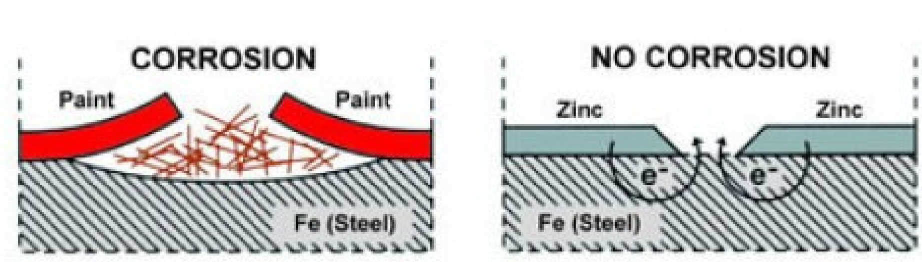
HOW ZINGA WORKS...

Introduction

Zinga is a unique form of corrosion protection because it provides both Active and Passive protection in a form that's as easy to apply as paint...BUT... Zinga is not paint.

Zinga is an active zinc performance coating which works in conjunction with the metal beneath whereas paints are only passive barriers. Regardless of how thick paints are applied, they remain as barriers. Once they are breached corrosion sets in immediately. Despite this significant difference, Zinga is still often mistaken for a paint simply because it's liquid and comes in a tin. But there are other, more subtle differences. For example it does not "skin over" in the tin because Zinga has an unlimited pot-life, it doesn't go "tacky" like a paint and also the thickness of a Zinga coat cannot be measured wet because it flattens off and dries too quickly.

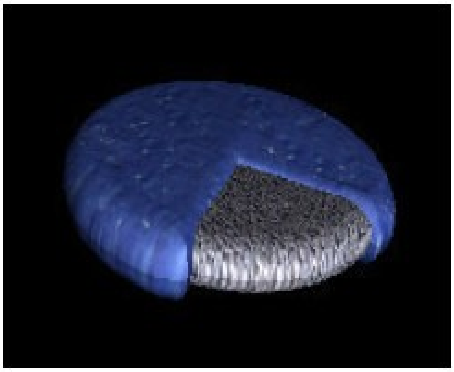


Active Protection

Cathodic protection, or active protection, arises from the zinc (the anode) sacrificing itself in favour of the base metal (the cathode) with the resulting flow of electrons preventing corrosion's chemical reaction. In this way the protection of the metal is guaranteed, even when the zinc layer is slightly damaged. Other well established methods of cathodic protection include hot-dip galvanising (HDG) and zinc thermal spraying both of which exhibit a constant sacrificial rate of the zinc layer.

Within Zinga though this sacrificial rate reduces dramatically after the zinc layer has oxidised and the natural porosity have been filled with zinc salts. Additionally each zinc particle within the Zinga layer is encased and protected by the organic binder without adversely affecting the electrical conductivity. This enables Zinga to create nearly the same galvanic potential between the zinc and the steel as hot dip galvanising but with a lower rate of zinc loss because, put simply, the binder acts as a "corrosion inhibitor" to the zinc. Please see the Zinc Loss Prediction Chart further down this page for a estimate of expected zinc coating service life.

"The zinc in Zinga becomes the sacrificial anode in relation to the steel but it corrodes at a much slower rate than would otherwise be expected"
(Extract from B.N.F. Fulmer report of JJB Ward, Oxfordshire, Jan '92)



This illustration shows the minute elliptical zinc particle encased in the protective organic binder. This covering does not adversely affect the electrical conductivity between neighbouring particles or the steel substrate but does ensure that the zinc in Zinga is better protected than pure zinc from the weather, abrasion, pH etc.

