**NEWS ARTICLE**

Three of the best zinc coating processes

**1 February 2024:** Zinc is a highly reactive metal commonly used to protect steel from corrosion. While there are a variety of zinc coating processes available, three of the most common are zinc thermal spray, zinc-rich paints, and continuous galvanizing, explains **Simon Norton**, Director of the [International Zinc Association (IZA) Africa](http://www.zinc.org).

Zinc thermal spray is a process of applying zinc to a surface by melting it and spraying it onto the substrate using a high-pressure gas stream. The zinc particles melt and solidify on the surface to form a protective coating. Zinc thermal spray is a versatile process that can be used to coat a variety of materials, including steel, concrete, and wood. It is also a good choice for coating complex shapes and inaccessible areas.

The zinc particles in a zinc thermal spray coating are typically very small, with a diameter of ten to 100 micrometres. It gives the coating a high degree of adhesion, making it highly resistant to peeling and chipping. Zinc thermal spray coatings are also very durable and can withstand a wide range of environmental conditions.

Although a relatively costly process, zinc thermal spray is often the best choice for applications where a high level of corrosion protection is required. For example, it is often used to coat steel structures such as offshore oil rigs, wind turbines, fishing trawler hulls and bridges that are exposed to harsh environments.

Zinc-rich paints, on the other hand, contain a high percentage of zinc powder. It provides corrosion protection by forming a barrier between the steel substrate and the environment. Zinc-rich paints are typically applied by brush or spray. It is a good choice for coating steel in mild to moderate corrosive environments.

What’s more, zinc-rich paints are a cost-effective option for corrosion protection. They are relatively easy to apply and can be used to coat complex shapes. However, zinc-rich paints are not as durable as zinc thermal spray coatings and may require more frequent recoating.

Hot dip galvanizing is a process of coating steel with zinc by dipping it into a molten zinc bath. The zinc coating is typically 50 to 100 micrometres thick. Hot dip galvanizing is a highly effective corrosion protection method that can be used to coat a wide variety of steel products and is relatively inexpensive.

Hot dip galvanizing is the most common zinc coating process. It is used to coat steel products from nails to screws, fencing, and pipes. Hot dip galvanizing is also used to coat steel structures such as bridges and buildings. A reliable and cost-effective way to protect steel from corrosion, it is however not suitable process for coating complex shapes or inaccessible areas.

Other zinc coating processes available including sherardising, electroplating, and mechanical plating. Sherardising is a process of forming a uniform, corrosion-resistant zinc coating on the surface of iron or steel objects. It involves heating the object in a sealed container with finely divided zinc to a temperature below the point at which zinc melts. The two metals amalgamate to form alloys of zinc and iron, plus an external layer of pure zinc in an adherent coating that resists corrosion and also makes an excellent base for paint.

Zinc electroplating forms a layer of zinc on the surface of another metal such as steel by means of electrolysis. It involves running a current of electricity through a saline/zinc solution with a zinc anode and steel conductor. Zinc electroplating provides a protective coating for metallic substances such as nuts, bolts, fasteners, automotive parts, and many other hardware items.

Mechanical zinc plating deposits zinc on steel and other metals by means of a rotating drum filled with zinc powder, chemicals, and glass balls of different diameters. When the products are introduced into the drum, the glass balls hammer the zinc onto their surface to create a zinc layer comparable to zinc electroplating.

Mechanical zinc plating is less common for fasteners than zinc electroplating, but it has the advantage of there being no risk of hydrogen embrittlement. However, the buildup of the zinc layer must be tightly controlled to prevent thread interference.

“The best zinc coating process for a particular application depends on a number of factors, including the type of material to be coated, the corrosive environment, and the budget. It is important to consult with a corrosion engineer to determine the best zinc coating process for a particular application,” concludes Norton.

***Ends***

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**About the International Zinc Association**

The IZA is the only global industry association dedicated exclusively to the interests of zinc and its users. Operating internationally and locally through its regional affiliates, the IZA helps sustain the long-term global demand for zinc and its markets by promoting such key end uses as corrosion protection for steel and zinc as being essential in human health and crop nutrition. IZA’s main programmes are Sustainability & Environment, Technology & Market Development and Communications.

In South Africa, the IZA plays a vital role in establishing the basis for the successful revitalisation of the zinc industry by increasing awareness of zinc and its applications and benefits in key sectors and markets, which will ultimately translate into the increased uptake of zinc.

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