WHAT IS ZINC PLATING?
Zinc plating is a tool used in combating corrosion of steel. Essentially, you can think of plating as a double protection system from corrosion for steel parts. Continuing research has developed a wide range of options regarding this protective coating. In many industries, zinc plating is standard on all parts.

HOW DOES IT WORK?
The zinc corrodes first sacrificing itself for the benefit of the steel. (This is also known as cathodic protection.) A metallurgical bond is formed between the zinc and steel forming an iron rich alloy with tenacious bond. This protective layer is commonly known as “white rust”. A zinc plated part can either be left unpainted where it will form its own protective oxide layer, treated with a special coating, or painted.

TYPES OF ZINC PLATING
There are many types of zinc plating options available varying in costs and corrosion resistance. The application typically determines which option is selected. Hansen’s plated parts are zinc and yellow dichromate.

Chromate coatings are chemical conversion coatings and a post-plate treatment commonly used with zinc plating. A coating is added that with the zinc has a profound effect on the corrosion properties, significantly increasing the time to white rust. Colored chromates are some of the most effective corrosion protection that one can buy. Chromate colors in order of increasing corrosion resistance: White - Blue - Yellow - Black - Olive Drab. According to finishers, yellow chromate is the most popular.

In addition to the type of plating selected (in Hansen’s case, zinc with yellow dichromate), two additional factors determine how long the corrosion protection will last.

WHY CORROSION PROTECTION IS BETTER
Because the corrosion protection offered by sacrificial deposits is so lengthy, accelerated tests are routinely performed to predict and compare the long-term effectiveness of the various plating options.

The most common accelerated corrosion test method is a destructive test called the “Salt Spray Test” (ASTM B117). The parts are sprayed using a 5% salt solution dissolved in water in a closed cabinet at 95°F. This method has two parts:

1. White Rust: Plain zinc coating will show signs of white rust within a few hours in a salt spray test. With a yellow dichromate coating, the test will determine how well the chromate (color) protects the zinc plating deposit, or how many hours it takes to wear through the chromate which causes the zinc to rust and form its characteristic “white rust”. This is reported as hours to white rust. The type of chromate affects how long it will be before white rust occurs which in turn affects how long it will take to see red rust.
2. Red Rust: Part two is to continue the testing until there is red rust noticeable, which means that the plating layer has given way and allowed the base metal to corrode. This is reported as hours to red rust. The thicker the zinc plating deposit is, the longer it will take to see red corrosion products. Hansen products have a zinc base between 0.001 to 0.004 inches. Generally, our larger valves have a thicker zinc base.

Now you know how the lab test works, so you must be wondering what this means in the real world.

**HOW LONG WILL IT LAST?**

We hate to say it, but that depends. Generally, three factors determine the corrosion resistance on the part: coating thickness, any post-plate treatments, and environmental exposure. There is much debate in the coatings and finishing industry about the correlation of salt spray tests and real world conditions. In general, the experts feel there is no correlation. So why do we conduct these tests? Because it serves as a benchmark for comparisons of various finishes. One estimate is that 96 hours in a salt spray cabinet is similar to six months in a seaside resort.

At Hansen, we offer products with yellow dichromate zinc plating plus paint. The coating has a thickness between 0.001 to 0.004 inches and can be expected to last approximately 500 hours in salt spray test before red rust occurs. To increase corrosion protection, in addition to the zinc plating, Hansen adds a coating of green paint. The paint serves two functions: it protects the zinc plating from scratches and nicks during installation, and protects the zinc from ammonia. Ammonia and water can attack the zinc and accelerates the corrosion process.