

GALVANIZED STEEL

Philip G. Rahrig, Executive Director at the American Galvanizers Association, www.galvanizeit.org, contributed this month's [column](#), pertaining to galvanizing.

How does galvanizing protect steel from corrosion?

Zinc metal used in the galvanizing process provides an impervious barrier between the steel substrate and corrosive elements in the atmosphere. It does not allow moisture and corrosive chlorides and sulfides to attack the steel. Zinc is more importantly anodic to steel—meaning it will

ing 850 F molten zinc where the steel and zinc metallurgically react to form three zinc-iron intermetallic layers and a pure zinc layer

—the newly galvanized steel is sight-inspected (if it looks good, it is), followed up by measurement of coating thickness with a magnetic thickness gauge

Are there any environmental impact when the zinc coating sacrificially corrodes? Is zinc a safe metal?

There are no known studies to suggest zinc corrosion products cause any harm to the environment. Zinc is a naturally occurring element (25

Should I be concerned when galvanized steel comes in contact with other metals?

Zinc is a noble metal and will sacrifice itself (i.e. corrode, give up its electrons and create a bi-metallic couple) to protect most metals. So, it is recommended to insulate galvanized steel so that it doesn't come in direct contact with dissimilar metals. Rubber or plastic, both non-conductive, are often used to provide this insulation.

What is the difference between hot-dip galvanizing after fabrication and continuous hot- galvanized sheet?

The process steps are similar but the production equipment is very different. After fabrication galvanizing is a more manual process where structural steel (fabricated

th most abundant element in the earth), and necessary for all organisms to live. It is a recommended part of our diet (RDA 15 mg) and necessary for reproduction. It is used in baby ointments, vitamins, surgical instruments, sunscreens and cold lozenges.

corrosion products off as they develop, inflating the corrosion rate of zinc. This lab test is not reflective of real-world performance of zinc coatings.

What causes wet storage stain and how can it be prevented?

Zinc on newly galvanized steel is very reactive and wants to form zinc oxide and zinc hydroxide corrosion products that eventually become the stable zinc carbonate. When galvanized steel is tightly stacked or stored in wet boxes that don't allow for free flowing air, the zinc forms excessive layers of zinc hydroxide, otherwise known as wet storage stain. Most wet storage stain can be easily removed with a cleaner or nylon brush. To prevent wet storage stain, store galvanized steel indoors or block it so that there is ample free flowing air between each galvanized article.

Why do galvanized steel appearances differ from project to project and galvanizer to galvanizer and is there any difference in the corrosion protection offered by the different appearing coatings?

The steel chemistry is the primary determinant of galvanized coating thickness and appearance. Continuously cast steel produced by the steel companies has a wide variety of chemistries, thus the different coating appearances.

There are several different additives that galvanizers may put in their zinc kettle to enhance the coating appearance by making it shiny, spangled or matte gray.

The appearance of the coating (matte gray, shiny, spangled) does nothing to change the corrosion protection of the zinc coating.

How well does galvanized steel perform in permanent water immersion?

Galvanized steel performs very well in many complete