

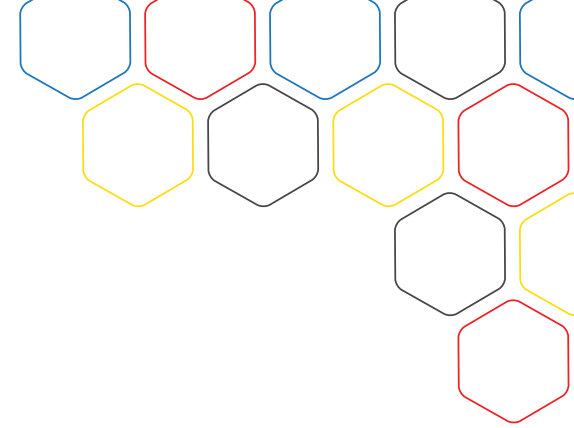
Fastener Coating Comparison

FASTENER ATTRIBUTES	DOXSTEEL NICKEL-COBALT PLATING	BARE STEEL	ZINC PLATING	CADMIUM	ZINC NICKEL PLATING	PTFE	HOT DIP ZINC	ZINC PLATING + PTFE TOP COAT	CERAMIC + PTFE TOP COAT
No Oversizing	✓	✓	✓	✓	✓	✓	✗	✗	✗
5 Year No-Seize Warranty	✓	✗	✗	✗	✗	✗	✗	✗	✗
Time to Seize Bolt and Nut in Salt Fog per ASTM B117	10+ years	0.5 year	1 year	1.5 year	1.5 year	1 year	1.5 year	2.5 years	4 years
Barrier to Hydrogen Embrittlement	✓	✗	✗	✗	✗	✗	✗	✗	✗
High Operational Temp (>700°F) for B7, B16 Bolting*	✓	✓	✗	✗	✗	✗	✗	✗	✗
Consistent K (Nut) Factor	✓	✓	✓	✓	✓	✗	✗	✗	✗
Corrosion Protection After Torque	✓	N/A	✗	✗	✗	✗	✗	✗	✗
Zero Hot Bolting	✓	✗	✗	✗	✗	✗	✗	✗	✗

Table values based on tendencies shown in our laboratory tests. We encourage everyone to run their own testing prior to making a decision.

*No risk of Liquid Metal Embrittlement. ASTM 193 Appendix X2.1 "...use of coated fasteners at temperatures above approximately one-half the melting point of the coating is not recommended..."

High operational temperature (>700°F) is based on Doxsteel's capability to withstand temperature ranges from -300°F to 1300°F (melting point for Nickel-Cobalt is ~2600°F).



Fastener Comparison

FASTENER ATTRIBUTES TESTS	UNITS	CADMIUM	HOT DIP ZINC	ZINC PLATING	ZINC PLATING + PTFE TOP COAT	CERAMIC + PTFE TOP COAT	ZINC NICKEL PLATING	DOXSTEEL NICKEL-COBALT PLATING
Coatings Evaluation Salt Fog Test ASTM B117	Hours with less than 15% of Red Rust	1,500	1,500	1,000	3,000	5,000	1,500	25,000
Coatings Evaluations Salt & Acid Fog Test ASTM B368 (CASS)	Hours with less than 15% of Red Rust	60	40	40	125	100	200	1,300
Coatings Evaluations Cyclical Salt Fog Test ASTM G85	Hours with less than 15% of Red Rust	150	120	120	100	210	120	1,200
Coatings Evaluations Electrochemical Test ASTM G59	μ /year	5	50	50	1.9	1.8	7	0.16
Acid Immersion Test ASTM G31	Grams	2.382	2.025	2.025	0.093	0.126	1.121	0.0037
FELT TEST in (CASS)	Maximum Hours to Seize	2,500	2,000	2,000	3,750	5,300	2,300	13,500
Corrosion Protection after Torque		No	No	No	No	No	No	Yes
Temperature Range of Coating	Fahrenheit (°F)	-40 to 300	-10 to 390	-10 to 390	-50 to 350	-50 to 350	-10 to 390	-300 to 1300
Subsea Application API 20E	Compliance	No	No	No	No	No	No	Yes
BSEE & API 20E	Compliance	Toxic	No	No	No	No	Yes	Yes
K (Nut) Factor	Consistent	Yes	No	Yes	No	No	Yes	Yes
Fit & Function ASME PCC1-1	Consistent	No	No	No	No	No	No	Yes

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