

GALVANIZING INSIGHTS

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Proper Repair Ensures Galvanizing's Long Life

A galvanized coating has a tough reputation, literally. But even the toughest coating can take a beating. When a galvanized coating has been damaged due to welding or severe abrasion it's important to properly touch-up and repair those areas.

Galvanizing provides sacrificial, or cathodic, corrosion protection to the base steel. The zinc actually migrates and preferentially corrodes at areas where the steel is exposed, such as small scratches and drill holes.

However, at larger damaged areas, zinc still attempts to provide this cathodic protection, but cannot always protect the exposed steel. Being unable to do so, the zinc is consumed at a faster rate than normal, and the useful life of the galvanized coating is decreased.

Proper touch-up and repair ensures the galvanized coating provides uniform and consistent corrosion protection.

There are several methods of repairing a galvanized coating acceptable under ASTM A 780 specification for *Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings*. Zinc-rich paint, zinc based solders and zinc metallizing are all effective methods of touching up galvanized steel.

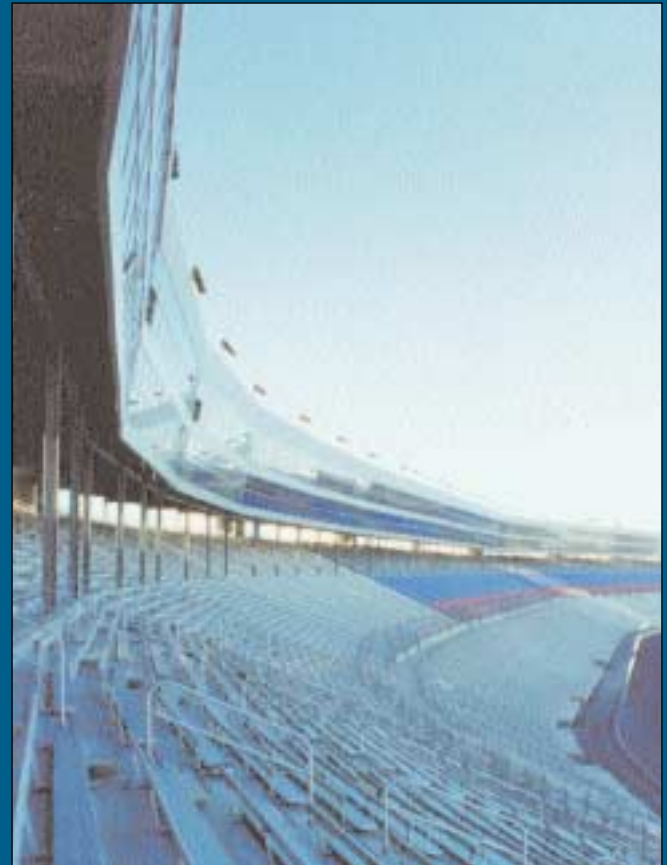
Prior to any touch-up, the steel and surrounding zinc must be clean, dry and free of any oils or grease. Remove any weld spatter, either by blast cleaning or chipping. It is very important for the uncoated area to be clean in order for the touch-up material to properly adhere to the steel.

Zinc-Rich Paints

When using zinc-rich paint to repair a damaged area, the paint must contain at least 65 percent zinc in order to conform to A 780. The more zinc in the paint, the more cathodic protection is provided to the steel underneath the paint.

Zinc-rich paint is typically the easiest method of touch-up, although it doesn't provide very good abra-

And The Winner Is . . .



The Texas Motor Speedway won the AGA Most Distinguished Project award in the "1997 Excellence in Galvanizing Awards" competition. Inside this issue of "Galvanizing Insights" the winners in all seven categories are featured. These exceptional examples of galvanizing highlight the best projects of the year.

sion resistance and may not look as aesthetically appealing as the other two methods of repair because the paint will weather differently than the galvanized coating.

Zinc Solders

When using a zinc solder to repair a damaged area special care should be taken not to burn off the surrounding zinc coating. Apply the repair stick evenly to obtain the appropriate mil thickness.

Continued on Page 3

Not All Zinc Coatings Are Created Equal

Dear Dr. Galv:

What is the difference between a G90 galvanized coating and an A 123 galvanized coating?

This is a little bit of a trick question. First, G90 isn't a specification, it's a coating designation within ASTM specification A 653 *Standard Specification for Steel Sheet, Zinc-Coating (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*. This specification pertains to steel hot dip galvanized in the continuous process and then fabricated.

ASTM A 123 *Standard Specification of Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products* refers to products which are fabricated and then hot dip galvanized using the batch process.

The two methods of hot dip galvanizing, continuous and batch, produce very different products with different characteristics.

In the most common continuous galvanizing process, the steel in sheet, strip or wire form is passed through the cleaning tanks and the zinc bath at a very rapid speed. The speed determines the coating thickness and can range upwards of 200 feet per minute. This speed, in combination with slight additions of aluminum to the zinc bath, help suppress the formation of zinc-iron alloy layers. The result is a thin coating of almost pure zinc.

A G90 designation means the total amount of zinc on both sides of the steel is 0.90 oz./sq.ft., or 0.45 oz./sq.ft. per side (0.75

mils per side)

When galvanizing in the batch process the pre-fabricated products (i.e.: beams, pipes, etc.) are individually dipped in each cleaning tank and then into the zinc bath. Depending on the size of the piece, it is immersed in the zinc bath long enough to develop a series of inter-metallic zinc layers capped by a free-zinc layer.

The minimum coating thickness for A 123 galvanized products is 2.3 oz./sq.ft. on all surfaces of the part (3.9 mils per side), although the nature of the process makes thicker coatings more common.

