



Guide to Fencing Product Finishes



Introduction

When you buy security and perimeter fencing from Alexandra you're buying a product that will last and continue to function well for many, many years.

The fencing around your premises is the first thing that visitors will see. Left exposed to the elements, untreated steel fencing will eventually rust and discolour which not only looks bad, but could compromise the structural integrity of your fencing, leading to security issues. This is why Alexandra's modern security installations use the very latest coating techniques to ensure our perimeter fencing looks as good as it performs.

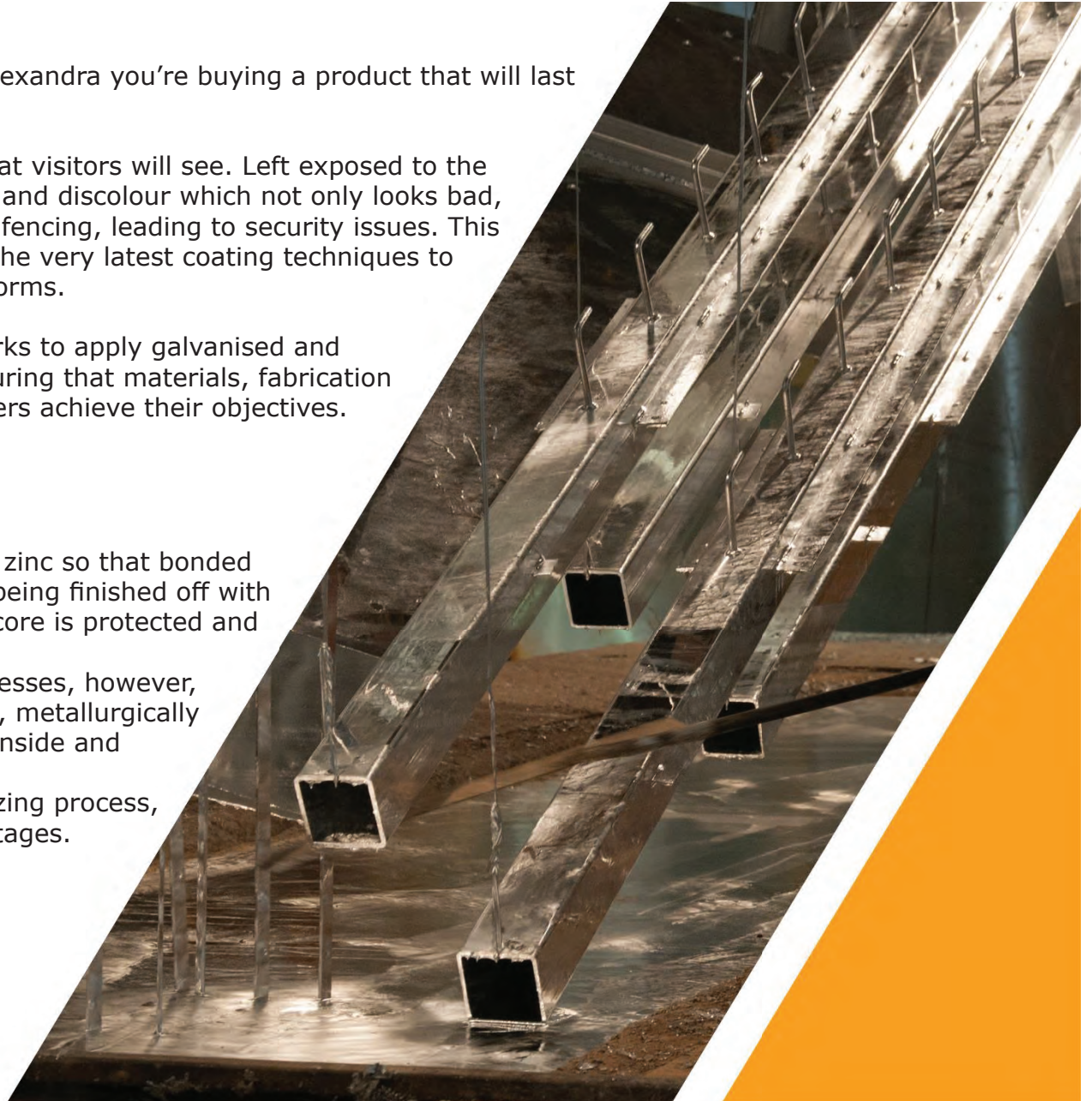
This simple guide will help explain how Alexandra works to apply galvanised and powder coated finishes to our range of products, ensuring that materials, fabrication and installation all come together to help our customers achieve their objectives.

