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# **CN49 (CuNi44)**

## **Copper Nickel No 49**

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# Alloys : CN49 (CuNi44 Copper Nickel)

[JIS C 2532]

Heat-resistant, oxidation-resistant, and can be used up to 400°C. Non-magnetic, small temperature coefficient at room temperature.

Good processability such as thin wire and rolling, and good solderability.

Used in precision grade AC resistors, precision resistors for communication equipment, etc.

JIS	JIS Code	Electrical Resistivity [ $\mu\Omega\text{m}$ ]	Average TCR [ $\times 10^{-6}/^{\circ}\text{C}$ ]
GCN49	C 2532	0.49 $\pm$ 0.03	* $\pm$ 40

(\* )Reference value

Cuprous Electromotive Force Mv/K (0~100°C)	Thermal Expansion Coefficient $\times 10^{-6}/$	Specific Heat J/g·K (20°C)	Thermal Conductivity w/m·K	Density g/cm <sup>3</sup> (20°C)	Melting Point °C	Max Operating Temperature °C
-41	13.5	0.41	23	8.90	1240	400

Chemical Composition	Mn	Ni	Cu+Ni+Mn
(%)	0.5~2.5	42~48	$\geq$ 99

Alloys	Type	Diameter (mm)	
CN49W	Wire	$\phi$ 6.00~0.025	
CN49R	Ribbon	t=2.90~0.08	w=40~0.4 (Depends on thickness)
CN49P	Plate	Please consult	
CN49	Foil	Please consult	

# CN49 (CuNi44 Copper Nickel)

## Resistance·Length·Weight

Wire Electrical Resistivity (23°CμΩm) 0.49±0.03

Diameter (mm)	Tolerance (mm)	Cross section (mm <sup>2</sup> )	Resistance Tolerance (%)	DC Resistance (Ω/m)	Length (m/Kg)	Weight (g/m)
6.00	±0.080	28.27	±5	0.0173	3.97	252
5.50	±0.063	23.76	±5	0.0206	4.73	211
5.00	±0.063	19.64	±5	0.0250	5.72	175
4.50	±0.063	15.90	±5	0.0308	7.06	142
4.00	±0.063	12.57	±5	0.0390	8.94	112
3.50	±0.050	9.621	±5	0.0509	11.7	85.6
3.20	±0.050	8.042	±5	0.0609	14.0	71.6
2.90	±0.050	6.605	±5	0.0742	17.0	58.8
2.60	±0.040	5.309	±5	0.0923	21.2	47.3
2.30	±0.040	4.155	±5	0.118	27.0	37.0
2.00	±0.040	3.142	±5	0.156	35.8	28.0
1.80	±0.040	2.545	±5	0.193	44.2	22.6
1.60	±0.032	2.011	±5	0.244	55.9	17.9
1.50	±0.032	1.767	±5	0.277	63.6	15.7
1.40	±0.032	1.539	±5	0.318	73.0	13.7
1.30	±0.032	1.327	±5	0.369	84.7	11.8
1.20	±0.025	1.131	±5	0.433	99.3	10.1
1.10	±0.025	0.9503	±6	0.516	118	8.46
1.00	±0.025	0.7854	±6	0.624	143	6.99
0.90	±0.025	0.6362	±6	0.770	177	5.66
0.85	±0.025	0.5675	±6	0.864	198	5.05
0.80	±0.020	0.5027	±6	0.975	224	4.47
0.75	±0.020	0.4418	±6	1.11	254	3.93
0.70	±0.020	0.3848	±6	1.27	292	3.43
0.65	±0.020	0.3318	±6	1.48	339	2.95
0.60	±0.020	0.2827	±6	1.73	397	2.52
0.55	±0.016	0.2376	±7	2.06	473	2.11
0.50	±0.016	0.1964	±7	2.50	572	1.75
0.45	±0.016	0.1590	±7	3.08	706	1.42
0.40	±0.016	0.1257	±7	3.90	894	1.12
0.35	±0.013	0.09621	±7	5.09	1168	0.856
0.32	±0.013	0.08042	±7	6.09	1397	0.716
0.29	±0.013	0.06605	±7	7.42	1701	0.588
0.26	±0.010	0.05309	±8	9.23	2116	0.473
0.23	±0.010	0.04155	±8	11.8	2704	0.370
0.20	±0.010	0.03142	±8	15.6	3577	0.280
0.18	±0.008	0.02545	±8	19.3	4415	0.226
0.16	±0.008	0.02011	±8	24.4	5588	0.179
0.15	±0.008	0.01767	±8	27.7	6358	0.157
0.14	±0.008	0.01539	±8	31.8	7299	0.137
0.13	±0.006	0.01327	±9	36.9	8465	0.118
0.12	±0.006	0.01131	±9	43.3	9935	0.101
0.11	±0.006	0.009503	±9	51.6	11823	0.0846
0.10	±0.006	0.007854	±9	62.4	14306	0.0699
0.09	±0.005	0.006362	±10	77.0	17662	0.0566
0.08	±0.005	0.005027	±10	97.5	22353	0.0447
0.07	±0.005	0.003848	±10	127	29196	0.0343
0.06	±0.004	0.002827	±11	173	39739	0.0252
0.05	±0.004	0.001964	±11	250	57224	0.0175
0.04	±0.003	0.001257	±12	390	89413	0.0112
0.03	±0.003	0.0007069	±12	693	158956	0.00629
0.025	±0.002	0.0004909	±13	998	228896	0.00437

