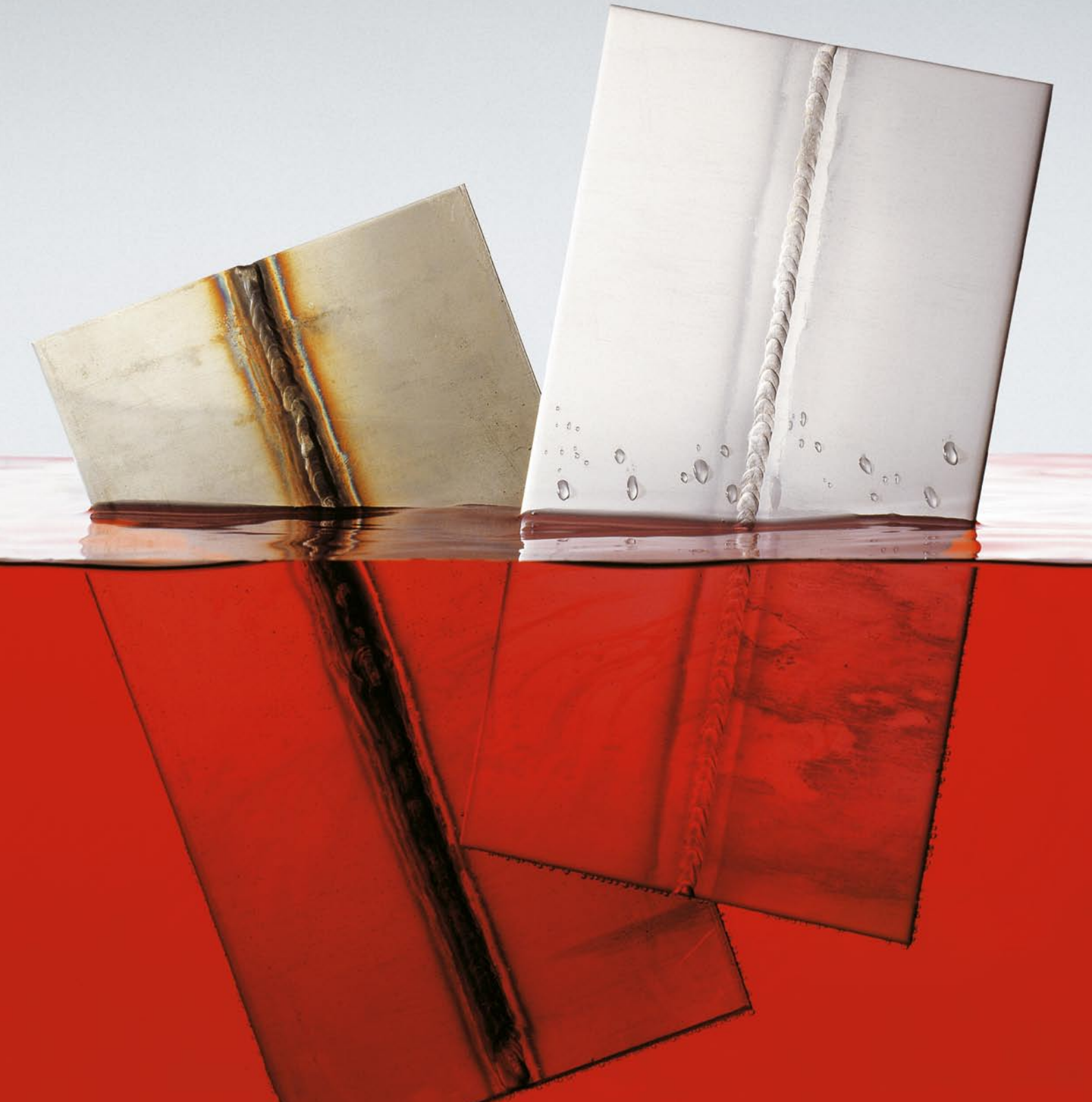
POLIGRAT

Pickling Cleaning Passivating



Why Pickle?

Pickling insures the corrosion resistance of components made of stainless steel and thus considerably Influences their service life and usefulness.

