

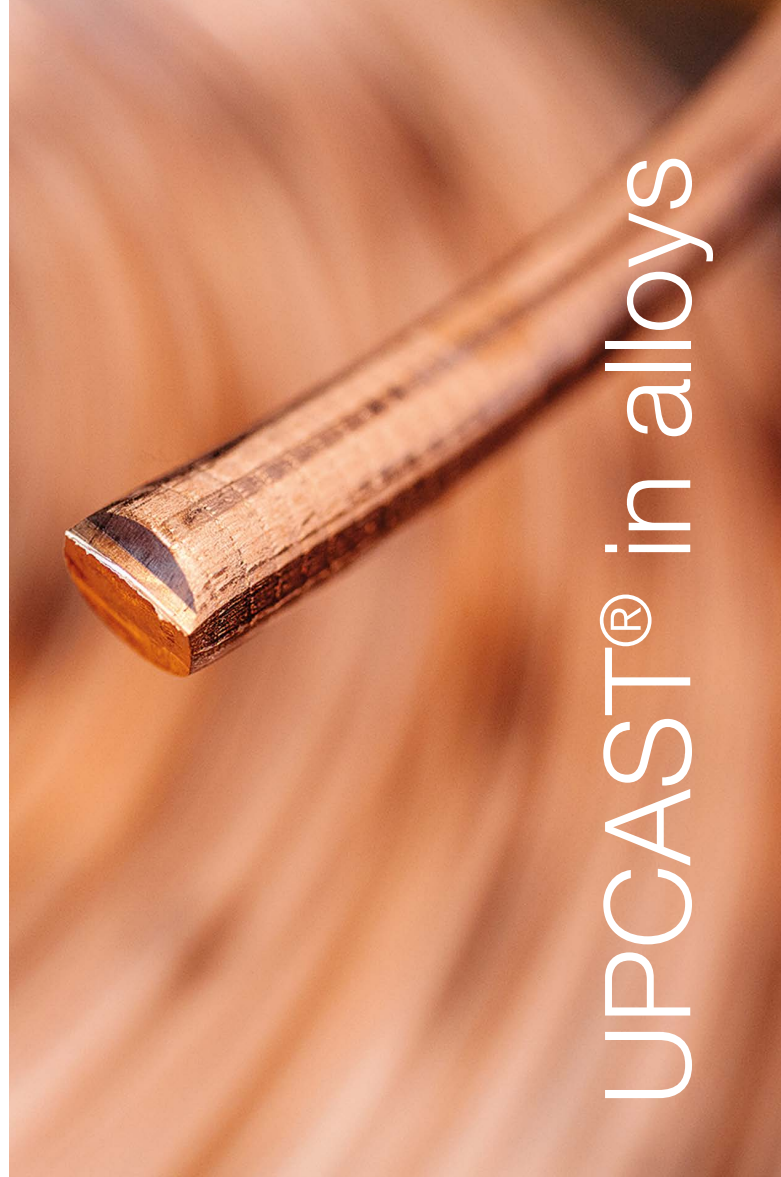
**The Upward Continuous Casting Technology**, better known as the UPCAST® process, was originally innovated and developed in the late sixties at Outokumpu's facilities in Pori, Finland for the company's own use.

# UPCAST® is a versatile process that can be used **for the production of pure metals and alloys.**

However, very quickly its many advantages became so well known in the business, that a continuous string of deliveries (around 200 in 45 years) have successfully taken place to multiple companies worldwide. Although the majority of these UPCAST® units are being used for the production of oxygen free (OF) copper wire rod and Cu-DHP SGTube, the first unit sold to an outside customer was for brass rod and this was to be followed by many others.

**UPCAST® Legacy** has been carried forward under the banner of UPCAST OY with casting lines freely available for many non-ferrous applications as can be seen from the list on the opposite side of this leaflet.

**Applications for alloyed Coppers and Copper Alloys** continue to develop rapidly. The unique features of the UP-CAST® system make it suitable for the production of many of them. Silver bearing coppers are used in various electrical and electronic applications. Zip fasteners are made of brasses (Cu + Zn) and nickel silvers (Cu + Ni + Zn). Tin or phosphor bronzes (Cu + Sn + P) are used for example as



UPCAST® in alloys

connectors in mobile phones – previously they were widely used in paper and pulp industries. Silicon bronze (Cu + Si) and brasses are suitable for manufacturing high-quality screws, with good resistance to stress corrosion.

**High Strengths with CuMg** in elevated temperatures and its good electrical conductivity have increased the demand of this interesting alloy. The requirements for end products change all the time and engineers seek for the best efficiency. CuMg is good material especially for grooved contact wire for high speed trains and for e.g. automotive wire harnesses, electrical and electronic connectors, conductors and connector wires.

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**UPCAST OY FINLAND [www.upcast.com](http://www.upcast.com)**

# UPCAST® in alloys

UPCAST® is used for casting a wide number of non-ferrous metals and alloys – this list gives you a general idea of the most common ones.

Designation	Composition	Electrical conductivity	Special characteristics
	Cu	%IACS	
<b>Pure Metals</b>			
Cu-OF	99.99	≥100	High Conductivity Oxygen Free Copper, immune to hydrogen embrittlement, suitable for all electrical uses, weldable
Cu-OFE	99.99	≥101	High Conductivity Oxygen Free Copper, immune to hydrogen embrittlement, special copper for special electronic uses, weldable
Ag			Working Silver, jewellery – Sterling Silver, solid
Au			Gold, alloyed with Cu, Ag and other metals, jewelry, electronics
Zn			Zinc, alloying, corrosion protection, metal and mold spraying
<b>Alloyed Coppers</b>			
CuAg	99.98	99–100	Silver Bearing Copper, Oxygen Free, immune to hydrogen embrittlement, higher resistance to softening than Cu-OF or Cu-OFE
CuMg	99.5	≥62	Excellent formability at medium strength, good conductivity, highest Mg content, very high strengths can be achieved
CuSn	99.5	≥60	Good conductivity and corrosion resistance, excellent formability
Cu-DLP	99.90	96	Common Copper, Deep Drawing Copper, no hydrogen embrittlement, weldable
Cu-DHP	99.90	85	Tube Copper, no hydrogen embrittlement, most suitable for welding or brazing in reducing atmosphere/gases
<b>Brass</b>			
CuZn	61–90	27–44	For example commercial brass, red brass, gilding metal (resistant to dezincification and stress corrosion). Also Deep-Drawing brass, Cartridge brass
CuZnPb	61	27	Forging brass, excellent hot working and machining properties
<b>Other alloys</b>			
CuSn	92–95	12–19	Phosphor/Tin Bronzes, high strength and hardness, excellent spring properties, good resistance to corrosion, wear and fatigue
CuNiZn	62–64	6–8	“New Silver”, Nickel-Silver, good resistance to atmospheric corrosion, good spring properties
CuNiFeMn	88	9	Cupro Nickel, good resistance to corrosion, and bio-fouling in seawater
CuSiMn	96	7	Silicon Bronze, high strength at elevated temperatures, good corrosion resistance in marine atmosphere and seawater, weldable
ZnAl			High corrosion protection, easy machinability

