
Technical Data

High Performance Copper Alloy

NKC286

1. Introduction

High strength high conductivity copper alloy NKC286 has been developed by JX Nippon Mining & Metals to meet the increasing material requirements of interconnect designers. NKC286 is a new Hyper Corson alloy(Cu-Ni-Si) with high strength, excellent bend formability and high conductivity in comparison with conventional Corson alloys. This combination of properties lends the alloy to be used in a wide variety of applications including automotive and electrical connectors.

JX Nippon Mining & Metals is also able to provide NKC286 with reflow tin plated.

This technical brochure provides the comprehensive data of high performance copper alloy NKC286 and should help understand the alloy's features.

* This data included are nominal numbers.

2. Features

- (1) High strength and high conductivity.
- (2) Excellent combination of high strength, conductivity and formability.
- (3) High stress relaxation resistance.

3. Chemical composition

Table 1 Chemical Composition of NKC286 (wt%)

	Cu	Ni	Si	Sn	Zn
Typical	Bal.	2.8	0.6	0.5	0.4

4. Physical properties

Table 2 Physical Properties of NKC286

Electrical Conductivity	41	%IACS (@20°C)
Specific Resistance	42.1	nΩ · m (@20°C)
Thermal Conductivity	165	W/(m · K)
Coefficient of Thermal Expansion	17.4	× 10 ⁻⁶ /K (20 to 300°C)
Young's Modulus	127	GPa
Density	8.87	g/cm ³

5. Mechanical properties

NKC286 offers three tempers depending on strength as shown in Table 3.

Table 3 Mechanical Properties of NKC286

Temper	Tensile strength (MPa)	0.2% yield strength (MPa)	Elongation (%)	Hv
1/2H	780 (710-840)	760 (690-830)	6 (min.3)	230 (200-270)
H	830 (760-890)	810 (740-880)	4 (min.2)	245 (210-280)
EH	880 (810-940)	860 (790-930)	2 (min.1)	260 (230-300)

6. Bend formability

The W-shaped bending test was performed to evaluate bend formability of NKC286. The minimum bending radius (MBR) without surface crack is determined using a specimen with 10mm of width. Table 4 shows MBR/t (Minimum Bend Radius/Thickness).

Table 4 Bend formability of NKC286

Temper	MBR / t (0.15mm thickness)	
	Good way	Bad way
1/2H	0.5	0
H	1.0	0.5
EH	1.7 (1.0※)	1.7 (1.0※)

※ for 0.08mm thickness

7. Stress relaxation resistance

Stress relaxation resistance is highly important for maintaining the contact force for long period of time or at elevated temperatures. Figure1 exhibits the stress relaxation resistance of NKC286. It is noted that NKC286 maintains over 85% of the initial applied stress after 1000h at 150°C.

