Guide Specification - NORTEC® Concrete Floor Finish

Concrete densification and hardening on new and existing floors/surfaces***

Notes on planning and execution

Every concrete surface in the untreated state has a certain porosity that makes it unsuitable as a finished industrial floor. The porosity results in increased abrasion and dust formation. Likewise, the lack of impermeability leads to the penetration of chemical liquids. These negative properties of the concrete are **permanently eliminated with a one-time application of a concrete densifier and hardener. It has been shown that abrasion resistance, impermeability, and chemical resistance are increased, and that ease of care and surface appearance are improved.**

Specially modified silicates are used **with concrete's own reactive substances to permanently harden the surface without multi-layer build-up inside at a depth of 5–7 mm**, eliminating the need for further application of additional layers on top of the concrete. This is especially true for concrete surfaces that are not subject to additional structural requirements and/or in LAU systems.

The process is **not comparable to conventional water glass applications, coatings or impregnations,** which can wear off, or have to be repeated or should only be used in combination with dry shake.

In contrast to the above-mentioned surface treatments, this technology leads to a **permanent** change in the cement structure at the **concrete surface**, making it **denser, stronger and** consequently **harder.** However, it does not form a membrane or layer on the concrete surface. The treated floors are permanently robust, abrasion and dust resistant, non-combustible, conductive, and chemically resistant and are characterized by easy care, lower maintenance, and an aesthetically pleasing appearance.

This environmentally friendly process mimics natural processes found in nature and is considered the **most cost-effective, environmentally friendly and sustainable technology for improving cementitious surfaces** and has been a tested and proven **international standard** for **decades**.

With regard to the *DGNB's recommendations on the choice of materials for sustainable building products*, densified and hardened concrete floors meet **the strict criteria on climate protection, resource conservation, protection of health and the environment, and sustainable supply chains.** In industrial construction, monolithic concrete floors are assumed to have a **technical service life of 50 years**. The concrete densifiers are pollutant-free, VOC-free, low-emission and come from domestic production.

Concrete densifiers can be used on **concrete, cement screed or cement-bound dry shake** on **new and old** surfaces. The application is **possible on indoor and outdoor surfaces**. The existing visual concrete/screed surface condition is not changed by the use of the densifier.

**New surfaces are surfaces to be remunerated that have been produced in standard industry quality as a level, smoothed or as a final rough surface, are still covered with plastic curing blankets and/or are not yet in use.*

*** Existing surfaces are new areas that are already used by other trades and are no longer covered with curing blankets.*

Concrete densifiers are suitable for concrete floors with CEM I or CEM II cements, as well as for clinker-reduced concrete (e.g. CEM III cement).

The **surfaces to be treated are to be installed in standard industry concrete quality** and, if required, with increased levelness and flatness as a smooth troweled or as a final rough surface. During construction, the surfaces should be adequately protected from chemical attacks, such as rust or oil stains, until they are handed over to the client and the hardening process is completed. Refinement can be achieved by a **cleaning and grinding process (Pos. 1.3.)** before applying the hardener.

The concrete floors must comply with DIN 1045 or EN 206 and the applicable standards and rules. This applies, in particular to the valid information sheets of the *German Society for Concrete and Construction Technology (Deutscher Beton- und Bautechnik-Verein E.V.) and the German Cement Works Association (Verein Deutscher Zementwerke e.V.*) (www.vdz-online.de).

We recommend the following information sheets in particular:

- T1 Concrete industrial floors
- LB1 Flooring for warehouses
- B9 Concrete exposure classes and special concrete properties
- B8 Post-treatment of concrete
- B18 Cracks in concrete
- B27 Efflorescence – formation, prevention
- VDZ leaflet "Visible concrete"

1. *Construction process & quality assurance*

There are **no delays in the construction process due to the surface treatment.** Curing times are not to be observed. The treated surfaces can be mechanically stressed after complete drying (usually after 4 hours, depending on the weather).

In general, it must be ensured that the **areas to be treated are freely accessible** and that **the client guarantees continuous free access to the construction site during the application period**.

To assure quality, it is recommended to communicate end user expectations of the floor and coordinate polishing operations across other associated trades and work.

