

# Electrical properties

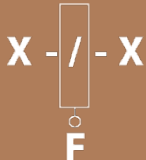

## ELECTRICAL PROPERTIES ( AT 20°C)

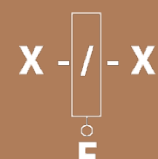

Designations			Volumen Resistivity	Resistivity mass <sup>a</sup>	Conductivity		
Material		Metallurgical State			$\frac{\Omega \times \text{mm}^2}{\text{m}}$	$\frac{\Omega \times \text{g}}{\text{m}^2}$	MS/m
Symbolic	Numerical			max.	max.	min.	min.
Cu-OFE Cu-PHCE	CW009A CW022A	Annealed		0,01707	0,1517	58,6	101
				0,01724	0,1533	58	100
Non annealed			In accordance				
Cu-ETP Cu-FRHC Cu-OF CuAg0,04 CuAg0,07 CuAg0,10 CuAg0,04(OF) CuAg0,07(OF) CuAg0,10(OF) Cu-PHC	CW004A CW005A CW008A CW011A CW012A CW013A CW017A CW018A CW019A CW020A	D		0,01786	0,1588	56	96,6
		H035	R200	0,01724	0,1533	58	100
		H065	R250				
		H065	R230				
		H085	R300	0,01754	0,1559	57	98,3
		H085	R280				
		H075	R260				
		H100	R350	0,01786	0,1588	56	96,6

Designations		Metallurgical State	Volumen Resistivity	Resistivity mass <sup>a</sup>	Conductivity				
Material			$\frac{\Omega \times \text{mm}^2}{\text{m}}$	$\frac{\Omega \times \text{g}}{\text{m}^2}$	MS/m	% IACS <sup>b</sup>			
Symbolic	Numerical		max.	max.	min.	min.			
<b>CuAg0,04P</b> <b>CuAg0,07P</b> <b>CuAg0,10P</b> <b>Cu-HCP</b>	CW014A CW015A CW016A CW021A	D	0,01818	0,1616	55	94,8			
		H035	R200	0,01754	0,1559	57	98,3		
		H065	R250						
		H065	R230						
				H085	R300	0,01786	0,1588	56	96,6
				H085	R280				
				H075	R260				
				H100	R350	0,01818	0,1616	55	94,8
NOTE 1 – The IACS % values are calculated as percentages of the normalized value of high conductivity annealed copper, according to those established by the International Electrotechnical Commission. Copper whose volume resistivity is of 0,017 24 $\Omega \times \text{m}$ , at 20°C, is defined as that corresponding to a conductivity of 100%.									
NOTE 2 – 1 MS/m is equivalent to 1 m/( $\Omega \times \text{mm}^2$ ).									
<sup>a</sup> Calculated with a copper density of 8.89 g/cm <sup>3</sup> .									
<sup>b</sup> IACS: International Annealed Copper Standard.									

## PERMISSIBLE CURRENT. DIN 43671

Room temperature: 35°C • Final temperature of bars: 65°C • Conductivity 56 M/Ωmm<sup>2</sup> (r-0.0178 Ωmm<sup>2</sup>/m)

Width x Thickness	Alternating current up to 60 Hz								Corriente continua y alterna 16 2/3 Hz								Static characteristics					
	Painted				Polished				Painted				Polished									
	No. Bar				No. Bar				No. Bar				No. Bar									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	Jx	Wx	lx	Jx	Wx	lx
	I	II	III	II II	I	II	III	II II	I	II	III	IIII	I	II	III	IIII	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
12 x 2	123	202	228		108	182	216		123	202	233		108	182	220		0,0288	0,0480	0,3460	0,0008	0,0080	0,0577
15 x 2	148	240	261		128	212	247		148	240	267		128	212	252		0,0563	0,0750	0,4330	0,0010	0,0100	0,0577
15 x 3	187	316	381		162	282	361		187	316	387		162	282	365		0,0844	0,1130	0,4330	0,0034	0,0225	0,0866
20 x 2	189	302	313		162	264	298		189	302	321		162	266	303		0,133	0,133	0,577	0,0013	0,0133	0,0577
20 x 3	237	394	454		204	348	431		237	394	463		204	348	437		0,200	0,200	0,577	0,0045	0,0300	0,0866
20 x 5	319	560	728		274	500	690		320	562	729		274	502	687		0,333	0,333	0,577	0,0208	0,0833	0,1440
20 x 10	497	924	1320		427	825	1180		499	932	1300		428	832	1210		0,667	0,667	0,577	0,1670	0,3330	0,2890
25 x 3	287	470	525		245	412	498		287	470	536		245	414	506		0,391	0,313	0,722	0,0056	0,0375	0,0866
25 x 5	384	662	869		327	586	795		384	664	841		327	590	794		0,651	0,521	0,722	0,0260	0,1040	0,1440
30 x 3	337	544	593		285	476	564		337	546	608		286	478	575		0,675	0,450	0,866	0,0068	0,0450	0,0866
30 x 5	447	760	944		379	672	896		448	766	950		380	676	897		1,130	0,750	0,866	0,0313	0,1250	0,1440
30 x 10	676	1200	1670		573	1060	1480		683	1230	1630		579	1080	1520		2,250	1,500	0,866	0,2500	0,5000	0,2890

