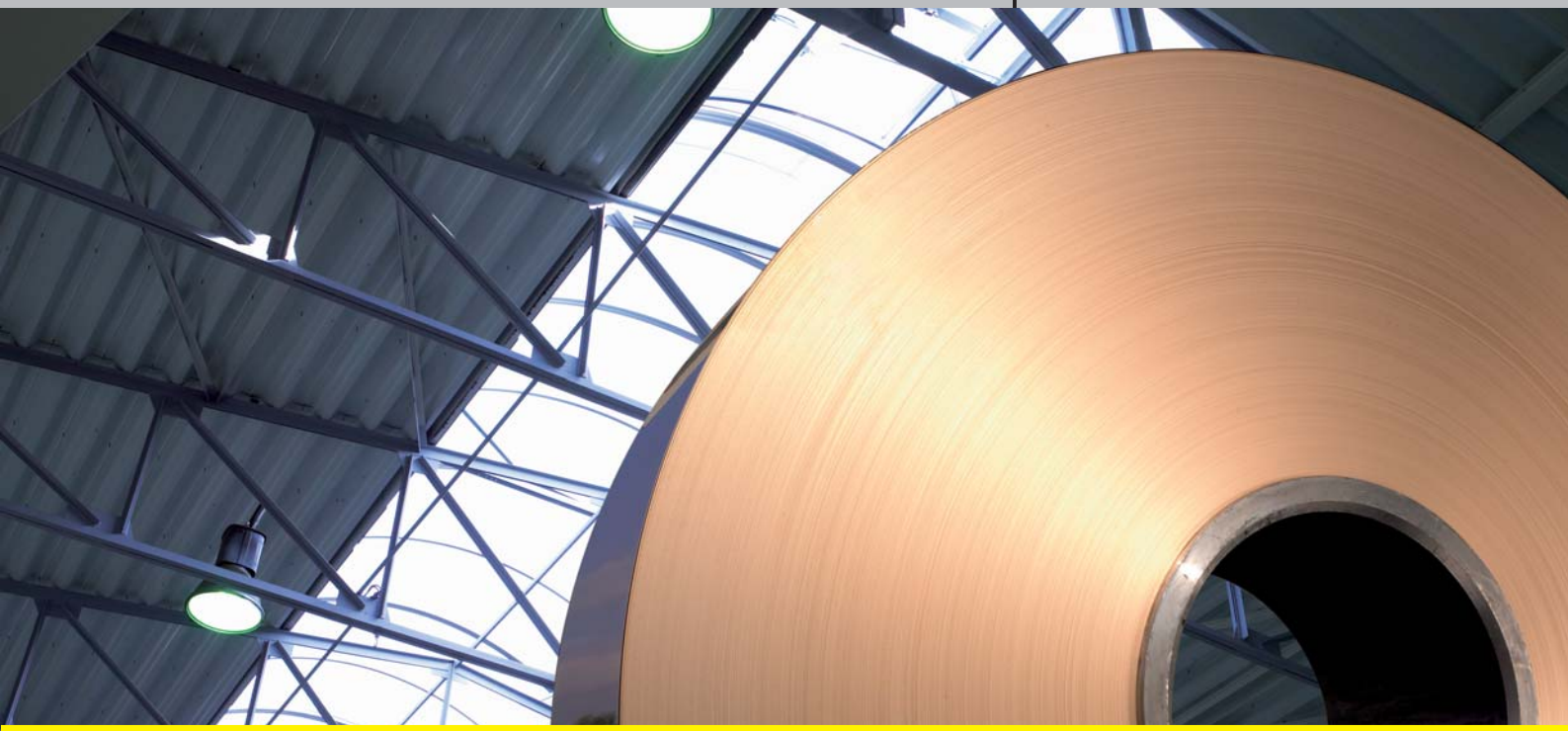

Material Specification

for strips of BRONZE und BRONZE WITH ZINC CONTENT

KEMPER

Bronzes - mechanical properties

Alloy	Temper	Tensile strength R_m [MPa]*	Yield strength $R_{p0,2}$ [MPa]*	Elongation A_{50} [%]	Vickers hardness	Spring bending limit [MPa]*
Cu Sn4	R290/H70 R390/H115 R480/H150 R540/H170 R610/H190	290-390 390-490 480-570 540-630 ≥ 610	≤ 190 ≥ 210 ≥ 420 ≥ 490 ≥ 540	≥ 40 ≥ 11 ≥ 4 ≥ 3 ---	70-100 115-155 150-180 170-200 ≥ 190	≥ 340 **
Cu Sn5	R310/H75 R400/H120 R490/H160 R550/H180 R630/H200 R690/H220	310-390 400-500 490-580 550-640 630-720 ≥ 690	≤ 250 ≥ 240 ≥ 430 ≥ 510 ≥ 600 ≥ 670	≥ 45 ≥ 14 ≥ 8 ≥ 4 ≥ 2 ---	75-105 120-160 160-190 180-210 200-230 ≥ 220	
Cu Sn6	R350/H80 R420/H125 R500/H160 R560/H180 R640/H200 R720/H220	350-420 420-520 500-590 560-650 640-730 ≥ 720	≤ 300 ≥ 260 ≥ 450 ≥ 500 ≥ 600 ≥ 690	≥ 45 ≥ 17 ≥ 8 ≥ 5 ≥ 3 ---	80-110 125-165 160-190 180-210 200-230 ≥ 220	≥ 350 ** ≥ 370 **
Cu Sn8	R370/H90 R450/H135 R540/H170 R600/H190 R660/H210 R740/H230	370-450 450-550 540-630 600-690 660-750 ≥ 740	≤ 300 ≥ 280 ≥ 460 ≥ 530 ≥ 620 ≥ 700	≥ 50 ≥ 20 ≥ 13 ≥ 5 ≥ 3 ≥ 2	90-120 135-175 170-200 190-220 210-240 ≥ 230	≥ 410 **

