

ZOLLERN

Solid metals. Fine solutions.

Sand Casting and Forging

Short-circuit,
copper rings
Rotor bars





Copper rings.

For electric motors.

ZOLLERN offers seamlessly rolled and forged copper rings for industry and traction motors with high component quality and short lead times.

Produced in a modern ring-rolling mill

- Near net shape, seamlessly rolled rings
- First-class surface quality

ZOLLERN supplies

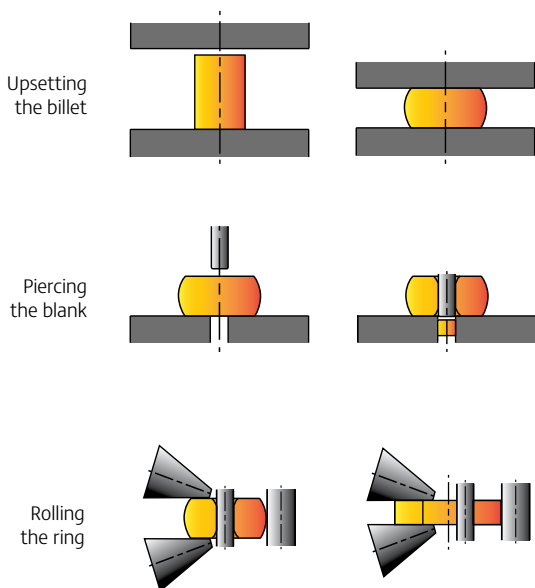
- Short-circuit rings, slip rings, short-circuit rods; for larger rotors
- Cap rings made from high-stability copper alloys; for fast-running rotors
- Seamlessly rolled and forged rings in pure CuCr1Zr copper
- Slip rings in CuNi2Si
- Rings with external diameters from 200 mm to 2,500 mm

ZOLLERN also offers

- Large series and small volumes from 2 to 10 rings
- Rings in pre-processed and fully finished condition
- Destructive and non-destructive testing

Modern process.

Ring rolling.



// Ring material properties

Material	Standard	Yield strength Rp0.2 N/mm ²
Cu-HCP SE-CU	CW021A 2.0070	≥ 40*
Cu-OFE OF-CU	CW009A 2.0040	≥ 40*
CuCr1Zr CCZr	CW106C 2.1293	≥ 270
CuNi2Si NSB	~CW 111C 2.0855	≥ 320
CuAl10Ni5Fe4 EBZ	CW307G 2.0966	330
CuAl10Ni6Fe6 EBZ-OE		440
CuNi14Al3Fe1 NB1	2.1504	540

*Higher values are possible through strain hardening, which are relativised by hard soldering.



Rotor bars.

For electrical drives and generators.

ZOLLERN supplies bars and wedges for electrical drives and generators. In the first stage, the bars are pressed, then drawn, aligned and sawn to the required dimensions.

Batch sizes: 200 to 2000 kg

Tensile strength Rm N/mm ²	Elongation A5%	Hardness HB HRC	LW MS/m
≥ 200*	≥ 35	≥ 45*	≥ 57
≥ 200*	≥ 35	≥ 45*	≥ 58
≥ 360	≥ 15	≥ 110	45
≥ 420	≥ 12	≥ 140	11-16
700	15	170	4-6
740	12	205	4-6
740	10	210	4-6

Materials for rotor bars and short-circuit rods

ZOLLERN		~ substantial coherence		DIN EN		Conductivity at 20°C MS/m	IACS %
Number	Brand	Material	Standard No.	Standard			
// Copper, low-alloy							
0100	SE-Cu F25	Cu – HCP	CW021A	13601 & 13605		> 56.5	> 97.4
0100	SE-Cu F30	Cu – HCP	CW021A	13601 & 13605		> 56.5	> 97.4
0120	CuAg	CuAg 0.10P	CW016A	13601 & 13605		> 56.0	> 96.6
1040	ZV45	~CuTeP	~CW118C	-		44.0 – 52.5	75.9 – 90.5
1050	CCZr F44	CuCrZr	CW106C	12163 & 12167		> 43.5	> 75.0
1112	V 422	CuNi0.5Mn	-	-		23.5 – 27.5	40.5 – 47.4
1117	NSB Cr-Zr	~CuNi2Si	~CW111C	-		19.0 – 26.0	32.8 – 44.8
1250	NSB4	CuNi3Si	CW112V	12163		18.0 – 21.0	31.0 – 36.2
1020	ZV15	-	-	-		15.2 – 16.2	26.2 – 27.9
1110	NSB	CuNi2Si	~CW111C	-		12.0 – 16.0	20.7 – 27.6
1100	HK 2	CuNi2Si	~CW111C	-		7.0 – 9.0	12.1 – 15.5
// Copper, alloyed with silicon							
1220	HK 8	CuSi 0.12	-	-		34.0 – 38.0	58.6 – 65.5
1190	HK 7	CuSi 0.20	-	-		27.0 – 30.0	46.6 – 51.7
1160	HK 5	CuSi 0.35	-	-		20.5 – 23.0	35.3 – 39.7
1150	HK 4	CuSi 0.55	-	-		15.5 – 17.5	26.7 – 30.2
1090	HK 1	CuSi 0.45	-	-		14.5 – 16.8	25.0 – 29.0
1260	HK 9	CuSi 0.9	-	-		10.5 – 11.5	18.1 – 19.8
1185	HK 11	CuSi 1.3	-	-		8.2 – 9.2	14.1 – 15.9
1170	HK 6	CuSi 1.7	-	-		7.0 – 8.0	12.1 – 13.8
1180	HK 10	CuSi 1.7	-	-		6.65 – 7.35	11.5 – 12.7
// Copper-zinc-brass							
2650	Ms 95	CuZn5	CW500L	~ 1652		30.0 – 34.0	51.7 – 58.6
2640	Ms 93	~CuZn7	~CW500L	-		28.5 – 31.5	49.1 – 54.3
2720	Ms 90	CuZn10	CW501L	12163		24.0 – 27.0	41.4 – 46.6
2730	Ms 85	CuZn15	CW502L	12163		17.5 – 22.5	30.2 – 38.8
2620	Ms 80	CuZn20	CW503L	12163		16.5 – 19.5	28.4 – 33.6
2760	Ms 70	CuZn30	CW505L	12163		14.5 – 17.5	25.0 – 30.2
2630	Ms 63	CuZn37	CW508L	12163 & 12167		13.0 – 16.0	22.4 – 27.6



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