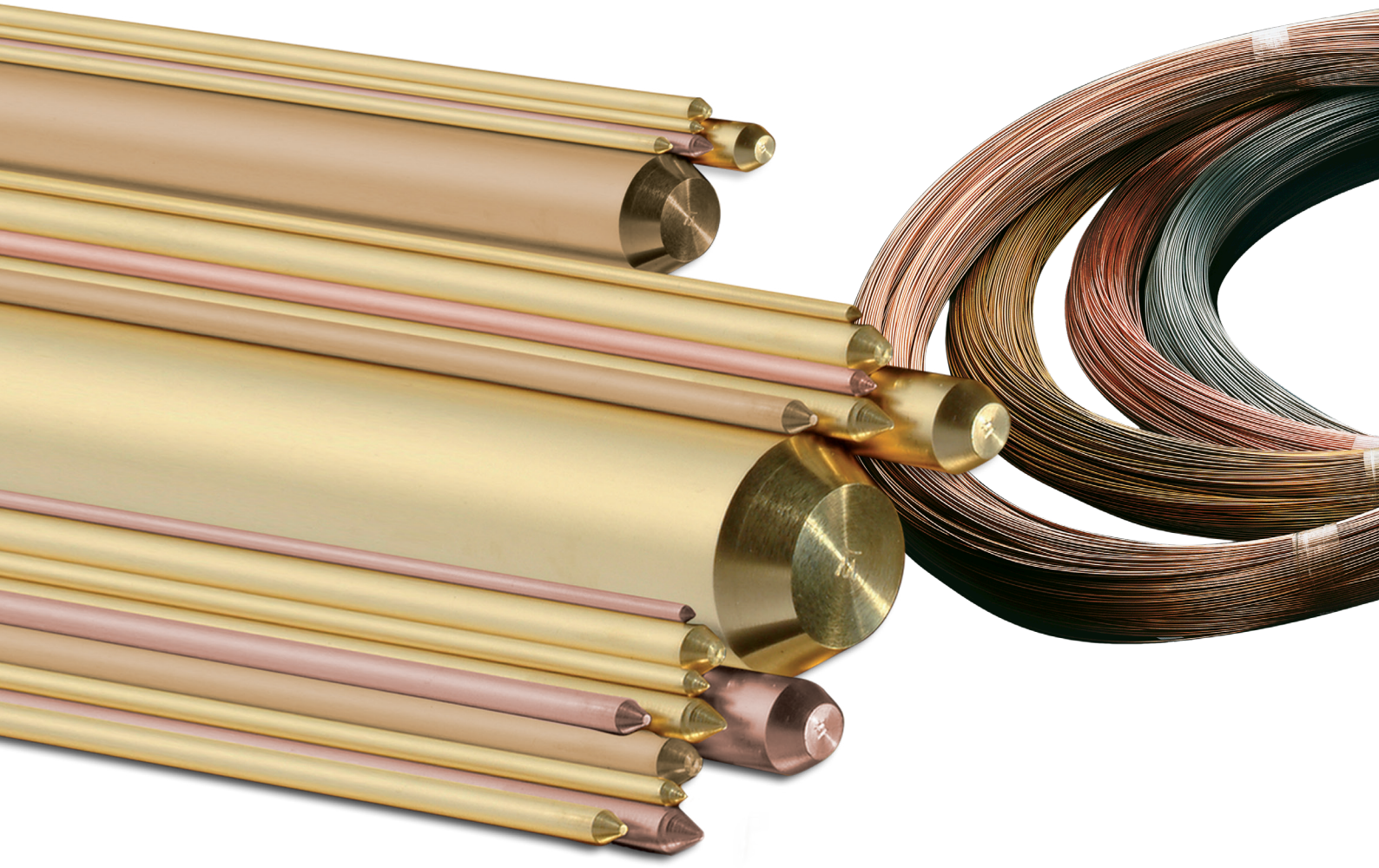
wieland

Copper alloys for machined connectors



WICONNEC®

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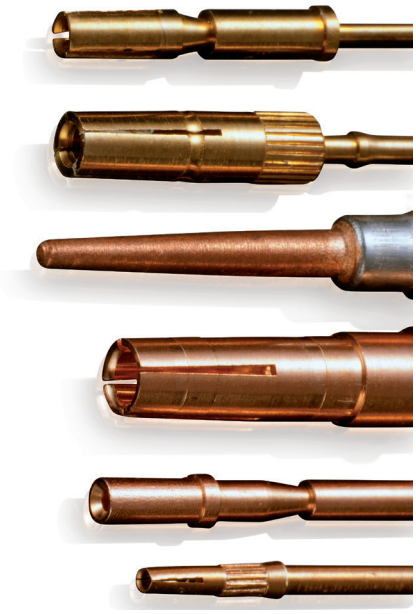
Under the brand WICONNEC Wieland offers different copper alloys in the form of rods and wires which are particularly suitable for the production of female and male connectors.

