



## KEMPER Special alloys

 KHP102



## KEMPER High Performance Alloy KHP102

KHP102 belongs to the group of CuNiSi alloys and is particularly suitable for the use in electrical and electronic products. The material is registered in the USA under the UNS number C19010.

The perfect adaption of the single elements results in technical properties which provide an extremely high performance regarding the use in sophisticated components.

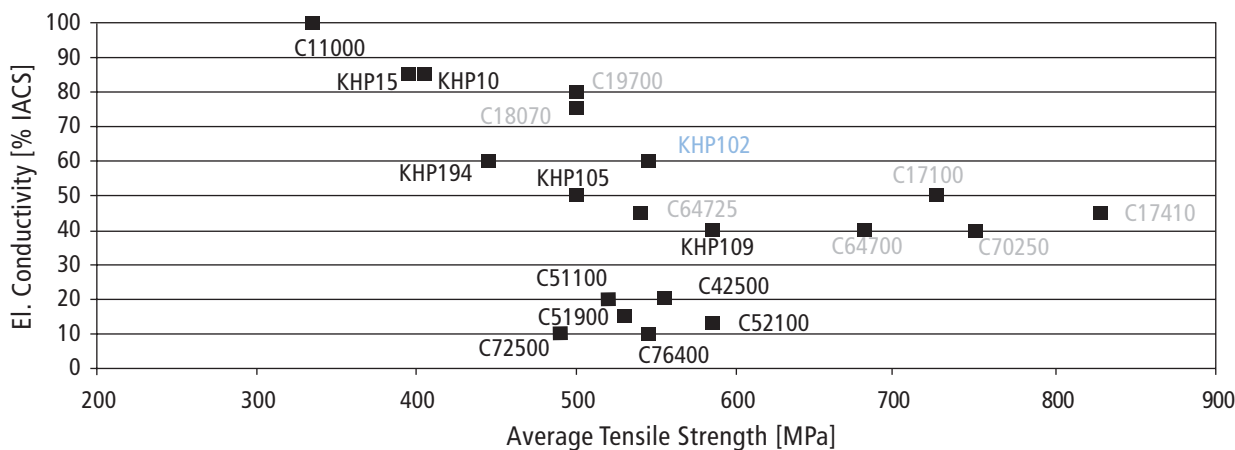
### The alloy is characterised by

- high tensile strength
- high electrical conductivity
- very good resistance against stress relaxation under elevated temperature

So the alloy complies with the requirements for the miniaturization in the connector and electronic sector.

The global availability leads to a high security of supply.

## Alloys for the Electrical and Electronics Industry



### Chemical Composition

| Cu      | Ni [%]    | Si [%]    | P [%]     |
|---------|-----------|-----------|-----------|
| Balance | 0,80-1,80 | 0,15-0,35 | 0,01-0,05 |
|         |           |           |           |
|         |           |           |           |

### Processing Information

|                           |      |
|---------------------------|------|
| Weldability               | good |
| Solderability             | good |
| Stress corrosion cracking | none |

## Physical Properties

|                                  | KHP102   |
|----------------------------------|--|
| Density                          | 8,9 g/cm <sup>3</sup>  |
| Electrical conductivity          | 35 m/Ω mm <sup>2</sup> = 60% IACS <sup>1)2)</sup> (29 m/Ω mm <sup>2</sup> = 50% IACS <sup>1)2)</sup> in temper R580) |
| Thermal conductivity             | 260 W/mK (197 W/mK in temper R580)   |
| Coefficient of thermal expansion | 17,0 x 10 <sup>-6</sup> /K   |
| Young Modulus                    | 127 GPa  |

