Technical Data

High performance copper alloy

NKT322

JX Nippon Mining & Metals Corporation

1. Introduction

JX Nippon Mining & Metals has developed a new original alloy, NKT322. NKT322 is a Fe bearing titanium copper modified by optimized manufacturing process. NKT322 highly improved strength and bend formability comparison with conventional titanium copper.

This technical brochure should help understand NKT322.

＊This data included are normal numbers.

2. Features

(1) High strength and good bend formability

(2) Good stress relaxation property at elevated temperatures

3. Chemical Composition

Table.1 Chemical composition of NKT322 (wt%)

	Ti	Fe	Cu+Ti+Fe
Typical	2.9～3.4(3.2)	0.17～0.23	≧99.5

4. Physical Properties

Table.2 Physical properties of NKT322

Electrical Conductivity	10～13	%IACS(@20℃)
Specific Resistance	132～172	nΩ・m (@20℃)
Thermal Conductivity	66.79	W/mK
Thermal Expansion Coefficient	18.0	10^{-6}/K (20 to 200℃)
Young's Modulus	120	kN/mm^2
Density	8.70	g/cm^3

5. Mechanical Properties

Table.3 Mechanical properties of NKT322

Temper	Tensile Strength (N/mm^2)	0.2% offset Yield Strength (N/mm^2)	Elongation (%)	Hv
H	950 (900～1000)	850 (800～900)	18 (min 12.0)	300
EH	970 (920～1020)	900 (850～950)	16 (min 10.0)	310
SH	1020 (970～1100)	950 (900～1000)	12 (min 6.0)	320
ESH	1070 (1010～1200)	1000 (950～1050)	9 (min 3.0)	340

Upper numbers: Typical mechanical properties of over 0.1mm-thick material.
Lower numbers: Requirements for each temper

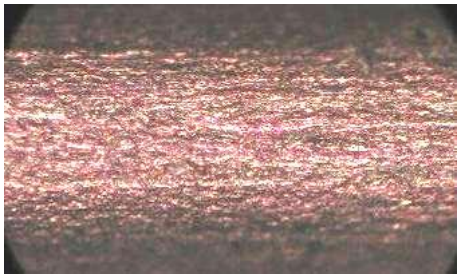
6. Bend Formability

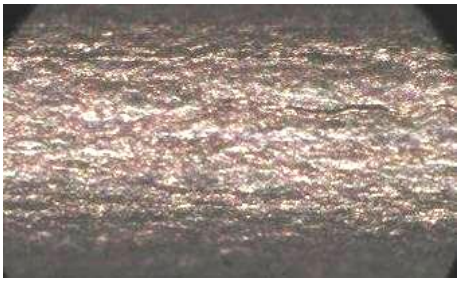
W shaped bending test was performed to evaluate minimum bend radius without surface crack (MBR). Table.4 shows MBR/t (Minimum Bend Radius /Thickness). Fig1 shows typical surface appearance. NKT322 has high strength and even better good bend formability. "Temper H" of 1mm width and 0.15mm thickness can be bent by 180° U-shaped bend with zero radius in both bad way and good way.

Table.4 Bend formability of NKT322

Temper \ Thickness (mm)	MBR ／ t	
	Good way	Bad way
H ≦0.15	0.0	0.0
H 0.15～0.25	0.0	0.5
EH ≦0.15	0.0	0.5
EH 0.15～0.25	0.5	1.0
SH ≦0.12	0.0	1.0
SH 0.12～0.22	1.0	2.0
ESH ≦0.10	1.0	2.0
ESH 0.10～0.20	2.0	3.0

