Removing the Pain from Painting Galvanized Metal

Galvanized metal presents unique coating challenges due to its protective zinc layer. It's a popular substrate for doors, railings, pipes, and overhead structures. When properly coated with a topcoat, also called a duplex system, the metal's lifespan can be extended for decades. Here's what you need to know to get long-lasting results when coating galvanized metal surfaces.

Get to Know Galvanizing
Galvanizing involves coating steel or iron with zinc, which provides a "sacrificial" layer that corrodes instead of the underlying metal. This protective coating can last for decades in mild environments but degrades quickly in harsh conditions. Zinc can be depleted in less than a month in very aggressive environments.

Different galvanizing methods (such as hot-dip, continuous, or electrogalvanizing) can affect the surface appearance depending on the size of the zinc crystals. This is known as its "spangle." The main concern when coating galvanized metal is preparing the substrate surface for adhesion.

Some manufacturers apply pre-treatments, temporary coatings, and passivation treatments like hexavalent chromium in solution. The manufacturer should disclose whether these treatments or coatings have been used and remove them (at no cost to the contractor) before delivery. They will prevent good surface adhesion.

Surface Challenges
Newly galvanized metal can be challenging to paint because its smooth, shiny surface lacks an anchor pattern for coating adhesion. Surface contaminants, such as oils or chromate treatments, may have been used during manufacturing. These contaminants can prevent adhesion or cause early failure. Be sure to thoroughly prepare the surface, including removing oils, white rust (zinc oxides), and chromate residues. New surfaces may also need to be deglossed.
During a recoating project, the previous coating likely failed for the reasons listed above. In those cases, the old coating should be sandblasted or sanded to accept a new coating properly.

Three Stages of Weathering
Next, consider the metal's stage of weathering. Galvanized metal undergoes three weathering stages:

1. **Newly Galvanized (0-48 hours)**: A shiny zinc surface reacts with oxygen, forming zinc oxide.
2. **Partially Weathered (48 hours-2 years)**: A porous layer of zinc hydroxide may form, offering little protection.
3. **Fully Weathered (6 months-2 years)**: Zinc carbonate develops, creating a dull gray protective layer.

Surface preparation will vary based on the stage of weathering. At a minimum, ensure there are no previous coatings, oils, or pre-treatments that could prevent adhesion.

Coating Selection
Different coatings are suitable for galvanized surfaces depending on the environment, including:

- **Mild/Moderate Conditions**: Latex or waterborne acrylics are ideal for non-abrasive areas like ceilings and ducts. High-performance latex products can be used for higher traffic or humid environments.
- **Aggressive Conditions**: Epoxy coatings offer durability for high-traffic industrial areas and may require a polyurethane topcoat for outdoor use and to prevent chalking. For extreme conditions, a vinyl wash primer can be applied under the epoxy for additional protection.

What About Primers?
One of the main rules of top coating is not to apply alkyds directly over unprimed galvanized surfaces. It will cause a reaction that causes coating failure.Use a primer.Cementitious primers made from linseed oil and Portland cement have shown excellent results on galvanized surfaces. However, these are difficult to source. Choose a primer formulated for galvanized metal, and for best results, do not add any tinting.

Specialty Coatings
Once primed, it's time to topcoat. These specialty coatings have proven effective on galvanized metals:

- **Dry Fall Paints**: These coatings dry quickly and reduce overspray cleanup, making them a good choice for overhead areas.
- **Aluminum Paint**: Recommended for areas with moisture exposure, such as piping, where abrasion resistance is less critical.
- **Bituminous Coatings**: Provides water resistance and is suitable for buried or non-sun-exposed structures.

MPI is Here to Help
When choosing a coating system for galvanized metal, visit these sections of the MPI Approved Products List for ideas and recommendations:

- Waterborne acrylic primers (such as **MPI #134**) have shown good success in interior applications. They offer lower odor and less danger from flammable solvent fumes during application.
- **MPI #135** is a solvent-based material designed to resist the saponification commonly associated with alkyds applied to galvanized metals.
- **MPI #101** is used with the epoxy system.