Electric heating wires

Table 1

Symbol	JIS C 2520 Symbol	Form	Chemical compositions (%)	Resistivity μΩ· m	Max. operating temp. (℃) *	Life value (cycle) on JIS C 2520	Advantages
SILVER No.1	NCHW1	wire	Ni 77min. Cr 19-21	1.08 ±0.05	Approx.1150	300min.	Very good oxidation resistance (service life) at high atmospheric temperatures
	NCHRW1	ribbon					
SILVER No.2	NCHW2	wire	Ni 57min. Cr 15-18	1.12 ±0.05	Approx.1000	200min.	Good oxidation resistance (service life) at high air temperature
	NCHRW2	ribbon					
SILVER No.3	FCHW1	wire	Cr 23-26 Al 4-6	1.42 ±0.06	Approx.1250	100min.	High volume resistivity
	FCHRW1	ribbon					
SILVER No.30	FCHW1	wire	Cr 23-26 Al 4-6 Special useful elements added	1.42 ±0.06	Approx.1300	300min.	High volume resistivity, good oxidation resistance (service life) at high air temperature
	FCHRW1	ribbon					
SILVER No.4	FCHW2	wire	Cr 17-21 Al 2-4	1.23 ±0.06	Approx.1100	70min.	Higher volume resistivity than Ni-Cr type alloys.
	FCHRW2	ribbon					

* The maximum surface temperature of 3mmΦ heating element when kept at the same temperature for 1,000 hours.

Electric heating wires

Table 2

Symbol	JIS C 2520 Symbol	Form	Density g/cm³	Conductor resistance Ω/m	Length m/kg	Weight g/m
SILVER No.1	NCHW1	wire	8.41	1.375 ÷ d²	151.40 ÷ d²	6.605 × d²
	NCHRW1	ribbon		1.125(1.102) ÷ a ÷ b	123.85(121.33) ÷ a ÷ b	8.074(8.242) × a × b
SILVER No.2	NCHW2	wire	8.25	1.426 ÷ d²	154.32 ÷ d²	6.480 × d²
	NCHRW2	ribbon		1.167(1.143) ÷ a ÷ b	126.26(123.69) ÷ a ÷ b	7.920(8.085) × a × b
SILVER No.3	FCHW1	wire	7.20	1.808 ÷ d²	176.83 ÷ d²	5.655 × d²
	FCHRW1	ribbon		1.479(1.449) ÷ a ÷ b	144.68 (141.72)÷ a ÷ b	6.912(7.056) × a × b
SILVER No.30	FCHW1	wire	7.20	1.808 ÷ d²	176.83 ÷ d²	5.655 × d²
	FCHRW1	ribbon		1.479(1.449) ÷ a ÷ b	144.68 (141.72)÷ a ÷ b	6.912(7.056) × a × b
SILVER No.4	FCHW2	wire	7.35	1.566 ÷ d²	173.22 ÷ d²	5.773 × d²
	FCHRW2	ribbon		1.281(1.255)÷ a ÷b	141.72(138.83) ÷ a ÷ b	7.056(7.203) × a × b

Remars：a, b, and d indicate the following: a (mm): Ribbon thickness, b (mm): Ribbon width, d (mm): Wire diameter
The coefficient of the cross-sectional area is "0.96 for ribbons with a width of less than 10 mm, and 0.98 for ribbons with a width of 10 mm or more." This is already incorporated in the above equations.
The numbers in parentheses apply to ribbons with a width of 10 mm or more.

