

NASH38X (UNS N08120)

Heat-Resistant Nickel Alloy

NASH38X (UNS N08120) is a high-nickel heat resistant alloy offering outstanding high-temperature strength and oxidation resistance. With coarse grain structure controlled by high temperature heat treatment and C, N, Nb components, NASH38X offers particularly high creep strength.

Nippon Yakin supplies NASH38X in plate form.

Grade/Standard

Nippon Yakin Grade	JIS	ASTM B409
NASH38X	—	UNS N08120

Chemical Composition

	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
Specification ASTM B409 (UNS N08120)	0.02~ 0.10	≤1.0	≤1.5	≤0.040	≤0.03	35.0~ 39.0	23.0~ 27.0	≤2.50	≤0.50
	Al	Ti	B	Co	W	N	Nb	Fe	
Specification ASTM B409 (UNS N08120)	≤0.40	≤0.20	≤0.010	≤3.0	≤2.50	0.15~ 0.30	0.4~ 0.9	Bal.	

Physical Properties

Density	[g/cm ³]		8.00
Specific heat	[J/kg · K]		472
Electrical resistivity	[μΩ · cm]		103
Thermal conductivity	[W/m · K]		11.5
Average coefficient of thermal expansion	[10 ⁻⁶ /°C]	25~200°C	14.8
		25~400°C	15.6
		25~600°C	16.2
		25~800°C	17.0
Young's modulus	[MPa]		19.6 x 10 ⁴
Magnetism	[μ]		None
Melting range	[°C]		1,360~1,391



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Mechanical Properties

1. Mechanical Properties at Room Temperature

			0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness [HBW]
Specification ASTM B409 (UNS N08120)			≥276	≥621	≥30	—
Example	Hot-rolled plate	16mmt	318	726	51	176

2. Creep Properties

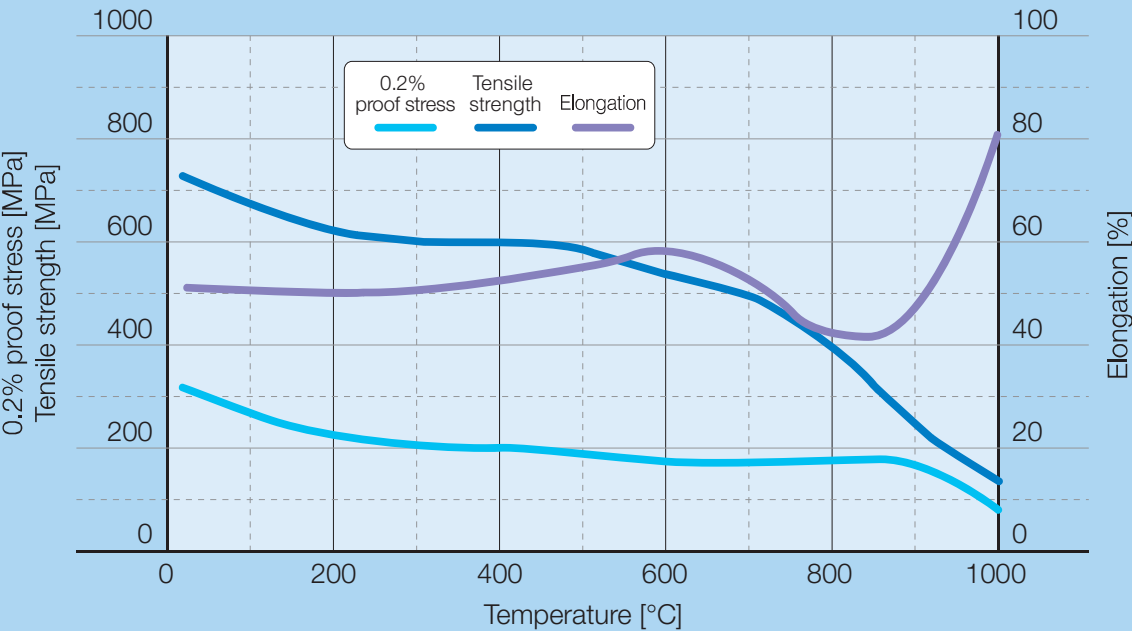
			Test condition	Rupture time [hr]	Elongation [%]
Example	Hot-rolled plate	16mmt	816°C, 110MPa	86	65

