Q **Customers have contacted me in regards to the use of hot-dip galvanized steel in contact with food — can it be used safely? Do foods cause excessive corrosion of galvanized steel?**

A The answer to your two questions is both yes and no, respectively. Yes, it is safe for most foods to be in contact with zinc. No, most foods do not cause excessive corrosion of galvanized steel. There is really only one exception to these statements: acidic foods. Let's get into some specifics to completely answer your question.

The U.S. Department of Health and Human Services' 1997 Food Code, Section 4-101.15 Galvanized Metal, Use Limitation, reads: "Galvanized metal may not be used for utensils or food-contact surfaces of equipment that are used in contact with acidic food" [emphasis added]. Therefore, in accordance with the 1997 Food Code, the use of galvanized steel in contact with meat and non-acidic fruits and vegetables is acceptable. Additionally, the U.S. Department of Agriculture states, "Chrome, nickel, tin, and zinc (galvanization) platings will generally be acceptable for most appropriate applications" (Accepted Meat and Poultry Equipment, Food Safety and Inspection Service Directive 11220.1).

One of the largest beef production plants in the U.S., located in Plainwell, Michigan, demonstrates a wide use of galvanized steel throughout the plant. As reported in 1982, one of the company employees is quoted as saying, "If it weren't for galvanizing, we couldn't operate and maintain our margin of profit." Galvanized steel is used successfully throughout the plant for beams, columns, stairs, railings, kickplates, and overhead monorails.

The only restriction on the use of galvanized steel in contact with food arise if the food is acidic; acidic species are particularly aggressive to the corrosion of zinc coatings. When zinc is in contact with acidic foods and beverages, it is converted to zinc salts, which are readily absorbed by the body. Excessive levels of these salts can cause minor sickness in humans, though few illnesses have been reported when galvanized containers were used to store an acidic-based juice. However, this situation is the same as any other where galvanized steel would be in contact with an acidic environment. Zinc coatings do not perform well in highly

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acidic environments and should not be used.

Oftentimes, food is stored in containers made of plastic or other materials, so direct contact between food and galvanized steel never occurs. In these situations galvanized steel is a very suitable application. Documented applications of this include bread cooling racks and pallet racks in a freezer. Galvanized steel has also been used as a coating for counter tops in restaurants and bars in Europe and the United States.

Galvanized steel performs very well in food applications mainly because they are located inside and sheltered from normal atmospheric exposure. These sheltered conditions promote maximum service life for galvanized steel. Therefore, galvanized steel is a very safe and effective way to provide corrosion protection in environments where there is food.