
Technical Data

High Conductivity and Heat Resistance
Copper Alloy

NKE012
(CDA No.C14415)

1. Introduction

High conductivity, heat resistance copper alloy NKE012 (CDA No. C14415) has a small amount of tin in chemical compositions. This combination of properties lends the alloy to be used in a wide variety of applications including automotive and electrical connectors.

This technical brochure provides the comprehensive data of high performance copper alloy NKE012 and should help understand the alloy's features.

* The data shown is nominal value.

2. Features

- (1) High electrical and thermal conductivity.
- (2) By adding a small amount of tin, strength, heat resistance, stress relaxation resistance, are improving to pure copper.
- (3) Good bend formability

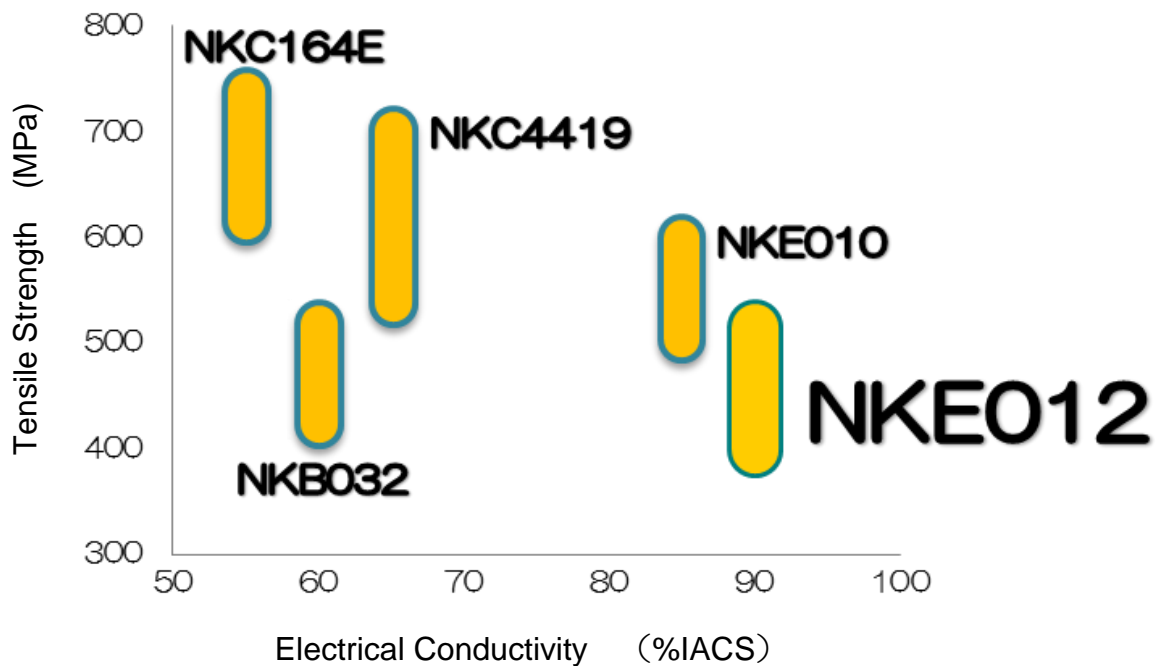


Fig.1 Properties of NKE012

3. Chemical Composition

NKE012 has a small amount of tin for improving strength.

Table 1 Chemical Composition of NKE012 (mass%)

	Cu	Sn
NKE012	Bal.	0.12

※ Not using cadmium(Cd) , lead(Pb) , mercury(Hg) , six value chrome(Cr^{+6}) , polybrominated biphenyl (PBB) , Polybrominated biphenyl ether (PBDE) restricted with RoHS etc.

