



## Frequently Asked Questions

### What is Gold Coat?

Gold Coat is a revolutionary multi-layer protection system. It is comprised of an organic top coat barrier layer and a zinc layer placed over a steel substrate. This double barrier more effectively protects the steel from its environment.

### Why does a connector need any protection?

A structural connector must maintain its integrity to continually support the loads it is designed to resist. Over time corrosion can eat away at the base steel material and reduce the capacity of the connector. With adequate protection against corrosion, a structural connector can maintain its integrity throughout its service life.

### What different types of protection are available?

Historically structural connectors were made from steel coated with zinc. Depending on the type and thickness of the steel, the zinc may be applied either before or after the product is manufactured. For thinner material connectors, zinc is applied during the steel coil manufacturing process. Thicker products are put through a process where they are submerged in a bath of molten zinc called hot dipped galvanizing.

Also, connectors may be made from stainless steel material or painted. Stainless steel offers the best corrosion protection available. Painting is not usually intended to provide long term corrosion protection, but rather short term protection such as shipping the product to a job site. Painting is normally done after the product is fabricated and done by dipping the product.

### How does Gold Coat differ from paint?

Gold Coat is specifically designed with corrosion inhibitors to address the electrochemical reactions of connector and fastener corrosion. Gold Coat is also uniquely formulated to be flexible, and an (pending) application process creates superior adhesion that bonds the Gold Coat to the galvanization. This provides for maximum durability throughout manufacturing, shipping, and installation.

### What is corrosion?

Corrosion can be broadly defined as the reaction of a material with its environment causing the deterioration or degradation of a material. It is an electrochemical reaction where water often acts as the electrolyte transferring ions from the steel to a dissimilar metal in contact with it. Over time this will erode the base steel and ultimately lose its strength. Accelerating this process is contact with air, acids, bases, salts, oils, and solid or liquid chemicals. Examples of this are: ocean air or salt spray, acid rain, agricultural chemicals, animal wastes or swimming pool chemicals, to name a few. Typically steel corrosion occurs when it is exposed to air causing it to oxidize or rust. As the steel rusts it will flake off exposing fresh steel which will then corrode and flake off too starting a cycle.

### **What is the difference between Zinc coated and Gold Coat connectors?**

**Zinc** provides galvanic protection in the form of a "sacrificial metal". This type of protection occurs because zinc is a more reactive metal than the underlying protected metal. Zinc is applied to steel through the "galvanizing" process.

**Gold Coat** barrier protection is provided from an organic coating. Types of organic coatings include resins, plastics, paints, enamels, and oils. The protective coating is an inert material that provides a physical barrier between the base metal and its surrounding environment. With this barrier in place, the metal will not react chemically and produce corrosion products. The metal cannot release electrons because the electrons cannot freely react to their environment.

### **What is wrong with zinc?**

Zinc has historically been used in countless applications and environments. In many of these applications it has performed adequately. As a sacrificial protecting agent, however it inherently has a finite life. Gold Coat is the next generation of protection, providing extended life.

### **How does a barrier coat work?**

Metal corrosion is a chemical reaction between the metal surface and its environment. This corrosion can either occur in a gaseous environment or a wet environment. For our connectors we are primarily concerned with the wet environment. Specifically in a wet environment, corrosion occurs when an electrolyte transfers ions from one material to another. With connectors it is the steel which loses its electrons to the environment. For this reaction to occur the electrolyte must be in contact with the metal. The barrier coat prohibits this contact, which means the metal does not give up its electrons, or corrode.

### **What about the exposed edges?**

Because of the patented (pending) coating process developed by USP for the Gold Coat products, the connectors are manufactured in a similar manner as our standard product lines. As with our standard products we manufacture these components from a coil of steel which is run through a stamping operation. Because the galvanization and coating is applied to the material prior to stamping, there will be exposed edges on the final product.

A unique property of zinc as a sacrificial material is its ability to protect adjacent uncoated steel. Just in the same way the zinc protects the edges of our standard products, it will protect the edges of the Gold Coat product. This same philosophy also works to protect any minor incidental scratches you may get on the surface of the Gold Coat connector.

### **Is Gold Coat appropriate for all environments?**

Gold Coat is an excellent choice for most exterior applications. There are some environments which do not require the additional protection provided by Gold Coat. At the same time there are some environments which potentially need more protection than even Gold Coat provides.

### **What is the white powder I see on the connector?**

Often when galvanized connectors and fasteners are subject to prolonged exposure to moisture without any drying cycles there will be a formation of a white powder on the surface. This material is zinc oxide and represents the galvanization reacting with the environment and sacrificially protecting the base material.

### **How long will Gold Coat last?**

In accelerated corrosion testing Gold Coat's weight loss was two to three times less than standard galvanization. Because of the inherent limitations of accelerated corrosion testing, and the numerous variables involved, such as real world environments and cyclic exposures, it is impossible to provide an exact anticipated performance life for Gold Coat.

### **Has Gold Coat been tested?**

Gold Coat has been tested to a modified AWPA E12 test standard. In the test program, test coupons were fastened to pieces of treated and non-treated material and placed in a corrosion chamber for 120 days. The chamber was kept at a steady state of 49 degrees Celsius and 90 percent relative humidity. After the 120 days the coupons were removed from the chamber, separated from the wood and cleaned to record the material weight loss. Weight loss measurements included both total sample weight loss and base material (steel) weight loss.

Final product testing was conducted at Michigan State University with the assistance of Dr. Pascal Kamdem; a noted industry leader on this topic. The test methodology used was developed in conjunction between USP and Dr. Kamdem based on both parties extensive experience with accelerated corrosion testing. By developing a test program which measures base material weight loss, the true effectiveness of a coating system can be measured.

### **Is Gold Coat code approved?**

The Gold Coat barrier is applied to products which already have code approvals for structural testing to IEE-ES ACIS. Currently there isn't an ICC-ES Acceptance Criteria specifically for structural connectors in contact with preservative treated wood. USP has conducted extensive research on different test methods and the appropriate application of test results. We are currently leading efforts and working with the industry to develop a test methodology which will be developed into an ICC-ES Acceptance Criteria. When this Acceptance Criteria is complete, we will then submit for an evaluation report.

### **What fasteners should I use with Gold Coat connectors?**

Gold Coat nails and screws are available for use with Gold Coat connectors.

### **What if the coating gets scratched?**

Naturally we anticipate that during shipping or construction activity there will be some scratching of the Gold Coat surface. Because of the double layer protection, the underlying zinc layer will still provide protection for the base steel. USP has conducted corrosion testing on intentionally scratched samples to investigate its performance. By its nature, zinc has the ability to bridge across exposed areas and provide protection. This performance characteristic works the same way with Gold Coat connectors. However, using products with significant scratches should be avoided.