<sup>1)</sup> IACS = International Annealed Copper Standard

<sup>2)</sup> reference values at room temperature 20 °C

## Mechanical Properties

### KHP102

| Temper    | Tensile Strength<br>$R_m$ [MPa <sup>1)</sup> ] | Yield Strength<br>$R_p 0,2$ [MPa <sup>1)</sup> ] | Elongation<br>A 50 mm [%] | Hardness HV | Bendability      |                  |                  |                  |
|-----------|--|--|---------------------------|-------------|------------------|------------------|------------------|------------------|
|           |  |  |                           |             | 90° $r/t^2$      |                  | 180° $r/t^2$     |                  |
|           |  |  |                           |             | GW <sup>3)</sup> | BW <sup>4)</sup> | GW <sup>3)</sup> | BW <sup>4)</sup> |
| R360/H100 | 360-430  | min. 250   | min. 12                   | 100-130     | 0                | 0                | 0                | 0                |
| R410/H130 | 410-480  | min. 360   | min. 10                   | 130-150     | 0                | 0                | 0,5              | 1,5              |
| R460/H140 | 460-530  | min. 430   | min. 8                    | 140-160     | 0,5              | 1                | 2                | 2,5              |
| R520/H150 | 520-580  | min. 490   | min. 5                    | 150-170     | 1                | 1,5              | 3,5              | 4                |
| R580/H175 | 580-650  | min. 540   | min. 6                    | 175-205     | 1,5              | 2                | 4,5              | 5                |

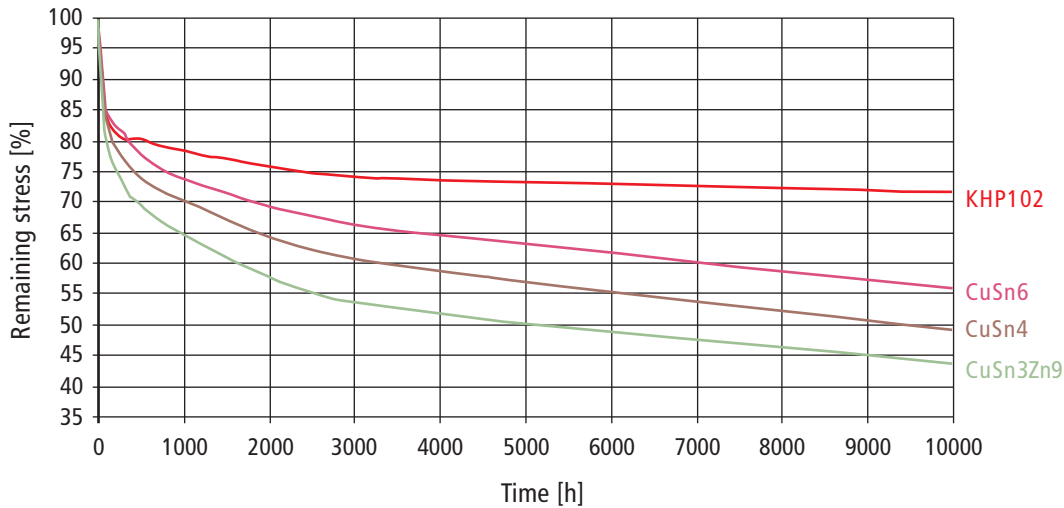
1) 1 MPa = 1 N/mm<sup>2</sup>

2)  $r$  = bending radius,  $t$  = strip thickness

3) GW = good way

4) BW = bad way

## Stress Relaxation



KHP102 age hardened,  
other alloys stress relieve annealed  
Temperature 150 °C  
Initial Stress 0,8 x  $R_{p0,2}$   
Values extrapolated according to  
Larson-Miller

## Applications

Connector springs, tabs, contact springs, switches, relays, leadframes



Our products are tested, evaluated and subjected to stringent tests in every stage of our production process. KEMPER strips meet the highest technical requirements of the automotive, communications and electrical engineering industries worldwide. We ensure these requirements by our quality management system which is certified per ISO/TS 16949:2002 and DIN EN ISO 9001:2000. At KEMPER quality is an obligation for all our employees, resulting in products which you can lastingly rely on.



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