Resistance wires

Table 3

Symbol	JIS C 2532 Symbol	Form	Chemical compositions (%)	Resistivity μΩ· m	Average TCR 10-6/K 23-100℃	Cuprous Electromotive Force μV/K 0-100℃	Max Operating Temperature (℃)
SILVER No.1	GNC108W	wire	Ni 77 min. Cr 19-21	1.08 ±0.05	50	+5	500
	GNC108R	ribbon					
SILVER No.2	GNC112W	wire	Ni 57 min. Cr 15-18	1.12 ±0.05	150	+1	500
	GNC112R	ribbon					
SILVER No.3	GFC142W	wire	Cr 23-26 Al 4-6	1.42 ±0.06	100	-4	400
SILVER No.4	GFC123W	wire	Cr 17-21 Al 2-4	1.23 ±0.06	150	-3	400
SILVER CN49	GCN49W	wire	Mn 0.5-2.5 Ni 42.0-48.0 Cu+Ni+Mn 99.0 min.	0.49 ±0.030	±80	-41	400
	GCN49R	ribbon					
SILVER CN30	GCN30W	wire	Mn 1.5 max. Ni 20.0-25.0 Cu+Ni+Mn 99.0 min.	0.30 ±0.024	200	-32	300
	GCN30R	ribbon					
SILVER CN15	GCN15W	wire	Mn 1.0 max. Ni 8.0-12.0 Cu+Ni+Mn 99.0 min.	0.15 ±0.015	500	-25	250
	GCN15R	ribbon					
SILVER CN10	GCN10W	wire	Mn 1.0 max. Ni 4.0-7.0 Cu+Ni+Mn 99.0 min.	0.10 ±0.012	700	-18	220
	GCN10R	ribbon					
SILVER CN5	GCN5W	wire	Mn 1.0 max. Ni 0.5-3.0 Cu+Ni+Mn 99.0 min.	0.05 ±0.0075	1500	-13	200
	GCN5R	ribbon					
SILVER CM44	GCM44W	wire	Mn 10.0-13.0 Ni 1.0-4.0 Cu+Ni+Mn 98.0 min.	0.44 ±0.030	±50	±2	150
	GCM44R	ribbon					

Resistance wires

Table 4

Symbol	JIS C 2520 Symbol	Form	Density g/cm³	Conductor resistance Ω/m	Length m/kg	Weight g/m
SILVER No.1	GNC108W	wire	8.41	1.375 ÷ d²	151.40 ÷ d²	6.605 × d²
	GNC108R	ribbon		1.125(1.102) ÷ a ÷ b	123.85(121.33) ÷ a ÷ b	8.074(8.242) × a × b
SILVER No.2	GNC112W	wire	8.25	1.426 ÷ d²	154.32 ÷ d²	6.480 × d²
	GNC112R	ribbon		1.167(1.143) ÷ a ÷ b	126.26(123.69) ÷ a ÷ b	7.920(8.085) × a × b
SILVER No.3	GFC142W	wire	7.20	1.808 ÷ d²	176.83 ÷ d²	5.655 × d²
SILVER No.4	GFC123W	wire	7.35	1.566 ÷ d²	173.22 ÷ d²	5.773 × d²
SILVER CN49	GCN49W	wire	8.9	0.6239 ÷ d²	143.06 ÷ d²	6.99 × d²
	GCN49R	ribbon		0.5104(0.5) ÷ a ÷ b	117.04(114.65) ÷ a ÷ b	8.544(8.722) × a × b
SILVER CN30	GCN30W	wire	8.9	0.382 ÷ d²	143.06 ÷ d²	6.99 × d²
	GCN30R	ribbon		0.3125(0.3061) ÷ a ÷ b	117.04(114.65) ÷ a ÷ b	8.544(8.722) × a × b
SILVER CN15	GCN15W	wire	8.9	0.191 ÷ d²	143.06 ÷ d²	6.99 × d²
	GCN15R	ribbon		0.1563(0.1531) ÷ a ÷ b	117.04(114.65) ÷ a ÷ b	8.544(8.722) × a × b
SILVER CN10	GCN10W	wire	8.9	0.1273 ÷ d²	143.06 ÷ d²	6.99× d²
	GCN10R	ribbon		0.1042(0.102) ÷ a ÷ b	117.04(114.65) ÷ a ÷ b	8.544(8.722) × a × b
SILVER CN5	GCN5W	wire	8.9	0.06366 ÷ d²	143.06 ÷ d²	6.99× d²
	GCN5R	ribbon		0.05208(0.05102) ÷ a ÷ b	117.04(114.65) ÷ a ÷ b	8.544(8.722) × a × b
SILVER CM44	GCM44W	wire	8.44	0.5602 ÷ d²	150.86 ÷ d²	6.629 × d²
	GCM44R	ribbon		0.4583(0.449) ÷ a ÷ b	123.42(120.9) ÷ a ÷ b	8.102(8.271) × a × b

