

# Hot-Dip Galvanized **Food and Beverage Processing Facilities**



**Safe**

**Durable**

**Sustainable**

**Maintenance-Free**

# Hot-Dip Galvanized Food & Beverage Products

With a daily grind riddled with forklifts, pallets, chemicals, washdowns, and moisture, food and beverage processing facilities are some of the toughest, most corrosive environments imaginable. Strong, durable protection for structures, stairs, and storage racks is imperative to keep things flowing smoothly and safe from any corrosion contamination. Hot-dip galvanized steel provides the right mix of resilience and toughness to keep steel corrosion-free for decades.

## DURABILITY

Whether rough, physical abrasion or slow, insidious deterioration over years of exposure to moisture and chemicals, hot-dip galvanized steel provides the most comprehensive protection against corrosion – inside and out.

The zinc coating developed during the galvanizing process creates a barrier which protects steel against the corroding effects of moisture and chemical abrasion. With rigid regulations for cleanliness, food processing plants are exposed to more than the average share of harsh chemical cleaners and water. In his article "Making Corrosion Protection Standard Operating Procedure," author George Dauberger explains industrial food processing environments sometimes require additional protection from corrosive elements such as solvents, salts, alkali, and oxidizing agents, and the tough barrier protection of a galvanized coating will hold up for years against brutal processing environments.<sup>1</sup>

"Water, water everywhere. That's the normal condition of a refrigerated processing facility. If it's not in puddles or beaded on pipes, it's thick in the air," Mike Pehanich, contributor to *Food Processing* magazine writes.<sup>2</sup> Not only do processing facilities have to worry about chemical corrosion from daily cleanings, they also must worry about the higher levels of condensation present in cooling facilities. Hot-dip galvanized steel has stood strong against the harshest salt-water environments imaginable – used on piers and bridges exposed daily to lapping brine and salt-water permeated air. Hot-dip galvanized steel can easily protect pipes, storage racks, and structures from drips and condensation within a processing facility.



**The world's largest producer of mozzarella cheese, LePrino Foods, chose hot-dip galvanized steel for the Waverly, NY plant to eliminate contamination.**



**This hot-dip galvanized ice facility received a state health department rating of 100 percent. This gave Bristol, Virginia's Eagle Ice Plant, a much higher market share.**

**"Hot-dip galvanized steel has stood strong against the harshest salt-water environments imaginable—used on piers and bridges exposed daily to lapping brine and salt-water permeated air."**

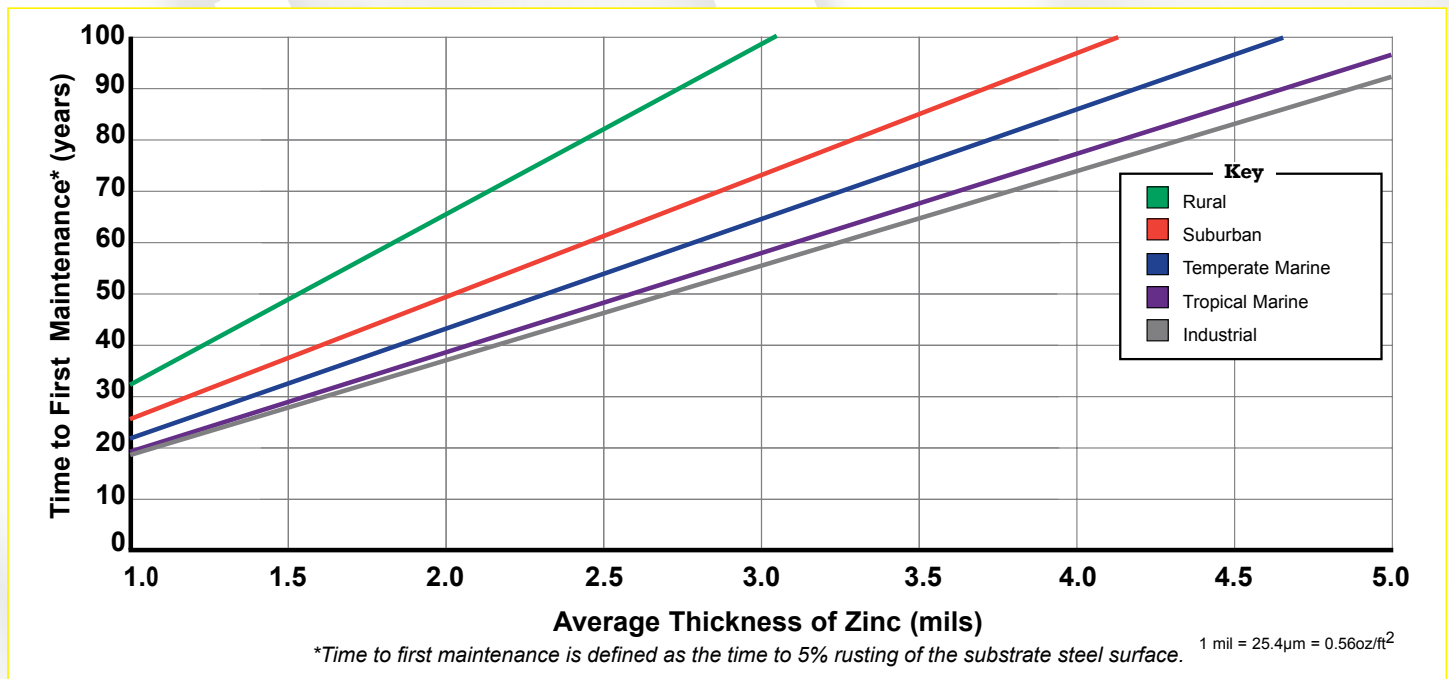
Though the temperature of the air can have a significant effect on the corrosion rate of some materials, galvanized steel does not show significant differences at either very low temperatures (below -40 F) or at very high temperatures (above 150 F and below 390 F.) Studies regarding the effect of low temperature environments on HDG steel indicate minimal change in the behavior of the galvanized coating, making the system well-suited to refrigerated climates. Galvanized steel products have performed uninterrupted for decades in chilly, corrosive environments, even in the frigid climes of places like the Arctic Circle—proving shelving and structural galvanized steel utilized in refrigerated facilities will be able to stand the test of time.

