
Technical Data

High Performance Copper Alloy

NKC164E

1. Introduction

NKC164E is a High performance Copper Alloy produced to meet the high electrical conductivity needs of “high-power” electronic circuits and electronic connectors. This alloy provides design engineers with a unique combination of properties with high electrical conductivity, good strength, excellent formability and good plateability compared to other copper alloys of equivalent conductivity. 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 NKC164E with reflow tin plated.

This technical brochure provides the comprehensive data of high performance copper alloy NKC164E and should help understand the alloy’s features.

* This data included are nominal numbers.

2. Features

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

3. Chemical composition

Table 1 Chemical Composition of NKC164E (wt%)

	Cu	Ni	Si
Typical	Bal.	1.6	0.35

4. Physical properties

Table 2 Physical Properties of NKC164E

Electrical Conductivity	55	%IACS (@20°C)
Specific Resistance	30	nΩ · m (@20°C)
Thermal Conductivity	240	W/(m · K)
Coefficient of Thermal Expansion	17.7	× 10 ⁻⁶ /K (20 to 300°C)
Young’s Modulus	120	GPa
Density	8.89	g/cm ³

5. Mechanical properties

NKC164E offers two tempers depending on strength as shown in Table 3.

Table 3 Mechanical Properties of NKC164E

Temper	Tensile strength (MPa)	0.2% yield strength (MPa)	Elongation (%)	Hv
H	630 (590-680)	610 (540-680)	12 (Min.5)	200 (160-220)
EH	690 (620-760)	670 (600-740)	5 (Min.2)	210 (170-230)

Upper numbers : Typical mechanical properties.

Lower numbers : Requirements for each temper.

6. Bend formability

The W-shaped bending test was performed to evaluate bend formability of NKC164E. 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). Fig.1 shows relationship between MBR/t and thickness of NKC164E-EH. Figs.2-1 and 2-2 show surface appearances and cross sections bent to W-shape and U-shape with zero radius.

