

PLATING/BAKING SPECIFICATIONS

Plating	Description
Electro-Zinc & Clear	Zinc is relatively economical and offers good corrosion resistance in environments not subject to excessive moisture. Commercial zinc plating has a standard minimum thickness of 0.00015 inches. However, Class 2A thread allowances in sizes No. 8 and smaller may not accommodate this thickness. A clear or blueish chromate finish is applied on top of the zinc to provide additional protection against white oxidation spots which can form due to moisture. Electroplating is the most common way of applying zinc coatings to fasteners.
Electro-Zinc & Yellow	Commercial zinc-yellow plating has a standard minimum thickness of 0.00020 inches. However, Class 2A thread allowances in sizes No. 8 and smaller may not accommodate this thickness. Yellow chromate offers a greater degree of protection from white corrosion than does clear chromate. Electroplating is the most common way of applying zinc coatings to fasteners.
Electro-Zinc & Wax	A wax lubricant is added to the zinc coatings of certain fasteners to improve the ease of assembly. This is the standard plating for thread rolling screws including the Plastite® and Taptite® II, as well as two-way reversible center-lock nuts. Case-hardened parts are still recommended to be baked after plating (see below).
Mechanical Zinc & Clear	Mechanically applying zinc to fasteners reduces the risk of hydrogen embrittlement forming within the parts. A clear or blueish chromate finish is applied on top of the zinc to provide additional protection against white oxidation spots which can form due to moisture. It is common for lockwashers made from spring steel to be plated this way to avoid brittleness after baking.
Mechanical Zinc & Yellow	This finish is identical to mechanical zinc but with a yellow chromate finish. This is the standard plating for high-alloy split lockwashers and for tooth lockwashers used with zinc yellow machine screws.
Electro-Zinc & Clear for Sockets	Socket cap screws can receive a zinc plating of 0.0002 inches thickness. A clear chromate finish is applied on top of the zinc to provide additional protection against white corrosion. The manufacturer must be told prior to the thread rolling process that the parts are to be plated. The plated parts are then baked at 375°F for 24 hours within 1 hour of plating, then subjected to a 72-hour stress test.
Black Phosphate	This is the standard finish for most drywall screws, particle board screws and retaining rings. It can have either a dull or bright appearance. No additional oil treatment is added.
Black Phosphate & Oil	The most common standard coating of black phosphate and oil is 1100 mg per sq/ft, minimum. The oil serves as a rust inhibitor and a lubricant. Some fasteners with this plating are required to pass a salt-spray test, the duration and cost of which must be agreed upon between buyer and seller prior to the sale. Floorboard screws, frame bolts, Grade-GT locknuts and spring nuts are usually supplied with a black phosphate and oil finish.
Nickel	Nickel has more of a silver color to it than zinc and has similar corrosion resistant characteristics. It is the standard finish of cap nuts and countersunk finishing washers.
Cadmium & Wax	Cadmium plating results in a smoother surface and greater resistance to white oxidation spots than zinc plating. However, cadmium is a much more toxic metal than zinc, which makes the plating process more difficult and costly. The standard most commercial platers use when applying cadmium is a minimum thickness of .0002 inches. A supplemental wax coating is often added as a lubricant when cadmium is used on prevailing torque lock nuts.
Hot-Dip Galvanized	Hot dip galvanizing is generally the most effective way to apply a sufficient thickness of zinc to threaded fasteners for the zinc to serve as a corrosion protectant in harsh environments. During the galvanizing process, steel reacts with molten zinc, forming layers of zinc-iron alloy layers which are metallurgically bonded to the steel surface. This hard barrier has a low corrosion rate and resists mechanical damage. Bolts and nuts 3/8 inch diameter and smaller shall have a zinc coating with an average thickness of 0.0017 in. with no individual bolt having a coating of less than 0.0014 in. Bolts and nuts over 3/8 inches diameter, and all sizes if washers shall have a zinc coating with an average thickness of 0.0021 in. with no individual bolt having a coating of less than 0.0017 in.
Dacrotized	Dacrotizing is a pollution-free ceramic coating for fasteners used with treated lumber. The coating offers corrosion protection comparable to hot-dip galvanizing without discoloring the wood. Screws with a proper dacrotized coating can typically withstand a 500-hour salt-spray test. Dacrotizing minimizes greatly the risk of hydrogen embrittlement so baking the parts is not required after the finish is applied.
Baking of Case Hardened Parts	Electroplated screws which are case hardened should be baked for a minimum of 4 hours within the temperature range of 375-450°F no later than 4 hours after the plating operation. However, this process does not guarantee that hydrogen embrittlement will not still be present after baking or that it will not occur at a later date while in service. Specialized testing or a substitute part may be required, depending on the application. This heat treatment practice is recommended for tapping screws, drywall screws, SEMS screws, clinch nuts and clinch studs.