CB771S AquaNordic® - Ingot

The CB771S AquaNordic® ingot alloy has very good dezincification resistance. The alloy is lead free and is approved according to the 4MS list, use for drinking water applications, product groups B-D. The alloy is also approved by Kiwa Sverige AB for components with contact with drinking water.

CB771S AquaNordic® is suitable for use in sanitary water fittings where a leadfree alloy is desired. The alloy has a good castability and high machining properties.

Composition

CB771S	Cu	Zn	Pb	Sn	Fe
Limits	62.0–65.0%	Rem	<0.1%	≤0.3%	≤0.2%

Al	Ni	Mn	Si	Sb	As	B
0.45-0.70%	≤0.2%	≤0.1%	≤0.02%	0.02-0.05%	0.02-0.04%	4-7ppm

Standardization

Closest equivalent EN-standard:

CB771S	The alloy belongs to category 5 in 4MS Common Compositions List.

Dezincification resistance

The alloy is dezincification resistance, according to ISO 6509 and AS 2345-2006, appendix C, if production is carried out by gravity die casting at 980-1040°C and that it is followed by cooling of the casting in air.
Otherwise normal manufacturing method for tap water fittings should be used.

Heat treatment

Stress-relief annealing. Temperature 330-350°C. Time 1-2 hours. Stress-relieve annealing can be justified after machining. Heat treatment decreases the risk of stress corrosion cracking caused by internal stress.
Soft annealing. Temperature 500-550°C. Time 2-4 hours.

Corrosion resistance

Copper is a relatively noble metal. Copper and its alloys therefore show little tendency to react with the environment.
As a result of this, the copper materials generally have good corrosion resistance. However, corrosion may occur under disadvantageous unfavorable conditions. The type of corrosion which may occur depends on both the environment and the composition of the alloy.

The corrosion resistance of cast alloys is:

Corrosion types	Corrosion resistance	Comment
Stress Corrosion Cracking, SCC	Satisfactory	This type of corrosion only occurs in the simultaneous presence of high stresses in the material, and a corrosive medium containing ammonia and moisture. See Heat treatment
Dezincification, DZR	Very good	
Erosion corrosion	Quite good	

Castability

Castability is good. Suitable temperature is 980-1040°C. Slow cooling from the casting temperature must be applied so that no continuous strings of β-phase, which decreases the corrosion resistance, are left after cooling.

Machinability

The alloy is possible to machine in automats, however, not as easy as the traditional machining brasses, e g CW614N, due to the low content of lead.
The chips are able to mix without any problems with alloys contenting lead, as CW617N, CW614N and CW602N.
AquaNordic® rod gives lower cutting forces, less vibrations, less adhesive gluey on the work piece, better chips braking and less burr than low lead brass with the same analyze.

Tools- and cutting data. PVD-coated Tungsten carbide, due to ISO-group K10. Given values may vary depending on the tooling machine and the tools quality as well as the specific operation.

Cutting Data	PVD-coated Tungsten Carbide [1)]	PVD-coated High speed steel
Rake angel γ_o	15-25°	15-35°
Back rake angel α_o	6-11°	6-14°
Cutting speed v_c	150 m/min or faster	100 m/min or faster
Feeding f_n	0,05-0,20 mm/cuttingedge	0,05-0,20 mm/cuttingedge
Chip breaker	Type MM or in grinded [2)]	In grinded in the chip surface

PVD coated cutting edge	TiAlNO	Low friction type
Cutting fluid	Oil or emulsion	Oil or emulsion

1. Uncoated Tungsten carbide can be used with advantage when the chip cutting is critical, gives thicker and brittle but higher cutting forces than coated HM. CVD-coated Tungsten carbide is not recommended, it has in most cases to pointless edges.
2. Chip breaker has to be used in most cases, but it should be as open as possible. A too narrow chip breaker gives higher cutting forces.

Welding and brazing

The following applies to the different welding methods:

Welding method	Suitability	Comment
Fuse welding and resistance welding	Poor	Cannot be carried out with good results.
Braze welding	Poor	Cannot be carried out with good results because of the minimal difference between the melting temperature of the base metal and the working temperature of the solder.
Brazing (hard soldering)	Satisfactory, can be carried out with a silver solder and silver-phosphorus-copper solder	Difficult to carry out with a phosphorus-copper solder and cannot be carried out with satisfactory results with a brass solder (see Braze welding).
Soldering	Excellent	Very easy to carry out.

Surface treatment

Mechanical surface treatment such as grinding, brushing, blasting and polishing is carried out by conventional methods.
Pickling (non-oxidizing pickling) is suitably carried out with diluted sulphuric acid at room temperature.
Pickling to a metallically clean surface (oxidizing pickling) is suitably carried out in a pickling bath containing oxidants such as peroxide, nitric acid or dichromate. For pickling to a high gloss, baths containing nitric acid are mainly used.
Chemical and electrolytic polishing is easy to carry out with mixtures of concentrated acids, e.g. phosphoric acid, nitric acid and acetic acid.
Polishing is suitably carried out with commercial cleaning products for copper.
Dark dyeing is easy to carry out by wet chemical methods, dark sulphide or oxide layers being obtained.
Varnishing with clear varnish means that the appearance obtained after cleaning or dyeing, for example, is retained for a long time. Clear varnishes containing a discoloring inhibitor are available for demanding applications.
Metallization (metallic surface coating) is easy to carry out.

Environment and recycling

AquaNordic®, with a lead content less than 0.1% is not only approved in the environment classification system as BASTA*, Byggvarubedömningen** and Sunda Hus***, furthermore also in an international level by the EU, through 4MS composition list, and by the American authority. The alloy fulfills, all for the moment known demands.

All returns from this alloy can be handled without any restrictions of mixing and can therefore be used as a base of all of our alloys.

* BASTA is an independent environmental assessment system for construction and civil engineering products aimed at contractors, clients / builders, property owners, architects, consultants, wholesalers and material suppliers.

**Byggvarubedömningen, a non-profit economic association that assesses and provides information on sustainability-assessed goods. Our vision is in this way to promote the development towards a non-toxic and good built environment that takes responsibility for both this and future generations.

*** With a web-based system and qualified advice, Sunda Hus is a complete solution for systematizing the work of phasing out hazardous substances in a building's entire life cycle. Assessments are performed by Sunda Hus' own chemists, who review product content information and request supplements if necessary.