Table.4 Bend formability of NKC164E

質別	MBR / t	
	Good way	Bad way
H	0	0
EH	0	0.2

※thickness:0.2mm×width 10mm

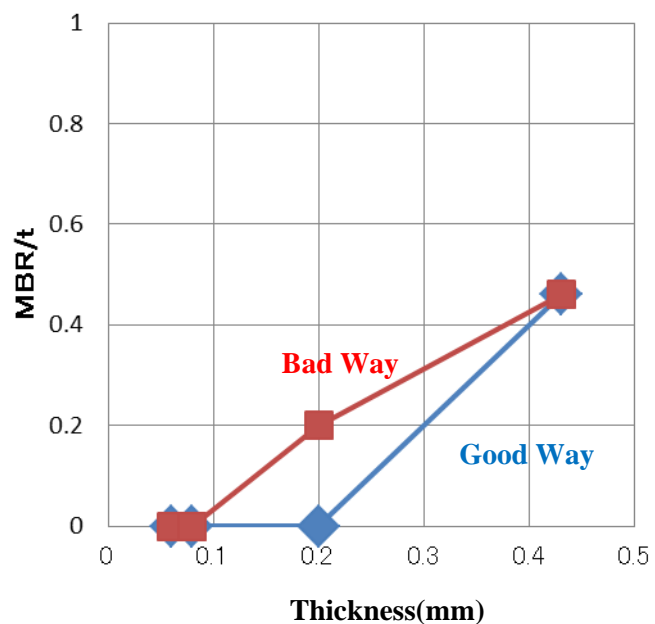


Fig.1 Relationship between MBR/t and thickness of NKC164E-EH

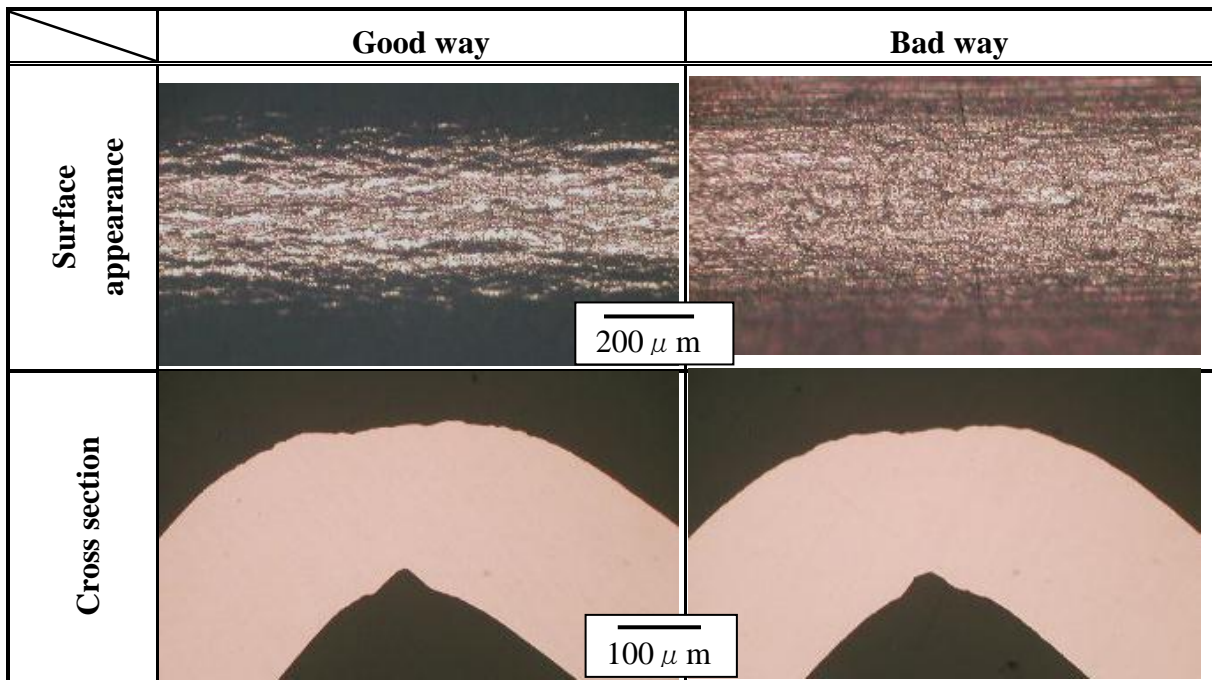


Fig.2-1 Surface appearances and cross sections of 90° W-shaped bending test specimens.
Temper H , Thickness = 0.2mm , R/t=0 , Width =10mm

