



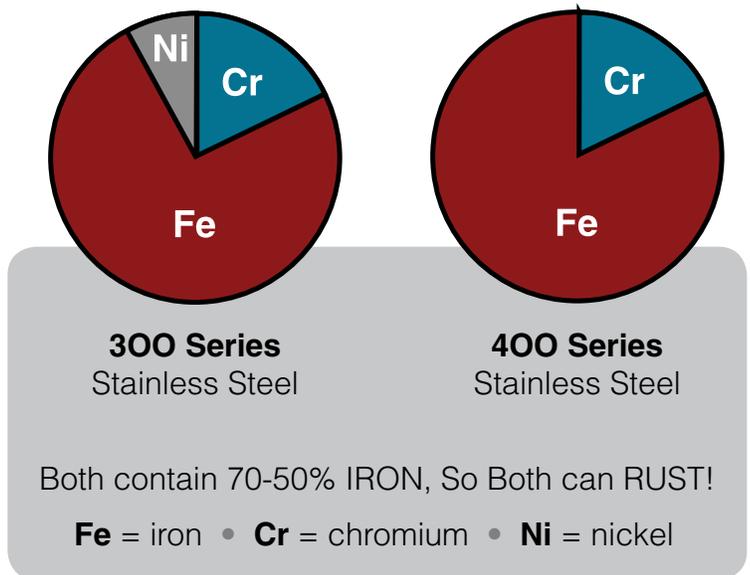
Stainless Steel Equipment Care & Cleaning

Stainless steels ARE susceptible to corrosion and rusting.

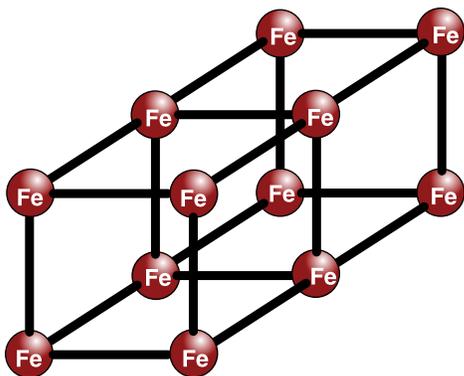
Corrosion on metals is common and is recognized on iron and steel as yellow/orange rust. Because these metals actively corrode in the natural environment, they are referred to as “active.”

Stainless steels are considered passive metals due to the fact that they contain other metals, like chromium and nickel. 400 series stainless steels contain chromium while 300 series contain both chromium and nickel.

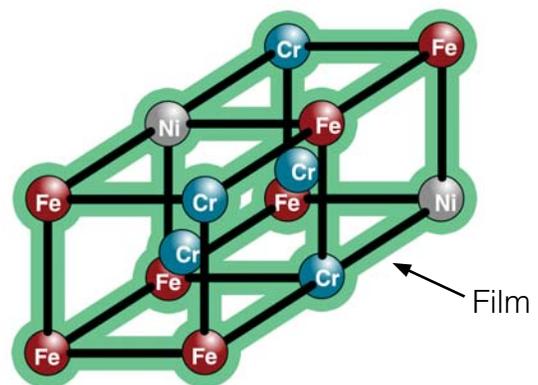
Metals are crystalline solids that are configured in atomic arrangements like that of Tinker Toys. When containing anywhere from 12% to 30% chromium, an invisible passive film covers the steel's surface acting as a shield against corrosion. The metal becomes “passive” toward corrosion.



If the film has not been compromised, remains intact or has not become contaminated - the metal is passive and stain-less.



The above model of raw iron shown here at the atomic level, has no protection from corrosion.



The above model of stainless steel, has a protective film that is created when alloyed with other metals. Keep in mind that the protective film is only millionths of an inch thick.

Enemies of Stainless Steel

There are three basic things which can break down your stainless steel's passivity layer and invite corrosion.

1. **Mechanical abrasion**
2. **Deposits & Water**
3. **Chlorides**

MECHANICAL ABRASION: Any material or object that will scratch stainless steel such as steel pads, wire brushes, and scrapers.

WATER: Depending on the source and region of the country, the water from the local tap may have varying degrees of hard or soft water characteristics. Hard water may leave behind spots due to the mineral content. Additionally, when hard water is heated it leaves behind deposits. If those deposits are left unattended it will break down the passive layer and begin to rust the stainless steel surface.

