

| Designation | DIN | EN No. | UNS (ASTM) | AISI | LMSA |
|--------------|--------|--------|------------|------|------|
| CuBe2 | 2.1247 | CW101C | C17200 | - | A150 |

Chemical composition (weight %)

| | | | | |
|---------|-------------|-----------|--------------|------------|
| Cu | Be | Co + Ni | Co + Ni + Fe | Pb |
| Balance | 1.80 - 2.00 | 0.2% min. | 0.6% max. | 0.02% max. |

Copper plus additions equal 99.5% minimum.

In order to achieve maximum homogeneity and consistent quality, the actual tolerances on both alloy components and impurities are significantly tighter and more precisely defined than the standard composition indicated.

Main technical properties and features

Beryllium copper CuBe2 achieves the highest strength and hardness available among all copper alloys after age hardening, and is consequently very widely used. The alloy 190 has the same chemical composition as the alloy Brush 25 but it is delivered mill hardened. As no further age hardening is necessary, there is no distortion of the finished parts and the customer avoids the expensive hardening process. It exhibits various bendability according to the different tempers: a bending at 90° is possible independently of thickness, bending direction and radius for the AM temper, for the other tempers from ¼ HM to XHMS, the minimal radius of bending change from 1 to 6X the thickness of the strip (see table). The alloy Brush 190 provides a unique combination of very high strength and high conductivity, high fatigue strength limit and an excellent thermal strength relaxation behaviour.

Typical manufacturing range

| | Thickness (mm) | Width (mm) | Length (mm) |
|--|----------------|--------------|-------------|
| Rolled products Strip in coils ¹⁾ | 0.015 - 2.000 | 1.5 - 200.0 | - |
| Strip as sheets ¹⁾ | 0.015 - 1.500 | 10.0 - 200.0 | 100 - 3000 |

1) Not all our production possibilities are presented here. Other dimensions or other product forms available upon request. Certain combinations of thicknesses and widths are not possible.

Mechanical properties of strips

| Temper | | | R _{p0.2} (N/mm ²) | R _m (N/mm ²) | A _{50mm} (%) | Hv (N/mm ²) | R/t (90°) T/L ²⁾ |
|------------------------|-------|------|---|--|--------------------------|----------------------------|--------------------------------|
| AM | R690 | H210 | 480-680 | 690 -760 | 16-50 | 210-250 | 0.0/0.0 |
| ¼ HM | R750 | H240 | 550-760 | 750-830 | 15-50 | 240-280 | 0.5/0.5 |
| ½ HM | R830 | H260 | 690-870 | 830-930 | 12-18 | 260-310 | 0.5/1.0 |
| HM | R930 | H290 | 750-950 | 930-1040 | 9-15 | 290-350 | 2.0/2.0 |
| SHM ¹⁾ | R1030 | H310 | 860-970 | 1030-1100 | 9-14 | 310-360 | 2.8/3.2 |
| XHM ¹⁾ | R1100 | H350 | 970-1150 | 1100-1250 | 4-10 | 350-390 | 4.0/5.0 |
| XHMS | R1200 | H360 | 1030-1250 | 1200-1320 | 3-9 | 360-420 | 5.0/10.0 |
| Hardened ³⁾ | R1200 | H360 | -/- | 1200-1320 | -/- | 360-420 | -/- |

1) These tempers are not given in the EN standard.

2) Minimum bend radius at 90°. R = radius, t = thickness of the strip, G = "Good way" and B = "Bad way".

3) Special temper dedicated to the watch industry

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Physical properties

| | | |
|--|-----------------------|-------------------------------------|
| Modulus of elasticity | kN/mm ² | 131 |
| Poisson ratio | | 0.285 |
| Density | kg/dm ³ | 8.36 |
| Melting point / Melting range | °C | 870 – 980 |
| Linear dilatation coefficient (20-300°C) | 10 ⁻⁶ / °C | 17 |
| Thermal conductivity at 20°C | W/m °K | 105 |
| Electrical resistivity | μΩcm | 10-6 |
| Electrical conductivity | MS/m | 10-16 |
| Electrical conductivity | % IACS | 17-28 |
| Magnetic properties | | Non magnetic (Slightly diamagnetic) |
| Permeability | | μ = 1.0006 |

Typical uses

Contacts springs for the manufacture of connectors, switchblades, bellows, diaphragms, many parts for the clock industry: needles, wheels, springs, etc.



| | | | | | | |
|--------------------|--------------|---------------|------------------|----------------------|-----------|--------------|
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|--------------------|--------------|---------------|------------------|----------------------|-----------|--------------|

Tolerances

| Thickness | Thickness (mm) | | EN Standard | | Lamineries MATTHEY SA | | |
|--|----------------|---------|--------------------|--------------------|-----------------------|-------------------|-----------------|
| | ≥ | < | 10140 Precision | 10258 Precision | LMSA Standard | LMSA Precision | LMSA Extreme |
| <p>The table shown is an outline of our typical thickness tolerances available, which are tighter than industry standards.</p> <p>Upon request: our "Precision" and "Extreme" tolerances are also available.</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 | ± 0.0012 |
| | 1.200 | 1.250 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.0012 |
| 1.25 | 1.500 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.0014 | |

Width

Our width tolerance is + 0.2 -0.0 mm (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) | | | |
|---|------------|-----|--------------------|----------|---------------|----------|
| | > | ≤ | LMSA standard | | LMSA extrêmes | |
| | | | ≤ 0.5 mm | > 0.5 mm | ≤ 0.5 mm | > 0.5 mm |
| Our tolerance "standard" respects the EN Standard 1654 (Length of measurement 1000 mm). | 3 | 6 | 12 | - | 6 | - |
| Other tolerances upon request. | 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