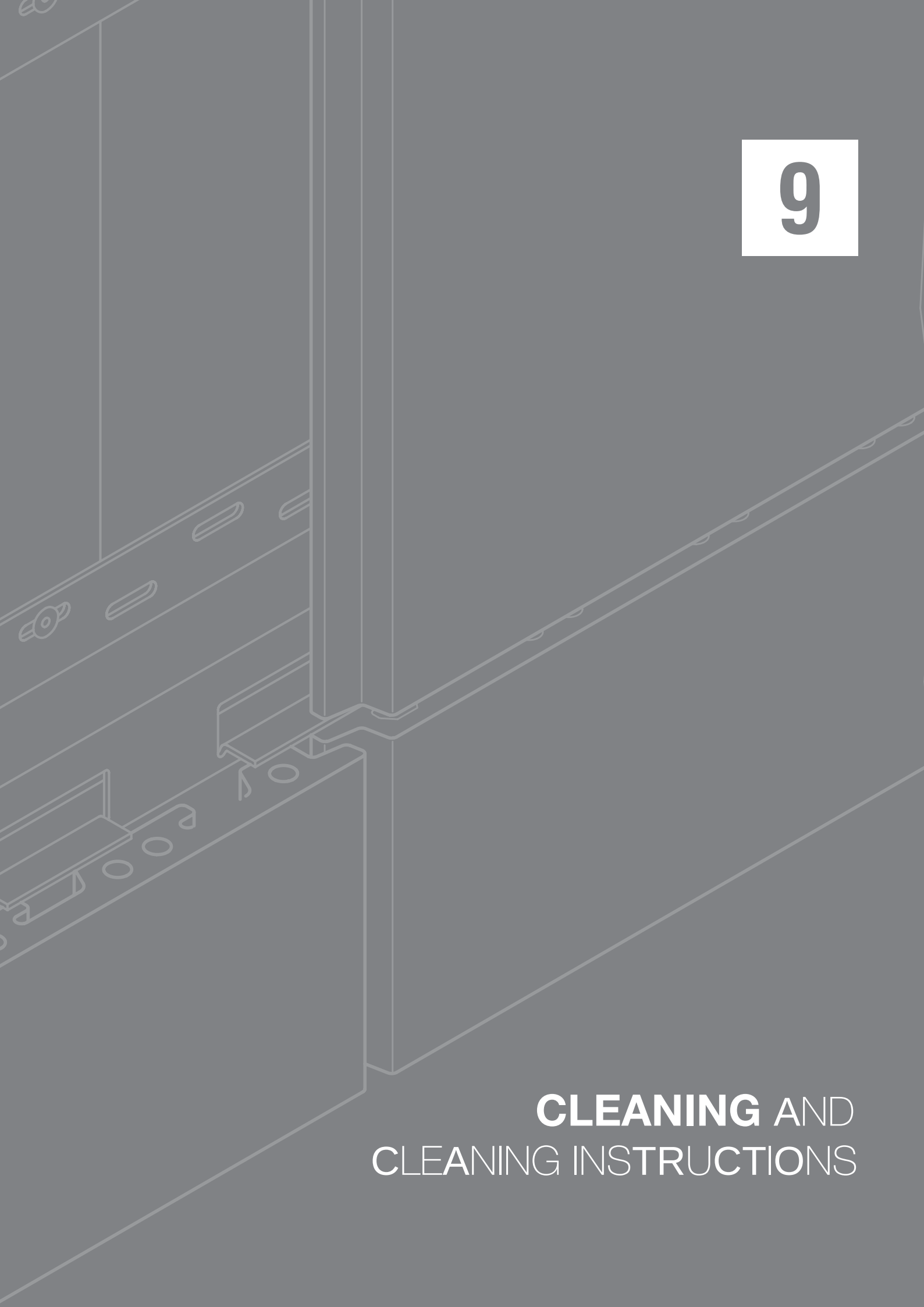

9

CLEANING AND CLEANING INSTRUCTIONS

9.1 CLEANING INSTRUCTIONS

A) GENERAL

Market research studies, tests and above all practical experience prove that ceramic shows excellent properties compared to other covering materials. Its lasting beauty, ease of cleaning and high functionality are decisive criteria in both private and public areas.

Our products are high-quality brand items. All glazed an unglazed materials are distinguished by surfaces which are ideal for easy cleaning. When using any cleaning agents, please make sure that the instructions for use and hazard indications of the respective manufacturer are complied with. It goes without saying that we cannot assume any liability for damage incurred by non-complicance with these instructions and this information.

