COPPER MATERIALS

KME

ENGINEERING
COPPER SOLUTIONS

Copper and copper alloys for semi products and stamped parts
January 2025

KME-ON THE WAY TO CLIMATE NEUTRALITY

ENERGY MANAGEMENT - COPPER RECYCLING - KME ECOLOGICAL COPPER

The transformation of production methods and operational processes towards climate neutrality is the focus of KME's targeted development. We report our CO_2 emissions on a voluntary basis as part of the CDP*) sustainability ranking.

With **KME ECOLOGICAL COPPER**, KME offers materials with a particularly climate-friendly CO2 balance:

Made entirely from 100% copper scrap without the use of primary raw materials.

Avoidance of the use of new metals, which are extremely energy-intensive to produce, thereby reducing CO2 emissions in production by 90%.

Independent inspection and certification of **KME ECOLOGICAL COPPER** manufacturing processes by external bodies.

Further information on this can be found in the KME Sustainability Report, which is available for download on our homepage.

*) *CDP is a non-profit organization that promotes transparent climate reporting*

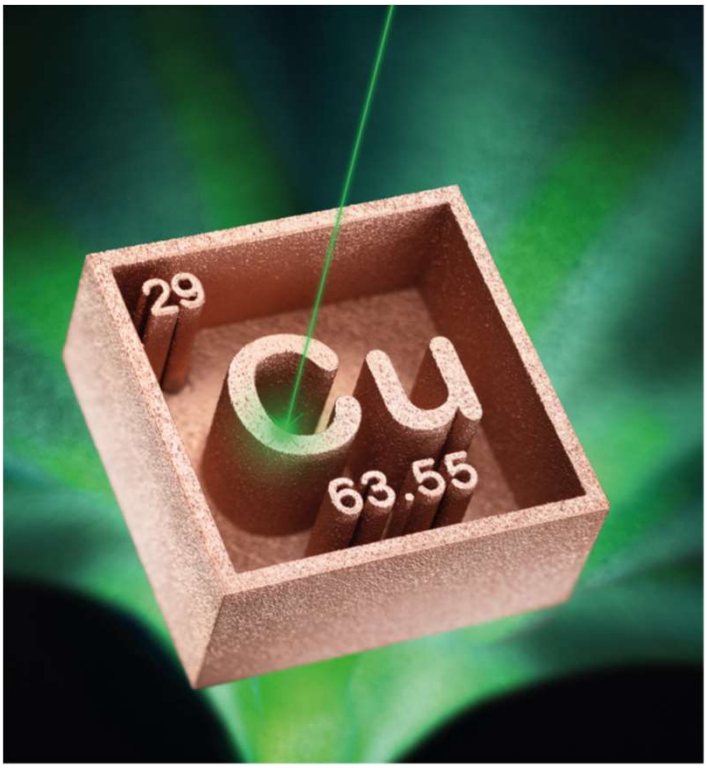
Contact: info-sustainability@kme.com

small difference in chemical composition

3D-PRINTING WITH COPPER

AN INNOVATIVE MANUFACTURING TECHNOLOGY BASED ON KME EXPERTISE

Additive manufacturing (AM) is a process that directly utilizes digital design data to create fully functional objects. Among the various AM techniques, selective laser melting (SLM) stands out as the optimal solution for the forward-looking production of copper components using 3D printing.
In collaboration with Osnabrück University of Applied Sciences, KME is developing an optimized process to transition copper material processing from research and development (R&D) to full-scale production. This method involves applying thin layers of copper material on top of each other to construct three-dimensional workpieces. The advanced 3D printers used in this process offer a particularly exciting capability: melting copper powder with a laser and fusing it into virtually any desired shape.
As part of the TECHNOS e.V. cooperation, KME continues to refine the selective laser melting (SLM) technique, ensuring its effective application in 3D printing with copper.



Contact: info-3D-printing@kme.com . Tel +49 (0)541/321-1177

- **Thickness range:** 0.05 – 6.00 mm*
  Width range: 10 – 1220 mm*

*)Other ranges on request

- **Strips**
  - Bare strips
  - Pre tinned strips
    - by hot dip tinning (Strip thickness: 0.10 - 1.20 mm)
    - by electro plating

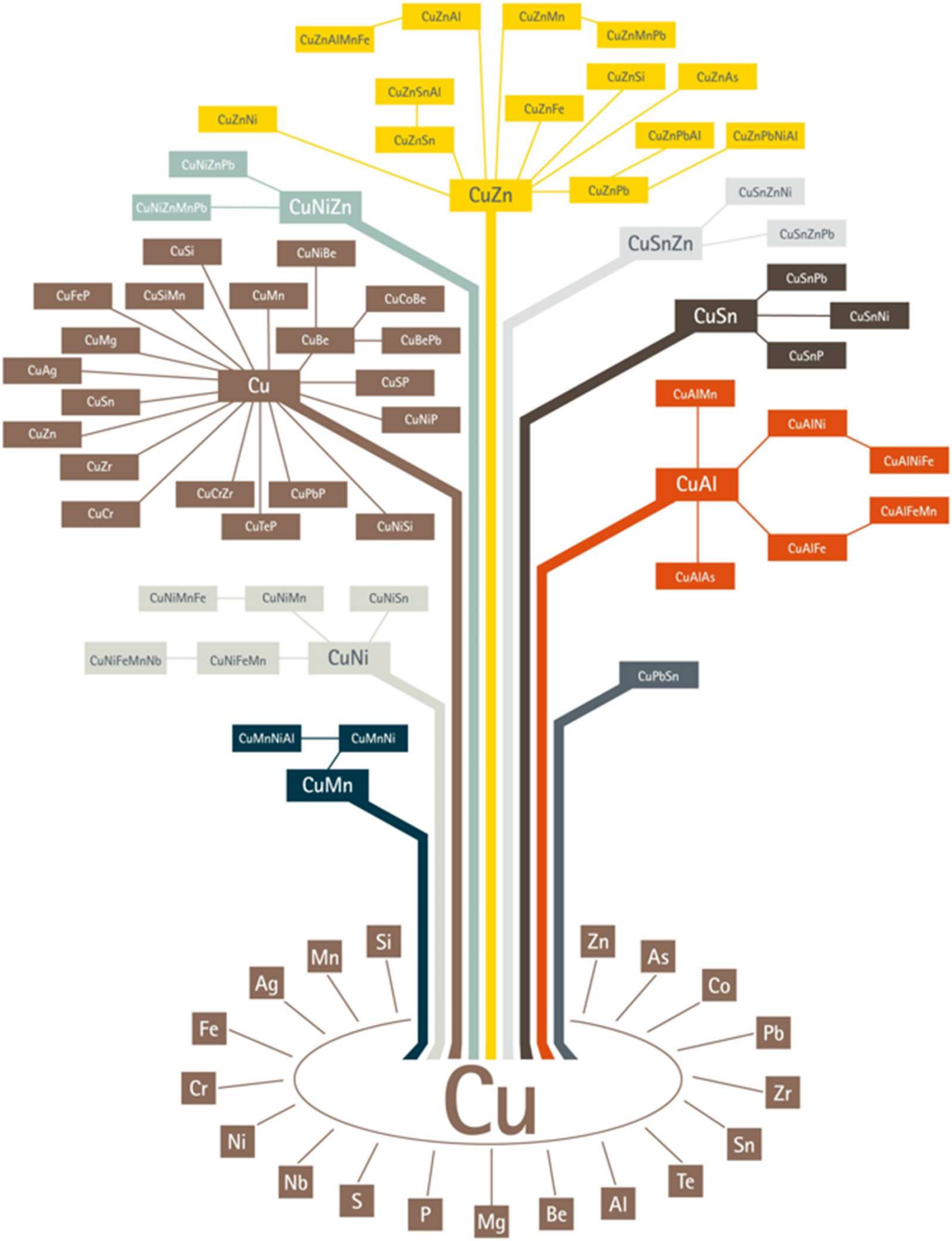
- **Special qualities**
  - narrow tolerances
  - stress relieved
  - stress annealed

- **Traverse wound strips**
  - drum weight: 300 - 1.500 kg
  - wooden, plastic and metal drums
    - with flange and flange less

- **TEC**STRIP®_multicoil
  - thickness: 0.15 - 0.80 mm
  - width: 15 - 50 mm
  - max. pallet weight: 2.500 kg *

*) higher pallet weights on request

- **Pre stamped-and finish products**


CuZnAl
CuZnMn
CuZnAlMnFe
CuZnMnPb
CuZnSi
CuZnAs
CuZnSnAl
CuZnFe
CuZnNi
CuZnSn
CuZnPbAl
CuZnPbNiAl
CuNiZnPb
CuZn
CuZnPb
CuSnZnNi
CuNiZnMnPb
CuNiZn
CuSnZn
CuSnZnPb
CuSi
CuNiBe
CuSnPb
CuFeP
CuSiMn
CuMn
CuCoBe
CuSn
CuSnNi
CuMg
CuBe
CuBePb
CuSnP
CuAg
Cu
CuSP
CuAlMn
CuSn
CuAlNi
CuNiP
CuZn
CuAl
CuAlNiFe
CuZr
CuCrZr
CuPbP
CuAlFeMn
CuCr
CuTeP
CuNiSi
CuAlFe
CuAlAs
CuNiMnFe
CuNiMn
CuNiSn
CuNiFeMnNb
CuNiFeMn
CuNi
CuPbSn
CuMnNiAl
CuMnNi
CuMn
Si
Mn
Ag
Fe
Cr
Ni
Nb
S
P
Mg
Be
Al
Te
Sn
Zr
Pb
Co
As
Zn
Cu

kupfer_

Unless otherwise agreed, we manufacture our strips according to the current European standards for rolled flat products made of copper and copper alloys.
For thickness and width tolerances, we can comply with half the value of the standard specifications. Tighter tolerances are also possible on request. Please contact us for this.

Unless otherwise agreed, this handout will be used as a basis.

STAMPING-CENTER OSNABRÜCK

1.3. OVERVIEW

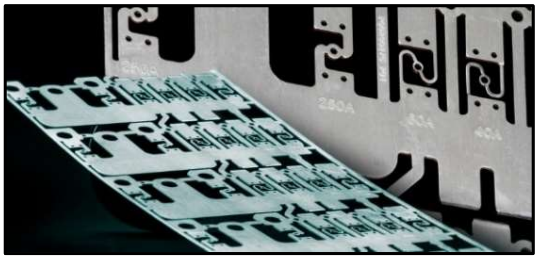
ENGINEERING
COPPER SOLUTIONS

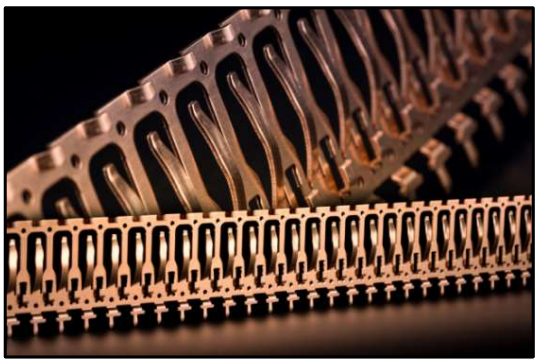
- When it comes to high-quality stamped and formed parts with maximum precision at a high technical level, we are your partner. .

- We offer fully integrated manufacturing chain

  - Advice on materials
  - Hot Dip Tinned, electro plated- and coating of stamped parts
  - Manufacturing of stamped parts especially for material-intensive products
  - Recycling of stamping parts
  - Metal management

- We will send you an overall concept tailored to your needs





	High speed presses (Bruderer)	*Presses (Haulick & Roos)*
Pressing force	500 kN	1,600 – 3,000 kN
Stroke rate	max. 1,100 strokes/min	max. 300 strokes/min
Tool length	max. 1,100 mm	max. 2,500 mm
Material quality	all standard material qualities	all standard material qualities
Material width	max. 200 mm	max. 400 mm
Material thickness	up to primarily 1 mm	up to primarily 5 mm

Contact person:

Mr. Marc Kovermann
Technical Sales Manager stamped products

Mr. Malte Wiemeyer
Sales Manager stamped products

KME - ELOPIN® FOR INNOVATIVE PRESS-FIT TECHNOLOGY

As a licensee of press-fit technology using EloPin®, KME offers this connection technology for high-quality solderfree and gas-tight electrical connections in the field of PCB contacting with connectors. Stamped parts with pressfit zones are then usually further processed into hybrid parts or electromechanical assemblies.

In press-fit technology with EloPin®, connectors can be inserted into circuit boards and printed circuit boards without additional soldering, in order to subsequently guarantee a smooth energy and data transport in practice by means of simple plugging. No damage whatsoever occurs during assembly and high flexibility is guaranteed during use.

KME's high-performance materials for press-fit technology also come into play where high-pole plug connections are produced quickly and cost-effectively. KME copper alloy materials are reliable for use in highly stressed components such as in the automotive and electronics industries.

KME materials in the alloy groups CuSn, CuNiSi, and CuCr meet special requirements when used in press-fit zones and show their best side when used in a wide range of temperature ranges:

- If the operating temperature is max. 105 °C, CuSn6 (C51900) offers an excellent combination of strength, cold formability and hardness. It is wear resistant, has good corrosion resistance and good soldering properties.
- At operating temperatures of max. 135 °C CuNiSi - STOL® 76M (C19005) is the ideal material for applications in electro-mechanical components. The material is characterized by medium conductivity, good bending properties and good relaxation resistance.
- If the application temperature is ≥ 135 °C, the material C70250 comes into play. The higher alloy CuNiSi alloy has excellent bending properties, high strength and good relaxation properties.
- An excellent alternative if used ≥ 135 °C for applications in electrical engineering can be the material CuCrSiTi - STOL® 75 (C18070) with high conductivity and good relaxation resistance.
- If the application temperature can reach values up to 20°C, CuCrZr – STOL® 95 (C18160) would be a possible alternative for applications in the electromobility sector, among others, that still needs to be tested. Electromobility, for example, as this materiel offers an unbeatable combination of maximum conductivity good bending properties and very good relaxation resistance.