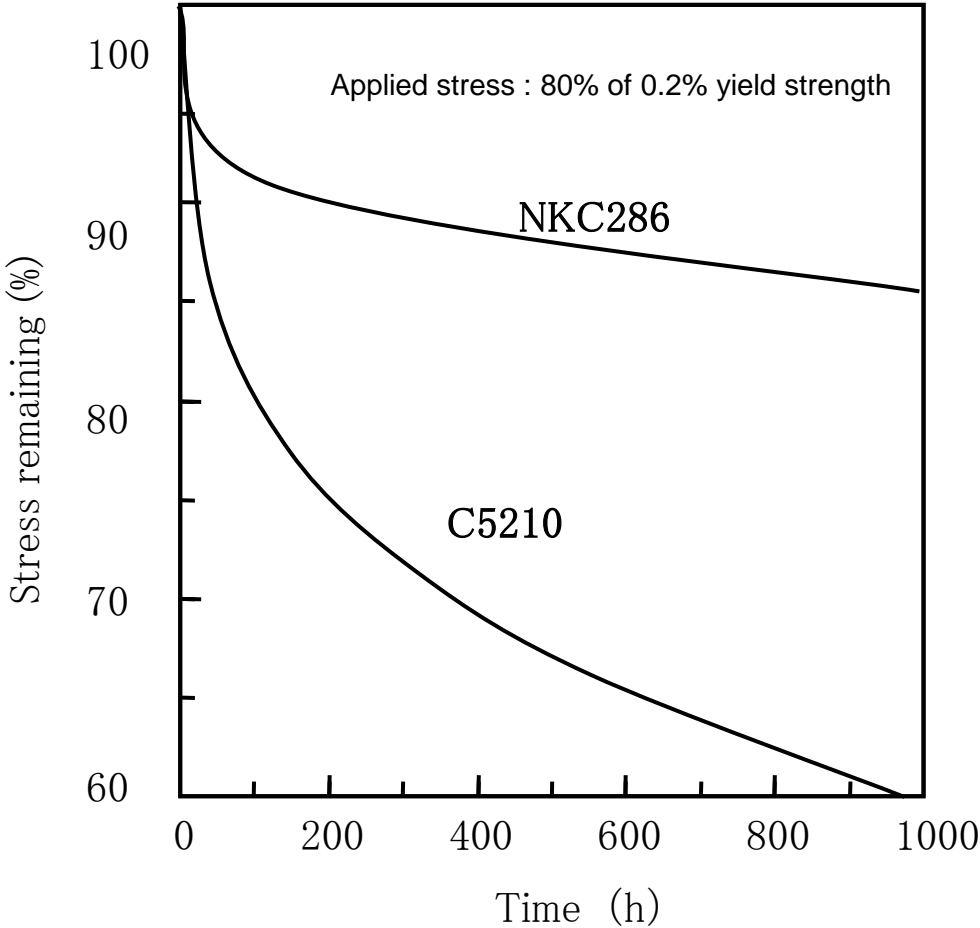


Fig.1 Stress relaxation of connector alloys at 150°C.

8. Stress – Strain curve

Figure2 shows the Stress-Strain curves for NKC286-1/2H.

