

Table 10: Wrought Copper–zinc and Copper–tin Binary Alloys – Compositions, Uses and Typical Properties

| Material Designation | | Composition, %, Range or Max | | | | | | Nearest Old BS Equivalent | Characteristics and Uses | Typical Mechanical Properties | | | | Inclusion in the following EN Standards with Indicated Material Conditions (1) | | | | | | | |
|-------------------------------------|--------|------------------------------|------------|-----------|-----------|------------|-----------------------|---------------------------|---|--|---------------------------------------|----------------|---------------|--|---------------------------------------|------------------|---------------------------------|------------------------|---------------|------------------------------------|--------------------|
| Symbol | Number | Cu | P | Pb | Sn | Zn | Others | | | 0.2% Proof Strength (N/mm ²) | Tensile Strength (N/mm ²) | Elongation (%) | Hardness (HV) | 1652 Plate, Strip, Sheet, Circles (2) | 1654 Strip for Springs, Connectors | 12163 Rod (2) | 12164 Rod for Free Machining | 12165 Forging Stock | 12166 Wire | 12167 Profiles, Rectangular Bar | 12449 Tubes (2) |
| Copper–zinc (Brass) | | | | | | | | | | | | | | | | | | | | | |
| CuZn5 | CW500L | 94.0 - 96.0 | | | | Rem. | 0.1 | CZ125 | Very good cold working properties for electrical engineering components. Flexible tubes and sleeves. Attractive range of colours for costume jewellery. Can easily be enamelled. | 60-420 | 240-420 | 45-4 | 50-125 | RH | | MRH | | | | MRH | |
| CuZn10 | CW501L | 89.0 - 91.0 | | | | Rem. | 0.1 | CZ101 | | 120-560 | 240-600 | 45-2 | 60-165 | RH | | MRH | | MRHG | | MRH | |
| CuZn15 | CW502L | 84.0 - 86.0 | | | | Rem. | 0.1 | CZ102 | | 120-590 | 260-630 | 50-2 | 65-170 | RHG | RHY | MRH | | MRHG | | MRH | |
| CuZn20 | CW503L | 79.0 - 81.0 | | | | Rem. | 0.1 | CZ103 | | 120-590 | 260-630 | 50-2 | 65-170 | RHG | | MRH | | MRHG | | MRH | |
| CuZn28 | CW504L | 71.0 - 73.0 | | | | Rem. | 0.1 | - | Very good cold working properties for extreme deep drawing and cold forging applications. | 120-420 | 310-500 | 30-2 | 90-160 | | | MRH | | | | | |
| CuZn30 | CW505L | 69.0 - 71.0 | | | | Rem. | 0.1 | CZ106 | | 130-810 | 300-830 | 55-1 | 65-200 | RHG | RHY | MRH | | MRHG | | MRH | |
| CuZn33 | CW506L | 66.0 - 68.0 | | | | Rem. | 0.1 | - | | 120-420 | 300-500 | 30-2 | 65-160 | RHG | | MRH | | | | | |
| CuZn36 | CW507L | 63.5 - 65.5 | | | | Rem. | 0.1 | CZ107 | The standard alloys for deep drawing, spinning, upsetting, thread rolling and bending. Good soldering properties. | 130-800 | 280-820 | 50-1 | 65-190 | RHG | RH | MRH | | MRHG | MRH | MRH | |
| CuZn37 | CW508L | 62.0 - 64.0 | | | | Rem. | 0.1 | CZ108 | | 130-800 | 280-820 | 50-1 | 65-190 | RHG | | MRH | | MH | MRHG | MRH | MRH |
| CuZn40 | CW509L | 59.5 - 61.5 | | | | Rem. | 0.2 | CZ109 | Muntz metal - good hot and cold working properties. | 200-420 | 340-500 | 45-2 | 90-150 | RH | | MRH | | MH | | MRH | MRH |
| Copper–tin (Phosphor Bronze) | | | | | | | | | | | | | | | | | | | | | |
| CuSn4 | CW450K | Rem. | 0.01 - 0.4 | | 3.5 - 4.5 | | 0.2 | PB101 | Strength increases as tin content increases. Good corrosion and corrosion fatigue properties lead to uses such as springs, instrument components, wire cloth, condenser tube-plates and vessels, and electronic components. Controlled resistivity wire for power applications. | 140-850 | 320-950 | 60-1 | 75-230 | RH | RHY | | | | MRHG | | |
| CuSn5 | CW451K | Rem. | 0.01 - 0.4 | | 4.5 - 5.5 | | 0.2 | PB102 | | 140-850 | 320-950 | 60-1 | 75-230 | RH | RHY | MRH | | MRHG | | | |
| CuSn6 | CW452K | Rem. | 0.01 - 0.4 | | 5.5 - 7.0 | | 0.2 | PB103 | | 140-950 | 340-1000 | 60-1 | 80-250 | RH | RHYB | MRH | | MRHG | MRH | MRH | |
| CuSn8 | CW453K | Rem. | 0.01 - 0.4 | | 7.5 - 8.5 | | 0.2 | PB104 | | 170-1000 | 390-1100 | 60-1 | 85-270 | RH | RHYB | MRH | | MRHG | MRH | MRH | |
| CuSn8P | CW459K | Rem. | 0.2 - 0.4 | | 7.5 - 8.5 | | 0.2 | - | 260-550 | 390-650 | 50-2 | 95-200 | | | MRH | | | | | MRH | |
| CuSn4Pb2P | CW455K | Rem. | 0.2 - 0.4 | 1.5 - 2.5 | 3.5 - 4.5 | | 0.2 | - | 400-500 | 480-550 | 10-5 | 150-210 | | | | MR | | | | MRH | |
| CuSn4Te1P | CW457K | Rem. | 0.1 - 0.4 | | 4.0 - 5.0 | | (0.5 - 1.0 Te) 0.2 | - | 300-400 | 380-480 | 15-2 | 140-160 | | | | MR | | | | | |
| CuSn5Pb1 | CW458K | Rem. | 0.01 - 0.4 | 0.5 - 1.5 | 3.5 - 4.5 | | 0.2 | - | 350-680 | 450-750 | 15-2 | 150-210 | | | | MR | | | | | |
| CuSn8PbP | CW460K | Rem. | 0.2 - 0.4 | 0.1 - 0.5 | 7.5 - 9.0 | | 0.2 | - | 280-550 | 460-650 | 40-5 | 125-180 | | | | | | | | MRH | |
| CuSn3Zn9 | CW454K | Rem. | | | 1.5 - 3.5 | 7.5 - 10.0 | 0.2 | - | A dilute alloy with properties approaching those of the true bronzes. | 200-620 | 320-700 | 40-2 | 80-210 | RH | RH | | | | | | |
| CuSn4Pb4Zn4 | CW456K | Rem. | 0.01 - 0.4 | 3.5 - 4.5 | 3.5 - 4.5 | 3.5 - 4.5 | 0.2 | - | Wrought version of a casting-type, bearing material composition. | 350-680 | 450-750 | 15-2 | 150-210 | | | | MR | | | | |

Notes:

- (1) M – as manufactured
R – mandatory tensile strength
H – mandatory hardness
- G – mandatory grain size
B – mandatory spring bending limit
Y – mandatory 0.2% proof strength
- (2) For general purposes