

*“Our mission is to provide cost effective, safe, environmentally responsible solutions to bacterial control in the food and water industries”*

*technical*

# The T25 series

## of Disinfectant Generators

The T25 is available in four capacities 40, 80, 120 and 250 Liters per hour. The size of machine you require is dependent on the amount of water you wish to treat and the initial conditions of the water. A dosing guide to assist you in calculating your requirements is contained in this brochure on page 5 but if you are unsure our staff or our distributor will be delighted to assist. We normally recommend that the calculation of the size of machine be based on an operating time of 15 hours per day this allows a comfortable safety margin in case of a variable biological load and also for the machine to run some automatic maintenance routines.

The machine comes complete with a brine (salt solution) tank and 75 kg of salt to enable the machine to be commissioned and put in to service. Further supplies of salt can be purchased from us or a local supplier. The quality of the salt is important as contaminants can affect the correct functioning of the machine. You will find on page 11 a recommendation for the specification of the salt. In order to commission the machine the technician needs to know the hardness of the local water supply in order to set the built in water softener to the correct regenerating cycle. The machine also has a built in 50 Micron filter to remove particulates that could affect the optimal performance of the generator. If however your water supply has a high level of sediment we would recommend the fitting of an

external filter between the potable water supply point and the machine.

High levels of Iron and Manganese can adversely affect the performance of the generator cell. Whilst the inbuilt softening system will remove low levels of these contaminants if the level is above 0,5 mg/L for iron and 0.1 mg/L for manganese we would recommend that a separate removal system be installed. Our technical sales people will be happy to advise you on this point. If you are using well water and it is contaminated with oxidized Iron or Manganese (the water often takes on a red/brown colour) a separate removal system is always necessary.

The generator requires a three phase 400 volt 50Hz power supply located within 3 meters of the machine plus a potable water supply of between three and seven bar with a shut off valve terminating in a fitting within 2 meters of the machine. Full specification and requirements of the machine are laid out on page 11. There should also be a suitable wastewater point or connection within 3 meters of the machine.

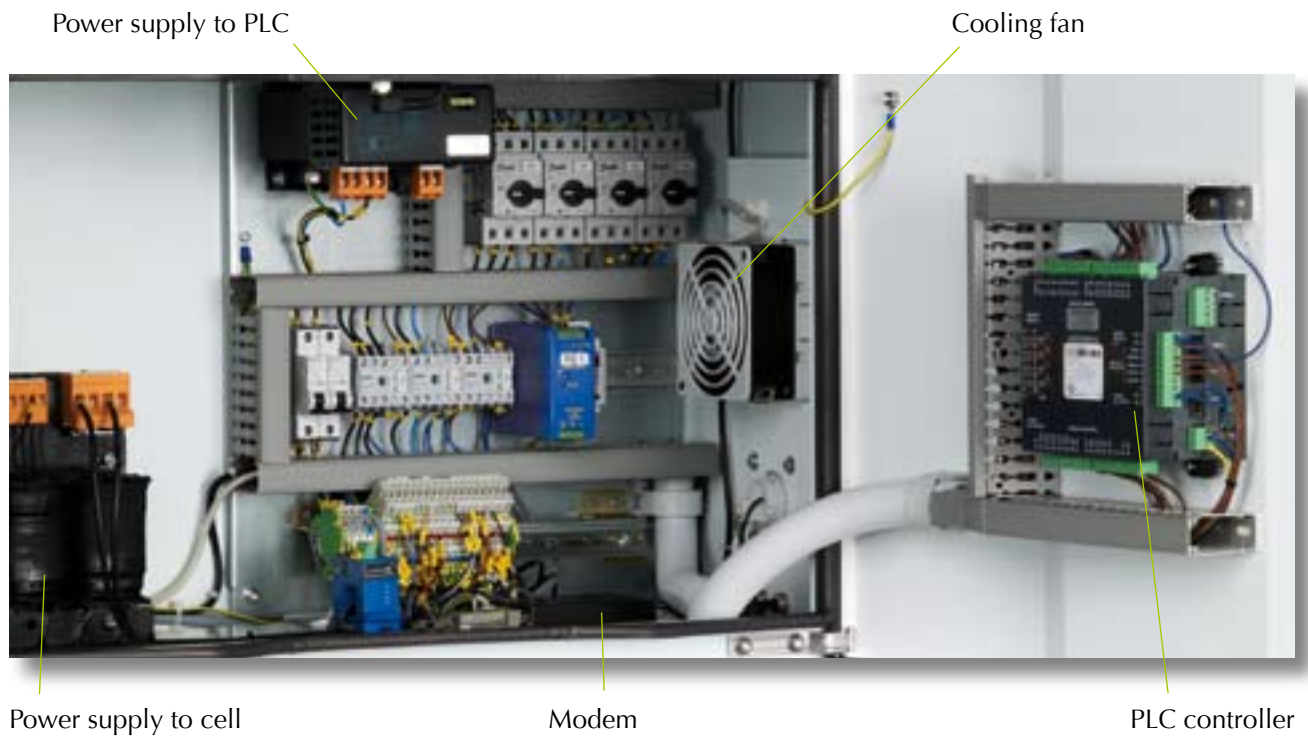
In addition if you have opted for remote monitoring and alerts via your Ethernet you must provide a lead terminating in an RJ 45 plug.



