Technical Data

High Performance Copper Alloy

NKC286S

JX Metals Corporation

1. Introduction

NKC286S is a new Hyper Corson alloy(Cu-Ni-Si) which is improved bend formability, maintaining high strength, high conductivity of NKC286. It has excellent bend formability, enabling applications involving rigorous bending of small radiuses. Further, NKC286S has the Young's modulus lower than conventional Corson alloys, which enhances the flexibility of design. This combination of properties lends the alloy to be used in a wide variety of applications including automotive and electrical connectors.

JX is also able to provide NKC286S with reflow tin plated.

This technical brochure provides the comprehensive data of high performance copper alloy NKC286S and should help understand the alloy's features.

＊This data included are nominal numbers.

2. Features

(1) High strength and high conductivity.
(2) Excellent bend formability.
(3) Low Young's modulus.
(4) High stress relaxation resistance.

3. Chemical composition

Chemical composition is the same as NKC286.

Table 1 Chemical Composition of NKC286S (wt%)

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

4. Physical properties

Table 2 Physical Properties of NKC286S

Electrical Conductivity	41	%IACS(@20℃)
Specific Resistance	42.1	nΩ・m (@20℃)
Thermal Conductivity	165	W/(m・K)
Coefficient of Thermal Expansion	17.4	$\times 10^{-6}$ /K(20 to 300℃)
Young's Modulus	110	GPa
Density	8.87	g/cm^3

5. Mechanical properties

Table 3 Mechanical Properties of NKC286S

Temper	Tensile strength (MPa)	0.2% yield strength (MPa)	Elongation (%)	Hv
1/2H	800 (730-870)	765 (695-835)	7 (min.3)	250 (215-285)
H	880 (800-940)	845 (775-915)	2 (min.1)	285 (250-320)

6. Bend formability

The W-shaped bending test was performed to evaluate bend formability of NKC286S. 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) and figure 1 shows surface appearances and cross sections of W-shaped bending test specimens(R=0).

The results of U-shaped bending test and W-shaped bending test after notching were shown in figure 2.

Table 4 Bend formability of NKC286S

Temper	MBR / t	
	Good way	Bad way
1/2H	0	0
H	0	1

※ MBR/t of temper 1/2H is a 0.18 mm thickness specimen test result and temper H is a 0.08mm thickness specimen test result.

