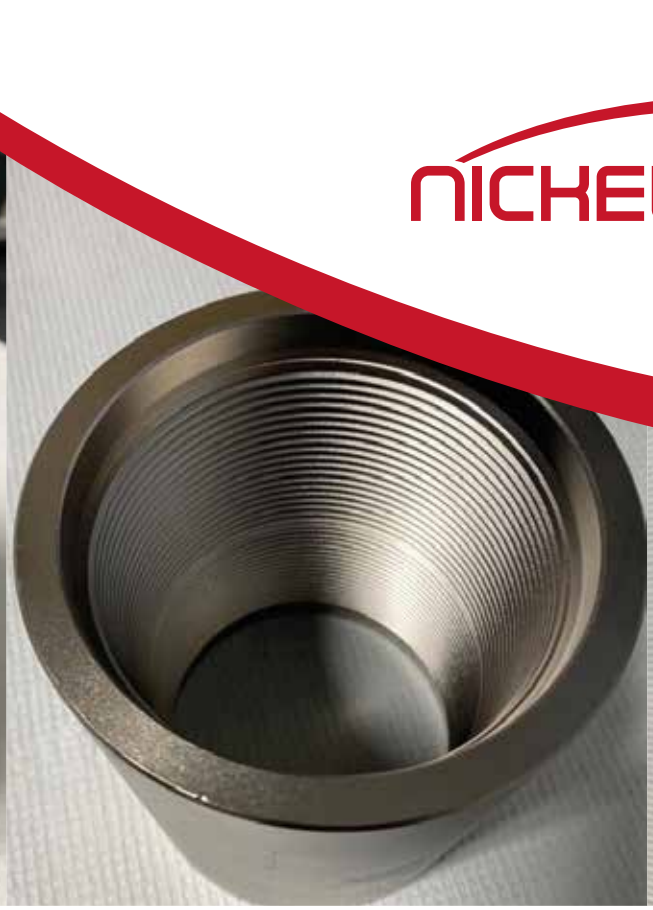

NICKELCOAT® BorTec

NICKELCOAT®

BorTec offers an excellent corrosion resistant protective coating option with our High Phosphorous Electroless Nickel. High phosphorous NICKELCOAT® offers maximum resistance in strongly acidic corrosive environments – NICKELCOAT® is most commonly used to protect against corrosive gases and CO_2 Injection wells in the Oil & Gas Industry. The auto-catalytic reaction causes the nickel to deposit onto the substrate, creating a uniform coating throughout the entire workpiece. With a plated hardness of ~45 Rockwell C, along with great adhesion to the substrate, NICKELCOAT® also offers good wear resistant and anti-galling properties.

- Withstands over 1000 hrs of salt spray exposure test with no rust (Excellent corrosion resistance)
- Uniform plating procedure, even on complex parts.
- Very low porosity in deposits provides an excellent barrier for corrosion protection
- Recommended in highly acidic corrosive environments
- Great protection against CO_2, H_2S, H_2SO_4, HNO_3, HCL, ...

NICKELCOAT®

BorTec's NICKELCOAT® shows superior corrosion resistance against other EN coatings on the market – this is a direct result of the proprietary procedures which are standard in BorTec's NICKELCOAT® process.

Chart 1 represents the measured corrosion rate of the sample's weight loss, calculated in mils, after 1 year. Chart 2 illustrates NICKELCOAT® vs various other alloys.

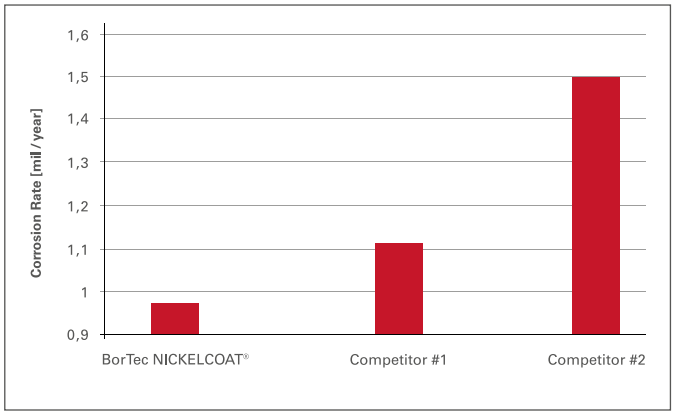

Chart 1: Electrochemical Corrosion 1 % NaCl - Saturated CO_2

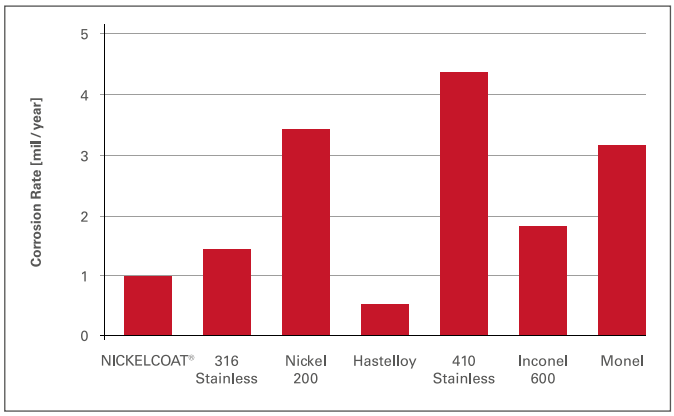

Chart 2: Electrochemical Corrosion 1 % NaCl - Saturated CO_2

Chemical	Conc. (wt.%)	Temp. (°C)	Removal (mils/Yr)
HNO_3	25 %	22	83.00
H_2SO_4	98 %	22	3.20
HCl	37 %	22	2.20
HF	40 %	22	2.20
CH_3COOH	50 %	22	0.03
H_3PO_4	5 %	22	1.00
NaOH	50 %	22	0.03
Chlorine	100 %	22	0.50
Chlorine, Dry Gas	100 %	22	0.10
Exhaust Gasses	Reducing	260	1.00
Exhaust Gasses	Oxidizing	540	0.10
CO_2	100 %	22	0.50
Crude Oil	100 %	22	0.10
Beer (pH 3.7)	100 %	22	0.01

Property/ Level of Alloy	High Phosphorous
% Phosphorous	10 – 13
Deposit Density Range (g/cm³)	7.6 – 7.9
Hardness (Rc)	41 – 46
Taber Wear Index (m/m/C)	22 – 24
Coefficient of Thermal Expansion	8 – 10
Electrical Resistivity	75 – 110
Thermal Conductivity	0.010
Tensile Strength (MPa)	650 - 900
Elongation	1 – 1.25
Melting Range (°C)	880 – 900
Magnetic Properties	Non-magnetic