# CN49 (CuNi44 Copper Nickel)

## Temperature Current Characteristics · Diameter · Temperature · Current

Wire Electrical Resistivity (23°CμΩm) 0.49±0.03 [Unit: Ampere]

Diameter (mm)	50 (°C)	100 (°C)	150 (°C)	200 (°C)	250 (°C)	300 (°C)	350 (°C)	400 (°C)
6.00	23.0	33.0	59.6	75.0	90.2	106	121	138
5.50	20.6	37.9	52.4	66.0	79.3	93.3	107	122
5.00	17.8	32.8	45.5	57.4	68.9	81.0	92.8	105
4.50	15.3	28.2	39.0	49.2	59.1	69.6	79.6	90.5
4.00	13.3	24.6	34.2	42.8	51.2	60.2	68.7	77.8
3.50	11.0	20.3	28.1	35.3	42.2	49.5	56.6	64.1
3.20	9.60	17.7	24.5	31.0	37.0	43.3	49.4	56.2
2.90	8.33	15.8	21.4	26.8	32.0	37.6	42.9	48.7
2.60	7.46	13.7	18.8	23.7	28.2	33.0	37.8	42.5
2.30	6.24	11.4	15.9	19.8	23.7	27.6	31.6	35.5
2.00	5.10	9.36	12.9	16.2	19.3	22.6	25.8	29.1
1.80	4.65	8.46	11.6	14.5	17.3	20.1	22.9	25.9
1.60	3.94	7.17	9.87	12.3	14.6	17.1	19.4	21.8
1.50	3.58	6.52	8.98	11.2	13.3	15.6	17.6	19.9
1.40	3.25	5.91	8.14	10.2	12.1	14.1	16.1	18.0
1.30	3.06	5.57	7.68	9.60	11.3	13.2	15.0	16.7
1.20	2.72	5.00	6.82	8.53	10.1	11.7	13.3	14.9
1.10	2.50	4.42	6.05	7.53	8.93	10.4	11.7	13.2
1.00	2.12	3.88	5.30	6.62	7.85	9.09	10.3	11.6
0.90	1.80	3.30	4.61	5.63	6.67	7.73	8.76	9.82
0.80	1.63	3.00	4.09	5.10	6.03	6.94	7.86	8.55
0.70	1.35	2.49	3.38	4.22	5.01	5.76	6.51	7.09
0.65	1.21	2.24	3.05	3.80	4.50	5.18	5.87	6.38
0.60	1.14	2.12	2.89	3.59	4.24	4.86	5.48	6.07
0.55	1.02	1.88	2.56	3.19	3.76	4.32	4.87	5.38
0.50	0.890	1.66	2.25	2.79	3.30	3.97	4.28	4.72
0.45	0.733	1.43	1.95	2.44	2.87	3.29	3.70	4.10
0.40	0.701	1.30	1.77	2.19	2.58	2.95	3.32	3.68
0.35	0.587	1.09	1.49	1.83	2.17	2.47	2.79	3.09
0.32	0.522	0.969	1.32	1.64	1.93	2.20	2.47	2.75
0.29	0.459	0.851	1.16	1.43	1.69	1.94	2.17	2.40
0.26	0.426	0.785	1.07	1.32	1.55	1.77	1.97	2.19
0.23	0.366	0.672	0.914	1.13	1.33	1.51	1.70	1.87
0.20	0.303	0.557	0.757	0.943	1.10	1.25	1.40	1.50
0.18	0.272	0.503	0.684	0.843	0.987	1.13	1.26	1.42
0.16	0.230	0.427	0.574	0.716	0.863	0.956	1.07	1.20
0.15	0.214	0.396	0.537	0.664	0.776	0.888	0.989	1.11
0.14	0.195	0.360	0.490	0.604	0.706	0.808	0.900	1.01
0.13	0.185	0.337	0.459	0.567	0.662	0.765	0.842	0.927
0.12	0.163	0.302	0.413	0.509	0.594	0.678	0.750	0.832
0.11	0.145	0.270	0.367	0.459	0.528	0.602	0.670	0.738
0.10	0.126	0.233	0.317	0.392	0.458	0.523	0.583	0.644
0.09	0.112	0.207	0.281	0.347	0.406	0.463	0.516	0.567
0.08	0.0975	0.181	0.247	0.305	0.353	0.403	0.450	0.488
0.07	0.0814	0.151	0.220	0.256	0.291	0.338	0.376	0.412
0.06	0.0685	0.127	0.172	0.201	0.246	0.282	0.312	0.344
0.05	0.0533	0.0688	0.134	0.164	0.192	0.219	0.244	0.268
0.04	0.0398	0.0742	0.100	0.123	0.144	0.164	0.182	0.201
0.03	0.0269	0.0502	0.0679	0.0834	0.0978	0.111	0.123	0.136
0.025	0.0217	0.0402	0.0543	0.0668	0.0782	0.0886	0.0981	0.108