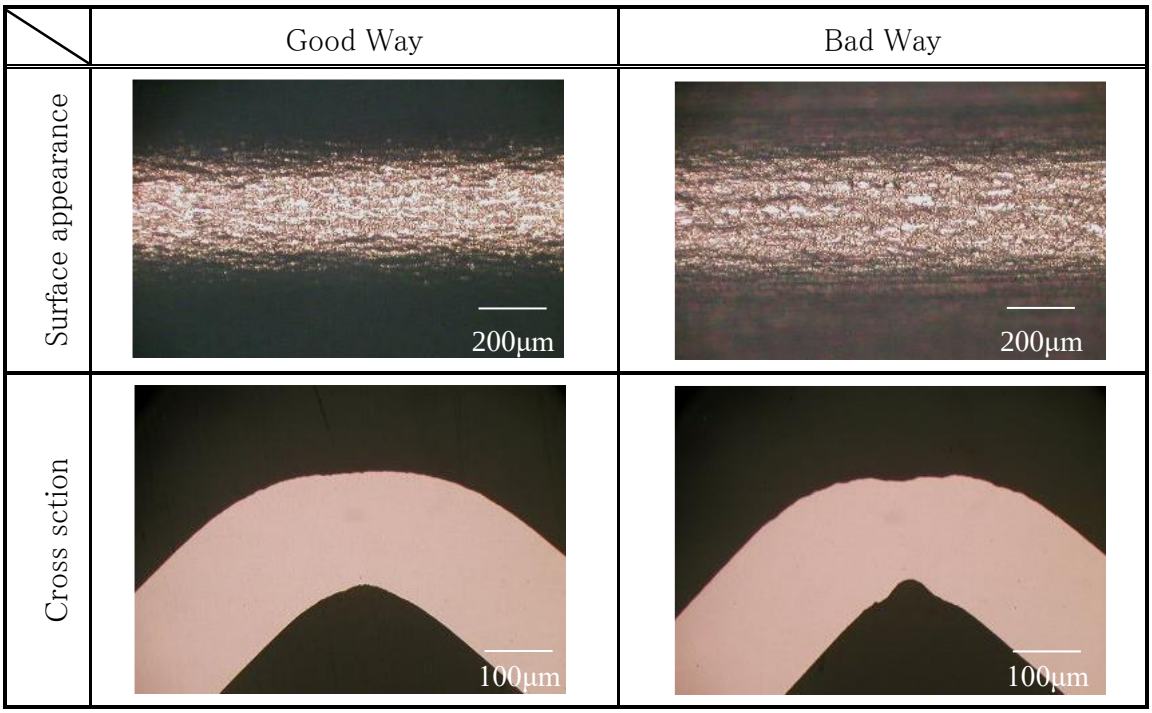


Figure 1 Surface appearances and cross sections of W-shaped bending test specimens.
Temper = 1/2H, Thickness = 0.18mm, R/t = 0, Width = 10mm

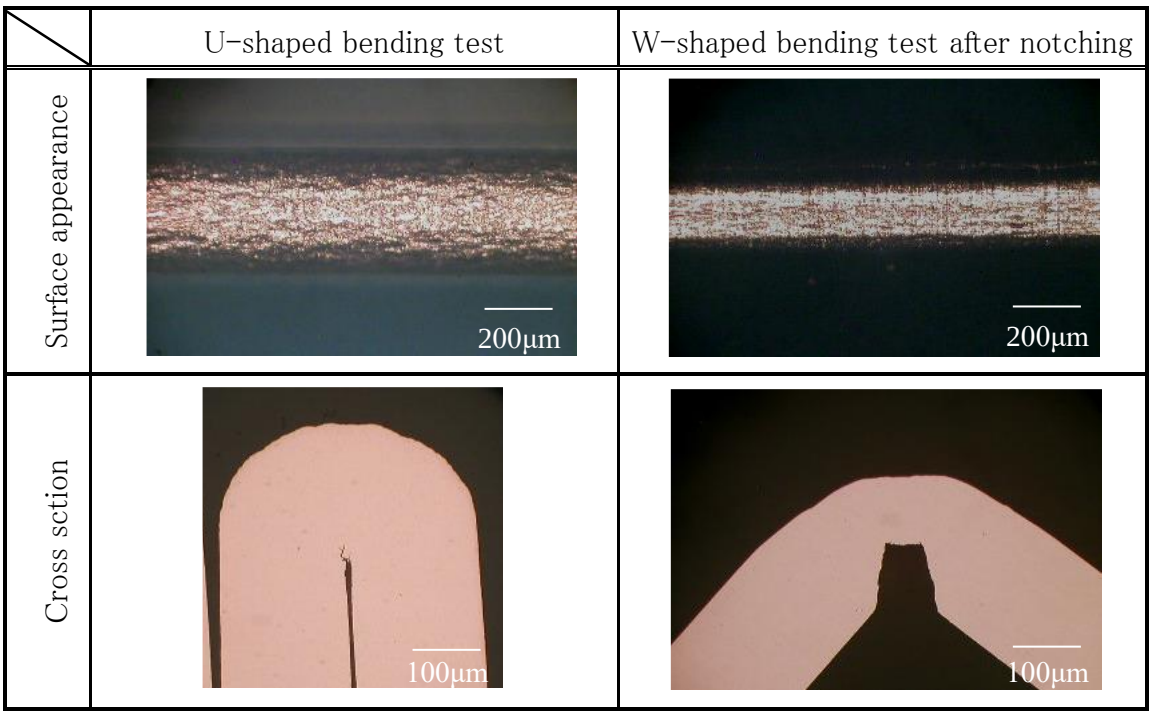


Figure 2 Surface appearances and cross sections of bending test specimens.
Temper = 1/2H, Thickness = 0.18mm, Width = 10mm,
Bending direction = GW, Noching depth = 90 μ m

7. Stress relaxation resistance

Stress relaxation resistance is highly important for maintaining the contact force for long period of time or at elevated temperatures. Figure3 exhibits the stress relaxation resistance of NKC286S. It is noted that NKC286 maintains about 85% of the initial applied stress after 1000h at 150℃.

