

Material Data sheet

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Cold-rolled nickel foils and nickel strips W.-Nr. 2.4068**1. Application examples**

Pure nickel has very good corrosion resistance, especially in alkaline media, even at temperatures above 300 °C.

It is used in chemical apparatus construction and in the pharmaceutical industry. Since nickel is insensitive to chemical attack, it ensures the absolute purity of the processed products.

Due to the lower carbon content, grade 2.4068 has less carbide precipitation at temperatures above 300° Celsius and therefore better corrosion resistance than nickel grade 2.4066 (Alloy 200). Due to the lower carbon content in the 2.4068 alloy, the mechanical values are somewhat reduced, but the ductility is improved.

Further application examples:

- Production of fluorine and hydrogen chloride as well as CFC
- Production of NaOH (caustic soda)
- Storage and transportation of phenols
- Manufacture of soap and artificial silk
- Core layers of coin blanks

The material is not suitable as a spring material.

If there are high demands on mechanical properties, precipitation-hardenable nickel alloys such as Alloy 718 or nickel beryllium should be used.

2. Material codes

German Norm: 2.4068 LC-Ni99,2

AISI:

UNS: N02201

English Norm: BS NA 12

French Norm:

Japanese Norm:

3. Alloy Composition *

Ni: > 99,2%

C: max. 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: cold rolled, not hardenable
Surface: bright
Ultimate tensile strength: ca. 500 N/mm² (half hard) and ca. 1000 N/mm² (temper rolled)

Further mechanical data: see chapter 7 and 8.

5. Sizes

thicknesses: 0,01 bis 0,30 mm
raw material width: depending on the thickness (100 - ca. 320mm)
standard widths: 100/150 and 305-320mm
edges: cut
Lengths: individual lengths from 5 to 10 000mm or as coil

The following sizes are available from stock (without obligation):

<i>thickness</i>	<i>hardness</i>	<i>widths</i>
0,01	Temper rolled	only 100mm width
0,02	Temper rolled	only 100mm width
0,05	Temper rolled	only 150 mm
0,10	half hard	150 + 320mm
0,15	half hard	150 + 305mm
0,20	half hard	150 + 320mm
0,25	half hard	150 + 305mm
0,30	half hard	150 + 305mm

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6. Tolerances

thickness tolerance: +/- 10 % of the thickness
width tolerance: DIN EN
straightness: normal
flatness: wave height max. 1,0 mm

7. Further mechanical data

Yield strength Rp0,2 : depending on the ultimate tensile strength
Elongation A80: depending on the ultimate tensile strength

Pure nickel should not be used for springs or mechanically stressed components. As an alternative, precipitation-hardenable nickel alloys such as Alloy718 or nickel-beryllium are available.

The highest application temperature depends on the corrosive environment, whereas the alloy 2.4068 (with less Carbon) is better than the alloy 2.4066. Further data are given in chapter 15.

8. Physical properties

Density: 8,90 g/cm³
Thermal conductivity: 60-81 W/(m °C) depending on the temperature
Heat capacity: 460 J/(kg °C) medium 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 μ r: 100-600 (Magnetism is measurable)

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

This alloy is very easy to etch.

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/mm ²)	Temper rolled (ca. 1000 N/mm ²)
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/mm ²)	Temper rolled (ca. 1000 N/mm ²)
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 if 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.