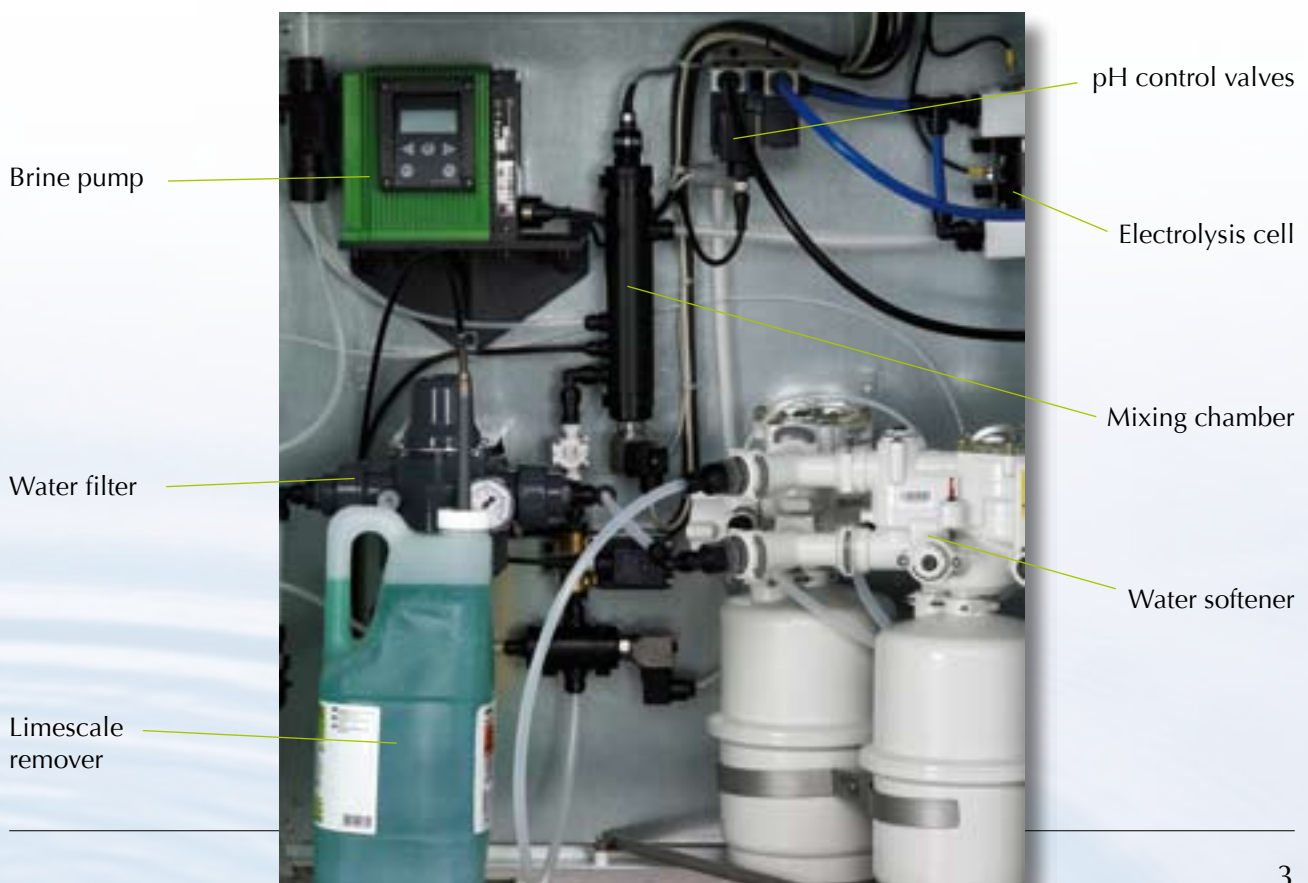
If you have opted for GPRS alerts it is necessary to check the availability of a cellular network in that area simply by seeing if your mobile phone has a good signal strength in that position.