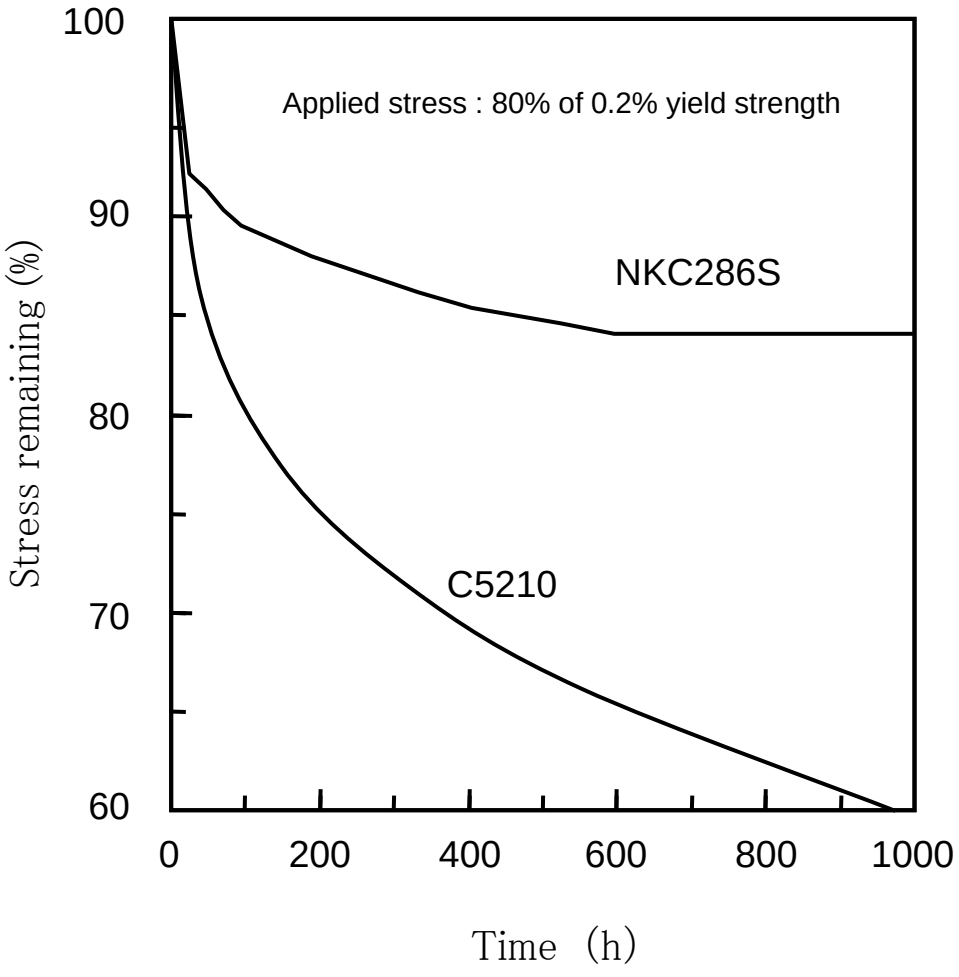


Figure 3 Stress relaxation of connector alloys at 150℃.

8. Stress - Strain curve

Figure 4 and 5 show the Stress-Strain curves for NKC286S. Figure 6 and 7 show comparison of NKC286S and NKC286.