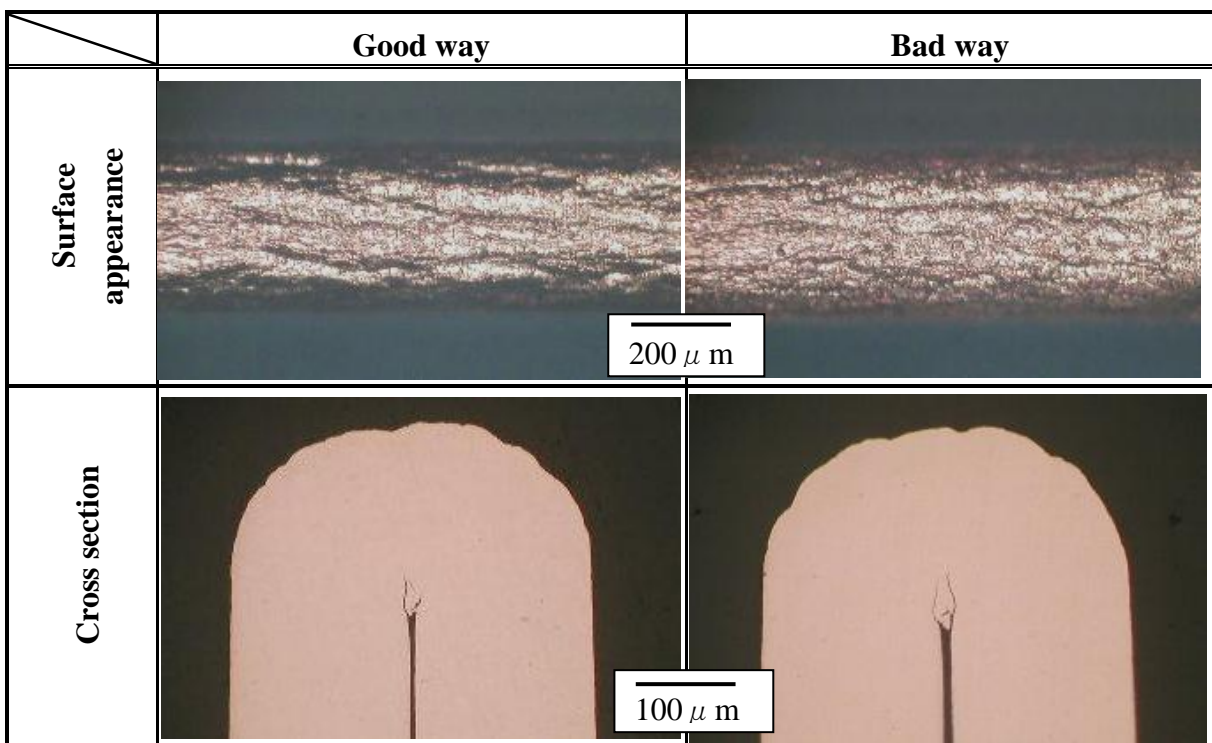


Fig.2-2 Surface appearances and cross sections of U-shaped bending test specimens.
Temper H , Thickness = 0.2mm , Width =10mm

7. 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 NKC164E. It is noted that NKC164E maintains over 75% of the initial applied stress after 1000h at 150°C.

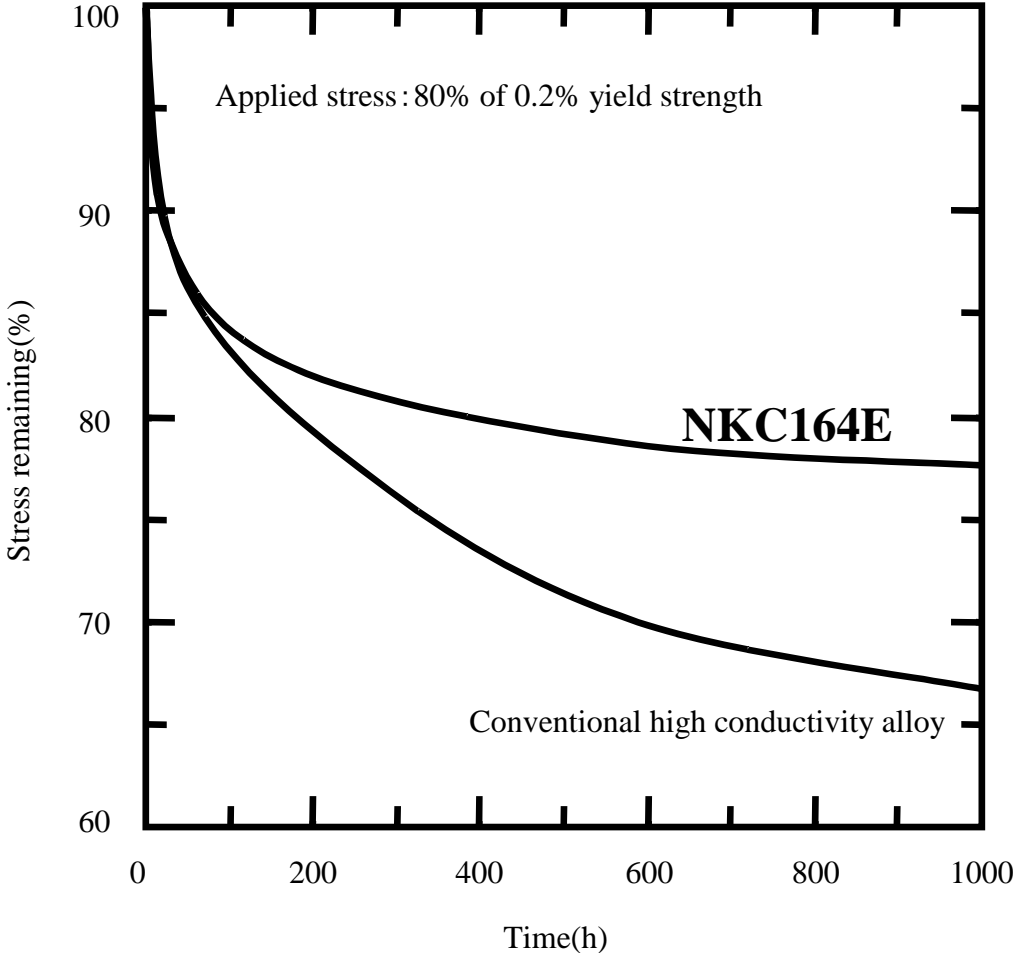


Fig.3 Stress relaxation of connector alloys at 150°C.

8. Stress – Strain curve

Figs.4-1 and 4-2 show the Stress-Strain curves for NKC164E.

