

Alternative Material to Beryllium Copper Alloy

NKT322 GIGALLOY®

(UNS Alloy No. C19910)

Beryllium-Free Ultrahigh-Strength Titanium Copper
Designed for Highly Reliable Connectors



The Future of Energy, Resources and Materials

JX Nippon Mining & Metals Corporation

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◆ Description

NKT322 GIGALLOY® is a titanium copper developed independently by JX Nippon Mining & Metals Corporation. By adding Fe to C1990, a conventional titanium copper, and optimizing process conditions, NKT322 GIGALLOY® shows dramatically improved mechanical properties and bend formability. The excellent balance of its mechanical properties allows it to be widely used for switches, connectors and other electronic components. NKT322 GIGALLOY® is recognized as the best substitute for beryllium copper alloys.

◆ Features

1. A beryllium-free ultrahigh-strength copper alloy
2. Excellent strength and bend formability equal or superior to those of mill-hardened beryllium copper; widely used as an alternative alloy
3. The highest level of stress relaxation resistance among copper alloys; keeps contact force at high temperatures

◆ Table 1. Chemical Composition of NKT322

Chemical Composition	Ti	Fe	Cu+Ti+Fe
Typical values	2.9–3.4	0.17–0.23	≥99.5

◆ Table 2. Physical Properties of NKT322

Electrical Conductivity	10–13	%IACS (@20°C)
Specific Resistance	132–172	nΩ · m (@20°C)
Thermal Conductivity	66.79	W/mK
Thermal Expansion Coefficient	18	×10 ⁻⁶ /K (20 to 200°C)
Young's Modulus	120	GPa
Density	8.7	g/cm ³

◆ Table 3. Mechanical Properties of NKT322

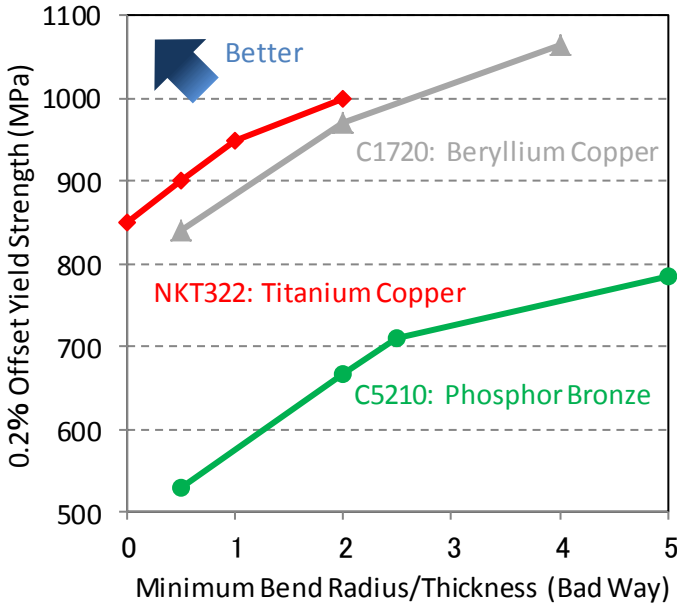
Temper		Tensile Strength	0.2% Offset Yield Strength	Elongation	Vickers Hardness
		(MPa)	(MPa)	(%)	(Hv)
H	Typical values	950	850	18	300
	Specifications	900–1000	800–900	12 min.	-
EH	Typical values	970	900	15	310
	Specifications	920–1020	850–950	10 min.	-
SH	Typical values	1020	950	10	330
	Specifications	970–1100	900–1000	6 min.	-
ESH	Typical values	1070	1000	5	340
	Specifications	1010–1200	950–1050	3 min.	-

◆ Standard Strip Thicknesses of NKT322

0.08 mm, 0.10 mm, 0.12 mm, 0.15 mm, 0.20 mm, 0.25 mm and 0.30 mm are available.

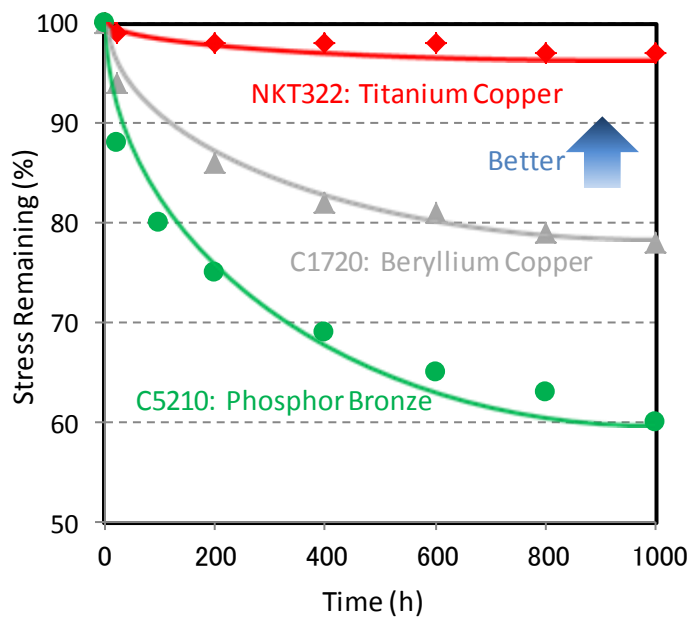
Please contact us for other thicknesses on request.