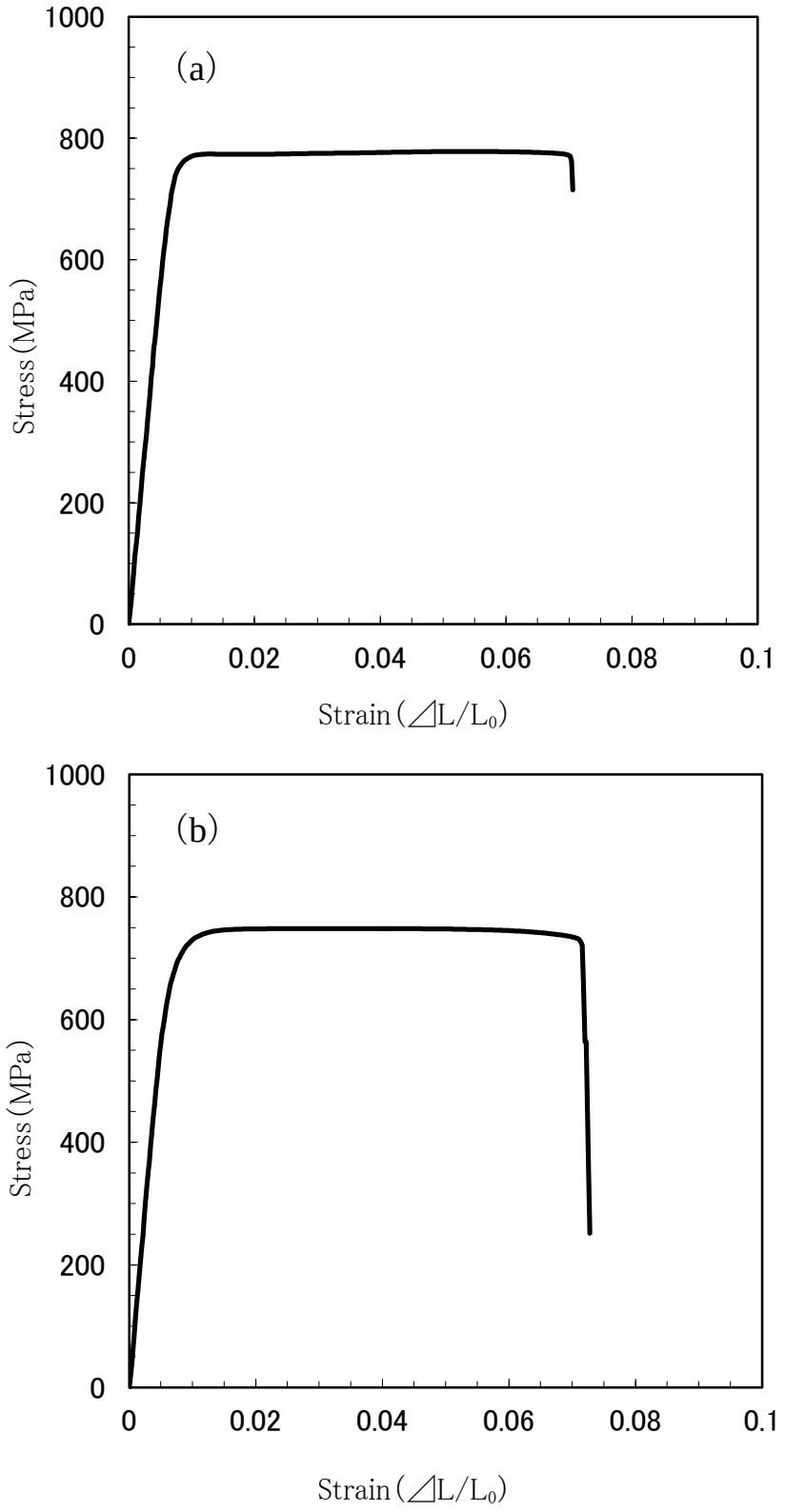
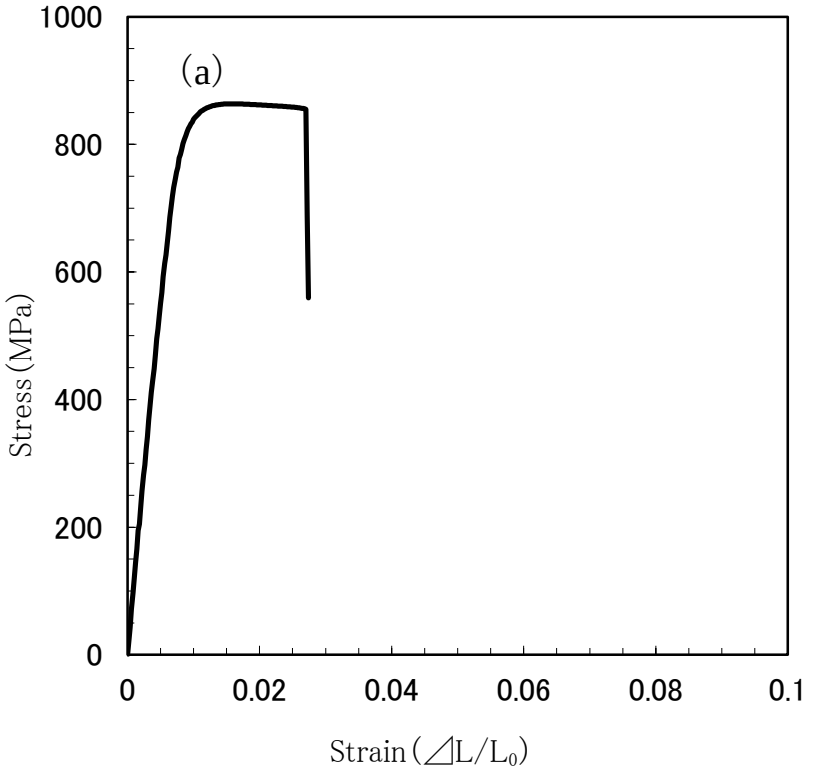