C11000

2.1. Cu-ETP

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	Cu-ETP
DIN CEN/TS 13388	CW004A
UNS	C11000

Characteristics

Cu-ETP is an oxygen containing copper which has a very high electrical and thermal conductivity. It has excellent forming properties. Due to its oxygen content soldering and welding properties are limited.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.90	%
O	≤ 0.040	%

Main Applications

Electrical: Transformer Coils, Switches, Terminals, Contacts, Radio Parts, Busbars, Terminal Connectors, Conductors, Stranded Conductors, Cable Strip
Industrial: Printed circuit boards, Stamped parts, Pressure Vessels, Chemical Process Equipment, Chlorine Cells, Chimney Cap Screens, Heat Exchangers, Printing Rolls, Anodes, Rotating Bands, Kettles, Pans, Vats, Heat sinks

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bendability 90° gw	Bendability 90° bw
					rel. Bending radius R/T	
	MPa	MPa	%	HV	Strip thickness ≤ 0.50mm	
R200	200 .. 250	≤ 100 *	33	40 .. 65	0	0
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0.5
R360	≥ 360	320	2	≥ 110	1	2

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.394	J/(g·K)
Thermal conductivity		394	W/(m·K)
Electrical conductivity	MS/m	58	MS/m
Electrical conductivity	IACS	100	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.7	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Less suitable
Laser Welding	Less suitable

During heating in reducing atmosphere hydrogen can penetrate inside the copper and react with Cu-Oxide to water vapour. Its pressure can cause embrittlement.

* For more details call our technical service

C10300

2.2. Cu-HCP

ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	Cu-HCP
DIN CEN/TS 13388	CW021A
UNS	C10300

Characteristics

Cu-HCP is a high purity, low level residual phosphorus, deoxidized copper. It has a very high electrical and thermal conductivity, good welding and soldering properties as well as resistance to hydrogen. It has excellent hot and cold forming properties, and a good corrosion resistance in water and especially in atmosphere (including industrial atmosphere).

Main Applications

Electrical: High Frequency Cable, Submarine Cable Strips, Wave Guide Tubing, Standard material for longitudinally welded cables, Commutators, Applications Requiring High Conductivity, Tubular Bus, Electrical Conductors, Clad Products, Busbars, Terminals, Thermostatic Control Tubing

Industrial: Applications Requiring Good Brazing, Applications Requiring Good Weldability, Pressure Vessels, Billet Mold Tube, Extrusion Cans for Powder Metallurgy

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.95	%
P	≤ 0.004	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0
R360	≥ 360	320	2	≥ 110	0	0.5

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	16.9	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		385	W/(m·K)
Electrical conductivity	MS/m	57	MS/m
Electrical conductivity	IACS	98	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.7	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding (Spot / But)	Less suitable / Good
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C10300

2.3. Cu-PHC

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	Cu-PHC
DIN CEN/TS 13388	CW020A
UNS	C10300

Characteristics

Cu-PHC is a high purity, low level residual phosphorus, deoxidized copper. It has a very high electrical and thermal conductivity, good welding and soldering properties as well as resistance to hydrogen. It has excellent hot and cold forming properties, and a good corrosion resistance in water and especially in atmosphere (including industrial atmosphere).
Cu-PHC has a higher conductivity than Cu-HCP.

Main Applications

Electrical: High Frequency Cable, Submarine Cable Strips, Wave Guide Tubing, Standard material for longitudinally welded cables, Commutators, Applications Requiring High Conductivity, Tubular Bus, Electrical Conductors, Clad Products, Busbars, Terminals, Thermostatic Control Tubing

Industrial: Applications Requiring Good Brazing, Applications Requiring Good Weldability, Pressure Vessels, Billet Mold Tube, Extrusion Cans for Powder Metallurgy

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.95	%
P	≤ 0.003	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw / bw rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0
R360	≥ 360	320	2	≥ 110	0	0.5

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		385	W/(m·K)
Electrical conductivity	MS/m	58	MS/m
Electrical conductivity	IACS	100	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.7	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding (Spot / But)	Less suitable / Good
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C12200

2.5. Cu-DHP

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	Cu-DHP
DIN CEN/TS 13388	CW024A
UNS	C12200

Characteristics

Cu-DHP is a phosphorus-deoxidized copper with a limited, high amount of residual Phosphorus. It has excellent welding and soldering properties and is resistant against hydrogen embrittlement. It can be deformed excellent, either hot or cold.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.90	%
P	0.015 - 0.040	%

Main Applications

Electrical: Wire Connectors, Heater Elements

Industrial: Construction, Rotating Bands, Kettles, Anodes for Electroplating, Heat Exchanger Shells, Oil Coolers in Airplanes, Tanks, Casting Molds, LP Gas Service, Medical Gas-Oxygen, Plating Anodes, Plating Racks, Plating Hangers, Marine Oil Coolers

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0
R360	≥ 360	320	2	≥ 110	0	0.5

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.94	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.386	J/(g·K)
Thermal conductivity		330	W/(m·K)
Electrical conductivity	MS/m	47	MS/m
Electrical conductivity	IACS	81	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.4	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Good

* For more details call our technical service

C10200

2.6. Cu-OF

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ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	Cu-OF
DIN CEN/TS 13388	CW008A
UNS	C10200

Characteristics

Cu-OF is a high purity, oxygen free, non phosphorus-deoxidized copper that does not contain in vacuum evaporating elements. It has a very high electrical and thermal conductivity, good welding and excellent soldering properties. It has excellent hot and cold forming properties, and a good corrosion resistance, especially in atmosphere due to a good adherence of the oxide layer.

Main Applications

Automotive: Automotive Rectifiers

Electrical: Transistor Component Bases, High Resistance-Ratio Cryogenic Shunts, Bus Conductors, Wave Guides, Hollow Conductors, Anodes for Vacuum Tubes, Coaxial Cable, Waveguides, High Frequency Cable, Submarine Cable, Coaxial Tube, Klystrons, Microwave Tubes, Bus Bars, Lead-in Wire, Vacuum Seals, Conductors, Glass-to-Metal Seals, Lead frames for semiconductors, Heat sinks.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.95	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0
R360	≥ 360	320	2	≥ 110	0	0.5

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.39	J/(g·K)
Thermal conductivity		394	W/(m·K)
Electrical conductivity	MS/m	58	MS/m
Electrical conductivity	IACS	100	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.81	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C10100

2.7. Cu-OFE

ENGINEERING
COPPER SOLUTIONS

Alloy Designation	
EN	Cu-OFE
DIN CEN/TS 13604	CW009A
UNS	C10100

Characteristics

Cu-OFE is a high-purity, oxygen-free copper, that does not contain elements that can vaporise in a vacuum environment. It is very thermally and electrically conductive and it also performs extremely well during hot and cold forming. Cu-OFE is corrosion-resistant, especially against atmospheric influences and water, and is also insensitive to stress corrosion cracking.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.99	%

Main Applications

Cu-OFE is a popular material in electrical engineering, vacuum engineering and the production of high-frequency cables.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R220	220 .. 260	≤ 140 *	33	40 .. 65	0	0
R240	240 .. 300	180	8	65 .. 95	0	0
R290	290 .. 360	250	4	90 .. 110	0	0
R360	≥ 360	320	2	≥ 110	0	0.5

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.39	J/(g·K)
Thermal conductivity		394	W/(m·K)
Electrical conductivity	MS/m	58.6	MS/m
Electrical conductivity	IACS	101	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.81	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C22000

3.1. CuZn10

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ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuZn10
DIN CEN/TS 13388	CW501L
UNS	C22000

Chemical Composition (Balance) Weight percentage		
Cu	90	%
Zn	Rest	%

Characteristics

CuZn10 has very good cold forming properties and is well suited for e.g. coinage, beating, embossing. This alloy has a higher strength as pure copper. It has good welding and brazing properties as well as a good corrosion resistant and is not fragile to stress corrosion and dezincification. **CuZn10** is principally used in jewellery, metal goods, watch industry and in electronic industry for installation parts.

Main Applications

Jewellery and metal good, Components for the electrical industry.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° rel. Bending Radius R/T gw	bw
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R240	240 .. 290	≤ 140 *	36	50 .. 100	0	0
R280	280 .. 360	200 *	13	80 .. 130	0	0
R350	350 .. 450	290 *	4	110 .. 160	-	-

* only for information

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.80	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.2	10^{-6}/K
Specific heat capacity		0.376	J/(g·K)
Thermal conductivity		184	W/(m·K)
Electrical conductivity	MS/m	25	MS/m
Electrical conductivity	IACS	43	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	1.8	10^{-3}/K
Modulus of elasticity	GPa	124	GPa

Fabrication Properties *

Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Fair

* For more details call our technical service

C23000

3.2. CuZn15

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuZn15
DIN CEN/TS 13388	CW502L
UNS	C23000

Chemical Composition (Balance) Weight percentage		
Cu	85	%
Zn	Rest	%

Characteristics

CuZn15 has very good cold forming properties and is well suited for e.g. coinage, beating, embossing. This alloy has a higher strength as pure copper. It has good welding and brazing properties as well as a good corrosion resistant and is not fragile to stress corrosion and dezincification. **CuZn15** is principally used in jewellery, metal goods, watch industry and in electronic industry for installation parts.

Main Applications

Jewellery and metal good, Components for the electrical industry, Cladding Panels.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° rel. Bending Radius R/T gw	Bending 90° rel. Bending Radius R/T bw
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	300 .. 370	≤ 170 *	16	85 .. 120	0	0
R350	350 .. 420	270 *	8	100 .. 150	0	0
R410	410 .. 490	360 *	3	125 .. 155	0	1
R480	480 .. 560	420 *	1	150 .. 180	1	3
R550	≥ 550	480 *	-	≥ 170	-	-

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.75	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.5	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		159	W/(m·K)
Electrical conductivity	MS/m	20	MS/m
Electrical conductivity	IACS	34	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	2.6	10^{-3}/K
Modulus of elasticity	GPa	122	GPa

Fabrication Properties *	
Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Fair

* For more details call our technical service

C26000

3.3. CuZn30

ENGINEERING
COPPER SOLUTIONS

Alloy Designation	
EN	CuZn30
DIN CEN/TS 13388	CW505L
UNS	C26000

Chemical Composition (Balance)
Weight percentage

Cu	70	%
Zn	Rest	%

Characteristics

CuZn30 combines excellent cold forming properties with good mechanical strength. CuZn30 has good hot forming properties and excellent soldering and brazing properties. Due to the outstanding deep drawing properties CuZn30 called “deep-draw” or “cartridge” brass.

Main Applications

Terminal Connectors, Flashlight Shells, Lamp Fixtures, Reflectors, Screw Shells, Fasteners, Electrical Sockets, Lamps.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R270	270 .. 350	≤ 170 *	40	55 .. 105	0	0
R350	350 .. 430	270 *	21	95 .. 125	0	0
R410	410 .. 490	350 *	9	120 .. 180	0	1
R480	480 .. 570	430 *	4	150 .. 190	0,5	2
R550	550 .. 640	480 *	2	170 .. 210	1	3
R630	≥ 630	560 *	-	≥ 190	-	-

* only for information

Physical Properties
Typical values in annealed temper at 20 °C

Density		8.53	g/cm³
Thermal expansion coefficient	20 .. 300 °C	19.7	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		126	W/(m·K)
Electrical conductivity	MS/m	16	MS/m
Electrical conductivity	IACS	28	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	1.5	10^{-3}/K
Modulus of elasticity	GPa	115	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Fair
Laser Welding	Less suitable

* For more details call our technical service

C26800

3.4. CuZn33

ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuZn33
DIN CEN/TS 13388	CW506L
UNS	C26800

Chemical Composition (Balance)
Weight percentage

Cu	67	%
Zn	Rest	%

Characteristics

CuZn33 combines excellent cold forming properties with good mechanical strength. CuZn30 has good hot forming properties and excellent soldering and brazing properties. Due to the outstanding deep drawing properties CuZn30 called “deep-draw” or “cartridge” brass.

Main Applications

Metal goods, Deep drawn parts, Components for the electrical industry, stamped parts, Connectors.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R280	280 .. 380	≤ 170 *	44	55 .. 95	0	0
R350	350 .. 430	170 *	23	95 .. 125	0	0
R420	420 .. 500	300 *	6	125 .. 155	0	0
R500	≥ 500	450 *	3	≥ 155	0,5	0,5

* only for information

Physical Properties
Typical values in annealed temper at 20 °C

Density		8.47	g/cm³
Thermal expansion coefficient	20 .. 300 °C	19.9	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		121	W/(m·K)
Electrical conductivity	MS/m	15	MS/m
Electrical conductivity	IACS	26	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	1.6	10^{-3}/K
Modulus of elasticity	GPa	112	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Fair
Laser Welding	Less suitable

* For more details call our technical service

C27000

3.5. CuZn36

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuZn36
DIN CEN/TS 13388	CW507L
UNS	C27000

Chemical Composition (Balance) Weight percentage		
Cu	64	%
Zn	Rest	%

Characteristics

CuZn36 is the major brass alloy for the cold forming process. Even though brasses with lower Zinc content have better cold forming properties, **CuZn36** is the most used alloy. Reasons for this are on the one hand economical due to lower price of Zinc compared to Copper, on the other hand the forming properties of this alloy meet the demand of many applications.

Main Applications

Metal goods, Deep drawn parts, Stamped parts, Connectors.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	300 .. 370	≤ 180 *	38	55 .. 105	0	0
R350	350 .. 430	170 *	19	95 .. 125	0	0
R410	410 .. 490	300 *	8	120 .. 155	0	0
R480	480 .. 560	430 *	3	150 .. 180	0,5	2
R550	≥ 550	500 *	-	≥ 170	1	3
R630	≥ 630	600 *	-	≥ 190	-	-

* only for information

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.47	g/cm³
Thermal expansion coefficient	20 .. 300 °C	20.2	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		121	W/(m·K)
Electrical conductivity	MS/m	14	MS/m
Electrical conductivity	IACS	24	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	1.7	10^{-3}/K
Modulus of elasticity	GPa	110	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Fair
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Fair
Laser Welding	Less suitable

* For more details call our technical service

C27200

3.6. CuZn37

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuZn37
DIN CEN/TS 13388	CW508L
UNS	C27200

Chemical Composition (Balance) Weight percentage		
Cu	63	%
Zn	Rest	%

Characteristics

CuZn37 is the major brass alloy for the cold forming process. Even though brasses with lower Zinc content have better cold forming properties, **CuZn37** is the most used alloy. Reasons for this are on the one hand economical due to lower price of Zinc compared to Copper, on the other hand the forming properties of this alloy meet the demand of many applications.

