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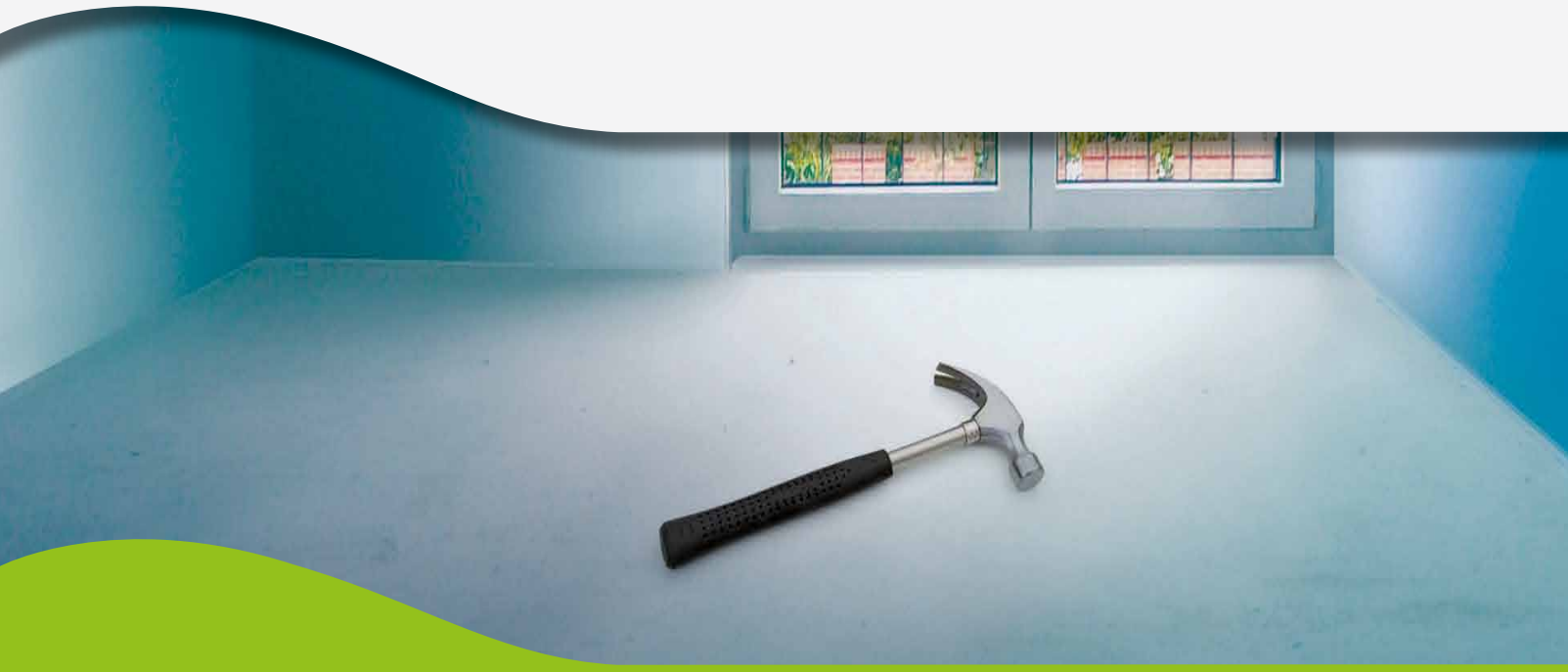

Code of Practice

4

Assessment and treatment of the surfaces of flowing calcium sulphate screeds

Instructions and guidelines for planning and application of calcium sulphate flowing screeds

Code of Practice from the
Industriegruppe Estrichstoffe im
Bundesverband der Gipsindustrie e.V.,
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Assessment and treatment of the surfaces of flowing calcium sulphate screeds

1 General

Flowing calcium sulphate screeds (hereinafter referred to as flowing screeds) have proven themselves in indoor applications for decades thanks to their wide range of technical advantages.

Flowing screeds are characterized by a compact structure as well as an even and firm surface. They are suitable for the application of all common coverings.

It is generally state-of-the-art that flowing screed surfaces are sanded. However, it is possible to omit sanding of the surface if the flowing screed surface quality is adequate for the intended purpose. Testing and assessment of the screed surface before application of the covering with the tests commonly used in the trade, such as a grid scratch test, hammer blow test, wetting test, are indispensable just as with all other screeds.