Width x Thickness	Alternating current up to 60 Hz								Corriente continua y alterna 16 2/3 Hz								Static characteristics					
	Painted				Polished				Painted				Polished									
	No. Bar				No. Bar				No. Bar				No. Bar									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	Jx	Wx	lx	Jx	Wx	lx
	I	II	III	II II	I	II	III	II II	I	II	III	IIII	I	II	III	IIII	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
40 x 3	435	692	725		366	600	690		436	696	748		367	604	708		1,60	0,80	1,15	0,0090	0,0600	0,0866
40 x 5	573	952	1140		482	836	1090		576	966	1160		484	848	1100		2,67	1,33	1,15	0,0417	0,1670	0,1440
40 x 10	850	1470	2000	2580	715	1290	1770	2280	865	1530	2000		728	1350	1880		5,33	2,67	1,15	0,3330	0,6670	0,2890
50 x 5	697	1140	1330	2010	583	994	1260	1920	703	1170	1370		588	1020	1300		5,21	2,08	1,44	0,0521	0,208	0,144
50 x 10	1020	1720	2320	2950	852	1510	2040	2600	1050	1830	2360		875	1610	2220		10,40	4,17	1,44	0,4170	0,833	0,289
60 x 5	826	1330	1510	2310	688	1150	1440	2210	836	1370	1580	2060	696	1190	1500	1970	9,00	3,00	1,73	0,0625	0,250	0,144
60 x 10	1180	1960	2610	3290	985	1720	2300	2900	1230	2130	2720	3580	1020	1870	2570	3390	18,00	6,00	1,73	0,5000	1,000	0,289
80 x 5	1070	1680	1830	2830	885	1450	1750	2720	1090	1770	1990	2570	902	1530	1890	2460	21,30	5,33	2,31	0,0833	0,333	0,144
80 x 10	1500	2410	3170	3930	1240	2110	2790	3450	1590	2730	3420	4490	1310	2380	3240	4280	42,70	10,70	2,31	0,6670	1,330	0,289
100 x 5	1300	2010	2150	3300	1080	1730	2050	3190	1340	2160	2380	3080	1110	1810	2270	2960	41,70	8,33	2,89	0,1040	0,417	0,144
100 x 10	1810	2850	3720	4530	1490	2480	3260	3980	1940	3310	4100	5310	1600	2890	3900	5150	83,30	16,70	2,89	0,833	1,670	0,289
120 x 10	2110	3280	4270	5130	1740	2860	3740	4500	2300	3900	4780	6260	1890	3390	4560	6010	144,00	24,00	3,46	1,000	2,000	0,289
160 x 10	2700	4130	5360	6320	2220	3590	4680	5530	3010	5060	6130	8010	2470	4400	5860	7110	341,00	42,70	4,62	1,330	2,670	0,289
200 x 10	3290	4970	6430	7490	2690	4310	5610	6540	3720	6220	7460	9730	3040	5390	7150	9390	667,00	66,70	5,77	1,670	3,330	0,289

In the case of several parallel bars, the distance between the bars is the same as the thickness. For alternating current, the net distance between the phases is

equal to  $0.8 +$  the distance between phase axes.

\*Minimum distance