4. Physical Properties

Table 2 Physical Properties of NKE012

	NKE012
Electrical Conductivity [%IACS]	90
Specific Resistance [$n\Omega \cdot m$] @20°C	19
Thermal Conductivity [W/(m·K)]	350
Coefficient of Thermal Expansion [$\times 10^{-6}/K$] (20~300°C)	17.7
Density [g/cm^3]	8.92
Poisson's Ratio	0.33
Modulus of Elasticity [GPa]	128

5. Mechanical Properties

Table 3 Mechanical Properties of NKE012

	Temper	Tensile Strength [MPa]	0.2% Yield Strength [MPa]	Elongation [%]	Vickers Hardness [Hv]
NKE012	H	430 (375~475)	420 -	3 (Min. 1.0)	130 (95~160)
	EH	500 (410~600)	490 -	2 -	145 (105~175)

- indicates no specification in JIS.

6. Bend Formability

Table 4 Minimum Bend Radius / Thickness (MBR/t) for U-Type Bend Test and W-Type Bend Test
(specimen width : 10mm)

	Temper	Thickness (mm)	U-type Bend		W-type Bend	
			Good Way	Bad Way	Good Way	Bad Way
NKE012	H	0.64	0 (tight)	0 (tight)	0	0
	EH	0.64	0 (tight)	0 (tight)	0.5	0.5
		0.15	0 (tight)	0 (tight)	0	0

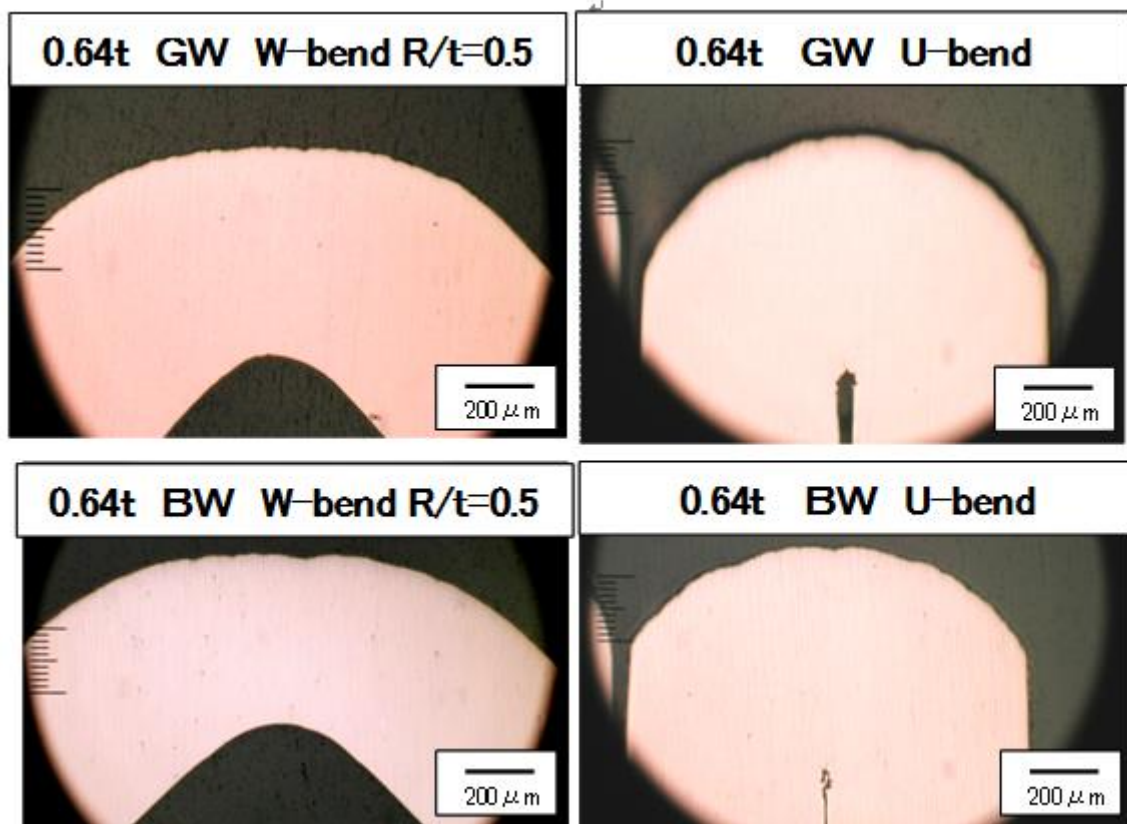


Fig. 2 Cross Sections of Bend Test specimens (NKE012-H).

