

Migration Towards Dip Spin Applied Finishes

by:

Matthew Delawder
Sales & Marketing Manager/Partner
SWD Inc., Fastener Sorting Corporation
910 Stiles Dr.
Addison, IL 60101 USA
www.swdinc.com

Increased corrosion protection, elimination of hydrogen embrittlement, consistent torque tension values and compliance with current and future environmental regulations.

At **SWD Inc.** we have seen a large number of parts migrate from traditional electroplated finishes to Dip Spin applied engineered finishes. There are multiple reasons for this change. Whether it is corrosion protection, elimination of hydrogen embrittlement, consistent torque tension values, meeting current and future environmental regulations or other alternative finish costs, these multilayer zinc-flake coating systems are engineered to meet your requirements. Each system can be custom developed to perform exactly as needed depending on the application.

With ever greater vehicle lifespan, the corrosion protection provided on various parts needs to exceed that time frame. The Dip Spin coatings applied at SWD are at a minimum tripling the corrosion protection that would have been seen with conventional zinc electroplating. In many cases we can provide corrosion protection that will exceed 1000 hours of salt spray testing.

Hydrogen Embrittlement Eliminated

Unlike zinc electroplated parts, there is no chance for hydrogen embrittlement in parts that utilize the engineered coatings applied by SWD Inc. This is increasingly important on high strength parts such as 9.8 or parts above a Rockwell C 38. When a part is zinc electroplated, atomic hydrogen is generated on the surface of the part when it is immersed in the electrolyte solution. The hydrogen diffuses into the substrate and some remains on the surface, which may cause hydrogen-induced stress corrosion. The electroplated surface forms a barrier that locks hydrogen into the part and may not allow it to escape, thus the hydrogen is forced into voids in the part which can lead to dramatic failures. Due to the nature of zinc-flake coatings, no hydrogen is introduced from the coating or the application process.

Specified Torque Tension Range is Ensured

When parts are being assembled it is vital to provide a consistent torque range to ensure the fasteners are meeting the calculated clamp load. At SWD Inc. we verify each specification we process actually meets the specified torque tension range in our **A2LA**-accredited laboratory. Surrogate bolts are used to verify torque tension values per specification as well as coating thickness. We also verify salt spray and humidity



Dip spin hoist used to apply multi-layer, zinc-flake coating systems at SWD Inc. (above). Samples of fasteners and other components processed with these coatings at SWD (below).



testing to ensure the corrosion protection will meet or exceed specification. Further, *AIAG CQI-12* is used as an auditing benchmark for our processing.

The zinc-rich coating systems used at SWD Inc. is Chromium-free as well as *RoHS* and *ELV* compliant. SWD is *ISO 14001* certified and is committed to continuous environmental stewardship. SWD Inc. is a charter member of the **USEPA National Environmental Achievement Track**, and was the only metal finishing company in the United States to be awarded a Gold level in the Strategic Goals Program.

FTI EMPHASIS: Coating & Plating

Summary of Coating System Benefits

The Dörken zinc-rich coating systems applied by SWD Inc. provide the following benefits:

- May be applied to fasteners equal to or greater than M6. Smaller fastener sizes are possible with special processing (thin coating system, 5-15 µm is normal).
- No hydrogen embrittlement due to process technique. Suitable for high-strength fasteners.
- Always Chromium (VI)-free
- Integrated friction modification for consistent torque in assembly. Average coefficient of friction (depending on topcoat) $\mu_{tot} = 0.10 - 0.16$ (ISO16047) and multiple friction levels are available.
- High corrosion protection: ASTM B117, ISO 9227 offers greater than 1000 hours no red corrosion; ASTM G85 Annex 4 (S02) offers greater than 1000 hours no red corrosion; GM9540P offers greater than 120 cycles; and SAE J2334 offers greater than 80 cycles.

To obtain additional information and technical specifications on SWD's dip spin-applied, multi-layer, zinc-flake coating systems that provide increased corrosion protection, elimination of hydrogen embrittlement, consistent torque tension values and compliance with current and future environmental regulations visit the website listed below.

www.swdinc.com

FTI

Company Profile:

SWD Inc., Fastener Sorting Corporation, specializes in black oxide, passivation, phosphating, dip spin coatings and fastener sorting. SWD Inc. is the Chicago, IL, USA area's premier metal finishing, dip spin coatings and fastener sorting facility. The company specializes in working with stampings and fasteners such as screws, nuts, bolts and washers. SWD Inc. has created a tradition of exceptional production quality, complete customer satisfaction and continuing commitment to environmental conservation. SWD Inc. was the first metal finishing and fastener sorting company in the USA to receive ISO 14001 certification. The company is reportedly the largest black oxide shop in the continental USA. SWD Inc. has specialized in black oxide for more than 25 years. Other names for black oxide include black penetrate, Black Magic, Black N and gun bluing. Please contact the company for a quote or visit the website below for any information regarding its plating, metal finishing or coating systems.

www.swdinc.com



BLACK OXIDE  **ZINC PHOSPHATE**  **MANGANESE PHOSPHATE**  **PASSIVATION**
HIGH-CORROSION DIP SPIN COATINGS  **FASTENER SORTING & PACKAGING**



"Your trusted partner delivering the best solution of specialized processing with quality, speed, flexibility, technical expertise and passion to serve with total commitment and integrity."

HOME OF THE
BLACK OX



Phone:(630) 543-3003 www.swdinc.com Fax:(630) 543-3028