains them in further detail.

When carrying out the inspection, the contractor must raise his concerns in particular concerning the following deficiencies:

1. Major unevenness
2. Cracks in the substrate
3. Insufficiently dry substrate
4. Insufficient surface strength of the substrate
5. Too porous or too rough surfaces
6. Contaminated substrate surface, e.g. by oil, wax, lacquers, paint residues
7. Incorrect height of the substrate surface in relation to the height of adjacent building components

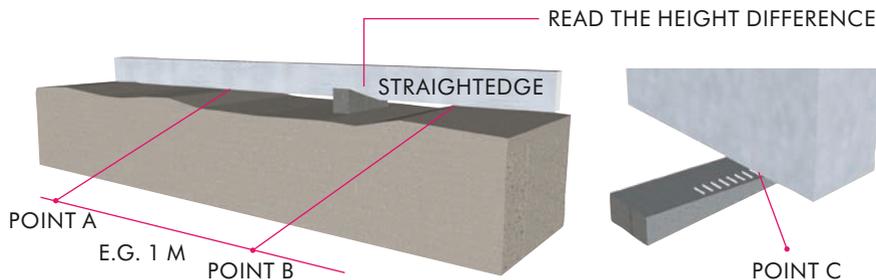
8. Improper subfloor temperature
9. Improper room climate (temperature and humidity)
10. Perimeter strips are missing or do not project

Please note that the objections raised concerning the requested force-fit closing of movement joints in the subfloor are no longer expressly indicated but are nonetheless applicable! The expression "in particular" implies that the substrate deficiencies listed above should only be regarded as examples, and that the contractor's duty of inspection also includes other deficiencies than those specified in this guide (e.g. the exis - tence of special separation layers identifiable for the contractor on the substrate surface, efflorescence etc).

1. Major unevenness

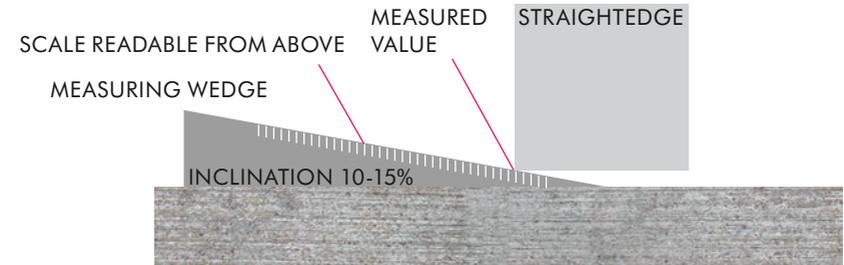
Within the scope of his duty of inspection and notification, the contractor must check whether the substrate surface is even enough to accommodate floor coverings and wood flooring. To determine substrate evenness, at least three measuring points must be set in relation to each other.

INSERT THE MEASURING WEDGE



The relevant standard for this test is DIN 18 202 "Dimension Tolerances in Building Construction" or the corresponding local standards. At the start of measurement, place a straightedge on the substrate to be tested. After that, determine the two surface elevations (reference points)

between which the difference in height is to be measured. Somewhere in the middle between both points, push a measuring wedge under the straightedge as far as it will go. Then read the height difference in mm on the upper side of the wedge.



EVENNESS TOLERANCES ACCORDING TO DIN 18 202

Line	Applicable to	Position deviations *1 (limit values) in mm for distances between measuring point in m				
		Measuring point distance in m				
		0,1	1	4	10	15
		Max. permissible height difference in mm				
1	Unfinished uppers surfaces of floors, subfloors and concrete bases	10	15	20	25	30
2	Unfinished upper surfaces of floors, subfloors and concrete bases subject to more stringent requirements (e.g. to receive floating screed, industrial floors, tile flooring and bonded screed), and finished surfaces for minor purposes (e.g. in storerooms or basements)	5	8	12	15	20
3	Finished floors (e.g. screed as wearing courses or screeds to receive a flooring, tiles, trowelled and bonded flooring) *2	2	4	10	12	15
4	Finished floors like group 3 but subject to more stringent requirements (e.g. self-levelling compounds) *3	1	3	9	12	15
5	Unfinished walls and unfinished ceilings	5	10	15	25	30
6	Finished walls and ceilings (e.g. plastered walls, wall claddings and linings, suspended ceilings)	3	5	10	20	25
7	As group 6 but subject to more stringent requirements	2	3	8	15	20

*1 Deviation means the deviation of a surface from straight measuring lines.
 *2 In line 3, the applicable limit values for the installation of floor coverings/wood flooring are indicated as deviations. Example: At a measuring point distance of 1 m, the maximum permissible height difference (see line 3, column 3) would be 4 mm. At a measuring point distance of 4 m, 10 mm are acceptable (line 3, column 4).
 *3 The deviations indicated in line 4 apply for finished floors that have to meet higher requirements. These must be expressly agreed between contractor and ordering party.

2. Cracks in the substrate

Cracks in the screed can be due to very different reasons. Depending on the binder,

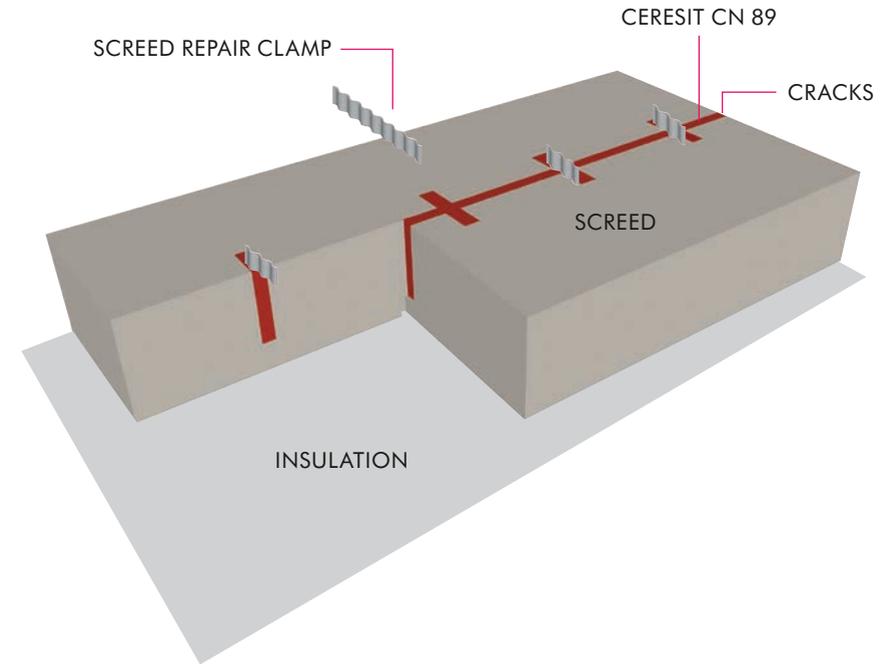
they can also be caused by the material (shrinkage in the drying process of screeds).



Since a floor covering cannot be installed free of defects on a cracked subfloor, it is necessary to carry out suitable repair work prior to installation of the floor covering. Screed cracks must always be expertly closed by force-fit. For this purpose, there are a couple of special reaction resins

such as Ceresit CN 89 or alternatively Ceresit R 755 extended with quartz sand (grain size 0.1–0.3 mm). First, the cracks are expanded mechanically with a cutting disk and then cleaned with an industrial vacuum cleaner. This ensures that all edges are clean and sound.

The cutting depth must be at least 2/3 of the screed thickness. In the case of moving parts of the screed, it is necessary to produce additional cuts at right angles to the crack (intervals of 25 cm) and fix these with so-called screed clamps. The same applies to false or dummy joints and working joints. Only after the joints have been expertly closed by force-fit using a 2-component reaction resin, the screed can be considered as flawless with respect to cracks.



3. Insufficiently dry substrate

The floor installer must ensure that the floor covering can be installed without the risk of later bumps and blisters. It is therefore part of his duties to check whether the substrate is sufficiently dry. Although the time passed since the screed was installed

is already an indicator, there are a couple of other factors influencing the drying process of the substrate. Among other things, it must be checked whether the screed is protected by a moisture barrier against moisture penetrating from outside.



Here some factors that have an impact on the drying behaviour of the substrate: weather influences that take effect through opened or unglazed windows, room ventilation, structural moisture still trapped

in the walls as well as type and thickness of the screed. In addition, the proper drying of the screed may be partially restricted by covering it with building materials.

