

Cleaning and Maintenance of Architectural Stainless Steel Surfaces



Index

Euro Inox has taken care to provide technically accurate information. However, readers should note that this material is for informational purposes only. Euro Inox, its members, staff and advisors accept no liability or responsibility for any loss, damage or injury resulting from the use of the information contained in this publication.

ISBN 2-87997-055-5

© Euro Inox 2002, 2003

1.

Introduction	1
2. The self-repairing mechanism of stainless steel	1
3. Initial cleaning	2
4. Maintenance cleaning	3
5. Cleaners	4
6. Cleaning utensils	5
7. Cleaning intervals	6
8. Bibliography	7

Full members

Acerinox
www.acerinox.es

AvestaPolarit
www.avestapolarit.com

ThyssenKrupp Special Steel Terni Spa
www.acciaitemi.it

ThyssenKrupp Nirosta GmbH
www.nirosta.de

UGINE & ALZ Belgium
UGINE & ALZ France
www.ugine-alz.com

Associate members

Swiss Inox Working Group
www.swissinox.ch

British Stainless Steel Association (BSSA)
www.bssa.org.uk

Cedinox
www.acerinox.es

Centro Inox
www.centroinox.it

Stainless Steel Information Centre
www.edelstahl-rostfrei.de

Institute for Stainless Steel Development (I.D.-Inox)
www.idinox.com

International Chromium Development Association (ICDA)
www.chromium-asoc.com

International Molybdenum Association (IMOA)
www.imoa.info

Nickel Development Institute (NiDI)
www.nidi.org

Polish Steel Distributors Union (PUDS)
www.puds.com.pl

1. Introduction

Stainless steels are inherently corrosion-resistant materials that do not require any additional surface protection to improve their appearance and durability. Regular maintenance and cleaning are necessary to keep stainless steel surfaces in good condition and thus ensure that neither their aesthetic appearance nor their corrosion resistance is compromised. In this respect, stainless steels are no different from other

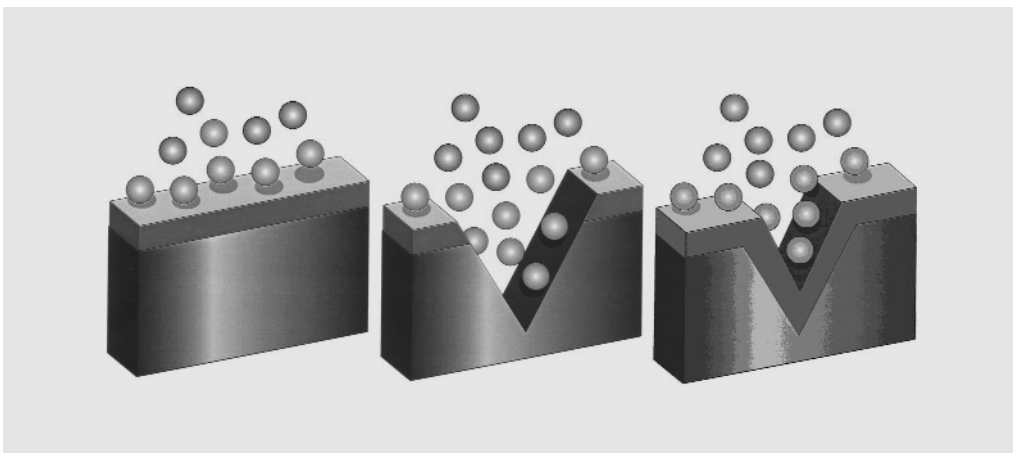
construction materials such as glass, plastic, or coated steel, which require maintenance throughout the life of a building.

The purpose of these recommendations is to advise building owners, builders and facility managers on how to clean effectively and cost-efficiently, allowing them to take advantage of the anti-corrosive properties of stainless steel.

2. The self-repairing mechanism of stainless steel

First, it is very important to understand why stainless steel is so resistant to corrosion. 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 reforms instantly in the presence of oxygen.

from the air or water. Even if the material is damaged or scratched, this passive layer continues to protect the surface from corrosion. This explains why stainless steel does not need any type of coating or other corrosion protection to maintain its shiny appearance even after decades of use.

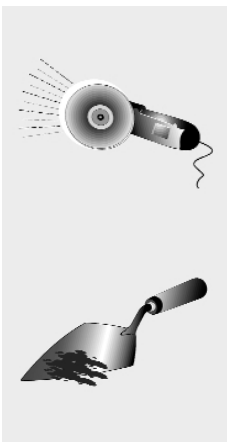


3. *Initial stainless steel cleaning*



The first cleaning process is usually carried out before the building is handed over to the owner. If the stainless steel parts have been properly protected, it may only be necessary to carry out "maintenance cleaning" at the time of delivery.

