

# NAS H330 (UNS N08330)

## NAS Heat-Resistant Nickel Alloy

NAS H330 is a heat resistant nickel alloy with excellent high temperature strength, corrosion resistance, and metallurgical stability. In particular, it provides superior resistance to carburization and nitridation. Because it has a fully austenitic microstructure, it displays good workability. Nippon Yakin supplies NAS H330 in plate, sheet, and strip forms.

### Steel Grade/Standard

NAS	JIS	ASTM B536
NAS H330	—	UNS N08330

### Chemical Composition

	C	Si	Mn	P	S	Ni	Cr	Cu	Pb	Sn	Fe
Specification (UNS N08330)	≤0.08	0.75~1.50	≤2.00	≤0.03	≤0.03	34.0~37.0	17.0~20.0	≤1.00	≤0.005	≤0.025	Balance

### Physical Properties

Density	[g/cm <sup>3</sup> ]	7.98
Specific heat	[J/kg · K]	480
Electrical resistivity	[μΩ · cm]	100
Thermal conductivity	[W/m · K]	11.9
Average coefficient of thermal expansion [10 <sup>-6</sup> /°C]	25~200°C	15.3
	25~400°C	16.0
	25~600°C	16.5
	25~800°C	17.1
Young's modulus	[MPa]	19.6 × 10 <sup>4</sup>
Magnetism	[μ]	None
Melting range	[°C]	1340~1395

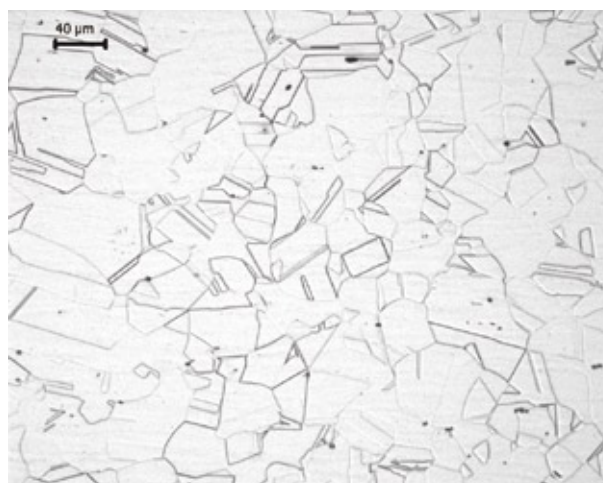
Mechanical Properties

Mechanical Properties at Room Temperature

			0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness [HRB]
Specification ASTM B536 (UNS N08330)			≥207	≥483	≥30	70~90
Examples	Hot-rolled plate	9.5mm <sup>t</sup>	253	549	46	78
	Cold-rolled sheet	3mm <sup>t</sup>	269	545	45	76

