



Code of Practice

2

Drying of flowing calcium sulphate screeds

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

Code of Practice from the
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Drying of flowing calcium sulphate screeds

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

Like all mineral-based building materials, screeds also have to dissipate the excessive putty water that has not been bound into the ambient air.

Correct drying is therefore essential for flowing screeds so that they are speedily ready for application of surface treatments or coverings.

As flowing screeds bond quickly, drying can commence quickly. Deformations (curling) are not an issue.

1 Ventilation

The water dissipated from the screed must be absorbed by the ambient air and transported away as quickly as possible. This requires a continuous exchange of moist air with fresh, dry air. Accordingly, the drying time depends on the nature and means of ventilation. Tilted or closed windows hinder or prevent the exchange of air and considerably delay drying (refer also to the BEB information sheet regarding climatic prerequisites on construction sites for the drying of screeds ^[1]).

A permanently tilted window is insufficient to quickly dry screeds.

The following points must be observed when drying flowing screeds:

- The screed must be protected from draughts for about 48 hours after application.
- Intensive ventilation is required from the 3rd day onwards. The water absorption capacity of the air is dependent on the weather, e.g. on the temperature. For example, the air at 30°C has three times the moisture absorption capacity than it does at 10°C (see figure 1). This is why it is prudent to heat the rooms and apply surge ventilation in case of frost, high levels of air humidity and extended rainy periods. Ideally, all windows and doors should be opened wide for at least 10 minutes five times a day. The windows and doors should then be closed again. In favourable climatic conditions (low levels of humidity), permanent ventilation can be provided.
- Ensure that precipitation cannot enter through the open doors and windows.

Contrary to popular belief, screed dries very well in winter when the rooms are heated. During the exchange of air, a large quantity of moisture can be absorbed by the cold air inflow, which is warmed in the heated interior allowing it to absorb large amounts of moisture. These large amounts of moisture can be discharged relatively quickly during short periods of surge ventilation. In mid-summer on the other hand, the humidity level occasionally approaches almost 90 % so that the hot and humid air is hardly able to absorb any moisture. However, by contrast in the cooler interior, condensation can form on the screed surface resulting in a slight moisture absorption.

Window position	Air exchange / hour
Windows closed, doors closed	0 to 0.5
Windows tilted, blinds closed	0.3 to 1.5
Windows tilted, no closed	0.8 to 4.0
Window half open	5 to 10
Window fully open	9 to 15
Windows and doors fully open (directly opposite each other)	Approx. 40

Reference values for drying rates

The air absorbs different amounts of water depending on the temperature. The same relative humidity means different quantities of water at different temperatures. The absolute water content of the air and the dew point can be determined from this relationship.

Reading examples:

- 1) At 20°C and 50 % rel. humidity there is approx. 8.6 g/m³ of water vapour in the air.
- 2) Graphic determination of the dew point: 20°C and 50 % rel. humidity result in a dew point temperature of 9.3°C.

2 Heating floor screed

Drying of heating floor screed is accelerated by heating it up. The screed can dissipate its humidity faster and the air can absorb more moisture as it is warmed up. Hence, the drying time for heated floor screed depends on the nature and means of ventilation as well. Continuous closing of the windows to avoid heat loss simultaneously prevents drying of the screed. A constantly tilted window is also insufficient to quickly dry the heated floor screed.

Further detailed instructions for dry heating floor screed can be found in the Code of Practice No. 3 Calcium sulphate screeds on underfloor heating^[2].

3 Air dehumidifiers

If provision of adequate ventilation is not possible (e.g. too few windows), quick drying can be attained by using dehumidifiers. Condensate driers are mainly used in building applications to provide a constant supply of dry air with a level of relative humidity of approx. 35%. Economic operation is generally achieved in a temperature range of 12 to 30°C. At low temperatures, heating with auxiliary electrical or indirect heating devices is required. Condensate drying uses the recirculation drying method, meaning that the doors and windows must remain closed during the drying process. Adequate air circulation must be ensured, e.g. by the provision of fans. The resulting condensation water must be discharged so that constructional components and the room are not re-humidified.

During the drying phase, the driers should be repositioned at least once to avoid pockets of residual moisture.

The capacity and number of condensate driers required is dependent on the room volume and the level of building humidity present.

For further information refer to the BEB information sheet on accelerated drying of calcium sulphate screeds 01/2007^[3].

