Material Data sheet Issue: October 2015

Pure nickel, mat. no. 2.4068 (Ni 99.2)

1. Applications:

Pure nickel is very corrosion-resistant in alkaline media in particular, even at temperatures above 300°C. It is used in the chemical apparatus construction and pharmaceuticals industries.
As nickel is resistant to chemical substances, the absolute purity of the product being processed is ensured.

Further applications:
Production of fluorine or hydrogen chlorides
Production of NaOH (Caustic soda)
Production and storage of phenol
Production of soaps and artificial silk
Core layer of coins

Pure Nickel is not suitable for springs (see DIN EN 1654).
At high demands on the mechanical strength we suggest age hardening alloys like Nickel-Beryllium or Alloy 718.

2. Material codes:

German Norm:	2.4068 LC-Ni 99.2
UNS:	N02201
Engl. Norm:	BS BA12
Franz. Norm:	
Japan. Norm:	

3. Chemical composition: *

Ni:	> 99,2%
C:	< 0,02%
Fe:	max. 0,4%
Mn:	max. 0,3%
Si:	max. 0,1%
Cu:	max. 0,25%
Mg:	max. 0,05%
Ti:	0,01-0,10%
S:	max. 0,005%

* the exact composition of each batch can be documented by a material certificate 2.2 or 3.1 according to DIN EN 10 204.

4. Delivery condition:

Condition:	temper rolled, not hardenable
Surface:	bright
Flatness:	according to EN-Norms
Ultimate tensile str.:	see table at chapter 5

Further mechanical data: see chapter 7 and 8.

5. Sizes:

Thicknesses:	0.01 – 0.30mm
Standard sizes:	100/150 or 320mm (not in all thicknesses)
Edges:	cut
Lenghts:	individual lengths from 5 to 10 000mm or as coil

The following sizes are available from stock (without obligation),
status: October 2015:

Thickness in mm	***Tensile strength***	***Annotation***
0,01	full hard	only 100mm wide
0,02	full hard	only100mm wide
0,05	full hard	150 + 305mm
0,10	half hard	150 + 320mm
0,20	half hard	150 + 320mm
0,30	half hard	150 + 320mm

6. Tolerances:

Thickness tolerance:	+/- 10% of the thickness
Width tolerance:	according to DIN EN
Straightness:	normal
Flatness:	wave height max. 1mm

7. Further mechanical data:

Yield str. Rp0,2 :	depends on the tensile strength
Elongation A 50:	depends on the tensile strength

Nickel should not be used for springs.

The maximum temperature depends on the corrosive area, whereat the alloy 2.4068 (low carbon) is better at higher temperatures than the alloy 2.4066.
Further data is given in chapter 15.

8. Physical properties

Density:	8.90 g/cm³
Thermal conductivity:	60-81 W/(m °C) depending on the temperature
Spec. heat capacity:	460 J/(kg °C) mean value at 50 – 100 °C
Thermal expansion:	13.3 x 10 -6 (between 0 - 100 °C)
	13.9 x 10 -6 (between 0 - 200 °C)
	14.3 x 10 -6 (between 0 - 300 °C)
Electric resistance:	8.5-26 Ohm x mm²/m depending on the temperature
Modus of elasticity:	210 000 MPa at 20 °C
Relative permeability µr:	100-600

9. Blanking

We recommend a punch-to-die clearance of 4-10 % of the strip thickness.
The corner radius should be at least 0.25 mm and the punching die should be at least twice the strip thickness.

The pieces should then be tumbled to receive a good edge roundness.

10. Laser cutting
This alloy can be laser cut by solid state lasers.

11. Photo etching
Pure Nickel can be etched easily.

12. Bending
As this material is supplied in the temper rolled condition, the rolling direction is important regarding the bending. The suggested minimum bending radius depends on the tensile strength of the material.

Bending at right angle (90°) to the rolling direction:

	Half hard (ca. 500 N/mm²)	Full hard (ca. 1000 N/mm²)
Up to 0,50 mm	1 x t	4 x t

t = strip thickness

Bending parallel to the rolling direction:

	Half hard (ca. 500 N/mm²)	Full hard (ca. 1000 N/mm²)
Up to 0,50 mm	3 x t	9 x t

t = strip thickness

13. Flat grinding
Nickel is not magnetic and can be hold by magnetic clamping devices of flat grinding machines.

14. Welding
Nickel is suitable for welding, but a lower hardness can occur at the welding seam. Hard and soft soldering can be done easily.

15. Corrosion resistance
Pure Nickel has a very good resistance against many very corrosive substances (also in oxidising substances is a passivating oxide layer can be formed), against caustic solutions and molten salt (for the alloy 2.4068 also for temperatures above 300 °Celsius), against many mineral acids and also against dry chlorine gas and hydrogen chloride (also at high temperatures up to 500 ° Celsius).

Important Annotation
The specifications which are given in this technical information sheet about the condition and application of the alloys are only for reference and are no confirmation about certain performances and characteristics.
The information correspond to our own experiences and experiences of our suppliers.
We can not guarantee for the results during processing and utilisation.