

# NASNi201 (UNS N02201)

## High Corrosion Resistant Pure Nickel

Pure Nickel (NASNi201) offers excellent corrosion resistant against caustic soda, chlorine gas, etc. In particular, it is used as a material for caustic soda manufacturing equipment by diaphragm electrolysis method. Nippon Yakin supplies this product in plate, sheet and strip form.

### Grade/Standard

Nippon Yakin Grade	JIS G 4902	ASTM B162	EN
NASNi201	NW2201	UNS N02201	2.4068

### Chemical Composition

	C	Si	Mn	S	Ni	Fe	Cu
Specification (NW2201)	≤0.020	≤0.35	≤0.35	≤0.010	≥99.00	≤0.40	≤0.25
Specification (UNS N02201)	≤0.02	≤0.35	≤0.35	≤0.01	≥99.0	≤0.40	≤0.25

[wt %]

### Physical Properties

Density	[g/cm <sup>3</sup> ]	8.88
Specific heat	[J/kg · K]	456
Electrical resistivity	[μΩ · cm]	9.2
Thermal conductivity	[W/m · K]	72.7
Average coefficient of thermal expansion [10 <sup>-6</sup> /°C]	25~100°C	12.9
	25~200°C	13.6
	25~300°C	14.2
Young's modulus	[MPa]	21.1 × 10 <sup>4</sup>
Melting range	[°C]	1433~1444



**NIPPON YAKIN KOGYO CO., LTD.**

Mechanical Properties

Mechanical Properties at Room Temperature

			Thickness [mm]	Tensile strength [MPa]	0.2% Proof stress [MPa]	Elongation [%]
Specification (NW2201)		Annealed	≤1.2	≥345	≥80	≥30
			≤1.2~2.7	≥345	≥80	≥35
			≥2.7	≥345	≥80	≥40
Specification (UNS N02201) [Cold-Rolled Sheet]		Annealed	—	≥345	≥80	≥40
Example	Cold-rolled sheet	Annealed	0.6	415	231	43

Corrosion Resistance

Alkali Resistance

NASNi201 provides extremely high corrosion resistance against alkalis.

Alloy	Corrosion rate in boiling sodium hydroxide solution (mm/y)		
	20%	40%	60%
SUS304	0.01	2.77	13.30
NAS64	<0.01	0.51	5.79
NAS185N	<0.01	0.51	2.36
NASNW22	<0.01	0.03	0.06
NASNi201	<0.01	0.02	0.03

Test time: 24h

## Acid Resistance

Alloy	Corrosion rate in sulfuric acid at 80°C (mm/y)					
	5%	10%	20%	40%	60%	80%
SUS304	1.93	14.59	195.2	1347	231.8	151.4
NAS64	<0.01	0.02	1.07	191.9	1054	60.72
NAS185N	0.02	0.04	1.32	2.89	3.20	4.78
NASNW22	0.01	0.02	0.02	0.04	0.47	0.34
NASNi201	1.01	1.15	1.86	3.83	13.70	0.79

Test time: 24h

Alloy	Corrosion rate in hydrochloric acid at 80°C (mm/y)			
	0.1%	1%	2%	3%
SUS304	0.02	2.42	7.16	18.99
NAS64	0.01	0.01	12.94	30.51
NAS185N	0.01	0.02	4.20	7.21
NASNW22	0.02	0.03	0.02	0.04
NASNi201	0.99	7.28	13.38	15.91

Test time: 24h

(Reference)

Alloy	JIS	UNS No.	Chemical composition
SUS304	SUS304	S30400	18Cr-8Ni
NAS64	SUS329J4L	S32506	25Cr-6.5Ni-3.3Mo-0.17N
NAS185N	SUS312L	S31254	20Cr-18Ni-6Mo-0.8Cu-0.2N
NASNW22	NW6022	N06022	57Ni-21Cr-14Mo-3W-4Fe
NASNi201	NW2201	N02201	99Ni

**Workability**

Because the work hardenability of Pure Nickel is low, it is suitable for severe cold working by methods such as spinning and coining.

**Weldability**

Possible welding methods include shielded metal arc welding, TIG, MIG, and resistance welding. ENi-1 welding consumable should be used for TIG and MIG welding.

**Heat Treatment**

Heat treatment of NASNi201 is normally performed at the temperature range from 760 to 1050°C followed by being quenched in water or rapidly cooled by other means.

**Pickling**

It should be noted that descaling of NASNi201 is somewhat difficult in comparison with Type 304.

**Applications**

Caustic soda manufacturing plant, Terminal applications, Coins.

**For more information, please contact:**

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