Remars：a, b, and d indicate the following: a (mm): The coefficient of the cross-sectional area is "0.96 for ribbons with a width of less than 10 mm, and 0.98 for ribbons with a width of 10 mm or more." This is already incorporated in the above equations.
The numbers in parentheses apply to ribbons with a width of 10 mm or more.

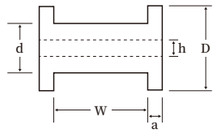
Bobbins and spools

Below are the details of the bobbins and spools we handle.
We may be able to supply products not included in the list, so please feel free to send an inquiry.

Table 5

Type fo Bobbin	Flange diameter mm	Barrel diameter mm	Traverse length mm	Flange thickness mm	Hole diameter mm	tare g	Packing bobbin ／carton
P-3R	130	80	90	10	20	250±5	6
P-5R	160	90	90	12	20	400±5	4
DIN 63	63	40	49	7	11	40±3	20
DIN 80	80	50	64	8	16	70±2	20
DIN 100	100	63	80	10	16	130±3	12
P-1	100	50	70	10	16	105±3	12
P-5	160	70	90	12	20	300±5	4
P-10	200	90	110	12	25	500±20	2
P-15	250	110	110	15	30	890±15	1
P-30	300	130	130	15	30	1300±30	1
A1-3K	130	80	90	10	20	1220 and 1240	4

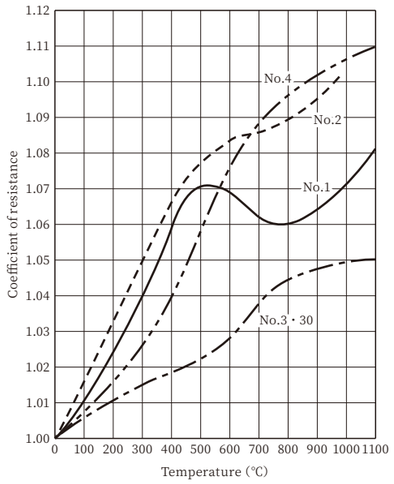
Remars：(1) Bobbin is made of plastics(P) or aluminium(Al).
(2) Tolerance for capacity in ±10%.
(3) DIN means Deutsche Industrie-Normen(German Industrial Standards).
(4) Letters of bobbin spec.shown above are as follows.



If you have any questions about products or bobbins not listed above,
please feel free to contact us with your questions at any time.

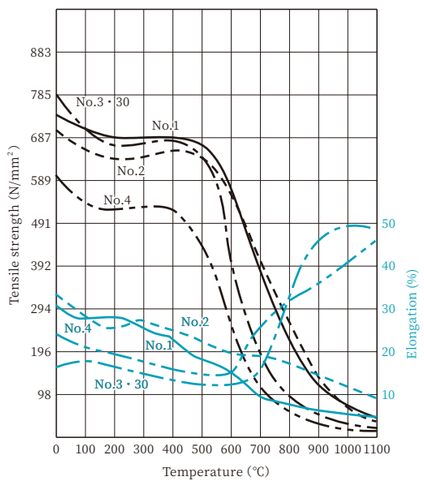
Relations between Temperature and Coefficient of resistance

