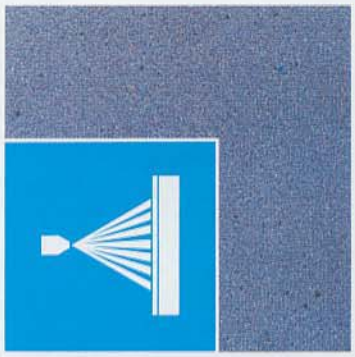
Hot Dip Galvanizing Data Sheet GA

1.1 Corrosion protection using zinc

The various processes for protecting steel from corrosion using zinc – demonstrated in photomicrographs and surface views . . .

Zinc Spraying

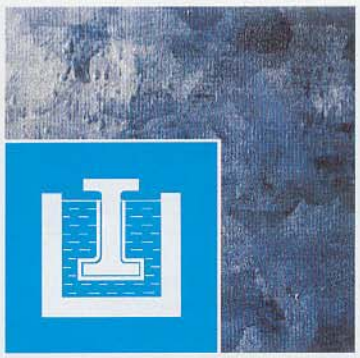
Grit blasted surfaces are coated with droplets of semi-molten zinc sprayed from a special gun fed by either zinc wire or powder (BS 2569: Part 1).



Hot Dip Galvanizing

a) General Galvanizing

A batch process in which the parts to be galvanized are dipped in molten zinc (galvanizing of fabricated articles in accordance with BS 729).



Metallic Coating With Zinc Dust (mechanical plating/sherardizing)

A process by which suitably prepared small components are tumbled in zinc dust at temperatures below the melting point of zinc under appropriate conditions to develop a coating (BS 4921 for sherardizing).

b) Continuous Galvanizing

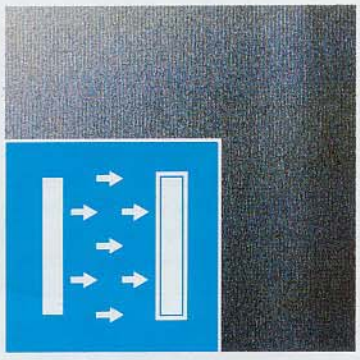
The continuous galvanizing of steel strip (BS 2989), wire (BS 443) and tube (BS 1387) which are immersed in molten zinc in an automatic plant.

Zinc Dust Painting

Process in which steel surfaces are coated using paints containing sufficient powder to develop a film which can conduct electricity.

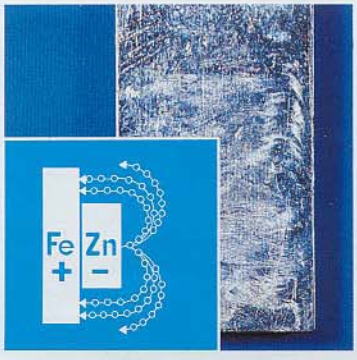
Zinc Plating (electrogalvanizing)

A zinc salt solution is used to electrolytically deposit a layer of zinc on a cleaned steel surface. Acid or alkaline electrolytes (some containing cyanide) can be used (BS 1706 and BS 3382).



Cathodic Protection

A method of corrosion protection in which a zinc anode is connected to the steel component in the presence of an electrolyte.



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. . . and in tabular form

PROCESS	Normal coating thickness [µm]	Alloying with the base	Composition of the coating	Processing method	After treatment	
					Normal	Possible
Hot Dip Galvanizing						
a) general galvanizing of iron and steel articles. BS 729.	50 – 150	yes	Iron-zinc alloy layers on basis steel usually with a zinc layer above them. Predominantly zinc layers on basis steel	Dipping in molten zinc	–	Overcoating also alloying*
b) continuous: steel strip galvanizing BS 2989	15 – 25	yes		Running through molten zinc	Chromate treatment	
– continuous hot dip galvanizing of steel strip	20 – 40	yes			–	
– galvanizing wire BS 443	5 – 30	yes			–	
Thermal spraying – BS 2569 Part 1	80 – 150	no	Coating of drops of zinc on film of oxide	Spraying of molten zinc	Sealing of penetrating coating	Overcoating
Zinc plating (electrogalvanizing)						
– individual baths BS 1706	5 – 25	no	Pure zinc coating	Zinc deposition by electrical current in aqueous electrolyte	Chromate treatment	Overcoating
– continuous process	2.5 – 5	no				
Metallic coatings with zinc dust						
a) Sherardizing BS 4921	15 – 30	yes	Iron-zinc alloy coating	Diffusion steel-zinc below Zn fusion temperature.	–	Overcoating
b) Mechanical plating	10 – 20	no	Homogeneous zinc coating possibly on intermediate layers of copper	Hammering of zinc powder by glass balls	Partial chromate treatment	Overcoating
Painting BS 4652	Thin coat 10 – 20 Norm coat 40 – 80 Thick coat 60 – 120	no	Zinc dust pigment with binding agent	Deposit by brushing, rolling, spraying, dipping	Top coating compatible with primary coating	–
Protection	High purity zinc anodes (99.995 %) can be used to sacrificially protect iron and steel structures that are immersed or buried in an efficient electrolyte. If the zinc anode is to function efficiently it is vital that it is always in good contact with the steel that it is protecting. The rate at which zinc anodes are consumed in sea water is about 12 kg/ampere – year. On bare steel the average current density is about 0.10 A/m^2. Therefore, to protect 100 m^2 of bare steel requires approximately 120 kg/year of zinc anodes.					

* Alloying of a zinc coating by specific heat treatment especially with galvanized steel strip.