◆ Figure 1. 0.2% Offset Yield Strength and Bend Formability Evaluated by 90° W-Bend Test



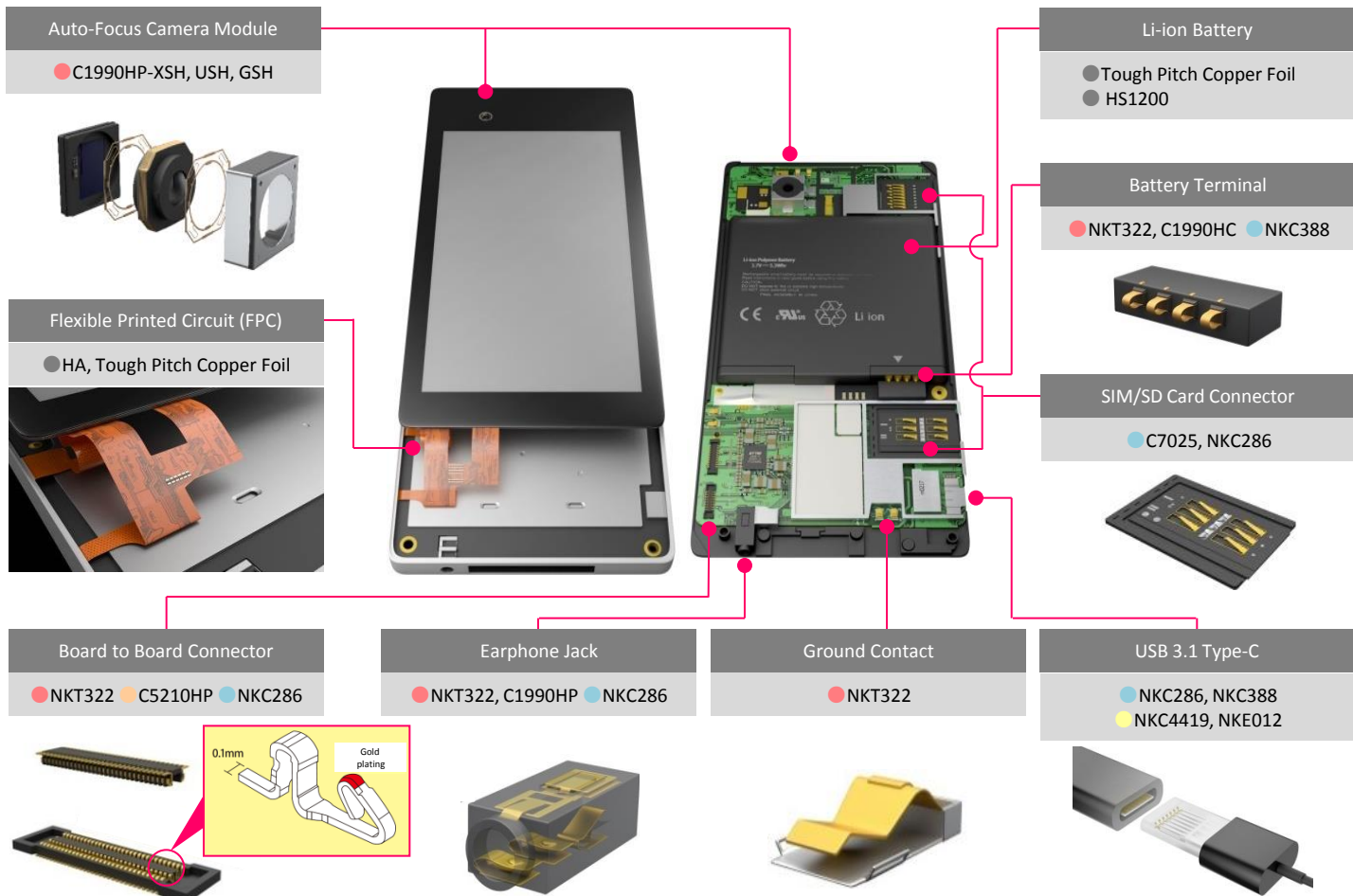
90° W-bend test is carried out in the transverse direction, bad way. Sample size: thickness 0.2 mm × width 10 mm × length 30 mm. These results for bend formability are typical values as measured by us and are not guaranteed values.

