

NAS 75N (UNS S32760)

NAS High Corrosion Resistant Super Duplex Stainless Steel

NAS 75N is a super duplex stainless steel with a pitting resistance equivalent (PRE) number of more than 40, and provides excellent corrosion resistance and strength properties. In comparison with UNS S32205, SUS 329J3L, and SUS 329J4L (NAS 64), it offers superior localized corrosion resistance, and thus is suitable for use in chemical plants, seawater desalination plants, and similar severe environments. Nippon Yakin supplies this product in plate form.

Steel Grade/Standard

NAS	JIS	ASTM A240	EN 10088-2/10028-7
NAS 75N	—	UNS S32760	1.4501

Chemical Composition

	C	Si	Mn	P	S	Ni	Cr	Mo	N	Cu	W	PRE [*]
Specification (UNS S32760)	≤0.030	≤1.00	≤1.00	≤0.030	≤0.010	6.0~8.0	24.0~26.0	3.0~4.0	0.20~0.30	0.50~1.00	0.50~1.00	≥40
Specification* (EN 1.4501)	≤0.030	≤1.00	≤1.00	≤0.035	≤0.015	6.0~8.0	24.0~26.0	3.0~4.0	0.20~0.30	0.50~1.00	0.50~1.00	—

*EN 10088-2

*PRE = %Cr + 3.3×%Mo + 16×%N

Physical Properties

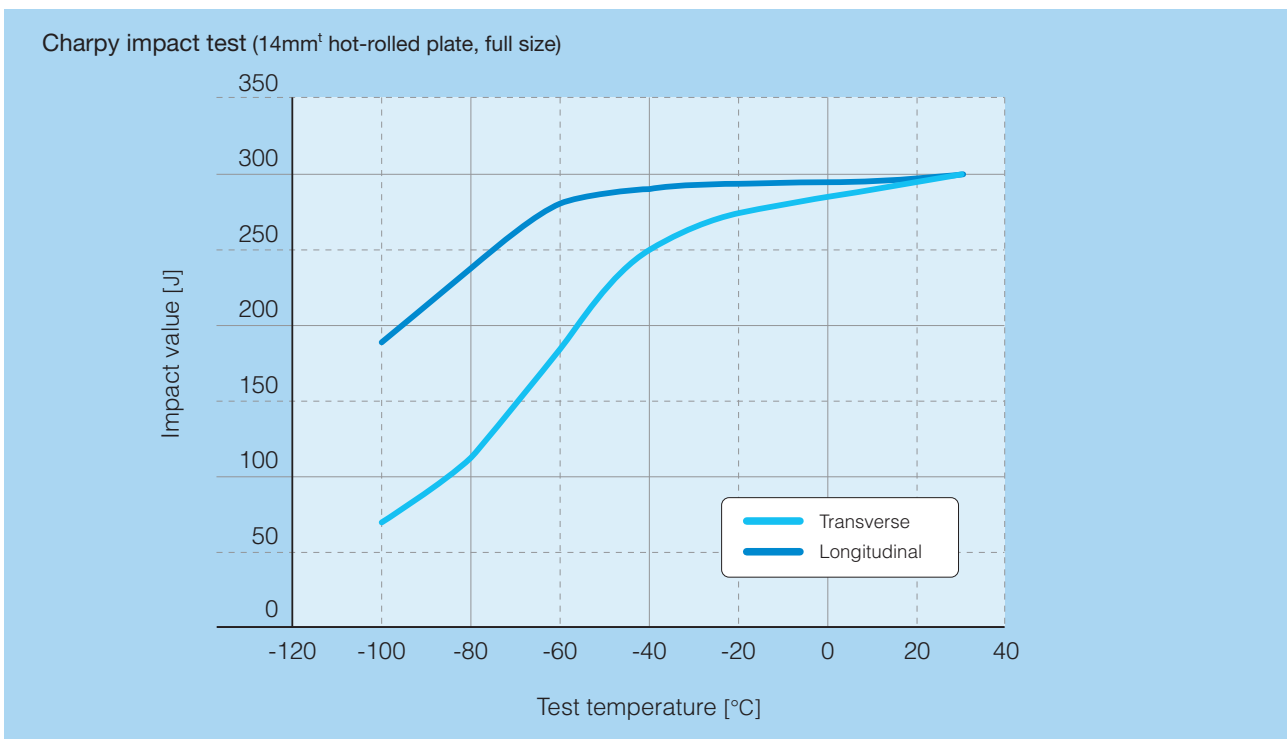
Density	[g/cm ³]	7.80
Specific heat	[J/kg · K]	466
Electrical resistivity	[μΩ · cm]	99.0
Thermal conductivity	[W/m · K]	12.8
Average coefficient of thermal expansion [10 ⁻⁶ /°C]	20~100°C	13.5
	20~200°C	13.8
	20~300°C	13.8
	20~400°C	14.0
Young's modulus	[MPa]	18.9 × 10 ⁴
Magnetism		Y (magnetizable)
Melting range	[°C]	1400~1450