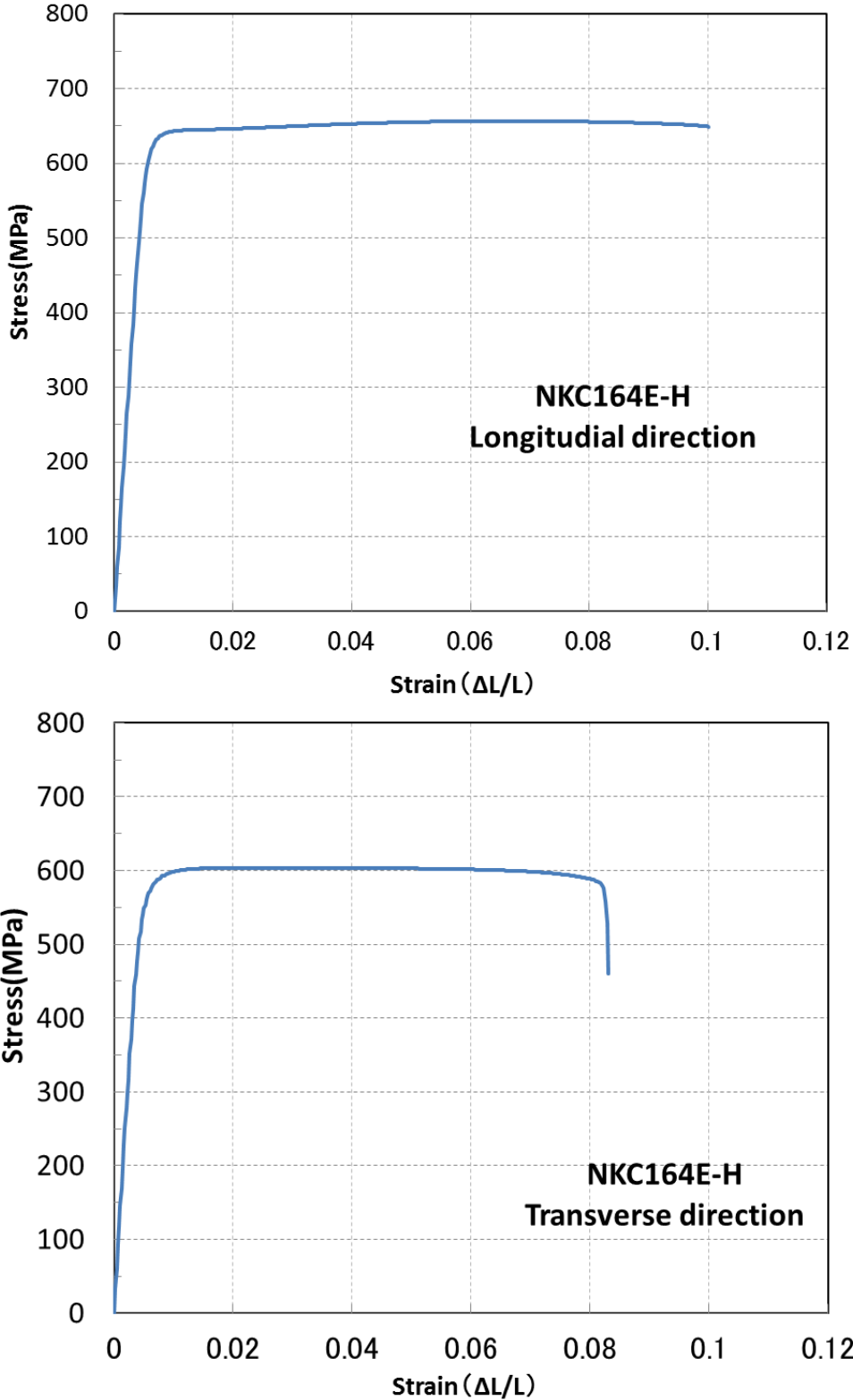


Fig.4-1 Stress-Strain curves for NKC164E-H

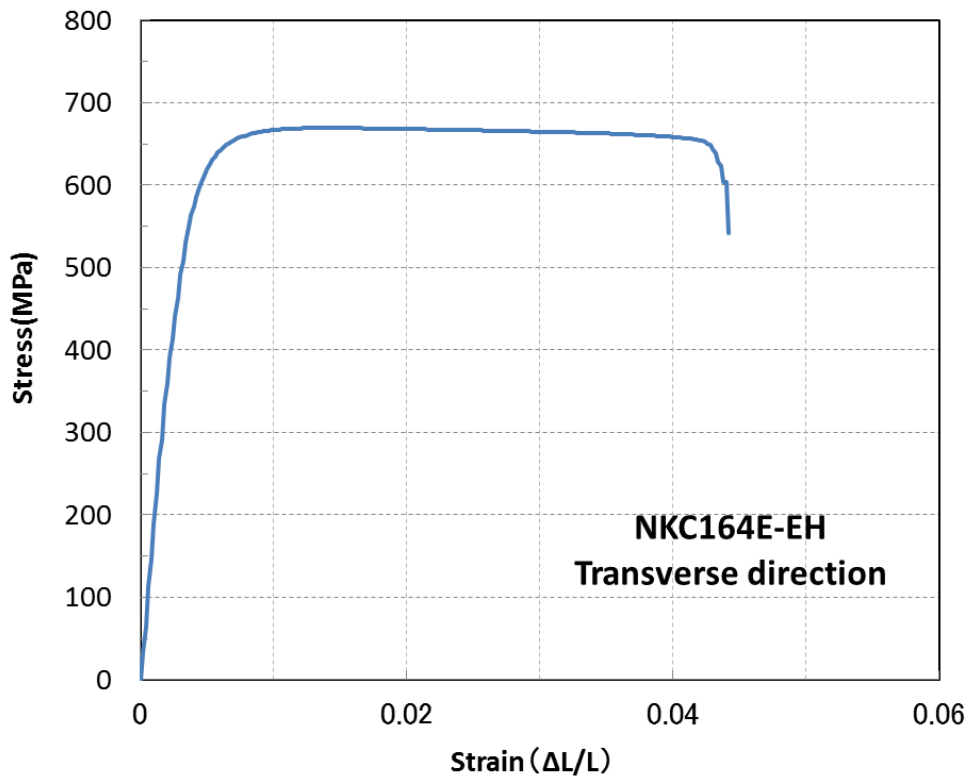