◆ Figure 2. Stress Relaxation Resistance

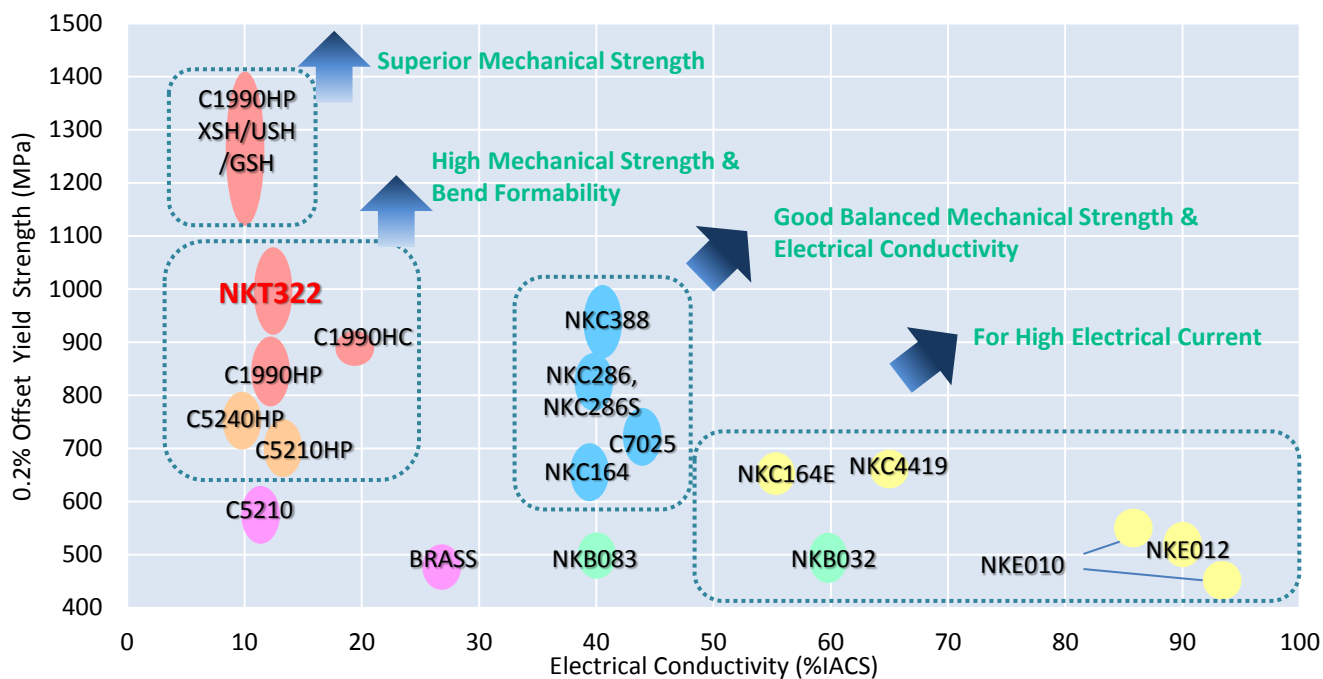


Test temperature: 150°C. Applied stress: 80% of 0.2% offset yield strength. These results for stress relaxation resistance are typical values as measured by us and are not guaranteed values.

◆ Figure 3. Examples of Applications for High-Performance Copper Alloys for Smartphones



◆ Figure 4. High-Performance Copper Alloys Available to Meet Customers' Needs



Hyper Phosphor Bronze
 • C5210HP
 • C5240HP

Titanium Copper Alloy
 • NKT322
 • C1990HP
 • C1990HC

Corson Alloy
 • C7025 • NKC164
 • NKC286 • NKC286S
 • NKC388

High Electrical Conductivity Alloy
 • NKC4419 • NKE010
 • NKC164E • NKE012

Company Outline (As of January 1, 2016)

Name	JX Nippon Mining & Metals Corporation
Capital	JPY 40 billion
Lines of Business	Resource development Smelting and refining Recycling and environmental services Electronic materials
Head Office	1-2 Otemachi 1-chome, Chiyoda-ku, Tokyo, Japan
Parent Company	Wholly owned by JX Holdings, Inc.

Contact Information

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