

# NAS255NM (UNS N08926)

## High Corrosion Resistant Super Stainless Steel

NAS255NM (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

Nippon Yakin Grade	JIS	ASTM A240/B625	EN
NAS255NM	—	UNS N08926	1.4529

### 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



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

Mechanical Properties

Mechanical Properties at Room Temperature

		0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness [HRBW]
Specification (UNS N08926)		≥295	≥650	≥35	—
Example	Cold-rolled sheet 3mm <sup>t</sup>	356	731	48	84

Corrosion Resistance

Because NAS255NM contains high concentrations of chromium and molybdenum and also contains nitrogen, it displays excellent pitting corrosion resistance and crevice corrosion resistance in chloride environments. NAS255NM demonstrates excellent corrosion resistance under corrosion environments where it had been difficult to maintain corrosion resistance with conventional duplex stainless steels.

Pitting Corrosion Resistance

Alloy	ASTM G48 Method A		ASTM G48 Method C
	22°C	50°C	Critical pitting corrosion temperature CPT (°C)
NAS255	○	×	50
NAS329J3L	○	×	50
NAS64	○	○	55
NAS255NM	○	○	75

Test conditions

ASTM G48 Method A (○: No pitting corrosion, ×: Pitting corrosion)

- Test solution: 6%FeCl<sub>3</sub>
- Test temperature: 22°C, 50°C (Recommended temperature in this test)
- Test time: 72h

ASTM G48 Method C

- Test solution: 6%FeCl<sub>3</sub> + 1%HCl
- Test time: 72h

Crevice Corrosion Resistance

Alloy	ASTM G48 Method D
	Critical crevice corrosion temperature CCT (°C)
NAS255	10
NAS329J3L	25
NAS64	30
NAS255NM	40

Test conditions

ASTM G48 Method D

- Test solution: 6%FeCl<sub>3</sub> + 1%HCl
- Test time: 72h

## 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)
NAS255	×	×	×	×	○	○	○	○
NAS329J3L	×	×	×	×	×	×	○	○
NAS64	×	×	×	×	×	×	○	○
NAS255NM	×	×	×	○	○	○	○	○

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%
NAS255	<0.01	<0.01	0.78	2.95	0.48	5.01
NAS329J3L	0.01	0.17	4.65	365.9	1456	106.4
NAS64	<0.01	0.02	1.07	191.9	1054	60.72
NAS255NM	<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%
NAS255	<0.01	0.01	2.70	3.72
NAS329J3L	0.02	0.03	31.10	60.62
NAS64	0.01	0.01	12.94	30.51
NAS255NM	<0.01	<0.01	3.22	5.66

Test time: 24h

(Reference)

Alloy	JIS	UNS No.	Chemical composition
NAS255	SUS890L	N08904	20Cr-24Ni-4.3Mo-1.5Cu
NAS329J3L	SUS329J3L	S32205	22Cr-5.3Ni-3.2Mo-0.16N
NAS64	SUS329J4L	S32506	25Cr-6.5Ni-3.3Mo-0.17N
NAS255NM	—	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 NAS255NM 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 NAS255NM, 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**

Chemical plants, Flue gas desulfurization plants, Heat exchangers.

**For more information, please contact:**

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