

## Regarding 304 and 304L stainless steel as compared to GRABBERGARD®.

Salt Spray (ASTM B117)

304 and 316 stainless have been rated @ 2500 hours

304L and 409 stainless have been rated @ 1500 hours

GRABBERGARD® exterior have been rated @ 1000 hours

All 300 Series Stainless screws are non-magnetic.

There is no absolute criterion for converting salt spray to actual exposure conditions. Unless this is a very severe application, i.e. salt water wharf, or exterior applications within 250 yards of shore, we would recommend the GRABBERGARD® over the stainless steel as the most efficient and cost effective solution to an exterior application.

### What are Plating and Coating?

Plating and Coating are the deposition of an adherent metal on the surface of a base metal. Fasteners are typically either electroplated, hot dipped, or mechanically deposited on the base metal.

**Chemical Conversion Coating:** Adherent films chemically formed on a metal surface when immersed in a bath of appropriate solution. Chemical conversion coatings popularly specified for fasteners are chromate treatments on electroplated parts and zinc and phosphate coatings.

**Electroplating:** is a process where a water based plating chemical compound has an electrical current passed through it which causes the plating to precipitate out and be deposited onto the submerged parts. Process described in ASTM B633 Zinc A165 Cadmium.

**GRABBERGARD®:** JWA proprietary coating (rated @ 1000 hours (ASTM B117) utilizing electroplating, chemical processing, and exterior coating.

**Hot Dip Galvanizing:** is accomplished by submerging carbon steel parts for a few minutes in a bath of molten zinc at 950° F (510° C). The result is an iron-zinc alloy at the steel surface and pure zinc gradually changing to pure zinc a fasteners exterior. Process described in ASTM 153.

**Hydrogen Embrittlement:** Associated with fasteners made of carbon and alloy steels. It is caused by absorption of hydrogen into the fasteners surface during manufacture and processing — particularly during pickling and alkaline cleaning prior to plating. If the hydrogen is not removed by a post baking operation, when stress is applied, the hydrogen gas migrates towards points of highest stress concentration. Pressure builds until the strength of the base metal is exceeded and minute ruptures occur.

**Mechanical Plating:** metal coating is applied by impacting particles of the plating metal against the parts and cold welding a coating to their surface. Process described in ASTM B695 Zinc and B696 Cadmium.

**Passivation:** To make inactive or less active the surface of steel by chemical cleaning.

**Key Plating Metals:** Zinc, cadmium, and aluminum are the most popular for carbon steel fasteners because they are less noble than carbon steels, stainless steel.

**Platings:** Are the deposition of an adherent metal onto the surface of a base metal. Commercial fasteners (non-aerospace) primarily utilize electroplating, hot dipping or mechanical plating. Plating

**Passivation:** is a cleaning process in which the fastener is immersed in solution of nitric acid and water to clean stainless steel of foreign matter.

Regarding ASTM B153 and ASTM B633 ASTM Test reference electroplating and hot dipped.

GRABBERGARD® coating is a variation of those criteria. **GRABBERGARD® Screws Meet or Exceed the testing criterion in ASTM 153 and ASTM B633 for corrosion resistance. The common testing criterion for construction fasteners is ASTM B117 as described in hours.**

GRABBERGARD® is an augmented RUSPERT process comprise of Teflon, ceramics and polymers. The process begins with chemical cleaning of the fasteners, then electro-chemistry application of Zinc, then non-chemical pollution cleaning process, baking, then application of first layer of GRABBERGARD® coating (chemical composition: resin polyesters, melamine, epoxy, and silicon, filler, pigment, aluminum powder, xylene, butyl cellosolve, butanol, hydrocarbon solvent, ether solvent, alcoholic solvent, and ceramic additive) baking and second coating of chemical processing, cooling, and then QC. GRABBER® is now requiring 10-12 microns of GRABBERGARD® coating to achieve a 1000hr ASTM B117 test result.

GRABBER® exterior grade screws are coated with the proprietary GRABBERGARD® coating (comprised of several layers of zinc coating with a final coating of a chemical composition including: resin, pigment, aluminum powder, and filler. GRABBERGARD® Premium quality exterior screws are manufactured to withstand 1000 hours in the ASTM B117 test environment.