Chart 1



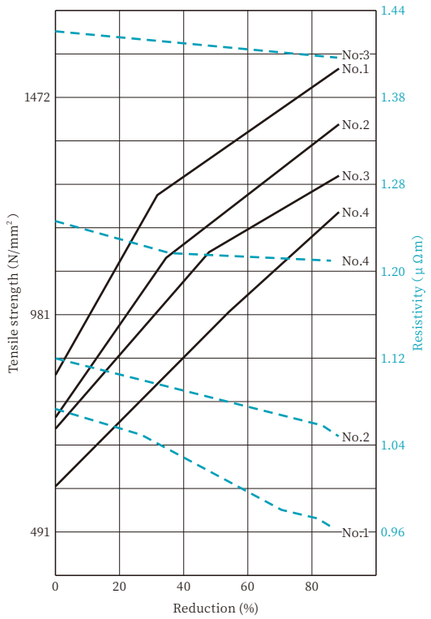
Relations between Temperature and Mechanical properties

Chart 2



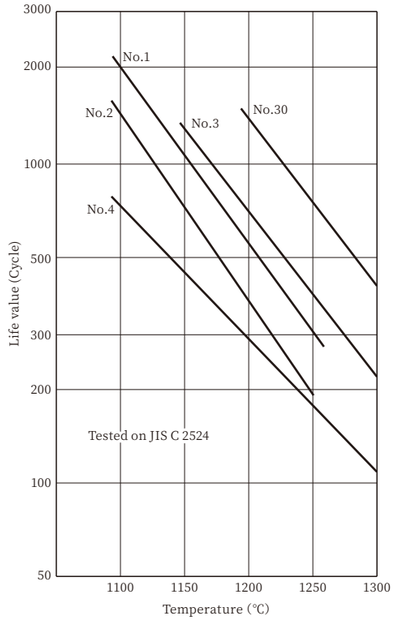
Changes in tensile strength and Resistivity by cold drawing

Chart 3



Relations between Temperature and Life value

Chart 4



Resistant to corrosion

Table 6

Cycle		After 1000 cycles tested		After 60 cycles tested		
Class		SILVER No.1	SILVER No.2	SILVER No.3 No.30	SILVER No.4	SUS 304
Treatment of test piece	Bright annealed wire of 1 mm in diameter	A	B	C	C	B
	Test piece which was treated with #320 emery paper polishing on above wire	A	B	C	C	B

Remarks (1) Testing method : Dip & Dry method (After dipping in the testing solution stated below for 2 seconds, the test piece is pulled up and dried in air for 100 seconds.This cycle is repeated.)

(2) Testing solution : Na_2SO_3 0.5g H_2O 1050cc
$Na_2S_2O_3$ 0.2g PH 9.3
Na_2SO_4 1.0g Temperature of solution 42℃
NaCl 105g Temperature of drying room 42℃

(3) Grading A Excellent (No rust is observed on the surface of test piece)
B Good (A little and slight rust is observed)
C Poor (A rust is clearly observed)

A guidance on selection of recommendable class

Table 7

Place or circumstance used	Recommendable Class				
	SILVER No.1	SILVER No.2	SILVER No.3	SILVER No.30	SILVER No.4
As a heater for domestic appliance.	○	○	○	○	○
When used at 1200 °C and over.	△	×	○	○	×
When intermittent heating operations is considerable.	○	○	△	△	△
When used under the outer stress.	○	□	△	△	△
When used in continuous heating under no outer stress.	○	○	○	○	○
When used at about 475°C	○	○	□	□	□
For the purpose of elctrical resistant for general use.	○	○	○	○	○
When used in atmosphere of nitrogen gas.	○	□	△	△	△
When used in atmosphere of hydrogen gas.	○	□	△	△	△
When used in atmosphere of hydrocarbonized gas.	○	△	△	△	△
When used in atmosphere of carbon monoxide gas or carbon dioxide gas.	○	□	□	□	□
When used in atmosphere of sulphurated hydrogen gas,sulphurous acid gas.	×	×	○	○	○
When used in atmosphere of dissociated Ammonia gas.	○	○	△	△	△
When used in a vacuum.	○	○	△	△	△

Note : ○ Excellent □ Standard △ Poor × Not recommendable