Earnest

Fastener Concepts

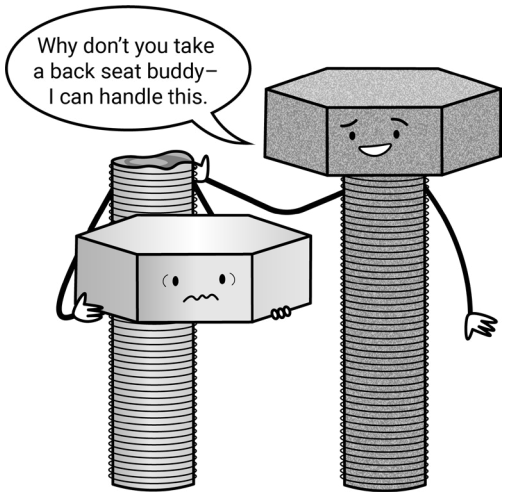
What a Flake!

The Benefits of Zinc Flake Coating

Finishing Touches

A fastener's finish is an important aspect of choosing the right parts for the job. The right finish will protect the fastener from the environmental elements of the specific application. Zinc is a particularly popular finishing material. It's a cost-effective material with a wide breadth of application processes available. While zinc always offers high corrosion resistance to the fasteners' base steel, the way in which the finish is applied effects its advantages in certain settings.

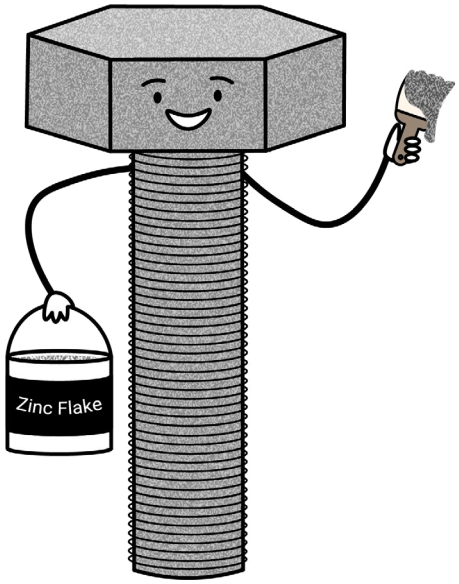
Up until the 1970s, electroplating was the standard for applying a zinc finish to a fastener. This method effectively applies a thin even coat, which protects the pieces from corrosion with a shiny metallic coat. But part of the process introduces a huge margin for error–the chance of hydrogen embrittlement. The first step in electroplating is giving the fasteners a chemical bath, which can make their structure imperceptibly vulnerable to breaking [See our article *How to Keep Your Head On: Avoiding Hydrogen Embrittlement in Zinc-Plated Fasteners*]. This leaves the fastener without any visible damage; hydrogen embrittlement is often not caught until the fastener's head pops off in application. As technology advanced in fields such as automotive, agriculture, construction equipment, and heavy trucking, fasteners were under more extreme environmental pressures. The risk hydrogen embrittlement posed was too great to continue using electroplated pieces in these applications. But these industries needed a new finish that offered the protection of zinc without the risk of suddenly breaking–that's where zinc flake comes in.



Confidence in Coating

Zinc flake coating is an increasingly popular style of finish, and it's not hard to see why. It does not use hexavalent chromate, so it's more environmentally safe. It's also safer for the end user, because skipping acid pickling saves the structural integrity from hydrogen embrittlement. Instead, the fasteners are prepared for coating with a water-based cleaning solution and shot with tiny steel balls to remove any grease, dirt, or rust. They're then covered in the coating material made of zinc and aluminum flakes–reminiscent of a silver paint.

"Dip and spin" is a common application method for zinc flake coating. Fasteners are placed in a basket and dipped into a vat of coating liquid. Then a machine spins the basket to remove the extra material, ensuring a thin and even coat. Zinc flake coating tends to leave a thicker deposit than electroplating, which can lead to problems with thread fit and recess fill. But the thicker deposit offers higher corrosion protection, so finding the correct balance is project specific.



The coating techniques come in a variety of form factors, which allow for more control over the final products' characteristics. Depending on the brand and formula of coating, one can control the color, level of corrosion resistance, and coefficient of friction modifier. Because of the variables involved, it is important to find an applicator licensed in a reputable zinc-flake brand such as Geomet, Magni, Delta Protekt, or Dorrltech.