The generator should be located in a frost free well ventilated room close to the selected dosing point in your water system. If the generator is located in a small confined space without adequate ventilation it is necessary to fit an exhaust system which our staff will be able to advise you on.

# Main components (control)



# Main components (process)





# Operation of the Generator

The generator is fully automatic and controlled by a touch screen display. The PLC has three levels of access. User access which can be controlled by the end user, technician access that should only be used by the commissioning or maintenance technician and factory settings which may only be altered by DCW staff. Any attempt to access or alter factory settings will result in the voiding of warranties.

On commissioning the technician will train the end user in the correct operation of the generator and an operations manual will be left with the machine. It is recommended that at least two people are trained in this manner.

If you have opted for remote system monitoring it will be necessary to select the PC you are intending to use and download and commission the software.

Once the machine is commissioned it is only necessary to keep the brine tank topped up with salt. The frequency of this filling is determined by the amount of disinfectants produced. Our technician will advise you of how often you will need to do this. Should the brine tank become empty the generator will cease to function and the system status beacon on the top of the machine will turn red. Prior to this the beacon will turn amber to indicate that the salt level in the brine tank is too low.

Despite the built in water softener the generator cell will over a period of time become coated in limescale which will reduce the performance of the generator cell. This is dealt with by an automatic flushing system which at regular periods will flush the cell with a limescale remover. The machine comes complete with a 5 liter container of our limescale remover but when this becomes empty the display screen and the status beacon will alert you to change this. It is important that only our limescale remover is used as others may damage the generator cell and void the warranty.

# Dosing Levels and Methods

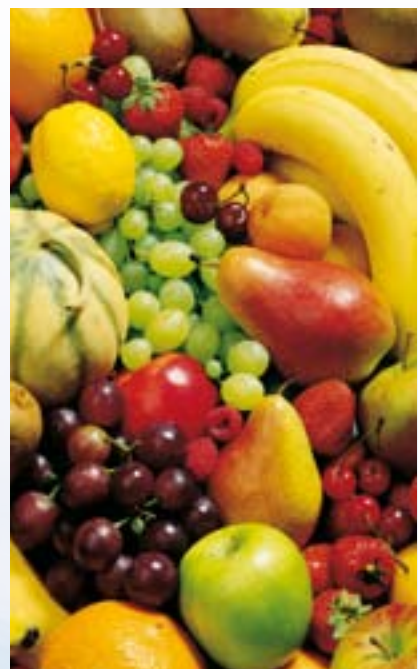
The amount of Neuthox that should be added to a water system is dependent on the application and the biological load of the water or surface to be treated. The higher the biological load the greater the concentration. Experience has shown that for the majority of applications dosing levels in the range of 1:500 to 1:2000 are sufficient. Some exceptions to these guidelines are in animal husbandry where the high biological load requires a higher dosing level and in the treatment of potable water where the residual level of chlorine species in the public water supply should be as low one part per billion, consequently a lower dosing level is required.

