

NAS 800 (UNS N08800)

NAS Heat-Resistant Nickel Alloy

NAS 800 (NCF 800, UNS N08800) is a nickel-iron-chromium alloy that provides high strength and excellent resistance to oxidation and carburization at high temperatures. It also offers excellent corrosion resistance in many aqueous environments. Nippon Yakin provides this product in plate, sheet, and strip forms.

Grade/Standard

NAS	JIS G4902	ASTM B409	EN 10095
NAS 800	NCF 800	UNS N08800	1.4876

Chemical Composition

	C	Si	Mn	P	S	Ni	Cr	Cu	Al	Ti	Fe
Specification (NCF 800)	≤0.10	≤1.00	≤1.50	≤0.030	≤0.015	30.00~35.00	19.00~23.00	≤0.75	0.15~0.60	0.15~0.60	Bal.
Specification (UNS N08800)	≤0.10	≤1.0	≤1.5	—	≤0.015	30.0~35.0	19.0~23.0	≤0.75	0.15~0.60	0.15~0.60	≥39.5
Specification (EN 1.4876)	≤0.12	≤1.00	≤2.00	≤0.030	≤0.015	30.00~34.00	19.00~23.00	—	0.15~0.60	0.15~0.60	—

Physical Properties

Density	[g/cm ³]	8.02
Specific heat	[J/kg · K]	460
Electrical resistivity	[μΩ · cm]	99.0
Thermal conductivity	[W/m · K]	12.6
Average coefficient of thermal expansion [10 ⁻⁶ /°C]	25~200°C	15.9
	25~400°C	16.8
	25~600°C	17.3
	25~800°C	18.1
Young's modulus	[MPa]	19.7 × 10 ⁴
Curie point	[°C]	-115
Magnetism		None
Melting range	[°C]	1357~1385

Properties at High Temperatures

	Thermal conductivity [W/m · K]	Average coefficient of thermal expansion [10 ⁻⁶ /°C]	Young's modulus [10 ⁴ MPa]
Room temperature	12.6	—	19.7
100°C	14.1	14.6	19.3
200°C	16.1	15.9	18.7
300°C	17.8	16.4	18.0
400°C	19.3	16.8	17.3
500°C	20.6	17.0	16.7
600°C	23.2	17.3	15.9
700°C	24.4	17.7	15.2
800°C	25.1	18.1	14.5
900°C	25.9	18.3	13.8
1000°C	26.7	18.6	13.1

