Electroless Nickel Plating

Ideally suited for plating complex shapes with precise tolerances!

Unique characteristics

- Process without electricity. Also called chemical, electroless or autocatalytic. In practice, chemical nickel is referred to as NiP. Electroplated nickel, on the other hand, as Ni.
- Very even and accurate layer thickness with a tolerance of ± 2 microns
- Applicable on steel, aluminium and copper
- Makes the product harder (500-600 HV) and more wear-resistant. This makes it almost twice as hard as a normal nickel layer
- Can be refined to a high hardness (900-1000 HV) by means of heat treatment
- Corrosion resistant. The corrosion resistance increases further with a thicker layer
- Starting from 25 microns, or higher, the layer is pore-free
- Nickel layers possible up to approx. 50 microns
- Can be used for soldering and is chemically resistant
- Is used as an undercoat for silver on aluminium

Areas of application

Chemical nickel is often used for corrosion protection and for making products more wear-resistant in machine and equipment construction, electrical engineering, hydraulics, defence and automotive industries.

Chemical nickel plating at Galvano Hengelo

- Standard on aluminium: nickel layer with phosphorus content: 6-9% (=medium). High phosphorus on request. Production method: rack
- Standard on steel: nickel layer with high phosphorus content: >10% (=high). Production method: rack
- Medium phosphorus is slightly magnetic, can be soldered well and is reasonably chemically resistant
- High phosphorus is not magnetic, can be soldered less well and has good chemical resistance
- Maximum process temperature with chemical nickel plating: 95°C
- Fast delivery thanks to large capacity

Examples include

- Machine and equipment construction: gears, sprockets, housings, shafts, springs, machine parts and valves
- Hydraulics: manifolds, hose connections
- Electrical engineering: telecom test equipment
- Defence: F16 fighter jet components and missile parts
- Automotive: shock absorbers

Properties of electroless nickel		
Symbol	NiP	
Content Ni	87-92,5	%
Content P (mid-phos NiP-coatings, standard used on aluminium)	6-9	%
Content P (high-phos NiP-coatings, standard used on steel)	>10	%
Density (mid-Phos / high-Phos)	8,1 / 7,8	±0,2 g/cm3
Melting point	850-880	°C
Electrical resistance	50-100	µΩ/cm
Magnetism mid-Phos / high-Phos	Slight / Not	
Solderability mid-Phos / high-Phos	Good / Poor	
Hardness as plated	500 - 600	HV
Hardness after thermal treatment (standard 16 hours 280 °C)	900 - 1000	HV

Base materials for electroless nickel plating:
Steel and aluminium

Maximum product dimensions:
LxBxH = 1300 x 300 x 900 mm