

### BACKGROUND

Ronstan has carried out extensive corrosion testing on investment cast stainless steel products, including our RF2429-xx padeyes which are manufactured from high strength grade 15-5PH stainless steel. Prolonged exposure to the corrosive environment in our salt spray testing facilities shows only occasional discolouration in the vicinity of the countersunk fasteners.

We have however seen some cases of padeyes that have exhibited corrosion in the field, which have been the subject of considerable follow-up, research and further testing to determine the cause.

### UNSUITABLE CLEANING PRODUCTS

Many of the products typically used on boats for general cleaning and removal of stains from gel coat contain a percentage of hydrochloric acid, and their Material Safety Data Sheets (MSDS) indicate that they are potentially corrosive to metals.

At full strength these cleaners typically contain 10-20% HCl, and they are intended to be diluted for use at a ratio of 1:10. This dilution would result in a concentration of 1-2% which has little or no effect on grade 316 stainless steel but will attack grades 17-4PH and 15-5PH. The rate of corrosion for a diluted cleaning solution at this concentration is seven times higher for 17-4PH and 15-5PH stainless steel than for grade 316 stainless steel. The corrosion rate doubles for every 10°C increase in temperature, so the corrosive effect is accelerated in tropical climates.

In tests with a popular “off the shelf” cleaning product used for restoring gel coat (containing hydrochloric acid, diluted as instructed), just a small amount of diluted solution brushed onto a padeye was enough to show obvious corrosion. Products containing hydrochloric acid must NOT be allowed to come in contact with products manufactured from 17-4PH or 15-5PH stainless steel.

### CARE AND MAINTENANCE

To restore the original finish to stainless steel items after exposure to the type of aggressive cleaning products described above, we can recommend Polinox US Rust and Stain Remover (MSDS at <http://www.geordi.com.au/MSDS/Polinox%20US%20-%20MSDS%20MM3.pdf>). Our tests of this product show that it works extremely well in removing the major signs of rust and corrosion. The compound should be brushed onto the affected padeyes and left for no more than 30 minutes (longer exposure will result in a blackening of the stainless steel surface). It should then be rinsed off and wiped down.

Further protection against corrosion can be achieved by applying a protective barrier film such as Interflon Film WB (<http://www.interflon.com/asset/download/32328>). This gives the padeye further protection against future oxidation, and ensures longevity of the shine. This combination of cleaning followed by application of a protective film performed very well in our further salt spray tests.

We have been advised by Poligrat GmbH, the German manufacturer of Polinox US, that this product has been discontinued. They have developed a new process called “POLINOX Protect” as a replacement application, available in two versions:

- POLINOX Protect Cleaner, a repair and refurbishing product for already corroded surfaces
- POLINOX B Protect (TC), and immersion bath for initial improvement of the corrosion resistance of stainless steel.

# CARE & MAINTENANCE

## Investment Cast Stainless Steel Products

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Both products are said to be biodegradable and free of harmful chemicals such as HF, HNO<sub>3</sub> or HCl. We plan to test these products as soon as we are able to obtain them in Australia. Meanwhile, further information on is available on the Polygrat website [www.polygrat.de](http://www.polygrat.de).

### RECOMMENDATIONS

Any cleaning solution used on a boat must always be thoroughly washed away with fresh water after use, with particular attention to ensure there is no pooling or accumulation of cleaning agents around any stainless steel deck fittings.