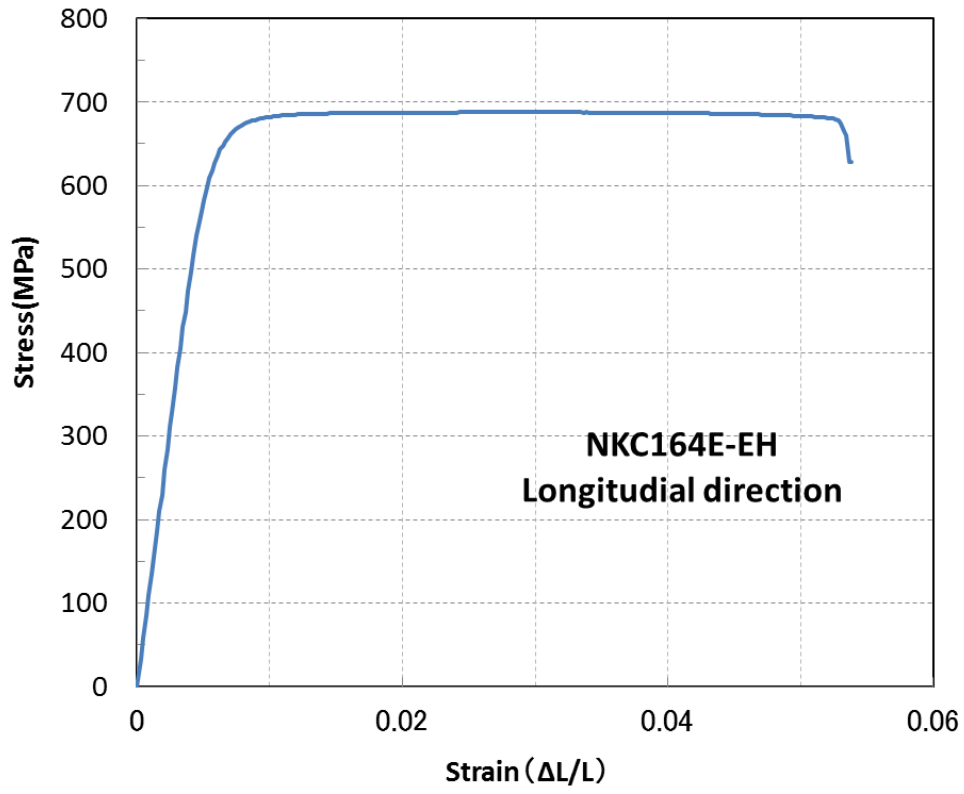


Fig.4-2 Stress-Strain curves for NKC164E-EH

< Further Information >

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