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NIPLATE® 600 SiC
Electroless Nickel-SiC

Niplate 600 SiC is a composite medium phosphorus (5-9%) electroless nickel plating with silicon carbide grains (SiC) in 20-30% concentration.
The Silicium Carbide crystals give an excellent wear resistance which guarantees a long working life in textile and motorsport applications.

VERY HIGH WEAR RESISTANCE

Thanks to the tenacity of the electroless nickel matrix and to the extreme hardness of the ceramic particles of SiC, the Niplate 600 SiC coating has greater abrasive and adhesive wear resistance than that of hard chrome.

EXTREME HARDNESS, UP TO 1100 HV

The ceramic particles of SiC with hardness up to 2000HV permit to increase the hardness of the composite layer up to 1100 HV.

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		
MATRIX	Ni 91 ÷ 95 % - P 5 ÷ 9 %	
PARTICLES	SiC 1 ÷ 3 µm	20 ÷ 30 % vol.
Composite coating with medium phosphorus electroless nickel matrix and silicon carbide particles		

APPLICABLE STANDARDS
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

NOMINAL THICKNESS, OPTIONAL	TOLERANCE
10 ÷ 30 µm	± 10% (min ±2 µm)
Uniform thickness over entire external and internal surface	
Absence of point effect typical of galvanic coatings	

AESTHETIC APPEARANCE

Smokey grey metal appearance due to the high content of SiC particles.
Morphology similar to machined piece.

Matt finish option (Sandblasting, shot-peening or shotblasted)

On request, possibility of obtaining a electroless-nickel metal appearance option.

In case of hardening treatment, layer discolouring could occur:
- 260-280°C, white colour with possible yellow halos
- 340°C, iridescent blue-red colouring

HARDNESS

Niplate 600 SiC has a very high hardness, a combination of electroless nickel matrix and ultra-hard ceramic particles. This varies according to the hardening heat treatment performed after layer deposition.

HARDNESS VALUE	HEAT TREATMENT
700±50 HV	Dehydrogenation 160-180°C x 4 hrs
850±50 HV	Hardening 260-280°C x 8 hrs
1050±50 HV	Hardening 340°C x 4 hrs

WEAR RESISTANCE

Niplate 600 SiC has extreme abrasive and adhesive wear resistance, superior to that of hard chrome, thanks to the high content of ultra-hard silicon carbide particles.

APPROXIMATE WEAR VALUE, TWI-CS10	HEAT TREATMENT
1.0±0.1 mg / 1000 cycles	Dehydrogenation 160-180°C x 4 hrs
0.8±0.1 mg / 1000 cycles	Hardening 260-280°C x 8 hrs
0.6±0.1 mg / 1000 cycles	Hardening 340°C x 4 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

0,5 ÷ 0,8 depending on antagonist material

CORROSION RESISTANCE

The corrosion protection of Niplate 600 SiC, 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
≥180 hours	Carbon steel
≥240 hours	Aluminium 6082

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

CHEMICAL RESISTANCE

For application where high chemical resistance is required Niplate 500 is recommended.
Niplate 600 SiC does in any case have good chemical resistance above all in alkaline environments.

- ✓ 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

- ✓ Easily braze weldable using RMA, RA acid flow agents

FERROMAGNETISM

PRESENCE OF FERROMAGNETISM	HEAT TREATMENT
Ferromagnetic	Dehydrogenation 160-180°C x 4 hrs
Ferromagnetic	Hardening 260-280°C x 8 hrs
Ferromagnetic	Hardening 340°C x 4 hrs

MELTING POINT, SOLIDUS

870°C

DENSITY

6,8 g/cm³

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