CUPPER-NICKEL

Copper and Nickel form a very simple alloy in which both metals dissolve into each other in all proportions, creating a solid solution. Nickel added to brass and bronze improves their electrical properties and toughness. All cupronickels are single-phase alloys, easily worked in hot conditions, not susceptible to heat treatment, and their properties can only be altered through cold working.

They have good to excellent corrosion resistance but are susceptible to galvanic corrosion when combined with Iron, Aluminum, Magnesium, Tin, and Zinc. They are resistant to brackish atmospheric water, seawater, and corrosion from non-oxidizing acids. Avoid heating in oxidizing atmospheres or exposure to oxidizing acids, moist halogens, sulfides, ammonia, or solutions containing ammonium ions.

ALLOY: VN - 994 = UNS C99400

Alloy with high sealing capability against liquid or gas pressure at both low and high temperatures. Extraordinary resistance to corrosion fatigue and the corrosive and erosive effects of fast-moving seawater, freshwater, alkaline solutions, and many organic chemicals. Excellent workability in both hot and cold conditions (forging, stamping, coining, pressing).

Chemical Composition:

%Cu	%Pb	%Zn	% Fe	%Ni	%Mn	%Al	%Si
Rem.	0,09 max.	0,5 - 5,0	1 - 3	1,0 - 3,5	0,5 max.	0,5 - 2,0	0,5 - 2,0

Mechanical and Physical Properties:

- **Tensile Strength,** *Kg/mm²*..... 46,4 - 55,5
- **Yield Strength,** *Kg/mm²*..... 21,1 - 37,9
- **Elongation,** *%*..... 25 - 15
- **Hardness,** *HB (10 mm / 500 Kg)*..... 125 - 170
- **Thermal Conductivity,** *W / m °C (20 °C)*..... -
- **Coefficient of thermal Expansion,** *10^{-6} / °C (20 - 300 °C)*..... -
- **Electrical Conductivity,** *% IACS (20 °C)*..... 16,8
- **Operating Temperature,** *°C*..... -233 - 260
- **Operating Load or Pressure,** *Kg/mm²*..... 5,1 - 7,1 (muy alta)

Technical manufacturing standards:

- Chemical Composition and Mechanical Properties: UNS C 99400
- Centrifugal Casting : ASTM B271 / 271M
- Sand Mold Casting : ASTM B763 / B763M
- Continuous Casting : ASTM B505 / 505M

Main Uses and Application:

Speed impellers and naval fittings in contact with saltwater ● Pumps, valves, condenser tubes, and fittings for evaporators, distilleries, and heat exchangers in the chemical, naval, food, refinery, power plant, and desalination industries ● Special parts for cold and hot working applications.

✱ ***Referential Specifications for Chemical Composition, Mechanical, and Physical Properties based on the Unified Numbering System (UNS-C) of the Copper Development Association (CDA) for cast and forged copper alloys; subject to written confirmation by VULCANO METALS***