Figure 4 Stress-Strain curves for NKC286S-1/2H in the (a)longitudinal and (b)transverse directions.



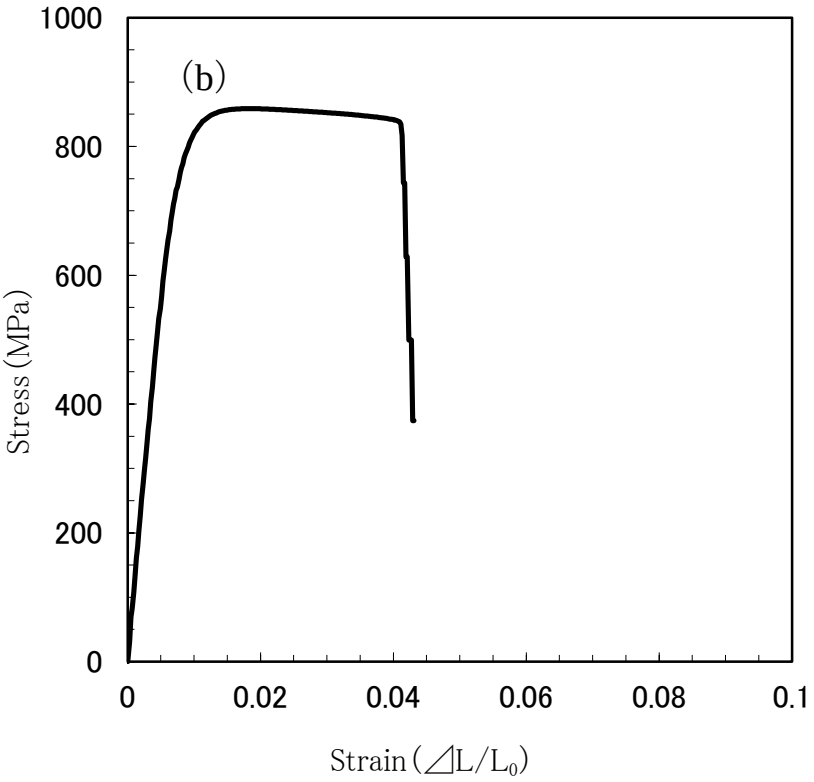
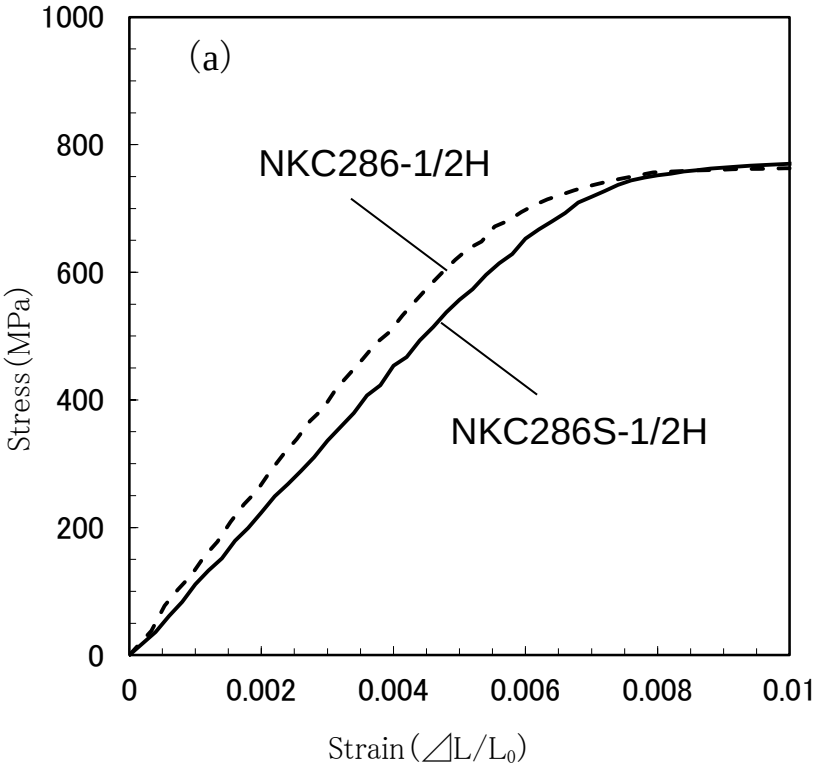


