

SEA THE DIFFERENCE

Materials designed for performance in extreme environments...

The Elite Marine Alloy range of superior wrought cupro-nickel and cupro-nickel/aluminium bronze hybrid alloys possess some of the most advanced material technology available to marine engineers.

The importance of these alloys is in their excellent corrosion resistance in sea water applications, combined with the application of innovative process techniques, developed by Copper Alloys Ltd to tailor mechanical properties to meet the exact requirements of design engineers in extreme environments.

The Elite Marine Alloys include:

1. CNC-1, the longest lasting, most shock resistant marine copper alloy
2. CAL T-1000, the strongest of our marine copper alloys, with excellent corrosion resistance
3. CAL T-850, the most balanced of our marine copper alloys, with high strength and high ductility

This range of alloys is manufactured with enhanced properties, produced by precipitation and spinodal hardening mechanisms to offer engineers extreme strength and ductility with superb resistance to corrosion.



ELITE MARINE®

HIGHLY ADVANCED MATERIAL TECHNOLOGY

The Elite Marine Alloys are the result of decades of research and development, which is still ongoing, to identify more advanced corrosion resistant metals. The ongoing development programme is conducted by Copper Alloys Ltd on behalf of marine engineers using the expertise of our highly qualified metallurgical engineers with the purpose of creating ever-more progressive alloys.

The latest addition to the range is CAL CNC-1 (CuNi30Cr2) which as a single phase alloys over twice as strong as 70/30 cupro nickel, whilst still retaining the excellent corrosion resistance of this family of alloys.

The Elite Marine Alloys are available in a range of formats including complex finish machined, turnkey components, rings, discs, blocks, bars, closed die forgings and customised shapes.



ENHANCED MATERIAL POSSIBILITIES

Extreme mechanical strength

- High hardness and resistance to wear
- Very high shock resistance
- Low rate of corrosion and pitting in sea water
- Anti bio-fouling (lack of marine growth)
- Immune to hydrogen embrittlement
- Anti galling
- Low relative magnetic permeability
- Easy to machine and dimensionally stable
- No loss of properties at cryogenic temperatures
- Cost effective compared with other materials

THIS RANGE OF ADVANCED ELITE MARINE ALLOYS IS DESCRIBED AS 'GAME CHANGING' FOR MARINE ENGINEERS WORLDWIDE.

WHY USE THE ELITE MARINE ALLOYS?

The Elite Marine Alloys have a wide range of mechanical properties, ensuring a range of demanding applications can be satisfied. The Elite Marine Alloys offer extreme fracture toughness combined with high strength through to extreme tensile strength and hardness. **This presents unique combinations of extreme mechanical properties, excellent corrosion resistance and anti-biofouling properties.**

The extremely low corrosion rate and immunity to preferential phase attack make these materials ideal for critical marine applications and by far out perform conventional materials such as nickel aluminium bronze, stainless steels and conventional cupro-nickel alloys. The Elite Marine

Alloys are also inherently anti-biofouling, removing the need for aggressive treatments or coatings.

These industry-leading alloys are the result of decades of research and advanced manufacturing processes combined with metallurgical expertise enabling the production and development of a range of wrought products of up to 25,000Kg piece-weight. These materials are available as raw material (proof machined bar stock, forgings, plates) or finished machined components, supplied to print.

Full traceability and complete certification in accordance with EN 10204 3.1 provided as standard Certification to 3.2 (independent witnessing) is available upon request.

TYPICAL PROPERTIES AND ATTRIBUTES

	◀ Increasing strength and hardness							
	▶ Increasing ductility and fracture toughness/shock resistance							
	CAL T-1000		CAL T-850		CAL CNC-1 and CNC-2 Cu30Cr1FeMnSiZrTi (Def Stan 02-886 / Def Stan 02-824 Part 1)			
	Copper-Nickel-Manganese-Aluminium Alloy CuNi14Al2 (DIN 2.1504)		Copper-Nickel-Manganese-Aluminium Alloy CuNi14Mn4Al2 (Def Stan 02-835)		CAL CNC-1 (Wrought)		CAL CNC-2 (Wrought enhanced)	
	Extreme strength and hardness		High strength and hardness		Moderate strength with high ductility		High strength with moderate ductility	
	Metric	Imperial	Metric	Imperial	Metric	Imperial	Metric	Imperial
Tensile Strength	820-1050 MPa	119-152 Ksi	725-825 MPa	105-120 Ksi	550-650 MPa	80-94 Ksi	700-800 MPa	45-52 Ksi
0.2% Proof	600-850 MPa	87-123 Ksi	430-550 MPa	62-80 Ksi	380-480 MPa	55-70 Ksi	650-750 MPa	94-109 Ksi
Stress	10-16%	10-16%	18-28%	18-28%	24-34%	24-34%	15-22%	15-22%
Elongation	250-290	250-290	210-240	210-240	160-200	160-200	195-230	195-230
	Low-moderate toughness		Moderate toughness		Extreme toughness and shock resistance			
Impact	10-16 J	7-11 ft lbf	40-65 J	29-48 ft lbf	130-150 J	96-111 ft lbf	90-120 J	66-88 ft lbf