

## Tech Note

# Water Quality in relation to the Nessie® Wood Concept, type NWC



Nessie® Wood Concept Unit, type NWC

To ensure optimal operation of the NWC, some considerations must be made regarding water quality.

The following guidelines must be followed when evaluating specific water qualities. Nessie may help testing the water quality, and often local authorities know what the local water quality is like or can help testing it.

Several parameters must be considered in connection with water quality, and for the NWC the following apply:

1. Impurities
2. Chloride content ( $Cl^-$ )
3. Water Hardness
4. Hydrogen-ion concentration, expressed in the pH value of the water.
5. Water quality, filtration and temperature

## How the System is affected by various Water Quality Parameters

### 1. Impurities

Contaminated water involves extensive costs. If the water supply sends out large amounts of sand and other impurities in the piping system (the supply to the NWC equipment), the 10 micron filter placed in the water supply inlet will clog up quickly. The capacity of the filter is 0.6 kg ensuring a long operation period. However, the operation period is depending on the amount of impurities in the water.

Owing to a required service life increase for the existing filter, coarse filter may be placed before the NWC unit. The coarse filter will typically be a bag filter with a filtration degree of  $50\mu m$ .

The 10 micron filter is not to be replaced by a coarse filter element with a filtration degree lower than  $10\mu m$  absolute. If a coarse filter with lower filtration degree is used, the service life of the NWC will be reduced.

### 2. Chloride Content

The chloride content may cause corrosion problems. If the chloride content is higher than approx. 200 mg/l, it may cause corrosion problems (crevice corrosion) even on stainless surfaces. Free chlorine ( $Cl_2$ ) should not be found in the water, since it also could cause risk of corrosion (raises the potential).

### 3. Water Hardness

Water hardness is a crucial parameter for calcification of nozzles and pipes placed inside the kiln.

Water temperature and hardness are decisive for the rate of calcification.

For Danfoss Lumber Drying nozzles it is recommended to replace the nozzles every 6 months or when required. The nozzles are maintained by descaling in a solution of acetic acid or phosphoric acid. In any case, the nozzles must be replaced due to wear and tear.

*Note: these chemicals are not to be used in the piping system as they may damage the components and the NWC system.*

Water hardness expresses the content of magnesium (Mg) and calcium (Ca) of the water and is calculated as

$$\frac{\text{Ca (mg/l)}}{7.13} + \frac{\text{Mg (mg/l)}}{4.35} \text{ expressed in "German" hardness degrees (}^{\circ}\text{d)}$$

In the regulation, no maximum values are mentioned, but our experience shows that hardnesses between 5 and 15 °d will not cause problems under normal operation conditions.

It is always recommended to install a water softening system to extend the service life of the unit and nozzle.

Conversion table between the hardness specifications of different countries:

	Earth alkaline ions (mmol/l)	Earth alkaline ions (mva/l)	German degree (°d)	English degree (°e)	French degree (°f)	ppm CaCO <sub>3</sub> (°US)
Earth alkaline ions (mmol/l)	1.00	2.00	5.60	7.02	10.00	100.0
Earth alkaline ions (mval/l)	0.50	1.00	2.80	3.51	5.00	50.0
German degree	0.18	0.357	1.00	1.25	1.78	17.8
English degree	0.14	0.285	0.798	1.00	1.43	14.3
French degree	0.10	0.200	0.560	0.702	1.00	10.0
ppm CaCO <sub>3</sub>	0.01	0.020	0.056	0.0702	0.100	1.00

High hardness causes increased risk of calcification and thus blocking and crevice / covering corrosion.

Normally, the calcium will be caught in the filter. Practical experience based on life tests of Nessie components shows that main part of the calcium will be deposited in the filter element within the first 50-100 operation hours. Then replacement of the filter is required. The filter element has to be changed when the signal lamp "change filter" on the control panel is on - or minimum once a year.

### 4. Hydrogen-ion Concentration

The Hydrogen-ion concentration expressed in the pH value of the water. The pH value must be between 6.5 and 8.5. At lower pH values there is a corrosion hazard.

