

**Guidance Information & Definitions of metal finishing & anti-corrosion treatments**  
**(Issued 11<sup>th</sup> Nov 2013)**

There are many metal finishing options available in the market today along with some very confusing technical terminology which is frequently misinterpreted. This guide has been written to help potential customers, architects and specifiers make an informed choice, as is often the case, the lowest price is not necessarily the most appropriate choice.

At the outset, it is important to draw a distinction between anti-corrosion protection and finishing. Anti-corrosion protection involves a sacrificial coating (normally Zinc) which protects steel from oxidation. The term sacrificial indicates that this layer degrades over time, that is, it will eventually deplete and corrosion of the base metal layer (substrate) will commence. It is customary to measure the level of anti-corrosion resistance by establishing the thickness of the protective layer (measured in microns). Finishing, on the other hand, is purely a decorative or aesthetic process to apply a surface colour membrane to a product. Unfortunately, convention within the construction and metal processing industries has led to the terms to be used interchangeably.

Most NK Fencing products use one of 3 different anti-corrosion protection methods, all of which are Zinc based, in addition to our colour finishing process, which is generally polyester based:

#### **Galvanized**

The term to describe components or products, coated using the process known as Industrial Galvanization. Mesh fencing is constructed from continuously galvanised wire (galvanised to BS EN 10244-2:2009) which is then cut and fusion welded to form mesh panels. The process of continuously galvanising wire produces a product which has typically 8-10 microns of Zinc coating.

##### *Note on wire fencing fabrication*

The process of cutting pre-galvanised wire reduces the overall integrity of the anti-corrosion layer, exposing bare steel at the point of the cut. When galvanised wires are then fusion welded to produce the mesh grill effect, this process again burns the zinc coating at these weld fusion points. The result is an area at the weld which has significantly less zinc coating due to the welding process burning the zinc coating.

##### *Note on corrosion resistance*

Zinc corrosion rates are linear and therefore predictable given the thickness of the zinc layer. However, a major variability in calculating life expectancy is the environmental factors. The presence of high levels of atmospheric pollutants such as SO<sub>2</sub> or indeed atmospheric salt concentrations directly increases the rate of zinc corrosion. Please refer to the Zinc Millennium map at [www.galvanizing.org.uk](http://www.galvanizing.org.uk) for further information or follow the link for the Engineers & Architects Guide on our website.

#### **Galvanized and Powder Coated (Marine Grade)**

The term to describe components or products, coated using the process known as Industrial Galvanization. Mesh fencing is constructed from continuously galvanised wire (galvanised to BS EN 10244-2:2009) which is then cut and fusion welded to form mesh panels. The process of continuously galvanising wire produces a product which has typically 8-10 microns of Zinc coating. A two coat polyester powder coating process is then applied. The first layer of powder consists of a zinc rich epoxy powder offering a zinc coating boost to the substrate at welded & cut areas. The epoxy layer is also non-porous and very hard wearing. The final layer of polyester powder is applied as an aesthetic finish, offered in a wide array of colour and gloss levels.

##### *Note on corrosion resistance*

Salt spray tests (ASTM.B117-09) on wire mesh panels galvanised to BS EN 10244-2:2009 and subsequently powder coated (Marine Grade) satisfactorily complete 500 hours of testing.

The test involves subjecting a sample to an accelerated corrosion process, in order to measure how well the powder layer is bound to the zinc layer. This result indicates that products coated to this standard are

suitable for normal and hazardous environments provided an appropriate care and maintenance regime is followed. (Please refer to the Care & Maintenance Instructions for NK Products for further details).

### **Hot Dipped Galvanized**

The term to describe components or products, coated in zinc by submerging the fabricated metal product into a bath of molten zinc at a temperature of 450 degrees. A metallurgic reaction establishes a metal zinc alloy coating over the entire surface of the product. The process & quality standards are laid down in BS EN ISO 1461:2009. The process of Hot Dipped Galvanizing produces a product which has typically 70-85 microns of Zinc coating.

#### *Note on corrosion resistance*

Salt spray tests are not conducted on Hot Dipped Galvanized products as Zinc Oxide does not react with the salt water to simulate an accelerated corrosion process. Zinc however does oxidise at a linear rate, allowing the calculation of product life expectancy given the thickness of the Zinc coating. The anticipated level of anti-corrosion resistance offered by hot dipped galvanizing is in the region of 20 – 25 years (this is dependant on local atmospheric conditions). Please refer to the Zinc Millennium map at [www.galvanizing.org.uk](http://www.galvanizing.org.uk) for further information or follow the link for the Engineers & Architects Guide on our website.

### **Polyester Powder Coated**

The term to describe components or products, electro statically coated in powder and cured in an oven to form a smooth and even coating of coloured polyester, providing a tough painted surface which is slightly porous. This finish is for decorative and aesthetic purposes only, offering minimal anti-corrosion properties as the physical powder barrier is fundamentally porous. A wide range of colour and gloss level options are available.

#### *Important note*

It is recommended that Polyester Powder Coated fencing systems should not be installed less than 6000 metres from coastlines, tidal estuaries or other hazardous environments such as industrial estates, quarries or close to heavily salted roads. In these circumstances, NK recommends the use of suitable anti-corrosion protection. In all cases, the process of base metal corrosion and subsequent powder shedding can be minimised by regular cleaning and maintenance. This helps reduce salt and pollutant particle penetration into the powder layer. (Please refer to the Care & Maintenance Instructions for NK Products for further details).

### **Hazardous Environment**

The term hazardous environment is used to categorize any environment which provides increased risk or exposure to corrosive atmospheric conditions. This can be caused by increased atmospheric levels of salt, pollutants of chemicals.

### **Improving the lifespan of metal products through care & cleaning**

The lifespan of commercial finishes of Galvanising and Polyester Powder Coating on fence products or indeed any external steel components are greatly influenced by environmental conditions. Polyester powder coating, due to its porous nature, will be affected by the presence of various atmospheric contaminants, for example high salt concentration in moist air (e.g. near the sea), industrial zones, road salt sprayed from traffic. There are many other environmental contaminants which will on contact with any galvanized and powder coated steel components accelerate the breakdown of the protective coating. This process of corrosion can be minimised by regular cleaning as stated in the British Standard. (Please refer to the Care & Maintenance Instructions for NK Products for further details).