Main Applications

Metal goods, Deep drawn parts, Stamped parts, Connectors.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	300 .. 370	≤ 180 *	38	55 .. 105	0	0
R350	350 .. 430	170 *	19	95 .. 125	0	0
R410	410 .. 490	300 *	8	120 .. 155	0	0
R480	480 .. 560	430 *	3	150 .. 180	0,5	2
R550	≥ 550	500 *	-	≥ 170	1	3
R630	≥ 630	600 *	-	≥ 190	-	-

* only for information

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.47	g/cm³
Thermal expansion coefficient	20 .. 300 °C	20.2	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		121	W/(m·K)
Electrical conductivity	MS/m	14	MS/m
Electrical conductivity	IACS	24	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	1.7	10^{-3}/K
Modulus of elasticity	GPa	110	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Fair
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Fair
Laser Welding	Less suitable

* For more details call our technical service

CuSn0.04

4.1. CuSn0.04

ENGINEERING
COPPER SOLUTIONS

Alloy Designation	
EN	-
DIN CEN/TS	-
UNS	-

Characteristics

CuSn0.04 is an in-house developed alloy and is specifically used for radiator fin applications. The alloy has excellent thermal properties. Hot and cold formability is very good (which makes it ideal for engine cooling applications where heat transfer is critical).

The tin addition improves mechanical properties and, as such, contributes to a sturdy final product.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.90	%
Sn	0,015 – 0,055	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *
	MPa	MPa	%	HV
R220	220 .. 275	80	15	53 .. 65
R255	255 .. 315	190	4	80 .. 100
R260	260 .. 330	210	3	85 .. 110
R280	280 .. 360	240	1	95 .. 120
R330	330 .. 410	300		105 .. 130
R355	355 .. 435	330		115 .. 140
R390	390 .. 475	370		125 .. 150

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		360	W/(m·K)
Electrical conductivity	MS/m	53	MS/m
Electrical conductivity	IACS	92	%
Modulus of elasticity	GPa	120	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Hot formability	Good
Soft Soldering, Brazing	Excellent
Welding	Good

* For more details call our technical service

CuSn0.09

4.2. CuSn0.09

ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	-
DIN CEN/TS	-
UNS	-

Characteristics

CuSn0.09 is an in-house developed alloy and is specifically used for radiator fin applications. The alloy has excellent thermal properties. Hot and cold formability is very good (which makes it ideal for engine cooling applications where heat transfer is critical).

The tin addition improves mechanical properties even more than our alloy CuSn0.04 and, as such, contributes to a sturdy final product.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.90	%
Sn	0.055 – 0.135	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *
	MPa	MPa	%	HV
R220	220 .. 275	80	15	53 .. 65
R255	255 .. 315	190	4	80 .. 100
R260	260 .. 330	210	3	85 .. 110
R280	280 .. 360	240	1	95 .. 120
R330	330 .. 410	300		105 .. 130
R355	355 .. 435	330		115 .. 140
R390	390 .. 475	370		125 .. 150

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		355	W/(m·K)
Electrical conductivity	MS/m	52	MS/m
Electrical conductivity	IACS	90	%
Modulus of elasticity	GPa	125	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Hot formability	Good (decreasing with higher hardnesses)
Soft Soldering, Brazing	Excellent
Welding	Good

* For more details call our technical service

C14415

4.3. STOL® 81 - CuSn0.15

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 81
EN	
DIN CEN/TS 13388	CW117C
UNS	C14415 #

small difference in chemical composition

Characteristics

CuSn0,15 is a low Tin (Sn) special alloy that combines low cost with highest conductivity. The total cost for finish products are often equal to brass due to excellent conditions for stamping scrap.

Typical applications are male connectors and fuse boxes.

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Sn	0.1	%

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals.
Elektrotechnik: Switches and Relays, Contacts, Connectors, Terminals, Components for the electrical industry, Stamped parts, Semiconductor Components.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R250	250 .. 320	200	9	60 .. 90	0	0
R300	300 .. 370	250	4	85 .. 110	0	0
R360	360 .. 430	300	3	105 .. 130	0	0
R420	420 .. 490	350	2	120 .. 140	1	1

* only for information

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		340	W/(m·K)
Electrical conductivity	MS/m	47	MS/m
Electrical conductivity	IACS	81	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.3	10^{-3}/K
Modulus of elasticity	GPa	120	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Fair
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Fair
Gas Shielded Arc Welding	Excellent
Laser Welding	Good

* For more details call our technical service

C14410

4.4. STOL® 80 - CuSn0.20

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 80
EN	CuSn0,2
DIN CEN/TS 13388	
UNS	C14410

Characteristics

STOL® 80 is a low Tin (Sn) special alloy that combines low cost with highest conductivity. The total cost for finish products are often equal to brass due to excellent conditions for stamping scrap.

Typical applications are male connectors and fuse boxes.

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Sn	0.2	%
P	0.01	%

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals.

Electrical: Switches and Relays, Contacts, Connectors, Terminals, Components for the electrical industry, Stamped parts, Semiconductor Components.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	300 .. 370	270	10	80 .. 100	0	0
R360	360 .. 430	310	7	110 .. 130	0	0
R420	420 .. 490	370	5	120 .. 150	1	1
R460	≥ 460	410	4	≥ 135	1	1.5

*only for information

Other temper classes on request

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.94	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.3	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		330	W/(m·K)
Electrical conductivity	MS/m	44	MS/m
Electrical conductivity	IACS	76	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.3	10^{-3}/K
Modulus of elasticity	GPa	120	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Fair
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Fair
Gas Shielded Arc Welding	Excellent
Laser Welding	Good

* For more details call our technical service

C51100

4.5. CuSn4

ENGINEERING
COPPER SOLUTIONS

Alloy Designation	
EN	CuSn4
DIN CEN/TS 13388	CW450K
UNS	C51100

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Sn	4	%
P	0.1	%

Characteristics

CuSn4 provides an excellent combination of strength, excellent formability and hardness. It has a good electrical conductivity and corrosion resistance. Soldering and brazing properties are excellent.

Main Applications

Stamped parts, Connectors, Contact springs, Spring elements, Ultra high strength spring elements, Membranes, Switch elements, Fixed contacts.

Mechanical Properties

Temper * Only information	**Tensile Strength** **Rm**	**Yield Strength** Standard **$Rp_{0.2}$**	**Yield Strength** Bending optimized **$Rp_{0.2}$**	**Elongation** Bending optimized (min.) **A_{50mm}**	**Hardness *** **HV**	**Bending** optimized quality 90° gw bw rel. Bending Radius R/T
	MPa	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm
R290	290 .. 390	≤ 190 *		40	70 .. 105	0 0
R390	390 .. 490	≥ 320	≥ 250	20	115 .. 155	0 0
R480	480 .. 570	≥ 440	≥ 400	13	150 .. 180	0 0
R540	540 .. 630	≥ 480	≥ 450	12	160 .. 200	0 0
R600	600 .. 760	≥ 560	≥ 530	12	≥ 180	0 0
R660	660 .. 760	≥ 620	≥ 590	7	≥ 180	0 0
R700	700 .. 800	-	≥ 640	3	≥ 190	0 0

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.94	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.8	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		100	W/(m·K)
Electrical conductivity	MS/m	12	MS/m
Electrical conductivity	IACS	21	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	0.1	10^{-3}/K
Modulus of elasticity	GPa	110	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good

*For more details call our technical service

C51000

4.6. CuSn5

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuSn5
DIN CEN/TS 13388	CW451K
UNS	C51000

Chemical Composition (Balance)
Weight percentage

Cu	Rest	%
Sn	5	%
P	0.1	%

Characteristics

CuSn5 provides an excellent combination of strength, excellent formability and hardness. It has a good electrical conductivity and corrosion resistance. Soldering and brazing properties are excellent.

Main Applications

Stamped parts, Connectors, Contact springs, Spring elements, Ultra high strength spring elements, Membranes, Switch elements, Fixed contacts.

Mechanical Properties

Temper * only information	Tensile Strength Rm	Yield Strength Standard $Rp_{0.2}$	Yield Strength Bending optimized $Rp_{0.2}$	Elongation Bending optimized (min.) A_{50mm}	Hardness * HV	Bending optimized quality 90° gw bw rel. Bending Radius R/T
	MPa	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm
R310	310 .. 390	≤ 250 *			70 ..105	0 0
R400	400 .. 500	≥ 340		17	120 .. 160	0 0
R490	490 .. 580	≥ 450	≥ 440	19	160 .. 190	0 0
R550	550 .. 640	≥ 500	≥ 480	13	180 .. 210	0 0.5
R630	630 .. 720	≥ 570	≥ 560	7	200 .. 230	0 1
R690	≥ 690	≥ 630	≥ 600	4	≥ 220	2 3

Physical Properties
Typical values in annealed temper at 20 °C

Density		8.94	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.8	10^{-6}/K
Specific heat capacity		0.38	J/(g·K)
Thermal conductivity		90	W/(m·K)
Electrical conductivity	MS/m	10	MS/m
Electrical conductivity	IACS	17	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	0.1	10^{-3}/K
Modulus of elasticity	GPa	120	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good

*For more details call our technical service

C51900

4.7. CuSn6

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuSn6
DIN CEN/TS 13388	CW452K
UNS	C51900

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Sn	6	%
P	0.1	%

Characteristics

CuSn6 provides an excellent combination of strength, cold formability and hardness. It is wear resistant, has good corrosion resistance and soldering properties.

Due to its high strength and good spring properties combined with good machining properties it is used for all kind of springs, Connectors, Bourdon tubes or flexible metal tubes.

Main Applications

Stamped parts, Connectors, Contact springs, Spring elements, Ultra high strength spring elements, Membranes, Switch elements, Fixed contacts.

Mechanical Properties

Temper * Only information ** Thickness 0.15 - 0.60 mm	Tensile Strength Rm	Yield Strength Standard $Rp_{0.2}$	Yield Strength Bending optimized $Rp_{0.2}$	Elongation Bending optimized min. A_{50mm}	Hardness * HV	Bendability 90° gw rel. Bending Radius R/T	Bendability 90° bw rel. Bending Radius R/T
	MPa	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R350	350 .. 420	≤ 300 *		45	80 .. 120	0	0
R420	420 .. 520	≥ 350	≥ 340	29	120 .. 170	0	0
R500	500 .. 590	≥ 450	≥ 410	22	160 .. 190	0	0
R560	560 .. 650	≥ 520	≥ 490	15	180 .. 210	0	0
R640	640 .. 730	≥ 590	≥ 570	12	200 .. 230	0	0.5
R720	≥ 720	≥ 650	≥ 620	4	≥ 210	1	-
**R850 ** **	≥ 850		≥ 800	1.5	≥ 240	1	-

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.95	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.5	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		75	W/(m·K)
Electrical conductivity	MS/m	9	MS/m
Electrical conductivity	IACS	16	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	0.7	10^{-3}/K
Modulus of elasticity	GPa	115	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent / Good
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good

* For more details call our technical service

C52100

4.8. CuSn8

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuSn8
DIN CEN/TS 13388	CW453K
UNS	C52100

Characteristics

CuSn8 strips provide a better corrosion resistance compared to bronze with lower tin-content, combined with higher strength, very fine grain and good slip properties. It is wear resistant, has excellent spring properties, especially in application of miniaturisated connector systems, good cold forming and soldering properties.

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Sn	8	%
P	0.1	%

Main Applications

Stamped parts, Connectors, Contact springs, Spring elements, Ultra high strength spring elements, Membranes, Switch elements, Fixed contacts.

Mechanische Eigenschaften

Temper * Only information ** Thickness 0.15 - 0.60 mm	**Tensile Strength** **Rm**	**Yield Strength** Standard **$Rp_{0.2}$**	**Yield Strength** Bending optimized **$Rp_{0.2}$**	**Elongation** Bending optimized min. **A_{50mm}**	**Hardness *** **HV**	**Bendability** 90° gw / bw rel. Bending Radius R/T	
	MPa	MPa	MPa	%	HV	Banddicke ≤ 0.50mm	
R370	370 .. 450	≤ 300 *			80 ..120	0	0
R450	450 .. 550	≥ 370	≥ 350	35	120 .. 175	0	0
R540	540 .. 630	≥ 460	≥ 440	27	170 .. 200	0	0
R600	600 .. 690	≥ 520	≥ 480	20	180 .. 210	0	0
R660	660 .. 750	≥ 600	≥ 580	14	210 .. 240	0	2
R740	740 .. 810	≥ 680	≥ 660	8	210 .. 260	2	3
**R800 ** **	800 .. 930	≥ 720	≥ 700	-	230 .. 290	-	-
**R850 ** **	≥ 850	-	≥ 800	-	≥ 240	-	-

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.96	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.0	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		67	W/(m·K)
Electrical conductivity	MS/m	6.5	MS/m
Electrical conductivity	IACS	11	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	0.065	10^{-3}/K
Modulus of elasticity	GPa	109	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good

* For more details call our technical service

C52400

4.9. CuSn10

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuSn10
DIN CEN/TS	not standardized
UNS	C52400

Chemical Composition (balance) Weight percentage		
Cu	Rest	%
Sn	10	%
P	0.1	%

Characteristics

CuSn10 strips provide a better corrosion resistance compared to bronze with lower tin-content, combined with higher strength and good slip properties. It is wear resistant, has excellent spring properties, good cold forming and soldering properties.

Main Applications

Stamped parts, Connectors, Contact springs, Spring elements, Ultra high strength spring elements, Membranes, Switch elements, Fixed contacts.

Mechanical Properties

Temper	Temper	Tensile strength Rm	Yield strength $Rp_{0.2}$	Yield strength Bending optimized $Rp_{0.2}$	Elongation min. A_{50mm}	Hardness* HV	Bending 90° gw	Bending 90° bw
		MPa	MPa	MPa	%	HV	rel. bending radius R/T Thickness ≤ 0.50mm	
R400	**O60**	400 .. 500	≤ 200	-	≥ 55	120 .. 150	0	0
R520	**H02**	525 .. 625	≥ 460	400	> 20	160 ..210	0	0
R650	**H04**	650 .. 750	≥ 580	≥ 550	> 11	200 .. 240	0	0
R750	**H06**	750 .. 850	≥ 650	≥ 620	> 9	230 .. 270	0	1,5
R850	**H08**	850 .. 950	≥ 780	≥ 750	> 5	250 .. 290	1	2,5
R950	**H10**	950 .. 1050	≥ 900	-	> 1	270 .. 310	-	-
R1000**	**H12****	> 1000	≥ 950	-	-	> 290	-	-

* Only for information
** Thickness 0.20 - 0.60 mm

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.8	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.4	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		50	W/(m·K)
Electrical conductivity	MS/m	6	MS/m
Electrical conductivity	IACS	10	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	0.065	10^{-3}/K
Modulus of elasticity	GPa	110	GPa

Fabrication Poperties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good

* For more details call our technical service

C70620

5.1. CuNi10Fe1Mn

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuNi10Fe1Mn
DIN CEN/TS 13388	CW352H
UNS	C70620

Characteristics

For many decades, copper-nickel alloy **CuNi10Fe1Mn** has extensively been used as a piping material for seawater systems in shipbuilding, offshore, and desalination industries. Attractive characteristics of this alloy combine excellent resistance to uniform corrosion, remarkable resistance to localised corrosion in chlorinated seawater, and higher erosion resistance than other copper alloys and steel. Furthermore, **CuNi10Fe1Mn** is resistant to biofouling providing various economic benefit.