Specimen size: thickness×10mm^{w}×30mm^{l}



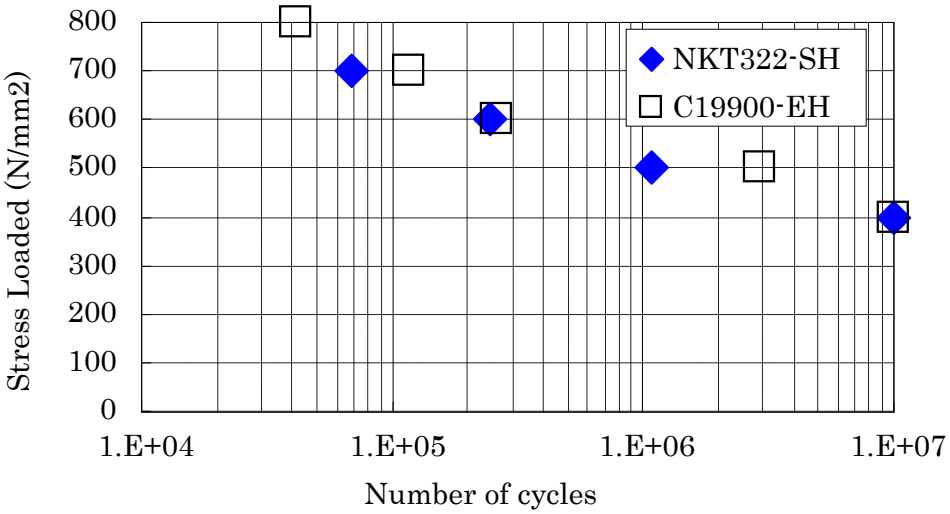


Temper:SH, Thickness: 0.1mm(TS=1.05GPa)　Temper:SH, Thickness: 0.08mm(TS=1.03GPa)

Fig.1 Surface appearance of 90° W shaped bending test specimens NKT322 (Bad way R/t =1)

7.Fatigue Characteristic

Fatigue Characteristic is important when material is used as spring application such as connectors. Fig. 2 shows results of fatigue tests.



Testing method : According to JIS-Z-2273

Fig. 2　Comparison of Fatigue Strength

8. Stress Relaxation Resistance

Stress relaxation resistance is highly important for maintaining the contact force for long period of time or at elevated temperatures. Fig.3 exhibits the stress relaxation resistance of NKT322. It has excellent stress relaxation resistance in comparison with beryllium copper.