## Some typical dosing levels (Guide Only)

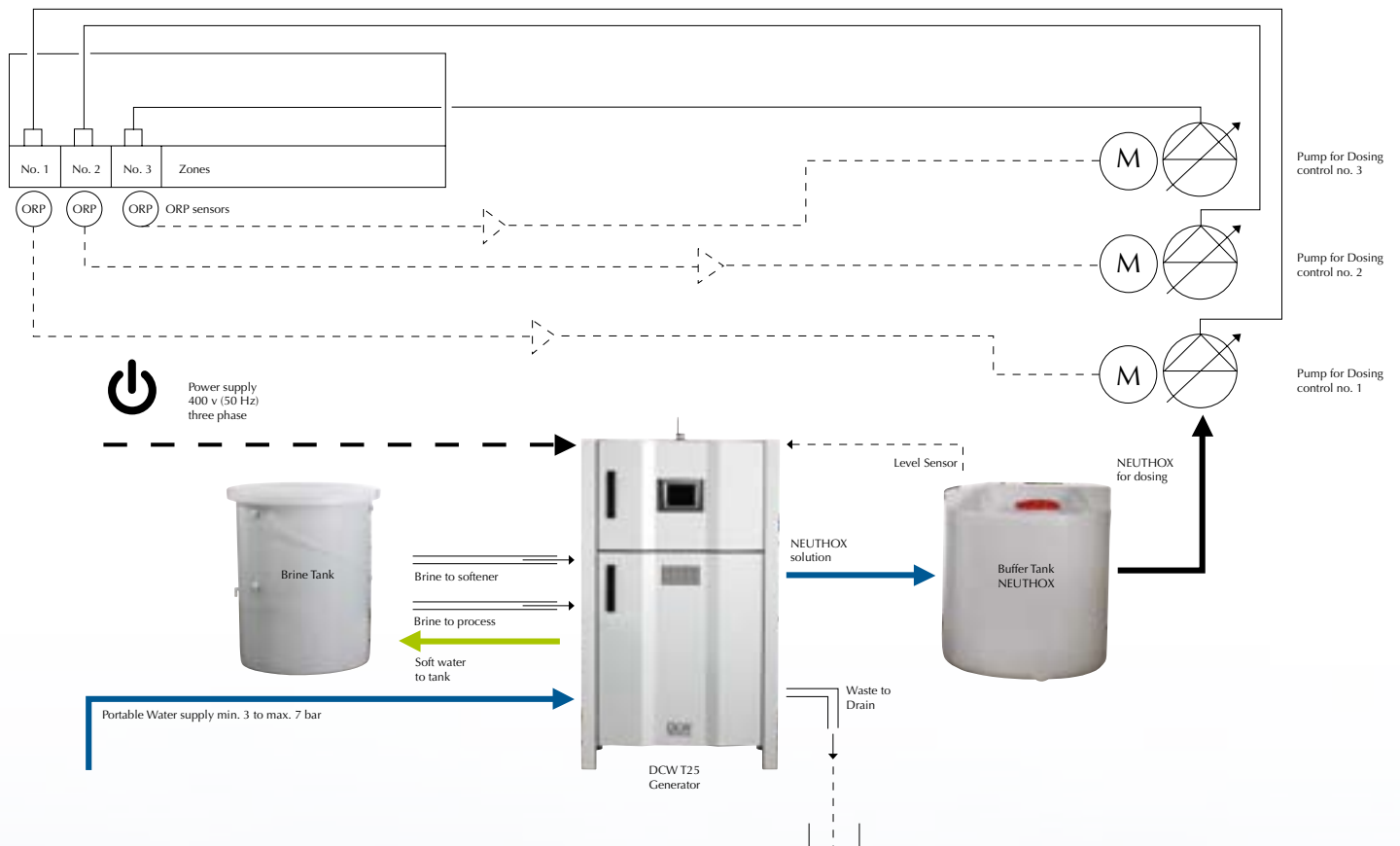
Fruit and vegetable washing	First wash 1:30 Final rinse 1:2000
Swimming pools	Maintain an FAC of 1 ppm
Animal drinking water	Typically 1:100 dependant on degree of contamination
Potable Water	1:1500
Cooling towers	1:1000 (Maintain an ORP of 500)
Legionella control in hot water	1:750 (Check delivery point for FAC of 0.5 ppm)