# CN49 (CuNi44 Copper Nickel)

## Conductor resistance

Ribbon

Electrical Resistivity (23°CμΩm)  $0.49 \pm 0.03$

[Unit: Ω/m]

Thickness (mm)	Width mm)													
	40.0	32.0	25.0	20.0	16.0	13.0	10.0	6.5	5.0	3.2	2.4	1.6	0.8	0.4
2.90	0.00431	0.00539	0.00690	0.00862	0.0108	0.0133	0.0172							
2.60	0.00481	0.00601	0.00769	0.00962	0.0120	0.0148	0.0192	0.0302						
2.30	0.00543	0.00679	0.0087	0.0109	0.0136	0.0167	0.0217	0.0341	0.0444					
2.00	0.00625	0.00781	0.0100	0.0125	0.0156	0.0192	0.0250	0.0393	0.0510					
1.80	0.00694	0.00868	0.0111	0.0139	0.0174	0.0214	0.0278	0.0436	0.0567					
1.60	0.00781	0.00977	0.0125	0.0156	0.0195	0.0240	0.0313	0.0491	0.0638					
1.40	0.00893	0.0112	0.0143	0.0179	0.0223	0.0275	0.0357	0.0561	0.0729					
1.20	0.0104	0.0130	0.0167	0.0208	0.0260	0.0321	0.0417	0.0654	0.0851					
1.00	0.0125	0.0156	0.0200	0.0250	0.0313	0.0385	0.0500	0.0785	0.102					
0.90		0.0174	0.0222	0.0278	0.0347	0.0427	0.0556	0.0873	0.113	0.177	0.236			
0.80		0.0195	0.0250	0.0313	0.0391	0.0481	0.0625	0.0982	0.128	0.199	0.266			
0.70			0.0286	0.0357	0.0446	0.0549	0.0714	0.112	0.146	0.228	0.304			
0.60			0.0333	0.0417	0.0521	0.0641	0.0833	0.131	0.170	0.266	0.354			
0.50			0.0400	0.0500	0.0625	0.0769	0.100	0.157	0.204	0.319	0.425			
0.45			0.0444	0.0556	0.0694	0.0855	0.111	0.175	0.227	0.354	0.473	0.709		
0.40					0.0781	0.0962	0.125	0.196	0.255	0.399	0.532	0.798		
0.35						0.110	0.143	0.224	0.292	0.456	0.608	0.911		
0.32						0.120	0.156	0.245	0.319	0.498	0.665	1.00		
0.29							0.172	0.271	0.352	0.550	0.733	1.10	2.20	
0.26							0.192	0.302	0.393	0.613	0.818	1.23	2.45	4.91
0.23								0.341	0.444	0.694	0.925	1.39	2.77	5.55
0.20								0.393	0.510	0.798	1.06	1.60	3.19	6.38
0.18								0.436	0.567	0.886	1.18	1.77	3.54	7.09
0.16										0.997	1.33	1.99	3.99	7.98
0.14										1.14	1.52	2.28	4.56	9.11
0.12											1.77	2.66	5.32	10.6
0.10												3.19	6.38	12.8
0.08												3.99	7.98	16.0

\*Allowable tolerance of conductor resistance : Width 10mm or more  $\pm 7\%$  , Width 10mm or less  $\pm 8\%$