Moisture tests of the substrate

There are different methods for checking the moisture content of a substrate.

• **CM method**

The moisture content of screeds is measured with the help of a CM moisture meter (CM = calcium carbide method). For this purpose, material is sampled from the screed cross-section and filled into the CM

steel flask together with carbide capsules and steel balls. When preparing the floor for the installation of wood flooring, the sample material is traditionally taken from the lower third of the screed.



A substrate is ready for the installation of floor covering if the following or lower CM values are measured:

Substrate	Heated	Unheated
Cement screeds	1.8 CM-%	2.0 CM-%
Calcium sulphate screeds Calcium sulphate flow screeds	0.3 CM-%	0.5 CM-%

Values refer to Central European climates

• **Equilibrium relative humidity (ERH) of subfloors**

The measuring principle is based on establishing equilibrium between screed moisture and air humidity which is called the "corresponding relative humidity". Measurement is performed by means of

a hygrometer that is either inserted into a hole in the screed / concrete or lies in a sealed box on the screed / concrete surface until the equilibrium is established.

• **Moisture measurement based on electrical resistance**

Electronic moisture meters are most often used as a preliminary check to find out in which places the floor moisture level is still quite high. It is a quick and simple method for determining the moisture content of floors. The measuring principle is based on the fact that the electrical resistance of a moist screed is lower than that of a dry one.

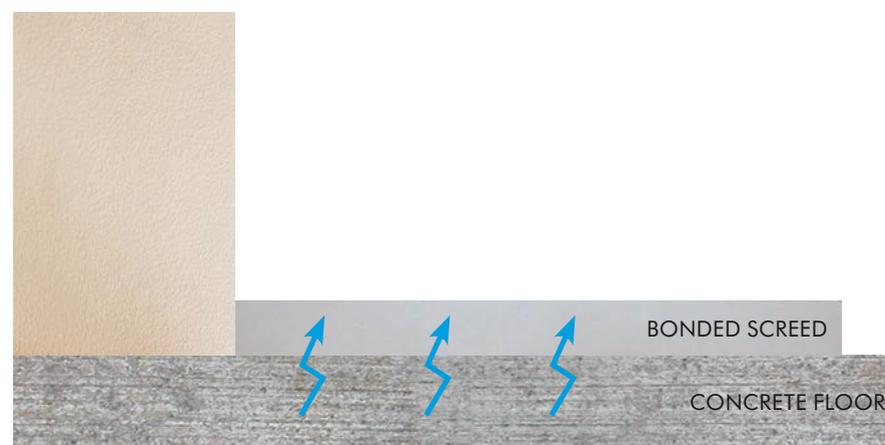
devices. The values measured in the upper zone allow no conclusion on the concrete moisture in the remaining part of the cross-section. Since concrete floors may require drying times of well over a year, it cannot be excluded that the residual moisture will damage the floor covering installed on top.

In the case of concrete floors, a reliable measurement of the moisture content is not possible with the customary measuring

In these cases, it is often necessary to apply a moisture barrier with Ceresit R 755 Epoxy Safety Primer.

! The following principle applies: Before the application of moisture-blocking primers, the respective substrates must be completely waterproof. If the screed has been installed on a concrete slab in contact with the ground, it is essential to consult the floor installation product manufacturer for recommendations concerning the proper substrate preparation. If in doubt, the floor installer should refrain from installing the floor covering.

Migration of moisture



Uncontrolled passage of moisture from the concrete floor into the upper layers (screed)

4. Insufficient surface strength of the substrate

The screed needs to have sufficient surface strength for its intended use. The surface must therefore be checked

whether the floor installation products to be used will establish a firm and long-lasting bond with the existing substrate.



• Surface strength test with a wire brush

When treating the substrate with a wire brush, the surface is partially scratched with a commercial wire brush. Scratching is done with regular, uniform motions and with the same amount of force. When assessing the surface strength, both the

particle amount scratched off the surface and the penetration depth of the wire brush are taken into account. This simple method ensures reliable testing of the surface strength of mineral substrates.

• Grid scratch test

The grid scratch test using the so-called "Ri-Ri device" has proven its

practical worth for testing the surface hardness.



Sufficiently strong screed surface



Insufficiently strong screed surface

After performing this test, new screed surfaces of normal quality only show linear traces without deeper scratches or areas of chipping where the scratch lines cross. The test is then regarded as passed. Evaluation of the test results requires a certain amount of experience. When deep scratches or considerable chipping is found where the scratch lines cross, it is

necessary to take further surface treatment measures depending on expert assessment. Such traces are indicators of instable surface areas. Testing the adhesive pull-off strength (which involves special devices as well as time- and labour-consuming measures) gives in some cases additional information about the subfloor, but is not normally part of the floor layer's work.

5. Too porous or rough substrate surfaces



The porosity of the surface depends on the type of binder, the composition of the mortar and the production of the screed.



A porous or too rough substrate surface will have a considerable impact on the subsequent work (application of floor installation products). Primers, for instance, can be completely soaked up by the screed. Due to rapid dehydration, the flow behaviour and easy spreadability of levelling compounds will be impaired. Moreover, unfavourable surface conditions can significantly increase the required quantity of floor installation products.

Only a visual inspection can verify if a surface is too porous or rough. Any additional preparatory work resulting from this inspection, e.g. the full-surface application of a thick coating or levelling compound, needs to be agreed on a case-by-case basis with the building client.

6. Contaminated substrate surfaces

Surfaces contaminated e.g. by oil, wax, lacquers or paint residues are problematic since the type of contamination is often not known. Every contamination of the substrate impairs the adhesion and may cause bonding problems for the subsequently used floor installation products.



If, for instance, the use of the subfloor was repeatedly changed over the course of time, it may be contaminated with different adhesion-inhibiting substances. When undertaking floor renovation, special measures must be taken to remove these contaminants. Needless to say that this also applies to old layers of levelling compound and adhesive.

Old floor installation products impair adhesion and must therefore be removed in the majority of cases. Old, water-soluble layers are particularly problematic as they penetrate deeply into the pores of the existing screed and, due to their high solubility, pose a severe risk.

As the formulations of standard primers are normally based on aqueous dispersions, they would partially dissolve the water-soluble layers. After intensive mechanical pretreatment of these substrates, it is therefore necessary to plan for precautionary waterproofing measures using water-free products such as Ceresit R 740 or R 755.



7. Incorrect height of the substrate surface in relation to the height of adjacent building components

The floor installer needs to check whether there will be no height difference between the installed floor covering and the adjoining building components, e.g. between rooms and corridors. Any necessary height adjustments are subject to a separate tender



and require further testing or special floor installation products such as thick- and thin-layer levelling compounds, e.g. Ceresit DH Maxi and Ceresit DA or Ceresit DX.

Also make sure to take the height of adjacent ceramic tile floors, parquet floors or door stop rails into account. This planning aspect is among the ordering party's duties. Substrates that are too high in relation to the adjacent floor coverings must be assessed by the contractor and, if necessary, objections be raised to the client.

8. Improper substrate temperatures



The surface temperature of the substrate must not be lower than +15 °C. Recommendable is a temperature of +18 °C. Please note that cold substrates usually have a strong impact on floor installation products and are able to seriously affect their properties.



To keep the thermal stresses of a floor construction as low as possible, the recommended substrate temperature must be maintained on site for a period of 3 days before start and for at least 7 days after completion of floor installation work.

9. Improper room climate

Temperature and relative humidity in rooms where flooring work is planned must be suitable for the application and installation of the intended materials (flooring and floor installation products). Only carry out floor installation work at a floor temperature above 15 °C, air temperature above 18 °C and relative humidity below 75 %.

Any deviation from these ambient conditions will have a negative impact on the floor installation work. It will then be necessary to take appropriate measures that ensure the desired room climate can be maintained.

When carrying out floor installation work, appropriate measures must be taken to protect the floor against direct sun radiation, e.g. by covering the window panes.