Hot Dip Galvanizing

This process sees prepared steel immersed in molten zinc so that bonded layers of zinc-iron alloy cover all the surfaces before being finished off with a final outer layer of pure zinc. This means the steel core is protected and should remain free of corrosion for many years.

Zinc coatings can be applied by several different processes, however, only hot dip galvanizing provides a continuous, tough, metallurgically bonded coating of substantial and uniform thickness inside and outside.

To achieve the final perfect finish, the hot dip galvanizing process, to the EN ISO 1461 standard, involves a number of stages.



Before galvanising

Alexandra's fencing systems are made to certain design and construction standards.

- In order to maintain the life of our products all surfaces must be galvanized on the inside as well as the outside, so the molten zinc must flow freely into the sections, as well as being allowed to drain out. All tubular or hollow constructions are, therefore, vented with appropriate sized holes.
- All welding slag and splatter, which can be caused whenever two pieces of steel are joined together, must be completely removed, as these can spoil the finished results
- If the surface quality of any two joined pieces differ, these must be treated by abrasive blasting to minimise differences in the applied galvanised coating.

Galvanising Processes

Alexandra employs the services of UK based professional hot dip galvanising plants to coat its products. In the initial stages all fabrications delivered to the galvaniser are subjected to initial examination and sorted to enable the galvaniser to arrange their work program in the most efficient way

Degreasing

Any light grease or oil on the surface of the metal must be removed, preferably by using a caustic or acidic degreaser; after degreasing the steel fabrication it should be washed in a rinse tank to avoid transfer of the degreaser to the next stage.

Chemical Cleaning

Chemical cleaning removes rust and mill scale, which are the most common contaminants of the surface of the steel fabrication. Usually, hydrochloric acid at ambient temperature is used to give a chemically clean steel surface prior to being immersed in the molten zinc.
How long this



takes depends on how rusty the item is. Everything is washed in a rinse tank after cleaning to remove all the acid prior to the flux treatment.

Flux Treatment

Flux treatment removes any remaining traces of impurities and gives the steel surface a last intensive cleaning. It also aids the reaction between iron and zinc. The flux usually consists of an aqueous solution of zinc chloride and ammonium chloride and is applied to the materials to be galvanised in different ways. The most common method is to dip the article into a tank containing the flux. Alternatively the article can be immersed in the zinc by passing it through a flux blanket which floats on the surface of the zinc. This is known as wet galvanising.

Drying

After the flux treatment, steel items are dried and coated with a thin film of flux. Many plants allow work to air dry, although some will also use waste gas from the burners heating the galvanising bath to heat a drying oven.

Galvanizing

Galvanizing protects against corrosion and prolongs the life of steel, greatly lowering the environmental and economic cost. Galvanising takes place in a bath containing molten zinc, the temperature of which is usually between 440-460°C (zinc has a melting point of 419°C). It may be higher – about 550°C – in galvanising plants which operate the high temperature process. The galvanising process forms a coating consisting of layers of zinc-iron alloy formed by the reaction of zinc with iron in the steel. As the galvanised components are removed from the molten zinc a further layer of near pure zinc is formed over the alloy layers. How long the articles are immersed for will depend on their weight and the thickness of the steel sections. While the galvanising process is taking place, the surface of the molten zinc in the bath becomes covered with a thin layer of oxide and flux residues. The surface of the zinc is



swept back to avoid the galvanised article getting contaminated with ash and flux residues when it is removed from the galvanising bath.

Cooling and Checking

The galvanized steel is either left to air cool or is immersed in a cooling tank prior to being checked for quality and weight. Galvanising which complies with BS EN ISO 1461 must consist of a continuous, relatively smooth coating that is free from flux staining and complies with the relevant coating thickness criteria.

Results

The thickness of the zinc coating is fundamental to the quality of a hot dip coating. It is normally measured in microns (1 micron = 0.001 mm) although the coating thickness may also be expressed in terms of coating weight measured in g/m².

A lasting finish

Not only does hot dip galvanizing give a coating with great abrasion resistance, it also means the coating will last between 34 and 170 years before the base steel is exposed, according to the most recent exposure tests.

Zinc's corrosion resistance depends primarily on the patina, or protective film, that forms on its surface. Contaminants in the atmosphere can affect the nature and durability of this film. The worst atmospheric culprit being sulphur dioxide (SO₂) the presence of which largely controls the rate at which zinc will corrode. However, levels of SO₂ in the atmosphere are declining and experts expect this to continue, meaning the life of galvanized coatings should extend even further in the years to come. Thus, the initial investment in galvanized steel for long-term protection in perimeter fencing can provide cost benefits for decades.



