Substrates and substrate preparation

APPLICATION ADVICE

General Information: Industrial Floors generally consist of a base slab and a wearing layer. The wearing layer must be permanently and tightly bonded to the base slab, to ensure the soundness of the entire floor. All the loading on the floor is transmitted into the building structure via the base slab or substrate, this element is therefore very important.

Substrates: The base slab must be sufficiently strong to support applied loadings. Concrete class B 25 is usually adequate for this. The MC Industrial Floor systems can be laid directly onto the concrete base slab providing the surface is adequately prepared. A textured closed surface satisfies this. Screeds should only be used if necessary for construction reasons. The minimum stability class must be ZE 30. If rising moisture is anticipated then only systems open to vapour diffusion may be used.
Due to their hydroscopic qualities, magnesite- and anhydrite-screeds must be kept dry (residual moisture in a magnesite-screed: must not be more than 2 %, anhydrite-screed: no more than 0.5 %). Wax layers often found on the surfaces of these coatings cause serious problems, and particularly asphalt containing screeds because of their deformity under mechanical usage as well as their sensitivity to solvents. These may only be coated with special systems.

Testing the Substrate: Prior to every surface-treatment the condition of the substrate must be tested. The following list of questions should be addressed:

- Moisture content of the floor
  Test by measuring, the calcium carbide method (CM device)
- Strength of the floor
  Test with the Schmidt hammer
- Surface strength
  Test pull-off strength, average 1.5 N/mm2 lowest single value 1.0 N/mm^2
- Inspect for damage due to reinforcement corrosion;
  Visual check, chisel open crack to determine reinforcement condition
- Detachable layers, old coatings:
  Visual check, scratch and cut test. Possible sample coating
- Contamination, oil-spills:
  Visual check, water moistening test (absorption)
- Test for chloride content
  Take dust samples from the concrete at graded depths for chloride content analysis
- Check for rising damp
  Consult the designer/owner, inspect the drawings and if necessary take a core
- Test the evenness
  Based on DIN 18202, Table 3, visual check or levelling
- Inspect for voids
  Hammer test (“Trailing hammer”)
- Inspect for cracks
  Visual check, using crack gauge, measure width and assess movement
- Check for roughness
  Visual check and sand spread test according to Kaufmann

To prepare a substrate for coating it must be free of all cement laitance, dust, oil, grease, slurries and any materials that would have de-bonding properties. Old paint and other coatings should also be removed, if not, extensive tests to determine compatibility and adhesion are necessary. Acceptable substrate dampness depends on the coating system chosen. For epoxy resins 6 % is usually acceptable and for polyurethane it may not be more than 4 %. Floors where rising dampness is anticipated must not be coated with diffusion proof

MC-Bauchemie Müller GmbH & Co. KG
Am Kruppwald 1-8 · 46238 Bottrop
Tel. +49 (0) 2041-101 0 · Fax: +49 (0) 2041-101 400
info@mc-bauchemie.de · www.mc-bauchemie.de

resins, as this might lead to loss of adhesion. Magnesite and anhydrite screeds would loose their strength if subjected to moisture. For such floors only coating systems open to vapour diffusion may be used.

Substrate preparation: The following measures are suitable to the preparation of horizontal surfaces.

Dust-free shot-blasting (Blastrac or similar): Steel-shot is hurled against the ground by a spinner, vacuumed up with the grit and returned, for re-use. Since this method is practically dust-free it can often be used in areas where production is ongoing. The amount of material removed will depend on the strength of the screed (and machine type and the adjustment of the machine). The machine types used determine the areas, which can be prepared in a given time frame.

Ultra-high pressure water jetting: A water jet with a pressure of more than 400 bar is moved across the surface of the concrete by rotating nozzles. This removes the laitance from screed surface. Preliminary tests are advised to deter-mine the intensity. Drainage for water/solids wash off should be provided. The floor must then be allowed to dry completely before organic coatings are applied, unless special primers are used.

Compressed-air blasting with solid particles (Shot blasting): With this method quartz free solid blasting material is projected at the surface via a hand held nozzle and using compressed air. This is a very dusty process; but the dust can be much reduced by adding water to the blasting mixture, this is called wet blasting. Preparation is completed by cleaning the surface with a high powered industrial vacuum cleaner.

Scarifying: This process comprises rotating steel discs which cut grooves into the concrete surface. The depth of cut must be adjusted so as to avoid undue fracturing of the concrete or transmitting vibration into the structure. The milling grooves should be no deeper than 5 mm and each pass of the machine should not over lap the last by more than 50 mm. This leaves a grooved surface which must be after treated with compressed air blasting or dust free shot blasting. The compressors used to provide compressed air for above must be equipped with oil separators to achieve a separation efficiency of < 0.01 %. After all substrate preparation is completed the floor must be finally cleaned of all dust and loose particles using a high powered industrial vacuum cleaner. To guarantee the layer thickness of the coating demanded also on edges those areas must be softened before. The data sheet “Levelling” advises about other methods of substrate preparation.

Literature

1. DafStb-guideline – Protection and Repair of concrete structural parts (Repair Guidelines, Parts 1-3)
2. ZTV-ING – Additional technical contract conditi-ons and guidelines for civil engineering works –Part 3 solid structure, paragraph 4 Protection and Repair of Concrete Structural Parts.
3. BEB – worksheet KH-O/U “Industrial Floors made from reactive resins, inspection and preparation of the substrate”, Troisdorf 19855)
4. AGI – worksheets A 12 - part 4; Arbeitsgemeinschaft Industriebau e.V., Hannover

MC-Bauchemie Müller GmbH & Co. KG
Am Kruppwald 1-8 · 46238 Bottrop
Tel. +49 (0) 2041-101 0 · Fax: +49 (0) 2041-101 400
info@mc-bauchemie.de · www.mc-bauchemie.de