

Hot-Dip Galvanized Steel Overview

Providing Maintenance-Free Corrosion Protection of Our Infrastructure for Generations

What is Hot-Dip Galvanizing?

A coating of naturally occurring zinc metallurgically bonded to steel to protect it from atmospheric corrosion for 75 years or more with no maintenance.

How Does It Work?

The zinc corrodes at a very slow rate, protecting steel bridges, sign structures, guide rail, light poles, water/wastewater facilities, power generation stations, distribution poles, and much more for generations.

Benefits of Utilizing Galvanized Steel

Durable Hot-dip galvanized steel delivers maintenance-free corrosion protection for 75 years or more, in even the most corrosive atmospheres (industrial - plant emissions, urban - vehicle exhaust, northern - road salts). The zinc coating is actually harder than the steel it is protecting, and will retain a consistent matte gray finish throughout its service life.

Economical Because galvanizing requires no maintenance, the initial cost of a bridge, mass transit station, sign structure, etc. is the final cost. Therefore, hot-dip galvanized steel is the lowest life-cycle cost corrosion protection system available, far more economical than painted steel or concrete, which require frequent and costly maintenance according to a predictable cycle.

Recyclable Zinc and steel are 100% recyclable, without the loss of chemical or physical properties. Galvanized steel has been used to protect automobile and truck body panels for decades, because it protects the consumer's investment and there is no end-of-life environmental impact.

Safe Hot-dip galvanizing makes steel structures (handrail, guide rail, bridges, signs) safer. The galvanizing process applies zinc on difficult to reach corners and the inside of poles, box girders, towers, and handrail; places where corrosion usually begins on painted and unprotected steel. Additionally, galvanized reinforcing steel in concrete bridge decks corrodes slowly and in such microscopic form it does not cause the spalling of concrete like epoxy coated and black reinforcing steel can. Zinc is a natural metal (27th most abundant in the Earth's crust), safe, healthy, and a necessary part of our diet, with a recommended daily allowance (RDA) of 15 mg.

Sustainable The energy input over the life (60-year study)¹ of hot-dip galvanized steel is less than half of painted steel. There is no energy, material, or labor input for maintenance throughout the project lifetime (including no unnecessary transportation of material and labor to the project site for each maintenance cycle). The global warming potential (CO₂) of hot-dip galvanized steel is one-third, and the acidification potential (SO₂) is less than half of painted steel.¹ In another study, the primary energy demand of hot-dip galvanized steel is less than 50% of that for concrete.² A third study reported galvanizing a 550-ton parking garage saves the environment over 63 tons of CO₂ emission and the impact to water (eutrophication) is just 30% of that for a painted garage.³

Available The factory controlled galvanizing process is independent of weather. Steel can be coated with zinc 24/7/365 and galvanizers are in virtually all geographic areas of the country.

Hot-Dip Galvanizing Maximizes Taxpayers' Investment in America

- **No maintenance** costs
- **Aesthetically pleasing**, consistent appearance
- **100% recyclability** at the end-of-life
- **Safe** structural steel, handrail, and deck
- **Sustainable** project lasting 75 years or more
- **Immediate availability** for construction in any weather condition

¹ VTT Building & Transport Study ² GaBi Database ³ Technical University of Berlin