VALTOR Fastener Surface Finish & Coating Reference

Stainless-steel surface treatments and carbon/alloy-steel coating systems

Buyer reference only. Coating performance depends on substrate, pretreatment, coating thickness, conversion/topcoat, lubricant, thread fit and service environment.

1. Stainless Steel Surface Treatments

Treatment	Process / Purpose	Typical Use	Main Standard	Buyer Note
Chemical passivation	Chemical treatment; nitric, citric or other qualified passivation process — Remove surface contamination/free iron and improve passive-surface condition	Machined fasteners, fabricated stainless parts, general corrosion-cleanliness requirement	ASTM A967/A967M-25	Passivation is not a decorative coating and does not turn 304 into 316 or increase the alloy grade.
Electropolishing / passivation	Electrochemical material removal and surface smoothing — Remove free iron, smooth surface, remove heat tint/oxide scale under suitable conditions	High-cleanliness, smoother-surface or enhanced corrosion-performance requirements	ASTM B912-26	Electropolishing changes surface topography; do not specify only by appearance.

2. Carbon / Alloy Steel Coating Systems for Fasteners

Coating System	Corrosion / Function	Thread / Dimension Note	Friction / Torque Note	Buyer Note
Electroplated zinc (Zn)	Electrodeposition + conversion/sealer/topcoat as specified — Sacrificial zinc corrosion protection	Coating thickness affects thread allowance and fit; specify coating system and thickness/class	Conversion coating, sealer and lubricant can materially change coefficient of friction and tightening behaviour	Do not purchase only as 'zinc plated' when corrosion class, color, thickness or torque behaviour matters.
Electroplated zinc-nickel (Zn-Ni)	Electrodeposition + conversion/topcoat/lubricant system — Zinc-alloy sacrificial coating; often selected for higher corrosion-performance coating systems	Thickness and topcoat must be compatible with thread fit	Friction is system-dependent; specify lubricant / friction requirement where tightening control matters	Do not assume all Zn-Ni systems have the same salt-spray or torque performance.
Zinc-flake coating	Non-electrolytic dip-spin / spray + cure; may include topcoat/lubricant — Sacrificial zinc-flake corrosion-protection system	Coating build and recess fill must be considered for threads, sockets and small features	Topcoat/lubricant strongly affects friction; specify friction window when required	Commercial names such as GEOMET/Dacromet-type systems should not replace the technical coating specification.
Hot-dip galvanized (HDG)	Hot-dip spun galvanizing — Relatively thick sacrificial zinc coating for outdoor/heavy corrosion exposure	ISO 10684 covers coarse-thread steel fasteners M8–M64 and is not recommended below M8 or pitch <1.25 mm; thread allowance/oversize nut strategy is critical	Thick zinc coating and lubricant condition affect assembly torque; verify project requirements	Do not substitute ordinary bulk galvanizing requirements for fastener-specific thread requirements.
Phosphate + oil / sealer	Phosphate conversion coating + oil/organic supplemental treatment — Corrosion protection plus lubricity / break-in / anti-wear function	Usually thin relative to HDG; verify coating mass and thread fit to the selected grade	Often used when controlled lubricity is important	Do not treat phosphate alone as a severe-exposure outdoor corrosion system.
Black oxide / blackening + oil	Chemical conversion / blackening + oil or sealer — Appearance, light-duty corrosion protection and lubricity	Very thin conversion finish, but final oil/sealer and cleanliness matter	Oil/sealer affects handling and torque behaviour	Black appearance by itself is not evidence of high corrosion resistance.

3. Quick Selection Guide

Buyer Requirement	Preferred Direction	Watch-Out	Standard Family
Stainless cleanliness / free-iron removal	Chemical passivation	Specify material and acceptance test; passivation is not an alloy upgrade	ASTM A967/A967M
Smooth, clean stainless surface	Electropolishing	Material removal can affect very tight dimensions	ASTM B912
General plated steel fastener	Electroplated Zn or Zn-Ni	Hydrogen-embrittlement control for high-strength fasteners	ISO 4042 / ASTM F1941
High-strength fastener, reduced coating-process HE risk	Zinc-flake	Topcoat/friction/recess fill need control	ISO 10683 / ASTM F3393
Outdoor large-thread steel fastener	Hot-dip galvanized	Thread accommodation and size/pitch limitations	ISO 10684 / ASTM F2329
Lubricity / light corrosion, indoor steel	Phosphate + oil	Not comparable to HDG/zinc-flake for severe exposure	ISO 9717 / ASTM F1137

4. Salt-Spray Test Interpretation

ISO 9227:2022 specifies NSS/AASS/CASS salt-spray test methods, but it does not set a universal exposure period for every product and explicitly states that salt-spray tests are not intended to rank different materials or predict long-term service corrosion. ASTM B117-26 likewise notes that stand-alone salt-spray results have seldom correlated with natural-environment performance. Therefore, an RFQ should state the applicable product/coating standard, failure criterion (e.g. white or red corrosion), test method and required hours — not only 'X hours salt spray'.

Recommended RFQ format: BASE MATERIAL + FASTENER STANDARD + COATING SYSTEM + COATING CLASS/THICKNESS + CONVERSION/TOPCOAT + COLOR + FRICTION/LUBRICANT + CORROSION TEST/CRITERION + CERTIFICATE.