### 5. Water Quality, Filtration and Temperature

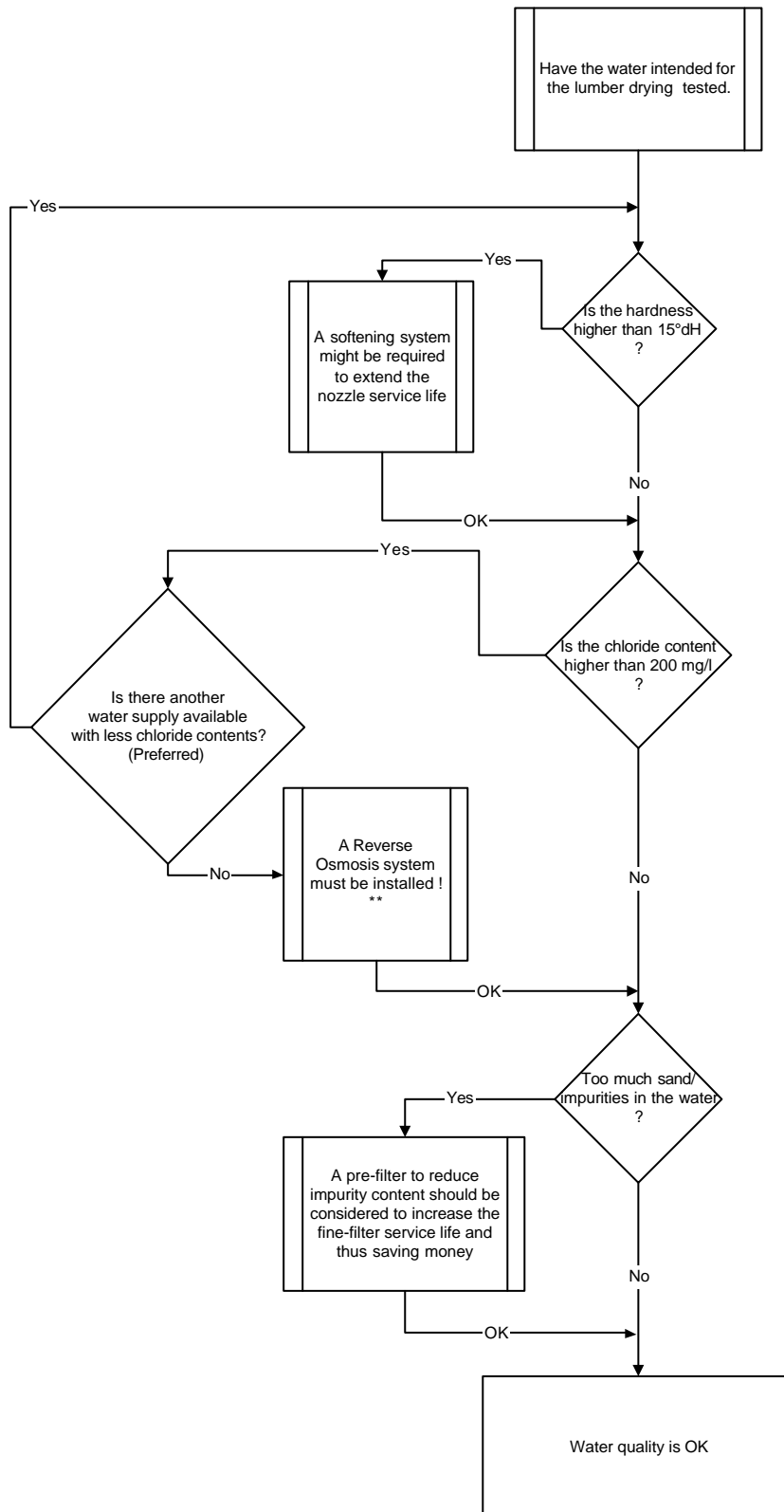
The NWC units are designed for ordinary drinking water, i.e. water without any additives (EU ordinary Water Directive, 80/778 EEC) and without abrasive elements.

The water supplied to the NWC unit must be filtered through a 10 µm absolute, β<sub>10</sub>-value > 5000 filter.

Water inlet temperature must not be higher than 20 deg. C equal to 68 deg. F,

*Filter version for NWC Ametek 20" P10-20"-N-Double open end D.O.E*

## Decision Tree for Correct Water Quality



\*\* Pump service life reduced by approx. 40%

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**DK - 6430 Nordborg  
Denmark**