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Ni	9 … 11	%
Fe	1 … 2	%
Mn	0.5 … 1	%

Main Applications

Cladding for corrosion protection of steel structures, Sheathing on offshore structures, Piping systems, pipes, fittings, flanges, desalination plant, offshore wind structures, shipbuilding.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	≥ 300	100 *	20	≥ 70	0	0
R320	≥ 320	180 *	12	≥ 100	0	0
R420	420 .. 510	370 *	3	≥ 120	0	0.5
R520	520 .. 610	480 *	2	≥ 150	1	2
R620	≥ 620	590 *	-	≥ 170	-	-

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.89	g/cm³
Thermal expansion coefficient	20 .. 300 °C	19.0	10^{-6}/K
Specific heat capacity		0.38	J/(g·K)
Thermal conductivity		50.2	W/(m·K)
Electrical conductivity	MS/m	5	MS/m
Electrical conductivity	IACS	9	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	7	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Excellent
Machinability (Rating 20)	Good
Electroplating Properties	Good
Hot Tinning Properties	-
Soft Soldering, Brazing	Excellent
Resistance Welding	Excellent
Gas Shielded Arc Welding	Good
Laser Welding	Excellent

* For more details call our technical service

C19005

6.1. STOL® 76M - CuNiSi

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 76M
EN	CuNiSi
DIN CEN/TS 13388	
UNS	C19005

Chemical Composition (Balance)
Weight percentage

Cu	Rest	%
Ni	1.5	%
Si	0.3	%
Sn	0.1	%
Zn	0.4	%

Characteristics

STOL® 76M is an optimized CuNiSi alloy that can be hardened by cold forming and by precipitation of NiSi-phases during a heat treatment. It has excellent bendability, excellent hot and cold forming properties, a high strength and a good corrosion resistance.

Due to the NiSi-precipitations the relaxation properties, even at temperatures up to 150 °C are excellent. In combination with a tin coating even at temperatures around 150 °C (3.000h) the tin coating does not peel off. The electrical and thermal conductivity is good. Welding, soldering and brazing properties are good too.

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals , Press fits.
Electrical: Switches and Relays, Contacts, Connectors, Terminals, Press fits, Components for the electrical industry, Stamped parts, Semiconductor Components.

Mechanical Properties

* values for stress relieved qualities

Temper	Temper H.. = Cold worked TM = Mill hardened	Tensile Strength Rm MPa	Yield Strength min. $Rp_{0.2}$ Mpa	Elongation min. A_{50mm} %	Hardness HV only for information	Bendability 90° gw rel. Bending Radius R/T Strip Thickness ≤ 0.50mm	bw
R530	TM04 (HM)	530 .. 630	430	14	150 .. 190	0	0
R580	TM06 (XHM)	580 .. 650	540	8	170 .. 200	1	1
R580S	TM06 (XHM) bending optimized	580 .. 650	520	9	170 .. 200	0.5	0.5
R620	TM08 (SHM)	620 .. 700	560	7	180 .. 210	1	1.5

Other temper classes on request

Physical Properties
Typical values in annealed temper at 20 °C

Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	16.8	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		250	W/(m·K)
Electrical conductivity	MS/m	33	MS/m
Electrical conductivity	IACS	57	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	2	10^{-3}/K
Modulus of elasticity	GPa	135	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C19010

6.2. STOL® 76 - CuNiSi

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 76
EN	CuNiSi
DIN CEN/TS 13388	
UNS	C19010

Characteristics

STOL® 76 is a CuNiSi alloy that can be hardened by cold forming and by precipitation of NiSi-phases during a heat treatment. It has excellent bendability, excellent hot and cold forming properties, a high strength and a good corrosion resistance.

Due to the NiSi-precipitations the relaxation properties, even at temperatures up to 150 °C are excellent. The electrical and thermal conductivity is good. Welding, soldering and brazing properties are good too.

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Ni	1.5	%
Si	0.25	%
P	0.03	%

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals.
Electrical: Switches and Relays, Contacts, Connectors, Terminals, Components for the electrical industry, Stamped parts, Semiconductor Components, Junction Boxes.

Mechanical Properties

Temper	Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV **	Bending 90° gw	Bending 90° bw
						rel. Bending Radius R/T	
		MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R520	TM06 (XHM)	520 .. 590	440	8	155 .. 180	0.5	0.5
R580	TM08 (SHM)	580 .. 650	520	9	160 .. 210	1	1

** only for information

Other temper classe on request

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	16.8	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		260	W/(m·K)
Electrical conductivity	MS/m	35	MS/m
Electrical conductivity	IACS	60	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	2	10^{-3}/K
Modulus of elasticity	GPa	135	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C70250

6.3. CuNi3Si

ENGINEERING COPPER SOLUTIONS

Alloy Designation	
EN	CuNi3Si
DIN CEN/TS 13388	
UNS	C70250

Characteristics

CuNi3Si is an optimized CuNiSi alloy that can be hardened by cold forming and by precipitation of NiSi-phases during a heat treatment. It has excellent bendability, excellent hot and cold forming properties, a high strength and a good corrosion resistance.

Due to the NiSi-precipitations the relaxation properties, even at temperatures up to 150 °C are excellent. In combination with a tin coating even at temperatures around 150 °C (3.000h) the tin coating does not peel off. The electrical and thermal conductivity is good. Welding, soldering and brazing properties are good too.

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Ni	3	%
Si	0.65	%
Mg	0.15	%

Main Applications

Automotive Switches and Relays, Contacts, Connectors, Terminals.
Electrical Switches and Relays, Contacts, Connectors, Terminals, Components for the electrical industry, Stamped parts, Semiconductor Components.

Mechanical Properties

Temper		Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV (only for information)	Bending 90° gw	Bending 90° bw
		MPa	MPa	%	HV	rel. Bending Radius R/T Strip Thickness ≤ 0.50mm	
R620	TM00	620 .. 760	500	10	180 .. 240	0	0
R650	TM02	650 .. 825	585	7	190 .. 250	1	1
R690	TM03	690 .. 860	655	5	210 .. 250	1.5	1.5
R760	TM05	760 .. 840	720	3	220 .. 260	3	3
R840 *	TM08	840 .. 920	810	1	240 .. 275	2.5 **	3.5 **
R900 *	TM10	900 .. 1000	880	1	260 .. 300	4 **	8 **

* only for thicknesses between 0.10 and 0.50 mm (other thicknesses on request) ** Bending radii with maximum bending width 5 x t

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.87	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.6	10^{-6}/K
Specific heat capacity		0.399	J/(g·K)
Thermal conductivity		190	W/(m·K)
Electrical conductivity	MS/m	23	MS/m
Electrical conductivity	IACS	40	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *	
Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Good
Hot Tinning Properties	Good
Soft Soldering, Brazing	Good
Resistance Welding	Fair
Gas Shielded Arc Welding	Good
Laser Welding	Less suitable

* For more details call our technical service

C70315

6.4. STOL® 94 - CuNiSi

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 94
EN	CuNiSi
DIN CEN/TS 13388	
UNS	C70315

Chemical Composition (Balance)
Weight percentage

Cu	Rest	%
Ni	2.5	%
Si	0.6	%
Zn	≤ 2	%
Sn	≤ 1	%

Characteristics

STOL® 94 is a CuNiSi alloy which is available in cold worked and precipitation hardened tempers. It combines maximum strength with excellent bendability, good electrical conductivity, excellent resistance against relaxation.
Partial substitute for copper-beryllium alloys.
Due to the NiSi-precipitations the relaxation properties, even at temperatures up to 150 °C are excellent. In combination with a tin coating even at temperatures around 150 °C (3.000h) the tin coating does not peel off. The electrical and thermal conductivity is good. Welding, soldering and brazing properties are good too.

Main Applications

Automotive: Switches and Relays, Terminals, Contacts, Connectors, miniaturized connectors.
Electrical: Switches and Relays, Terminals, Contacts, Connectors.

Mechanical Properties

* values for stress relieved qualities

Temper	Temper H.. = Cold worked TM = Mill hardened	Tensile Strength Rm MPa	Yield Strength min. $Rp_{0.2}$ Mpa	Elongation min. A_{50mm} %	Hardness HV only for information	Bendability 90° gw rel. Bending Radius R/T Strip Thickness ≤ 0.50mm	bw
R580	H06 (Extra Hard)	580 .. 650	520	4 6 *	170 .. 200	1	2.5
R620	TM01 ($^1/_2$ Hard)	620 .. 720	540	16	180 .. 240	0	0
R660	TM02 ($^1/_2$ Hard)	660 .. 750	590	10	200 . 250	1	1
R750	TM04 (Hard)	750 .. 830	680	8	210 .. 260	2	2

Other temper classes on request

Physical Properties
Typical values in annealed temper at 20 °C

Density		8.86	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17	10^{-6}/K
Specific heat capacity		0.399	J/(g·K)
Thermal conductivity		185	W/(m·K)
Electrical conductivity	MS/m	25	MS/m
Electrical conductivity	IACS	43	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *

Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Fair
Gas Shielded Arc Welding	Good
Laser Welding	Less suitable

* For more details call our technical service

C18070

7.1. STOL® 75 - CuCrSiTi

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 75
EN	CuCrSiTi
DIN CEN/TS 13388	
UNS	C18070

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Cr	0.3	%
Si	0.02	%
Ti	0.1	%

Characteristics

STOL® 75 is a CuCrSiTi alloy that can be hardened by cold forming and by precipitation during a heat treatment. This alloy provides a good combination of high electrical conductivity, good strength, good bendability, excellent hot and cold forming properties and a good corrosion resistance.

Due to the Precipitations the relaxation properties, even at temperatures up to 200 °C are excellent.

Main Applications

E-Mobility, Hybrid Applications, Elecrical contacts, Automotive Connectors, Photovoltaic-Systems and Electronic Components.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw rel. Bending Radius R/T	Bending 90° bw rel. Bending Radius R/T
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R400	400 .. 480	300	8	120 .. 150	0	0
R460	460 .. 560	400	9	140 .. 170	0.5	0.5
R530	530 .. 610	460	10	150 .. 190	1	1
R550	550 .. 630	520	10	150 .. 190	1	1

* only for information

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.0	10^{-6}/K
Specific heat capacity		0.38	J/(g·K)
Thermal conductivity		310	W/(m·K)
Electrical conductivity	MS/m	45	MS/m
Electrical conductivity	IACS	78	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3	10^{-3}/K
Modulus of elasticity	GPa	135	GPa

Fabrication Properties *

Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Good
Hot Tinning Properties	Good
Soft Soldering, Brazing	Good
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C18080

7.2. STOL® 88 - CuCrAgFeTiSi

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 88
EN	---
ASTM	B936
UNS	C18080

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Cr	0.20 - 0.7	%
Si	0.01 - 0.10	%
Ti	0.01 - 0.15	%
Ag	0.01 - 0.30	%
Fe	0.02 - 0.20	%

Characteristics

C18080 is a CuCrAgFeTiSi alloy that can be hardened by cold forming and by precipitation during heat treatment. It has good bendability, excellent hot and cold formability, high strength and good corrosion resistance. Due to the precipitates, the relaxation properties are excellent, even at temperatures up to 200 °C. The electrical and thermal conductivity is excellent.

Main Applications

E-Mobility, Hybrid Applications, Electrical contacts, Automotive Connectors, Photovoltaic-Systems and Electronic Components.

Mechanical Properties

Temper Class	ASTM	Tensile Strength Rm	Yield Strength $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV	Bending 90° gw (radius R/T)	Bending 90° bw (radius R/T)
		MPa	MPa	%	HV	thickness ≤ 0.50mm	
R420	---	420 .. 500	340	12	130 .. 150	0	0
R480	TM04	480 .. 560	450	10	140 .. 170	0	0
R540	TM08	540 .. 625	520	9	150 .. 180	0.5	0.5
R520	TR08	520 .. 625	495	8	160 .. 190	1	2

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.6	10^{-6}/K
Specific heat capacity		0.38	J/(g·K)
Thermal conductivity		320	W/(m·K)
Electrical conductivity	MS/m	46	MS/m
Electrical conductivity	IACS	79	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3	10^{-3}/K
Modulus of elasticity	GPa	140	GPa

Fabrication Properties *

Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Good
Hot Tinning Properties	Good
Soft Soldering, Brazing	Good
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C18160

7.3. STOL® 95 - CuCrZr

KME
ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 95
EN	CuCr1Zr
DIN CEN/TS 13388	----
UNS	C18160

Characteristics

STOL® 95 is a CuCrZr alloy that can be hardened by cold forming and by precipitation of CuCrZr - phases during a heat treatment. It has good bendability, excellent hot and cold forming properties, a high strength and a good corrosion resistance.

Due to the CrZr-precipitations the relaxation properties, even at temperatures up to 250 °C are excellent. The electrical and thermal conductivity is excellent. Welding, soldering and brazing properties are good too.

Chemical Composition (Balance)

Weight percentage

Cu (incl. Ag)	Rest	%
Cr	0.8	%
Zr	0.2	%

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals, Press fits, Hybrid Cars.

Electrical: Switches and Relays, Contacts, Connectors, Terminals, Press fits, Components for the electrical industry, Stamped parts, Semiconductor Components, Junction Boxes, Photovoltaic Systems.

Mechanical Properties

Temper	Temper TM = Mill hardened	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV (only for information)	Bending 90° gw rel. bending radius R/T	Bending 90° bw rel. bending radius R/T
		MPa	MPa	%	HV	Strip thickness ≤ 0.50mm	
R480	TM04	480 .. 560	450	8	150 .. 190	1.5	1.5
R540	TM08	540 .. 630	500	4	160 .. 200	2	2
R540S	TR08	540 .. 620	480	8	160 .. 190	1.5	1.5
R600 *	-	≥ 600	550	2	≥ 160	2 **	2 **

* only for thicknesses between 0.10 and 0.50 mm (other thicknesses on request) ** Bending radius with maximum bending width 5 x t

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.92	g/cm³
Thermal expansion coefficient	20 .. 300 °C	18.0	10^{-6}/K
Specific heat capacity		0.381	J/(g·K)
Thermal conductivity		330	W/(m·K)
Electrical conductivity	MS/m	50	MS/m
Electrical conductivity	IACS	86	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3	10^{-3}/K
Modulus of elasticity	GPa	135	GPa

Fabrication Properties *

Cold Forming Properties	Good
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C14530

8.1. CuTeSn

ENGINEERING
COPPER SOLUTIONS

Alloy Designation
EN
DIN CEN/TS
UNS C14530

Characteristics

CuTe0.02Sn0.02 is a solid solution strengthened copper alloy (tellurium and tin additions). The Zutphen produced thin gauge strip is primarily used for radiator fin applications. The alloy has excellent thermal properties. Hot and cold formability is good (which makes it ideal for engine cooling applications where heat transfer is critical). The addition of tellurium and tin improves mechanical properties and increases the anneal resistancy.