7. Stress Relaxation Resistance

NKE012-EH provides higher stress relaxation resistance than pure copper C1020, brass C2600, and Phosphor bronze C5210.

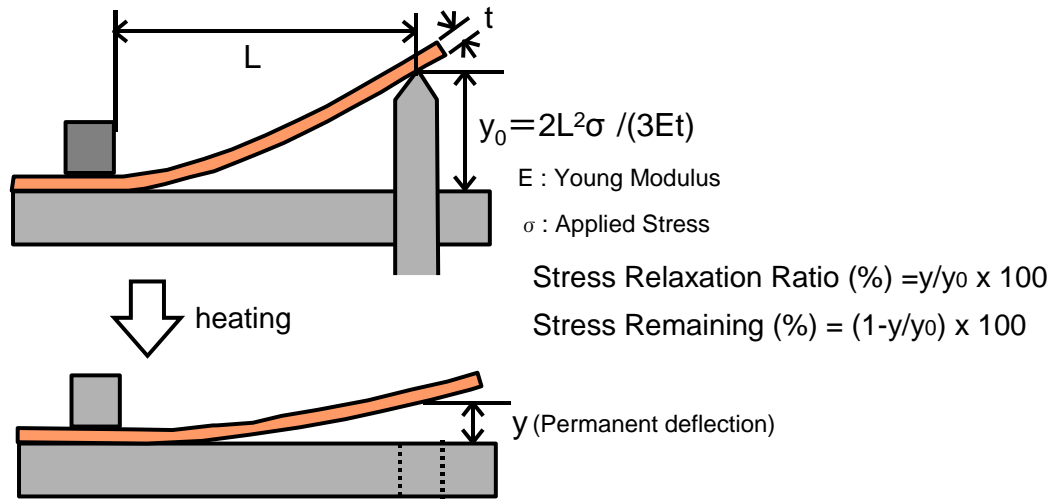


Fig. 3 Experimental Procedure of Stress Relaxation