The corrosion resistance of stainless steels is mainly based on the presence of at least thirteen per cent chromium in the alloy. In combination with oxygen, the chromium forms a dense chemically resistant passive layer of chromic oxide on the surface of the component. This protects the surface against corrosion. The passive layer usually forms anew after abrasion. The precondition is a metallically pure surface with a sufficiently high percentage of chromium.

Professionally pickled stainless steel surfaces and welding seams
– are metallically pure, free of scales and discolouration
– have the full corrosion resistance of the component, and
– have a decorative metallic appearance.

Every mechanical treatment damages the top layer of components by contamination with ferritic matter, change in the structure of the layers, development of stresses and reduction of chromium content. Heat treatment like annealing and welding leads to scaling and discolouration. These not only deteriorate the appearance of the component, but especially its corrosion resistance because they consist mainly of ferric oxides which are chemically less resistant,
A continuous passive layer of chromic oxide cannot form here.

Corrosive strain on insufficiently passivated stainless steel leads to the forms of corrosion typical for this type of material:

– pitting corrosion
– crevice corrosion
– stress corrosion cracking
– intercrystalline corrosion
– corrosion resulting from contact with foreign metals

A dense passive layer can only form on metallically pure surfaces.

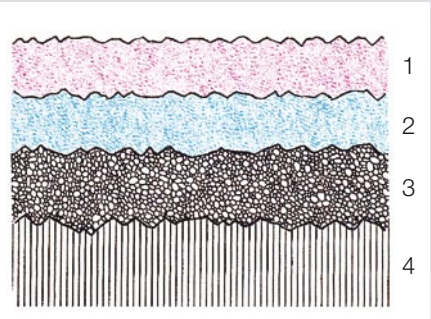
How to Pickle

Chemical pickling

Depending on the task involved, the components that are to be pickled are either immersed in a pickling solution or the pickle is applied to the metal surfaces. At room temperature, they are allowed to take effect for a few minutes up to a few hours and then they are rinsed with water.

Immersion pickling in a 30,000 gallon pickling bath

The illustration shows the build-up of scaling on welding seams or after annealing. The bottom acid-soluble FeO layer is preferably dissolved by the pickle. Thus the scaling is loosened and can be removed by rinsing with high-pressure devices or by brushing,



Chemical combination of "scaling" on welding seams
1: Fe_2O_3– layer, difficult to dissolve with acid
2: Fe_3O_4– layer, easier to dissolve with acid
3: FeO – layer, easy to dissolve with acid
4: Basic metal

The active pickling chemicals consist mostly of acids that cause a chemical removal of the top layer of the component from 1 - 3 µm. Oxides like scaling and discolouration, ferrites and contamination are preferably attacked and removed. The same is true for areas that have reduced chromium content. The pickled surfaces are metallically pure, have a regular matte finish, and are of high corrosion resistance. The passive film is formed while rinsing with water.

Anodic pickling

Anodic pickling processes erode the component using Direct Current. Hereby, pickling solutions with low chemical aggressiveness are used in special installations. This process allows whatever degree of metal removal is desired without impairing the result.

Chemical container, WN 1.4571, pickled inside and outside

The pickling effect is achieved only when applying an electric current and can be adjusted easily by varying the current density and application time. There is no danger of overpickling.

POLINOX – the POLIGRAT-Pickling Products

All POLINOX products are free from Hydrochloric acid and chlorides. For optimal results various POLINOX products are supplied.

Pickle Pastes for the cleaning of Seam Welds

POLINOX-P RETARD
Pickle paste which quickly and thoroughly removes weld scale, discolouration and ferritic contamination, thereby restoring the full corrosion resistance of the material without noticeable attack on the base metal.
Colour: Red

POLINOX-P RAPID
Strengthend pickle paste which quickly and completely removes heavy scale and burning from high alloy materials.
Colour: Orange

POLINOX-P NORMAL
White pickle paste which quickly and efficiently removes scale, discolouration and ferritic contamination from seam welds. Colour: White

POLINOX-UP
POLINOX-UP is a mild pickle paste which removes discolouration and ferritic contamination from welds without attacking the base metal. POLINOX-UP is free from Nitric Acid and contains less than 1% Hydrofluoric Acid. It is therefore classified only as corrosive and not as poisonous.
Colour: White

Spray pickling procedure for large areas

POLINOX-FL AKTIV
POLINOX-FL AKTIV is a sprayable, thixotropic paste for the treatment of large surface areas, free standing vessels and process systems. Surfaces and welds are pickled simultaneously to the same quality standard as obtained by immersion. POLINOX-FL AKTIV is applied using a POLINOX spray unit and after 30 to 90 minutes is rinsed off using a high pressure water gun.