Chemical Composition (Balance) Weight percentage		
Cu	≥ 99.90	%
Sn	0.003 – 0.020	%
Te	0.003 – 0.020	%
P	0.001 – 0.010	%

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongationg * Minimum A_{50mm}	Hardness HV *
	MPa	MPa	%	HV
R220	220 .. 275	80	15	53 .. 65
R255	255 .. 315	190	4	80 .. 100
R260	260 .. 330	210	3	85 .. 110
R280	280 .. 360	240	1	95 .. 120
R330	330 .. 410	300		105 .. 130
R355	355 .. 435	330		115 .. 140
R390	390 .. 475	370		125 .. 150

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.93	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.7	10^{-6}/K
Specific heat capacity		0.385	J/(g·K)
Thermal conductivity		360	W/(m·K)
Electrical conductivity	MS/m	53	MS/m
Electrical conductivity	IACS	92	%
Modulus of elasticity	GPa	120	GPa

Cold formability	
Cold formability	Excellent (decreasing with higher hardness levels)
Hot formability	Good (decreasing with higher hardness levels)
Brazing / Soldering	Excellent
Welding	Good

* Für weitere Informationen rufen Sie unseren technischen Dienst an

C15500

8.2. CuMgAgP

KME
ENGINEERING
COPPER SOLUTIONS

Alloy Designation	
EN	
DIN CEN/TS 13388	
UNS	C15500

Characteristics

C15500 is alloyed with Magnesium (Mg) to achieve a high strength combined with very good conductivity. It has good relaxation properties, high softening resistance and oxidation stability.

Chemical Composition (Balance) Weight percentage		
Cu (incl. Ag)	≥ 99.75	%
Mg	0.1	%
P	0.06	%
Ag	0.06	%

Main Applications

Electrical contacts, Connectors and Electronic Components.

Mechanical Properties

Temper		Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
						rel. Bending Radius R/T	
		MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R235	O61 (soft)	235 .. 295	105	30	-	0	0
R310	H02 (½ hard)	310 .. 380	260	13	90 .. 130	0	0
R385	H04 (hard)	385 .. 440	345	6	125 .. 145	0	0.5
R435	H06 (extra hard)	435 .. 495	385	5	140 .. 160	0.5	1
R450	H08 (spring)	450 .. 505	415	4	≥ 135	0.5	1
R470	H10 (extra spring)	470 .. 515	435	3	-	1	2

* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.91	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.8	10^{-6}/K
Specific heat capacity		0,385	J/(g·K)
Thermal conductivity		350	W/(m·K)
Electrical conductivity	MS/m	50	MS/m
Electrical conductivity	IACS	86	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	2.5	10^{-3}/K
Modulus of elasticity	GPa	120	GPa

C18665

8.3. STOL® 78 - CuMgP

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 78
EN	CuMgP
DIN CEN/TS 13388	
UNS	C18665

Characteristics

STOL® 78 is a high Magnesium (Mg) alloyed material with excellent formability at medium strength and good conductivity. Typical applications are automotive, electrical and electronic connectors, relays, current carrying springs and junction boxes.

Chemical Composition (Balance)

Weight percentage

Cu	Rest	%
Mg	0.6	%
P	0.01	%

Main Applications

Automotive: Switches and Relays, Contacts, Connectors, Terminals.

Electrical: Switches and Relays, Contacts, Connectors, Terminals, Components for the electrical industry, Stamped parts, Semiconductor Components.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R380	380 .. 460	330	14	115 .. 145	0	0
R460	460 .. 520	410	10	140 .. 165	0.5	1
R520	520 .. 570	460	8	160 .. 180	1	2.5
R570	570 .. 620	500	6	175 .. 195	2.5	5
R620 **	≥ 620	550	3	≥ 190	3	6

*only for information / ** Thickness max. 0.50 mm

Physical Properties

Typical values in annealed temper at 20 °C

Density		8.81	g/cm³
Thermal expansion coefficient	20 .. 300 °C	17.3	10^{-6}/K
Specific heat capacity		0.32	J/(g·K)
Thermal conductivity		270	W/(m·K)
Electrical conductivity	MS/m	36	MS/m
Electrical conductivity	IACS	62	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	2.5	10^{-3}/K
Modulus of elasticity	GPa	130	GPa

Fabrication Properties *

Cold Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair

* For more details call our technical service

C19400

8.4. STOL® 194 - CuFe2P

ENGINEERING COPPER SOLUTIONS

Alloy Designation	STOL® 194
EN	CuFe2P
DIN CEN/TS 13388	CW107C
UNS	C19400

Characteristics

STOL®194 is a medium strength alloy, with fine Fe precipitations. It combines high conductivity with medium strength and good relaxation properties.

Chemical Composition (Balance) Weight percentage		
Cu	Rest	%
Fe	2.4	%
Zn	0.1	%
P	0.03	

Main Applications

Automotive: Fuel Injectors, Electrical Connectors – Automotive.

Electrical: Circuit Breaker, Components, Contact Springs, Lead Frames, Electrical Connectors, Cable Warp, Electrical

Springs: Clamps, Plug Contacts, Fuse Clips, Terminal.

Mechanical Properties

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV *	Bending 90° gw	Bending 90° bw
					rel. Bending Radius R/T	
	MPa	MPa	%	HV	Strip Thickness ≤ 0.50mm	
R300	300 .. 360	≤ 240	18	80 .. 100	0	0
R360	360 .. 430	270	15	110 .. 135	0	0
R420	420 .. 480	380	10	130 .. 150	0.5	0.5
R480	480 .. 540	430	7	140 .. 160	0.5	0.5
R520	520 .. 580	470	4	≥ 140	2.5	3.5

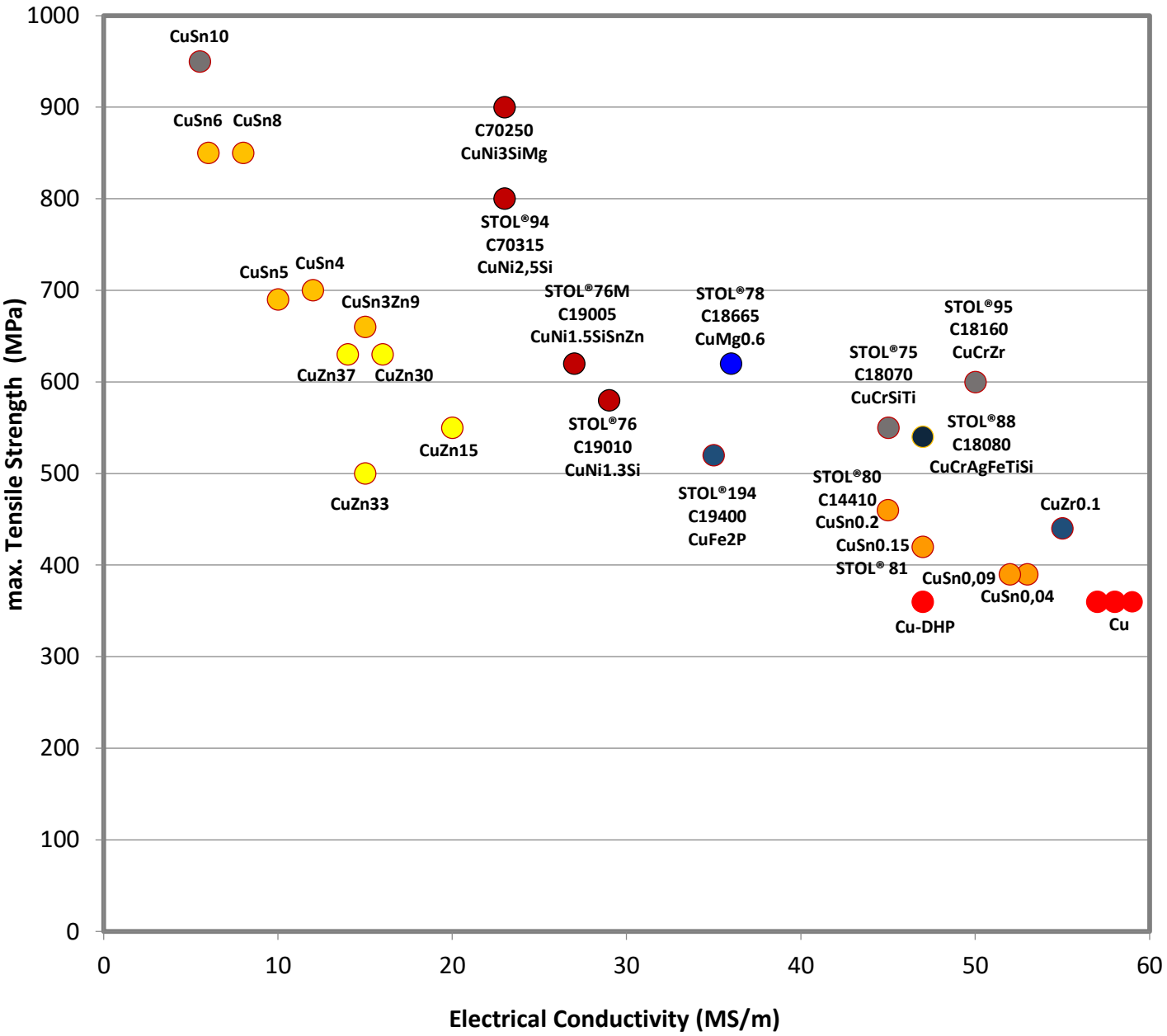
* only for information

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.91	g/cm³
Thermal expansion coefficient	20 .. 300 °C	16.3	10^{-6}/K
Specific heat capacity		0.38	J/(g·K)
Thermal conductivity		260	W/(m·K)
Electrical conductivity	MS/m	35	MS/m
Electrical conductivity	IACS	60	%
Thermal coefficient of electrical resistance	(0 .. 100 °C)	3.31	10^{-3}/K
Modulus of elasticity	GPa	125	GPa

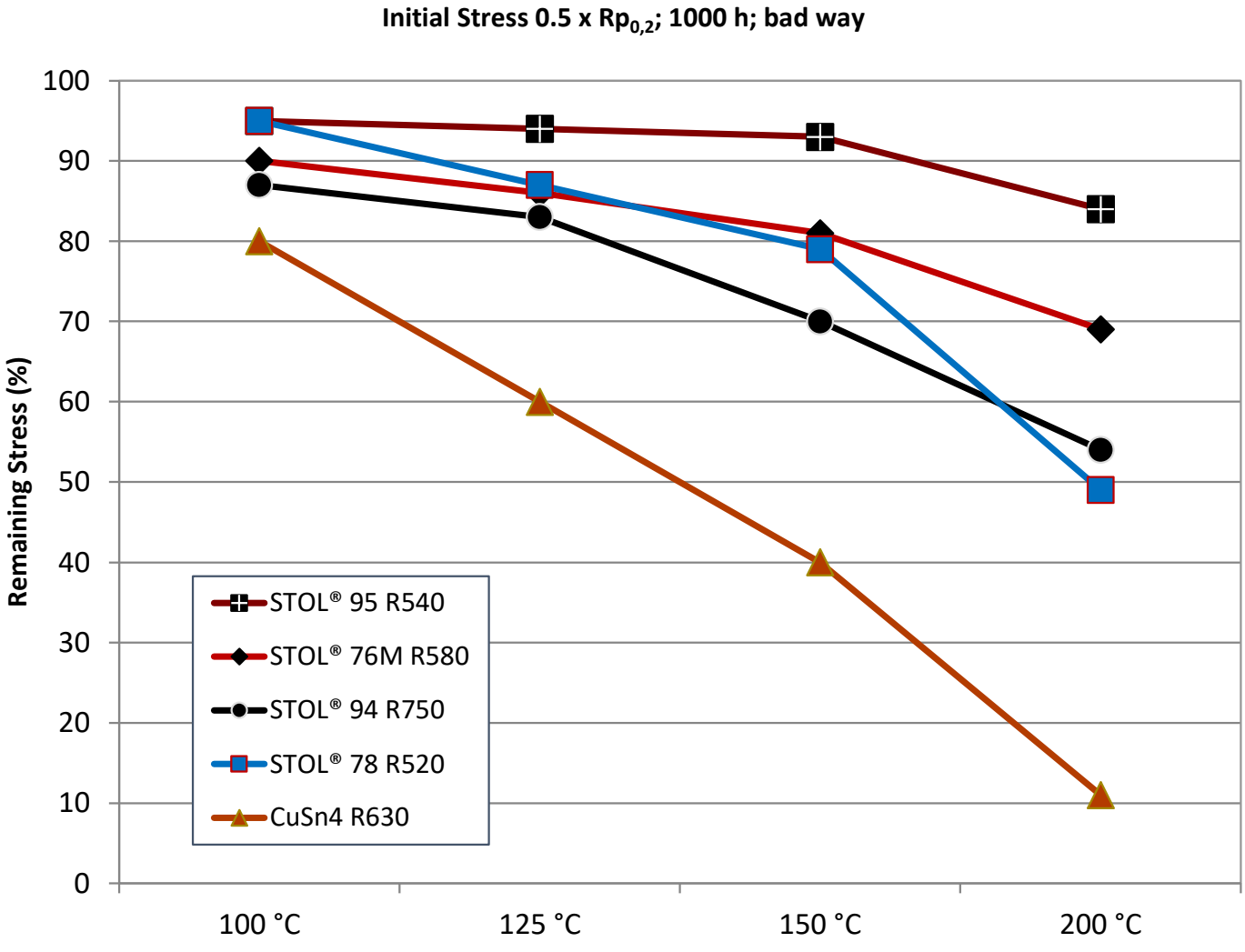
Fabrication Properties *	
Cold Forming Properties	Good
Machinability (Rating 20)	Good
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Excellent
Laser Welding	Good

