

Cleaning and Maintenance of Stainless-Steel Memorial

1. The Self-Repair Mechanism of Stainless Steel

Stainless Steels are inherently corrosion resistant materials that do not need additional surface protection to enhance their appearance and durability. Some routine maintenance and cleaning is needed to keep stainless steel surfaces in good condition so that the aesthetic appearance and corrosion resistance are not compromised. In this respect, stainless steels are no different to other construction materials such as glass, plastics or coated steels, which are never maintenance free throughout the life of a building. These guidelines are to give building owners, developers and facility managers advice on efficient, cost-effective cleaning that will allow them to take advantage of the corrosion resistant properties of stainless steel.

First of all, it is important to understand why stainless steel is so corrosion resistant. The alloying elements in stainless steel form a thin, transparent "**passive layer**" on the surface. Although this protective passive layer is only a few atoms thick, it instantaneously reforms in the presence of oxygen from air or water, so even if the material is scratched or damaged the passive layer continues protecting the surface from corrosion. This explains why stainless steel does not require any coating or other corrosion protection to remain bright and shiny even after decades of use.

2. Initial Cleaning

- 
- **Mortar and cement splashes** can be treated with a solution containing a small amount of phosphoric acid. Rinse with water (preferably deionised water) and dry. Deionised water reduces the risk of water staining marks. Proprietary products are available from specialists finishing companies. Never allow mortar removers or diluted hydrochloric acid to be used on stainless steel. If they have accidentally been applied to or spilt over the stainless steel, rinse generously with fresh water. Building contractors and tradesmen are not always aware of how dangerous proprietary building mortar removers containing hydrochloric acid are to stainless steel components. This should be stressed. If possible, the sequence of operations should be changed so that any ceramic tile fixing and cleaning is completed before neighbouring stainless steel components such as skirting boards or kick plates are installed.
 - **Iron particles** picked up from tools or from contact with structural steel, scaffold tubing etc. must be removed immediately. Steel dust particles created during operations such as **welding, cutting, drilling and grinding of carbon (non-stainless) steel will rust quickly**. Besides corroding themselves, these particles can locally break the self-healing "passive film" of stainless steel resulting in pitting corrosion in spite of their normally good corrosion resistance. At an early stage, **light deposits** can be removed mechanically using nylon pads, such as the "**Scotch-Brite**" type used in the kitchen. Alternatively, the contamination can be removed with a proprietary stainless steel cleaner containing phosphoric acid. **If pitting attack has occurred**, depending on its severity, **acid pickling treatments or mechanical rectification will be needed to restore the**

surface. Pickling agents in paste form are available for localised, on-site application. Care must be taken to use these products in accordance with the supplier's directions so that there is a safe system of work and the relevant legislation on environmental protection is adhered to. Specialist finishing companies will often carry out this service on site. While restoring the corrosion resistance of the surface, pickling may change the surface appearance of the steel. Further mechanical or chemical treatments may be necessary to restore the original surface finish. It is therefore advisable to avoid contamination, in the first place by either protecting the stainless steel parts, whilst other work is being done or by installing them after other operations that could cause contamination have been completed.

3. Maintenance Cleaning

On **external applications**, rainfall can normally be expected to wash off accumulations of dirt and other deposits efficiently, depending on the amount of exposure of the elevation. Special attention should be given to sheltered areas during routine cleaning to ensure that accumulations of airborne contaminants are removed. This is particularly important in marine and industrial environments, where build-up of airborne chlorides or SO_x can result in localised corrosion, if not effectively removed.

Where finger marks can be an issue. but the visibility of the marking should become less evident after the first few cleaning operations.

4. Cleansers

- To remove **fingerprints** and other marks from architectural finishes, soapy water or a mild detergent are usually safe and successful. Proprietary spray cleaners are available, which combine ease of cleaning with a light film that produces an even and smooth lustre. These spray cleaners remove existing fingerprints and leave the surface in a condition that reduces the tendency for fingerprints to show in subsequent service. After applying the spray to the surface, polish with a dry cloth.
- For **more stubborn stains**, mild household cream cleansers should be effective. This should also be suitable for cleaning off watermarks and light discolouration. After cleaning, remove the residues with (preferably deionised) water (available in supermarkets, e.g. for steam ironing or car batteries) and dry to avoid streaking and water marks. **Scouring powers should not be used** as these products can leave scratches on stainless steel surfaces.
- **Severe oil and grease marks** can be removed with alcohol based products, including mentholated spirit and isopropyl alcohol or other solvents such as acetone. These products are not a corrosion hazard to stainless steel. Care is needed with solvents to avoid spreading the staining on the stainless steels, which can then be difficult to fully remove. It is advisable to apply clean solvent several times with a clean, non-scratching cloth, until all traces of the partially dissolved oil / grease are removed.
- **Paint and graffiti** can be treated with proprietary alkaline or solvent-based paint strippers. The use of hard scrapers or knives should be avoided as the underlying stainless steel surface may become scratched.
- **Heavily neglected surfaces** can be treated with metal polishes, such as those for cleaning chromium-plated items (e.g. automotive trim). Furthermore, polishes used for re-finishing car paint can be considered. Care must be taken as highly polished surfaces may become scratched with



these cleaners. Alternatively, use a proprietary stainless steel cleaner containing phosphoric acid to remove contamination, rinse with deionised water and dry. It is advisable that the entire surface of the component is treated so that a patchy appearance is avoided.