Never use cleaning agents which contain hydrofluoric acid or compounds thereof (fluorides). They attack the ceramic even when diluted with plenty of water.

B) BASIC INFORMATION

There is an old saying which is still applicable today: dirt which is not brought in, does not need to be removed! Shoe-scrapers, doormats and zones provided for cleaning shoes by walking in front of the entrance area, ensure that most dirt is left outside.

The following principles apply for the cleaning process:

1. Choice of the appropriate cleaning agent.
2. There must be sufficient time for the cleaning agent to act upon the dirt and to loosen it.
3. The process must be supported mechanically by brushing or wiping.
4. The dirt separated from the covering must be thoroughly collected, washed or sucked off.

Do not use so-called pads or brushes with abrasive grain as they can significantly impair non-slip safety!

C) CLEANING AFTER INSTALLATION OR FIRST CLEANING

This involves final cleaning immediately after the surfacing has been completed. Once coarse dirt has been removed by sweeping, thorough cleaning takes place using a suitable cleaning agent. Cement films, i.e. residues of hydraulically hardening laying and pointing materials, can only be removed using acid cleaning agens, so-called cement film removers. Acid cleaners attack cement joints. Therefore, protect the joints by pre-wetting and thoroughly rinsing the covering with clear water after the use of acid cleaners, neutralising if possible. Normal dirt is best removed using alkaline or neutral cleaning agents.

D) ROUTINE CLEANING

Routine cleaning is unproblematic and is required at various intervals, depending on the degree of soiling and utilisation: weekly, daily, several times a day in heavily frequented areas. In general, it is sufficient to use water with standard cleaning agents. Combined preparations for cleaning and care are not necessary and may even be problematic in the long run: sticky grease, wax and synthetic layers may form on the covering, which have a negative influence on the visual, hygienic, non-slip and cleaning properties.

E) DEEP CLEANING AND STAIN REMOVAL

A deep clean is a thorough cleaning. The use of special cleaners, longer times for the agent to act upon the dirt, and increased mechanical support by brushes ensure thorough cleaning of the covering.

The following agents are suitable for removing most common stains:

LImestone deposits, urine scale, rust stains and metal abrasion residue:
Use acid cleaners, thoroughly pre-wet cement joints and completely remove the acid cleaner by rinsing with clear water or neutralising after allowing sufficient time for the cleaner to act upon the dirt.

Tar, bitumen, paint spots, expansion joint residue and media with synthetic resin additives:
Stains of this type are best removed using organic solvents such as naphtha, acetone or so-called caustic pastes.

Epoxy resins:
They can be removed with caustic pastes or special cleaning agents.

Oil grease and wax:
Highly-alkaline cleaners are capable of loosening and removing these substances. In the case of extreme soiling, this effect can be supported by solvents. Unglazed ceramics without upgrading or impregnation may show stains caused by oil, grease or coloured liquids, which cannot be completely removed again.

Rubber abrasio residue, pencil marks:
Chemical removal is not possible using cleaning agents. In this case, only mechanical removal by rubbing or brushing is effective, possibly supported by scouring powder.

F) UNGLAZED CERAMIC TILES

As a preventive measure, unglazed ceramic tiles without in-plant upgrading should be impregnated in cases where practical experience shows that the floor may come into contact with coloured liquids, grease or oil.

All unglazed tiles with in-plant Protecta upgrading as well as Hytect coating need not and must not be impregnated. As for glazed ceramics, the impregnation is unable to penetrate and consequently accumulates on the surface as a greasy layer.

G) NON-SLIP CERAMIC TILES

Our product range includes a great number of non-slip glazed and unglazed series. These products are perfectly suitable for use in commercial, industrial and public areas as well as in wet barefoot areas such as swimming pools, showers, saunas and the like. They have smooth, micro-rough or profiled surfaces, depending on the respective area of application. In the case of non-slip surfaces, mechanical cleaning by means of brushing machines with rotating soft nylon brushes or microfibre fleece as well as high-pressure or vapour pressure cleaners is most effective, whereby joints must be tailored to the required cleaning process. Brushes or pads containing abrasives must not be used under any circumstances, as they reduce slip resistance. Cleaning agents, equipment and methods must be suited to the respective type of soiling and area of application. Residues of cleaning products or disinfectants make the floor surface slippery, so rinse thoroughly with clean water (for disinfectants, observe the minimum contact time specified by the manufacturer!). Otherwise, they can react with moisture to form a greasy layer which impairs non-slip safety. Cleaning agents forming a film also have a negative impact on non-slip safety.