Besides low-cost brass, the materials portfolio includes specially developed copper alloys for sophisticated applications in the manufacture of machined connectors.

Depending on the technical requirement, materials with high electrical conductivity or high mechanical strength as well as a combination of these properties are used.

Apart from solid solution hardening alloys, the alloy spectrum is completed by precipitation hardening materials and lead-free materials (Pb max. 0.1 %).

All of the WICONNEC materials offered meet the requirements of current directives, such as RoHS (Restriction of Hazardous Substances) and the ELV (End of Life Vehicle) directive.



Different types of connectors

The WICONNEC range of alloys comprises the following materials:

Wieland designation	Composition	EN	UNS	JIS
WICONNEC-Z10	CuZn37Pb0.5	CW604N	C33500	–
WICONNEC-Z11	CuZn35Pb1	CW600N	C34000	C3501
WICONNEC-Z12	CuZn35Pb2	CW601N	C34200	C3601
WICONNEC-Z14	CuZn37Pb2	CW606N	C35300	C3601
WICONNEC-Z21	CuZn38Pb2	CW608N	C37700	C3603
WICONNEC-Z23	CuZn36Pb3	CW603N	C36000	C3601/C3602
WICONNEC-Z33	CuZn39Pb3	CW614N	C38500	C3603/C3604
WICONNEC-KC1	CuPb1P	CW113C	C18700	–
WICONNEC-K44	CuNi1Pb0.5P	–	C19140/C19150	–
WICONNEC-K41	CuNi1Pb1P	–	C19150/C19160	–
WICONNEC-B44	CuSn4Zn4Pb4P	CW456K	C54400	C5441

Lead-free materials part of the ecoline family wieland-ecoline.com

Wieland designation	Composition	EN	UNS	JIS
WICONNEC-M59	CuZn42	CW510L	–	–
WICONNEC-S34	CuZn34Mn2SiAlNi	–	C67340	–
WICONNEC-K55	CuNi3SiMg	–	C70250	–
WICONNEC-KS2	CuSP	CW114C	C14700	–
WICONNEC-KS4	CuNiSP	–	–	–

Technical Properties

WICONNEC	Z10	Z11	Z12	Z14	Z21	Z23	Z33	KC1
Designation [EN]	CW604N	C600N	CW601N	CW606N	CW608N	CW603N	CW614N	CW113C
Designation [UNS]	C33500	C34000	C34200	C35300	C37700	C36000	C38500	C18700
Product standards	–	EN 12164 (Stangen) + EN 12166 (Drähte)						EN 12164
Machinability [%]	60	75	80	85	90	90	100	80
Cold working*	2	2	2	3	3	3	4	1
Electrical conductivity [%IACS]	25	25	25	24	24	22	25	89
Thermal conductivity [W/(mK)]	113	113	116	105	109	100	113	350
Tensile Strength R_m [MPa]	330–610			320–620	340–620	340–630	360–630	250–450
Yield Strength $R_{p0.2}$ [MPa]	130–500			140–540				220–420
Elongation [%]	5–45			3–35				8–40
Hardness HV	80–200			80–185			80–200	90–120
Modulus of elasticity [GPa]	110	110	100	99	102	102	96	115
Product Rods [inches]	0.059–0.63			(further dimensions on request)				
Product Wires [inches]	0.059–0.63			(further dimensions on request)				
	WICONNEC-Products are 100 % eddy current tested							

WICONNEC	K41/44	B44	M59	S34	KS2	KS4	K55
Designation [EN]	–	CW456K	CW510L	–	CW114C	–	–
Designation [UNS]	C19140 C19150 C19160	C54400	–	C67340	C14700	–	C70250
Product standards	–	EN12164	EN 12164 EN 12166	–	–	–	–
Machinability [%]	70	70	60	70	80	70	25
Cold working*	2	2	4	2	1	2	2
Electrical conductivity [%IACS]	55	16,4	24	20	90	>50	50
Thermal conductivity [W/(mK)]	245	86.5	139	75	374	245	190
Tensile Strength R_m [MPa]	280–700	350–880	360–680	450–650	250–360	–	500–950
Yield Strength $R_{p0.2}$ [MPa]	130–670	300–750	200–560	200–450	180–300	–	400–860
Elongation [%]	8–50	2–20	2–40	3–25	2–7	–	1–16
Hardness HV	80–200	200–240	100–200	ca. 190	80-120	–	150–230
Modulus of elasticity [GPa]	124	118	107	117	118	117	130
Product Rods [inches]	0.059–0.63		0.079–0.63			0.059–0.63	
Product Wires [inches]	0.059–0.47		0.059–0.47		0.059–0.47		0.012–0.47
	WICONNEC-Products are 100 % eddy current tested						

