



## Stainless Steel and its care

Stainless steel makes for an effective commercial kitchen material in almost all respects. It is hygienic, bacteria resistant, looks good and is easy to clean. It does however need cleaning correctly to get the best from it.

The chemistry - Stainless steel is protected from corrosion by a thin layer of chromium oxide ( $\text{Cr}_2\text{O}_3$ ). Oxygen from the atmosphere combines with the chromium in the stainless steel to form a passive  $\text{Cr}_2\text{O}_3$  protective film, the process is known as passivation. If the film breaks down the base metal is exposed to corrosion, this film can take days (up to 21) to fully form or reform in ambient conditions. There are methods to increase the rate of passivation but this requires specialist chemicals. Any contamination of the surface by mineral deposits, dirt, or other materials can breakdown this layer down, hinder its passivation and trap corrosive agents, reducing the materials corrosion protection.

There are many grades of stainless steel. Within the food industry most are either 300 or 400 series. 300 series contains chromium and nickel, it is austenitic and so nonmagnetic. A commonly used 300 series commercial grade is 304 (also known as 1.4301, X5CrNi18-10 or 18-10) having good general corrosion resistance and hygiene properties. 400 series which contains chromium but no expensive nickel is less corrosion resistant, is ferritic and so magnetic, a common commercial grade is 430 (also known as 1.4016, X6Cr17 or 18-0).

All grades of stainless steel will stain and discolour due to surface deposits and cannot be considered completely maintenance-free. In order to retain maximum corrosion resistance, high cleanness and aesthetics the stainless steel surface must be kept clean.

**For basic cleaning** use a non-abrasive stainless steel cleaner with a clean soft lint-free microfiber cloth, and always follow the direction of the grain on the surface, rinse thoroughly with warm water, ideally soft or softened (less minerals), and then dry with a clean towel using a dabbing motion.

**For heavy duty cleaning** use a bleach-free, non-chloride, alkaline, alkaline Chlorinated or ammonia-based cleaning solution (to prevent possible breakdown of the stainless protective layer) with a clean nylon or soft plastic brush or pad, and follow the grain direction. Always comply with cleaner instructions, safety precautions and COSHH regulations. Once finished with cleaners rinse thoroughly with warm water, ideally soft or softened, and then dry with a clean towel. A basic clean (as above) may then be need to bring back full lustre.

To protect your stainless steel surfaces

**Avoid** contact with iron or carbon steel, particularly if it is likely to shed material such as a steel wire wool but also prolonged contact with carbon steel or iron pots, utensils or other sources, as these can deposit iron particles causing surface rusting and staining.

**Avoid** harsh abrasives and scouring materials as they leave scratches in the surface and damage the protective layer. Do not use wire brushes, scrapers or contaminated scouring pads.

**Avoid** prolonged contact with fluids containing high concentrations of salts or acids, including foods and some cleaners, as these may attack the protective layer. If in contact ensure they are thoroughly rinsed off as soon as possible.

**Avoid** chlorides. Many soaps, cleaners and detergents contain chlorides, which, if not diluted sufficiently and/or left for periods (30min max) may breakdown the protective layer, causing pitting and staining. If used thoroughly rinse off and dry immediately, ensure no residues are left as they will keep reacting with the stainless steel surface.