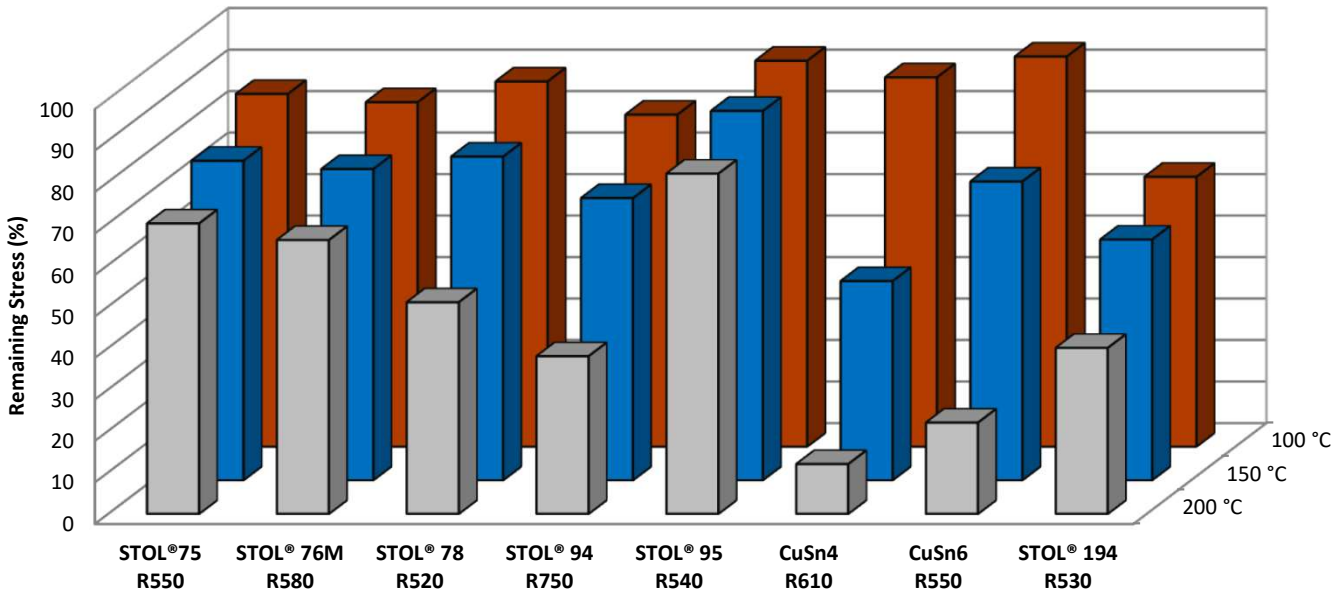
* For more details call our technical service

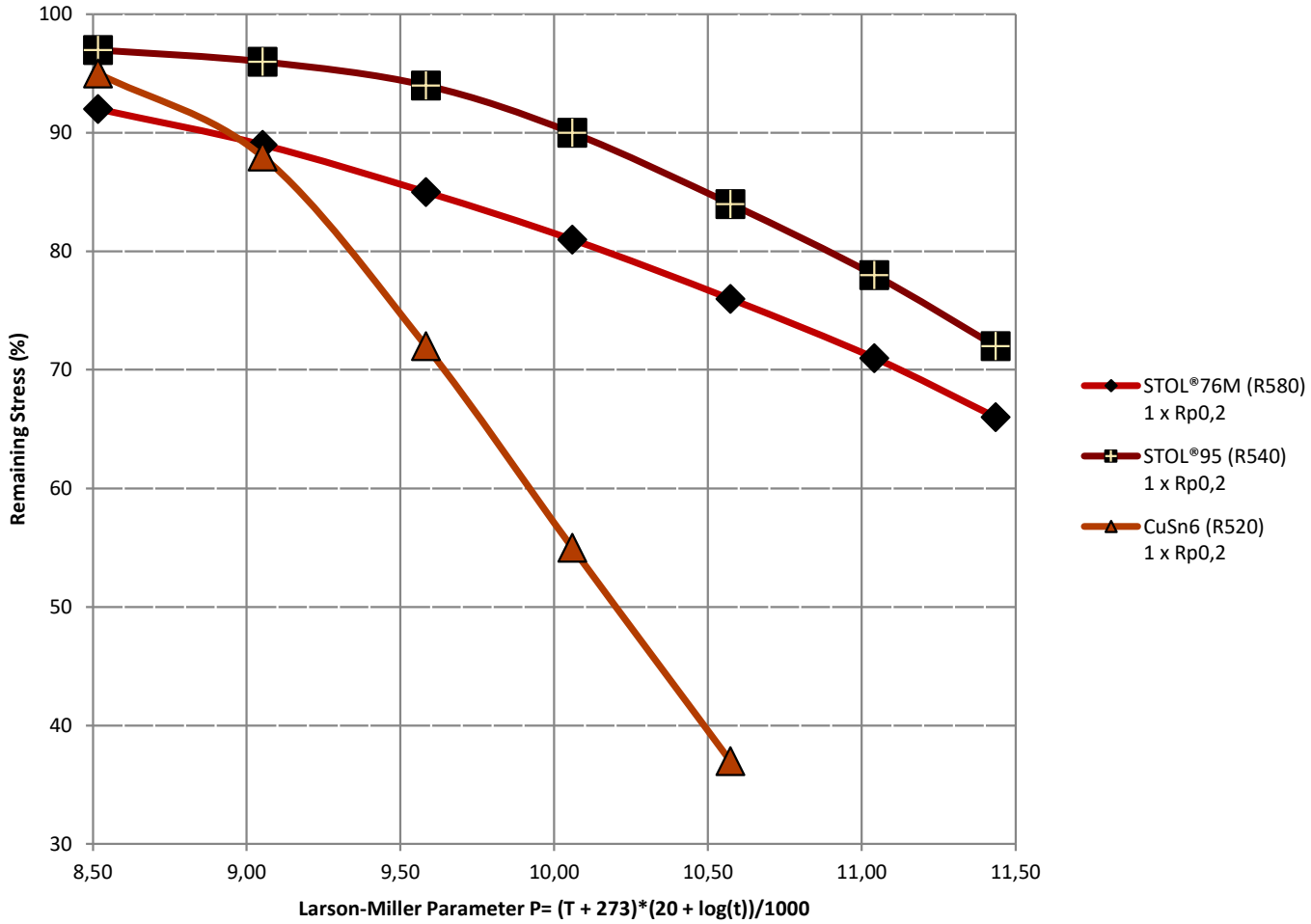
9.1. TENSILE STRENGTH vs. ELECTR. CONDUCTIVITY

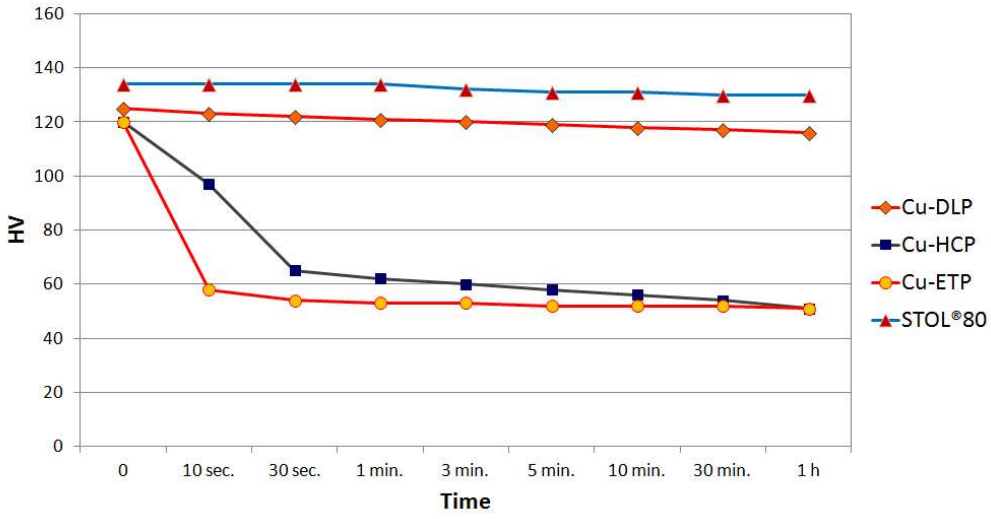


- Definition
  - Gradual decrease of stress under constant elongation.
  -
- KME Method
  - Cantilever - Bending-Test according to ASTM E 328
- Test conditions
  - Temperatures (100° C. / 125° C. / 150° C. / 200° C.)
  - Times (50 h / 100 h / 250 h / 500 h / 1000 h) // long term - Larson-Miller Methode
  - Initial stress (50 % oder 80 % of $Rp_{0,2}$)

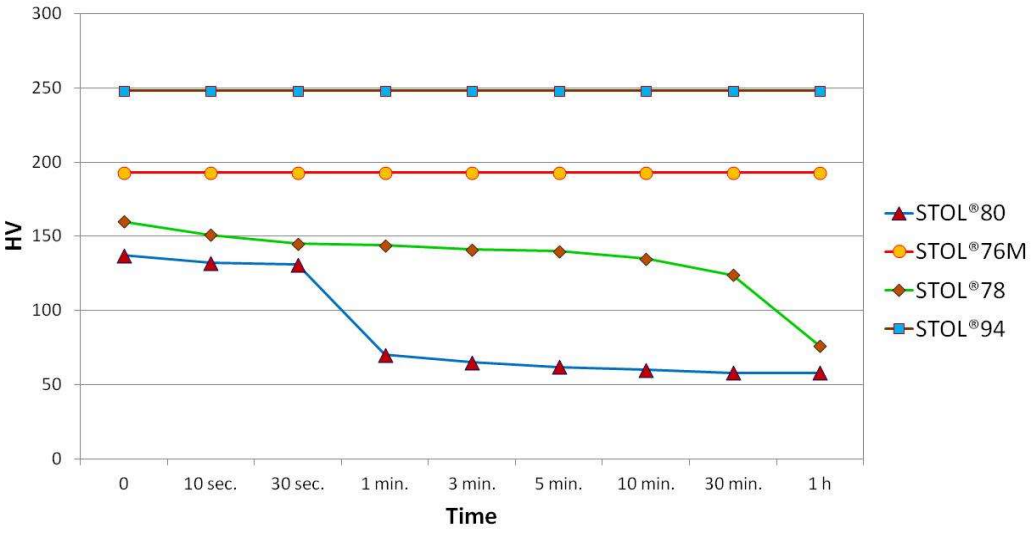



Remaining Stress (%)
100
90
80
70
60
50
40
30
20
10
0
100 °C
150 °C
200 °C
STOL®75 R550
STOL® 76M R580
STOL® 78 R520
STOL® 94 R750
STOL® 95 R540
CuSn4 R610
CuSn6 R550
STOL® 194 R530

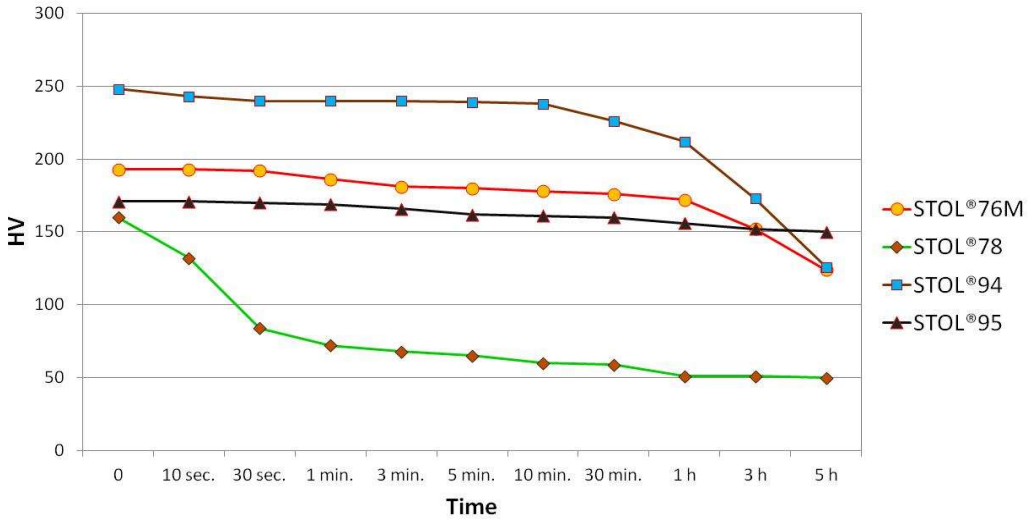

Remaining Stress (%)
100
90
80
70
60
50
40
30
8,50
9,00
9,50
10,00
10,50
11,00
11,50
Larson-Miller Parameter P= (T + 273)*(20 + log(t))/1000
STOL®76M (R580) 1 x Rp0,2
STOL®95 (R540) 1 x Rp0,2
CuSn6 (R520) 1 x Rp0,2



300 °C.

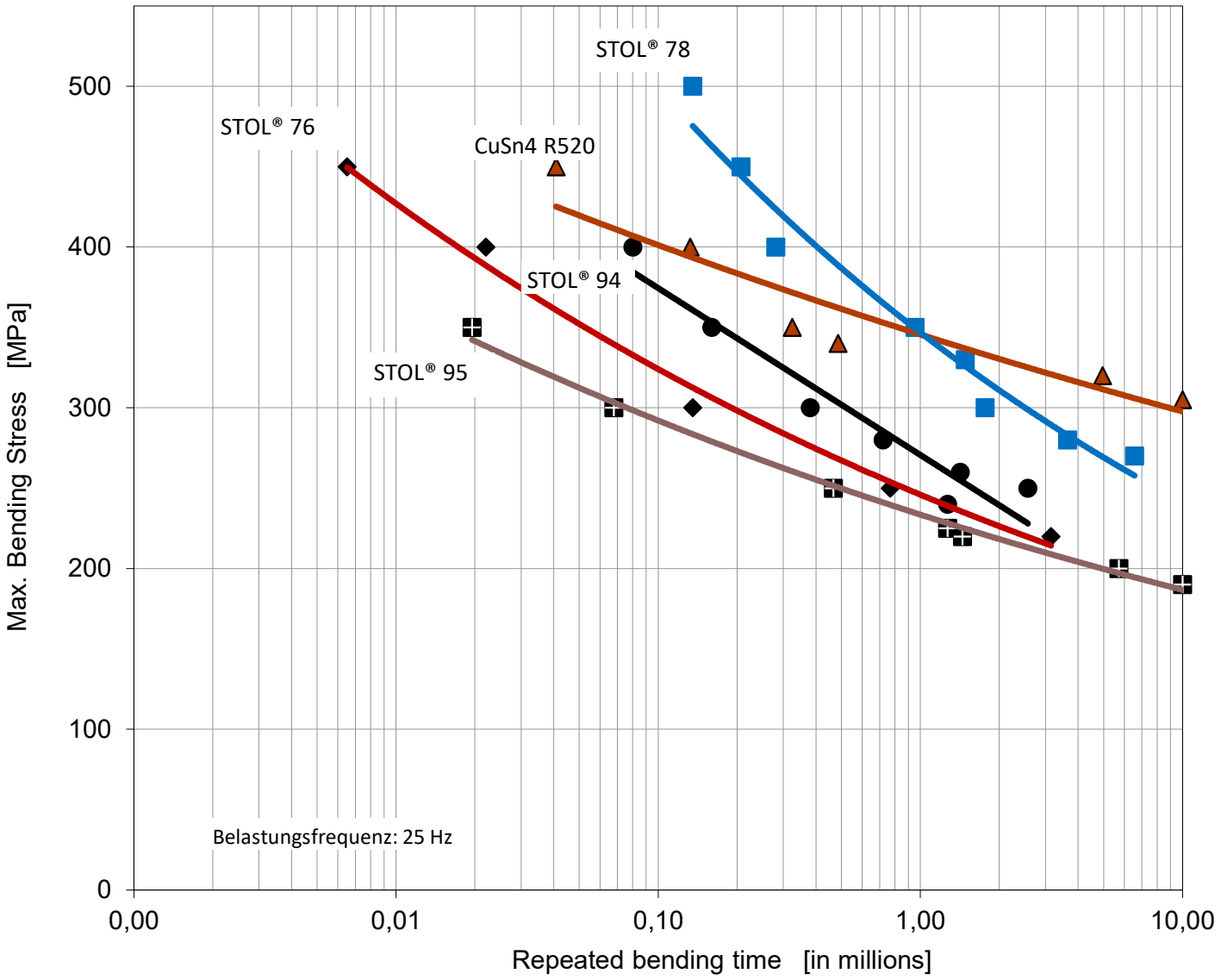


400 °C.

