

Coated Steel Buying Guide

In this guide, we'll explore the various types of galvanized steel, focusing on Worthington Steel's offerings, specifically hot-dipped galvanized and galvanized steel. We aim to provide you with the foundational knowledge to navigate the buying process confidently, ask the right questions, and select a quality galvanized steel processor that meets your business needs.



Why Worthington

Partnering with Worthington Steel simplifies your supply chain. You get the exact steel you need, with the correct specs, quantity, and timing. Our metallurgists collaborate with you to understand your process and source from the best mill for your requirements. Whether it's hot or cold roll, we process and coat it to match your needs with flexibility in gauge, coating weights, and finishes. This isn't off-the-shelf steel-it's custom-made, and our experts support you every step of the way. Let's dive into the world of galvanized steel together!

Key Questions Explored

- What is Galvanized Steel?
- What are the types of Galvanized Steel?
- What are the advantages and disadvantages of each galvanized steel type?
- What coating weights are available, and how do you determine the right one?
- How do you protect your galvanized steel coils, cut-to-length sheets, and finished products?
- How do you know you are purchasing a quality galvanized steel product?

What is Galvanized Steel?

Galvanized steel consists of two layers: the steel and the protective zinc coating adhered to it. The base steel is referred to as the "steel substrate." The substrate can be hot-rolled or cold-rolled steel, depending on the application's needs. This zinc coating adhered to the surface acts as a "sacrificial" layer, taking the beating from the environment while protecting the steel beneath it from corroding. While the zinc will eventually wear off, it will offer protection for many decades.

Types of Galvanized Steel and Their Benefits

When we say, "type of galvanized steel," we refer to the process used to apply the zinc coating. Different methods exist for adhering the zinc to the steel, and there are different points at which the coating is applied. Worthington Steel produces hot-dipped galvanized steel and galvannealed steel.



1 Hot-Dipped Galvanized Steel

- **Process:** The zinc coating is applied to the entire steel coil on a continuous line before it ships to the customer, where it is stamped or roll-formed into their products. The coating is applied by passing the steel coil through a molten zinc pot. As the steel exits the pot, air knives control the coating weight. More pressure from the air knives results in a thinner coating, while less pressure results in a thicker coating.
- **Benefits and Tradeoffs:** It is economical, efficient, and offers a wide range of coating thicknesses and differential coatings. It is ideal for most applications due to its consistent coating adherence and uniform quality while remaining cost-effective. Galvannealed steel is ideal for painted products, but galvanized steel can also be used with a paint line designed for it.

2 Galvanneal

- **Process:** First, the steel goes through the traditional hot-dipped process. Then the steel enters an in-line induction unit. The annealing process promotes iron diffusion from the steel substrate into the zinc coating. This process results in a composite material rather than the zinc sitting atop the substrate.
- **Benefits and Tradeoffs:** Better for painting adhesion due to the rougher surface of the composite material, and better for weldability due to the increased conductivity of the iron in the coating. Not recommended for non-painted applications.

3 Electro-Galvanized Steel

- **Process:** The coating can be applied after parts/products are made, but is usually applied when the steel is still in coil form. The steel is put into a bath, and an electrolytic process coats the steel with zinc. Zinc is applied to one side initially, and then to the other later in the process. The process is considerably slower than hot dipping.
- **Benefits and Tradeoffs:** It delivers exceptional coating precision, including the ability to apply differential coatings with significant variation between sides. However, the process is considerably slower and more costly than hot-dip galvanizing. For most uses, this level of specificity doesn't justify the increased cost.

2 Post-Dip Galvanized Steel

- **Process:** The part is formed and then dipped into a zinc bath.
- **Benefits and Tradeoffs:** Ensures zinc coverage over welds, though coating weight control is far less precise, resulting in uneven coating across the part. Used when precoated material cannot be used, or when customers prefer not to have a bare edge.



Coating Weights

What are standard coating weights, and how are they used?

“Coating weight” refers to the amount of zinc applied to steel, measured in ounces per square foot. G30 (.3 oz/ft²) is the lightest, used for indoor applications with minimal exposure to moisture, such as garage rails. G60 and G90 are the most common—G60 for moderate outdoor use and G90 for higher corrosion resistance in fencing, utility poles, and automotive parts. G400, the heaviest, protects steel constantly exposed to weather, salt, or harsh conditions, such as in transportation or ground contact. Other less common weights include G115, G160, G185, and G210.

How long do different coating weights last?

Heavier coating weights provide proportionally more protection—a G90 lasts about one-third longer than a G60 in the same environment. Actual lifespan varies widely with conditions: products endure far longer in dry climates than wet, salty ones. While we can explain the relative durability between coating weights, exact service life depends on each product’s exposure to moisture and corrosive elements.

How do you choose the right coating weight for your product?

Because zinc is costly, applying enough protection without excess is essential. We recommend following established industry coating standards to ensure quality expectations are met at the lowest cost.

How to handle and store your galvanized steel

Handling and Storage

Handle with care: Dropping, dragging, or sliding can scratch galvanized steel’s zinc coating. While minor marks don’t affect performance, customers expect a clean finish. Store in a dry, ventilated space to prevent oxidation, which dulls the surface and makes products look aged.

Adding ChemTreat

Worthington offers two Chem Treat options, CHR6 and RoHS CHR3, to protect galvanized steel from premature oxidation during transportation and manufacturing. With properly ventilated storage practices, these passivation coatings provide additional protection for up to six weeks before washing off.

The Benefits of Adding an Acrylic Topcoat

Worthington offers an acrylic topcoat, which can act like a solid lubricant in roll forming, and it delays oxidation, keeping your products looking newer, longer. Worthington's outdoor testing station monitors samples of galvanized steel with various coatings in real-time, showing that acrylic significantly delays the onset of white rust and maintains a uniform metallic brightness much longer than Chem Treat.



Quality Control and Testing

– Choosing the Right Supplier

The Importance of Adherence

Proper zinc adherence is critical to galvanized steel quality. Coils with poor adherence may look fine, but the coating flakes during forming, causing costly disruptions. That's why supplier testing is vital. Worthington Steel ensures adherence by controlling every factor in-house with our coating lines and a dedicated team of metallurgists.

System Alignment and the Olson Cup Test

Worthington uses multiple quality safeguards to ensure processing parameters are aligned and within standard tolerances. One such safeguard is the Olson cup test, which stretches steel with a ball to confirm zinc coating adhesion. Flaking during this test signals poor adherence. We test both sides and across the coil's width to ensure consistent quality.

Ensuring Standards and Specifications

Worthington follows ASTM A653 for non-automotive applications, ensuring efficient, consistent quality while allowing adjustments to properties, dimensions, coatings, and chemistry. We also meet specifications beyond A653, confirming intent since deviations may add cost. Each automotive OEM has unique specifications, and Worthington specializes in meeting these requirements.

Ready to know more?

Wondering if there's a better way?

Talk to an expert! Call our sales & support team now at 1-800-944-3733 or visit us at WorthingtonSteel.com/FlatRolledSteel.

