

| Designation | DIN | EN Nr. | UNS (ASTM) | AISI | LMSA |
|-----------------|-----|--------|------------|------|-------------|
| CuSn3Zn9 | - | CW454K | C42500 | - | B330 |

Chemical composition

| Cu | Zn | Sn | Ni | Pb | Fe | P | Others |
|---------|-------------|-------------|--------|--------|--------|--------|--------|
| Balance | 7.50 - 10.0 | 1.50 - 3.50 | ≤ 0.20 | ≤ 0.10 | ≤ 0.20 | ≤ 0.20 | ≤ 0.20 |

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.

Main technical properties and features

CuSn3Zn9 is a tin brass, it has very good tribological properties (low coefficient of friction), very good cold formability, good electrical conductivity combined with good mechanical strength and high hardness. It has excellent spring properties. In addition, CuSn3Zn9 alloy has an outstanding resistance to stress corrosion cracking and corrosion, and is particularly resistant to seawater and industrial atmosphere. Alloy CuSn3Zn9 can be easily welded. The annealing temperature is comprised between 425 and 600 °C, and stress relieving can be performed in the range 200 - 300 °C. It has a moderate machinability index of 30 % (compared to 100 % for CuZn39Pb3).

Typical uses

CuSn3Zn9 alloy in cold rolled strip form can be used for springs, switches, relays, contacts, components for electrical and automotive industry, membranes, stamped parts.

Typical manufacturing range

| | Thickness (mm) | Width (mm) | Length (mm) |
|--|----------------|--------------|-------------|
| Rolled products Strip in coils ^[1] | 0.010 - 2.000 | 1.5 - 200.0 | - |
| Strip as sheets ^[1] | 0.010 - 1.500 | 10.0 - 200.0 | 100 - 3000 |

^[1] Not all our production possibilities are presented here. Other dimensions or product forms available upon request. Some combinations of thicknesses and widths are not possible.

Mechanical properties of strips

| Temper | | | R _m (N/mm ²) | R _{p0.2} (N/mm ²) | A _{50mm} (%) | Hardness HV | R/t (90°) G / B ^[1] |
|--------|------|---------------|--|---|--------------------------|----------------|-----------------------------------|
| R320 | H080 | soft annealed | 320 - 380 | 230 max. | 25 | 80 - 110 | 0 / 0 |
| R380 | H110 | ¼ hard | 380 - 430 | 200 min. | 16 | 110 - 140 | 0 / 0 |
| R430 | H140 | ½ hard | 430 - 520 | 330 min. | 6 | 140 - 170 | 0 / 0 |
| R510 | H160 | ¾ hard | 510 - 600 | 430 min. | 3 | 160 - 190 | 0 / 1.0 |
| R580 | H180 | hard | 580 - 690 | 520 min. | - | 180 - 210 | 1.0 / 2.0 |
| R660 | H200 | extra hard | 660 min. | 610 min. | - | 200 min. | 3.0 / 9.0 |

^[1] Minimum bend radius at 90°. R = radius, t = strip thickness, G = "Good way", perpendicular to rolling direction and B = "Bad way", parallel to rolling direction. Values for strip thickness t ≤ 0.5 mm.

Other tempers can be guaranteed, according to other standards such as EN 1652 or 1654, for example.

Physical properties

| | | |
|---------------------------------|-----------------------|---|
| Modulus of elasticity | kN/mm ² | 125 (soft annealed R320) / 110 (cold rolled) |
| Poisson ratio | | 0.34 |
| Density | g/cm ³ | 8.75 |
| Melting point | °C | 1030 |
| Linear dilatation coefficient | 10 ⁻⁶ / °C | 18.4 |
| Thermal conductivity at 20°C | W/m K | 120 |
| Heat Capacity at 20°C | J/(kg. K) | 380 |
| Electrical resistivity at 20°C | μΩcm | 6.3 |
| Electrical conductivity at 20°C | MS/m | 16 |
| Electrical conductivity at 20°C | % IACS | 28 |
| Magnetic properties | | Non-magnetic (when free from iron precipitates) |

Tolerances (strip and foil)

| Thickness | Thickness (mm) | | EN Standard | | Lamineries MATTHEY | | |
|---|---|-------|--------------------|-----------------|--------------------|----------------|--------------|
| | ≥ | < | 10140 Precision | 10258 Precision | LMSA Standard | LMSA Precision | LMSA Extreme |
| <p>The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.</p> <p>Our "LMSA Precision" and "LMSA Extreme" tolerances are available upon request.</p> | - | 0.025 | - | - | - | - | ± 0.001 |
| | 0.025 | 0.050 | - | - | ± 0.003 | ± 0.002 | ± 0.0015 |
| | 0.050 | 0.065 | - | ± 0.003 | ± 0.003 | ± 0.0025 | ± 0.002 |
| | 0.065 | 0.100 | - | ± 0.004 | ± 0.004 | ± 0.0035 | ± 0.003 |
| | 0.100 | 0.125 | ± 0.005 | ± 0.006 | ± 0.005 | ± 0.004 | ± 0.003 |
| | 0.125 | 0.150 | ± 0.005 | ± 0.006 | ± 0.005 | ± 0.005 | ± 0.004 |
| | 0.150 | 0.250 | ± 0.010 | ± 0.008 | ± 0.008 | ± 0.006 | ± 0.004 |
| | 0.250 | 0.300 | ± 0.010 | ± 0.009 | ± 0.009 | ± 0.007 | ± 0.005 |
| | 0.300 | 0.400 | ± 0.010 | ± 0.010 | ± 0.010 | ± 0.007 | ± 0.005 |
| | 0.400 | 0.500 | ± 0.015 | ± 0.012 | ± 0.012 | ± 0.008 | ± 0.006 |
| | 0.500 | 0.600 | ± 0.015 | ± 0.014 | ± 0.014 | ± 0.010 | ± 0.007 |
| | 0.600 | 0.800 | ± 0.015 | ± 0.015 | ± 0.015 | ± 0.010 | ± 0.007 |
| | 0.800 | 1.000 | ± 0.015 | ± 0.018 | ± 0.018 | ± 0.012 | ± 0.009 |
| | 1.000 | 1.200 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.012 |
| | 1.200 | 1.250 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.012 |
| | 1.250 | 1.500 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.014 |
| Width | Our width tolerances "Standard" is +0.2, -0.0 (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request. | | | | | | |
| Camber | Width (mm) | | Camber max. (mm/m) | | | | |
| <p>Our tolerance "LMSA Standard" respects the EN Standard 1654 (Length of measurement 1000 mm). Other tolerances upon request.</p> | > | ≤ | LMSA Standard | | LMSA Extreme | | |
| | | | ≤ 0.5 mm | > 0.5 mm | ≤ 0.5 mm | > 0.5 mm | |
| | 3 | 6 | 12 | - | 6 | - | |
| | 6 | 10 | 8 | 10 | 4 | 5 | |
| | 10 | 20 | 4 | 6 | 2 | 3 | |
| | 20 | 250 | 2 | 3 | 1 | 1.5 | |
| Surface | Special surface qualities upon request | | | | | | |
| Flatness | Special requirement on the longitudinal or transversal flatness upon request | | | | | | |

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