If our disinfectant generator is installed on an older water system such as a cooling tower that has a high level of bio film it may be necessary to shock dose the system for a short period of time with a higher dosing level to remove this bio-film. This can sometimes result in the water becoming discoloured for a period of time as the bio-film is destroyed and released into the water.

In order to assist you in determining the correct dosing level we will be happy to supply you with a sample of Neuthox to enable you to treat some of your water samples at different dosing levels. Our staff will be pleased to advise you on this.



# Multi-zone ORP sensor controlled layout



This is a suggested layout for an application such as a tunnel pasteurizer where the level of dosing in different areas may vary. In this suggested layout three ORP sensors control three dosing pumps all being supplied by the same buffer tank equipped with a level sensor to switch the generator on and off.

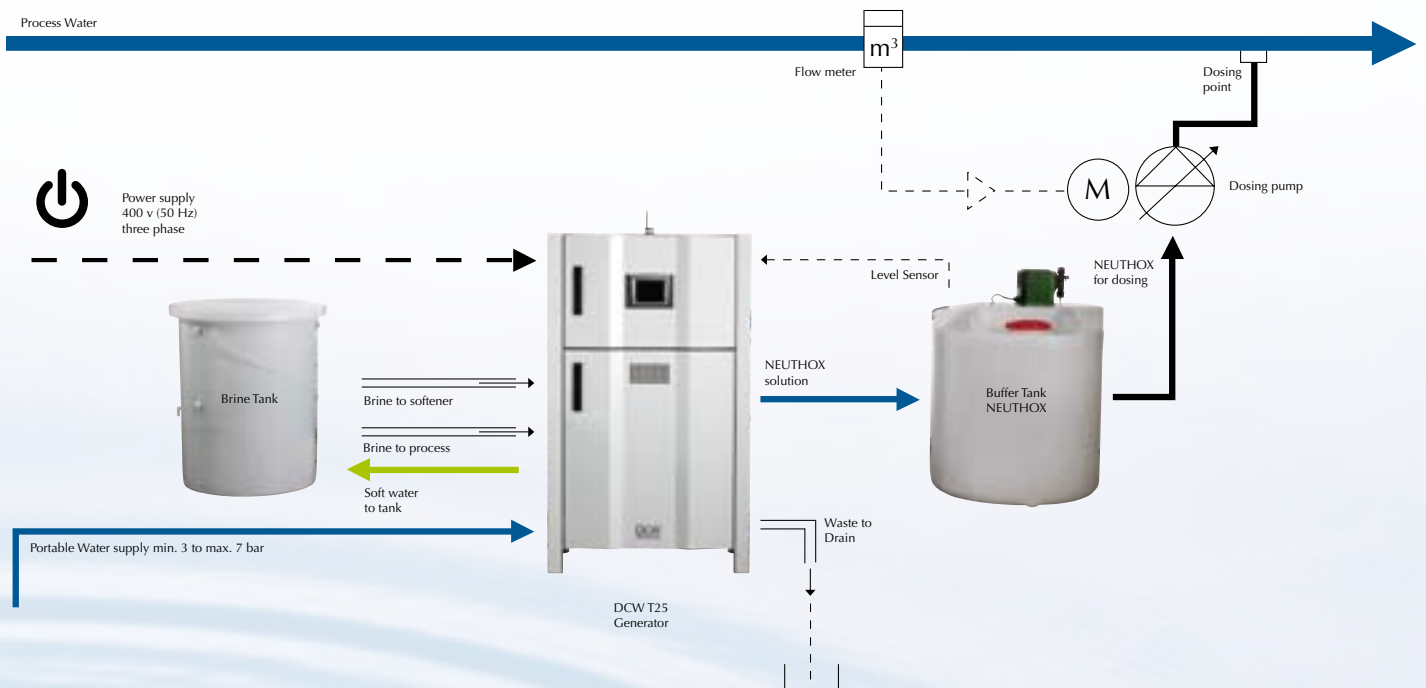
This layout would work equally well with dosing pumps controlled by flow meters if the percentage level of dosing was the critical factor.

