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http://conductivity-app.org

CuSn0,15Te

UNS:C14420
EN:-

Manufactures list:
Luvata (http://www.luvata.com/) - LUVATA: SM0701

CuSn0,15 alloy is a tin bearing tellurium copper with higher than pure copper softening temperature and good thermal conductivity. The alloy permits good corrosion resistance and has no stress cracking corrosion. Material has good formability at medium strength and good thermal and electrical conductivity.

Basic properties

Basic properties	Value	Comments
Density [g/cm^3]	8,9	
Specific heat capacity [J/(kg*K)]	385	
Temperature coefficient of electrical resistance (0...100°C) [10^{-3}/K]	3,2-3,3	
Electrical conductivity [T=20°C, (% IACS)]	80-95	
Thermal conductivity [W/(m*K)]	390	
Thermal expansion coefficient 20...300°C [10^{-6}/K]	17-18	
[Ref: 105, 106, 108]		

Applications

Main applications

Main applications are connected with heat transfer in electro industry, electronics, automotive. Possible applications: heat exchangers, radiator fins, boiler pressure vessels, connectors. Literature: [Ref: 105, 106, 108]

Kinds of semi-finished products/final products

Rolled plates, sheets, strips and folis [Ref: 105, 107, 108]

Chemical composition

Chemical composition	Value	Comments
Cu [wt.%]	99,7-99,955	Calculated
Sn [wt.%]	0,04-0,15	
Te [wt.%]	0,005-0,05	
Others [wt.%]	0-0,1	
[Ref: 106, 112]		

Mechanical properties

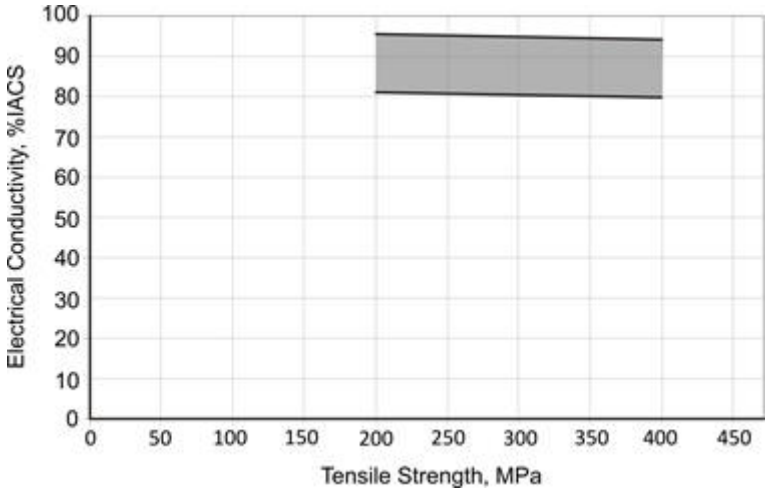
Mechanical properties	Value	Comments
UTS [MPa]	200-400	
YS [MPa]	No data	
Elongation [%]	2-30	
Hardness	50-140	HV
Young's modulus [GPa]	118	
Kirchhoff's modulus [GPa]	44	
Poisson ratio	0,34	
[Ref: 105, 106, 108]		

Material's mechanical and electrical properties in different tempers

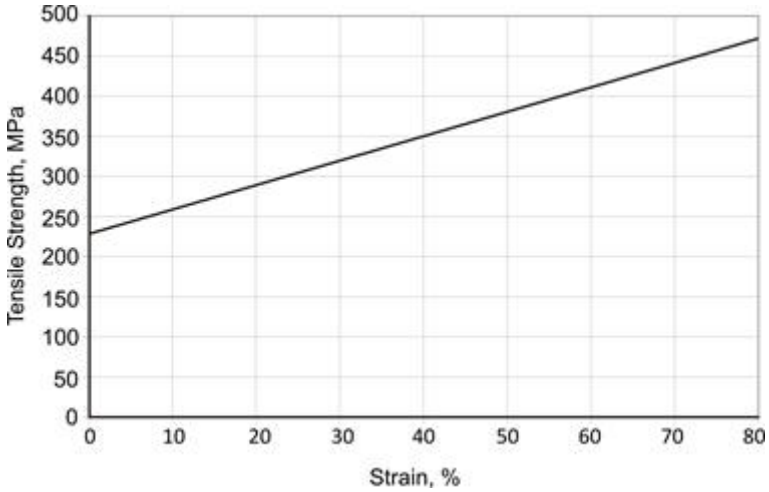
Temper	Ultimate Tensile Strength UTS, [MPa]	Hardness [HRF]	Hardness superficial 30-THR	Hardness[HV]	Elongaton at break during tensile test A[%]	Literature
O 25	205-260	max.65	max. 31	50-70	min.15	[Ref: 105, 108]
M25	205-260	max. 75	max. 41			
1/8H	220-275	54-82	max 49			
1/4H	235-295	60-84	18-51	65-85	min.9	
1/2H	255-315	77-89	43-57			
3/4H	285-345	82-91	47-59			
H	295-360	86-93	54-62			
EH	325-385	88-95	56-64	min.100		
Spring	345-400	91-97	60-66			
extra spring	min 360	min.92	min.61			