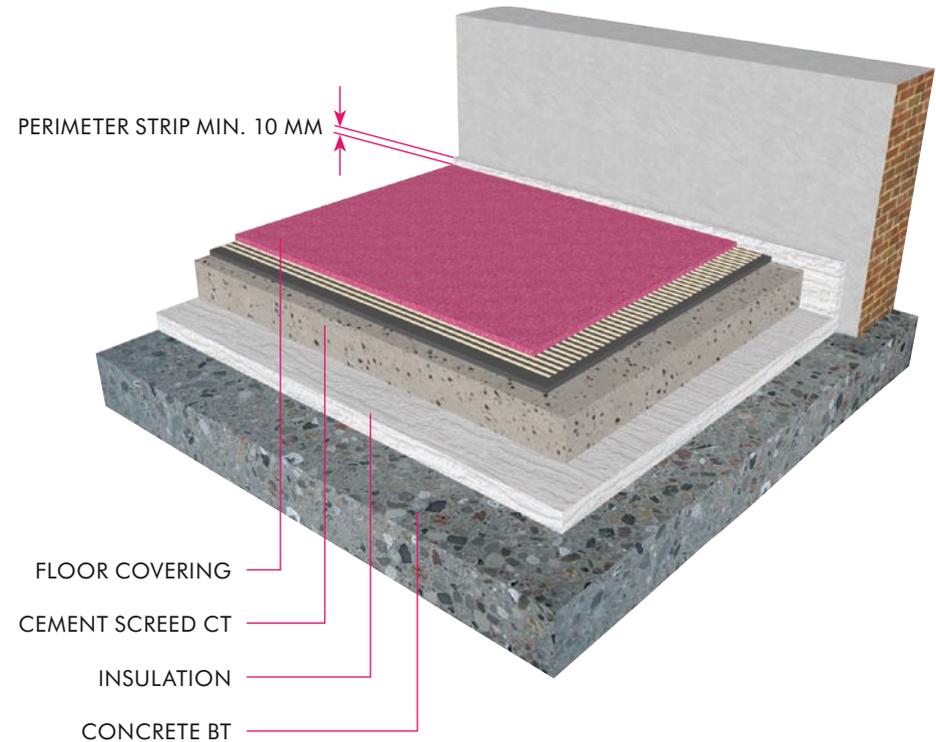
- Air temperature: min. 18 °C**
- Floor temperature: min. 15 °C**
- Relative humidity: max. 75 %**
- Recommended: max. 65 %**

These ambient conditions must be maintained on site for a period of 3 days before start and for at least 7 days after completion of floor installation work. It is recommended that the ordering party documents the compliance with these conditions.

10. Perimeter strips are missing or do not project

Around floating constructions, perimeter strips must exist between the floor and all adjacent building components as well as fixtures that are firmly connected with the building. Perimeter strips separate building components from each other for the purpose

of sound insulation. They also provide the constructions with the space for movement required with respect to thermal expansion. Make sure the edge insulation strip projects by at least 10 mm beyond the upper edge of the planned floor covering material.



If the perimeter strip is missing, it is urgently recommended to install it at a later date.



To ensure that the sounddamping function of a floating screed is not impaired, edge joints must never be "bridged" by contaminations, e.g. residues of mortar or

levelling compound. Even a single small lump of levelling compound jammed between screed and wall would be enough to destroy the entire sounddamping effect.

Pretreating | Priming | Blocking Moisture | Strengthening



Undercoats and primers serve as a “bonding bridge” between the substrate and the levelling compound or the adhesive applied on top. Their use is prescribed, among others, by DIN 18

365 “Flooring Work” and BS 8204 „Screeds, Bases and In-Situ Floorings“. They must always be used according to the respective manufacturer’s instructions.

DIN 18 365 “Flooring Work”

“Primers, trowelling and levelling compounds shall adhere firmly and permanently to the substrate, provide a keying surface for the adhesive and ensure that the floor covering can be installed on top without dimensional change. They shall not adversely affect the substrate, underlay, adhesive and floor covering.”

Undercoats and primers offer the following benefits:

They bind residual dust that a vacuum cleaner does not suck up.	Ceresit R 766, Ceresit R 777
They reduce the absorbency of screeds, thus preventing too fast dehydration of the levelling compound.	Ceresit R 766, Ceresit R 777
They improve the wettability of the substrate surfaces.	Ceresit R 766, Ceresit R 777
They increase the bonding strength/adhesion.	Ceresit R 766, Ceresit R 777
They function as a bonding course on dense/smooth substrates.	Ceresit R 766
They block the capillary rise of moisture from the substrate.	Ceresit R 755, Ceresit R 740
They protect the substrate/floor installation products against moisture rising from the levelling compound, e.g. with calcium sulphate or magnesia screeds.	Ceresit R 755, Ceresit R 740



One of the most important steps in floor construction is the pretreatment of the subfloor with suitable undercoats and primers. To ensure their full functionality, it is first of all necessary to prepare the floors mechanically. Old, non-absorbent wearing surfaces first need to be cleaned in order to completely remove old care films. This is usually done with the help of a basic cleaner and a grinding machine equipped with a black disk (cleaning pad). In a final step, the subfloor must always be thoroughly rinsed with clear water.

Some old subfloors, however, may require a more intensive pretreatment. This is for example the case when instable residues of floor installation products or old floor coverings need to be removed. Usually, this is done with screed grinders, shot-blasters or other special tools. But which device is the most effective for the task at hand? This should be clarified in advance with the manufacturers. If in doubt, carry out preliminary tests.

Mechanical grinding is also indispensable for new screeds. For best results use a medium grit abrasive disk, e.g. 60 to 80 grit. Only in this way is it possible to remove the unavoidable soiling (e.g. cement slurries, dusty surface layers)

caused by the work of other craftsmen. Failure to remove this soiling would prevent a secure bond of the subsequent layers. The standard pretreatment always follows the same scheme: **Grinding | Vacuum-cleaning | Priming**



Grinding



Vacuum-cleaning



Priming



Only after pretreating the subfloor with suitable undercoats and primers can levelling compounds be applied – even on smooth subfloors with poor adhesion. Application of a levelling compound on

Moisture barriers



Besides their adhesion-promoting properties, primers can also be used for protecting the subfloor against moisture – provided they have been specially designed for this purpose (see information in the technical data sheet). These primers are reaction resins based on 2-component epoxy resin (Ceresit R 755) or 1-component polyurethane (Ceresit R 740). They allow the floor layer to produce a moisture barrier on waterproof, mechanically prepared subfloors. This, in turn, protects the subsequently applied floor installation products from the negative impact of moisture rising from the substrate. Always apply Ceresit R 740 and Ceresit R 755 in two coats when using them as moisture barriers.

a ceramic tile surface, for instance, would not be possible without prior use of a primer. Especially in such cases, it is useful to have adhesion-promoting products like Ceresit R 766 Multi-Purpose Primer.

After curing, the above-mentioned reaction resin primers provide a relatively glazed surface. To ensure a firm bond with the subsequently applied levelling compound, the surface must now be treated with a black stripping pad to produce a rough with increased grip. After that, apply an intermediate priming layer with undiluted Ceresit R 766 Multi-Purpose Primer. Especially when expecting higher stresses or applying the levelling compound in layers of more than 10 mm, it is necessary to sprinkle quartz sand into the last coat of reaction resin while it is still fresh. Please refer to the technical data sheets of the respective products for more detailed information. If in doubt, request technical advice.

Furthermore, primers can be used to protect moisture-sensitive substrates or old floor installation products (as long as they firmly adhere) against the detrimental effect of the gauging water used for preparing the levelling compound. Being a 1-component, water-free primer, Ceresit R 740 offers easy handling and rapid work progress. The most important precondition: Follow the manufacturer's instructions for use.

Surface strengthening

Ceresit R 755 Epoxy Resin Primer can also be used for strengthening and stabilizing unstable screed surfaces. The details of execution, for example when preparing the floor in public or industrially used areas, should be clarified by consulting your Ceresit Flooring Advisor.



Filling | Levelling | Smoothing | Absorbency



Expert substrate preparation also includes the surface levelling. Depending on the surface condition, it may be necessary to produce layers of several centimetre thickness. In other cases, a fine smoothing layer of 1 to 2 mm is sufficient. Levelling compounds are also required if the substrate is non absorbent. In these cases, an absorbent

substrate can only be produced when applying a layer of 2 to 3 mm thickness.

Never forget that the most important precondition for the use of levelling compounds is a stable substrate that has already been mechanically treated and primed.

Classification of levelling compounds based on binding agents

• **Cementitious levelling compounds**

These standard products offer a clear advantage. Due to their cement content, the gauging water is rapidly bound even when applied in thick layers. Furthermore, there are so-called rapid levelling compounds. They contain accelerated cements which ensure that the readiness for floor installation is achieved very fast (after approx.