Heat Treatment and Grain Size

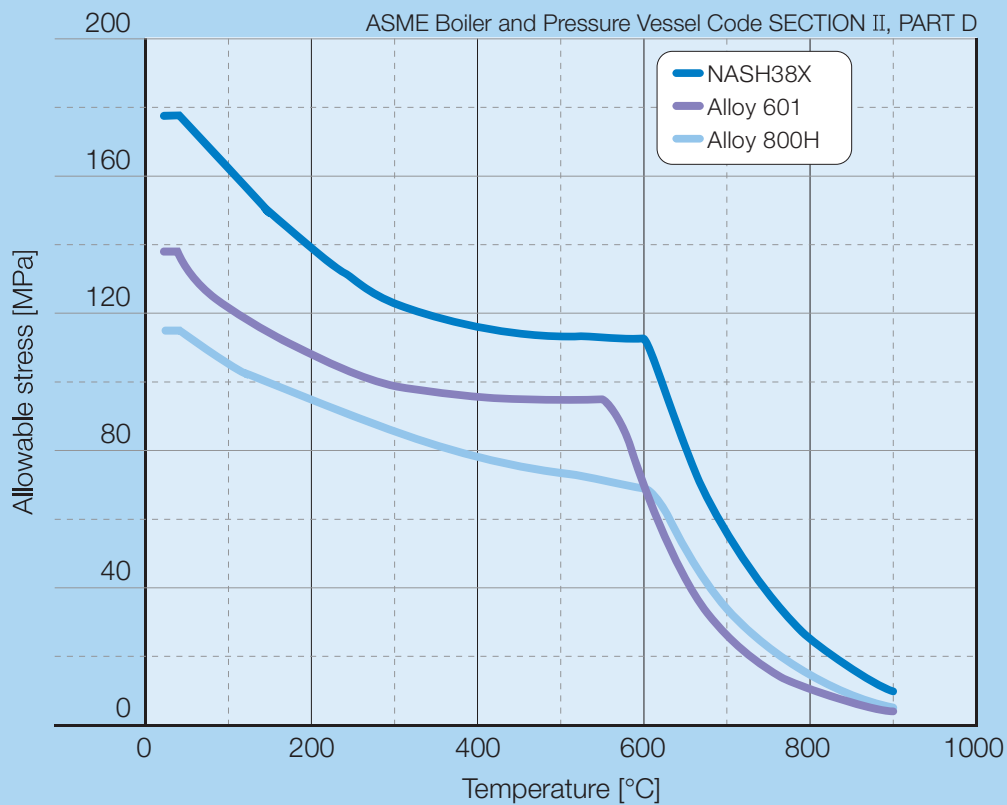
	Heat treatment	Crystal grain size
Specification ASTM B409 (UNS N08120)	≥1,177°C	No.5 or coarser

High Temperature Strength

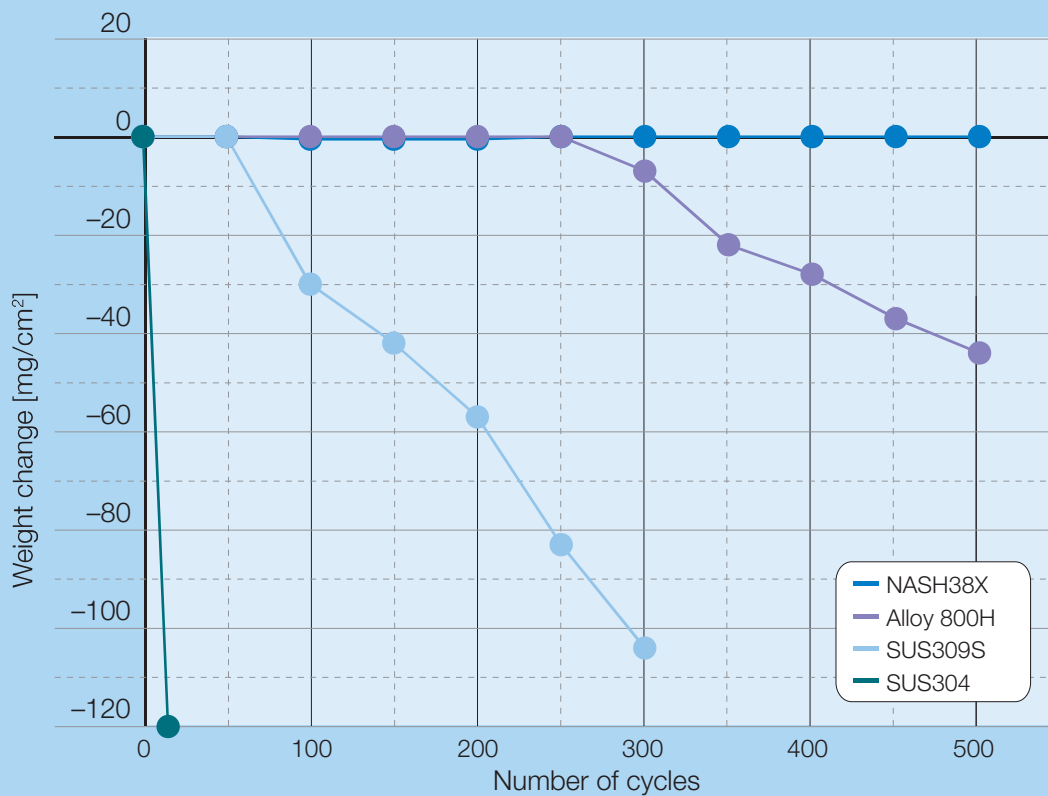
Results of high-temperature tensile test



Allowable Stress



Cyclic Oxidation Properties



Test cycles consisted of 40 min holding at 1000°C and 20 min cooling in air

Workability

Cold workability is equivalent to standard austenitic stainless steel.

Weldability

NASH38X is weldable by TIG, MIG, and shielded arc welding processes. AWS A5.9 ER3556 welding electrodes are commonly used.

Heat Treatment

NASH38X exhibits an austenite structure similar to austenitic stainless steel and is heat-treated in the same way. Typical heat treatment is as follows.

- Solution treatment: 1,177~1,232°C, Rapid cooling

Pickling

A mixture of nitric and fluoric acid is used in pickling.

Properties

NASH38X provides outstanding high-temperature strength, oxidation resistance, and carburization resistance, as well as excellent creep characteristics in temperatures of 800°C and above.

Applications

Furnace parts, Heat treatment fixtures.

For more information, please contact:

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