



Zinc-it anodes quality is certified by the ISO 9001:2008 process through the expected parameters and by our experienced staff.

The use of pure raw materials and alloy composition complies with the worldwide accepted standard - MIL-A-18001 - and final quality checks, weight, packaging and delivery make a difference towards our clients.

Cathodic Protection - **CP** - is a vital component in any maritime industry project.

Zinc-it anodes are highly valued with excellent quality records appreciated by Shipbuilders and Yards, corrosion consultants and equipment retailers all around Europe.

All shipments are safeguarded by the chemical analysis issued to each production batch.

A typical example can be seen here

Zinc-it						
Analysis Certificate - Sacrificial Zinc Anodes						
Date:		Spectrometer	Spectrolab M5			
Client:		Batch nº	5/2011			
Average number of sparks			24			
reference alloy norm			MIL-A-18001 K			
Chemical Composition						
%	Pb	Fe	Cd	Cu	Al	Zn
Norm	Max	Max	Range	Max	Range	Min
	0.006	0.005	0.025 - 0.07	0.005	0.1 - 0.5	99.314
Obtained	<b>0.0019</b>	<b>&lt; 0.005</b>	<b>0.035</b>	<b>0.002</b>	<b>0.31</b>	<b>99.65</b>

Signature / Date

Although every new Ship or Vessel is always fitted with corrosion anodes calculated specifically for each project (dimensioned by internal or external corrosion consultants) it often happens that during the life usage of the Ship, there simply isn't info available or a consultant that can help and therefore some calculations have to be made for replacing or maintenance.

On a simple manner, one can roughly calculate the anodes needed for protecting a certain area.

But again, this should be made by a corrosion consultant to get the most accurate results. A few factors that go into the equation that any ship responsible must be aware of;

### **Density of the current**

The electrochemical and mechanical conditions are - as well as temperature, salinity, drag ratios, etc - important factors when it comes to calculate a specific protection system.

Such system is usually expressed by the density of the electrical current required to provide enough or sufficient potential to the surface we wish to protect.

The normal density of the current for hulls is usually in the range of 10 mA/m<sup>2</sup> to 30 mA/m<sup>2</sup>, although these are not rigid norms and must be adapted in specific circumstances and checked for every installation

### **Life of the anode**

A Zinc anode is set for duration of approximately 2 to 3 years and usually they are replaced when the ship comes to dry dock for inspection, around these typical periods of time

### **How many anodes?**

We know the following values;

The Potential has a value of 1.05 V, the Capacity (Amp/Hour per Kg) has a value of 780 and Efficiency is of 95 %

Some simple calculation can be made to get a first glimpse of what your protection needs are and can be obtained by using these well established formulas:

First step will be to find out the current

10 to 30 mA/m<sup>2</sup>  
on steel hulls

$$\text{Current (Amperes)} = \frac{\text{Area (m}^2\text{)} \times \text{Density of the current (mA/m}^2\text{)}}{1000}$$

Once you determined the (A) value, you can calculate the weight of the anodes needed:

$$\text{Weight (Kg)} = \frac{\text{Current (A)} \times \text{life of the anodes (Years)} \times 8760}{\text{Capacity of the material (A/hour / Kg)}}$$

An example:

For an area of 800 m<sup>2</sup>

By using these formulas we can calculate

Value 780

Let's consider 20 mA/m<sup>2</sup>  
as an average value

$$A = (800 \times 20) / 1000 = 16$$

2 years of  
life span

$$\text{Kg} = (16 \times 2 \times 8760) / 780 = 360$$

So, if 360 Kg are required for 800 m<sup>2</sup>, we have a need of 0.45 Kg/m<sup>2</sup>

These are values for areas of plain uncoated steel

As the areas receive a first line of protection, such as paint, the obtained value will on average, be cut by roughly 30%.

### Positioning the anodes

The anodes are to be installed along the wet surface of the hull, above and below the balance keels, and in higher number around the stern due to the high density of current originated by the propeller's movement.

Anodes must always be positioned on the horizontal related to the sea line. Drag must be minimized at a minimum. "Zinc-it" anodes are free of any rough edges or square angles, precisely to avoid drag increase.

The intake tanks must be protect as well using our anodes of the NT series.

Every "Zinc-it" distributor will gladly help you dimensioning your project and of course, the original drawings and specs of the ship usually determine which kind and quantity of anodes should be installed.