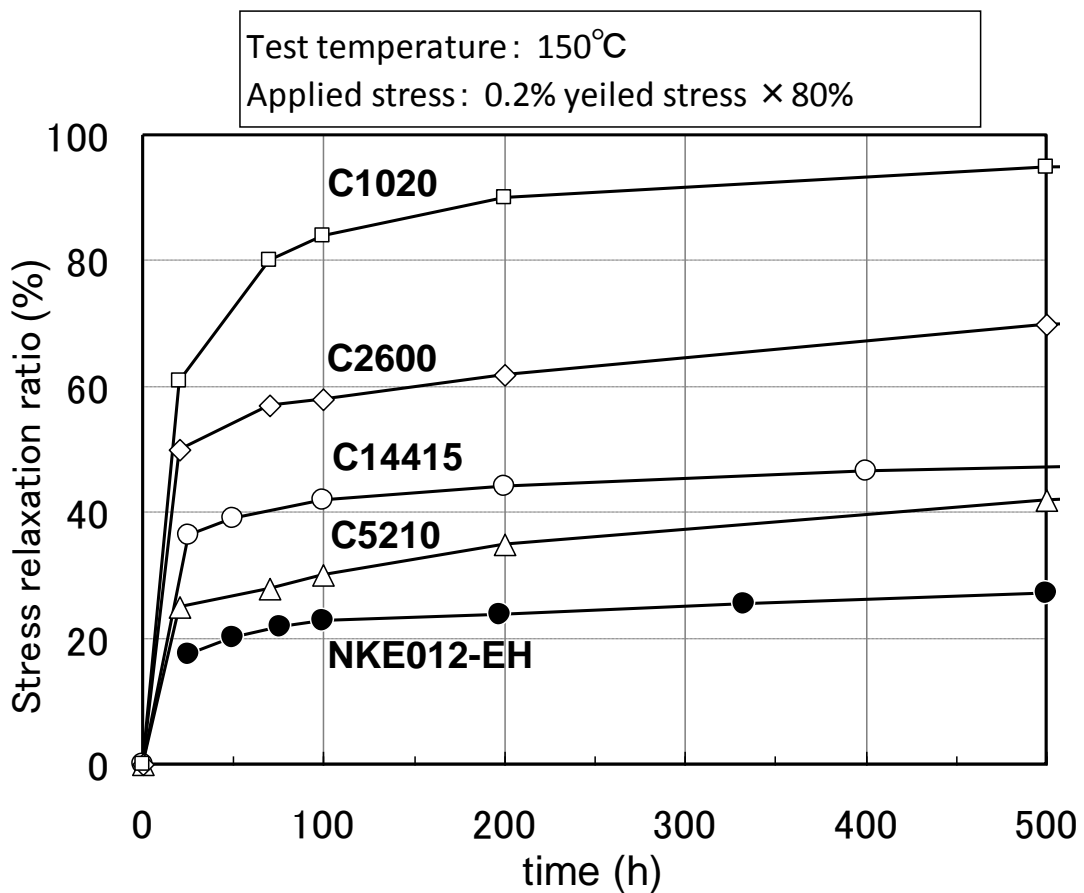


Fig. 4 Stress Relaxation of NKE012 and Other Alloys.

8. Heat Resistance

NKE012-H provides higher heat resistance than pure copper C1020-H.

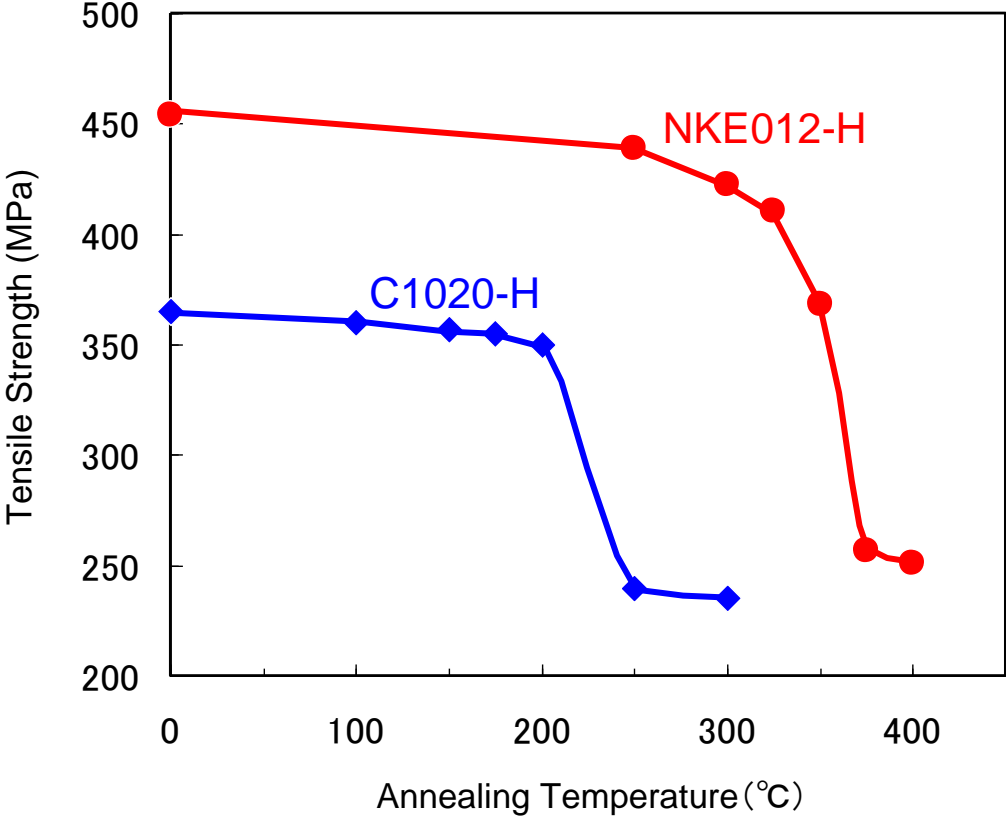


Fig. 5 Softening Curve of NKE012.