If the Zinga layer is sufficiently damaged to expose the base metal below, the steel would form a layer of surface rust but no corrosion would take place beneath it. In other words if the surface discolouration was removed the steel below would not be pitted or eroded. This is called "throw" and enables Zinga to protect bare metal up to 3 - 5mm or so away from where the coating ends – slightly less than new HDG. Zinc sacrificial anodes used on the steel hulls of boats below the waterline work on the same principle to protect metal in the surrounding area. Zinga is simply a different form of these anodes and is therefore sometimes referred to as a liquid anode or sheet anode when used in immersed conditions.

The ability of zinc to provide galvanic protection is a function of it's weight per given area. Dry Zinga contains a minimum of 96% pure zinc by weight, the particles of which are significantly smaller than those found in most coatings. The Zinga particles small size and elliptical profile ensures maximum contact between both the individual particles and the substrate. This greater density of zinc per given area combined with the good conductivity of the binder ensures that charge flows through every millimetre that has been coated and therefore provides excellent cathodic protection.

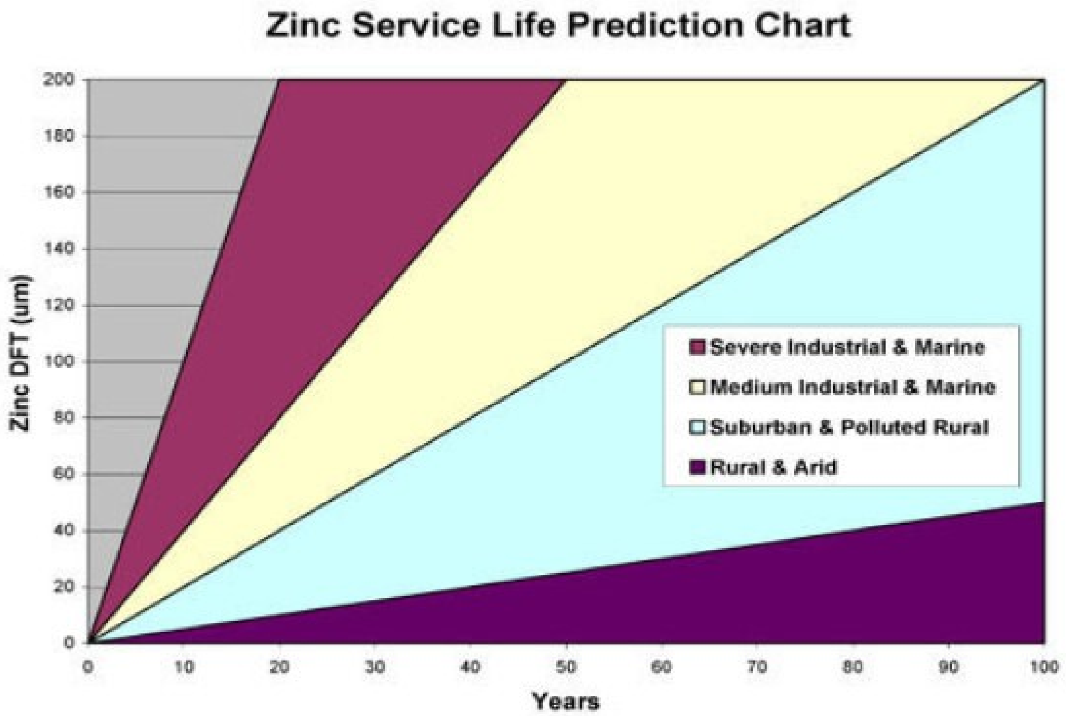
Passive Protection

Passive protection, such as paints and cladding, creates a "barrier" between the steel substrate and the elements. Once this barrier is compromised then the moisture and atmospheric salts will be able to start corroding the steel beneath the damaged area. This corrosion will then begin to creep extensively beneath the coating.

With Zinga, the organic binder and the zinc oxide layer that forms on the surface create an impervious barrier by blocking the zinc's natural porosity with oxide particles. Unlike other passive coatings, once breached the zinc oxide layer simply renews itself by re-oxidising. This layer of oxides is the reason behind the matt appearance of Zinga as opposed to the shiny hot-dipped finish and is the key to Zinga's extra long life.