Galfan

Galfan is a variation on the hot-dip galvanized steel process which uses a method of continuous hot-dip coating in a bath of molten metal consisting of approximately 95% zinc and 5% aluminium. This can improve corrosion resistance by 50% or more over traditional galvanization.

Galfan has a cellular surface which appears mottled and acquires a patina over time as its initial metallic appearance dulls to a matte grey. It offers an alternative to thicker galvanized coatings and post-galvanization and superior corrosion resistance, particularly where there has been damage from impact, scratches or gravel impingement and at cut edges.

Powder Coating

For customers looking for a more personalised fencing solution or one that better suits their surroundings; powder coating is the answer.

All fencing need to be able to withstand the harshness of the outdoors, regardless of whether its primary function is decoration or security. Powder coating not only creates a smooth, clean and attractive finish to the product, it also vastly improves the durability of the fence.

All of our Alexandra Security powder coating is applied to British and ISO standards.

What is powder coating?

Powdered paint is applied by electrostatically charging the item to be sprayed, then applying the powder coating with a spray gun. It is then placed in a powder coating oven and cooked, melting the powder particles so that they coalesce to form a continuous film.



Product description

Polyester Powder Coatings offer durable decorative finishes in a wide range of colours, textures and gloss levels. They are formulated to provide maximum corrosion resistance, colour stability and gloss retention. They are suitable for interior and exterior use and entirely TGIC free.

Suitable substrates

The excellent properties of polyester powder coatings make them suitable for application to a wide variety of substrates. These include aluminium, steel and galvanized steel.

Colour selection

The ranges of colours available include RAL, BS 4800, BS 381C, BS 2660. Munsel, Pantone and Dulux, all in a full range of gloss levels.

Powder coating process

Pre-treatment

As with the process for galvanising, Alexandra products have to undergo rigorous cleaning and preparation before the powder-coating can be applied.

Application

Application is by multiple, booth mounted, automatic guns augmented by two expert sprayers using hand lances. This ensures consistent and comprehensive coverage of even the most complex profile.

Standards

We are able to offer our customers coatings in compliance with all relevant national and international standard specifications. Unless otherwise instructed all work is produced to the requirements BS EN 13438:2005.



Curing Schedule

These can differ, but for most standard powders cure schedules can vary between ten minutes at 180°C and fifteen minutes at 200°C dependent on powder type and gloss level.

Why powder coat?

The powder coating process is very similar to a painting process except that the “paint” is a dry powder rather than a liquid. The electrostatic charging of the powder and grounding of the parts means the powder sticks to the item. As long as it can tolerate the heat used in curing the powder, any substrate that can be electrically grounded to enhance charged particle attachment can be used.

There are several advantages of powder coating over paints:

- Powder recovery for reuse
- No VOC (Volatile Organic Compound) generation therefore no VOC destruction required
- More durable than standard paints (powder chemistry dependent)

Proper surface preparation before powder coating is still critical to ensure complete adhesion and avoid defects.

A typical powder coating process for metal items would be:

1. Cleaning - typically using an alkaline cleaner
2. Rinsing
3. Phosphating – an optional step which improves corrosion protection and adhesion
4. Rinsing
5. Drying
6. Powder Coating
7. Curing - very energy intensive due to the high temperatures required



Drying and curing

Typical drying and curing operations use convection ovens and can be quite slow if the coated parts are large and heavy. Essentially, the whole item must get hot enough to cause the surface to either dry or the powder coat to cure.

Depending on the size and shape of the item, another option is to dry and cure it using infra-red heating. The infrared light heats the part surface and not the paint, resulting in paint drying from the inside out, which means the heat is going where it is needed. The paint does not skin over and trap solvent or water underneath it, as can sometimes happen with convection curing. All the volatiles are driven out of the paint, starting at the base surface working through to the surface of the paint. It is also a very rapid heating process, since there is instant infra-red light absorption. Another advantage of infra-red heating is that rapid heating of the parts surface results in better powder flow with less likelihood of dust or dirt defects, since there is very little air flow to deposit particles compared to convection heating.

Colour spread

Most security and perimeter fencing is specified with either a galvanised finish, or powder coated green. But more and more customers are looking for every part of their installation to reflect something of the company and brand, which includes selecting special colours for the perimeter and security fencing. Big users of this option are schools and local businesses, who both feel the importance to make the right impression in the community.

The cost of special colours may be a bit more than our standard palate, but as these pictures show, the effect is certainly more than worth it.



Knight Fencing product guarantee

So confident are we that your products will provide years of trouble free service that we will offer a 15-year guarantee on all of our mesh systems, which covers workmanship, design, material and of course finish.