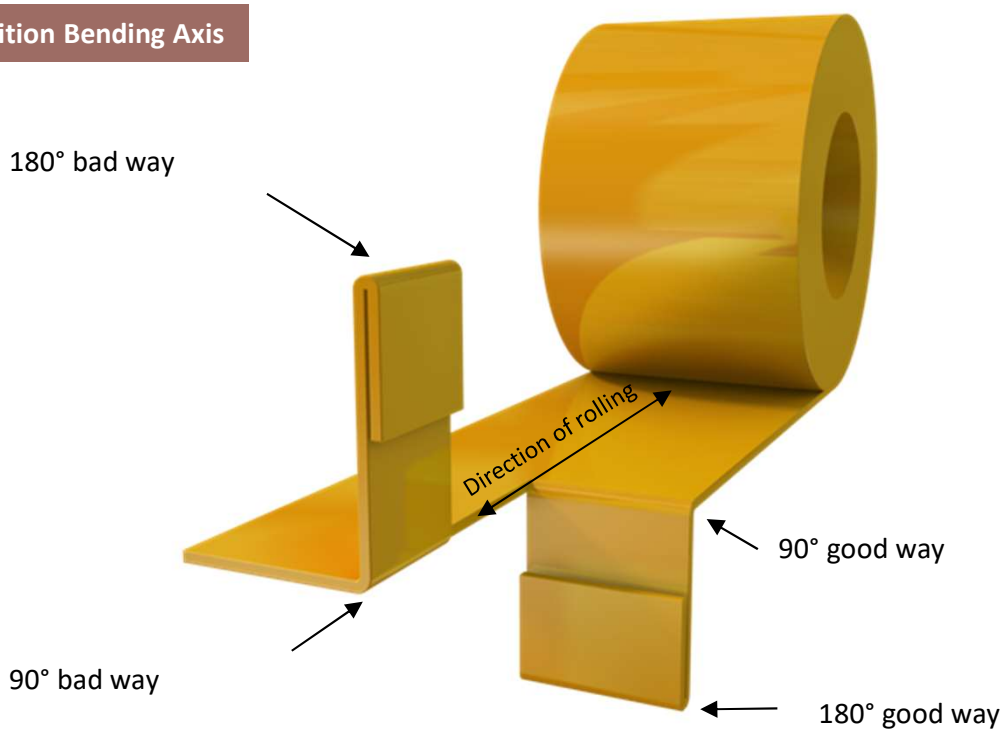


500 °C.

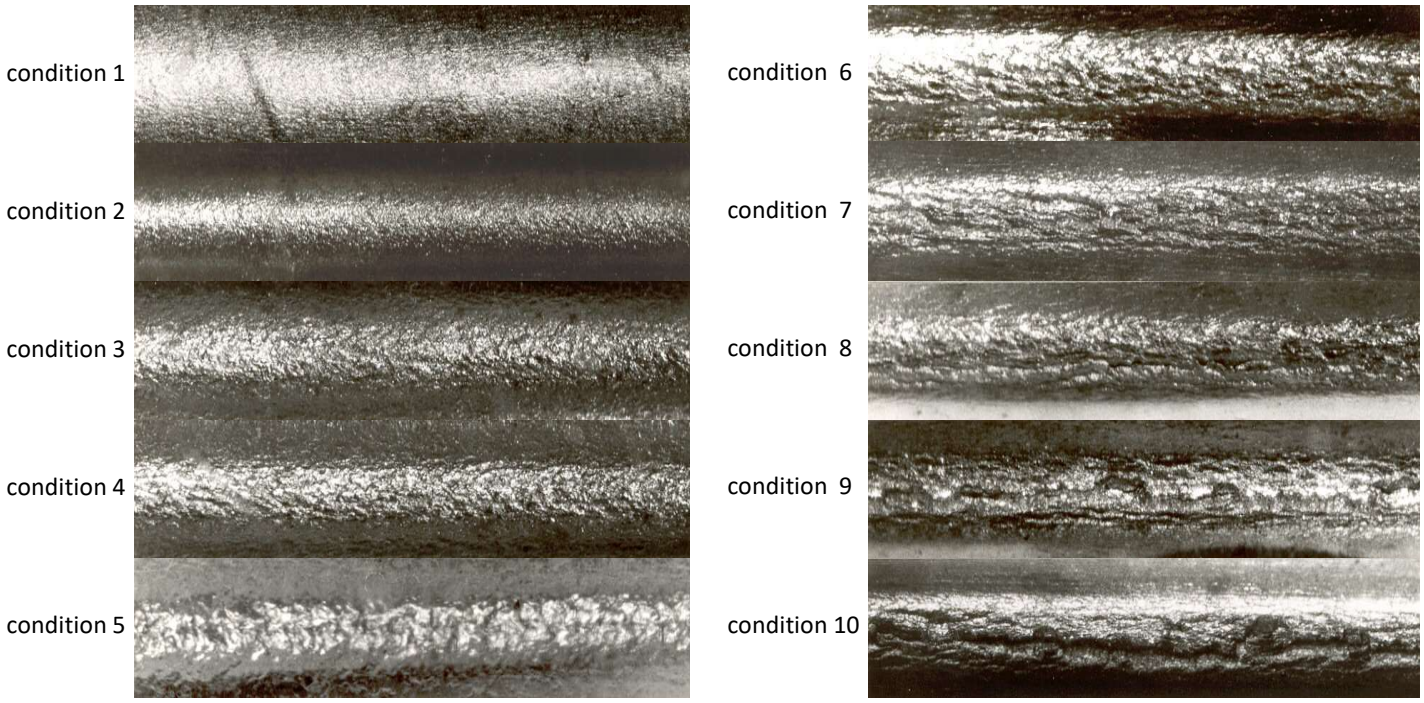
10.3. BEND FATIQUE (at room temperature)



Definition Bending Axis



Evaluation of Bending

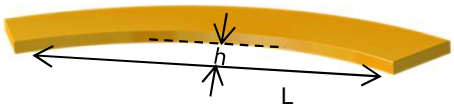


Condition 1	smooth, no cracks (no orange skin, no rough grain)
Condition 2	rough, no cracks (no orange skin, no rough grain)
Condition 3	slight orange skin, no cracks
Condition 4	orange skin, no cracks
Condition 5	strong orange skin, no cracks

Condition 6	very sligth cracks
Condition 7	sligth cracks
Condition 8	cracks
Condition 9	strong cracks
Condition 10	very strong cracks, nearly broken

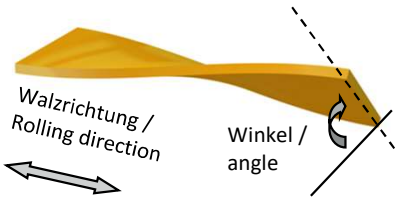
Test condition, in accordance with DIN ISO 7438, scale in accordance with DIN EN 1654 plus additionally valid for 180° bending.

Säbel / Camber

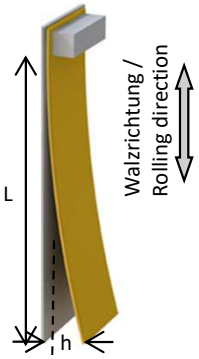


Walzrichtung /
Rolling direction

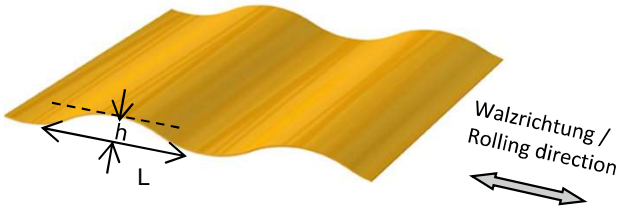
Drall / Twist



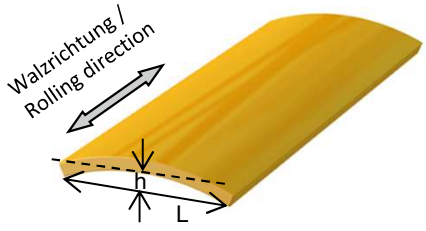
Ausbiegung / Coil set



Planheit / Eveness



Querwölbung / Transverse Flatness



KME PLATING SERVICE

To ensure the functional reliability of the contact system, today different coatings on copper materials become prescribed from our customers. We meet these specifications with our hot-dip tinning and electroplating facilities, which are available at various KME locations.

HOT-DIP TINNING ACCORDING TO DIN EN 13148 (RoHS conform)

Layers		pure tin	tin-silver (Sn28M)	thermal tin (Sn13)
Thickness range (mm)			0.10 – 1.20	
Width range (mm)			15 – 330	
Layer thickness (µm)	0.8 – 2	●	–	●
	1 – 3	●	●	–
	2 – 5	●	●	–
	3 – 7	●	●	–
	4 – 8	●	●	–
	5 – 10	●	●	–
	10 – 20	●	●	–

Note
Generally, the order thickness of the strip-material is that of the uncoated strip.
The coating thickness must be added to the order thickness.
Other coating thicknesses are possible by request.

GALVANIC COATING ACCORDING TO DIN EN 14436 (RoHS conform)

Layers	Cu + Sn	Ni + Sn	Ni + Cu + Sn	Ag
Surface finish		matte bright reflow brushed matte brushed bright		N/A
Thickness range (mm)	0.2 – 2.0 (> 2 – 5 on request)			
Width range (mm)	5 – 340 (> 340 – 450 on request)			

- KME offers sheets, plates and discs in a wide range of dimensions.
- Our rolling mill is supplied by our own foundries.
- Our strengths lie in a rich range of more than fifty alloys.
- We can also produce plates and discs to customer specific drawings on request.
- In addition to lead-free alloys, we have a large number of special alloys in stock, including bronze and cupronickel.

Copper / Copper alloys

European material descripton		DIN-standard (former)		ASTM	Typical properties / applications	Manufaturing standard
Cu-ETP	CW004A	E-Cu 58 E-Cu 57	2.0065 2.0060	C11000	standard alloy for electrical components, main application in switchgear construction	DIN EN 13599 DIN EN 1652
Cu-HCP Cu-PHC	CW021A CW020A	SE-Cu	2.0070	C10300	hydrogen-resistant, very high conductivity, easy to weld	DIN EN 13599
Cu-OF	CW008A	OF-Cu	2.0040	C10200	hydrogen-resistant, very high conductivity, very easy to weld	DIN EN13599
Cu-OFE	CW009A			C10100	high purity, Cu 99.99% fur vacuum switching systems, targets	DIN EN13604
Cu-DHP	CW024A	SF-Cu	2.0090	C12200	very easy to weld, without particular conductivity requirements	DIN EN1652 DIN EN1653 AD-2000W6/2
CuAg0,1P	CW016A	Cu-Ag0.1P	2.1191	C10700	mould plates, commutator rings, electrodes	DIN EN13599
CuCrZr	CW106C	CuCrZr	2.1293	C18150	mould plates, welding equipment, furnace and mould engineering, heavy current engineering	DIN 17670
CuNi2Si	CW111C	CuNi2Si	2.0855	C18000	mould engineering, machine parts, die casting equipment	by arrangement

Products can be supplied by arrangement in compliance with other international standards such as BS, JIS and GOST.