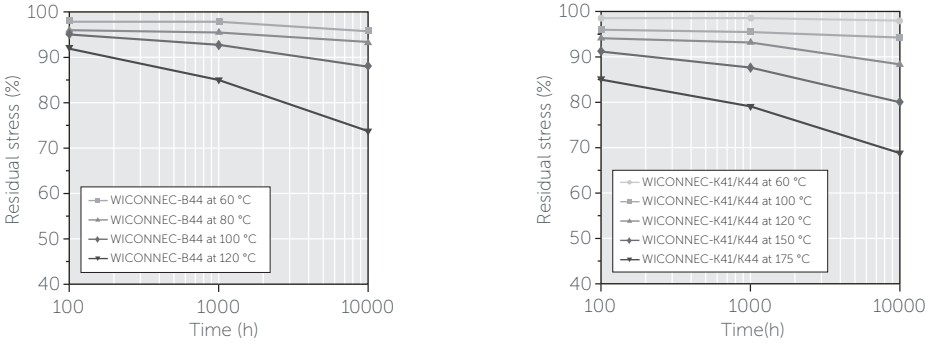
** 1 = excellent 2 = good 3 = fair 4 = less suitable*

Flexural fatigue strength

The flexural fatigue strength is defined as the maximum bending stress amplitude at which a material withstands 10^7 load cycles under symmetric alternating load without breaking. The flexural fatigue strength depends on the tested temper of the specimen and is approximately a third of the tensile strength R_m.

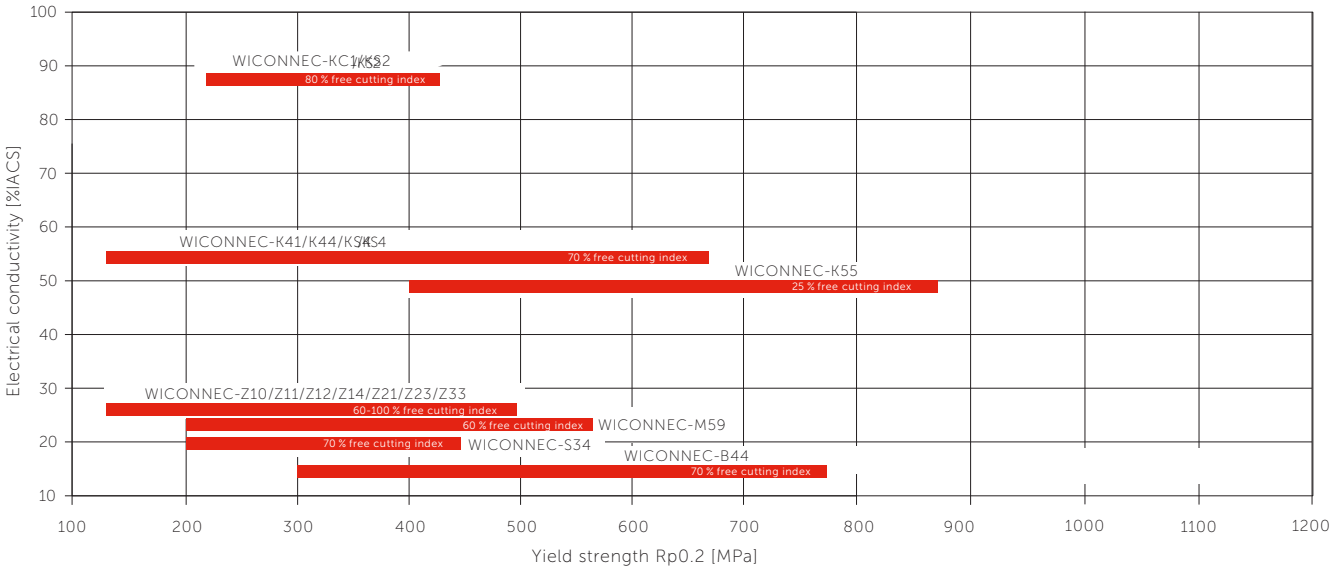
Stress Relaxation

The total amount of stress relaxation depends on the stress applied. The initial stress is normally half the yield strength $R_{p0.2}$.
The flexural fatigue strength and stress relaxation resistance values are non-guaranteed reference values which have been determined to the best of our knowledge. They do not replace expert advice or the customer's own tests. Depending on the operational conditions and design of the finished parts, there may be deviations from the values indicated.



Stress remaining as function of service temperature and time.
Values extrapolated according to F.R. Larson, J. Miller, Trans ASME74 (1952) 765-775.

Electrical Conductivity and Yield Strength $R_{p0.2}$



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