1-3 hours). Depending on their formulation, these compounds are suitable for special applications. For example, they are fibre-reinforced for use on wooden subfloors or have very high strength for heavy-duty applications (pallet truck or forklift traffic).

Examples: Ceresit XXL, XXL Xpress, DX, DA, DD, DD+, DH Maxi

• **Gypsum-based levelling compounds**

Gypsum-based levelling compounds are designed especially for use on gypsum substrates (calcium sulphate screeds, anhydrite screeds). Thanks to their very low shrinkage, they are well suited for use on almost all old subfloors and dry screeds.

This type of compound is also available with the addition of fibres for use on wooden subfloors. However, when applied in thicker layers (> 3 mm), they tend to dry more slowly than cementitious levelling compounds.

Examples: Ceresit AS 1, DG

Main tasks of levelling compounds

Filling

Repair mortars (Ceresit RS 88) with a stiff consistency have been developed for filling holes, producing slopes or patch repairing thresholds. Their consistency can be adjusted by the addition of water. They harden within a short time (approx. 30-60 min).

Levelling

Levelling compounds often need to level out very rugged, uneven substrates or floors with a significant slope. For large-area application, there are self-levelling, thick-layer levelling compounds with a pourable consistency.

Smoothing

Most often, levelling compounds are used for smoothing over uneven substrate surfaces. This is best done with self-levelling, thin-layer smoothing compounds. They prevent that unsightly irregularities of the substrate show through the top covering, e.g. Ceresit DX, DD, XXL, DA.

Absorbency

In addition, levelling compounds produce an absorbent substrate that ensures the uniform drying of dispersion adhesives.

No matter which type of levelling compound you choose, its application is subject to certain preconditions. An important factor of influence is the room climate. About half of the gauging water used for preparing a levelling compound must evaporate; the remaining water is chemically bound by the binding agent, e.g. cement. For this reason, it must be ensured on site that excess water can escape from the rooms (via windows, doors, air circulation). On the other hand, the ambient conditions like air humidity (ideal: 50-60 % RH) and room temperature (ideal: approx. 20 °C) need to be appropriate. Significant deviations can,

among others, negatively affect the strength of levelling compounds. Also the floor installation products should be stored under optimal climatic conditions. In summer, make sure that the products, in particular the levelling compounds, are not exposed to blazing sunshine or stored in a closed vehicle. Excessive heat will significantly impair the product's flow properties so that a smooth, level surface can no longer be produced. The same effect results when the levelling compound is too cold. The optimum storage temperature is between 15 and 25 °C.

Would you have known?

A levelling compound layer of 2 mm thickness contains about 0.8 l of water per m². If about half of the water is to evaporate and the room size is 20 m², this means that as many as 8 l need to be eliminated! This clearly illustrates the need for good air circulation/ventilation (without air draft) when working with levelling compounds.

Mixing the levelling compound

Mineral levelling compounds are mixed with clean, cold water at a predefined mixing ratio. Afterwards, they are stirred with a suitable stirring device/agitator for approx. 2-3 min. Strong deviations from the

amount of gauging water specified by the manufacturer will, among others, result in reduced flowability, distinct loss in strength and negative effects on the surface quality.

! Too high amounts of water will invariably result in lower strength values and longer drying times. Self-levelling compounds react to water overdose by the heavier components settling to the bottom while the lighter components tend to float at the surface. As a result, the upper surface area will be instable and the entire structure is weakened.

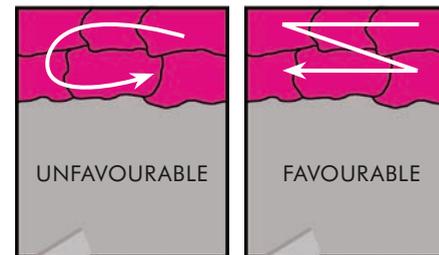


When dealing with large surface areas (from 500 m² upwards) or higher layer thickness, it may be useful to apply the levelling compound with a mortar pump. Please consult your Ceresit Flooring Advisor.

Applying the levelling compound

After mixing, apply the required amount to the substrate and spread it with a suitable tool. This can be a smoothing trowel or pointed finishing trowel; even more preferable are notched trowels whose notch size already determines the layer thickness. With the help of a doctor blade and attached telescopic handle, the compound can be

spread in an upright, ergonomic position. Basically, all levelling compounds must be applied with a certain layer thickness before the self-levelling effect is achieved. To produce sufficiently smooth floors, it is therefore highly recommended to apply layers of at least 2 or even better 3 mm.



In large rooms, make sure to work fast enough so as to ensure there are smooth transitions with no visible overlaps. The result: a uniformly smooth surface.

It is recommendable to treat (de-aerate) the freshly applied levelling compound with a spiked roller.



Trowel application



Doctor blade application



Spiked roller



**Strike! Ultra-smooth surfaces
with Ceresit levelling compounds.**

Floor coverings and their installation

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Flooring adhesives



Adhesives which are used for producing a bond between the floor covering and the expertly prepared substrate need to meet special requirements. For instance when fixing textile flooring, it must be ensured that the adhesive will “survive” shampoo or spray extraction cleaning and will firmly secure even the wet flooring to the

substrate. Adhesives used for bonding PVC flooring must be resistant to plasticizers, whereas adhesives for rubber flooring must feature excellent adhesion to rubber. Last but not least, wood floor adhesives must be able to resist the natural shear and shrinkage forces of the wood.



Today, modern dispersion adhesives are predominantly used. They not only offer many technical features but also advantages with respect to indoor air quality. These very low emission adhesives are able to cover all possible flooring applications.

Besides the type of substrate, also other factors are crucial when applying dispersion adhesives: the **notch size** of the trowel, the open time, the **working time** and the **final strength**.

The **notch size** determines how much adhesive is applied to the surface. The most often used notch size (toothing) for

resilient flooring is A2, for textile flooring B1. The technical data sheets of the respective products specify the notch sizes to be used. For more detailed information on notched trowels please refer to TKB Technical Briefing Note 6 “Trowel Notch Sizes”, which is meanwhile regarded to be an internationally valid standard.

Notch grades

TKB Notch size	bridge width or groove clearance	notch width or groove width	notch depth or groove depth	notch angle	bridge width or groove clearance
S1	0.10 mm	1.80 mm	2.55 mm	30.0°	
S2	0.10 mm	4.20 mm	3.35 mm	60.0°	
A0					
A1	0.50 mm	1.50 mm	1.10 mm	55.0°	
A2	1.30 mm	1.70 mm	1.40 mm	55.0°	
A3	0.40 mm	1.60 mm	1.50 mm	45.0°	
A4	0.40 mm	1.10 mm	0.75 mm	55.0°	
B1	2.60 mm	2.40 mm	2.00 mm	55.0°	
B2	2.00 mm	3.00 mm	2.55 mm	55.0°	
B3	3.30 mm	3.70 mm	3.25 mm	55.0°	
B5	14.30 mm	5.70 mm	5.15 mm	55.0°	
B11	7.90 mm	6.10 mm	5.00 mm	60.0°	
B15	6.90 mm	5.60 mm	6.30 mm	45.0°	
B17	3.90 mm	6.60 mm	9.85 mm	35.0°	
R1	1.50 mm	4.00 mm	3.00 mm	R	
R2	2.00 mm	4.00 mm	5.00 mm	R	

Open time

The open time is the time between applying the adhesive and placing the top covering into the adhesive bed. During this time, a large amount of the moisture contained in the adhesive normally evaporates and initial tack develops. The open time considerably depends on the ambient conditions and on the substrate. Especially on absorbent substrates, the open time must not be too

long as the adhesive ridges may already have hardened before the resilient flooring is placed on top. Even with a pressure roller the hardened adhesive ridges can no longer be flattened. The consequence: the adhesive ridges will only be flattened when a point load acts on them, e.g. a chair or table leg. This may result in permanent depressions in the floor covering.

Working time

Working time means the limited time after application of the adhesive in which the top covering can be placed into the adhesive bed while still achieving full,

uniform wetting of the backing. If this time is exceeded, a sufficiently strong bond is no longer possible. The working time very much depends on the ambient conditions.