9. Stress – Strain Curve

Fig. 6 shows the Stress-Strain curves for NKE012.

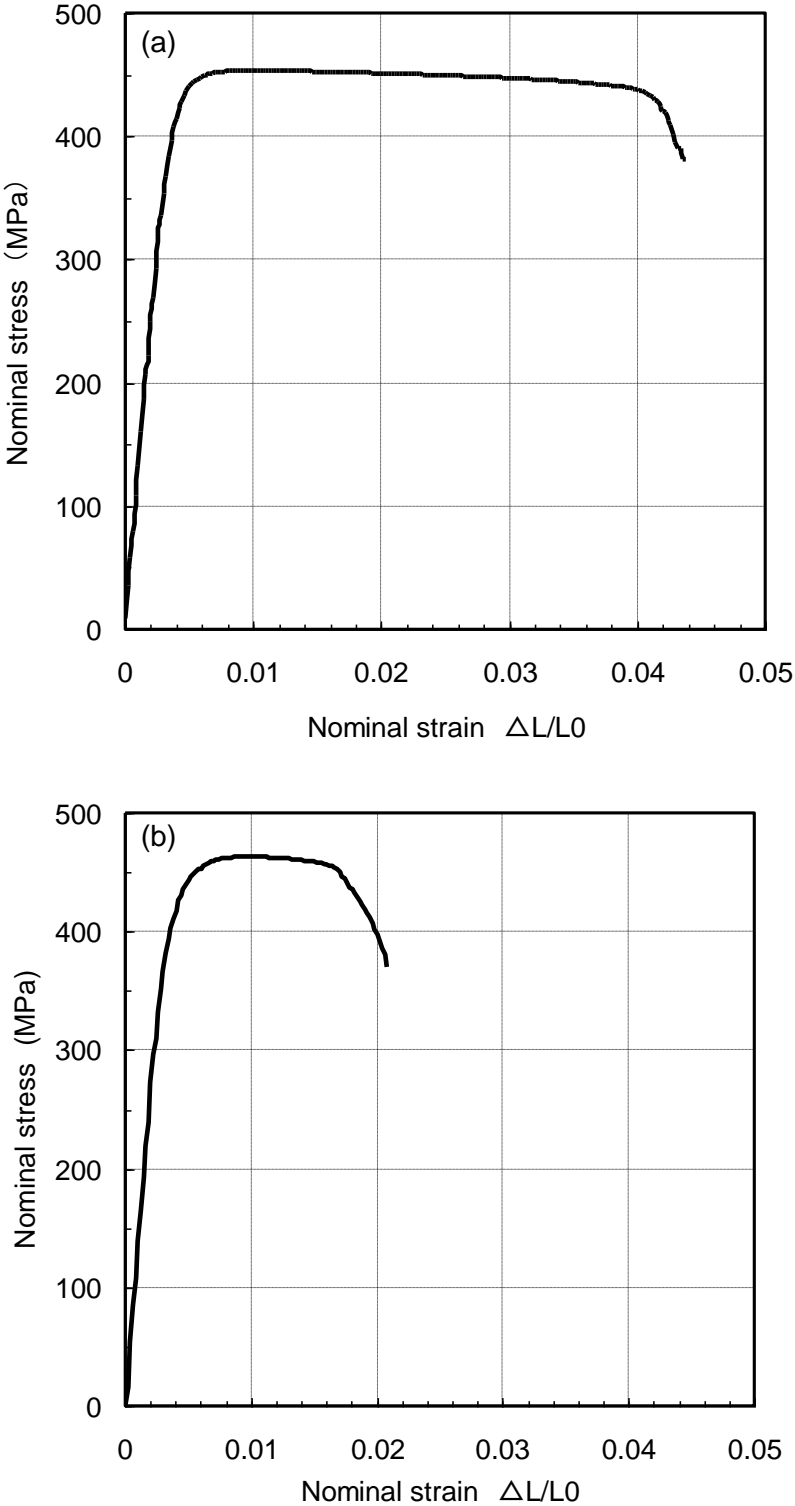


Fig. 6-1 Stress-Strain Curves for NKE012-H
(a) Longitudinal and (b) Transverse Directions.

