

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

Physical Properties

Density	[g/cm ³]	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 ⁻⁶ /°C]	25~100°C	12.9
		25~200°C	13.6
		25~300°C	14.2
Young's modulus	[MPa]	21.1 × 10 ⁴	
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	
		$\leq 1.2\sim 2.7$	≥ 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:

Nippon Yakin Kogyo Co., Ltd.

Material Solutions Sales Department

San-Ei Bldg., 5-8, 1-chome Kyobashi, Chuo-ku,

Tokyo 104-8365 Japan

TEL: +81-3-3273-4649 FAX: +81-3-3273-4642

URL: <https://www.nyk.co.jp/en/>

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