

# NAS 255NM (UNS N08926)

## NAS High Corrosion Resistant Super Stainless Steel

NAS 255NM (UNS N08926 equivalent) is a high corrosion resistant stainless steel with high contents of chromium and molybdenum, and provides excellent corrosion resistance under severe environments such as high temperature seawater and flue gas desulfurization plants. Depending on the environment, it is a highly economical stainless steel with corrosion resistance comparable to that of Nickel alloy and pure titanium. Nippon Yakin supplies this product in plate, sheet and strip form.

### Steel Grade/Standard

NAS	JIS	ASTM A240/B625	EN
NAS 255NM	—	UNS N08926	—

### Chemical Composition

	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N
Specification* (UNS N08926)	≤0.020	≤0.50	≤2.00	≤0.030	≤0.010	24.0~ 26.0	19.0~ 21.0	6.0~ 7.0	0.5~ 1.5	0.15~ 0.25

\*ASTM A240

### Physical Properties

Density	[g/cm <sup>3</sup> ]	8.06
Specific heat	[J/kg · K]	466
Electrical resistivity	[μΩ · cm]	94.7
Thermal conductivity	[W/m · K]	11.8
Average coefficient of thermal expansion [10 <sup>-6</sup> /°C]	20~100°C	15.0
	20~200°C	15.4
	20~300°C	15.8
	20~400°C	16.1
Young's modulus	[MPa]	21.1 × 10 <sup>4</sup>
Magnetism		None
Melting range	[°C]	1320~1390



## Stress Corrosion Cracking Resistance

Alloy	MgCl <sub>2</sub> concentration (boiling point (°C) are in brackets)							
	45% (155°C)	42% (143°C)	40% (138°C)	38% (134°C)	35% (126°C)	30% (115°C)	25% (110°C)	20% (108°C)
NAS 255	×	×	×	×	○	○	○	○
NAS 329J3L	×	×	×	×	×	×	○	○
NAS 64	×	×	×	×	×	×	○	○
NAS 255NM	×	×	×	○	○	○	○	○

Test conditions

- Immersion in boiling MgCl<sub>2</sub> solution
- Test time: 300h
- U-bend test specimen is used.

○: No stress corrosion cracking  
×: Stress corrosion cracking

## Acid Resistance

Alloy	Corrosion rate in sulfuric acid at 80°C (mm/y)					
	5%	10%	20%	40%	60%	80%
NAS 255	<0.01	<0.01	0.78	2.95	0.48	5.01
NAS 329J3L	0.01	0.17	4.65	365.9	1456	106.4
NAS 64	<0.01	0.02	1.07	191.9	1054	60.72
NAS 255NM	<0.01	0.02	0.05	1.07	0.34	3.81

Test time: 24h

Alloy	Corrosion rate in hydrochloric acid at 80°C (mm/y)			
	0.1%	1%	2%	3%
NAS 255	<0.01	0.01	2.70	3.72
NAS 329J3L	0.02	0.03	31.10	60.62
NAS 64	0.01	0.01	12.94	30.51
NAS 255NM	<0.01	<0.01	3.22	5.66

Test time: 24h

(Reference)

Nippon Yakin	JIS	UNS No.	Chemical composition
NAS 255	SUS 890L	N08904	20Cr-24Ni-4.3Mo-1.5Cu
NAS 329J3L	SUS 329J3L	S32205	22Cr-5.3Ni-3.2Mo-0.16N
NAS 64	SUS 329J4L	S32506	25Cr-6.5Ni-3.3Mo-0.17N
NAS 255NM	—	N08926	20Cr-25Ni-6Mo-1Cu-0.2N

### Workability

Cold and hot workability are approximately equal to those of Type 304, 316, and other standard austenitic stainless steels. However, care is necessary for both cold and hot worked materials because they have high strength.

### Weldability

Possible welding methods include shielded metal arc welding, TIG welding, and plasma welding, in the same manner as with standard austenitic stainless steels. As welding consumables, Alloy 276 should be used. Preheating and post-welding heat treatment are not necessary.

### Machinability

As a distinctive feature of high Ni stainless steels, machinability is difficult in comparison with the austenitic stainless steels, but is easier than with Ni-based alloys. Use of a superhard tool whenever possible, together with a slow feed speed and large cut depth, is advised.

### Heat Treatment

Solution annealing of NAS 255NM should be performed at 1100°C and higher followed by being quenched in water or rapidly cooled by other means. (Conditions provided in ASTM A480/A480M)

### Pickling

A mixture of nitric acid and hydrofluoric acid is used in pickling. However, due to the high corrosion resistance of NAS 255NM, scale is somewhat difficult to remove in comparison with Type 304. Therefore, the material should be immersed in an alkaline solution before pickling, or if possible, shot blasting is extremely effective.

### Applications

- Seawater environments: Seawater desalination equipment, heat exchangers using seawater, condenser tubes, etc.
- High concentration chloride ion environments: Flue gas desulfurization systems, pulp and papermaking industries, various types of bleaching equipment, etc.

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