Bronzes with zinc content - mechanical properties

Alloy	Temper	Tensile strength R_m [MPa]*	Yield strength $R_{p0,2}$ [MPa]*	Elongation A_{50} [%]	Vickers hardness	Spring bending limit [MPa]*
Cu Sn3 Zn9	R320/H80 R380/H110 R430/H140 R510/H160 R580/H180 R660/H200	320-380 380-430 430-520 510-600 580-690 ≥ 660	≤ 230 ≥ 200 ≥ 330 ≥ 430 ≥ 520 ≥ 610	≥ 25 ≥ 16 ≥ 6 ≥ 3 --- ---	80-110 110-140 140-170 160-190 180-210 ≥ 200	
Cu Sn6 Zn6	R610/H190 R760/H230	610-690 ≥ 760	≥ 570 ≥ 690	≥ 12 ---	190-220 ≥ 230	

* 1 MPa = 1 N/mm^2

** Vickers hardness – values are not binding for official acceptance

Bronzes - physical properties

Density [g/cm³]	Coefficient of thermal expansion [10⁻⁶/K]	Electrical conductivity [MS/m]***	Electrical conductivity [% IACS]	Thermal conductivity [W/m K]	Modulus of elasticity [GPa]****	Weldability	Solderability	Season cracking
8,85	18,2	11,5	20	84	118	good	very good	no
8,85	18,2	10	16,5	82	118	good	very good	no
8,80	18,5	9	15	75	115	good	very good	no
8,80	18,5	7,5	13	62	115	good	very good	no

Bronzes with zinc content - physical properties

Density [g/cm³]	Coefficient of thermal expansion [10⁻⁶/K]	Electrical conductivity [MS/m]***	Electrical conductivity [% IACS]	Thermal conductivity [W/m K]	Modulus of elasticity [GPa]****	Weldability	Solderability	Season cracking
8,70	18,4	12	20	120	120	good	good	light
8,80	18,4	9	15	75	114	good	good	light

*** MS/m = m/Ωmm²
**** 1 GPa = 1 kN/mm²

Bronzes - chemical composition

Chemical composition [%]	EN	USA UNS Alloy-No.	Earlier standards	Applications
Sn 3,5-4,5/ P 0,01 - 0,4/ Cu rest	CW450K	C51100	DIN 17670 BS Alloy PB 101	connectors, contact springs, multiple plugs, relay springs, switch elements, all kinds of stamped parts, blade springs, membranes, metallic hoses, corrugated tubes, gear wheels, bushes, pump parts, clock parts, parts in the machine and apparatus manufacturing
Sn 4,5-5,5/ P 0,01 - 0,4/ Cu rest	CW451K	C51000	BS Alloy PB 102	
Sn 5,5-7/ P 0,01 - 0,4/ Cu rest	CW452K	C51900	DIN 17670 BS Alloy PB 103	
Sn 7,5-8,5/ P 0,35/ Cu rest	CW453K	C52100	DIN 17670 BS Alloy PB 104	

Bronzes with zinc content - chemical composition

Chemical composition [%]	EN	USA UNS Alloy-No.	Earlier standards	Applications
Sn 1,5-3,5/ Zn 7,5-10/ P 0,2/ Cu rest	CW454K	C42500	---	stamped parts, connectors
Sn 5-7/ Zn 5-7/ P 0,01-0,1/ Cu rest	---	---	DIN 17670	stamped parts, connectors

Forms of supply

You may choose between the following types und forms:

Dimensions

Strips
Thickness: 0,1 - 3 mm
Width: Thickness ≤ 0,3 mm: 3-310 mm
Thickness > 0,3 mm: 3-330 mm

Coils
Thickness: 0,1 - 0,8 mm
up to 12 kg / mm width
Thickness: over 0,8 mm
up to 6 kg/mm width

Traverse wound strips
on cores
on drums

(depending on strip cross section
and type, up to 1,800 kg drum weight)

Multicoil
up to 3 t

Order quantities
bare strip min. 500 kg, tinned strip min. 800 kg,
other quantities upon request

Surface
with oil film
oil-free
passivated

Surface plating
hot dip tinning
galvanic tinning
selective plating
gold, silver, nickel plating

Profiled
according to your drawings

Our products are tested, evaluated and subjected to stringend tests in every stage of our production process. KEMPER strips meet the highest technical requirements of the automotive, communications and electrical engineering industries worldwide. We ensure these requirements by our quality management system which is certified per ISO/TS 16949:2002 and DIN EN ISO 9001:2000. At KEMPER quality is an obligation for all our employees, resulting in products which you can lastingly rely on.

KEMPER

Gebr. Kemper GmbH + Co. KG
Metallwerke
Postfach 15 20 D-57445 Olpe
Harkortstraße 5 D-57462 Olpe
Tel. +49 (0) 27 61 8 91-0
Fax +49 (0) 27 61 8 91-2 02
info@kemper-olpe.de
www.kemper-olpe.de

KEMP 7051 04/08