Individual sheets made of copper – cold-rolled

Width (mm)	Thickness (mm)					
	3 – 4.8	> 4.8 – 6.5	> 6.5 – 8	> 8 – 10	> 10 – 12	> 12 - 35
30 – 670	max. 4000 mm long	max. 4000 mm long	max. 3100 mm long	max. 3100 mm long	max. 2500 mm long	max. 6200 mm long
> 670 - 1000	max. 4000 mm long	max. 4000 mm long	max. 3100 mm long	max. 3100 mm long	max. 2500 mm long	
> 1000 – 1250	max. 4000 mm long	max. 3000 mm long	max. 3100 mm long	*	*	
> 1250 – 1600	max. 4000 mm long	max. 3000 mm long				

* on request

Plates made of copper – hot-rolled

Width (mm)	Thickness (mm)					
	3 – 5	> 5 – 12	> 12 – 20	> 20 – 60	> 60 – 200	> 200
30 – 1000	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	max. 4000 mm long	*
> 1000 – 2500	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	*	*
> 2500 – 3000		*	max. 4000 mm long	max. 4000 mm long		
> 3000 – 3200			*	max. 4000 mm long		
> 3200			*	*		

* on request

Brass (lead free)						
European material descripton		**DIN standard (former)**		**ASTM**	**Typical properties/application**	**Manufacturing standard**
CuZn5	CW500L	CuZn5	2.0220	C21000	Alloy with very good cold formability; well suited to pressing, embossing, enchasing. Application: installation components for electrical engineering, construction industry, facades, jewellery Industry.	DIN EN 1652
CuZn10	CW501L	CuZn10	2.0230	C22000		DIN EN 1652
CuZn15	CW502L	CuZn15	2.0240	C23000		DIN EN 1652
CuZn20	CW503L	CuZn20	2.0250	C24000		DIN EN 1652
CuZn28		CuZn28	2.0261		Alloy with very good cold formability achieved by deep-drawing, pressing, riveting, crimping. Application: cooling plates, musical instruments, every type of deep-drawn part, flat springs, ammunition.	DIN EN 1652
CuZn30	CW505L	CuZn30	2.0265	C26000		DIN EN 1652
CuZn33	CW506L	CuZn33	2.0280	C26800	Alloy with very good cold formability, especially suitable for crimping and cold-upsetting.	DIN EN 1652
CuZn36	CW507L	CuZn36			Main alloys for the application of brass materials; highly suitable for cold forming by means of deep-drawing, pressing, upsetting, rolling, thread rolling, embossing, bending; easy to solder and weld; suitable for electrolytic polishing. Application: etching quality e.g. clock and watch faces, furniture industry.	DIN EN 1652
CuZn37	CW508L	CuZn37	2.0321	C27200		DIN EN 1652
CuZn40	CW509L	CuZn40	2.0360	C28000	Alloy with good hot and cold formation properties; suitable for bending, riveting, upsetting and crimping and, in its soft state, for embossing as well as deep-drawing; better machinability than CuZn5 to CuZn37. Application: capacitor bases, facades, apparatus engineering, furniture fittings.	DIN EN 1652

Brass (leaded)

European material descripton		DIN-Norm (former)		ASTM	Typical properties/application	Manufacturing Standard *
CuZn39Pb0,5	CW610N	CuZn39Pb0.5	2.0372	C36600	Alloy with good cold and hot formability combined with adequate machinability. Application: bending, riveting, upsetting, crimping, tube sheet plates	DIN EN 1652
CuZn39Pb2	CW612N	CuZn39Pb2	2.0380	C37700	Alloy with good cold and hot formability combined with very good machinability; limited cold formability by means of bending, riveting, crimping; good for punching. Application: turning, drilling and milling quality, tool making, fixtures, engraved plates	DIN EN 1652

Special brass

CuZn20Al2As	CW702R	CuZn20Al2As	2.0460	C68700	Alloy with arsenic to improve dezincification resistance. Application: capacitors, seawater applications, welded tubes.	DIN EN 1652
CuZn28Sn1		CuZn28Sn1	2.0470	C44300	Alloy with improved dezincification resistance and conditional seawater resistance. Application: capacitors, heat exchangers, apparatus engineering.	DIN EN 1652
CuZn38AlFeNiPbSn	CW751R	CuZn38-AlFeNiPbSn	2.0525	C47000	Alloy with higher strength combined with good machinability. Application: apparatus engineering, capacitors, heat exchangers.	DIN EN 1653
CuZn38Sn1(As)	CW717R	CuZn38Sn1(As)	2.0530	C46400 (C46500)	Alloy with good corrosion-resistance. Application: capacitors, heat exchangers, apparatus engineering, cladding.	DIN EN 1653

Other alloys are available on request, for which we are excellently equipped with our modern alloy foundry.
We can cast blocks of up to 15 tons, and finished plates can weigh up to around 10 tons depending on alloy.

* on request

Individual sheets made of brass – cold-rolled

Width (mm)	Thickness (mm)					
	3 – 4.8	> 4.8 – 6.5	> 6.5 – 8	> 8 – 10	> 10 – 12	> 12 - 35
30 – 670	max. 4000 mm long	max. 4000 mm long	max. 3100 mm long	max. 3100 mm long	max. 2500 mm long	max. 6200 mm long
> 670 - 1000	max. 4000 mm long	max. 4000 mm long	max. 3100 mm long	max. 3100 mm long	max. 2500 mm long	
> 1000 – 1250	max. 4000 mm long	max. 3000 mm long	max. 3100 mm long	*	*	
> 1250 – 1600	max. 4000 mm long	max. 3000 mm long				

* on request

Plates made of brass – hot-rolled

Width (mm)	Thickness (mm)					
	3 – 5	> 5 – 12	> 12 – 20	> 20 – 60	> 60 – 200	> 200
30 – 1000	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	max. 4000 mm long	*
> 1000 – 2500	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	*	*
> 2500 – 3000		*	max. 4000 mm long	max. 4000 mm long		
> 3000 – 3200			*	max. 4000 mm long		
> 3200			*	*		

* on request

Cupronickel alloys

European material descripton		DIN standard (former)		ASTM	Typical properties/application	Manufacturing Standard *
CuNi5-Fe1Mn		CuNi5-Fe1Mn			Alloy with good resistance against seawater, erosion and corrosion, and good weldability. Application: offshore, maritime Applications	GOST
CuNi10-Fe1Mn	CW352H	CuNi10-Fe1Mn	2.0872	C70620	Alloy with good resistance against seawater, erosion and corrosion, and good weldability. Application: apparatus engineering, tube sheet plates, seawater processing, welded tubes, maritime applications, cladding	DIN EN 1652
CuNi30-Mn1Fe	CW354H	CuNi30-Mn1Fe	2.0882	C71520	Alloy with outstanding resilience against seawater, erosion and corrosion (because it contains more nickel) and good weldability. Application: apparatus engineering, tube sheet plates, seawater processing, maritime applications, cladding	DIN EN 1652

Copper-tin-alloys

CuSn4	CW450K	CuSn4	2.1016	C51100	Alloy with very good cold formability and corrosion-resistance, easy to soft- and hard-solder and good electrical conductivity (within its material group); higher strengths than copper.	DIN EN 1652
CuSn5	CW451K	CuSn5		C51000	Alloy with good cold formability and corrosion-resistance; insensitive to stress corrosion cracking; Application: electrical industry, automotive engineering, facades, monuments, works of art.	DIN EN 1652
CuSn6	CW452K	CuSn6	2.1020	C51900	Alloy with good cold formability and very good corrosion-resistance; easy to solder. Application: all types of spring, especially electrical industry; flexible metal tubes, facades, monuments, works of art.	DIN EN 1652
CuSn8	CW453K	CuSn8	2.1030	C52100	Alloy with good cold formability; higher abrasion resistance, corrosion-resistance, strength, hardness than CuSn6; good sliding properties. Application: sliding elements, especially for thin-walled sliding bearing bushings and sliding strips, springs.	DIN EN 1652

Copper-aluminium alloys

European material descripton		DIN-Norm (former)		ASTM	Typical properties/application	Manufacturing Standard
CuAl8Fe3Sn				C61300	main properties: alloys with high strengths compared with copper materials (including at higher temperatures) combined with outstanding corrosion-resistance against neutrals and acids, watery media and seawater; good resilience against scaling as well as erosion and cavitation; we can gladly advise on special requirements and help you select the right alloy.	DIN EN 1652
CuAl8Fe3	CW303G	CuAl8Fe3		C61400		
CuAl11Fe3		CuAl11Fe3		C62400		
CuAl9Mn2		CuAl9Mn2	2.0960		Application: highly stressed bearing components, sliding strips	DIN EN 1652
CuAl10-Fe3Mn2	CW306G	CuAl10-Fe3Mn2	2.0936	CA104	Application: chemical apparatus engineering, scaling-resistant parts.	BS
CuAl10-Ni5Fe4	CW307G	CuAl10-Ni5Fe4	2.0966	C63000	Application: maximum-strength parts, highly stressed bearing components, wearing parts, ship propellers, chemical apparatus engineering, tube sheet plates, maritime applications, potash industry.	DIN EN 1652

Special alloys

CuAsP		CuAsP	2.1491	only BS C107	Higher corrosion-resistance and less tendency to scale than pure copper. Application: fireboxes.	Only BS C107
CuSi3Mn		CuSi3Mn	2.1525	C66500	Apparatus engineering, heat exchangers, chemical industry, construction industry, crafts.	
CuMn2		CuMn2	2.1363		Chemical Apparates Engineering.	
C67000	CW704R			C67000	High strength, high static and dynamic loading capacity.	

Cupronickel, dimensions

Width (mm)	Thickness (mm)					
	3 – 5	> 5 – 12	> 12 – 20	> 20 – 60	> 60 – 200	> 200
30 – 1000	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	max. 4000 mm long	*
> 1000 – 2500	max. 6000 mm long	max. 8000 mm long	max. 4000 mm long	max. 6200 mm long	*	*
> 2500 – 3000		*	max. 4000 mm long	max. 4000 mm long		
> 3000 – 3200			*	max. 4000 mm long		
> 3200			*	*		

* on request

Copper-aluminium (aluminium bronze)

Width (mm)	Thickness (mm)				
	0 – 1250	> 1250 – 1600	> 1600 – 2000	> 2000 – 3000	> 3200
3 – 5	max. 3050 mm long				
> 5 – 12	max. 3050 mm long	max. 3050 mm long	*		
> 12 – 20	max. 3050 mm long	max. 3050 mm long	max. 3050 mm long	*	
> 20 – 60	max. 4000 mm long	max. 4000 mm long	max. 4000 mm long	*	*
> 60 - 130	max. 4000 mm long	max. 4000 mm long	max. 4000 mm long		
> 200	*	*			*

* on request

The storage of our blank and coated strip and stamped products (hereinafter referred to as "products") may influence their quality.

Insofar as the above mentioned products are stored at consistent room temperature in a dry atmosphere and in undamaged packaging, the following applies with regard to mechanical properties, surface condition and workability:

Mechanical properties

The mechanical product properties (including roughness) for our products are in any case given at least for the duration of the legally required warranty period; during this period, the layer thickness, verifiable using the X-ray fluorescence method, also remains the same.

Surface condition

Products protected „preserved“ with oil are protected against oxidation for up to three months.
Bare surfaces passivated with Benzotriazol or other media are protected against oxidation for up to six months.
Finished surfaces oxidize in the Angstrom area and can increasingly develop a slightly yellowish to black layer. However, when processed within one year, this layer is regularly removed by the relative movement during plugging due to the contact forces applied.

Processing of products with coating

Solderability/wettability can be impaired by the diffusion-controlled growth of the intermetallic phases, especially with thin tin layers. For precious metal coatings (e.g. with silver or gold) of products, we would recommend passivation.
If the storage conditions described above are observed, perfect processing can be guaranteed for up to half a year, depending on the coating process. Beyond that, however, the manufacturer's specifications of the respective coater have priority.

Storage instructions

Copper and copper alloys are sensitive to humidity, and moreover to condensation in certain atmospheres. In this contex, care has to be taken to avoid extreme temperature and/or humidity conditions.

- Ensure that the relative humidity remains below 60 % (non-codensing)
- Protect the material against solar irradiation.
- Keep protect from rain.
- Keep in closed original packing.
- Prevent contact to other chemical products.
- Keep protected against water penetration.
- Ensure that the information on the labels remains visible.

For the purposes of completeness only, we would like to point out that the above-mentioned Information does not extend to further processed products. Influences resulting from further processing - at your site or in the further supply chain - do not fall within our area of responsibility and must be taken into account on your part.

+ Resistance
o Less resistance
x Not resistance
^ Insensitive

	Industry atmosphere	natural atmosphere	Neutral to alkaline aqueous solutions	Nicht oxidierend wirkenden Säuren	Non-oxidising acids	Neutral or alkaline salt solutions	Organic acids	Drinking and process water	Ammonium-containing solutions
Copper		+	+	+	+			+	x
CuZn10/15		+	+			+		+	
CuZn30/33/36/37		+				+		+	
CuSn4/5/6/8	+	+							
CuNi10Fe1Mn	+	+		+			+		
C70250		+				+		+	
CuSn2Zn10 / CuSn3Zn9		+	+	+	+				
STOL® 75		+				+		+	
STOL® 76 / 76M		+				+		+	
STOL® 78		+				+		+	
STOL® 80 / 81	+	+	+	+	+			+	
STOL® 94		+	+					+	
STOL® 95	+	+		+	+			+	
STOL® 194	+	+		+		+		+	

	Wet ammonia	Cyanide	Gases containing halogens	Concentrated hydrohalogen acids	Oxidising acids	Moist sulphur compounds	Sulphur-hydrogen	Seawater	Stress corrosion cracking
Copper	x	x		x	x		x	x	
CuZn10/15	x				x	x			
CuZn30/33/36/37					x	x			
CuSn4/5/6/8	x	x	x				x	+	
CuNi10Fe1Mn			+				+		^
C70250	x	x	x		x	x	x		
CuSn2Zn10 / CuSn3Zn9	x	x	x				x	+	
STOL® 75	x	x	x				x		+
STOL® 76 / 76M	x	x	x		x	x			+
STOL® 78	x	x	x				x		+
STOL® 80 / 81	x	x	x		x		x		
STOL® 94	x	x	x		x	x			+
STOL® 95	x	x	x		x		x	x	+
STOL® 194	x	x	x		x		x		+

KME - RESEARCH & DEVELOPMENT

COPPER: THE MATERIAL OF THE FUTUR

MANIFOLD DEVELOPMENT POTENTIAL

Resolute market and customer orientation promotes visions and growth.
In order to ensure the three core values of KME: innovation, efficiency and quality, research and development takes utmost priority.
Customers in the most various application fields rightly demand highest standards. Our continuous research is therefore oriented to market conditions and customer requirements, always enabling us to develop new and improved materials, surfaces and processes for the manufacture and application of copper and copper alloys.

Copper is a unique material with an extraordinarily high development potential. Our comprehensively equipped laboratory and development areas are part of our management system certified according to IATF 16949. Here, qualified teams of engineers work on issues along and even beyond the entire value chain of copper – from the raw material over alloy production right down to the production of semi-finished copper products and from the finished part though to market application.

In our lab facilities, the engineering of alloys and casting techniques can be studied on a production-related scale in realistic operating conditions and with in-depth scientific expertise. Trial and experimental castings in magnitudes from a few kilograms to several tons provide fast and reliable development results.
All required tests and analysis can be conducted: Material and failure analysis, corrosion investigations, material tests (for the determination of mechanical and physical properties) and chemical analysis.

KME maintains cooperation projects with companies, universities and research facilities worldwide, and actively supports both national and international research projects. Furthermore, we proactively participate in the standardisation of products and processes. We engage ourselves regularly in supporting students' training and theses. KME encourages employees to think innovatively, thus promoting the quest for technical innovations, sustainability and growth. This process is enhanced by the extensive activities in the field of research and development.

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Due to continued improvements within our production process, the details stated in our brochure can not be guaranteed.
We reserve the right to update or amend our products, without prior notification.
We suggest that you obtain confirmation of our product details / specifications prior to committing to specific alloys.

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