This Code of Practice provides practical instructions and recommendations for testing, assessment and treatment of flowing screed surfaces. It should facilitate the screed applier and flooring applier to professionally assess and determine whether the flowing screed surface is adequate for the intended purpose, and whether further surface treatment is required or even if the applied screed surface is defective due to an error in the application.

2 Surface properties – testing, evaluation and treatment

2.1 "Sintered layer", "Lime film"

During the drying process, water is transported to the surface by capilliary action. Any substances (e.g. lime, additives) dissolved in the water can be deposited on the surface forming a so-called "sintered layer" or "lime film". They are only fractions of millimetres thick and have a matt to shiny appearance. The existence of such a layer must be determined by visual inspection or grid scratch test, and in case of doubt, with a surface strength test. Sinter layers are due to the materials used and may even occur on perfectly applied flowing screeds. They cause a reduction in the adhesion between screed and covering and must be removed by grinding or scraping them off.

2.2 Rare surface properties

The surface properties described under points 2.2.1 to 2.2.4 rarely occur and are an exception.

2.2.1 Hard shells

In rare cases (mainly caused by incorrect addition of water), a hardened shell (similar to a sintered layer) caused by the concentration of binders and/or additives, can form on the surface of the screed and can impede drying. Under load conditions, it will detach from the screed layer below it. This faulty bond can be recognized by performing the hammer blow test. In part, hard shells can be chipped off, but it is always possible to remove them by grinding or milling.

2.2.2 Efflorescence (lime bloom)

Efflorescence (blooming) arises due to the transport process occurring within the screed cross-section. The substances dissolved in the water (salts) are deposited on the screed surface forming crystallization. They can be detected by a visual inspection and must be removed by sweeping them off. Efflorescence does not affect the technical properties of the screed.

Overview: Test and assessment methods as well as treatment measures for preparation of screed surfaces

	Properties of the screed surface	Test and assessment	Treatment measures*
1	Sintered layer / lime film	Visual inspection, if reqd. grid scratch test. Surface strength-test in case of doubt	Sand, scrape off
2	Hard shell	Hammer blow test	Chip off, grind off, mill off, shot blast
3	Efflorescence	Visual inspection	Sweep off
4	Soft, farinaceous surface	Visual inspection, if reqd., grid scratch test. Surface strength test in case of doubt	Grind off
5	Insufficient absorptivity	Wetting test	Machine brushing, roughening, grind in rare cases
6	Soiling	Visual inspection	Machine brushing, grind clean

* After the completion of all treatment measures, the screed surface must be thoroughly cleaned with an industrial vacuum cleaner

2.2.3 Soft, farinaceous surface

If a flowing screed is applied with excess water, binders and fine particles can be deposited in the upper screed zone leading to the formation of millimetre thick and usually brighter layers, exhibiting a notably reduced surface hardness. These areas are tested by grid scratch tests, in cases of doubt by means of a surface strength test. In case of a proven poor surface hardness, this upper layer must be ground off right down to the aggregate grain (or with fine-grain screed down to the firm screed matrix).

2.2.4 Insufficient absorbtivity

Screeds must have a uniform absorbtivity so that they can accept the ancillary materials (primers, fillers, adhesive mortars) used to apply the covering. The absorbtivity is determined using a wetting test. Insufficient absorbtivity is caused by an excessively dense surface and can be remedied by roughening (machine brushing or sanding, grinding off in rare cases).

2.3 Soiling due to subsequent building work

Soiling of the screed surface due to foreign matter such as mortar, paint and plaster residue, dirt, dust, grease and oil reduce the adhesion of the surface. A visual inspection of the surface is required.

In accordance with the requirements of the German VOB part C, the screed must be cleaned before the covering is applied, i.e. brushed or sanded (sanded clean). The sanded material must be removed from the screed by an industrial vacuum cleaner.

3 Explanations of the different mechanical surface treatments

Scraping off:
Between 6 and 48 hours after application, the top screed layer (skin) is still pliable and can be removed using suitable scrapers. Ensure that the surface pores of the screed are not covered with partially moist scraped material remnants during the scraping process.

Chipping off:
Removal of hard shells with suitable tools.

