# CuNi12Zn24

# (M12)

| | | DIN | EN Nr. | UNS (ASTM) | AISI | LMSA |
|---|---|---|---|---|---|---|
| **Designation** | **CuNi12Zn24** | 2.0730 | CW403J | C75700 | - | **B400** |

## Chemical composition (Weight %)

| Cu | Fe | Mn | Ni | Pb | Sn | Zn | Autre |
|---|---|---|---|---|---|---|---|
| 63-66 | 0.3 | 0.5 | 11-13 | 0.03 | 0.03 | Balance | 0.2 |

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 analysis indicated.

## Main technological properties

Nickel silver CuNi12Zn24 provides good resistance to atmospheric corrosion, organic compounds as well as neutral and alkaline saline solutions. It is poorly resistant to oxidizing acids. The sensitivity to stress corrosion cracking of this alloy is much lower than that of brass. Nickel silver CuNi12Zn24 has an alpha single-phase structure. The alloy has excellent cold forming properties, on the other hand, its hot formability is limited. The colour is yellow silver, much less grey than that of CuNi18Zn20. Nickel silver is mainly used for the fabrication of connectors, relay springs, and in the optical and watch making industry, for example. Its machinability is rather poor. It is better to use a leaded nickel silver, e.g. CuNi12Zn25Pb1 (B420) if the machinability plays an important role. Nickel silver CuNi12Zn24 can be easily polished or plated and can be brazed or welded. Its weldability by laser however is not good. Its annealing temperature is situated typically between 620 and 700°C. To decrease the presence of internal stress, a stress-relieving heat treatment between 300-350°C is possible.

## Typical manufacturing range

| | | Thikness (mm) | Width (mm) | Length (mm) |
|---|---|---|---|---|
| **Rolled products** | Strips in coils [1)] | 0.015 - 2.000 | 1.5 - 200.0 | - |
| | Strips, sheets in [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 are available upon request. Certain combinations of thicknesses and widths are not possible.



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## Mechanical properties of strips

| Temper | | | Rm ($N/mm^2$) | Rp0.2 ($N/mm^2$) | $A_{50mm}$ (%) | Hv ($N/mm^2$) |
|---|---|---|---|---|---|---|
| R340 | H80 | annealed | 340-410 | max. 230 | 35-50 | 80-115 |
| R410 | H110 | ½ hard | 410-470 | min. 230 | 15-35 | 110-145 |
| R470 | H140 | ¾ hard | 470-540 | min. 380 | >6 | 140-170 |
| R540 | H165 | hard | 540-610 | min. 470 | - | 165-190 |
| R610 | H185 | extra hard | min. 610 | min. 580 | - | min. 185 |

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

## Physical properties

| | | |
|---|---|---|
| Modulus of elasticity | $kN/mm^2$ | 135 |
| Poisson ratio | | 0.34 |
| Density | $kg/dm^3$ | 8.67 |
| Melting point / Melting range | °C | 1060-1110 |
| Linear dilatation coefficient (20-200°C) | / °C | 0,000018 |
| Thermal conductivity at 20°C | W/m °K | 42 |
| Electrical resistivity | μΩcm | 21.55 |
| Electrical conductivity | MS/m | 4.4 |
| Electrical conductivity | % IACS | 8.0 |
| Specific heat | J/(g.K) | 0.380 |
| | Btu/ft-hr. °F | 0.218 |
| Magnetical properties | | Non magnetic |

## Typical uses

Contact springs, connectors, wheels and pinions for the watch industry, pressure membranes, etc.
Various parts for precision, electronic as well as optical instruments.
Parts made by stamping or even deep drawing, bending and cutting.



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## Tolerances

| **Thickness** | Thickness (mm) | | EN Standard | | Lamineries MATTHEY SA | | |
|---|---|---|---|---|---|---|---|
| | ≥ | < | 10140 Precision | 10258 Precision | LMSA Standard | LMSA Precision | LMSA Extreme |
| The table shown is an outline of our typical thickness tolerances available, which are tighter than industry standards.<br><br>Upon request: our "LMSA Precision" and "LMSA Extreme" tolerances are also available. | | 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 |
| | 1.25 | 1.500 | ± 0.020 | ± 0.020 | ± 0.020 | ± 0.015 | ± 0.014 |

| | |
|---|---|
| **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 extrême | |
| | > | ≤ | ≤ 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).<br>Other tolerances upon request. | 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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