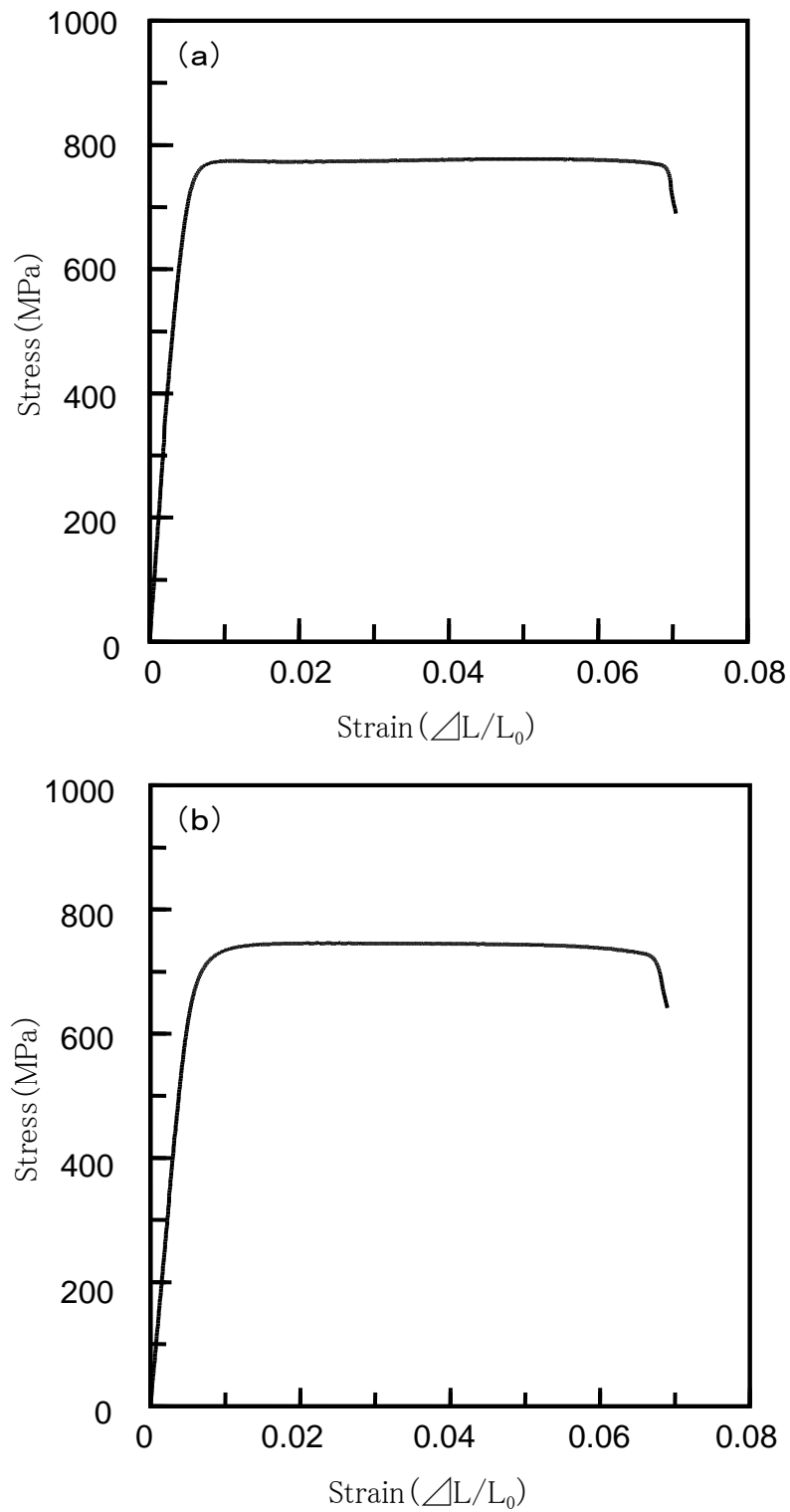


Fig.2 Stress-Strain curves for NKC286-1/2H in the (a)longitudinal and (b)transverse directions.

Figure3 shows the Stress-Strain curves for NKC286-H.

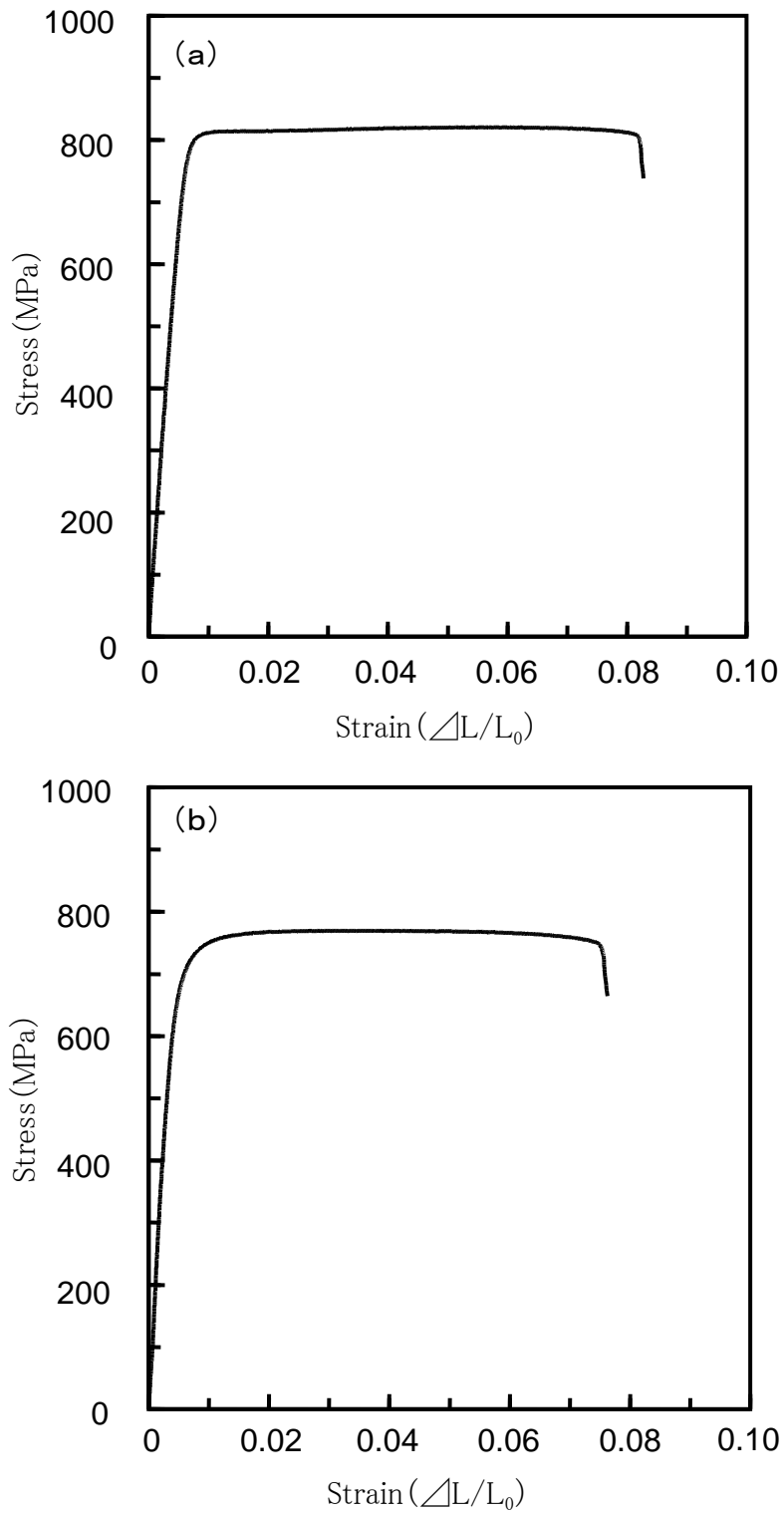


Fig.3 Stress-Strain curves for NKC286-H in the (a)longitudinal and (b)transverse directions.