Alkaline cleaning agents should be used for deep cleaning and routine cleaning. Where water is soft, only occasional acidic cleaning is necessary (weekly or monthly depending on the flow of water and water hard-ness). Harder water requires more frequent use of acidic cleaning agents.

A selection of suitable cleaning agents is outlined in the RK List (list of tested cleaning agents for ceramic surfaces in swimming pools) supplied by the German Society for the Pool Industry. In any case, the instructions for use and hazard warnings provided by the respective manufacturer must be followed.

As a general rule, the following routine cleaning procedure has proved its worth:

- Dilute the cleaning agent (depending on the degree of soiling) and pour over the surface.
- Allow to take effect for approx. 15 minutes while aiding the chemical cleaning process by mechanically brushing with nylon brushes (without abrasive grain).
- Remove the loosened dirt using sufficient amounts of water or rinse it off.
- Thoroughly rinse the covering.

H) POLISHED PORCELAIN STONEWARE

We recommend impregnating the dry and clean covering after the first cleaning immediately following installation. If impregnation is carried out once, it improves the ease of care and considerably facilitates the removal of stains caused by dirt, oil and coloured liquids.

I) CERAMIC FLOOR AND WALL TILES WITH HYTECT

Hytect proves its worth in all areas where particularly easy cleaning and perfect hygiene are required.

This surface coating for wall and floor tiles offers three important advantages:

- It is extremely easy to clean.
- It has an antibacterial effect.
- It dissolves unpleasant odours.

These effects are based on the principle of photocatalysis: The titanium dioxide catalyst, which is permanently fused into the glaze, triggers a reaction between light, oxygen and air humidity. In this process, activated oxygen is produced, which breaks down microorganisms such as bacteria, fungi, algae and mosses and prevents them from reforming.

Hytect tile surfaces are hydrophilic, i.e. instead of being repelled, the water spreads to form a thin film, dirt is washed down by the water and can be easily removed. This unique upgrade is practically indestructible. The photocatalytic effect already activated by normal indoor lighting or natural light is permanently conserved. The same products can be used for cleaning as for comparable ceramics without Hytect - with the advantage that the concentration of the cleaning agent can be considerably reduced. In this way, Hytect noticeably reduces maintenance cost whilst also helping to protect the environment.

All substances forming a film (so-called care or gloss-improving products) and impairing the effectiveness of Hytect must be avoided as they impede the incidence of light onto the tile surface. Hytect is re-activated as soon as light falls on the tile surface again after removing such a care agent film.

It is also very important to thoroughly remove cleaning and disinfecting agents (observe the minimum reaction time specified by the manufacturer!). Otherwise, they form a greasy, sticky layer in combination with moisture, which impairs the non-slip properties and impedes the activation of Hytect. Hytect does not affect the original properties and advantages such as resistance to abrasion, non-slip safety or resistance to chemicals. That is why strongly acidic or strongly alkaline cleaning agents can also be used for an intensive cleaning without destroying the coating.

Further information on this topic is available at www.hytect.com.

J) FACADE CERAMICS WITH HYTECT

During installation, it is practically impossible to avoid soiling with oily, greasy substances or other dirt.

To obtain a clean façade for the final inspection, cleaning must be carried out as follows:

- Spread a weak alkaline or an alkaline cleaning agent in the specified dilution ratio on the facade ceramics using a sponge or cloth.
- Wipe several times to ensure a sufficient soaking time and to support mechanical cleaning.
- Wipe with clear water.
- Any traces of metal abrasion can be removed using an acidic cleaning agent with abrasive grain. This procedure must be supported mechanically by repeated wiping.
- Impurities such as lacquers or paints can be detached and removed using pickling pastes.
- In the case of special impurities, we will be pleased to support you with specific recommendations, whereby it would of course be helpful if you could provide us with a brief description of the type of impurity.

Routine cleaning of the façade is taken care of by sun and rain on all surfaces directly exposed to the rain thanks to the Hytect coating applied in-plant. Due to the hydrophilic surface, rainwater forms a thin film which infiltrates the dirt and leads to a "self-washing" effect. Thus, every shower cleans the façade free of charge.

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