

NIPLATE® 600 MEDIUM PHOSPHORUS ELECTROLESS NICKEL PLATING

Niplate 600 is a medium phosphorus (5-9% in P) electroless nickel plating. Niplate 600 is the most widely used of all Niplate platings thanks to its high wear resistance, good corrosion resistance, and low cost.

The Niplate 600 coating is extremely versatile and is used to impart corrosion and wear protection to mechanical components in the automotive, hydraulic, and pneumatic sectors.

Due to its high hardness value, the coating plating offers protection against sliding wear, fretting wear, and erosion. Hardening treatments make it possible to achieve 1000 HV, equivalent to hard chrome. In fact, the treatment is employed in place of hard chrome platings for applications such as piston rods or cylinders, with the benefit, compared to hard chrome, that it can be applied on all alloys, and also offering better corrosion resistance.

The corrosion resistance of the Niplate 600 film makes it possible to protect brass parts against oxidation and corrosion such as valve bodies in the automotive and oxygen sector and forged brass parts, requiring high salt spray corrosion resistance.



EXCELLENT WEAR RESISTANCE

Thanks to its hardness and microcrystalline structure, Niplate 600 offers high wear and fretting resistance.

ECONOMICAL

Compared to the other Niplate treatments, considering the same coating thickness, Niplate 600 is more economical thanks to the high efficiency of the deposition process.

UNIFORM THICKNESS

Uniform and constant coating thickness over the entire surface, including holes; ideal for precision machined parts with tight tolerances and complex geometries.

CAN BE APPLIED ON VARIOUS METALS

All metals commonly used in mechanical field can be coated: alloys of iron, copper, and aluminium.

TECHNICAL SPECIFICATIONS

COMPOSITION AND APPLICABLE STANDARDS	
COMPOSITION	
Ni	P
91+95%	5+9%
Ni-P alloy, medium phosphorus electroless nickel plating	
TECHNICAL STANDARDS	
ISO 4527 NiP(7)	
ASTM B733 Type IV	
NSF 51 CERTIFICATION	
NSF 51 certification - Food equipment material.	

ROHS COMPLIANCE

RoHS compliant. No restricted substances present in amounts greater than the maximum tolerated concentrations.

REACH COMPLIANCE

REACH compliant. No SVHCs present in amounts higher than 0.1% by weight.

COATABLE METALS

IRON ALLOYS		CHARACTERISTICS
Carbon steel	Adhesion	★★★★★
	Corrosion resistance	★★★☆☆
Stainless steel	Pre-treatment	Sand blasting
	Adhesion	★★★★☆
	Corrosion resistance	★★★★★
Case hardened steel	Pre-treatment	Sand blasting
	Adhesion	★★★★☆
	Corrosion resistance	★★★☆☆
Nitrided steel	Pre-treatment	Sand blasting
	Adhesion	★★★★☆
	Corrosion resistance	★★★☆☆
COPPER ALLOYS		CHARACTERISTICS
Brass, Bronze, Copper	Adhesion	★★★★★
	Corrosion resistance	★★★★★
ALUMINIUM ALLOYS		CHARACTERISTICS
Machining alloys	Adhesion	★★★★☆
	Corrosion resistance	★★★★☆
Foundry alloys	Adhesion	★★★★☆
	Corrosion resistance	★★★☆☆
TITANIUM ALLOYS		CHARACTERISTICS
Pure titanium and titanium alloys	Pre-treatment	Sand blasting
	Adhesion	★★★★☆
	Corrosion resistance	★★★★★

COATING THICKNESS AND AESTHETIC APPEARANCE

COATING THICKNESS

NOMINAL THICKNESS, AS REQUIRED

3÷75µm

Uniform thickness over the entire external and internal surface

Absence of tip effect typical of galvanic coatings

TOLERANCE

±10% (min. ±2µm)

AESTHETIC APPEARANCE

Bright stainless steel metallic appearance that reproduces the morphology of the machined part

Option of matt finish (sand blasted, shoot peened, or grit blasted)

Hardening treatments may result in discoloration of the coating:

- 260-280°C, white color with possible yellow stains
- 340°C, iridescent blue-red coloring

TRIBOLOGICAL PROPERTIES

HARDNESS

The surface hardness of Niplate 600 varies in relation to the hardening heat treatment carried out after deposition of the coating.

HARDNESS VALUE

HEAT TREATMENT

700±50HV	Hydrogen embrittlement relief at 160-180°C for 4h
800±50HV	Hardening at 260 -280°C for 8h
1000±50HV	Hardening at 340°C for 4h

WEAR RESISTANCE

Niplate 600 offers a high level of wear resistance, depending on the heat treatment carried out.

GUIDELINE WEAR VALUE, TWI-CS10

HEAT TREATMENT

THE LOWER THE NUMBER, THE HIGHER THE PERFORMANCE - ASTM B733 X1 - TABER ABRASER WEAR TEST - CS 10 ABRASIVE WHEELS - 1 KG LOAD

16±2 mg / 1000 cycles	Hydrogen embrittlement relief at 160-180°C for 4h
12±2 mg / 1000 cycles	Hardening at 260 -280°C for 8h
9±2 mg / 1000 cycles	Hardening at 340°C for 4h

FRICTION COEFFICIENT

DYNAMIC DRY FRICTION COEFFICIENT VALUE

0.4 ÷ 0.6 depending on the antagonist material
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CHEMICAL PROPERTIES

CORROSION RESISTANCE

The corrosion protection of Niplate 600, assessed by means of the salt spray test, depends on the substrate material, machining and finish of the part, and the applied film thickness.

GUIDELINE CORROSION RESISTANCE VALUES

SUBSTRATE MATERIAL

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

≥1000 hours	Brass
≥180 hours	Carbon steel
≥240 hours	Aluminium 6082

CHEMICAL RESISTANCE

For applications requiring high chemical resistance, Niplate 500 should be used in place of Niplate 600. Niplate 600 anyway offers a good level of chemical resistance, especially in alkaline environments.

CHEMICAL COMPATIBILITY

Chemical compatibility values are referred **exclusively** to the coating and **do not** define the corrosion protection of the substrate material. The overall performance of the coated part is highly dependent also on the type and quality of the substrate material. The actual environmental resistance must anyway be tested in the field.

- ✓ Hydrocarbons (e.g. petrol, diesel, mineral oil, toluene)
- ✓ Alcohol, ketones (e.g. ethanol, methanol, acetone)
- ✓ Neutral saline solutions (e.g. sodium chloride, magnesium chloride, seawater)
- ✗ Dilute reducing acids (e.g. citric acid, oxalic acid)
- ✗ Acid oxidizing agents (e.g. nitric acid)
- ✗ Concentrated acids (e.g. sulphuric acid, hydrochloric acid)
- ✓ Dilute bases (e.g. dilute sodium hydroxide)
- ✗ Base oxidizing agents (e.g. sodium hypochlorite)
- ✓ Concentrated bases (e.g. concentrated sodium hydroxide)

PHYSICAL PROPERTIES

WELDABILITY

Easily brazed using RMA, RA acid fluxes

FERROMAGNETISM

Ferromagnetic
 Ferromagnetic
 Ferromagnetic

HEAT TREATMENT

Hydrogen embrittlement relief at 160-180°C for 4h
 Hardening at 260 -280°C for 8h
 Hardening at 340°C for 4h

FUSION POINT, SOLIDUS

870°C

DENSITY

8.1 g/cm³