AquaNordic® - Ingot

The alloy CB771S has good dezincification resistance and is suitable for use in sanitary water fittings where an alloy with lower lead content than CB772S is desired.

### Composition

<table>
<thead>
<tr>
<th>CB771S</th>
<th>Cu</th>
<th>Zn</th>
<th>Pb</th>
<th>Sn</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits</td>
<td>62.0–65.0%</td>
<td>Rem</td>
<td>≤0.1%</td>
<td>≤0.3%</td>
<td>≤0.2%</td>
</tr>
<tr>
<td>Al</td>
<td>0.45-0.70%</td>
<td>≤0.2%</td>
<td>≤0.1%</td>
<td>≤0.02%</td>
<td>0.02-0.05%</td>
</tr>
</tbody>
</table>

### 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, provided that production is carried out by gravity die casting at 980-1040°C and that it is followed by cooling in air. Otherwise, normal manufacturing method for tap water fittings should be used.

### Heat treatment

**Stress-relief annealing.** Temperature 330-350°C. Time 2-4 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:

<table>
<thead>
<tr>
<th>Corrosion types</th>
<th>Corrosion resistance</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress Corrosion Cracking, SCC</td>
<td>Satisfactory</td>
<td>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</td>
</tr>
<tr>
<td>Dezincification, DZR</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>Erosion corrosion</td>
<td>Quite good</td>
<td></td>
</tr>
</tbody>
</table>

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 cuttingforces, 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.

<table>
<thead>
<tr>
<th>Cutting Data</th>
<th>PVD-coated Tungsten Carbide ¹</th>
<th>PVD-coated High speed steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rake angel γ₀</td>
<td>15-25°</td>
<td>15-35°</td>
</tr>
<tr>
<td>Back rake angle α₀</td>
<td>6-11°</td>
<td>6-14°</td>
</tr>
<tr>
<td>Cutting speed v_c</td>
<td>150 m/min or faster</td>
<td>100 m/min or faster</td>
</tr>
<tr>
<td>Feeding fₙ</td>
<td>0,05-0,20 mm/cuttingedge</td>
<td>0,05-0,20 mm/cuttingedge</td>
</tr>
<tr>
<td>Chip breaker</td>
<td>Type MM or in grinded ²</td>
<td>In grinded in the chip surface</td>
</tr>
<tr>
<td>PVD coated cutting edge</td>
<td>TiAlNO</td>
<td>Low friction type</td>
</tr>
<tr>
<td>Cutting fluid</td>
<td>Oil or emulsion</td>
<td>Oil or emulsion</td>
</tr>
</tbody>
</table>

¹ PVD-coated Tungsten carbide, due to ISO-group K10.
² Type MM or in grinded in the chip surface.
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:

<table>
<thead>
<tr>
<th>Welding method</th>
<th>Suitability</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse welding and resistance welding</td>
<td>Poor</td>
<td>Cannot be carried out with good results.</td>
</tr>
<tr>
<td>Braze welding</td>
<td>Poor</td>
<td>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.</td>
</tr>
<tr>
<td>Brazing (hard soldering)</td>
<td>Satisfactory, can be carried out with a silver solder and silver-phosphorus-copper solder</td>
<td>Difficult to carry out with a phosphorus-copper solder and cannot be carried out with satisfactory results with a brass solder (see Braze welding).</td>
</tr>
<tr>
<td>Soldering</td>
<td>Excellent</td>
<td>Very easy to carry out.</td>
</tr>
</tbody>
</table>

### 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.
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 fulfill, all for the moment known demands. All scrap from this alloy can be handled without any restrictions of mixing and can therefore be used as a base of all of our alloys.