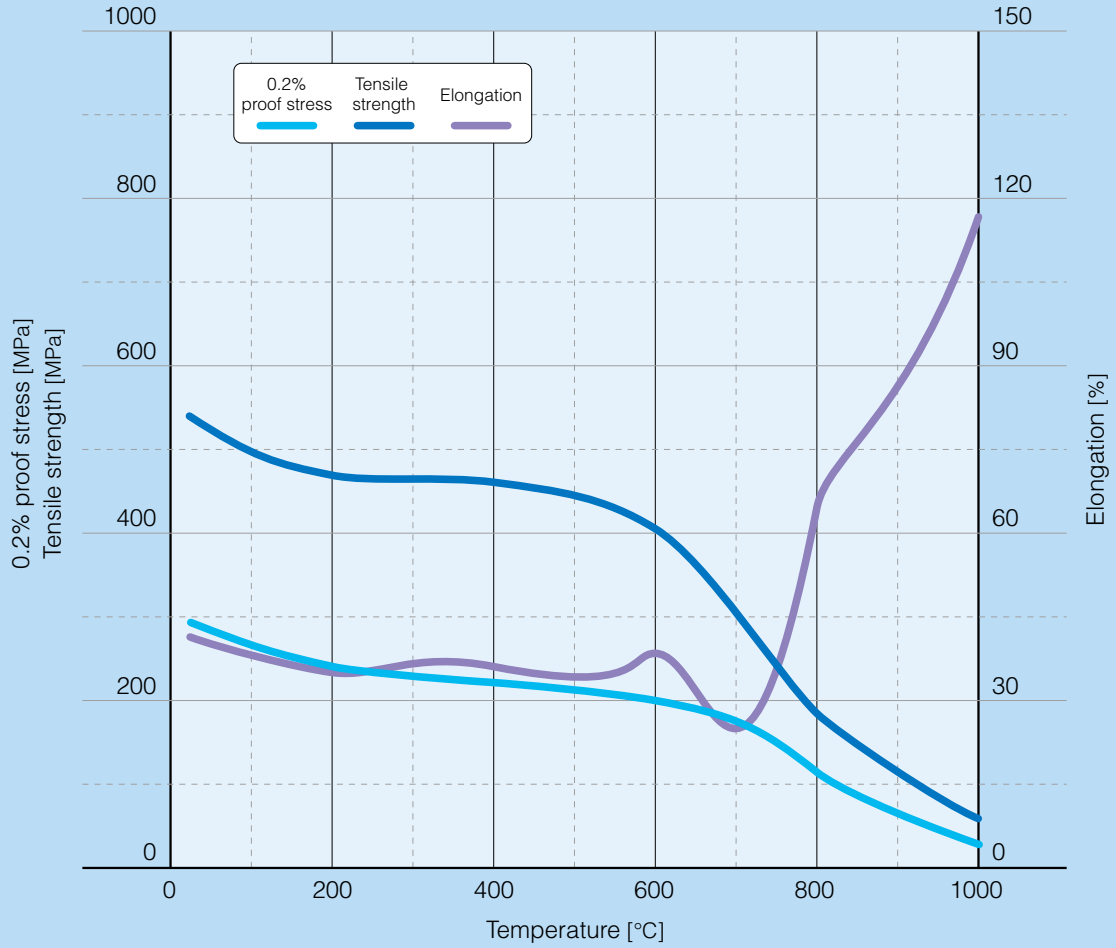
Mechanical Properties

Mechanical Properties at Room Temperature

	0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness	
				[Hv]	[HB]
Specification (NCF 800)	≥ 205	≥ 520	≥ 30	≤ 182	≤ 179
Specification (UNS N08800)	≥ 205	≥ 520	≥ 30	—	—
Specification (EN 1.4876)	≥ 170	450~680	≥ 30	—	≤ 192

High Temperature Strength

Results of high-temperature tensile test



Workability

Whether for hot working or cold working, NAS 800 offers workability similar to austenitic stainless steels. For hot working, temperatures should be between 1000 and 1230°C, although light work may be done at temperatures as low as 850°C. To prevent cracks, we recommend avoiding the temperature range between 650 and 800°C. Although cold workability is similar to austenitic stainless steels, work hardening tends to be slightly lower.

Weldability

As with standard austenitic stainless steels, NAS 800 may be welded using techniques such as TIG, MIG, and shield metal arc welding. AWS ERNiCr-3/AWS ENiCrFe-2 welding rods are often used.

Heat Treatment

NAS 800 exhibits an austenite structure similar to austenitic stainless steels, and appropriate heat treatment procedures and requirements are similar. Typical heat treatments are as follows:

Annealing: 980~1060°C; rapid cooling

Properties at High Temperatures

Because of its high nickel and chromium content, NAS 800 resists oxidation and carburization at high temperatures. NAS 800 is superior to Type 310S and approaches NAS 600 in resistance to oxidation. Offering superior high-temperature strength nearly equal to NAS 600, NAS 800 is widely used in applications requiring heat resistance, as they do not become brittle due to sigma phase precipitation during use. While NAS 800 is generally used at temperatures below 600°C, NAS 800H/800T are recommended for applications requiring superior creep properties at higher temperatures.

Corrosion Resistance

NAS 800 offers superior corrosion resistance in oxidizing corrosive environments such as nitric acid or nitric acid-sulfuric acid. Likewise, it performs well in sodium salt and other molten salt environments, with stress corrosion cracking resistance surpassing standard austenitic stainless steels.

Applications

NAS 800 is widely used in sheathed heaters, thermocouple protection tubes, heat treatment furnaces, and other high-temperature environments.

For more information, please contact:

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