POLINOX-US
POLINOX-US is a mild, sprayable pickle paste which removes discolouration and ferritic contamination from the surface without attacking the surface itself. It is therefore suitable for use with superior, decorative Stainless Steel surfaces. It can also be used with Aluminium to give a matt surface. POLINOX-US contains no Nitric Acid and less than 1% Hydrofluoric Acid. During use no dangerous nitrous gasses are given off. It is classified as corrosive rather than poisonous. Colour: White

Pickle Solutions

POLINOX-B PICKLE
POLINOX-B PICKLE is used by immersion, sprinkling through pumping and with pickle spray units, Special additives reduces the NOx emissions and reduces the nitrate content in the rinse water. They also improve the pickling at higher metal contents. It is delivered as concentrate which is diluted with water.

Spray pickling using POLINOX-FL AKTIV

POLINOX-UB PICKLE SOLUTION
POLINOX-UB is a pickle solution without Nitric and Hydrofluoric Acid. Its use is not subject to authorisation and control. It removes ferritic contamination and discolouration also from ferritic Stainless Steel. POLINOX-UB can be used chemically or electrolytically.

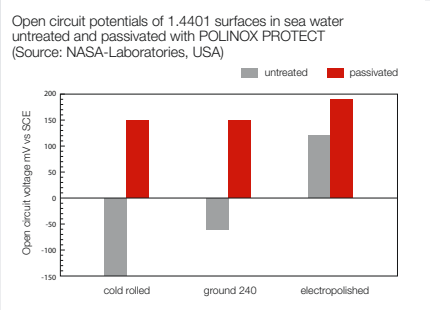
POLINOX-AB
POLINOX-AB is an anodic pickle solution for the descaling, cleaning and passivating of austenitic, feritic and martensitic Stainless Steel. It is free from Nitric and Hydrochloric Acids.

Complementary Products

POLINOX-ROVI SUPER Pickle Bath Additive
POLINOX-ROVI SUPER, when added to the pickle solution improves pickling performance, life of solution and allowable metal content. The emission of NOx is reduced as is the formation of nitrites and chromates.

Passivation

POLINOX PROTECT
Cleaning and improving the passive layer for highest corrosion resistive requirements, work or electropolished as well as on mechanical polished, ground or brushed surfaces, increases the Cr/ Fe ratio.
POLINOX B PROTECT :
immersion concentrate
POLINOX FL PROTECT :
spray gel



POLINOX PASSIV
Rapid build-up of the stainless steel passive layer after pickling process by immersion.

POLINOX-FL PASSIV
This brushable and sprayable thixotropic passivating paste ensures the complete passivation of Stainless Steel surfaces required under critical conditions.

Stainless Steel Cleaners

POLINOX-C CLEANER
POLINOX-C CLEANER will degrease, clean and remove loose rust in one operation. POLINOX-C CLEANER is free from Nitric and Hydrofluoric Acids. It is also suitable for cleaning Aluminium.

CSG-CLEANOX
Cleans and preserves in one process step; in addition the reduction of finger print sensitivity is achieved.

Additional Pickling Chemicals

Mild Steel

Pickling:

POLINOX-UB
For removal of laser cutting induced oxides

BESTA
For oxide removal at room temperature

BESTA-S
For anealed and hardened steel, fast oxide removal; low metal attack

Preservative chemicals:

DW-FLUID
Displaces water and preserves mild steel

CARBO-PASSIV
Temporary protection of mild steel against corrosion. Drying without oil/wax film

Titan

POLINOX-B PICKLE
Rapid pickling of heavy oxidized casting of forging ports

TITAN-PICKLE
Removes with care light oxidations and achieves a uniform and dull surface

Aluminium

POLINOX-UB
For rapid cleaning in a dip tank

POLINOX-US
Can be applied on large surface by spray or brush

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