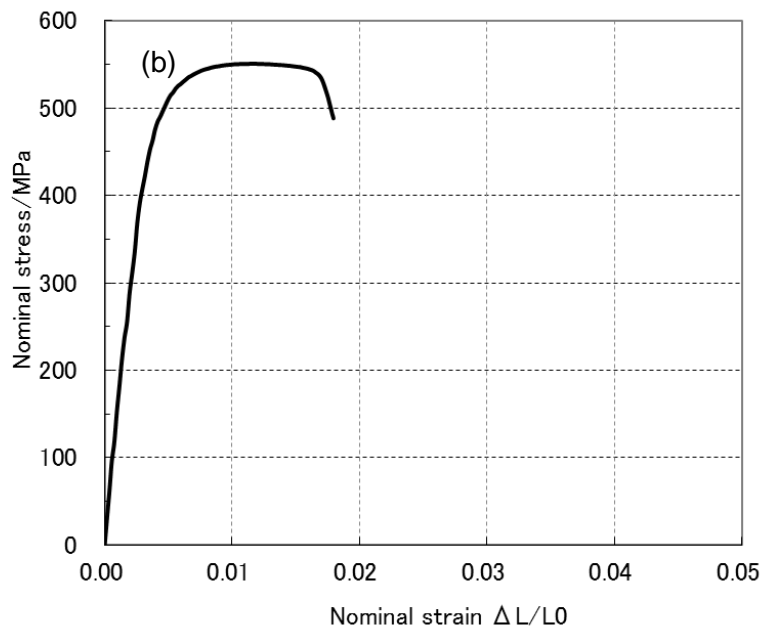
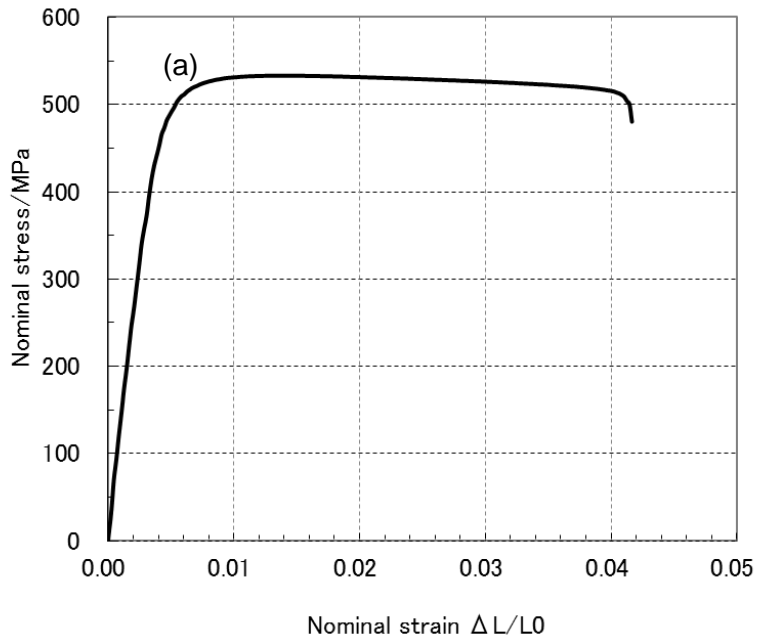


Fig. 6-2 Stress-Strain Curves for NKE012-EH
 (a) Longitudinal and (b) Transverse Directions.

< Further Information >

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