Final strength

The final strength of an adhesive indicates when exactly the bond becomes load-bearing and when the bonded areas are ready for the intended service conditions (e.g. foot or forklift traffic).

ridges, which is of high importance for the later optical quality of the surface. There is also interdependence between the levelling compound and the adhesive: the smoother the levelled surface, the more uniform the adhesive layer and the lower the amount of adhesive required. This also greatly influences the later visual appearance of the covered surface.

After placing the top covering, it is always necessary to press it down with a steel roller. This will produce a firm bond with the adhesive and flatten the adhesive

! Always observe short open times on absorbent substrates (to avoid later depressions). Non-absorbent substrates require long open times (only possible with adhesives specially designed for this purpose and with special types of flooring). Please refer to the technical data sheets for more detailed information.

Textile flooring



Textile flooring is often classified based on the manufacturing process since

this determines the necessary measures to be taken for its installation.

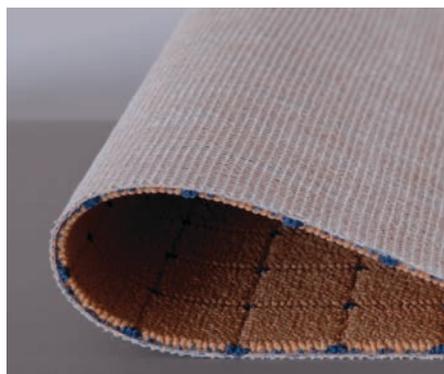
• **Woven carpeting**

Based on the manufacturing process, woven carpeting is available in two variants: **flat carpeting** and **pile carpeting**. Woven carpeting generally has a grid-like backing. High-quality adhesives like Ceresit T 410 are the adhesives of choice for bonding this type of covering as they feature extra high initial tack and a very long open time. Important for woven carpeting because it can be very unwieldy and difficult to handle. Due to the pattern repeat, a sufficiently long correction time for the seam area is required.



• **Tufted carpeting**

Tufted carpeting can be easily recognized in cross-section by the loop pile or cut pile surface. Cut piles are formed by cutting open the loops so that small “tufts” are created. Tufted carpets are manufactured up to 5 m width on multiple-needle sewing machines. All Ceresit carpet adhesives are well suited for bonding this very common type of carpeting.



• **Needle-punch or low-loop pile carpeting**

Both the needle-punch and the low-loop pile variants are especially hard-wearing and therefore often found in heavy-duty environments like open-plan offices. Just

like woven carpeting, also this type of textile flooring has a reputation for being very unwieldy. For this reason, it requires a very powerful carpet adhesive.



Needle punch

Low-loop pile

• **Flocked coverings (flocked textile flooring)**

Flocked coverings are produced with a PVC foam backing. Their top side consists of pile fibres inserted vertically into a base layer. For bonding this plasticized material, we recommend using K 188E and Ceresit UK 400 (notch size A2 or A3).



Resilient flooring primarily includes PVC, CV, rubber and linoleum coverings but also polyolefin and cork materials.

When choosing a product from this very heterogeneous group, the installation should be done properly and expertly by taking not only the substrate requirements but also the specific properties of the material into account. From a purely physical-technical point of view, the individual materials show a very different behaviour due to their nature. PVC coverings, for instance, are thermoplastic materials whereas rubber flooring consists of elastomeric materials. The term “thermoplastic” is derived from two words: materials are “plastic” when they

change their form (e.g. by the application of force) and afterwards retain their new surface morphology. Plasticine is such a material. The first part of the word, “thermo”, suggests that this change in form can be induced by the influence of heat. The most striking characteristic of elastomers, by contrast, is their elastic deformation. This phenomenon is well known from rubber bands. The band can be forcibly stretched to a greater or lesser extent – in other words: deformed. As soon as the application of force stops, the band will retract to its original shape.



To avoid costly complaints, it is absolutely essential to strictly observe the substrate requirements and carefully consider the specific properties of the respective material.

Somewhere between these two extremes, i.e. thermoplastics (PVC) on the one and elastomers (rubber) on the other hand, fall the properties of all other resilient floor coverings. These physical differences alone make it necessary to adapt the installation to the respective type. Never

make the mistake to underestimate typical “character” of a flooring type. Resilient flooring always calls for meticulously prepared, very smooth and clean substrates. Any kind of unevenness or soiling would inevitably show through the top covering.



Detailed knowledge of the materials and their handling are crucial factors that eventually determine whether the installation will be free from defects. For this reason, it is indispensable to strictly follow the installation instructions of the respective flooring manufacturer!

• PVC flooring

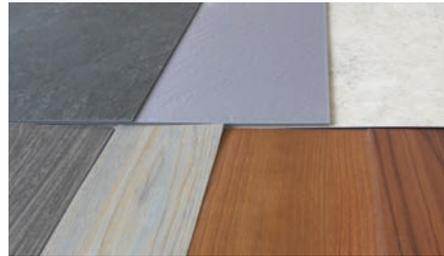
The well-known acronym PVC stands for the thermoplastic material polyvinyl chloride. Through the addition of plasticizers and stabilizers, the rigidity of this plastic can be modified. In addition, it can be easily coloured, is resistant to many acids, alkalis, alcohol and oil, and also absorbs hardly any moisture. These properties make PVC particularly well suited for use as

a flooring material. PVC flooring is popular and finds widespread use in the form of sheets, tiles and panels. It is offered both as a homogeneous (single-layered) and a heterogeneous variant (multi-layered, mostly with a decorative photo print). The heterogeneous variants are known under the name of "luxury vinyl tiles" (LVT).



• CV flooring

CV flooring falls under the category of PVC flooring. It is a two-layered material that consists of a textured PVC layer mounted on a foam backing. The letters C V stand for "cushioned vinyl". CV flooring is mainly available as sheeting.



Ceresit adhesives for PVC flooring:

- **Ceresit K 188 E Special Adhesive Extra**
- **Ceresit UK 400 All-Purpose Adhesive**



• Rubber flooring

Rubber flooring is extremely hard-wearing, impact sound damping, resistant to cigarette burn marks and able to resist at least short-term exposure to diluted alkalis, acids, oils and greases. The bonding of this flooring material clearly differs from that of PVC. An important factor of practical relevance is wettability. The wettability of rubber flooring continuously decreases over the open time of the adhesive. While PVC flooring can

also be installed by pressuresensitive (dry) bonding, rubber tiles and sheets require wet bonding. In contrast to PVC flooring, the wettability of the rubber floor backing ensures that a firm and reliable bond is established. As described in detail in TKB Technical Briefing Note 3 "Installation of Elastomer Flooring", rubber sheet flooring is usually bonded on absorbent substrates using a dispersion adhesive.

Ceresit dispersion adhesives for rubber flooring:

- **Ceresit K 150 Rubber and PVC Adhesive**
- **Ceresit K 188 E Special Adhesive Extra**

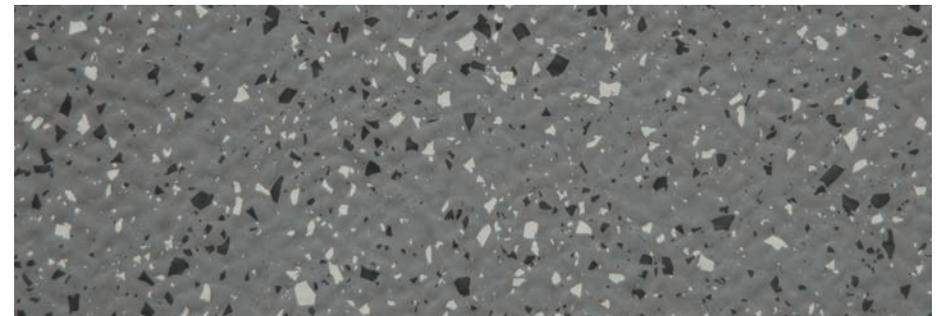
Ceresit reaction resin adhesive for rubber flooring:

- **Ceresit R 710 Polyurethane Adhesive**



When subject to normal service conditions and low thermal stresses, rubber tiles are bonded on absorbent substrates using a suitable Ceresit dispersion adhesive like Ceresit K 150 or K 188 E. The product of choice on impervious, non-absorbent substrates is a reaction resin

adhesive like Ceresit R 710 Polyurethane Adhesive. If high mechanical stresses are expected, e.g. pallet truck or forklift traffic, or if used in wet rooms with exposure to moisture, it is always recommended to use a heavy-duty reaction resin adhesive like Ceresit R 710 Polyurethane Adhesive.