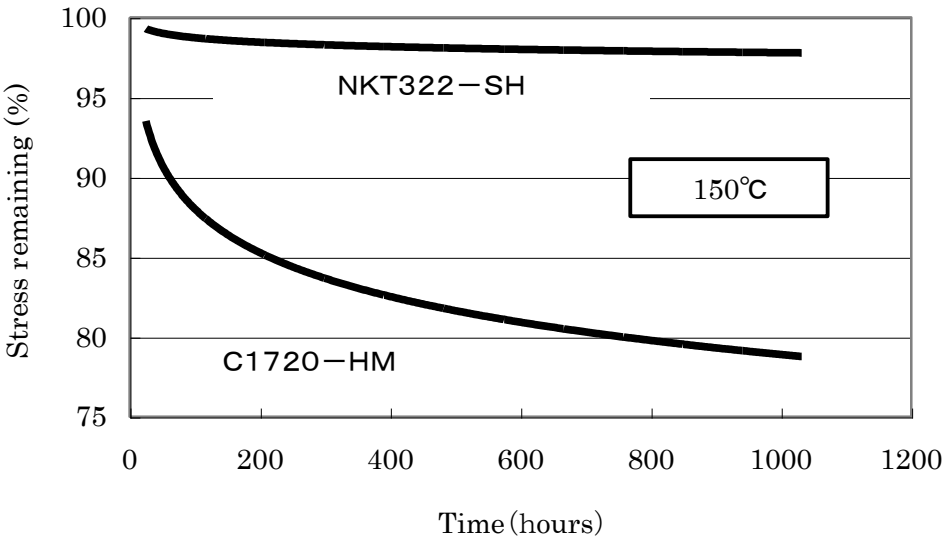
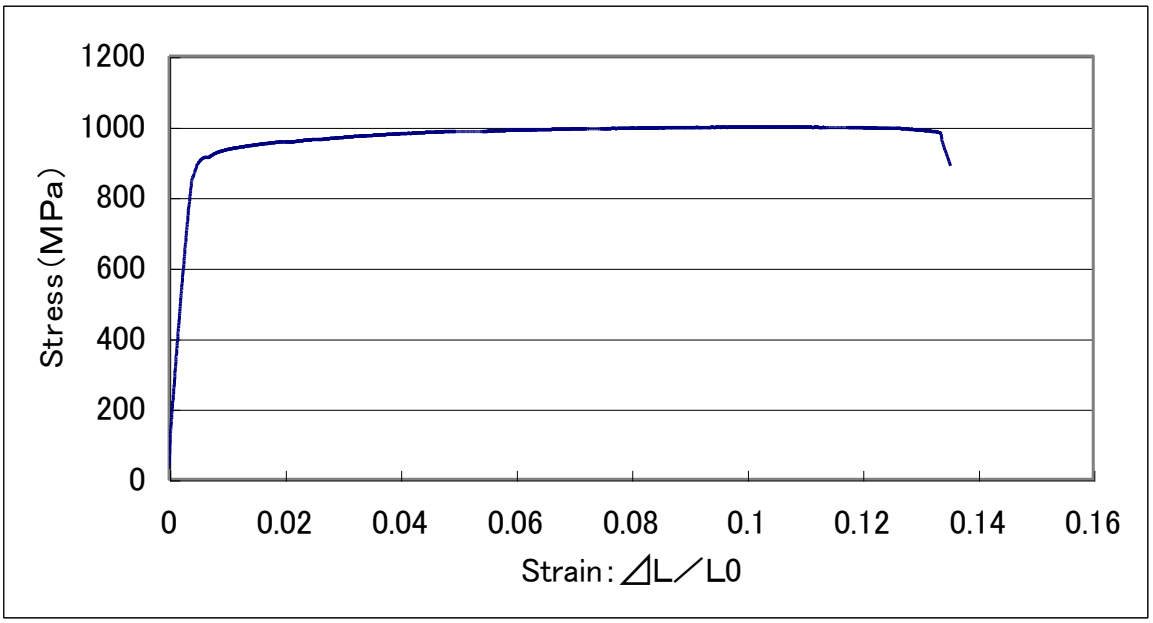


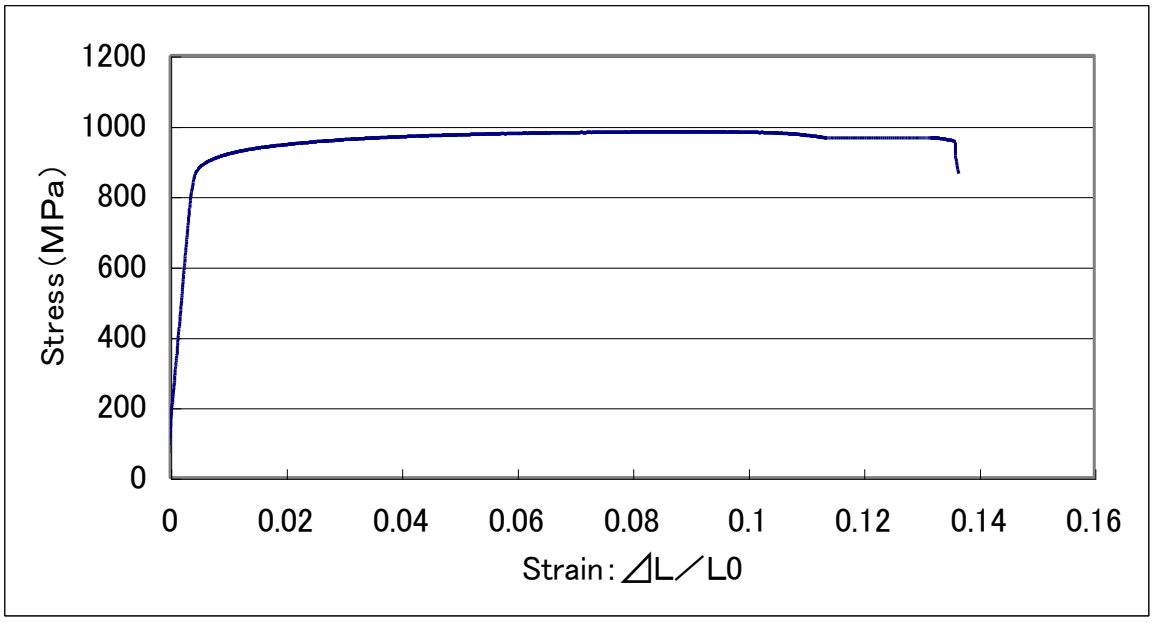
Fig.3　Stress relaxation resistance of NKT322 at 150℃