2. *Concrete flooring installation*

We recommend that **concrete placement and finishing work be carried out independent of weather conditions**, if possible, in an enclosed environment free of wind and drafts, in order to exclude weather-related damage, such as cracks and surface damage, e.g. due to precipitation, from the outset.

Concrete curing (e.g. covering with curing blankets as quickly as possible after finishing the slab) or timely joint cutting is the **most important criterion for obtaining high-quality concrete floors, in addition to the concrete mix design and the quality of the installation work**.

Concrete needs moisture and heat in the first hours and days. The earlier and longer the surfaces are covered with curing blankets, the better the surface quality. These times are subject to strict specifications and should not be reduced under any circumstances. Failure to observe this can have a lasting effect on the quality of the floor, especially strength development and uncontrolled cracking, especially in the first hours after concrete pouring.

To reduce the risk of cracking and for reasons of legal demarcation from the floor layer's performance, we recommend unconditional **compliance with the technologically specified concrete curing time.**

The concrete surface must **not be provided with chemical additives** which hinder or even exclude the reactivity the densifier. This applies in particular to chemical additives in the mixing water, e.g. dispersions, latex, acrylates, coatings, water repellents or after-treatment agents (e.g. spray film, paraffins). This does not apply to approved concrete admixtures, e.g. retarders or flow agents.

3. Use on exterior surfaces

It can be used on dry and damp substrates (no puddles!) and is suitable for improving abrasion and freeze-thaw resistance or maintaining broom finish. For unenclosed halls, the work is weather-dependent. The **soil temperature must be at least 5 °C during application**.

4. Substrate preparation

Before the application, the floor must be cleaned and can be visually upgraded if necessary, by mechanical processing. Depending on the degree of contamination and the condition of the surfacse, the following costs may be incurred:

- **Simple substrate preparation (Item 1.1.)**
- **Intensive substrate preparation (Item 1.2)**
- **Clean and Grind (concrete peeling) (Item 1.3)**
- **Allowances for work on elevations, columns, walls (Item 1.4)**
- **Allowances for micro- and hard-to-reach areas, such as stairs, platforms, cellars (Item 1.5)**
- **Substrate preparation for decorative concrete surfaces (Item 1.6)**

5. Application of the hardener

The application is odorless, dust-free and without noise. Furthermore, no toxic fumes or vapors are released during processing. **(Item 2.)**

6. Appearance

This type of surfaces treatment can also be used on colored concrete and does not lead to changes in surface texture, streaking or concrete surface discoloration.

For optical reasons, the concrete surface should already be clean, free of streaks and smoothed to the final finish as exposed concrete at the time of execution. Visual enhancements **by mechanical grinding (Item 1.3 or 1.6)** must be carried out before the application of the densifier. Any **polishing of the surfaces is carried out after the use of the hardener or additional surface protection (Item 3.2).**

7. Cracks & damage

Existing damage to the concrete due to foreign inclusions or discoloration, cracks, unevenness, surface washout due to precipitation, etc. will not be eliminated by the concrete sealer. **Damage or visual defects** must be repaired beforehand **with mineral mortar systems**.

8. Dry shake:

The **application is possible on dry-shake floors**. It is also pointed out that the concrete densifier does not replace dry shake layers (at least 10 mm) under high impact and impact loads, but it significantly improves their long-term properties by allowing even harder and, above all, liquid-proof and dust-proof floors to be created.

9. Limitations of use

There are no restrictions on concrete age. The area should already meet the visual expectations of the client. Surfaces can only be densified if they are oil-free and no impregnations or coatings have previously been applied to the concrete, screed or dry shake floors, or if these have been mechanically removed beforehand.

Special **requirements for the chemical resistance** of the treated surfaces should **be checked beforehand. The application of additional surface protection may be necessary (Item 3.1.)**

10. Reworking a hardened and damaged concrete floor

Any damage and visual defects can be repaired with synthetic resin filler systems. The bond between epoxy resin coatings and floor markings, which do not have an impregnating effect, is not impaired by the concrete densifier, but improved. In the case of subsequent reworking with synthetic resins, it is essential to observe the substrate preparation specifications of the product manufacturer.

The colored reworking of these floors is usually done for visual reasons or to mark traffic or safety zones, not to improve the durability of the industrial floor under high mechanical stress. In places with heavy exposure to vehicular traffic, reworking may not be necessary.

