

Long-Term Corrosion Resistance in Applications from Rural & City Climates to Onshore Environments

by:

Terry D. Windham, CEF
Durable Industrial Finishing Company (DIFCO)
4925 S. Royal Atlanta Dr.
Tucker, GA 30084 USA
www.difco.us.com

GEOMET® was developed by **NOF Metal Coatings Group** to meet the demands of increasing environmental concerns and regulations. GEOMET offers a high-performance alternative to traditional mechanical-zinc coating. It can coat and protect a wide range of metal fasteners, whether their geometry is simple or complex. Water-based zinc and aluminum flakes form a paintable metallic silver inorganic coating after thermal curing. GEOMET has also shown impressive protection against corrosion in ACQ treated wood.

In addition to meeting USA environmental standards, **EPA** and **OSHA**, GEOMET complies with *REACH*, *RoHS* and The End of Life Vehicles Directive in the EU.

How GEOMET® Provides Corrosion Resistance

GEOMET coating provides a three-level barrier to corrosion. A physical barrier is formed by zinc and aluminum flakes layering on top of each other, which protect the metal. Salt and moisture are neutralized from corroding metallic parts through galvanic action. Then passivation takes place when the metal compounds in the coating oxidize creating a passive layer over metal parts and fasteners to inhibit corrosion from forming on the actual fastener.

With the addition of black or colored topcoats, GEOMET basecoats provide an increased level of protection against many types of corrosion.

GEOMET is solvent resistant due its inorganic nature and is also effective in protecting against notoriously aggressive solvents such as brake fluid.

The GEOMET Process

Fasteners can be coated using a dip-spin processing method. The parts are loaded into a perforated metal basket, and then they are immersed into the GEOMET coating.

The basket then lifts and the excess coating is spun-off of the parts. Following coating, the parts are conveyed into a convection oven for curing at temperatures of up to 600°F, or more.

Advantages of GEOMET vs. Galvanizing

GEOMET has shown to provide extensive benefits compared to electro-galvanizing and hot dip galvanizing. GEOMET's galvanic and self-repairing properties, coupled with superior resistance to mechanical damage, result in an extended lifespan for fasteners.

- **Thin Film:** GEOMET is seven microns thickness on average without topcoat, and nine microns on average with topcoat. There is no need to undersize threads to compensate for coating thickness.

- **No Hydrogen Embrittlement:** Coating application process does not induce hydrogen embrittlement, unlike electroplating and galvanizing.
- **Consistent Torque-Tension Values:** GEOMET Provides consistent lubricity with no degradation over time and forms a smooth nonsticky coating.
- **Self-Repairing:** Binder system provides self-reparation and passivation.
- **Less Need for Drain Holes:** Applicable for large components and castings.



Uncoated fasteners are carried up to the large dip spin basket through a conveyor.



GEOMET® coated fasteners coming out of the DIFCO convection oven at 600°F after coating.

EMPHASIS: Coating & Plating

Coating System	Part Number	MCNA Required Hours to Test	Salt Spray Test Results
GEOMET® 720	Bolt	1512	3 Pass
GEOMET® 720 LTX*	Bolt	1512	3 Pass
GEOMET® 720 ML Black	Bolt	1512	3 Pass
Hot Dip Galvanizing	Bolt	1512	3 Fail

* LTX = Long Term Exposure

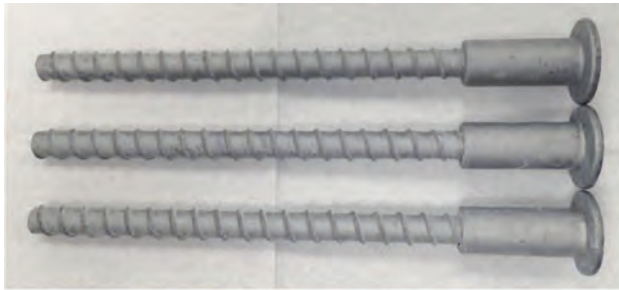
Salt Spray:

- Test Method: ASTM B117 and QP-M-16 (MCNA document)
- Test evaluation criteria: All surfaces including threads per ASTM D610-Grade 8
- Equipment Used: Singleton Salt Spray Chamber #4

Coating Weight/Thickness:

- Test Method: Batch coating weight per QP-DZ-01 (MCNA document)
- Equipment Used: Mettler Toledo Balance Model #ML1502E103

Testing Facility: NOF Metal Coatings Corporate Headquarters, Chardon OH



GEOMET® 720 Test Photo



Hot Dip Galvanizing Test Photo

Salt Spray Tests

Initial testing by NOF Metal Coatings Group at its testing facility at the company's headquarters in Chardon, OH, USA, demonstrated the increased longevity of GEOMET over hot dip galvanizing as seen in the above table and images.