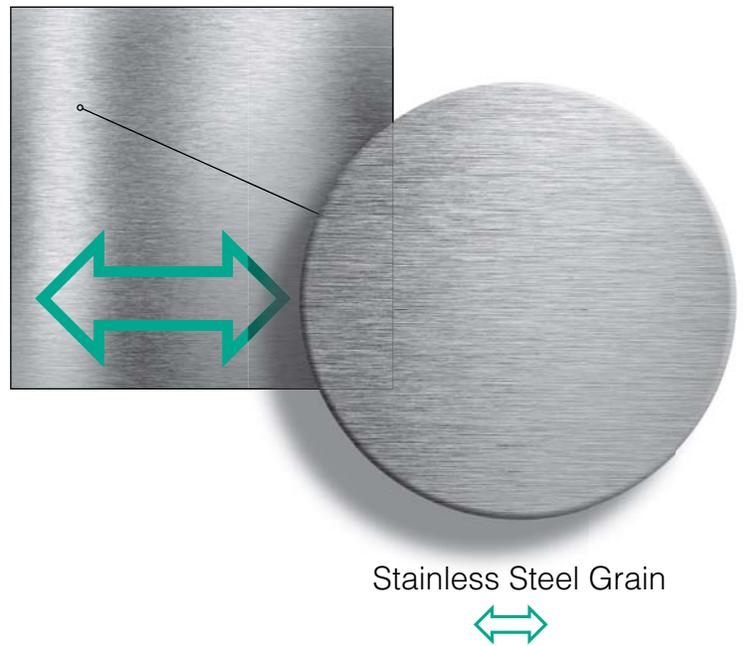
CHLORIDES: though abundant and commonly found in everything from water, food and table salt, it is the household and industrial cleaners that can be some of the worst perpetrators of chlorides.



1. Clean with the polish lines

Some stainless steels already display a noticeable "grain" or polishing line. When these lines are easily recognizable and visible, the scrubbing motion should always run parallel with the grain.

When the grain is not readily visible, err on the side of caution and use a soft cloth or plastic scouring pad.



2. Use alkaline, alkaline chlorinated or non-chloride containing cleaners

The industry continues to offer an ever increasing choice of non-chloride cleaners alongside the many long-established and customary cleaners that contain chlorides. If the chloride content in your cleaner is unknown, contact the cleaner manufacturer and request additional information. Should the cleaner contain chlorides, ask if an alternative or substitute cleaner is available for use. Also, avoid cleaners that contain **quaternary salts** as they too compromise stainless steel causing pitting and rusting. Use Windex or Isopropyl alcohol.



Chloride Cleaners

DON'T USE



Steel Pads



Scrapers



Wire Brush

3. **Keep the Equipment Clean**

Clean equipment frequently to avoid the build-up of hard, stubborn stains. The single most likely cause of damage comes from chlorides in the water. The hot water used in your typical hospital cart washer can cause damage due to the presence of chlorides in the water. The use of an alkaline, alkaline chlorinated, or non-chloride cleaner at suggested strength is recommended for cleaning.

4. **Rinse**

If chlorinated cleaners are used, the stainless steel surfaces must be **rinsed thoroughly** and **immediately wiped dry**. The sooner standing water is removed from the surface, especially when it contains cleaning agents, the better. After wiping the equipment down, allow to air dry as oxygen helps to maintain the protective passivity film of stainless steel.

5. **Regularly Restore/Passivate Stainless Steel**

Recommended Cleaners for Specific Situations

Job	Cleaning Agent	Comments
Routine cleaning	Soap, ammonia, detergent Medallion, Windex	Apply with cloth or sponge
Fingerprints & smears	Arcal 20, Uc-O-Nu Ecosnine, Windex	Provides barrier film
Stubborn stains & discoloration	Cameo, Talc, Zud First Impression	Rub in direction of polish lines
Grease & fatty acids, Wood, burnt-on foods	Easy-off, De-Grease it Oven Aid	Excellent removal on all finishes
Grease & oil	Any good commercial detergent, isopropyl alcohol	Apply with sponge or cloth
Restoration/ Passivation	Benefit, Super Sheen	



Never Use Hydrochloric Acid (muriatic acid)



On stainless steel surfaces



Corroded Stainless Steel

Passive Film Breakdown

Should the passive film of your stainless steel equipment become compromised the material will begin the slow process of corroding - with the eventual onset of rust.

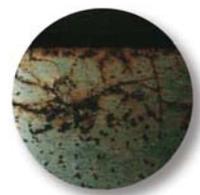
The first signs of corrosion will appear on the microscopic level. Under simple magnification or use of a microscope, small pits and cracks will become noticeable. Over time, the compromised stainless steel will give way to deepening pits and increased cracking. Red-orange rust will eventually appear and additional severe cracking will continue becoming increasingly noticeable.



Pitting



Microscopic cracking seen at 200x magnification.



Visible cracking

Review

1. Stainless steels will rust when:
 - Passivity (film-shield) breaks down.
 - Scrapes or scratches appear on the material.
 - The presence of deposits and chlorides.
2. Stainless steel rust starts with pits and cracks.
3. Use the proper tools to restore surface, such as non-metallic Scotch-Brite™ pads. Do not use steel pads, wire brushes, or scrapers (Step 1).
4. Use non-chlorinated cleaners at recommended concentrations. Use only chloride free cleaners (Step 2 and 5 chart).
5. Know the hardness of the water and soften accordingly. Use filters and softeners whenever possible (Step 3).
6. Wipe off cleaning agent(s) and standing water as soon as possible. Prolonged contact will eventually create problems (Step 4).