NASHX (UNS N06002) Heat-Resistant Nickel Alloy

NASHX (UNS N06002) is a nickel-chromium-iron-molybdenum alloy with outstanding strength and oxidation resistance in temperatures reaching as high as 1200°C. With superior workability and weldability as well, it is excellent for use in gas turbine members as well as various heating furnace parts. Nippon Yakin supplies this product in plate, sheet, and strip forms.

Grade/S	tanda	ard													
Nippon Ya	akin G	rade		JIS	G 490	2		A	STM B	435			AMS \$	5536	
NASHX				NW6002				UNS N06002				5536M			
Chemical Composition															
															[wt %
	С	Si	Mn	Р	S	Ni	Cr	Мо	Со	AI	Ti	Cu	W	Fe	В
Specification (NW6002)	0.05~ 0.15	≦1.00	≦1.00	≦0.040	≦0.030	Bal.	20.50~ 23.00	8.00~ 10.00	0.50~ 2.50	-	-	-	0.20~ 1.00	17.00~ 20.00	≦0.010
Specification (UNS N06002)	0.05~ 0.15	≦1.00	≦1 <u>.</u> 00	≦0.0 4	≦0.0 3	Bal.	20.5~ 23.0	8.0~ 10.0	0.5~ 2.5	-	-	-	0.2~ 1.0	17.0~ 20.0	-
Specification* (UNS N06002)	0.05~ 0.15	≦1.00	≦1.00	≦0.040	≦0.030	Bal.	20.50~ 23.00	8.00~ 10.00	0.50~ 2.50	≦0.50	≦0.15	≦0.50	0.20~ 1.00	17.00~ 20.00	≦0.010
AMS 5536M Physical Properties															

Density	[g/cm ³]		8.20
Specific heat	[J/kg · K]		434
Electrical resistivity	[μΩ · cm]		113
Thermal conductivity	[W/m · K]		10.5
Average coefficient of thermal expansion	[10 ⁻⁶ /°C]	25~ 200°C	13.9
		25~ 400°C	14.5
		25~ 600°C	15.0
		25~ 800°C	15.9
		25~1000°C	16.7
Young's modulus	[MPa]		19.5 × 10 ⁴
Magnetism			None
Melting range	[°C]		1290~1365

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Mechanical Properties

Mechanical Properties at Room Temperature

		0.2% proof stress [MPa]	Tensile strength [MPa]	Elongation [%]	Hard [HV]	ness [HBW]
Spe	ecification (NW6002)	≧245	≧660	≧35	-	-
Spe	ecification (UNS N06002)	≧240	≧655	≧35	_	_
Spe	ecification (SAE AMS 5536M)	≧310	≧724	≧35	_	_
Exar	Hot-rolled plate 6mm ^t	388	772	40	_	204
nple	Cold-rolled sheet 1.2mm ^t	369	777	45	183	_

Impact Value

	Aging treatment	Test temperature [°C]	Impact value [J/cm²]
	Not applied	-196	138
Solution-treated NASHX	Not applied	-78	162
	Not applied	Room temp.	184
	816°C for 50hr	Room temp.	53
NASHX solution treated,	816°C for 150hr	Room temp.	45
then aged	816°C for 500hr	Room temp.	41

High Temperatures Strength



Creep Properties

			Test temperature [°C]	Load [MPa]	Rupture time [hr]	Rupture elongation [%]
Specification (SAE AMS 5536M)			816	110	≧24	≧8
	Hot-rolled plate	35mm ^t	816	110	63	76
Exar	Hot-rolled plate	12mm ^t	816	110	77	97
nple	Cold-rolled sheet	3mm ^t	816	110	93	79
	Cold-rolled sheet	1.2mm ^t	816	110	67	74

Formability

Formability

A formability test was performed on a sheet of solution-treated NASHX 1.5mm thick with number 2B finish. NASHX is easily formed with cold working.

	Erichsen value [mm]	Limited drawing ratio			
NASHX	10.3	2.10			

Bendability

A 180° bending test to demonstrate the bending radius 2t (t being the nominal thickness) was performed on a sheet of solution-treated NASHX 3mm thick with number 2B finish.



No cracking



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Note regarding the handling of property data:

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