# **NAS354N** (UNS N08354) High Corrosion Resistant Super Stainless Steel

NAS354N (NCF354, UNS N08354, ASME Code Case 2585-1) is a super austenitic stainless steel with excellent corrosion resistance in various environments. The high chromium, molybdenum and nitrogen contents provide high resistance to crevice and pitting corrosion in oxidizing chloride environments while the high nickel content enhances resistance to stress corrosion cracking. The corrosion resistance of NAS354N exceeds the conventional 6 Mo super austenitic stainless steels because of containing 7.5% Mo. Nippon Yakin supplies this product in plate, sheet and strip form.

Steel Grade/St	andard									
мірроп такіп	Grade	JI	5 G 4902		ASTIV	1 8020		EN		
NAS354	N		NCF354			UNS N08354		_		
Chemical Com	position								[wt %]	
	С	Si	Mn	Р	S	Ni	Cr	Мо	Ν	
Specification (NCF354)	≦0.030	≦1.00	≦1.00	≦0.030	≦0.010	34.00~ 36.00	22.00~ 24.00	7.00~ 8.00	0.17~ 0.24	
Specification (UNS N08354)	≦0.030	≦1.00	≦1.00	≦0.030	≦0.010	34.0~ 36.0	22.0~ 24.0	7.0~ 8.0	0.17~ 0.24	

#### **Physical Properties**

Density	[g/cm <sup>3</sup> ]		8.16
Specific heat	[J/kg · K]		454
Electrical resistivirity	[μΩ · cm]		105.6
Thermal conductivity	[W/m · K]		11.3
Average coefficient of thermal expansion	[10 <sup>-6</sup> /°C]	30~100°C	14.0
		30~200°C	14.4
		30~300°C	14.7
		30~400°C	15.1
Young's modulus	[MPa]		$19.4 \times 10^{4}$
Magnetism			None
Melting range	[°C]		1362~1391

## **()** NIPPON YAKIN KOGYO CO., LTD.

#### Mechanical Properties at Room Temperature

		0.2% proof stress	Tensile strength	Elongation	Hardness		
		[MPa]	[MPa]	[%]	[HV]	[HRBW]	
Specification (NCF354)		≧295	≧640	≧40	_	-	
Specification (UNS N08354)		≧295	≧640	≧40	_	_	
Example	Cold-rolled sheet 2mm <sup>t</sup>	393	795	52	188	89	

#### **Corrosion Resistance**

NAS354N is a high Cr, high Mo stainless steel which provides excellent pitting corrosion resistance and crevice corrosion resistance in high Cl environments. As a high Ni steel, it also offers excellent stress corrosion cracking resistance.

#### Pitting Corrosion Resistance

Allow	ASTM G48	B Method A	ASTM G48 Method C		
AllOy	22°C	50°C	Critical pitting corrosion temperature CPT (°C)		
NAS329J3L	$\bigcirc$	×	50		
NAS64	$\bigcirc$	0	55		
NAS185N	$\bigcirc$	0	70		
NAS254N	0	0	80		
NAS354N	0	0	103		

Test conditions ASTM G48 Method A (O: No pitting corrosion, ×: Pitting corrosion)

Test solution: 6%FeCl₃

ASTM G48 Method C

• Test time: 72h

- Test solution: 6%FeCl₃ + 1%HCl
- Test temperature: 22°C, 50°C (Recommended temperature in this test)
- Test time: 72h

#### **Crevice Corrosion Resistance**

A.U	ASTM G48 Method D				
Alloy	Critical crevice corrosion temperature CCT (°C)				
NAS329J3L	25				
NAS64	30				
NAS185N	40				
NAS254N	45				
NAS354N	60				

Test conditions ASTM G48 Method D

Test solution: 6%FeCl<sub>3</sub> + 1%HCl

• Test time: 72h

### Stress Corrosion Cracking Resistance

	MgCl₂ concentration (boiling point (°C) are in brackets)								
Alloy	45% (155°C)	42% (143°C)	40% (138°C)	38% (134°C)	35% (126°C)	<b>30%</b> (115°C)	25% (110°C)	20% (108°C)	
NAS329J3L	×	×	×	×	×	×	0	$\bigcirc$	
NAS64	×	×	×	×	×	×	0	0	
NAS185N	×	×	×	×	0	0	$\bigcirc$	0	
NAS254N	×	×	×	0	$\bigcirc$	$\bigcirc$	0	0	
NAS354N	×	0	$\bigcirc$	0	0	$\bigcirc$	0	$\bigcirc$	

Test conditions • Immersion in boiling MgCl<sub>2</sub> solution

Test time: 300h

O: No stress corrosion cracking

• U-bend test specimen is used.

×: Stress corrosion cracking

#### Acid Resistance

Allow	Corrosion rate in sulfuric acid at 80°C (mm/y)								
Alloy	5%	10%	20%	40%	60%	80%			
NAS329J3L	0.01	0.17	4.65	365.9	1456	106.4			
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			
NAS254N	0.02	0.05	1.02	2.11	2.16	7.76			
NAS354N	0.01	0.03	0.03	2.06	3.02	4.99			

Test time: 24h

Allow	Corrosion rate in hydrochloric acid at 80°C (mm/y)							
Alloy	0.1%	1%	2%	3%				
NAS329J3L	0.02	0.03	31.10	60.62				
NAS64	0.01	0.01	12.94	30.51				
NAS185N	0.01	0.02	4.20	7.21				
NAS254N	0.01	0.02	0.01	9.14				
NAS354N	0.02	0.03	0.02	7.35				

Test time: 24h

(Reference)			
Alloy	JIS	UNS No.	Chemical composition
NAS329J3L	SUS329J3L	S32205	22Cr-5.3Ni-3.2Mo-0.16N
NAS64	SUS329J4L	S32506	25Cr-6.5Ni-3.3Mo-0.17N
NAS185N	SUS312L	S31254	20Cr-18Ni-6Mo-0.8Cu-0.2N
NAS254N	SUS836L	S32053	23Cr-25Ni-5.5Mo-0.2N
NAS354N	NCF354	N08354	23Cr-35Ni-7.5Mo-0.2N



A mixture of nitric acid and hydrofluoric acid is used in pickling. However, due to the high corrosion resistance of NAS354N, 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

Pickling

Chemical plants, Food manufacturing plants, Salt manufacturing plants, Heat exchangers, Marine structures, Environment-related equipment.

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#### Note regarding the handling of property data:

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