

SUBMERSIBLE SEAWATER TITANIUM PUMPS

Using galvanic anodes and duplex stainless steel for the shaft material are two of the preventive measures used in Tsurumi's seawater resistant pumps. However, with those counter-measures, there is the need of timely replacement of the galvanic anode or impeller, which works as sacrificial galvanic anodes. There is another series of Tsurumi pumps which does not require replacement of any parts and can operate continuously in prolonged exposure to seawater: TM Series, Titanium Pumps.

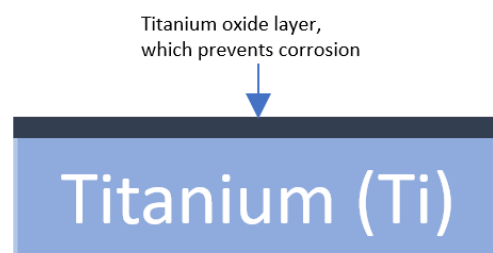


Since the initial application of Titanium in military equipment in 1950's, its corrosion resistive property has been an important consideration in its selection as an engineering structural material. Titanium has gained acceptance in many areas where its corrosion resistance and engineering properties have provided the corrosion and design engineer with a reliable material. However, due to the material cost limitations, medium-size, and large size pumps need to implement galvanic anode system for corrosion resistance, and Titanium pumps are available from 0.25kW to 3.7kW.

Protective Oxide Film on Titanium

Even in environments with trace amount of water or vapor, Titanium can form a stable and tenacious film of substantially inert oxide. In presence of sufficient oxygen, this layer of inert oxide is self healing.

Therefore, even if this film gets mechanically damaged, the base Titanium forms a new oxide layer in no time, and maintains its corrosion resistive property. This provides Titanium with exceptional resistance to corrosion in extremely wide range of aggressive environments.



TM Pumps



All the metallic parts in contact with the liquid are made up of Titanium in TM pumps. This includes motor frame, shaft, bolts and oil plugs. And to prevent galvanic corrosion, other parts which come in to contact with the liquid are made of resin reinforced with glass-fiber. So, there is no metal-to-metal contact of Titanium in wetted surrounding ensuring zero possibility of galvanic corrosion. Titanium, as aforementioned, is extremely resistant to local corrosion. So, without galvanic and local corrosion, there is virtually no means of corrosion phenomenon on Titanium pumps.

As mentioned in previous issues of TOPPI, stainless steel is not an appropriate material for seawater application. Following picture, illustrates two shafts, one Titanium and other Stainless steel 304) of same dimension and shape operated in seawater for 6 months. The Titanium shaft still looks as new with no noticeable signs of corrosion. However, the stainless steel shaft is severely corroded.