• Linoleum

Like all other top coverings, linoleum can be bonded with a dispersion adhesive without restrictions on all sufficiently absorbent substrates. Even the bight or pole marks typical of linoleum (which are slightly wavy parts caused by the linoleum drying process when the sheet is hung in large loops between poles) can be very well secured with modern linoleum adhesives.

In practical flooring work, it is usual to install linoleum sheets with a seam width of a postcard (0.3-0.5 mm) to account for the fact that linoleum expands in width.

Linoleum shrinks in length but expands in width. After applying a suitable adhesive with a trowel of notch size B1, push the sheets into the still wet adhesive bed. Only a wet adhesive bed ensures the required wetting of the linoleum backing. If the working time of the adhesive is exceeded, this will result in insufficient wetting of the backing.



The factory-cut edges of linoleum sheets may be uneven. Prior to bonding, they must be trimmed following the manufacturer's instructions. Before placing the curled edges into the adhesive, roll them back to flatten them out.

Solvent-free Ceresit adhesives for bonding linoleum:

- **Ceresit UK 400 All purpose Adhesive**
- **Ceresit L 240 D Linoleum Adhesive (dispersion)**



Wood flooring



Wood is a natural product and offers a number of advantages when used as a flooring material. The multitude of possible designs lends timeless beauty to any room. Due to the fact that wood tends to swell and shrink which may cause dimensional changes and deformation, wood flooring makes high demands on the substrate. According to DIN 18 356 "Laying Parquet Flooring" and BS 8201 "Code of practise for flooring of timber, timber products and wood based panel products", it must always be ensured that the substrate is even, permanently dry, clean, free of cracks and separating agents as well as tension- and pressure-proof.

With due skill, care and diligence, the floor/parquet layer must therefore assess whether the substrate is ready to receive floor coverings under consideration of the generally recognized rules of the trade, the current state of the art and the applicable regulations. The choice of a proper adhesive depends primarily on the parquet type and wood species, the demands to be met by the floor construction, the substrate to be covered and the information provided by the manufacturers of floor installation products. Make sure to follow the installation instructions given in their technical data sheets.

Recommended adhesives

- Ceresit P 600 Synthetic Resin Wood Flooring Adhesive
- Ceresit P 618 Dispersion Wood Flooring Adhesive
- Ceresit P 625 2C PUR Adhesive
- Ceresit P 675 Elast
- Ceresit P 685 Elast Universal

For the sake of consumer and environmental protection, we recommend using solvent-free adhesives of very low emission.



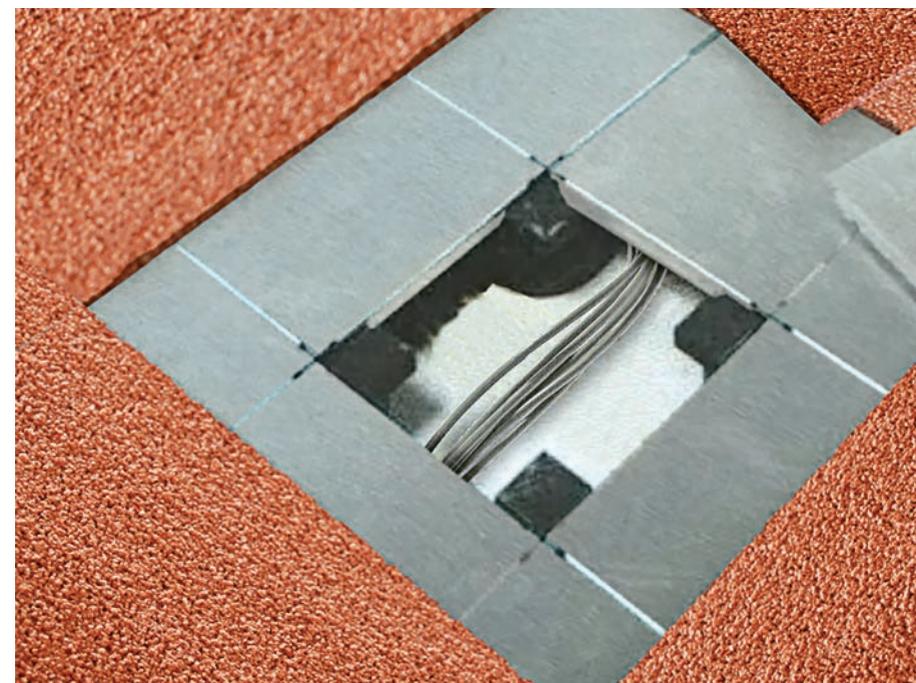
The moisture content of wood flooring always adapts to the existing ambient conditions. Preferably, wood flooring should therefore be installed at the room climate expected to prevail during its later use.

Equilibrium moisture content of wood flooring

Equilibrium moisture content of wood flooring in%	Temperature				
	10°C	15°C	20°C	25°C	30°C
80%	16.2	16.0	16.0	15.8	15.0
75%	14.7	14.5	14.3	14.0	13.0
70%	13.2	13.1	13.0	12.8	12.4
65%	12.0	12.0	11.8	11.5	11.2
60%	11.0	10.9	10.8	10.5	10.3
55%	10.1	10.0	9.9	9.7	9.4
50%	9.4	9.2	9.0	8.9	8.6
45%	8.6	8.4	8.3	8.1	7.9
40%	7.8	7.7	7.5	7.3	7.0
35%	7.0	6.9	6.7	6.4	6.2
30%	6.2	6.1	5.9	5.6	5.3
25%	5.4	5.3	5.0	4.8	4.5

Relative humidity

Removable installation of flooring



Anti-skid tackifiers

There is a growing demand for the removable installation of flooring (in particular textile) – also in commercially used areas – instead of fixing the flooring permanently. Removable installation means that the floor covering can be taken up again but not the slip protection (anti-slip layer). There is no fixation against lateral movement of the tiles so that these must be free of tension and declared by the manufacturer as suitable for this particular

application. Besides so-called “self-laying” or “self-flattening” carpet tiles, there are also “self-laying” modules or panels (larger carpet sections with an area of 1, 2 or more m² per element). Such elements are especially recommended for use on hollow and double floors, wherever easy access to the subfloor is required so that e.g. electrical cables can be installed at a later date.

Recommended anti-skid products:

- **T 425 Tackifier**

Ideal for loose-lay tiles with a fleece or PVC backing



Electrically conductive bonding

When two materials rub against each other (friction), small electrical charges can be transmitted from one material to the other. This causes the naturally balanced ratio of positively charged particles (protons) and negatively charged particles (electrons) to become unbalanced. In flooring technology, this phenomenon

occurs when persons walk upon the floor with shoes or slide across the floor with caster wheels: the neutral charge balance is lost and they become electrostatically charged. As a result, electric voltic builds up. However, these charges normally do not last long as they have a tendency to neutralize each other as fast as possible.



Grounding wire (copper strip)



If the selected flooring has such a high electrical resistance that the voltic cannot be discharged fast enough, this will sooner or later result in uncontrolled discharges via an electric conductor, for example the human body which due to its high moisture content is an optimal conductor. If an electrostatically charged person happens to touch an electrically conductive material (e.g. a door or window handle, metal banisters), the charge will suddenly discharge in the form of small flashes or visible sparks. Although these are perceived as extremely unpleasant, they are not dangerous. However, static discharge is able to destroy electronic

components. In rooms used for medical purposes, store rooms for explosives and computer rooms, such electrical discharges can have harmful consequences: life-saving equipment may suffer a malfunction, explosives may ignite and computer programs may crash. For this reason, static dissipative flooring (also referred to as conductive flooring) is mandatory for use in dedicated areas and is governed by a quite number of standards and regulations. All information pertaining to this issue must be provided by the ordering party and the necessary measures need to be established before the start of floor installation work.

To achieve the required earth/ground resistance, the conductive flooring must be fixed with a conductive adhesive on a static dissipative system. The key task of such a system, which is protected by a separate earth conductor, is the grounding of the floor (potential equalization) by connection to the existing electrical system. Grounding is done via a copper strip bonded to the surface over a length of approx. 1 m, with the end protruding at the edge by approx. 25-50 cm. Here, the ground connection is established.

As described in TKB Technical Briefing Note 7 "Installation of PVC Flooring", the requirements for the conductivity of a floor can vary considerably depending on the intended use of the room. Which products and additional measures are necessary for producing a conductive floor construction

should be agreed on a case-by-case basis with a Ceresit Flooring Advisor. When conductively bonding rubber tiles and expecting high mechanical stresses, e.g. by pallet truck or forklift traffic, it is always necessary to use a heavy-duty, conductive reaction resin adhesive.

