NAS36

Controlled Expansion Material

NAS36 is an alloy with nickel (36%) and iron as its main components. Because its coefficient of thermal expansion is extremely low, at about 1/10 that of 18-8 stainless steel, thermal stress caused by temperature changes can be held to a very low level, and complex shapes (wave, bellows, etc.) like those required with other low-temperature materials are not necessary. NAS36 also shows high toughness at low temperatures and provides excellent weldability. Nippon Yakin supplies NAS36 in plate, sheet and strip forms.

Steel Grade/Standard

Nippon Yakin Grade	JIS	ASTM	EN
NAS36	—	—	—

Chemical Composition

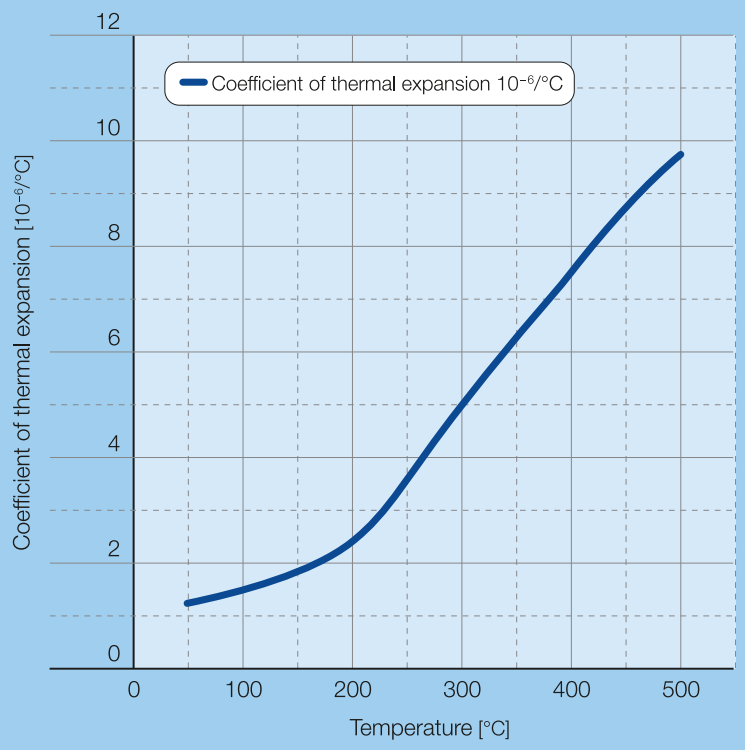
[wt %]

C	Si	Mn	Ni	Fe
≦0.05	≦0.30	≦0.80	35.0~37.0	Bal.

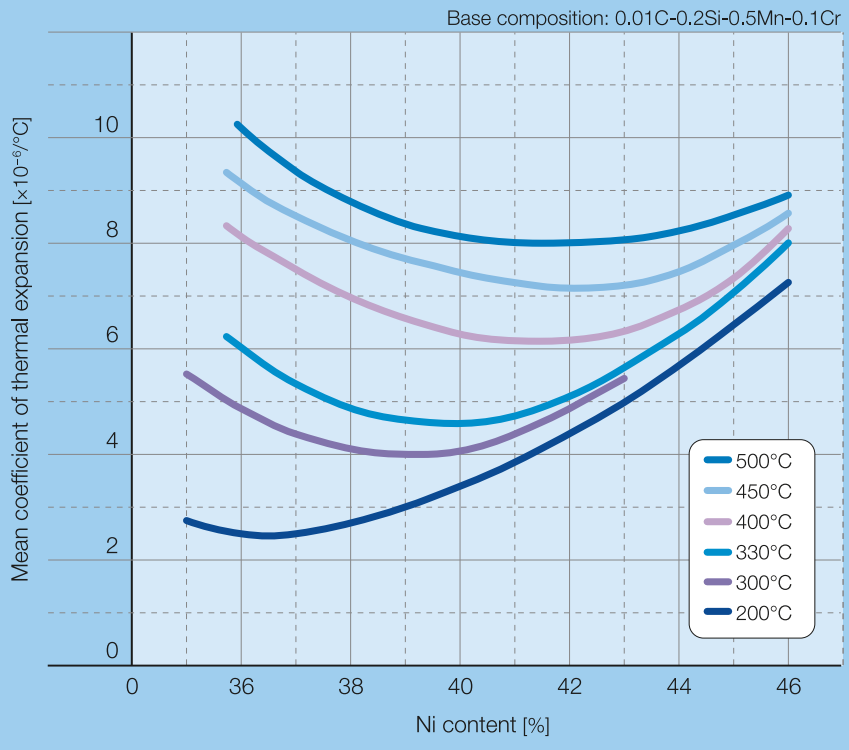
Physical Properties

Density	[g/cm^3]		8.14
Specific heat	[J/kg · K]	–196~20°C	385
Electrical resistivity	[μΩ · cm]	at 20°C	78
Thermal conductivity	[W/m · K]	at 20°C	10.5
		at –196°C	5.4
Average coefficient of thermal expansion	[10^{-6}/°C]	25~100°C	1.5±0.5
Young's modulus	[MPa]		14.5 × 10^4
Curie point	[°C]		240~260
Melting range	[°C]		1415~1465

Coefficient of Thermal Expansion



Mean coefficient of thermal expansion of Ni-Fe alloys



Mechanical Properties

Annealed Condition

		0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hardness
Example	Hot-rolled plate 22mm^t	241	430	44	115 (HBW)
	Cold-rolled sheet 1.3mm^t	292	477	37	132 (HV)

Weldability

NAS36 has good weldability. Joints of thin sheet materials can be welded by TIG welding without a filler, even in seam welding.

Applications

Molds for airplane body parts, Bimetals, Trimetals, Semiconductor manufacturing equipment.

For more information, please contact:
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