Figure 5　Stress-Strain curves for NKC286S-H in the (a)longitudinal and (b)transverse directions.



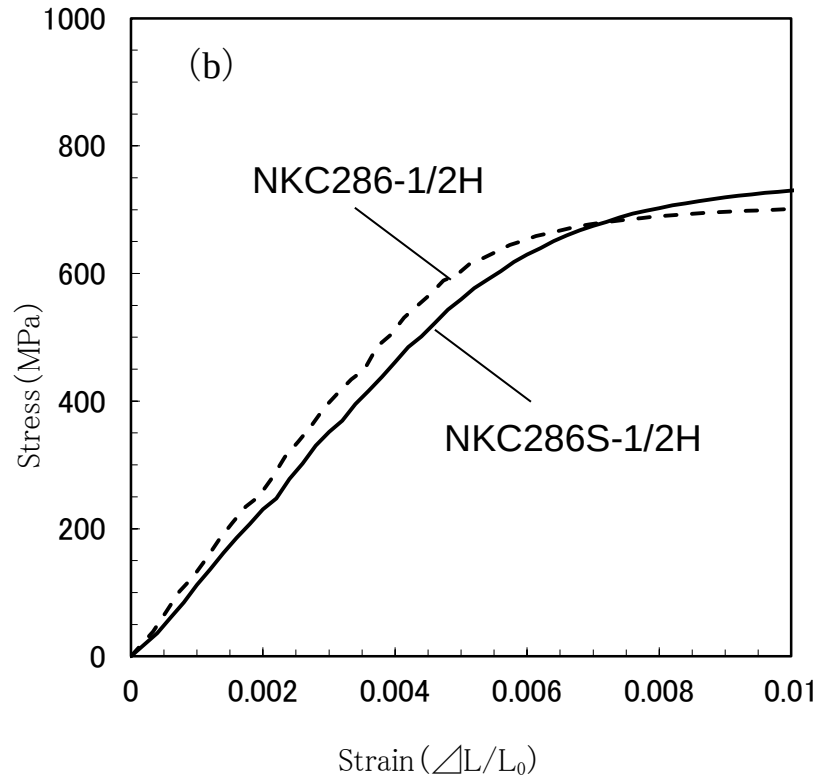
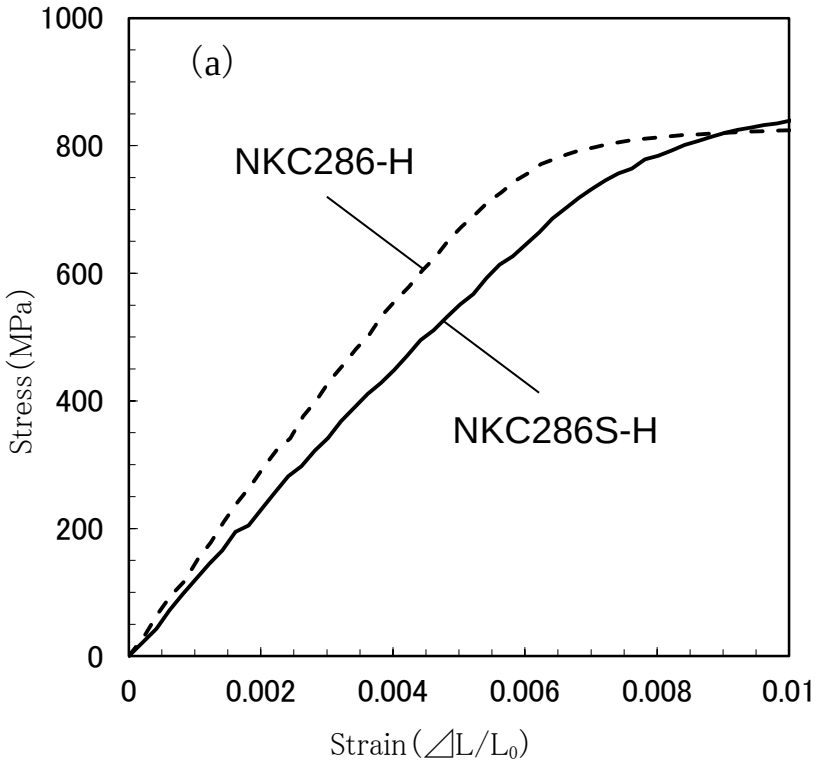


