



9508 35 AVE, Edmonton, AB, T6E 5S3

Phone: 780.466.5600

www.giantcoatings.com

Technical information contained within the following documents was provided by:



NiPro® ULTRA PHOS OG

“A PROVEN NEW GENERATION HIGH SPEED HIGH PHOSPHORUS, SEMI-BRIGHT ELECTROLESS NICKEL SYSTEM SPECIFICALLY DESIGNED TO MEET AND EXCEED THE NEEDS OF THE OIL AND GAS INDUSTRY”

DEPOSIT PROPERTIES OVERVIEW

Nickel Content	88.0 - 90.0 % w/w
Phosphorus Content	10.5 - 12.0 % w/w
- ASTM B-733	Meets Type 5
Melting Point	880 - 960 °C
Hardness	46 - 48 R as plated, 68 R (1hour, 400°C)
Density	7.7 - 7.9 g/cc
Neutral Salt Spray (ASTM B-117)	
- AMS-C-26074 Grade A	Pass (1000 hours)
- AMS-C-26074 Grade C	Pass (1000 hours)
Magnetic Properties	Non-magnetic
Deposit Stress	Slight compressive to neutral
Hydrochloric Acid Test	Pass
(50% HCL, 3 min, R.T.)	
Electrical Resistivity	50 - 100 micro-ohm/cm

PRODUCT HIGHLIGHTS

- Semi-bright appearance
- Superior corrosion resistance
- Protection from severe conditions including:
 - Hydrogen Sulfide
 - Chlorides
 - Brines
 - Sea Water

- Slight compressive stress enabling maximum adhesion
- Amorphous glass-like deposit structure
- Smooth, pit free
- High build capability (0.1- 10 mil thickness)



The NiPro® Ultra Phos OG advantage:

Unmatched characteristics make OG the ideal coating for the industry, with successful applications on valves, pumps, piping, down hole tools and components, and many others.





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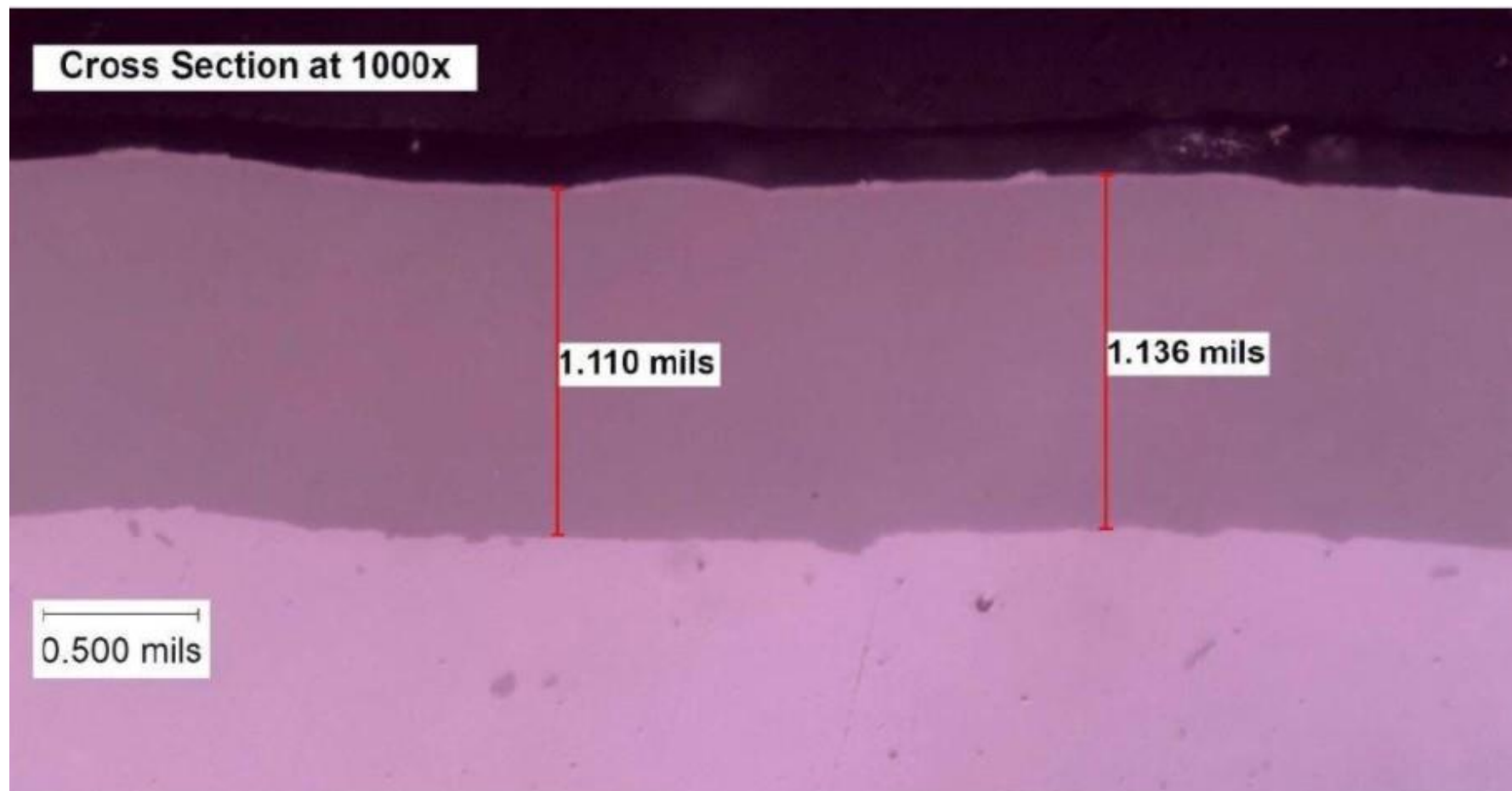