Buffer tanks are typically available in 300 to 1000 liter sizes and we can assist with a range of dosing pumps and sensors.

# Fixed % Dosing layout

If you want to dose at a fixed percentage to the water flow volume a layout such as below could be used. The generator produces into a tank which contains a level sensor. The level sensor can be set to a minimum and maximum which will control the start stop function of the generator. The size of buffer tank will be related to the flow of the system. A dosing pump is connected to a flow sensor and

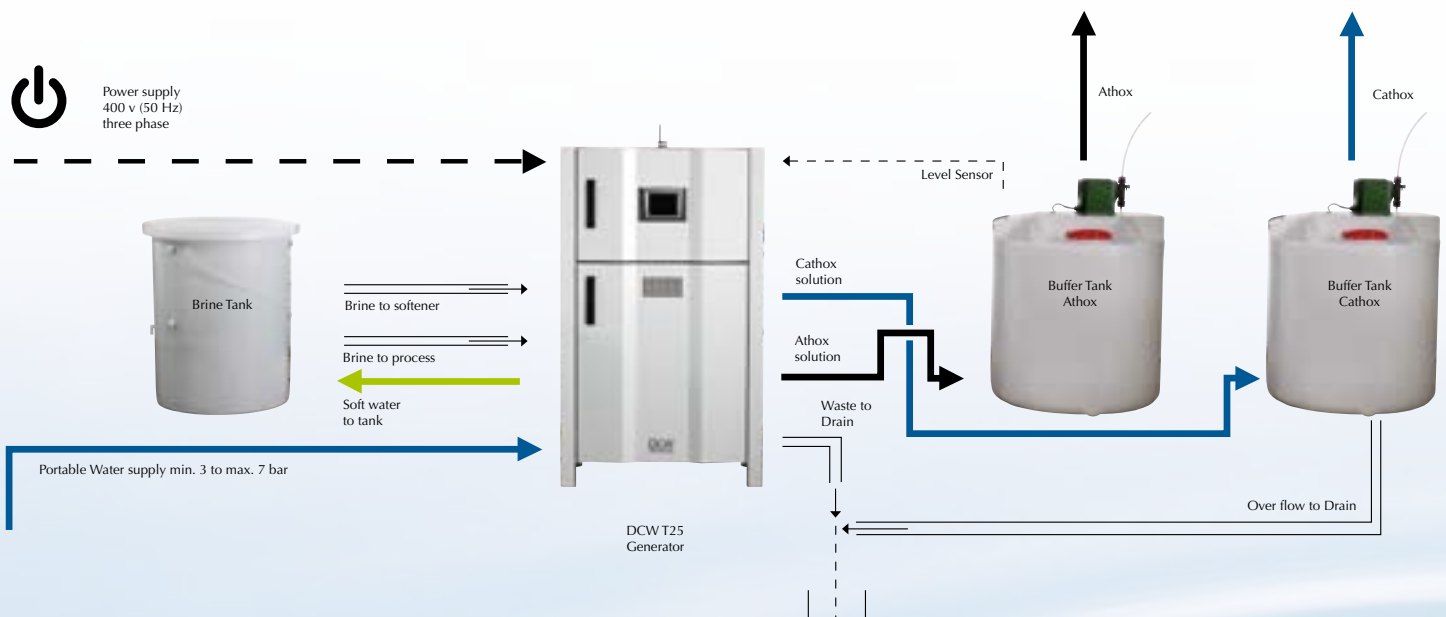
matches its speed to suit the flow rate. The advantage of the buffer tank is that if the flow rate demand for dosing is variable and at times exceeds the maximum output of the machine the shortfall is made up by the buffer tank. In this layout the flow sensor could equally well be substituted with an ORP sensor if the critical parameter was REDOX potential.