The useful life of zinc coatings is directly proportional to the thickness of the zinc coating. Figure 1 depicts the service life of zinc coatings in different environments. Because batch galvanizing has a thicker coating, it provides corro-

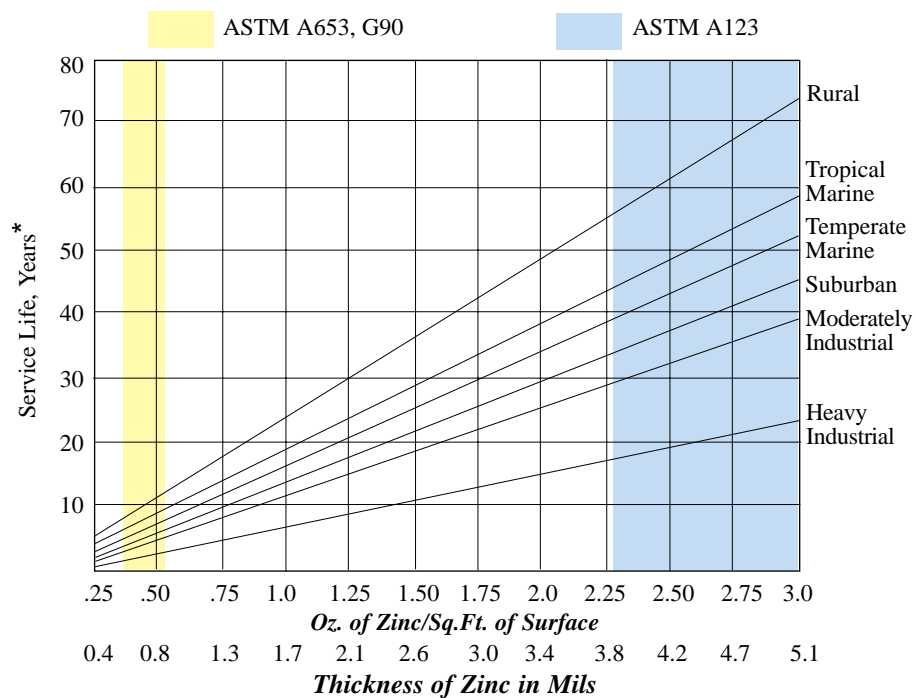
sion protection longer than continuous galvanized coatings. In order to extend the life of G90 products, continuous galvanized steel sheet is often painted to increase the barrier protection.

Both coatings provide barrier and cathodic protection, a benefit unique to galvanizing. And both coatings protect steel from rust better than other corrosion protection systems.

However, the coating thickness difference is significant. Each type of galvanized product, batch or continuous, has applications where it would be best utilized. Be sure the specified coating provides the appropriate thickness necessary for the application.

Questions for Dr. Galv should be directed to: Dr. Galv, American Galvanizers Association, 12200 E. Iliff Ave. Suite. 204, Aurora, CO 80014, 800-HOT-SPEC, fax 303-750-2909, e-mail aga@netway.net.

Figure 1. Service Life vs. Zinc Coating Thickness



Touch-Up and Repair Important for Damaged Galvanized Surfaces

Continued from Page 1

Zinc solders may prove more difficult to apply than paint or metallizing because the steel must be heated first, which can be tricky if the piece is already installed. Due to the amount of zinc in solders, they have a very good visual match over the life of a structure and adhere very well to the steel's surface.

Metallizing

Metallizing is the process of repairing galvanized steel by spraying droplets of molten zinc on to the steel. When metallizing, it's important to achieve a uniform texture, avoiding lumps and coarse areas.

Metallizing provides the best level of abrasion resistance, but does require application expertise to achieve a uniform coating. When applied correctly, metallizing comes the closest to matching the corrosion protection of the original galvanized coating.

All three touch-up methods, when utilized according to A 780, provide good corrosion protection to the damaged coating. The preferred method of touch-up depends on a variety of factors including, field limitations, environmental conditions, cost, and how the galvanized product will be used.

Properly repairing areas of damage on a galvanized coating is the best way to ensure the coating provides the highest level of corrosion protection possible.

Repair methods and materials should always conform to ASTM A 780.

For a copy of ASTM A 780 and a list of suppliers of touch-up and repair materials, call 800-HOT-SPEC.



Zinc rich paints provide the simplest method of repair to damaged galvanized coatings. They are easy to apply, as shown above.



Zinc solders provide the best color and aesthetic match between the repaired area and the original galvanized surface.



Metallizing provides the closest match in terms of corrosion resistance and abrasion resistance to the original galvanized surface.



Congratulations
Gerhard
Zinserling!

Mr. Zinserling, an architect from Chicago, Ill., won a zinc-coated putter just for filling out the survey in the last issue of *Galvanizing Insights*. Thanks to everyone who took the time to complete the survey. We appreciate your input!

Got Questions?

We have answers! We can help answer your toughest galvanizing questions, from design to inspection, applications to specifications and everything in between. Our technical staff is here to assist you. Just call 1-800-HOT-SPEC, fax us at 303-750-2909, e-mail us at aga@netway.net, or stop by our web site at <http://usalink.net/aga>. No question can stump us!

Galvanizing Insights is a publication of the American Galvanizers Association, a non-profit trade association for the after-fabrication, hot dip galvanizing industry. Published quarterly, *Galvanizing Insights* is designed to help specifiers, engineers, architects, fabricators, and end-users better understand, specify and utilize hot dip galvanizing. Please direct any questions or comments regarding *Galvanizing Insights* to: Shalea Bucheit Hardison, Editor, *Galvanizing Insights*, 12200 E. Iliff Ave. Suite 204, Aurora, Colorado, 80014, 303-750-2900, or e-mail at aga@netway.net