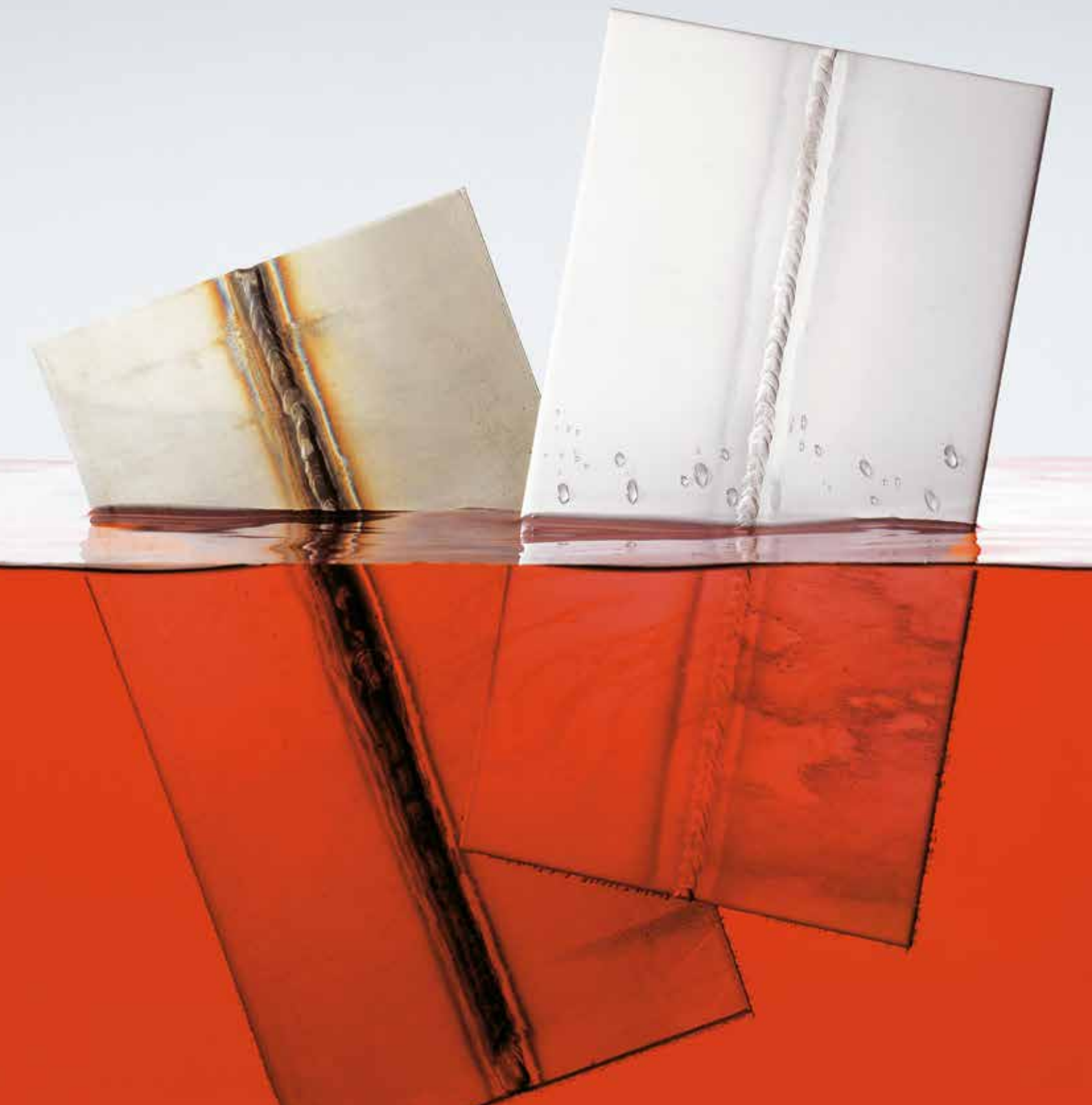




POLIGRAT

**Pickling - Cleaning -
Passivating**



Pickling – Cleaning – Passivating

Pickling – why?

Pickling is a strong chemical surface cleaning combined with a slight removal of metal. Pickling removes oxides, foreign metals and corrosion products. Additionally in most cases a thin layer of the base metal is removed. Pickling preferentially attacks grain boundaries causing a slight roughening of the surface, which develops a matt silky appearance. After pickling the surfaces are metallically and chemically clean and active.

Recommended for Stainless Steel, Titanium and Aluminium, the objective of pickling is to provide a metallically clean surface for the subsequent formation of a faultless protective oxide layer by reaction of the metal surface with oxygen from the atmosphere. These dense and chemically resistant oxide layers, also called “passive layers”, protect the metal surface from corrosion.

The precondition for a high corrosion resistance is a dense and homogenous passive layer free from local defects. The formation of passive layers can normally take several hours or days. In order to achieve the desired corrosion resistance instantly, pickled surfaces can be treated (“passivated”) with an oxidising media such as nitric acid or hydrogen peroxide.

Other metals such as Mild Steel or Copper are pickled to remove oxides and corrosion products and to activate the surfaces as pretreatment to be followed by electropolishing, chemical polishing or plating.

Pickling Products

POLIGRAT offers pickling processes and products for the treatment of Stainless Steel, Titanium, Mild Steel, Aluminium and Copper Alloys.

Pickling products contain additives, which improve the pickling process and avoid an overpickling.