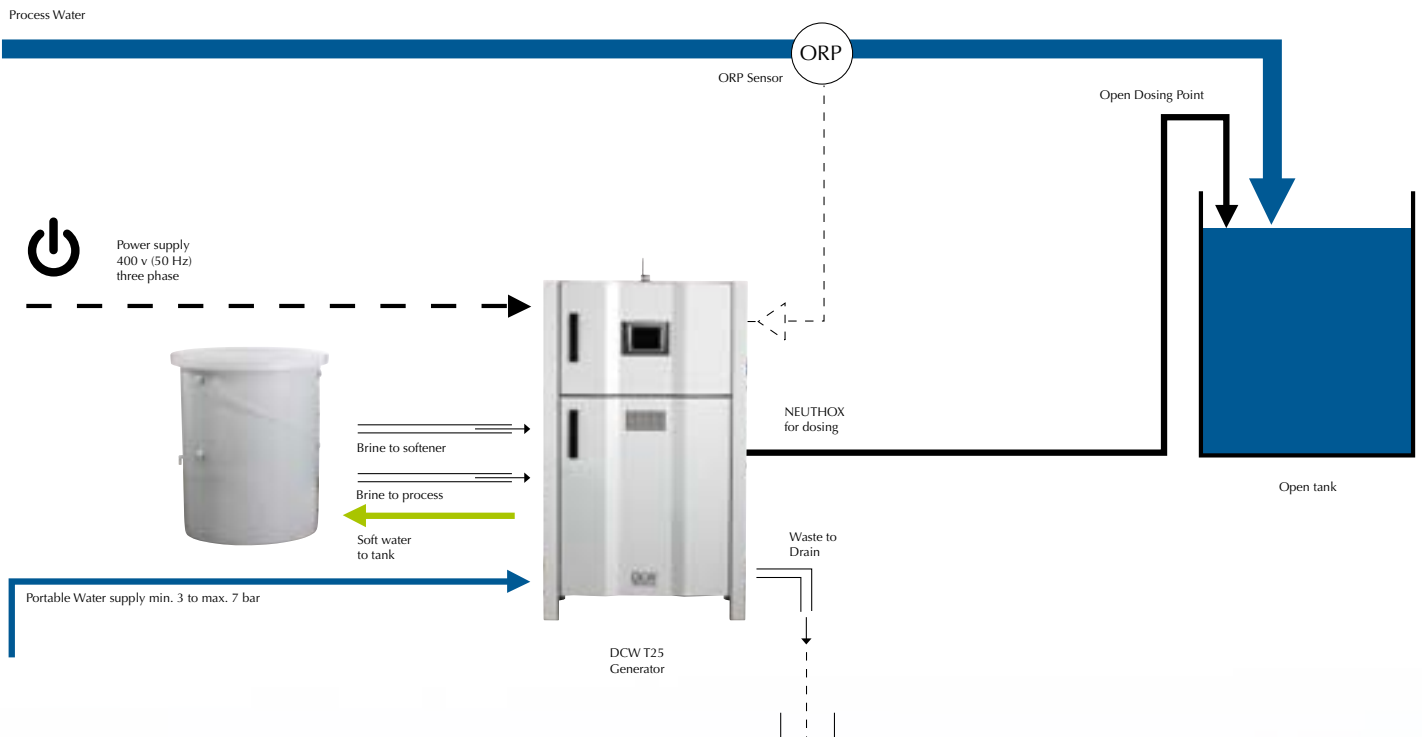
# Separate Athox and Cathox layout

This layout would be used when the disinfectant fluid (Athox) and the cleaning fluid (Cathox) are required as separate liquids. This configuration is often used in applications such as surface cleaning where the Cathox is added to warm water to facilitate its degreasing action. The generator is connected to a level sensor in the first buffer

tank and it will start or stop depending on the levels set at installation. Pumps can be connected to the tanks to move the fluids either into a water system or to connect to high pressure sprayers or fogging equipment for surface cleaning. In addition in the waste water industry Cathox and Athox are often required as separate fluids.