9. Stress-Strain Curve

Fig.4～6 shows the Stress-Strain curve for NKT322.

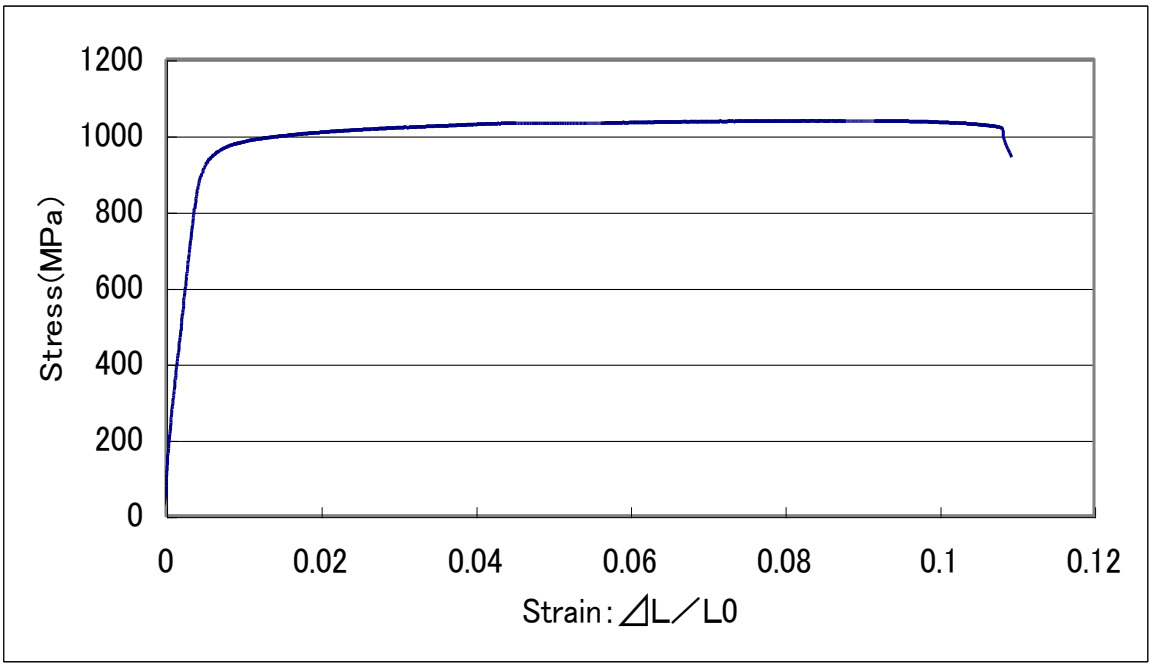


Rolling direction

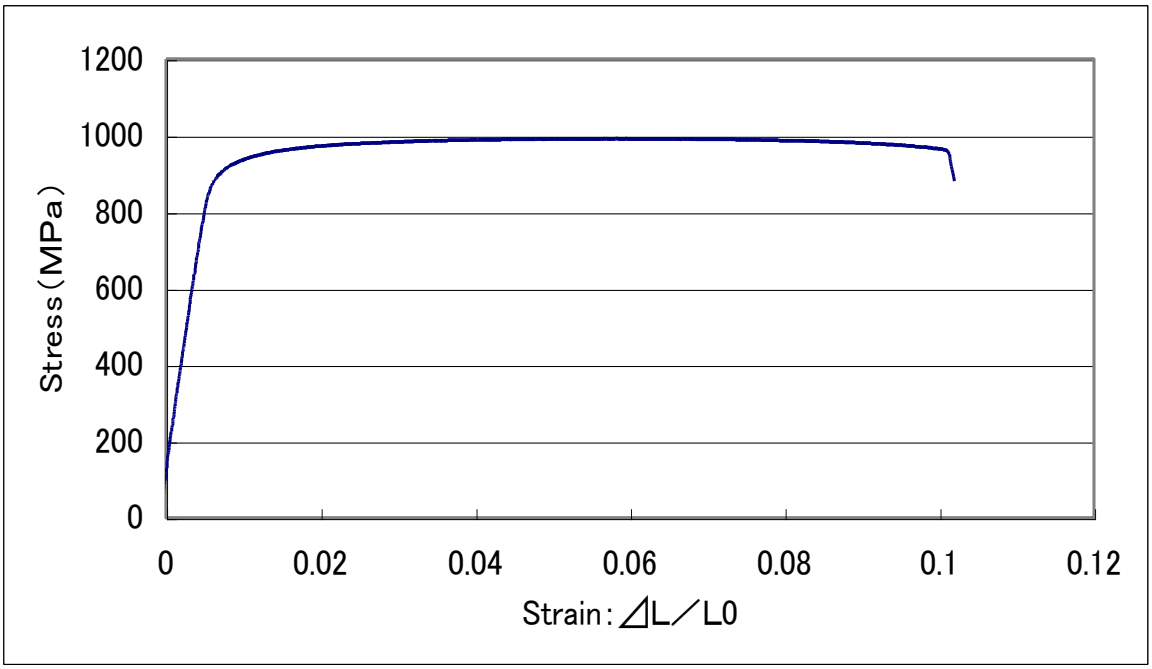


Transverse direction

Fig.4 Stress-Strain curve for NKT322-EH

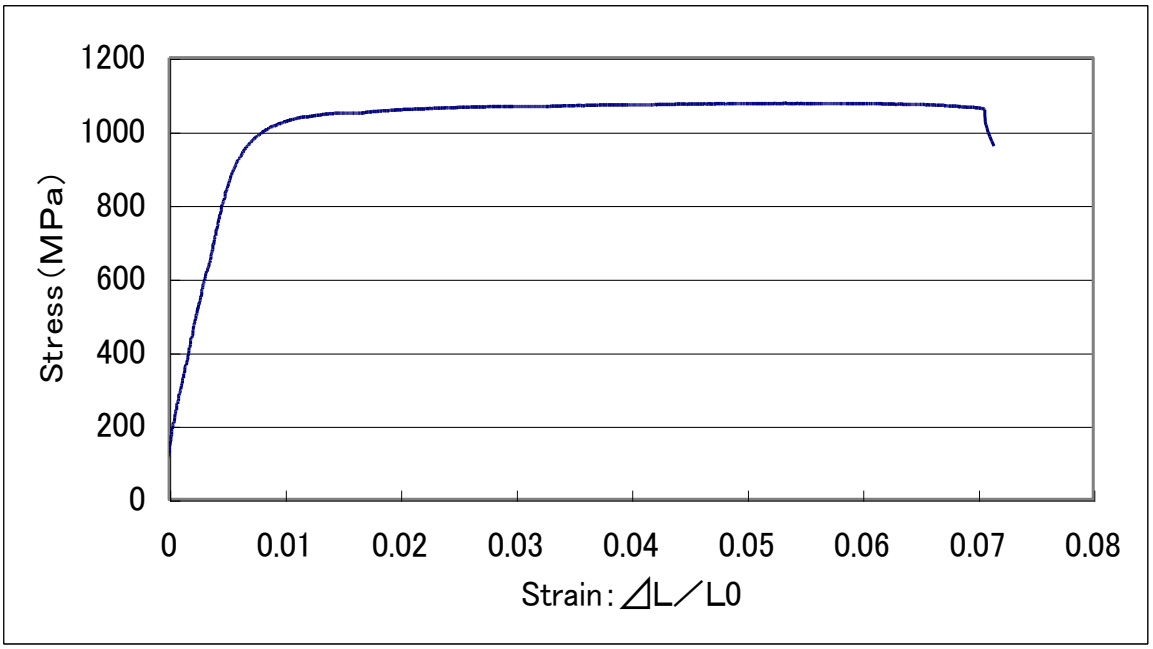