Often, a **layer of self-adhesive plastic** protects stainless steel parts during manufacture, transport and assembly. Although it provides excellent protection against damage and dirt, some plastics deteriorate when exposed to ultraviolet radiation from the sun's rays; this can make the plastic difficult to remove. Self-adhesive plastics can also stick to the stainless steel surface. Once they are no longer needed to provide protection during installation/construction, protective self-adhesive plastics should be removed, starting at the top of the building and working downwards.



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 marks. Specialist finishing companies offer products for this purpose. Never use mortar remover or diluted hydrochloric acid on stainless steel. If it has been

or a small amount has fallen on stainless steel, rinse with plenty of cold water.

Contractors and retailers are often unaware of how dangerous it can be to use substances containing hydrochloric acid to remove mortar from stainless steel components. This should be taken into account. If possible, the order of the work should be altered so that the tiling and cleaning of the tiles is completed before the stainless steel components, such as skirting boards or door protective plinths, are installed.

Iron particles from tools or contact with structural steel, scaffolding, etc., must be removed immediately. Steel dust particles created during welding, cutting, drilling and grinding of carbon steel (rustable) oxidise quickly. In addition to corroding, these particles can locally alter the "passive layer" that serves as self-protection for stainless steel and can cause pitting corrosion despite the good corrosion resistance normally present.

Initially, small deposits can be removed mechanically using nylon scouring pads, such as the "Scotch-Brite" type used in the kitchen. Another way to remove contamination is with a stainless steel cleaner

containing phosphoric acid.

If pitting has occurred, depending on the severity, it will be necessary to apply acid cleaning treatments or mechanical rectification to restore the surface. Paste-form stripping agents are available for application to localised areas. Great care must be taken when using these products and the supplier's instructions must be followed to ensure that the work system is safe and complies with the relevant legislation on environmental protection

Companies specialising in finishes often perform this service on site.

While restoring the surface's corrosion resistance, pickling can alter the appearance of the steel surface. Additional mechanical or chemical treatments may be necessary to restore the original surface finish. It is therefore advisable to avoid contamination, either by protecting stainless steel parts while other tasks are being carried out, or by installing them after operations that may cause contamination have been completed.

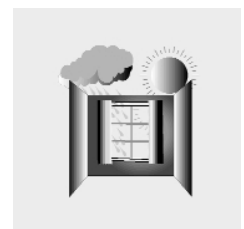
4. *cleaning and maintenance*

In **outdoor applications** such as façades, rain may be sufficient to effectively clean all accumulations of dirt and other deposits, depending on the degree of exposure of the elevation. During regular cleaning tasks, special attention should be paid to sheltered areas to ensure that accumulations of airborne contaminants are removed. This is very important in industrial or maritime locations where accumulations of airborne chlorides or SO_x can cause localised corrosion if not effectively removed.

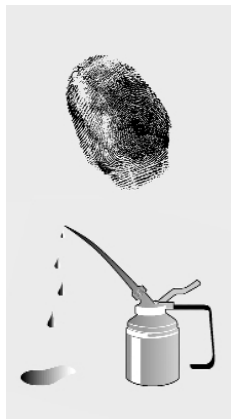
In **indoor applications**, fingerprints can be a problem. There is a

wide range of finishes for stainless steel, many of which are particularly suitable for use in high-traffic public areas. Selecting finishes that are less prone to showing fingerprints during the design process will reduce cleaning efforts and costs over the lifetime of a completed building.

Brushed finishes, which are a fairly common choice for interior finishes, may show finger marks in the period immediately after installation; however, the visibility of the marks becomes less obvious after some cleaning has been done.



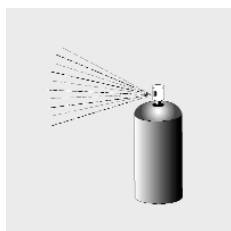
5. Cleaners



To remove **fingerprints** and other marks from architectural finishes, soapy water or a mild detergent can be used, as these are usually safe and produce good results.

Spray cleaners are available that combine ease of cleaning with a thin film that produces an even smoother shine. These spray cleaners remove existing fingerprints and leave the surface in a condition that makes fingerprints less visible during subsequent use.

After applying the spray to the surface, polish with a dry cloth. Your local stainless steel development association can advise you on the products available in your area.