POLIGRAT also offers immersion pickling processes for Stainless Steel, Mild Steel and Titanium, which do not cause hydrogen embrittlement.

Pickling – how?

Pickling liquids can be applied by immersion in a pickling bath, by pumping through hollow tubes and pipes or by spraying using a POLIGRAT pickling chamber.

Pickling gels and pastes are used for the pickling of surfaces, away from a pickling plant. The application is performed on large free standing surfaces by the spraying on of special pickle pastes (POLINOX FL) or locally by using brush pastes (POLINOX P).

In addition to chemical pickling, electrolytic (anodic) immersion pickling is also available. These processes remove more metal from the surface. Electrically insulating layers are not dissolved but removed by dissolution of the underlying metal surface. The resulting oxygen then pushes off the oxide layers.

Cleaning

Cleaning products (“Cleaner”) remove soluble organic contamination such as grease, paints, oil and weakly adherent particles. Oxides and metallic contamination will not be removed. After treatment the surfaces are clean and well wettable for subsequent processes.

Passivating

Passivating results in a fast corrosion protection after pickling. On Stainless Steel, Titanium and Aluminium, oxidising media are used for passivating by formation of a passive layer. On Mild Steel and Copper Alloys organic inhibitors are used for corrosion protection.

Corrosion Protection for Stainless Steel (POLINOX Protect)

POLINOX Protect is a newly patented process, which provides a substantially higher corrosion resistance to Stainless Steel by a final treatment after fabrication.

POLINOX Protect optimizes the existing passive layers in terms of structure and chemical consistency. The application as a final treatment after fabrication is done by dipping or spraying. Weld scale and thermal discolorations are converted into an effective passive layer and this can replace chemical pickling.

An additional short heat treatment for several minutes in the range of 150°C to 200°C (depending on the alloy) will further significantly increase the corrosion resistance.

Protect Cleaner is used for the cleaning and refurbishing of corroded surfaces on Stainless Steel. It can also be used for on site application. Corrosion products are removed, the corrosion is stopped and a significantly higher corrosion resistance is provided to the cleaned surfaces. This will reduce the probability that corrosion will return.

POLINOX Protect does not contain dangerous chemicals and uses only not toxic and bio-degradable ingredients. The application does not produce gases or offensive smells. The application is not subject to legal restrictions.

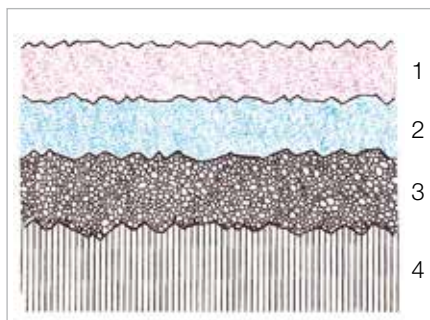


Immersion pickling in a 30,000 gallon pickling bath



Chemical container, WN 1.4571, pickled inside and outside

Process/Product	Stainless Steel	Steel	Titanium	Other Metals	Dipping	Spraying	Painting	Wiping
Cleanox	x				x	x		x
Cleaner F	x	x	x	x				
Cleaner K	x	x	x	x				
Cleaner Universal AB	x	x			x	x		x
Cleaner Universal A	x	x			x	x		x
Cleaner Universal S	x	x				x	x	x
Cleaner C	x					x	x	x
Cleaner CS	x					x	x	x
Protect Cleaner	x					x	x	x
Cleaner Metal T		x			x			x
POLINOX Komplextroster		x			x			
Cleaner Zink				x	x	x		x
POLINOX AB 8	x				x			
POLINOX UB	x			x	x			
POLINOX VA 100	x				x	x		
POLINOX B Badbeize	x				x			
POLINOX Rovi Super	x				x			
POLINOX B NF	x				x	x		
POLINOX FL Aktiv	x					x		
POLINOX FL NF	x					x	x	
POLINOX P Rapid	x						x	
POLINOX P Normal	x						x	
POLINOX P Retard	x						x	
POLINOX Weldclean	x				x			x
POLINOX Besta		x			x			
POLINOX Besta S		x			x			
POLINOX B Titanbeize			x		x			
POLINOX TB 100			x	x	x			
POLINOX B Passiv	x				x			
POLINOX B Protect	x				x			
POLINOX B Protect N	x				x			
POLINOX Protect TC	x				x			
Carbo Passiv 6		x			x			
Dewatering Fluid		x			x	x	x	

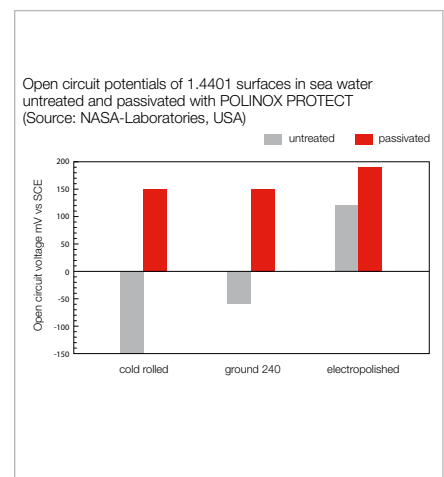


Chemical combination of "scaling" on welding seams

- 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



Spray pickling using POLINOX FL AKTIV



POLINOX Protect



ADDED VALUE THROUGH SURFACE TECHNOLOGY

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