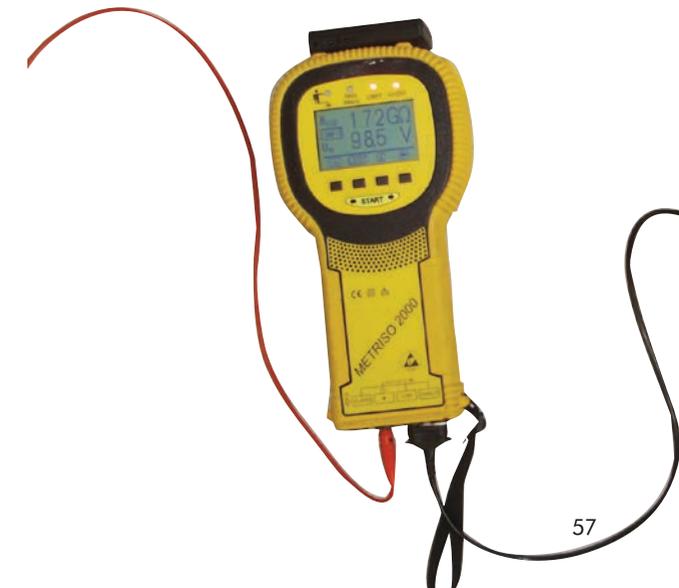
In order to determine whether a floor is sufficiently conductive for the intended use, the earth/ground resistance is measured. Such measurements are mostly carried out by properly trained experts. Make sure to observe a sufficiently long time (approx. 6-8 weeks) between the completion of the floor and the inspection date as the moisture contained in the dispersion-based products will influence the test result. It is therefore necessary to wait until the floor has completely dried.

! Electrical connections to the static dissipative system and the installation of the system itself are not part of the floor layer's duties but must be done by a qualified electrician.



Recommended adhesives for electrically conductive bonding:

- **Ceresit K 112 Special Conductive Adhesive**





Flooring contractors favorite

K188 E – the original. Germany's flooring contractors have given their vote of confidence – in a large-scale survey carried out by the renowned trade magazine "FussbodenTechnik"! and Ceresit K 188E was ranked as Number 1 in the category "Best adhesive". For more than 20 years, the leading special adhesive for all types of resilient floor coverings has proven its worth as a reliable partner for pressure-sensitive,

wet and contact bonding applications. Continuously enhanced over the years, its performance profile was adapted to the ever-increasing demands of the market and has recently been awarded the "Blue Angel" eco label. Ceresit K 188E has always been one step ahead of the times and is therefore rightly Germany's most popular flooring adhesive. For further product information refer to: www.ceresit.com

Materials and product information

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Levelling Compounds	61
Adhesives for textile- and resilient installation	62
Adhesives for wood flooring installation	64
Adhesives for conductive installation	64



Primers

Substrates	R 766	R 777	R 755
Cement screed	●	●	X
Calcium sulphate screed	●	●	X
Concrete	●	●	●
Wooden floorboards	●	-	X
Chipboards/OSB	●	-	X
Dry screed elements	●	●	X
Ceramic tiles, terrazzo and stone floors	●	-	●
Synthetic resin/epoxy resin coatings	●	-	●
Metal	●	-	●

- Ceresit recommendation
- X Alternative recommendation

* This is only a selection of products from our range. Please ask your flooring advisor for further products. For detailed product information please refer to our technical data sheets on your local Ceresit Website.

Levelling compounds

Substrates	AS 1	DA	DD	DG	DH Maxi	DX	XXL	XXL Xpress
Cement screed	X	●	●	●	●	●	●	●
Calcium sulphate screed	●	●	●	●	●	●	●	●
Concrete	-	●	●	●	●	●	●	●
Wooden floorboards	-	-	-	-	-	-	-	-
Chipboards/OSB	-	-	-	-	-	-	-	-
Dry screed elements	●	-	-	●	-	X	X	X
Ceramic tiles, terrazzo and stone floors	●	●	●	●	●	●	●	●
Synthetic resin/epoxy resin coatings	●	●	●	●	●	●	●	●
Metal	-	-	-	-	-	-	-	-

- Ceresit recommendation
- X Alternative recommendation

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Adhesives for textile- and resilient installation

Floor coverings	Dispersion adhesives						Reaction resin adhesives	Anti-skid tackifiers	
	K 150	K 188E	K 198	L 240D	T 440	UK 200	UK 400	R 710	T 425
Textile flooring									
Tufted carpeting	-	-	-	-	●	●	●	-	-
PUR foam backing	-	●	-	-	-	-	-	-	-
Fleece backing	-	-	-	-	●	●	●	-	-
PVC backing	-	●	●	-	-	-	●	-	-
Needle punch, normal	-	-	-	-	●	●	●	-	-
Needle punch, unwieldy	-	-	-	-	-	-	-	-	-
Woven carpeting	-	-	-	-	-	-	-	-	-
Loose-lay carpet tiles	-	-	-	-	-	-	-	-	●
Flat-woven fabric (coir/sisal) with latex backing	-	-	-	-	-	-	-	-	-

● Ceresit recommendation

* This is only a selection of products from our range. Please ask your flooring advisor for further products. For detailed product information please refer to our technical data sheets on your local Ceresit Website.

Adhesives for textile- and resilient installation

Floor coverings	Dispersion adhesives						Reaction resin adhesives	Anti-skid tackifiers	
	K 150	K 188E	K 198	L 240D	T 440	UK 200	UK 400	R 710	T 425
Textile flooring									
PVC/CV flooring (homogeneous/heterogeneous)	●	●	●	-	-	●	●	▲	-
PVC/CV flooring on polyester backing	-	●	●	-	-	●	●	▲	-
PVC/CV flooring on PVC foam backing	●	●	●	-	-	-	X	▲	-
PVC luxury vinyl tiles	●	●	●	-	-	X	●	▲	-
Quartz vinyl tiles	●	●	●	-	-	●	●	-	-
Polyolefin flooring	-	●	-	-	-	-	-	-	-
Linoleum	-	-	-	●	-	-	X	▲	-
Rubber sheet flooring (smooth, sanded backing)	●	● ^{*1}	-	-	-	-	-	▲	-
Rubber tile flooring (smooth, sanded backing)	● ^{*2}	X ^{*1}	-	-	-	-	-	●	-
Cork flooring with an uncoated or PVC-coated backing	-	-	-	-	-	-	-	-	-

● Ceresit recommendation
 ▲ Bonding is possible but difficult
 X Alternative recommendation

* This is only a selection of products from our range. Please ask your flooring advisor for further products. For detailed product information please refer to our technical data sheets on your local Ceresit Website.

^{*1} to 2.5 mm thickness ^{*2} to 4 mm thickness

Adhesives for wood flooring installation

Primers	R 766		R 766, R 777, R 740, R 755	No primer, R 740, R 755	
	P 600	P 618	P 625	P 675	P 685
Wood Flooring					
Strip flooring, 22 mm	●	●	●	●	●
Mosaic wood flooring	●	●	●	-	●
Woodblock RE	●	●	●	-	-
Solid wood flooring, 10 mm	● *1	● *1	●	-	-
Solid wood flooring planks	-	-	●	-	●
2-ply engineered wood flooring	●	● *2	●	●	●
3-ply engineered wood flooring	●	-	●	●	●
Other types of wood flooring	-	-	●	-	●

Adhesives for conductive installation

Conductive adhesives	
Conductive Flooring	K 112
Textile sheet flooring	-
Loose-lay carpet tiles	-
PVC flooring	●
Linoleum	-
Rubber sheet flooring	● *3
Rubber tile flooring	● *3

● Ceresit recommendation

*1 Only oak, 50x250 mm

*2 Up to 600 mm length

*3 Up to 2,5 mm thickness (application of R 762 Conductive Base Coat not required)

* This is only a selection of products from our range. Please ask your flooring advisor for further products. For detailed product information please refer to our technical data sheets on your local Ceresit Website.

Standards and directives

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This chapter provides an overview of the most important international standards and directives. The list makes no claim

to be complete but is merely intended to serve as an orientation aid.