Mechanical Properties

Mechanical Properties at Room Temperature

		0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness [HB]	Impact value R.T. Vnotch Fullsize (J)	
Specification (UNS S32760)		≥550	≥750	≥25	≤270	—	—
Specification (EN 1.4501)		≥530	730~930	≥25	—	≥100 (long)	≥60 (tr)
Example	Hot-rolled plate sheet 20mm ^t	583	834	36	243	295	290
	Hot-rolled plate 8mm ^t	616	852	35	243	—	—

Impact Value



Corrosion Resistance

NAS 75N has excellent localized corrosion resistance (pitting corrosion, crevice corrosion) and acid resistance in comparison with Type 304, Type 316L, NAS 329J3L (UNS S32205), NAS64.

Pitting Corrosion Resistance

Alloy	ASTM G48 Method A		ASTM G48 Method C
	22°C	50°C	Critical pitting corrosion temperature CPT (°C)
NAS 329J3L	○	×	50
NAS 64	○	○	55
NAS 75N	○	○	70

Test conditions ASTM G48 Method A (○: No pitting corrosion, ×: Pitting corrosion)
 • Test solution: 6%FeCl₃
 • Test temperature: 22°C, 50°C (Recommended temperature in this test)
 • Test time: 72h

ASTM G48 Method C
 • Test solution: 6%FeCl₃ + 1%HCl
 • Test time: 72h

Crevice Corrosion Resistance

Alloy	ASTM G48 Method D	
	Critical crevice corrosion temperature CCT (°C)	
NAS 329J3L	25	
NAS 64	30	
NAS 75N	45	

Test conditions ASTM G48 Method D

- Test solution: 6%FeCl₃ + 1%HCl
- Test time: 72h

Acid Resistance

Alloy	Corrosion rate in sulfuric acid at 80°C (mm/y)					
	5%	10%	20%	40%	60%	80%
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 75N	<0.01	<0.01	0.04	59.33	442.4	40.23

Test time: 24h

Alloy	Corrosion rate in hydrochloric acid at 80°C (mm/y)			
	0.1%	1%	2%	3%
NAS 329J3L	0.02	0.03	31.10	60.62
NAS 64	0.01	0.01	12.94	30.51
NAS 75N	0.01	0.01	<0.01	25.41

Test time: 24h

Alloy	Corrosion rate in boiling phosphoric acid (mm/y)				Corrosion rate in boiling nitric acid (mm/y)		
	20%	40%	60%	80%	20%	40%	60%
NAS 329J3L	0.03	0.06	3.96	5.52	0.02	0.04	0.11
NAS 64	0.01	0.06	0.25	4.99	0.02	0.02	0.08
NAS 75N	0.01	0.01	0.17	3.90	0.01	0.02	0.08

Test time: 24h

(Reference)

Nippon Yakin	JIS	UNS No.	Chemical composition
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 75N	—	S32760	25Cr-6.5Ni-3.6Mo-0.6Cu-0.6W-0.27N

Workability

The high-temperature strength of NAS 75N is basically the same as Type 430 in the range of 950~1150°C. It should be noted that the strength increases abruptly below 900°C. Solution annealing should be done after hot working. Regarding cold workability, care is required as proof stress is high and elongation is low in comparison with Type 304.

Weldability

Various welding methods are applicable in the same manner as with the standard austenitic stainless steels, including shielded metal arc welding, TIG welding, and plasma welding. Use of welding electrodes for UNS S32760 is recommended. Preheating and postheating are not necessary. In welding, the interpass temperature should be no more than 100°C in order to prevent formation of intermetallic compounds.

Heat Treatment

Solution annealing of NAS 75N 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 fluoric acid is used in pickling. However, because descaling is somewhat difficult in comparison with Type 304, alkali immersion before acid pickling, and if possible, shot blasting are extremely effective.

Applications

Chemical plant, Chemical tanker, Seawater desalination system, Seawater pump

Certification

It is possible to manufacture UNS S32760 in accordance with the Norsok standard below. The thickness is up to 40mm.

- Norsok M-650
- Norsok M-630 MDS D55

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