

## **Cleaning and Maintenance of Stainless Steel**

Generally it is valid, that stainless steel is noncorrosive and has alloying elements building a thin, transparent passive layer. Although this layer has a thickness of only some atoms, it protects stainless steel surfaces also after damages. Due to the influence of oxygen the layer is build again with air and water spontaneously.

This maintenance is addressed to building owner and user. The purpose is, to save the overhanging properties of stainless steel surfaces with efficient and economic methods in a long run.

### **1. Clean-up**

Generally, the clean-up is to do after handing over the building project to the owner or user. If the protection of the surface has been carried out sufficiently, the clean-up is not different to the later maintenance cleaning.

Mostly the surfaces are protected by a plastic film. Unfortunately these films are not light or UV-resistant and after a period it is very difficult to remove them. It is advisable to remove the film immediately upon completion (please remove the film top down) when the protection is not needed longer. Glue residues have to be removed, they cause corrosion damages. Resolvent cleaner (most a composite of organic dissolver), according to requirements, are qualified for removing adhesives, lacquer etc. In either case the cleaner has to be free of salt acid. Salt acid can create discolouration or even pitting.

Spots of lime or mortar should be removed before hardening using a rubber ductor or splint. Never use tools made of unalloyed steel, they can cause extraneous rust. Spots of lime or mortar can also be removed by using acid cleaner (salt acid free). Afterwards it is to flush richly with clear water. Calcium deposits can be avoided with distilled water.

The using of cleansing material always has to accord to the order of producer. Generally the cleaner is to dispense all over the surface. Tenacious contaminations will be treated intensive, e.g. with a soft synthetic fleece. Important: flushing with clear water or using a high pressure cleaner.

Please find an overview of detergent and utensils ex page 3.

## 2. Maintenance cleaning

Generally the maintenance or interval cleaning should confirm with the level of contamination and as well with the demands of the surface look. In either case the cleaning should be done before rough pollution has assembled.

As indication for surfaces maintenance it has proved to clean them in the same range as glass surfaces. If the surface is low bonded, maintenance cleaning should be done each 6 to 12 months.

For the most part the cleaning efficiency of rain protects claddings against deposit. The maintenance should be assured at surface-areas not reached by the rain, as a protection against inshore corrosive atmosphere, factory fumes, splash water containing de-iced salt, exhaust gas pollution. In a long run this parameters could increase discolouration, which a cleaning agent containing phosphoric acid can remove.

At interior applications, the point is to avoid and clean finger prints. Stainless steel offers a wide range of surfaces. Some of them are for special use in areas with a lot of public access. Right from the design or planning stage the maintenance costs could be reduced by choosing the right surfaces. Normally, for removal of finger prints, a solution of dishwashing detergent is enough. Usually the surface should be polished with a soft cotton cloth to avoid water spots.

Bright-annealed and mirror polished surfaces can be handled with glass cleaner (free from chloride).

Tenacious dirt can be removed by using a usual cleanser. After cleaning, the surface should be watered. A terminal flushing with distilled water avoids the formation of lime scale. Also the surface should be dried with a soft cotton cloth. Abrasive powder is absolutely inapplicable because of scratching the surface.

Oleaginous and fatty contaminations can be removed by using a dissolvent cleaner, e.g. ethyl alcohol, isopropyl alcohol or acetone. These are harmless for stainless steel. It should be avoided to deposit a large-scale area with the solute during the cleaning process. By using new soft cotton cloth, the cleaning should be repeated as long as all traces are removed.

Graffiti and colour spots can be removed by special alkaline or dissolver based cleaning agents.

For strongly uncared surfaces a special cleaning agent containing phosphoric acid is advised. In this case, the whole component should be cleaned to avoid spotting.

