Hi-Performance Alloy Series
Technical Data

High Conductivity 3%-Titanium Copper

C1990-EH(HC)

JX Nippon Mining & Metals Co.,Ltd.

1. Introduction

JX Nippon Mining & Metals has been supplying numbers of copper alloys. Recently, NMM has developed new series of copper alloys, which were named *Hi-Performance Alloy Series*.

On this brochure, *High conductivity Titanium Copper Alloy (C1990-EH(HC))* in the series is introduced.

C1990-EH(HC) has same strength, electrical conductivity and bend formability as mill-hardened beryllium copper(C1720-HM) and it has good stress relaxation resistance. You will be satisfied, we are sure, to find excellent characteristics of C1990-EH(HC) for electronic materials such as switches, connectors, relays etc.

＊This data included are nominal numbers.

2. Features

（1） C1990-EH(HC) has almost as same yield strength, electrical conductivity and bend formability as C1720-HM.

（2） C1990-EH(HC) has better stress relaxation resistance than C1720-HM.

（3） Same chemical composition as conventional titanium copper means easy scrap control and including no poison elements.

3. Chemical Composition

Table 1. Typical chemical composition of C1990-EH(HC)（wt%）

	Ti	Cu + Ti
Typical	2.9 ~ 3.5	≧99.5

4. Physical Properties

Table 2. Physical Properties of C1990-EH(HC)

Electric Conductivity	**20**	%IACS（@20℃）
Specific Resistance	**86**	nΩ･m （@20℃）
Thermal Conductivity	**84**	W/mK
Thermal Expansion Coefficient	**18.6**	$\times 10^{-6}$ /K（20 to 450℃）
Young’s Modulus	**127**	GPa
Density	**8.70**	g/cm^3

5. Mechanical Properties

Table 3. Mechanical Properties of C1990-EH(HC)

Temper	TensileStrength (MPa)	0.2% offset Yield Strength (MPa)	Elongation (%)	Vickers hardness
EH(HC)	**950**	**900**	**2.0**	**300**

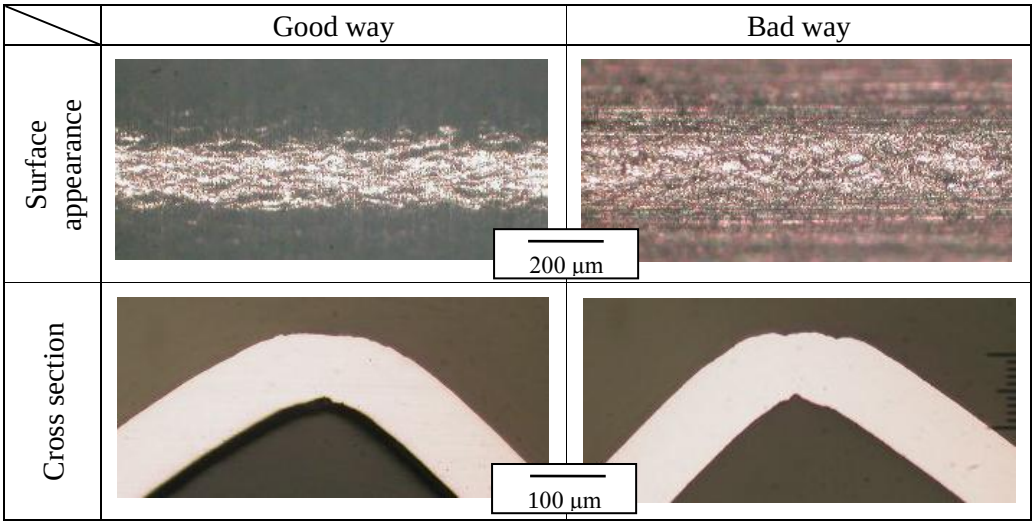
6. Bend Formability

"W" shaped bending test was performed to evaluate bend formability. The minimum bend radius (MBR) without surface crack is determined. Table 4 shows MBR/t value, while Fig. 1 shows outside surface and cross section.

Table 4. Minimum Bend Radius (MBR) of C1990-EH(HC)

Temper	MBR/t	
	good way	bad way
EH(HC)	**0**	**0**

＊ MBR/t value of C1990-EH(HC) is bending test result of 0.1mm thickness.



C1990-EH(HC), Specimen size ： $0.1mm^{t}\times10mm^{w}$, R/t=0

90° "W" shaped bending test (According to JIS-H-3130)

Fig. 1 Surface appearance and cross section of "W" shaped bending test specimen

7. Stress Relaxation Resistance

For connector system application, it becomes very important to maintain contact force over long period at elevated temperature. Fig.2 shows data of stress relaxation test to evaluate materials' such ability(heating temperature:150℃). It is apparent that C1990-EH(HC) gives much better stress relaxation resistance than C1720-HM.