The Time to First Maintenance Chart (*Figure 1*) shows the durability of hot-dip galvanized coatings in five environments representing atmospheric conditions. According to ASTM A 123, a minimum coating thickness of 3.9 mils is required for steel 1/4" thick, meaning even in the most harsh environment (Industrial), first maintenance will not be required for approximately 73 years.

<sup>1</sup> Dauberger, George. "Making Corrosion Protection 'Standard' Operating Procedure." Articles.DirectorM.net, Interaction Media Group.

<sup>2</sup> Pehanich, Mike. "Controlling Moisture in the Plant." Food Processing, Allbusiness.com.

Figure 1: Time to First Maintenance Chart



John Soules Foods owns and operates a 100,000 sq. ft. USDA inspected processing facility. HDG has been used on this staircase providing the additional abrasion resistance needed.

The barrier protection offered by galvanized steel is only half the story, however. The zinc coating also protects the steel cathodically – meaning nicks and scratches exposing the substrate steel will be protected from rust by the sacrificial properties of the surrounding zinc. This makes galvanized steel particularly well-suited for the sometimes rough food processing environment, where careless forklift maneuvering and hasty movement of pallets can easily ding and scratch stairwells, counters, and storage racks. Dauberger articulates hot-dip galvanized steel can protect surfaces that have been “breached due to cuts, scrapes, or other damage” by significantly slowing the corrosion.

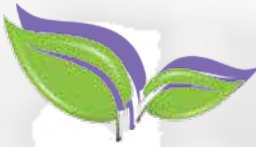
### SAFETY

Corrosion creates an unsafe and dangerous environment for food handling, so the durability of galvanized steel means there will be no fear of contamination for years to come. Rusted storage structures risk contaminating the food as well as creating a dangerous work environment for facility employees. As rust gnaws at steel, the metal becomes increasingly weak – and if one support or piece of the structure is weakened, the whole form is at risk of failure. Utilizing a tough galvanized coating will protect the structures within a facility, while the safe, natural zinc poses no threat to the products transported through the plant.

**“Rusted storage structures risk contaminating the food as well as creating a dangerous work environment for facility employees.”**

### MAINTENANCE-FREE

Dauberger explains, along with water, petrochemical, and mining facilities, food and beverage processing facilities require superior corrosion protection, and “corrosive elements can cause millions of dollars in damage through lost time, materials, and labor.” Facility owners do not have the time or money to waste on repairs – much less to waste on replacing structures disabled by corrosion. A rusted stairwell or rack must be removed from service. It hinders the speed of production, making it a costly waste of time. With the corrosion protection of hot-dip galvanized steel, there will be nothing slowing down the flow of food and beverages.



**"...utilizing 100% natural, recyclable zinc is an earth-friendly solution for corrosion protection."**

## **SUSTAINABILITY**

With the green-centric mindset of today's consumer, processing plants are paying more attention to the sustainability of the structures and processes used in their facilities. According to a Purchasing Plans Study conducted by the Packaging Machinery Manufacturers Institute (PMMI), improved efficiency and addressing energy use and greenhouse gas emissions were among the most frequent concerns of 30.5% of those polled, while 24.2% noted sustainability as a concern.<sup>3</sup> It may be a small step toward 'greening' your operation, but utilizing 100% natural, recyclable zinc is an earth-friendly solution for corrosion protection. Zinc is an element essential to all life, and natural in the Earth's crust. Therefore, galvanized structures, utilizing zinc, has little impact on the environment.



**These hot-dip galvanized gates are used in the Legacy Farm in Plainview, Texas. They are a sustainable and durable solution to corrosion protection in an agricultural environment.**

<sup>3</sup> Green Cover Story, "Sustainability." *Food Processing Magazine*, Foodprocessing.com.