Figure 1. Cross Section of Meta-Plate Ultra Phos OG plated over steel substrate. Uniform, complete coverage exhibiting the amorphous glass structure of this unparalleled chemistry.

COMPETITOR HIGH PHOS

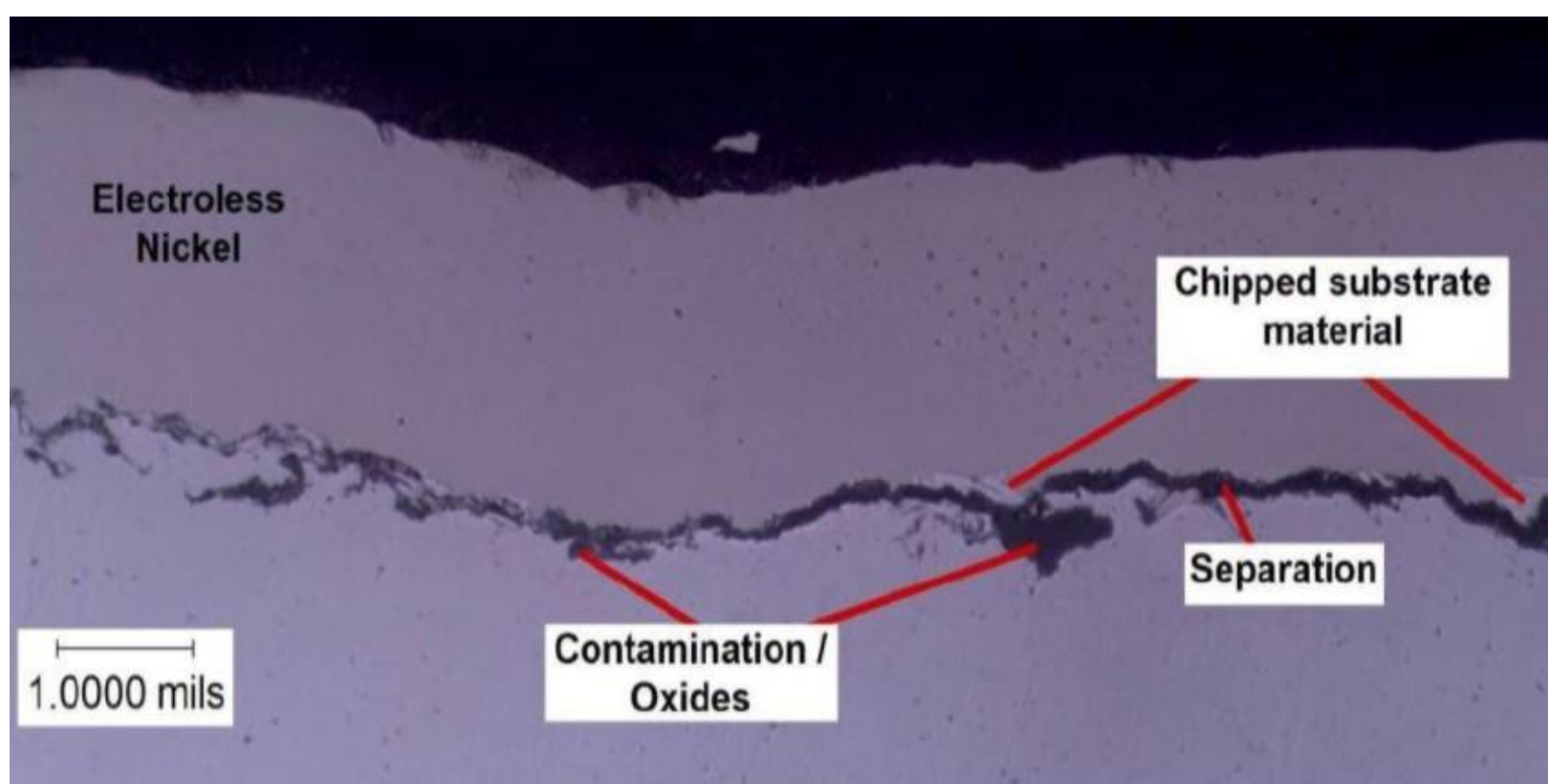


Figure 2. Cross section of Competitor High Phos over steel substrate. Highlighted defects show multiple areas for corrosion penetration.

CORROSION RESISTANCE

Oil Field Brine Corrosion Rate @ 95°C (µm/yr)						
Salt Conc % by wt	CO ₂ Environment		H ₂ S Environment		Mixed CO ₂ /H ₂ S Environment	
	Carbon Steel	Ultra Phos OG	Carbon Steel	Ultra Phos OG	Carbon Steel	Ultra Phos OG
0	180	5	260	0	190	0
0.5	190	5	130	0	230	0
3.5	290	5	250	0	490	0
10	350	8	230	0	750	0

*Tested in duplicate for 72 hr for carbon steel and 168 hr for Ultra Phos OG with a volume:area ratio of 20 ml/cm²

Effect of Temperature on Corrosion Rate in Oil Field Brines (µm/yr)		
Temperature (°C)	CO ₂ Environment	H ₂ S Environment
95	5	0
120	36	0
150	30	0
180	20	0

*Tested in duplicate for 24 hr with a volume:area ratio of 50 ml/cm². Panels in 3.5% brine saturated with CO₂ or H₂S



About Metal Chem

Metal Chem, Inc. is a specialty chemical business located in Greenville, South Carolina that concentrates its efforts on the development, manufacture, and service of pretreatment, post treatment, and waste treatment products used in the metal finishing industry. Metal Chem technology is the direct result of over 100 years of experience by dedicated people with extensive backgrounds in research and development, focusing on the needs of many industries which include aerospace, automotive, battery, computer, electronics, fasteners, oil and gas, and textiles among others.

What sets Metal Chem apart is its corporate commitment to customer service and satisfaction. Fast and Meaningful Technical Support in Electroless Nickel Chemistry is Our Expertise. Metal Chem's staff possesses a unique understanding of how each product functions and how it can best be utilized to maximize performance for each customer's needs. Designing specialized products for individual customers is a unique capability that is available through Metal Chem.

Metal Chem products feature advanced, innovative chemistries that are easy to use, environmentally safe, and very cost effective. Metal Chem is certified to the standards of ISO 9001:2015 to ensure that all customers receive products of the highest possible consistency in quality and performance.

After several years of investigating hundreds of formulations, the Meta-Plate Ultra Phos OG is the most suitable high phos electroless nickel for the oil and gas industry.

To learn more or request technical datasheets and samples, please contact your Metal Chem representative.