Machine brushing:
Cleaning and roughening of the screed surface with steel brushes and machines.

Sanding:
Grinding of the screed surface using a grinder or sander and grade 16 sandpaper. The screed thickness remains practically unchanged by the process.

Sanding clean:
The screed surface is sanded for the purpose of cleaning in this process.

Grind off:
Grinding down of a poor screed surface where the top screed edge zone is removed.

Milling off:
Removal of the surface layer of the screed using a milling cutter.

Shot-blasting:
Removal of a surface layer using the shot blasting method. Ensure that the correct

shot grade is selected when using the shot-blasting method.

Vacuum cleaning:
Pore-deep cleaning of the screed surface with a powerful industrial vacuum cleaner.

4 Test procedure

4.1 Grid scratch testing

With the grid scratch test, the screed surface is scratched in a grid of approx. 10 mm with sufficient spring force so that a grid scratch pattern is applied. If the test produces large scale spalling, the test is deemed to be failed. The test must be performed by an experienced tester.

4.2 Hammer blow test

The hammer blow test involves a hammer blow without force applied at an angle of approx. 45 to 60°. The weight of the hammer must be approx. 500 g (e.g. fitter's hammer). If there is a hard shell, it will splitter into coin sized pieces and the layer below it is deficient. The test must be performed by an experienced tester.

4.3 Wetting test

In the course of this test, a defined quantity of water (approx. 2 ml corresponding to a crown cap filled with water) is applied to the clean and dry screed surface and the time until the water has disappeared fully is determined. If the water is absorbed in more than three minutes or it remains on the screed surface, the absorptivity is too low (suspicion of a hard shell). The result should be evaluated in conjunction with further tests.

4.4 Supplementary tests

If a conclusive assessment of the screed surface is not possible with the above mentioned test methods, further assessment can be undertaken with surface tensile strength testing, adhesive bonding testing and peeling resistance testing. These tests are not generally performed.

4.4.1 Testing of the surface tensile strength

Test stamps made of steel with a diameter of 50 mm and 25 mm height are applied using a special adhesive. After the adhesive has set (after about 1 hour), the test stamps are pulled off in an upward motion with a surface tensile strength test device. The force required (in N) is measured and divided by the surface area of the stamp (in mm^2) resulting in the surface tensile strength (in N/mm^2) of screed surface. Some devices directly indicate the surface tensile strength (e.g. the DYNA Estrich tester). The required surface tensile strength is dependent on the intended usage. Reference values can be found in the BEB Code of Practice *Surface tensile strength and adhesive pull strength of floors - General, testing, influences, assessment*[5]. Instructions on carrying out a test on the surface tensile strength are provided in the working paper *Testing of the adhesive strength of floor surfaces made of calcium sulphate flowing screeds with the DYNA Estrich instrument – General, testing, assessment*[4].

4.4.2 Adhesive bonding test and resistance to peeling

An adhesive bonding test is performed on the dry and cleaned screed using the same system structure (primer or filler, adhesive is required) as planned for the application of the covering. The force required to remove the covering after the adhesive has dried and set provides information on the suitability of the substrate and the adhesive bond. Furthermore, the fracture pattern provides additional information. If screed with its characteristic aggregate grain adheres to the parquet strip or tile, this indicates a good surface quality.

4.4.2.1 Testing with parquet

A chisel is held vertically with the lower end of the side surface touching the bonded parquet strip. The parquet strip is loosened by hitting the lower section of the chisel horizontally with a hammer. Experience is necessary to rate the required force.

4.4.2.2 Testing with tiles

The tile is lifted using a hammer and chisel. Experience is required to rate the required force.

4.4.2.3 Testing with elastic and textile coverings

The test is undertaken by means of resistance to peeling. Strips 50 mm in width are cut out of the bonded covering. The strips are pulled off using a spring scale (force applied perpendicular to the surface). The minimum peeling force may not be under 50 N (corresponds to a weight of 5 kg).

Additional notes

Screed surfaces are treated with a primer to ensure uniform surface absorbtivity. Some manufacturers offer adhesive systems where a primer is unnecessary. The manufacturers specifications must be observed.

Cementitious flowing filler material or ceramic tile adhesive can be used on primed calcium sulphate flowing screeds when the appropriate primer is applied.

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