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Nautical Waste Solutions

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To the Vessel Owner/Operator,

The attached certificate confirms that the **AQUA-SAN II Marine Sewage Treatment System** supplied by Nautical Waste Solutions Pty Ltd of 8 Thorne Street, Wynnum, Queensland 4178, will meet the current Queensland Regulations for a Grade C Marine Sewage Treatment System, when installed, operated and maintained in accordance with the relevant documentation.

In particular, this system is designed to be used for no more than eight (8) people on a live-aboard basis, based on a minimum of 3.5 litres of seawater per flush, a cell runtime of at least 30 minutes per flush, and a dosing pump runtime of at least 50 seconds per flush. Increasing the dosing pump run-time will require a comparable increase in the cell runtime (approximately 2:1).

These settings can be varied to suit the vessel's requirements. Vessel's fitted with 'TECMA' toilets and similar should use settings that are approximately half of the above runtimes e.g. 20 minutes and 30 seconds, as these systems run both pumps twice per flush. A couple residing on a vessel on a live-aboard basis and using a 'TMC' toilet for example, should use higher settings e.g. 40 minutes or more cell time, and 80 seconds or more dosing pump time, as the treated waste is likely to be retained in the holding tank for a longer period of time.

Foreign objects i.e. anything other than human waste and toilet paper, must not be allowed to enter the system as blockages or other malfunctions may occur as a result. The removal or resolution of all blockages is the operator's responsibility. In particular, the introduction of partially digested food as a result of sea-sickness for example, should be avoided as the effect on the sanitisation process is unpredictable.

Sanitisation of the waste is provided via sodium hypochlorite solution generated from seawater. It is the operator's responsibility to ensure that the cell tank contains an adequate supply of seawater at all times, and that chlorine solution is being introduced into the treatment tank when the toilet is flushed.

The AQUA-SAN II Marine Sewage Treatment System must be installed in a clean, dry environment, and all electronic and electrical components must be protected from water penetration, or any other forms of contamination or corrosion.

Installation must be performed in a competent and workmanlike manner, and all normal safety practices followed. Please note that, once the system has been commissioned and used, the tank or its components will not be accepted for return or repair by Nautical Waste Solutions, unless prior arrangements have been made *in writing*. In the event of any warranty-related problems, please contact Nautical Waste Solutions on 07 3893 1911 prior to taking any further action.

Barry Mann
Nautical Waste Solutions Pty Ltd

Guidelines for use of the AQUA-San II

The AQUA-SAN II was designed to work within a number of parameters. These included a flush volume of approximately 3.5 litres of saltwater per flush, and a 'balanced load' of around three (3) liquid deposits to each solid deposit on average (i.e. 3 urinations to 1 faecal deposit). Information obtained from Internet sources indicated that these constraints were on the conservative side with many electric marine toilets flushing much more than 3.5 litres per flush, and the load average closer to four liquid to each faecal deposit.

The amount and concentration of chlorine added to the system with each flush is based on these statistics as the amount of chlorine required to sanitise liquid waste is much less than that required for solid waste. As a result, it is the total volume of chlorine added to the system over time that sanitises the waste, rather than the amount added with each individual flush. Adding sufficient chlorine to sanitise every flush as if it was solid waste, would result in the significant over-chlorination of the total waste mix and the discharged output would be unacceptable from an environmental perspective, as well as potentially damaging the discharge pump and other fittings.

Please note that the volume and concentration of chlorine added to the waste with each flush can be altered by moving the 'jumper pins' located in the grey plastic control module. This can be done by reducing or extending the amount of time that the dosing pump runs (to add more or less solution), and by reducing or extending the amount of time that the chlorine-generating cell runs for (to increase or decrease the average chlorine concentration). Please see your Owner's Manual for further details on re-setting these pins.

Guidelines for use of the system:

1. Maintain the flush volume at a minimum of 3 litres per flush. Reducing the flush volume in an attempt to allow more flushes per full holding tank, will seriously impact on the quality of waste being discharged.
2. Where possible, maintain a 'balanced load'. We understand that it is very difficult to influence the toilet habits of your guests, but, in particular, encouraging your guests to use the toilets for all liquid waste, as well as solid waste, will produce a better quality discharge. As information, the last result on the test certificate was as a result of over-loading the AQUA-SAN II system at a ratio of slightly less than one liquid to each solid deposit; there is insufficient chlorine available at this level of usage to effectively sanitise the waste.
3. 'Tune' the system to suit the expected load. This should have been done by the installer, but it can be done at any time. Please see the examples on the previous page. Make sure that the cell runs for at least 30 minutes per flush and that the dosing pump runs for at least 50 seconds per flush in total, unless the vessel is used primarily for short trips.
4. If the vessel is used for short trips e.g. river crossings, short sightseeing trips, etc., the cell and dosing pump run times can be reduced slightly e.g. 20 minutes and 40 seconds, as the volume of solids being introduced into the systems is likely to be low and over-chlorination should be avoided.
5. The discharged waste should have a slight chemical smell, but there should be no other unpleasant odours. In any event, discharging the waste when the vessel is underway is always preferred. If a toilet waste type of odour is present either when the waste is being discharged, or when the toilet/s is/are flushed, check the operation of the system (particularly the dosing pump), and if needed, increase the cell run time and dosing pump run time to suit.
6. Finally, do not over-load the system. The AQUA-SAN II will cope with a level of usage above its designed limits for a short period of time due to the reserve capacities built into the system. However, with extended usage (by more than eight (8) people), the concentration of chlorine in the cell tank may be reduced and the system may need regular re-starting to boost the available chlorine levels. Please see your Owner's Manual for further details on re-starting the system.