

CONCRETE SURFACE MAINTENANCE GUIDE

Concrete is an artificial stone material made of a binder (cement) and natural aggregates. The appearance of concrete surfaces can change over time, and various environmental factors can cause the surfaces to become dirty and even change their original color. To some extent, differences in color, mottling and hair cracks are natural.

Color differences

The surface tone of untreated concrete can be affected by a number of factors, such as the type of cement, the color of the fine aggregate, the setting temperature, the water-cement ratio of the concrete, and the quality and purity of the mold surface. The lower the water-cement ratio, the darker the surface, the larger, the lighter the surface.

Untreated concrete surfaces often also have stains, which can be caused by the uneven distribution of aggregate near the concrete surface, different water absorption of coarse aggregate and cement stone, leakage of cement paste through the formwork joint, etc.

In places, the pattern of the reinforcing mesh may also appear on the concrete surface. This is mostly due to the local segregation of the aggregate. When pouring a concrete mixture through a reinforcement mesh, larger particles of aggregate do not fall directly under the reinforcement but fall past it. Rather, a concrete mixture with a finer fraction accumulates under the reinforcement, and the concentration of cement paste there is locally higher and may therefore form a darker pattern on the surface.

Color changes over time

Over time, the color of the concrete surface may change. This is due to dust, precipitation, frost, but also due to moss and vegetation or human activities.

The appearance of the concrete surface is most affected by the accumulation of dust, especially on horizontal surfaces, joints, and protruding surfaces. Depending on the wind direction and speed, the dust cover of the outer walls may differ.

The run-off of rainwater along the concrete surface generally cleans the concrete surface, but in the case of dirty water (e.g., water accumulating on balconies or roofs), the end result may be the opposite, as dirt can be absorbed in the surface layer of the concrete together with the water. Also, with larger amounts of dust, traces of flow may remain on the walls.

Alkali frost is a water-soluble alkali salt contained in concrete, which under favorable conditions, filters in a light layer on the concrete surface. This phenomenon occurs especially when young concrete dries. Alkali frost can be easily removed, for example, by gentle pressure washing. NB! Make sure that the surface structure of the concrete is not damaged.

Limestone frost is a calcium salt slowly soluble in water, which is formed due to the constant migration of moisture through the surface of the concrete, creating light marks and stains on the surface. The more porous the surface, the greater the risk of formation. Limestone frost is not washable with water, but it wears off over time due to, among other things, precipitation, but very slowly.

Protection against staining

New, as well as cleaned concrete surfaces, can be protected from staining and darkening due to rainwater infiltration by covering the surfaces with an impregnating agent. Substances may change the degree of gloss of the surface (from dull to glossy, depending on the type of product). In addition, toning pigments may be added to some impregnants. Further recommendations and guidance on the use of the substance are provided by the manufacturer of the specific protective equipment.

Graffiti can only be removed from a concrete surface if the surface has been pre-treated with an anti-graffiti agent. These substances are of different types and are available in a wide range. Further recommendations and guidance on the use of the substance are provided by the manufacturer of the specific protective equipment.

Acidic and saline substances should be avoided when repelling/melting snow and ice from concrete surfaces, as they can react with the materials in the concrete to damage the concrete surface and promote frost damage. Also, do not use an ice iron or similar tool to clean concrete surfaces from ice and snow, as they will break or scratch the concrete surface.

It is also important to avoid storing snow (especially mixed with salt and black) against vertical concrete surfaces, as in this case, dirty spots may remain on the surface when the snow melts.

General principles for cleaning dirty surfaces

Prolonged contact of the dirt with the surface may increase its absorption into the concrete surface, therefore the dirt should be removed as soon as possible to ensure the best results.

In general, we recommend ordering the service of cleaning concrete surfaces from cleaning companies that have the necessary equipment, cleaning agents, and experience to perform this work. Cleaning should begin with cleaning behind corners and less conspicuous areas to find the most appropriate and effective way. Facade cleaning work should only be carried out under suitable weather conditions, as the subsequent stability of the finishing layer may depend on the weather conditions prevailing during the work.