The using of cleansing material always has to accord to the order of producer, the protection of the environment and the safety at work.

agent	composition	application area
multi-purpose cleaner or neutral cleaning agent	tenside, water and fragrance, often with add on phosphate or ammonia dilution	surfaces with oleaginous and fatty contaminations (e.g. finger-prints)
alkaline cleaner	tenside, alcohol, alkali	surfaces with strong oleaginous and fatty contaminations – claddings of stainless steel or food processing industries
abrasive acting alkaline cleaning agent	tenside, water and alkali (often with water soluble organic dissolver)	surfaces with strong fatty contaminations and mineral deposits (rust, smut, small water spots of calcareous water). Application in kitchen or sanitary facilities or claddings. Regard: the polishing agent may not be stronger than steel!
dissolver agent	alloy of organic dissolver, mixable with water (e.g. butyl carbitol, diethylene glycolic ether, alcohol) or not mixable (e.g. benzine or turpentine)	particularly suitable for cleaning of fat, oil, wax, tar, adhesives, colouring or varnish
emulsion cleaner, free of abrasive	tenside, water, organic dissolver not mixable with water, often added organic dissolver	particularly suitable for strong fatty contaminations, wax, tar, colouring
abrasive emulsion cleaner	q.v. emulsion cleaner, free of abrasive or polishing agent	like abrasive acting alkaline cleaning agent, better by tar or fatty contamination.
disinfecting agent	frequent component: <ul style="list-style-type: none"> <li>• quaternary ammonium compound with water additives</li> <li>• aldehyde, tenside and water</li> <li>• chlorine cleanser (sodium hypochlorite, tenside, alkali, water)</li> </ul>	only use products being listed by the Deutsche Gesellschaft für Hygiene und Mikrobiologie (DHGM). This agent acts on morbidous (pathogenic) germs, varying to disinfecting agent. Long-run impact of sodium hypochlorite can damage the steel grade
chlorous cleaning agent	sodium hypochlorite, tenside, alkali and water	disinfecting and cleaning (fat). Long-run impact with high concentration can damage the steel grade. The ph-value is not allowed to sink under 8. Otherwise hypochlorous acid (hurtful) or sometimes even hydrogen chloride (salt acid) will arise. The use should be avoid (formation of pitting corrosion).
acid cleaner	acidity (e.g. phosphoric acid, nitric acid, citric acid, acid-resistant) tenside, water and possibly fragrance	calcification and/or rust deposit, slight fat contamination. Cleaning of sanitary facilities and claddings. The cleaner must be free of salt acid or hydrogen fluoride (damaging the surface).
cleaner for high-pressure cleaner	alkaline, neutral or acidic cleaner, if necessary with creating foaming	because foaming creation the outlet is retarded and the reacting time is prolonged
agent for concurrent cleaning and conservation	Contains maintenance components, (e.g. hard wax, synthetic materials, and silicone) und detergent acting substance	only to use by low contamination. Coloured claddings can get streakings. Generally it is possible for dirt to sediment at the conservation agent and alloy it.

## Cleaning agents, being excluded from using

- chloric, particularly salt acid cleaner
- bleaching agent (by misusage or spillage spring-clean the surface with pure water)
- silver or brass agent
- all kind of scrubbing agent

## Mechanical cleansing material

appliance	qualified	unqualified
bristle products	Brushes with natural, synthetic oder stainless steel bristles	Brushes with unalloyed steel bristles or with with grit-bristles (synthetic brushes with abrasive grit)
textiles	textiles made of natural or chemical fibres for us as cotton waste and textile area-measured material (e.g. knitted fabrics, woven goods, cloths, flees etc.) Perfect to remove fringer-prints are micro-fiber cloths.	
synthetic fleece	without abrasive grit	fleece with abrasive grit
steel wool	only made of stainless steel	never to use: unalloyed steel wool (causing immediately extraneous rust)
cleansing agent containing abrasive, sanding and polishing powder	Paris white, kieselguhr, magnesia, magnesium carbonate, Wiener Kalk	carborundum (silicon carbide), corundum, emery, quartz, feldspar, pumic stone
abrasive paper	suitable only with grain size grit 400 (minimum)	not suitable until grit 400
water and/ vapour stream	high pressure cleaner or steam cleaner	
other	washlether, synthetic lether, synthetic fleece, sponges	