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NIPLATE® 500 PTFE
Electroless Nickel PTFE

Niplate 500 PTFE is a composite high phosphorus (10-13%) electroless nickel plating containing 25-35% of PTFE particles.
The PTFE particles give to the layer anti-stick proprierties and a low coeffi-cient of friction.

LOW COEFFICIENT OF FRICTION AND NON-ADHESION

Thanks to the high content of uniformly distributed PTFE particles, it possesses a high non-adhesion capacity and a very low friction coefficient (0.08 ÷ 0.12) in the absence of lubrication.

EXCELLENT ADHESION TO THE BASE MATERIAL

Compared to spray PTFE coatings, Niplate 500 PTFE has higher adhesion to the base material and higher hardness thanks to the metal matrix of electroless nickel.

UNIFORM THICKNESS

Uniform and constant thickness over the entire surface, including holes, ideal for precision mechanical engineering pieces with reduced tolerances.

APPLICABLE ON VARIOUS METALS

All the most common alloys used in mechanical engineering can be coated: iron, copper and aluminium alloys.

TECHNICAL SPECIFICATIONS

COMPOSITION	
The Niplate 500 PTFE coating consists of two layers of identical thickness: the first layer is medium phosphorus electroless nickel, the second layer is high phosphorus electroless nickel with PTFE particles.	
FIRST LAYER (40-60% of total thickness)	SECOND LAYER (40-60% of total thickness)
Ni 91 ÷ 95 %	MATRIX Ni 87 ÷ 90 % - P 10 ÷ 13 %
P 5 ÷ 9 %	PARTICLES PTFE 300 nm 25 ÷ 35 % vol.
Composite coating with electroless nickel and PTFE particle matrix.	

APPLICABLE STANDARDS
NSF 51 CERIFICATION
✅ Certified NSF 51 – Food equipment material
ROHS CONFORMITY
✅ RoHS conform. No restricted-use substances beyond maximum tolerated concentrations
REACH CONFORMITY
✅ REACh conform. No SVHC in quantities greater than 0.1% by weight.

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COATABLE METALS

IRON ALLOYS	PRE-TREATMENT	ADHESION	CORROSION RESISTANCE
Carbon steel	-	★★★★★	★★★☆☆
Stainless steel	Sandblasting	★★★★☆	★★★★★
Case-hardened steel	Sandblasting	★★★★☆	★★★☆☆
Nitrided steel	Sandblasting	★★★☆☆	★★★☆☆
COPPER ALLOYS			
Brass, Bronze, Copper	-	★★★★★	★★★★★
ALUMINIUM ALLOYS			
Wrought alloys	-	★★★★☆	★★★★☆
Foundry and die-casting alloys	-	★★★★☆	★★★☆☆
TITANIUM ALLOYS			
Pure titanium and alloys	Sandblasting	★★★★☆	★★★★★

COATING THICKNESS

TYPICAL THICKNESS	TOLERANCE
15 µm	±3 µm
Uniform thickness over entire external and internal surface	
Absence of point effect typical of galvanic coatings	

AESTHETIC APPEARANCE

Gunmetal grey metal appearance due to the high content of PTFE particles.
Morphology similar to machined piece.

Matt finish option (sandblasted, shot peened or shotblasted)

In case of hardening at 260-280°C, discolouring of the layer could occur with possible brown halos.

HARDNESS

The surface hardness of Niplate 500 PTFE varies according to the hardening heat treatment performed after layer deposition

HARDNESS VALUE	HEAT TREATMENT
250±100 HV	Dehydrogenation 160-180°C x 4 hrs
300±100 HV	Hardening 260-280°C x 8 hrs

WEAR RESISTANCE

Niplate 500 PTFE has high wear resistance in non-abrasive conditions and in applications with low local load
It is not suitable for applications where types of abrasive wear exist.
Hence with the Taber Abrasive test, wear values are high.

APPROXIMATE WEAR VALUE, TWI-CS10	HEAT TREATMENT
33±2 mg / 1000 cycles	Dehydrogenation 160-180°C x 4 hrs
21±2 mg / 1000 cycles	Hardening 260-280°C x 8 hrs

A LOW NUMBER INDICATES A BETTER PERFORMANCE – ASTM B733 X1 – TABER ABRASER WEAR TEST – ABRASIVE WHEELS CS 10 – LOAD 1 KG

FRICTION COEFFICIENT

DYNAMIC DRY FRICTION COEFFICIENT VALUE

0,08 ÷ 0,12 depending on antagonist material

Thanks to the high content of PTFE particles Niplate 500 PTFE has a very low dynamic dry friction coefficient which usually varies between 0.08÷ 0.12 depending on the antagonist material.

CORROSION RESISTANCE

The corrosion protection of Niplate 500 PTFE, assessed by means of salt mist test, depends on the base material, piece machining and finishing and the thickness of the applied coating

APPROXIMATE CORROSION RESISTANCE VALUES	BASE MATERIAL
≥1000 hours	Brass
≥240 hours	Carbon steel
≥240 hours	Aluminium 6082

NSS ACCORDING TO ISO 9227 – THICKNESS 20 µm – CORRODED SURFACE < 5%

CHEMICAL RESISTANCE

Excellent chemical resistance and to oxidization in many aggressive salt environments.
Passes the concentrated nitric acid immersion test (RCA, Nitric acid test – Concentrated nitric acid 42Bé, 30 seconds, room temperature).

- ✓ Hydrocarbons (e.g. petrol, diesel fuel, mineral oil, toluene)
- ✓ Alcohols, ketones (e.g. ethanol, methanol, acetone)
- ✓ Neutral saline solutions (e.g. sodium chloride, magnesium chloride, brine)
- ✓ Diluted reducing acids (e.g. citric acid, oxalic acid)
- ✗ Oxidizing acids (e.g. nitric acid)
- ✗ Concentrated acids (e.g. sulphuric acid, hydrochloric acid)
- ✓ Diluted bases (e.g. diluted sodium hydroxide)
- ✗ Oxidizing bases (e.g. sodium hypochlorite)
- ✗ Concentrated bases (e.g. concentrated sodium hydroxide)

Approximate values of compatibility with the coating environment only, they do not indicate corrosion protection of the base material. The overall performance of the coated piece depends to a large extent also on the type and quality of the base material. The actual resistance to the environment must in any case be tested in the field.

WELDABILITY

✗ Not braze weldable

FERROMAGNETISM

PRESENCE OF FERROMAGNETISM	HEAT TREATMENT
Ferromagnetic	Dehydrogenation 160-180°C x 4 hrs
Ferromagnetic	Hardening 260-280°C x 8 hrs

MAXIMUM CONTINUOUS OPERATING TEMPERATURE

260°C

DENSITY

6,3 g/cm³

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