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## Stainless steel treatment for chemical tankers and tank cars

Tanks and tankers, in which chemicals are to be stored or transported, are cleaned prior to use and periodically in the case of a new or different cargo.

### **Metal treatment**

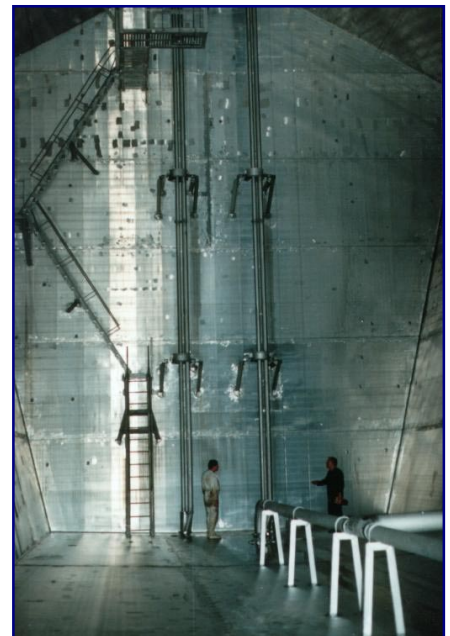
Stainless steel tanks must prior to use be chemically treated. The corrosion resistance of stainless steel is determined by a chromium-rich oxide film. As soon as this film has formed the material is designated as being passive. Austenitic stainless steel is supplied as passive by the supplier. During manufacture of the tanks the many mechanical and thermal treatments that the tank undergoes result in local damage to and contamination of the protective oxide film. This results in the oxide film losing its corrosion resistant features with the substrate material often corroding more rapidly than would have been the case for the original passive panel material. Rolled-in iron particles may also have disastrous consequences. It is therefore very important that this chromium-rich oxide film is completely sealed and clean before the tank is put into use and exposed to chemicals and environment.

### **Corrosion**

Due to the aggressive character of most chemicals, tanks in which they are to be transported are usually manufactured from Austenitic stainless steel types such as AISI 316 or 304. These have the advantage of being relatively resistant to chemicals. They are however not completely resistant to corrosion. It is important that light corrosion products be removed specifically with a view to avoiding deep pit and split corrosion with all their negative consequences and also to prevent contamination of the contents of the tank.

### **Precommissioning cleaning**

The precommissioning cleaning of Austenitic stainless steel types comprises in general three steps: degreasing, pickling and passivation. Degreasing is required to remove oil, grease and atmospheric pollution and to render the surface optimally accessible to the pickling agent. Degreasing is generally conducted using Vecom Multicleaner/TP-02 or Steamclean HPC-NF. The pickling treatment removes completely iron particles and other surface contaminants to the surface resulting from earlier treatments or otherwise. After the pickling treatment the material is rinsed acid-free using low-chloride water. The pickling treatment renders the surface chromium-rich, the surface being in fact refined. Although the Austenitic stainless steel is, after pickling and when exposed to sufficient atmospheric oxygen, able to passivate spontaneously, closed systems such as tanks are generally treated chemically in order to passivate their surfaces.



*The pickling of a stainless steel loading tank onboard*

The chemical fluids are sprayed against the walls with considerable force. This is done using an acid-resistant pump unit by means of spray units suspended in the tank or tank washing machines. The chemicals stream down the walls and over the bottom to a deep well from which they are recycled back to the tank of the pump unit by immersion pump. The time occupied by this treatment depends on the type of stainless steel and the temperature. The treatment is followed by rinsing, first with drinking water and then with demineralized water.

### **Maintenance cleaning**

Not only prior to refilling, but also when changing contents a mild detergent may often prove sufficient. With this residues of the previous contents and other contaminants can be removed so that the fresh contents will not be contaminated or react with residues of the previous cargo. Vecom has a wide range of detergent products with the preferred choice depending on the type of cargo.

Generally speaking the tanks are after the pickling treatment therefore rinsed only with water or a mild detergent. Only in exceptional cases and when corrosion products have formed is pickling carried out again. In the case of storage or transport of corrosive acid cargoes such as sulphuric acid is periodic passivation required for protection of the tanks.

Author: Dr.Ir.Ing. Maja Keijzer (Technical Manager) and Jan van Laer (Head Customer Services)  
Reactions and/or questions: e-mail: [tb@vecom.nl](mailto:tb@vecom.nl) or telephone: +31 (0)10-5930299