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# Case Studies

## The Raymond Corporation Pallet Truck - Worldwide

As a leader in pallet truck manufacturing in North America, The Raymond Corporation was looking to build a product to meet the harsh requirements of the food processing industry. Repeated entry and exits from the freezer, frequent exposure to wet and/or caustic materials, and the need for frequent spray downs to comply with FDA regulations all concern buyers of forklifts for food plants and warehouses.

Raymond's design and manufacturing teams in Greene, NY and Muscatine, IA partnered with an American Galvanizers Association member to optimize the truck for improved performance in harsh food environments. Truck parts are designed to have a smooth surface with increased heat dissipation and drainage holes to avoid zinc build-ups. Galvanizing provides a thick uniform coating for the forklift. The galvanizing process, combined with other enhancements to pins, bushings, and protection of the electrical system improved the durability and capabilities of the pallet trucks.

Hot-dip galvanizing (HDG) became a compelling feature for Raymond customers, with clear benefits. HDG extends product life in environments where wash down is required, reduces downtime caused by corrosion damage, and lowers the overall cost of ownership.

By offering this Extreme Environment Corrosion Package on three of its most popular pallet trucks, Raymond covers the full range of needs from light utility to heavy duty applications in food processing environments. Hot-dip galvanized steel has helped Raymond to establish the industry benchmark of corrosion protection for electrically powered pallet trucks.

## Quick-Chill Cooler Expansion - Delphi, IN

The Indiana Packers Corporation (IPC) invested \$70 million on this 160,000 square foot cooler and production capacity expansion, and more than doubled its workforce from 1,300 to 2,700. The facility required all metal building materials be aluminum, stainless steel, or hot-dip galvanized steel to comply with USDA food processing requirements. To protect their sizeable expansion investment, IPC wanted to choose a corrosion protection system that looked attractive and could easily withstand daily contact with corrosive elements. Beef and poultry production can be some of the most corrosive environments imaginable; but hot-dip galvanizing will protect against the corrosive elements, as well as the impact of working in a semi-industrial environment.

The expansion construction was performed in a compressed 6-month schedule and overcame weather delays at the remote location; but thanks to value engineering, including hot-dip galvanizing, the project was completed on schedule, saving the owner time and money. This project was recognized by the Associated Builders and Contractors as one of the nation's top construction projects for the quality and innovation of the design team. Hot-dip galvanizing was a large part of the initial success of the project, and with the longevity and durability of the coating, it will continue to be a prime factor in the project's success for years to come.



**This Raymond Corporation pallet truck utilizes the advantages of a thick hot-dip galvanized coating to combat the highly corrosive environments of food plants and warehouses.**



**This staircase belongs to the 160,000 square foot Quick-Chill Cooler, a facility that was hot-dip galvanized to protect it from the corrosiveness of chicken and beef processing.**

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## Buffalo Wild Wings - Bradley, IL

With gleaming rows of hot-dip galvanized racks lining the walls, Buffalo Wild Wings is ready to take on the corrosive food processing environment. Galvanized steel was specified because of the attractive appearance and durability of the coating, which the owners needed to withstand heavy-duty tubs nicking and abrading the surface of the shelving.

It was imperative the storage racks remain rust-free in the cool, damp environment of the storage facility. The zinc coating will protect the steel racks from rust and corrosion, thus protecting the stored materials from contamination.

The storage racks, sold under the name "Cooler Concept," have been specified hot-dip galvanized steel for more than seven years. Its proven durability under harsh environmental factors has led sales of the custom-made shelving system to grow more than 200% between 2006 and 2007. The galvanized shelves have been utilized in several Buffalo Wild Wings restaurants, as well as sites in the Miami Dolphins football stadium and the Washington Nationals baseball park.



**These hot-dip galvanized storage racks in Buffalo Wild Wings are protected from drips and condensation.**

## Bidart Dairy Milking Facility - Bakersfield, CA

With the construction of more than 500 dairies across the western U.S. on its resume, Structures Plus again selected hot-dip galvanizing as the corrosion protection system for the state-of-the-art Bidart Dairy. Utilizing heavy tubular steel for the columns, beams, and roof trusses, as well as traditional structural members for the perlines, handrail, milking stalls, and gates, Structures Plus and Bidart count on hot-dip galvanized steel to meet the USDA's tough regulations and California's rigid laws for safe waste disposal and environmental care.

Hot-dip galvanized steel plays an important role in dairy operations by providing a cost-effective, low maintenance, and durable coating to protect the complex. The zinc coating is natural and safe for milking cows and easily handles abrasions caused by loading and unloading cattle thanks to the coating's superior barrier and cathodic protection. Each day, the Bidart Dairy has the capacity to accommodate 12,000 cows and store 84,000 gallons of milk. The dairy is also capable of milking 280 cows simultaneously and shipping 15 truckloads of milk daily. As a result, dairymen around the world acknowledge the Bidart Dairy as the standard for design . . . to which hot-dip galvanizing is integral.



**Galvanized steel will protect this milking facility from the corrosive elements of the dairy industry.**

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