Figure 6　Stress-Strain curves for NKC286S-1/2H and NKC286-1/2H in the (a)longitudinal and (b)transverse directions.



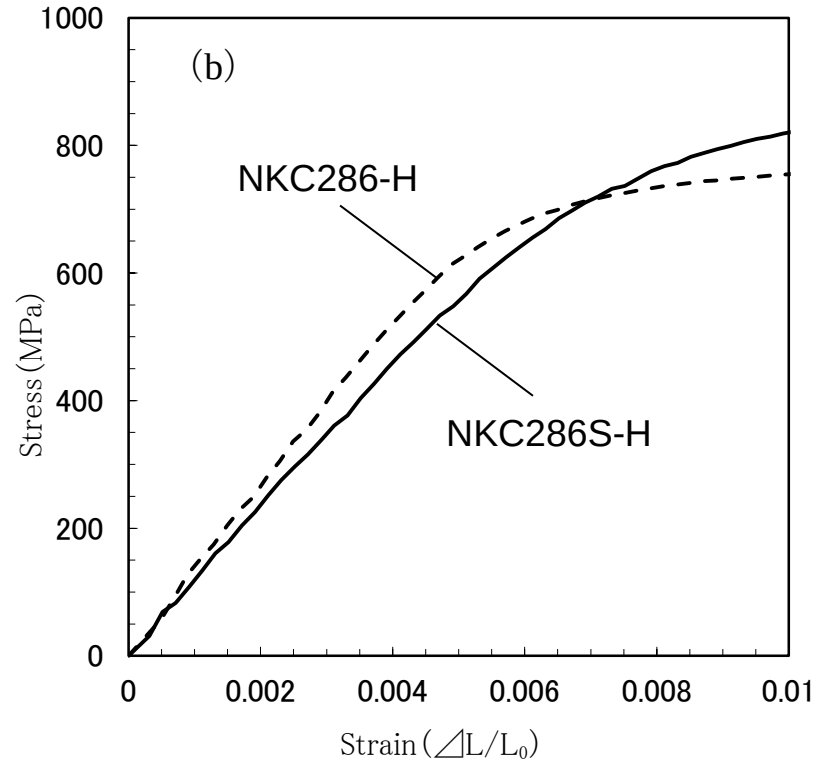


Figure 7 Stress-Strain curves for NKC286S-H and NKC286-H in the (a)longitudinal and (b)transverse directions.

＜Further Information＞

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