Before commencing any task, ensure that you have received the appropriate health and safety literature from the supplier and fully understand it. If in doubt, seek further advice.



Cleaners that should NOT be used on stainless steels include:

- Chloride-containing cleansers, especially those containing hydrochloric acid,
- Hypochlorite bleaches should not be used on stainless steels; if applied accidentally or spilt on stainless steel surfaces, should be rinsed off immediately with liberal amounts of fresh water,
- Silver-cleaners must not be used on stainless steel.

5. Cleaning Utensils

- **A damp cloth or chamois leather** will usually be suitable for removing normal soiling, fingerprints, etc. For more stubborn dirt, **nylon pads** such as those known as "Scotch-Brite" pads are usually satisfactory. Non-stainless steel based scouring pads, cleaning wool or wire brushes **must not be used** on stainless steel. Apart from scratching the surface, these pads can leave carbon steel deposits on the stainless surface, which can subsequently develop into rust spots, if the surface becomes wet.
- **Soft nylon brushes** can be used for cleaning stainless steel with patterned finishes. Non-stainless steel wire brushes must NOT be used. On "grained" directional finishes, the direction of cleaning strokes should be along the grain and not across it. Where water has been used for cleaning or rinsing, **wiping the surface dry** to prevent watermarks, especially in hard water areas may be advisable. The use of deionised water will prevent the formation of hard water staining. To avoid "cross-contamination" from iron particles, ensure that cleaning utensils have not been used for "ordinary" (i.e. carbon) steel before. Cleaning materials for use on stainless steel items should preferably be reserved exclusively for that purpose.



6. Cleaning Intervals

The cleaning of stainless steel items is really no different to other materials. Cleaning should be done before there is a visible build up of soiling or finger-marking, so that the effort and cost of cleaning is minimised along with the risk of marking or altering the appearance of the surfaces. On exterior applications, stainless steel may be exposed to a wider range of potentially more aggressive environments as a result of contact with:

- Marine atmospheres,
- Environments laden with industrial pollutants,
- Salt spray from road de-icing salt,
- Atmospheric dirt and traffic film.

All cause brown staining to appear. It is a good practice to clean the stainless steel at the **same frequency as the building's windows (glazing)**. Depending on the severity of soiling and deposit build up, routine cleaning frequencies of 6-12 months for light soiling and 3-6 months for heavy soiling or



environments such as those listed above is advisable. A stainless steel cleaner containing phosphoric acid will remove this form of contamination.

7. Summary

Problem	Cleaning Agent	Comments
Routine cleaning - All finishes	Soap or mild detergent (such as "Fairy Liquid") and water	Sponge, rinse with clean water; wipe dry if necessary.
Fingerprints - All finishes	Soap or warm water or organic solvent, e.g. Usher-Walker Thinners No. PF8017, acetone, Alcohol, Genklene.	Rinse with clean water; wipe dry if necessary.
Stubborn stains/ Discolouration - All finishes	Mild non-abrasive cleaning solutions or creams. e.g. Goddard Stainless Steel Care	Rinse well with clean water and wipe dry.
Oil/grease marks - All finishes	Organic solvents, e.g. Usher-Walker Thinners No. PF8017, acetone, alcohol, Genklene.	Clean afterwards with soap and water and wipe dry.
Rust and other corrosion products - All finishes	Various special gels, 10% Phosphoric Acid or Oxalic Acid solution. The cleaning solution should be applied with a swab and allowed to stand for 15-20 minutes before being washed away with water. May continue using Scotch - brite pads to give final clean.	Rinse well with clean water. For Phosphoric Acid rinse first with Ammonia. (Precautions for acid cleaners should be observed).
Scratches on Brush (Satin) Finish	Slight scratches: impregnated nylon pads. Polishing with scurfs dressed with iron-free abrasives. Deeper scratches: apply in direction of polishing, and then clean with soap or detergent as per routine cleaning.	Do not use ordinary steel wool, as iron particles can become embedded in stainless steel and cause further surface damage.
Paint / Graffiti	Alkaline or solvent paint strippers according to type of paint.	Use soft nylon or bristle brush. Follow manufacturer's instructions.
Maintenance	Deionised water	Apply after all cleaning regimes to protect against future staining.