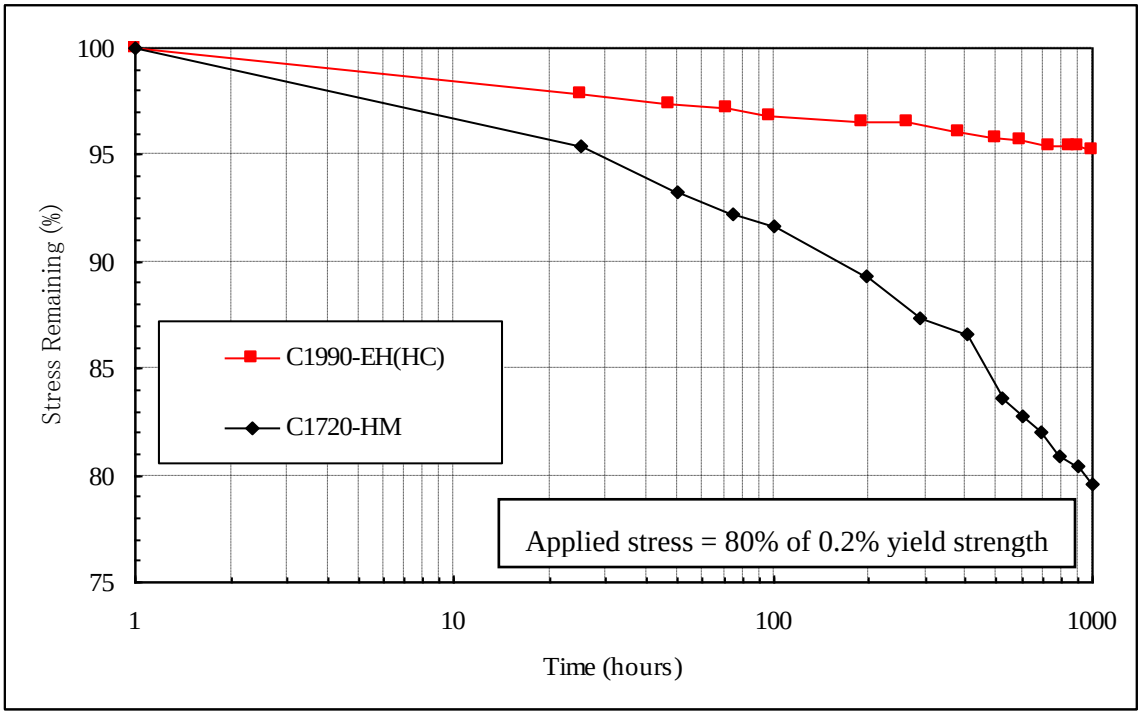
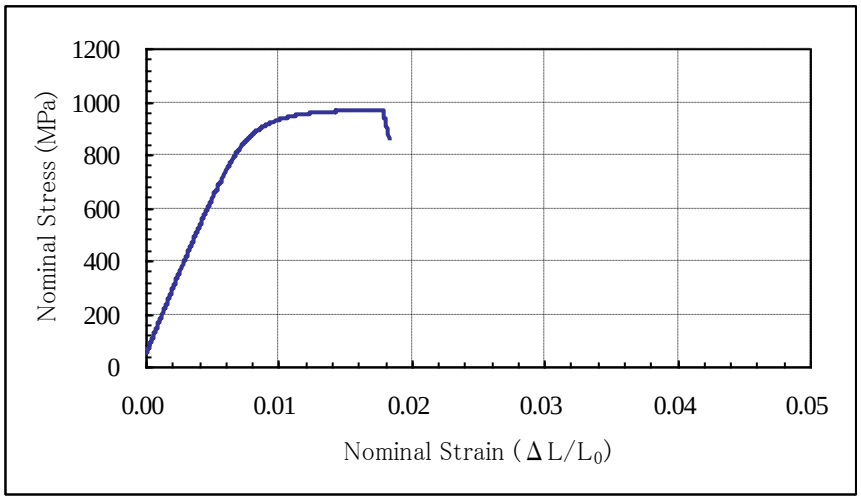


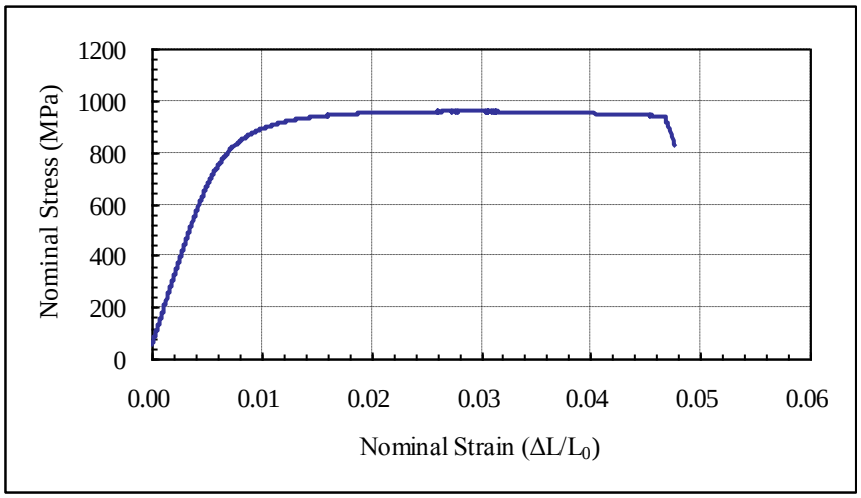
Fig.2 Stress relaxation of C1990-EH(HC) at 150℃

8. Stress-Strain Curve

Fig. 3 shows stress-strain curves of C1990-EH(HC).



S-S curve (Longitudinal Direction)



S-S curve (Transverse Direction)

Tensile test (according to JIS-Z-2241)

Specimen : JIS-Z-2201#13B tensile test specimen

Fig. 3　Stress-Strain Curves of C1990-EH(HC)

＜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

Ver.1.1