Common Applications

Common applications of the GEOMET coating include the following:

ASTM A490 and *ASTM A325* bolts, nuts, washers and DTIs

- Buildings
- Bridges
- Power Plants
- Automotive Parts
 - Brake Rotors
 - Fasteners
 - Valves
 - Bolt-down electrical connectors

5. Motor Components

- Castings, Forgings
 - Couplings
 - Valves

Continued...



GEOMET® coated fasteners complete the process in a thermal curing oven.

Long-Term Corrosion Resistance in Applications ...continued



The finished product: A durable GEOMET® coating has been applied to these fasteners.



A closer look: Fasteners coated with GEOMET® have attractive appearance and a durable coating suitable for inland or onshore applications.

vi. Construction Materials

1. Screws
2. Nails
3. Staples

vii. Marine

1. Fasteners
2. Trailer Hardware
3. Rotors
4. Dock Accessories
5. Motor Components

viii. Alternative Energy

1. Tower Bolts/Studs
2. Blade Studs
3. Interior ladder fasteners

of only two GEOMET job shop applicators located in the southeast USA.

The DIFCO operations center is a large facility, employing about 75 employees and specializing in all types of metal finishing. These metal finishing processes include zinc plating, electroless nickel, zinc nickel, phosphate coating and GEOMET. The company is also one of the largest such facilities in the southeast.

DIFCO is committed to being an industry leader in innovation, providing its clients with the products and services they need while also being a good neighbor in its community. And that's good business, too.

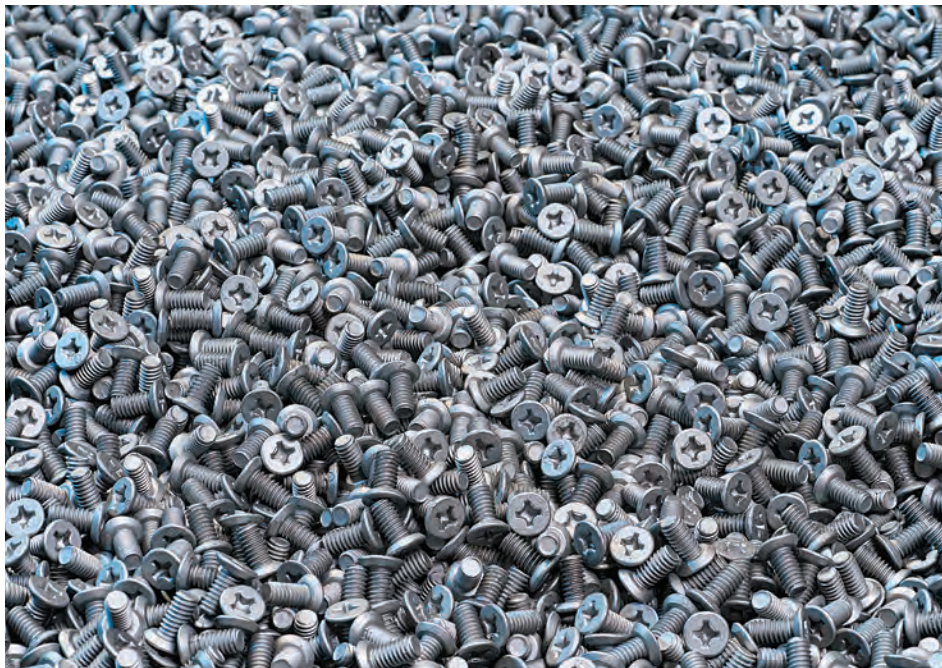
GEOMET® is a registered trademark of NOF Metal Coatings Group.

For further discussion, contact the author at DIFCO, or find additional technical specifications at the DIFCO website.

www.difco.us.com

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Durable Industrial Finishing Company (DIFCO) is one



A batch of fasteners ready for shipment after GEOMET® coating.

Company Profile:

Founded in 1960, Durable Industrial Finishing Company (DIFCO) is a nationally recognized electroplating and metal finishing job shop that is headquartered in Tucker, GA, USA, which is about 10 miles east of Atlanta, GA, USA. The company is one of the largest zinc plating and electro-galvanizing, phosphate coating, tin plating, metal finishing facilities in the southeast United States. DIFCO specializes in high-quality, high-volume, rack and barrel processing. Additionally, the company provides its customers with Just-In-Time delivery capability and operates under the ISO 9001:2015 management system.

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