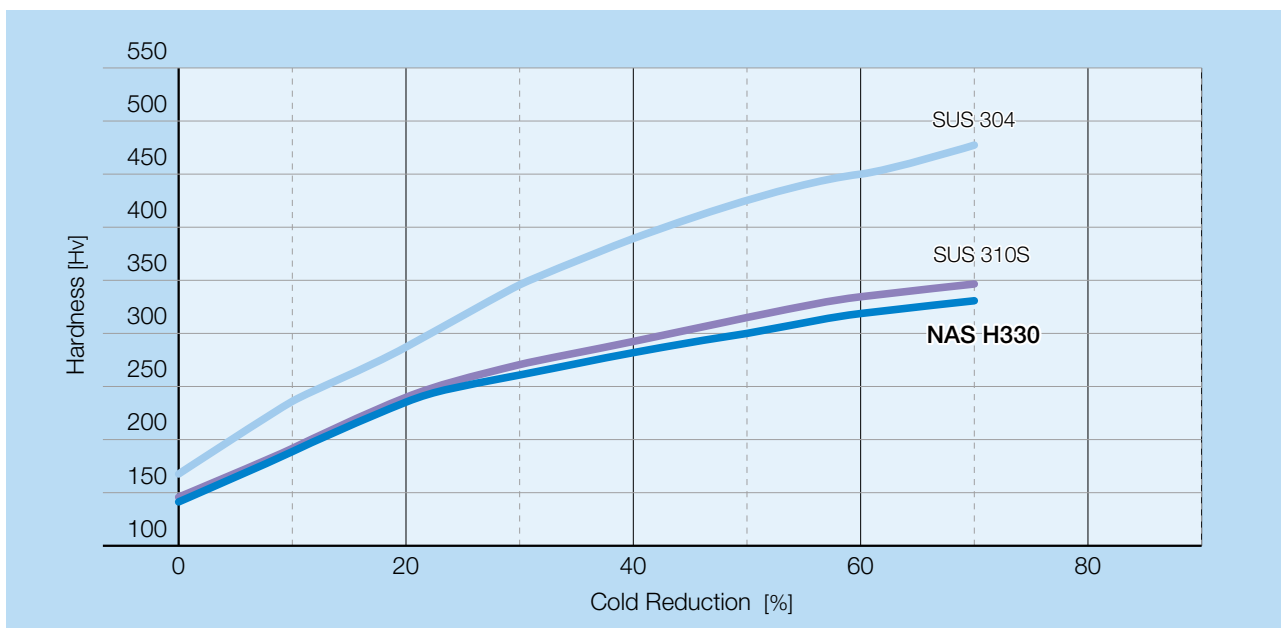
Microstructure

		Heat treatment
Specification ASTM B536 (UNS N08330)		≥1040°C

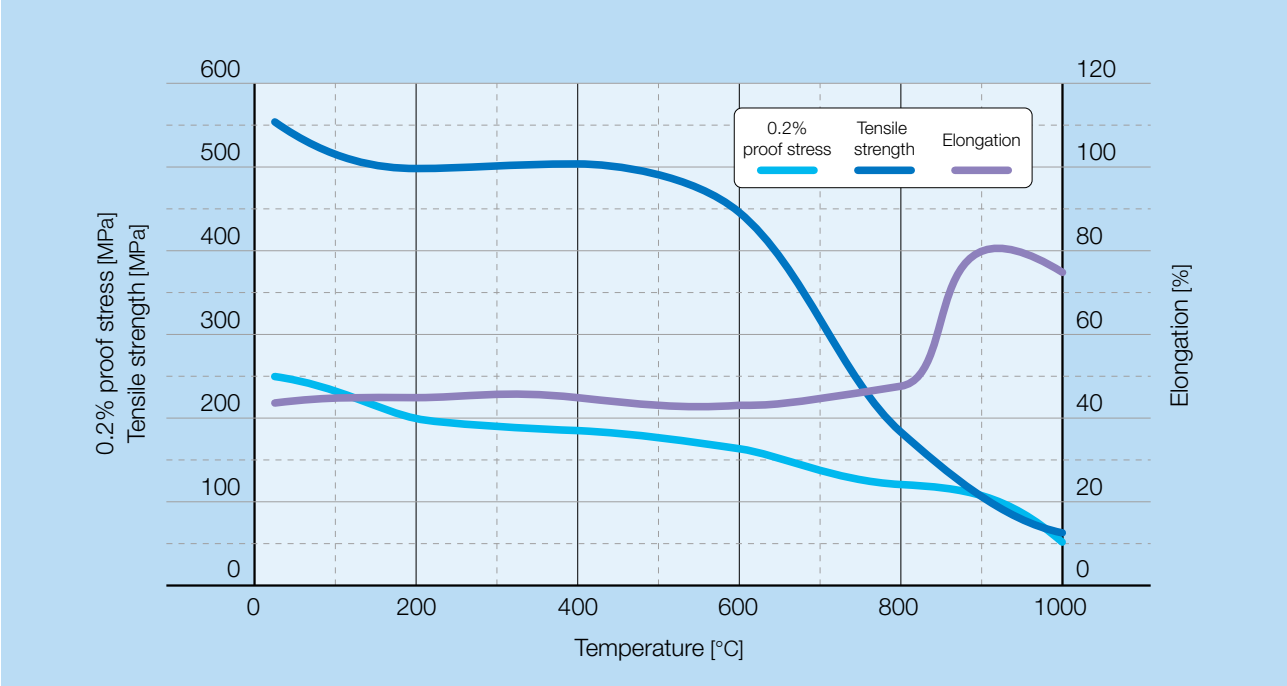


Typical microstructure of NAS H330 Grain Size Number = 5

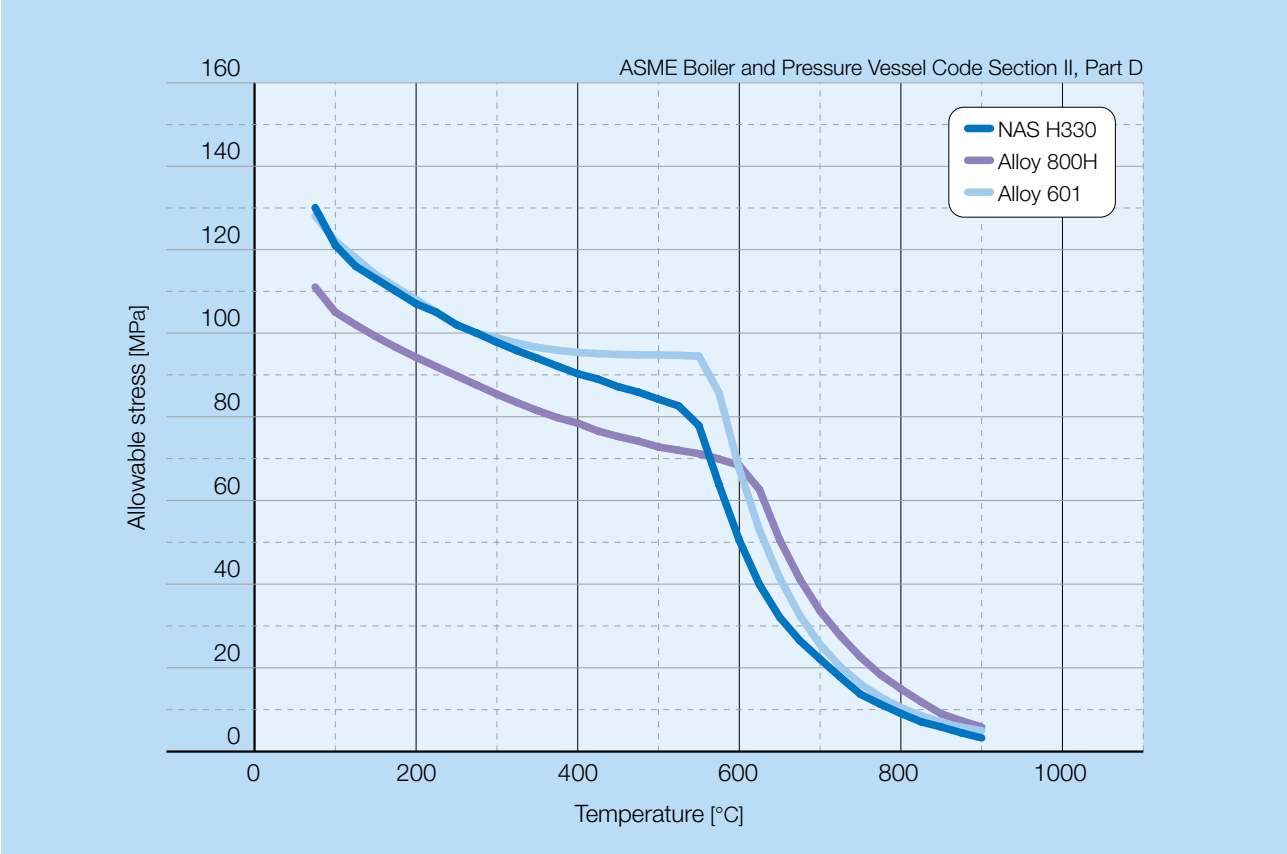
Work Hardening Property



High Temperature, Short Term Tensile Strength



Allowable Stress



### Workability

The hot workability and cold workability of NAS H330 are similar to those of conventional austenitic stainless steels. For hot working, a starting temperature of 1230°C and finishing temperature of 980°C are suitable. Cold workability is similar to that of conventional austenitic stainless steels. Work hardening tends to be slightly lower. Bending, drawing, and similar working are possible.

### Weldability

NAS H330 can be welded by TIG, MIG, and shield metal arc welding in the same manner as with conventional standard austenitic stainless steels. AWS ERNiCr-3 welding electrodes are frequently used.

### Heat Treatment

Heat treatment of NAS H330 is similar to that of conventional austenitic stainless steels. The typical heat treatment is as follows:

Solution heat treatment: 1040~1120°C

Carbide dissolution and strain removal are performed in the above solution heat treatment.

### Pickling

Pickling is performed with a nitric-hydrofluoric acid solution or aqua regia solution (nitric-hydrochloric acid solution) in the same manner as with standard austenitic stainless steels.

### Features

NAS H330 is used mainly in high temperature carburizing or nitriding atmospheres. It is most suitable for application in the 815~1150°C temperature range.

### Applications

- Industrial furnace parts
- Heat treatment boxes in carburizing, nitriding and solution heat treatment
- Radiant tubes
- Petrochemical processing equipments

#### For more information, please contact:

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

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