DIN STANDARDS German standards (DIN = Deutsches Institut für Normung)

DIN 18365	Flooring Work
DIN 18356	Laying of Parquet Flooring
DIN 18202	Tolerances in Building Construction

EN STANDARDS European standards

EN 14293	Adhesives – Adhesives for bonding parquet to subfloor – Test methods and minimum requirements
EN 15283	Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods
EN 12 825	Raised access floors
EN 13213	Hollow floors
EN ISO 140	Acoustics – Measurement of sound insulation in buildings and of building elements – Part 8: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor
EN 1081	Resilient floor coverings – Determination of the electrical resistance
EN 13415	Test of adhesives for floor coverings – Determination of the electrical resistance of adhesive films and composites
EN 14259	Adhesives for floor coverings – Requirements for mechanical and electrical performance
EN 13813	Screed material and floor screeds – Screed materials – Properties and requirements
EN 1264	Water-based surface embedded heating and cooling systems

BS STANDARDS British standards

BS 8201	Code of practise for flooring of timber, timber products and wood based panel products
BS 5325	Code of practice for installation of textile floor coverings
BS 8203	Code of practice for installation of resilient floor coverings
BS 8204	Screeds, Bases, and In-Situ Floorings

The Industrieverband Klebstoffe e.V. represents the German adhesives industry with its 112 members of adhesives manufacturers, producers of self-adhesive tapes and raw material producers. Henkel is a member of this organization. The TKB

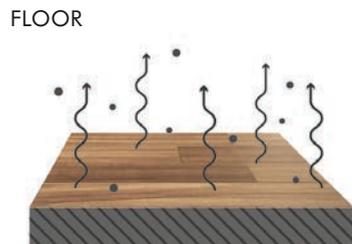
(Technische Kommission Bauklebstoffe = Technical Committee for Construction Adhesives) is part of this organization. The technical briefing notes issued by the TKB can be downloaded under www.klebstoffe.com/index_publikation.htm.

TKB Technical Briefing Note 1	Installation of Parquet
TKB Technical Briefing Note 2	Installation of Laminate Flooring
TKB Technical Briefing Note 3	Installation of Elastomer Flooring
TKB Technical Briefing Note 4	Installation of Linoleum Flooring
TKB Technical Briefing Note 5	Installation of Cork Flooring
TKB Technical Briefing Note 6	Trowel Notch Sizes for Installation of Floor Coverings, Wood Flooring and Tiles
TKB Technical Briefing Note 7	Installation of PVC Flooring
TKB Technical Briefing Note 8	Assessment and Preparation of Substrates for Installation of Floor Coverings and Parquet
TKB Technical Briefing Note 9	Technical Specification and Installation of Floor Levelling Compounds
TKB Technical Briefing Note 10	Wood Particle Boards used as Laying Substrate
TKB Technical Briefing Note 11	Installation of Self-Laying Carpet Tiles and Sheets
TKB Technical Briefing Note 12	Installation of Floor Coverings with Dry Adhesives

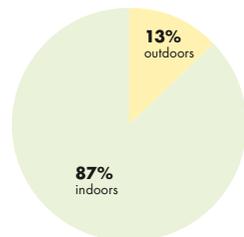
Low emission. Safer indoor environment.

What are emissions?

Emissions are the release of gaseous pollutants into the environment. In the indoor atmosphere they mostly emanate from freshly applied lacquers and paints, adhesives, insulation systems and other building materials. They are most eminent shortly after the application of certain products, but can persist in the air for days and months after the materials have been installed. Emissions are defined as "Volatile Organic Compounds" (VOCs).



Harmful gases emitted from floor installation products. In reality they are invisible.



On average, adults spend nearly 21 hours a day indoors (ca. 87%). Source: Brochure "EMICODE® – stands for low in emissions" available at www.emicode.com

VOCs and their adverse impact on people's health

Too high concentration of VOCs is suspected to have a negative influence on people's health and well-being. As we spend the majority of our time indoors: at home, at the working place or in the shopping centre, the air quality is of a great importance.

What is GEV-EMICODE?

The EMICODE issued by the GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte) is an internationally recognized guidance and quality standard for low-emission products, used in the categories: flooring installation, adhesives and construction materials. The system guarantees consistent and comparable product labelling, that helps the buyers choose the safest possible products.



Emicode labels

Across all business divisions, sustainability is a key topic at Henkel and this, of course, also includes Ceresit. Sustainability has been the company's driving force for years. In 1997, Ceresit was among the initiators of the GEV, the "Gemeinschaft für Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte." (Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building materials.).

This association laid the foundation for the classification of low-emission products in flooring technology. The aim: optimum indoor air quality. Meanwhile, the quality seal EMICODE EC 1 PLUS* for very low emission products has been granted to more than 90 % of all Ceresit products.

* in Western Europe



EMICODE EC 1
VERY LOW EMISSION



EMICODE EC 1R*
VERY LOW EMISSION REGULATED



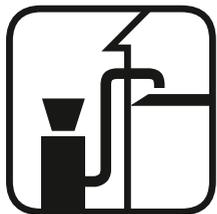
EMICODE EC 1 PLUS
VERY LOW EMISSION PLUS



EMICODE EC 1 PLUS R*
VERY LOW EMISSION PLUS REGULATED

* An R behind the EC class indicates that the product requires special attention for occupational safety during application.

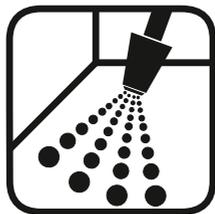
For further information please refer to www.emicode.com.



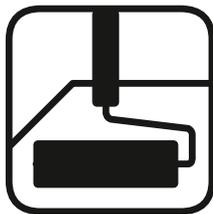
Pump application



Trowel application
(levelling compounds)



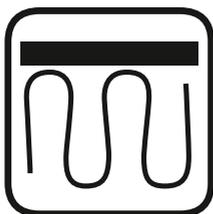
Spray application



Resistant to castors if
combined with suitable
flooring



Roller application



Squeegee application



Suitable for use on
underfloor heating

The indicated open and working times are based on standard climatic conditions (23°C and 50% relative humidity according to DIN 50014). The conditions prevailing on site may vary considerably from these values.

The required product amounts depend, among others, on the condition of the substrate surface. The values indicated can therefore only be a rough estimate. Please observe the instructions for use given in the technical data sheets, safety data sheets and on the packaging labels.

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Adlon Kempinski Hotel, Germany



Burj Khalifa, United Arab Emirates



Pudong International Airport, China



Shanghai Tennis Center, China

Ceresit – When flooring excellence is your daily business.

Setting and achieving high standards for yourself is not possible in the flooring business without the right partner at your side. Specialist Ceresit offers premium quality floor installation systems and

excellent technical support. Whether at home or abroad, in private or public buildings, in small or large-scale projects: Team up with an experienced and reliable partner – anywhere in the world!



Expert knowledge
for the professional floorer

Henkel sets benchmarks:

- 2007-2010: Industry leader in the DJSI World (Dow Jones Sustainability World Index)
Winner of the "German Sustainability Award"
- 2008: Sustainability Award
- 2004-2008: Sulphur dioxide (CO₂): - 41%
Water consumption: - 35%
Waste: - 30%, Energy: - 11%
- 2000: Responsible Care Award
- 1992: Publication of the first Environment Report
- 1991: Signing of the Business Charter for Sustainable Development of the International Chamber of Commerce (ICC)
- 1986: Launch of phosphate-free Persil
- 1971: Setting up a central department for environmental and consumer protection
- 1969: Launch of the solvent-free Pritt glue stick



- 2008: Commendation by the Federal Ministry for Labour and Social Affairs for low-dust ready-mixed dry mortars
- 2008: Patent application and launch of the first "low-dust levelling compounds" (dust reduction by up to 90 %)
- 2007: Active membership in the DGBN (German Sustainable Building Council)
- 2003: Use of APEO-containing emulsifiers discontinued as they had given rise to health and environmental concerns
- 1997: Main initiator and founding member of the GEV (Association for the Control of Emissions in Products for Flooring Installation)

**Making it to the top requires persistence
- especially when striving for sustainability.**

Safety and health at work and the protection of consumer and environment are key issues at Ceresit and the driving force behind all our thoughts and actions. Sustainability and social responsibility have a long tradition at Henkel and are firmly anchored in our corporate policy. For us, genuine

sustainability is no marketing trend, but the commitment to a clear set of values that governs our entire company organization and culture. A process that took many years but also generated successes that we are rightly proud of - for a better future.