Predicted Service Life

The corrosion rates of zinc in various environments have been well researched over the years. As a result it is possible to chart the predicted service life for a zinc layer at a given DFT in a particular situation. The chart below is based on Hot-Dip Galvanised steel but, as it has already been explained in the Active Protection section, Zinga performs at least as well as HDG in normal atmospheric conditions and even better in marine environments.



Source: SGS Axa-Med. Service Life is defined as the time to 5% rusting of the steel surface.

You will note on our Standard Specifications that the expected lifespan given is significantly lower than could be derived from this chart. This is because the Specifications were established in conjunction with Zingametall's insurers and therefore remain extremely cautious.

Duplex Systems

If Zinga is used as part of a duplex system, i.e. is over-coated with another compatible product, the top-coat provides the initial barrier but the zinc oxide will form a secondary barrier if the first layer is compromised for any reason. As the top-coat becomes naturally porous over time, the Zinga fills the pores from below with zinc oxides enabling the top coat to last longer. It is because of this that Zingametall in Belgium state that the lifetime of a duplex system can be 50% more than the life of the Zinga and the topcoat combined.

Re-Liquidising of Zinga

Another of Zinga's unique characteristics is its ability to re-liquidise when a new coat of Zinga is applied to form a single homogenous layer. This ensures a massive cost saving in on-going maintenance because the old Zinga layer does not have to be removed before re-coating with Zinga. This also means that once the initial abrasive blasting has been completed the surface will never have to be blasted again.

The following microscopic photos demonstrate the total integration of multiple layers of Zinga:

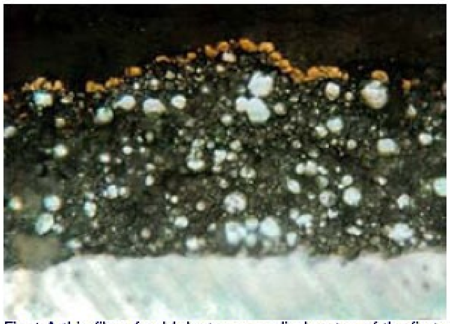


Fig.1 A thin film of gold dust was applied on top of the first coating of Zinga

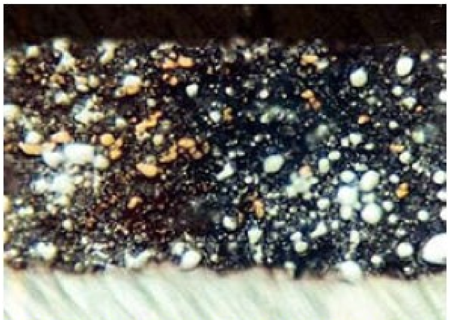


Fig.2 Seven days later a second coating of Zinga was applied on top of the gold dust. It can be clearly seen that the gold dust has mixed completely within th Zinga layers.

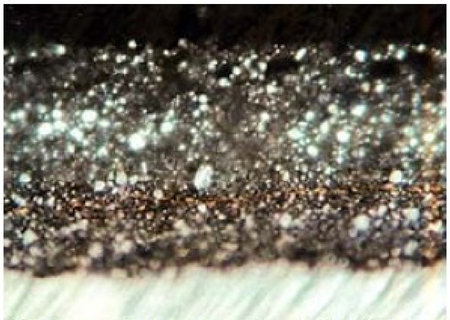


Fig.3 The same test was done with a zinc-rich paint. The gold film remains intact between the two coats demonstrating that they remain as separate layers.

For further information on the mechanism of Zinga's corrosion protection, please contact the Zinga UK Technical department.

For sales enquiry contact at:-

Polycoates Engineering Services

305-Cascade Complex, Nr.Chhani Jakat Naka,
Vadodara – 390024, (GUJ), India.

Phone – 0265 2774294,

zinga@industrialpainting.net