Figure4 shows the Stress-Strain curves for NKC286-EH.

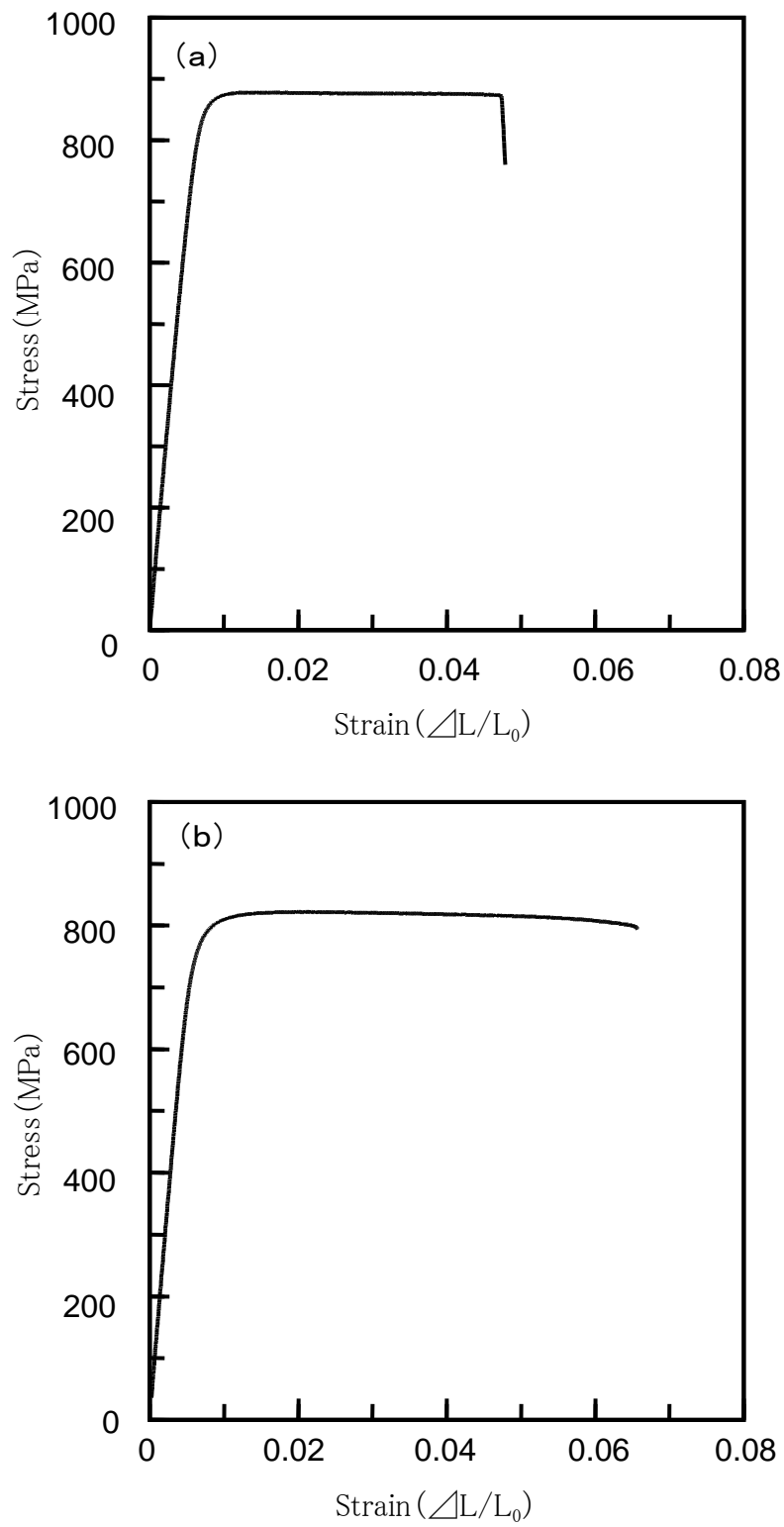


Fig.4 Stress-Strain curves for NKC286-EH in the (a)longitudinal and (b)transverse directions.

<Further Information>

JX Nippon Mining & Metals Corporation
Electronic Materials Group
Functional Material Division
Rolled & Fabricated Products Dept.
1-2,Otemachi1-chome, Chiyoda-ku, Tokyo 100-8164 JAPAN
Phone :+81-3-6257-7421
Fax :+81-3-6213-3612

Ver.3.2