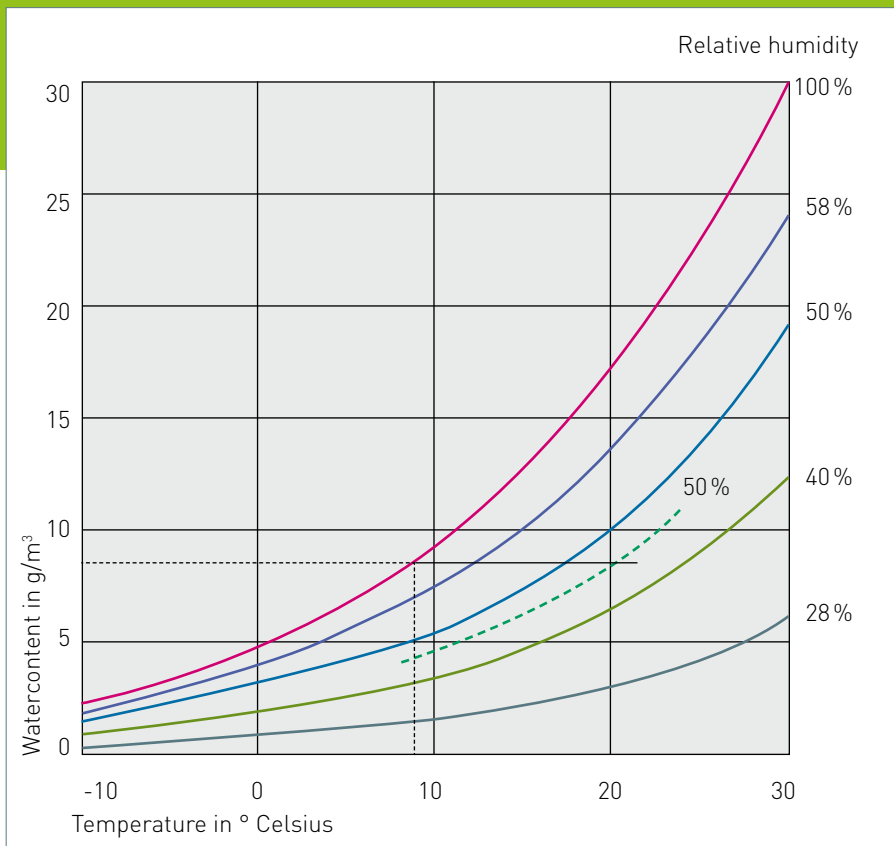


Fig. 1: Moisture content in the air dependent on the temperature and relative humidity

4 Building moisture intake, prevention of drying

In addition to the provision of adequate ventilation, it is essential that no additional moisture is introduced to the screed and that drying is not impaired to ensure proper drying of the screed.

- When heating rooms, heating devices that emit their exhaust gasses into the building (direct combustion) must not be used. Direct combustion of gas and oil produces additional water causing the level of room humidity to rise.
- Newly plastered walls can result in an increase in humidity leading to a temporary increase of the moisture level in the screed.

- If, for example, the temperature drop significantly at night while humidity levels are high, the water vapour can condense and accumulate in the screed. The water content in the screed in the morning will then be higher than it was the previous evening if the screed is not protected. The screed is protected in such cases by closing the windows and doors at night.
- A covered facade can prevent an intensive exchange of air and consequently extend the drying time of the screed.

- Covering the screed surface, for example, by storing building materials on it, will impair drying and should be avoided.
- As is the case with all mineral-based building materials, the drying time increases with increased thickness. If the screed thickness is doubled, the drying time will increase three- to four-fold under the same ambient conditions. This will broadly limit the benefits of quicker drying associated with flowing screeds. This should be considered in the planning phase.
- In case of bonded screeds, it is essential to consider that the drying can be impaired unforeseeably, for example, by rising moisture from structural components.

5 Equilibrium moisture of the screed and workability

Code of Practice No. 3^[2] contains detailed information concerning the attainment and assessment of the workability of the screed surface. It applies both for heated and unheated screed constructions.

Literature

Internet research

- [1] BEB Information sheet Bauklimatische Voraussetzungen zur Trocknung von Estrichen; Bundesverband Estrich und Belag [*Climatic building conditions for drying screeds*] (BEB) e. V., Troisdorf (published), 12/2000
- [2] Flowing calcium sulphate screeds on underfloor heating – Code of Practice No. 3; 2011 (Published by IGE and IWM)
- [3] BEB Information sheet Beschleunigten Trocknung von Calciumsulfatestrichen [*Accelerated drying of calcium sulphate screeds*]; Bundesverband Estrich und Belag (BEB) e. V., Troisdorf (published), 01/2007
- [4] Flowing calcium sulphate screeds in areas of high humidity – Code of Practice No. 1
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- [6] Joints in flowing calcium sulphate screeds – Code of Practice No. 5, 2011 (Published by IGE and IWM)
- [7] Austrocknungsverhalten von Calciumsulfat-Fließestrichen [*Drying behaviour of calcium sulphate flowing screeds*]; Schießl P. und Wiegrink K.-H. in ZKG International, issue 12-2004
- [8] Spannungen und Verformungen in Calciumsulfat-Fließestrichen (Teile 1 und 2) [*Stresses and deformation in calcium sulphate flowing screeds (Parts 1 and 2)*]; Schießl P. and Wiegrink K.-H. in ZKG International, issues 4-2005 and 5-2005
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