Mirror-finished stainless steel can be cleaned with glass cleaner. These products should not contain chlorides.

For **more stubborn stains**, mild household cream cleaners may be effective. These types of products may also be suitable for removing water marks and minor discolouration. After cleaning, remove any residue with water (preferably deionised water, available in supermarkets, for example for irons or car batteries) and dry the surface to avoid leaving streaks and water marks. Do not use , , , or cleaners, as these

products can scratch stainless steel surfaces.

Stubborn oil and grease stains can be removed with products containing alcohol, including methyl alcohol and isopropyl alcohol, or other solvents such as acetone. These products do not pose any corrosion hazard to stainless steel.

When using solvents, special care must be taken to avoid spreading the stain on the stainless steel, as this could make it very difficult to remove completely. It is advisable to apply clean solvent several times with a clean, non-scratching cloth until all partially dissolved oil or grease residues have been removed.

Paint and graffiti can be treated with suitable alkaline or solvent-based paint removers. Avoid using hard scrapers or knives so as not to scratch the surface of the stainless steel.

Heavily neglected surfaces can be treated with metal cleaners, such as those used for chrome fittings (e.g. car trims). Polishers used for finishing car paintwork could also be used. Special care should be taken as these cleaners can scratch surfaces that are polished frequently.

Alternatively, use a stainless steel cleaner containing phosphoric acid

phosphoric acid to remove contamination, rinse with deionised water and dry. It is advisable to treat the entire surface of the component to avoid patchiness.

Before starting any task, ensure that you have read and understood the manufacturer's health and safety instructions. If in doubt, seek advice.

Cleaners that should not be used on stainless steel include:

- Cleaners containing chlorides, especially those containing hydrochloric acid.
- Hypochlorite bleaches should not be used on stainless steel. In case of accidental use or splashes on the stainless steel surface, rinse immediately with plenty of cold water.
- Silver cleaners should not be used on stainless steel.



6. *nd cleaning utensils*

To remove dirt, fingerprints, etc., it is best to use a **damp cloth or chamois leather**.

To remove stubborn dirt, use **nylon scouring pads**, such as "Scotch Brite", which give good results. Steel wool pads, cloths or wire brushes should not be used on stainless steel surfaces. In addition to scratching the surface, these pads can leave traces of carbon steel on the surface of the stainless steel, which can cause rust if the surface gets wet.

Soft nylon brushes can be used to clean stainless steel with patterned finishes. Non-stainless steel brushes should not be used.

On finishes with a directional "grain", such as EN 10088-3 types G, J and K, the direction of cleaning strokes should be in the direction of the grain and not against it.

When using water to clean or rinse, **dry** the surface to prevent water marks; this is especially advisable in areas where the water is hard. Using deionised water will prevent hard water spots from forming.

To avoid cross-contamination from iron particles, ensure that cleaning utensils have not been previously used on 'normal' steel (e.g. carbon steel). It is preferable to reserve cleaning materials used for cleaning stainless steel and use them only for this purpose.



7. *nd cleaning intervals*

Cleaning stainless steel elements for building interiors is not very different from cleaning other materials. Cleaning should be carried out before a visible amount of dirt or fingerprints accumulates, so that the effort and cost of cleaning is minimised, as well as the risk of altering or marking the appearance of the surfaces.

In outdoor applications, stainless steel may be exposed to a greater number of potentially much more aggressive conditions as a result of contact with:

- marine atmospheres,
- environments filled with industrial pollutants,
- salt spray from road salt,
- atmospheric and traffic grime.

All of this causes brown stains to appear. It may be a good idea to clean stainless steel as **often as the building's windows (glass)**. Depending on the amount of dirt and the accumulation of deposits, the frequency for regular cleaning is 6-12 months for moderate dirt and 3-6 months for heavier dirt or for environments where the conditions mentioned in the above list occur. This type of contamination will be removed with a stainless steel cleaner containing phosphoric acid.



8. *Bibliography*

Care and Maintenance of Stainless Steel,
ed.: British Stainless Steel Association,
Sheffield, March 2001
(SSAS Information Bulletin No. 7.20.)

Cleaning and Descaling Stainless Steels,
ed.: Nickel Development Institute, Toronto
1988
(Designer's Handbook series, no. 9001)

Guide to the Use of Stainless Steel in
Construction, ed.: UBI, Aubervilliers 1997

Cleaning Stainless Steel, ed.: Information
Centre Edelstahl Rostfrei,
Dusseldorf 1997
(Memorandum 824)

ISBN 2-87997-055-5