Rolling direction

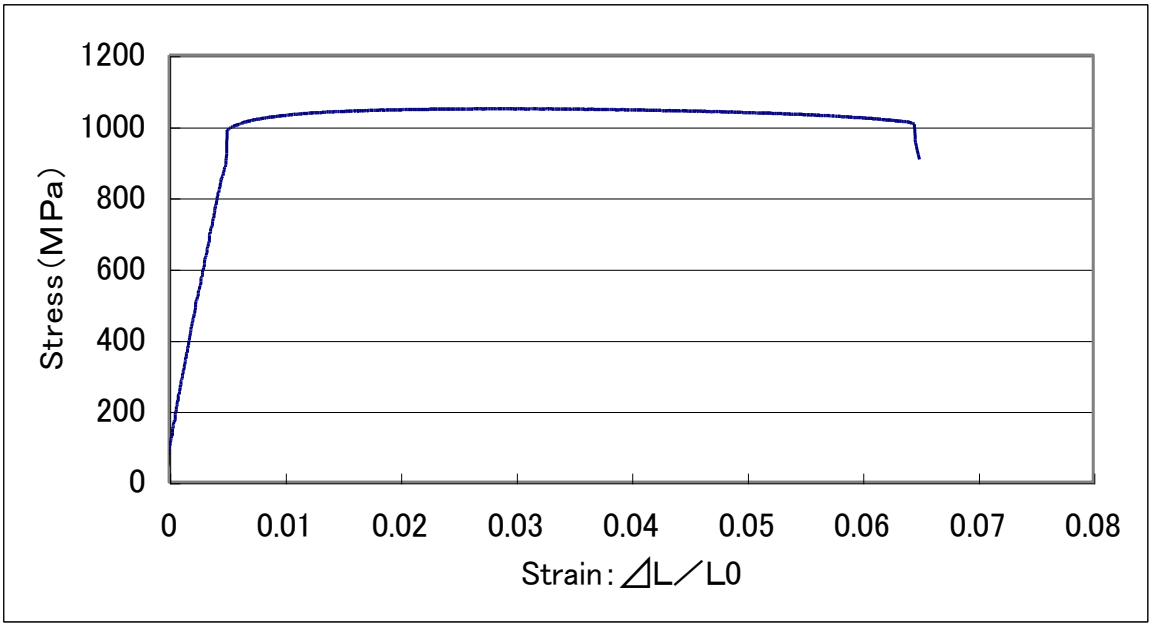


Transverse direction

Fig.5 Stress-Strain curve for NKT322-SH



Rolling direction



Transverse direction

Fig.6 Stress-Strain curve for NKT322-ESH

＜Further Information＞

JX Nippon Mining & Metals Corporation
Electronic Materials Group
Functional Material Division
Rolled & Fabricated Products Dept.
1-2, Otemachi 1-chome, Chiyoda-ku, Tokyo 100-8164 JAPAN
Phone ：+81－3－6257－7421
Fax ：+81－3－6213－3612

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