Material's grain sizes for different tempers

Temper	Grain size [mm]	Hardness [HRF]	Literature
O60 (soft anneal)	max 0,50	max 65	[Ref: 105]
O68 (deep drawing anneal)	max 0,50	30-75	



Levels of electrical and mechanical properties of material in different tempers [Ref: 2]

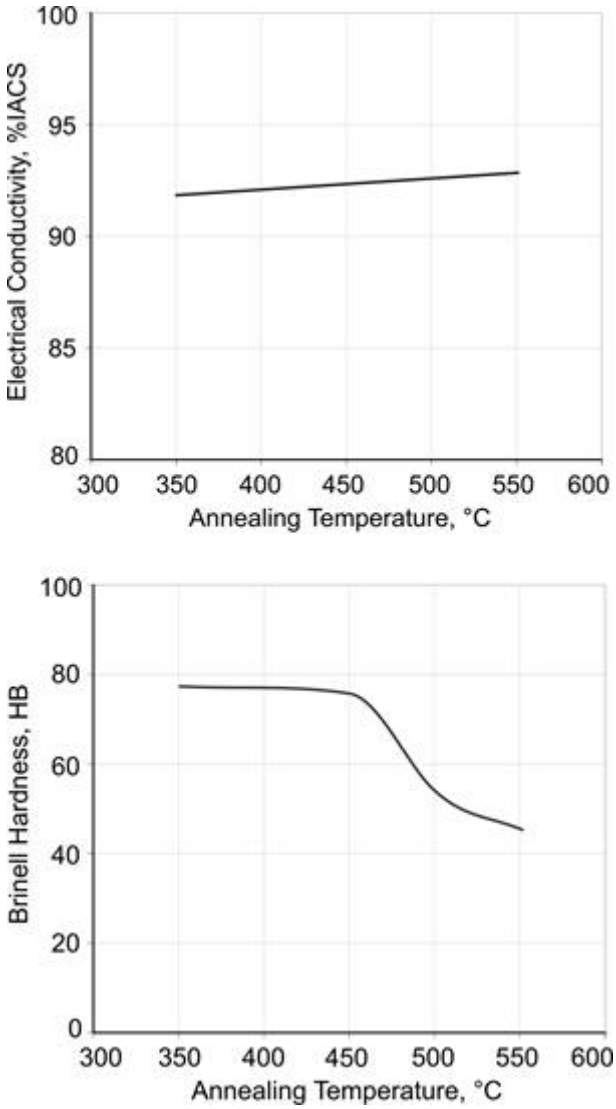


Ultimate tensile strength of material as a function of cold working strain calculated via formula based on approximation of different experimental data [Ref: 2]

Exploitation properties

Heat resistance

Mechanical and electrical properties vs temperatures



Variation of electrical conductivity and hardness with annealing temperature of material (conductivity and hardness tests at ambient temperature after heating) [Ref: 109]

Long-therm heat resistance, e.g. Arrhenius curve

NO DATA AVAILABLE

Half- softening temperature

Half softening temperature about 350-400°C [Ref: 106]

Corrosion resistance

Hydrogen embrittlement resistance

Material resistant to hydrogen embrittlement [Ref: 110]

Other kind of corrosion elements

Type of corrosion	Suitability	Literature
Atmospheric	no data	-
Marine environment	no data	-
Stress crack	Resistant	[Ref: 110]
Hydrogen embrittlement	Resistant	[Ref: 110]
Electrolytic	no data	-
Other - oxidising acids	no data	-

Rheological resistance

Stress relaxation

NO DATA AVAILABLE

Creep

NO DATA AVAILABLE

Wear resistance

Friction resistance

NO DATA AVAILABLE

Fatigue resistance

Fatigue cracking

NO DATA AVAILABLE

Impact strength

NO DATA AVAILABLE

Fabrication properties

NO DATA AVAILABLE

Technological properties

Technological properties	Value	Comments	Literature
Annealling temperature [°C]	430-530		[Ref: 106]

References:

2. **Properties of copper and copper alloys at cryogenic temperatures** - Simon N. J., Drexler E.S., Reed R. P., NIST Monograph 177, National Institute of Standards and Technology, U.S. Department of Commerce, Washington, D.C., Feb 1992

105. **Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar, B 152/B 152M – 06a** -

106. **Data sheet - Cuprofor** -

107. **Data sheet - Copper and Alloys** - ThyssenKrupp Materials NA

108. **Data sheet - Detaliled product description CuSn** -

109. **Influence of alloying elements on thermal conductivity and high temperature strength of copper based alloys** - K. T. Kim, W. J. Jung, and C. S. Choi, Materials Science and Technology April 2001 Vol. 17 455

110. **The Corrosion of Copper and I t s Alloys** - Roger Francis, ISBN 978-1-57590-225-8

112. **Application datasheet – C10100-C12099** -