Uncoated concrete surfaces

- it is often sufficient to wash dirty surfaces with water and a soft brush. A mild detergent can be used. NB! Make sure that the detergent is not corrosive!
- surfaces can also be cleaned with a pressure washer, using different detergents if necessary, depending on the nature of the soiling (oil, dust, etc.). When using a pressure washer, care must be taken to ensure that excessive water pressure does not damage the concrete surface
- fine-grained sandpaper can be used to remove solid dirt. When cleaning, care must be taken not to damage the surface or damage the cement stone layer. If the surface is damaged, it is recommended to cover the surface with an impregnating agent or a special putty and paint
- Suitable solvents can be used to clean unpainted walls stained with paint, but there is a risk that the dissolved/liquefied paint will be absorbed on the concrete surface and leave a spot that differs from the general background.

Painted concrete surfaces

- When cleaning and maintaining painted concrete surfaces, in particular, the recommendations and instructions of the paint manufacturer must be followed. Maintenance of a painted surface may involve painting over surfaces after a period of time to ensure paint durability and weather resistance.

- it is often sufficient to wash dirty surfaces with water and a soft brush. Detergent recommended by the paint manufacturer may be used
- when washing with a pressure washer, test work must first be carried out in a concealed area. It is generally recommended to keep the tip of the washer no closer than 50 cm to the wall. Never direct the water jet perpendicular to the façade surface, but keep it approx. at a 45-degree angle. The paint manufacturer and the representatives of the specific pressure washer should be consulted for more detailed operating instructions.
- the paint manufacturer's representative must be consulted for instructions on how to repair damage to the paintwork.

The most common types of dirt and their removal

Grouting concrete, mixture residues

Stains of hardened mortar can usually be removed from the concrete surface mechanically, for example, by wiping. Avoid damaging the concrete surface. The last operation may be conducting acid wash of the uncoated concrete surface with a diluted hydrochloric acid solution (5-10% aqueous solution). Before acid wash, the concrete surface must be wet and rinsed thoroughly and repeatedly with water after washing. Avoid getting the washing liquid on metal parts, doors and windows, etc. Upon contact with the joint filler, both the acid wash solution and the rinsing water can significantly bleach the color of the joint mastic. Be sure to follow the chemical manufacturer's safety instructions when handling the acid solution. Be sure to consult the paint manufacturer before removing residue from the painted surfaces.

Oil, bitumen, pitch

Bitumen and pitch stains are easily removed in colder environments. Turpentine, kerosene, white spirit, and other organic solvents are used for soaking. The surface must be cleaned more widely, upon on local moisturizing the dirt can dilute the dirt and spread to a wider area. Be sure to follow the chemical manufacturer's instructions when handling solvents.

Vegetation

Remove vegetation (mosses, lichens) first mechanically and then treat the surfaces with a special moss destroyer. Surfaces must be saturated with water before treatment to prevent toxic chemicals from penetrating deep into the wall. Be sure to follow the chemical manufacturer's instructions when handling the chemical.

Rust

Traces of rust are mainly caused by water flowing to the wall from rusted structures. Traces disappear over time by themselves after the cause has been eliminated. Special rust-removing chemicals can be used to remove rust, first making sure that the product is suitable for use on a concrete surface. Be sure to follow the chemical manufacturer's instructions when handling the chemical.

Damage

Traces of mechanical damage to concrete surfaces must be corrected using a suitable repair mixture system. There are different systems for repair mixtures - mineral, two-component, lightweight aggregate, etc.

In outdoor conditions, a repair mixture system with a suitable weather resistance must be used. The repair mixture system may provide for the damaged area to be covered with an adhesion promoter or mixture prior to the application of the repair mixture. The repair mixture system may also consist of several mixtures of different fineness and may require coating with an impregnating agent.

It is worth remembering that the repaired areas may remain different in color, smoothness, and gloss from the rest of the concrete surface. Due to the different water absorption of the repair mix and the concrete surface, the color differences may increase even more when the surface gets wet.

Detailed instructions for using repair mixtures are provided by the manufacturer of the repair mixture system.