11. Importance of cleaning during the construction phase

If only a densifier is applied (no extra polishing or surface protection), impermeability is achieved after 6 to 12 months, depending on use and wet cleaning intensity. We recommend regular wet cleaning during the construction phase or before shelving or machine assembly.

Execution

PREPARATION

1.1. New areas:
Removal of the curing blankets from the covered concrete surfaces, disposal by the client and simple mechanical substrate preparation *without* surface removal with a scrubbing machine
Removal of light dirt with brushes or cleaning pad.
No removal of cover traces and of oil, grease, paint, lime, plaster, or other impurities that have already penetrated.

Quantity: ..... m² *EP: ..... €/m²* *GP:.....€*
only unit price

1.2. New and existing areas:
Intensive mechanical substrate preparation *without* surface removal
with cleaning pad and re-washing with automatic scrubber machines as well as surface preparation of small areas, hard-to-reach areas or removal of tire tracks with hand-held single-disc machines. The effort for this substrate preparation depends on the degree of contamination of the surface.

Quantity: ..... m² EP: ..... €/m² GP:.....€
only unit price

Required items (required for higher optical requirements)

1.3. New and existing areas:
"Concrete peeling" cleaning sanding with *minimum* surface removal
Refinement of the surface texture and improvement of the appearance of the concrete floor, including cleaning of the surfaces (no creation of flatness, disposal of the grinding residues is carried out on-site)

System offered: **NORTEC®**

Quantity: ..... m² EP: ..... €/m² GP ..... €
only unit price

1.4. Allowance for item 1.2 or 1.3: Work on walls, pits, columns, elevations

1.2
Quantity: ..... lfm EP: ..... €/m .....GP: €
only unit price
1.3.
Quantity: ..... lfm EP: ..... €/m .....GP: €
only unit price

1.5 Allowance for item 1.2 or 1.3: Stairs, platforms, cellars

1.2
Quantity: ..... m² EP: ..... €/m GP .....€
only unit price
1.3.
Quantity: ..... m² EP: ..... €/m GP .....€
only unit price

1.6. Production of decorative concrete surfaces

Grinding with mechanical diamond tooling and polishing equipment for surface removal, according to mock-up, customer requirements and prior consultation, *design options: Class A – sintered layer, Class B – salt & pepper, Class C – terrazzo look (improvement of flatness possible, disposal of the grinding residues/slurry is carried out on-site)*

System offered: NORTEC®

Quantity: ..... m² EP: ..... €/m² GP .....€
only unit price

2. SURFACE TREATMENT

Densification & hardening

Application and incorporation of a modified inorganic and reactive concrete densifier based on sodium silicate of domestic production. The application is carried out on a damp substrate according to the manufacturer's guidelines and by a professional installer and authorized by the manufacturer.
Consumption 0.10 – 0.25 l/m² (depending on the absorbency of the substrate)

System offered: **NORTEC®** or equivalent

(proof of equivalence must be enclosed with the offer in the form of test certificates, certifications, approvals and indication of long-term references in the desired field of application)

Quantity: ..... m² EP: ..... €/m² GP: ..... €
only unit price

3. PROTECTION & GLOSSY LOOK

Required items

3.1. Allowance for item 2.: Protective Sealer

Application of an additional surface protection agent/guard in case of expected higher chemical exposure

indicated system: **NORTEC®** or equivalent

Quantity: ..... m² EP: ..... €/m² GP .....€
only unit price

3.2. Allowance for item 2.: Polishing the surface

to accelerate the hardening process of the coated surfaces and/or to achieve the desired glossy appearance: honed, polished, or high-gloss

Quantity: ..... m² EP: ..... €/m² GP: .....€
only unit price

4. OTHER

4.1. Construction site setup

Quantity: ..... EP: ..... € GP: ..... €
only unit price

4.2. Travel costs per installation phase

Quantity: ..... EP: ..... € GP ..... €
only unit price

4.3. Services on an hourly basis

Quantity: ..... h EP: ..... €/h GP ..... €

Total concrete surface treatment .....€

Plus the legally chargeable VAT rate.....€

Total.....€

Place, date Legally valid signature & stamp/company