# Sensor Controlled Dosing Layout



This is a typical layout that might be used in an application such as a cooling tower or pond. This layout can be used when the dosing is in to an open system or tank and there is no need to have the disinfectant injected into the system under pressure.

The ORP sensor measures the REDOX potential in the system and the PLC switches the machine on or off when the ORP reading is outside the parameters set by the end user. The advantage of this layout is that there is no need for a buffer tank or dosing pump. It is important that the dosing point is

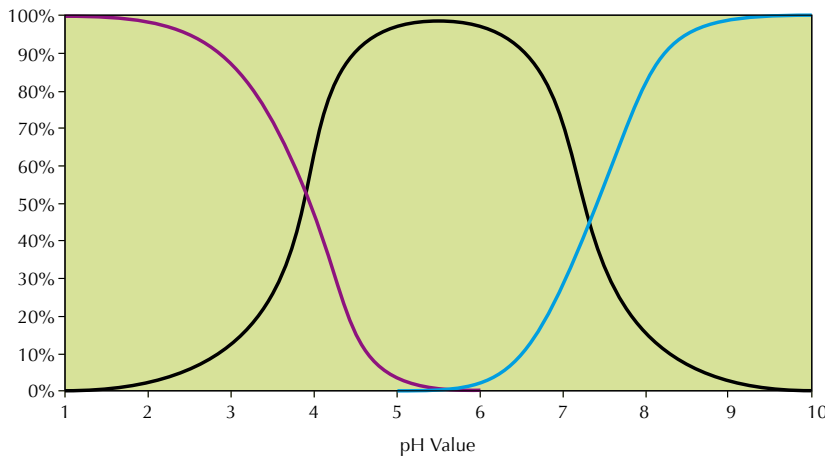
positioned after the sensor in the systems water flow to ensure that it is taking a true reading.

ORP sensors need to be calibrated on a regular basis following the manufacturer's instructions. Ideally the stop start settings on the PLC should be set at least 50mv apart to avoid the generator starting and stopping for very short periods.

It is also possible to set the PLC so that if the ORP continuously stays outside the required band an alert can be sent via Ethernet or GPRS to your PC or cell phone.

# ORP

# Relationship of chlorine species dependant on pH value



The effectiveness of the Hypochlorous acid as a disinfection agent is affected by the pH level of the water in the end users system. Alongside is a graph showing the pH levels where the HOCL (Hypochlorous Acid) is at its highest concentration and therefore most effective.

- Gaseous and dissolved Cl<sub>2</sub>
- Hypochlorous HOCl
- Hypochlorite OCl



## Corrosion report

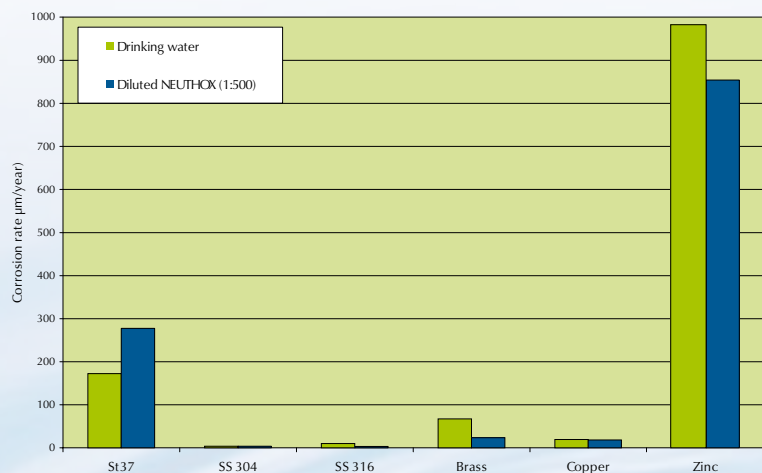
### Introduction

The corrosivity of a diluted NEUTHOX solution (1:500) has been compared to normal Danish drinking water by means of an electrochemical corrosion analysis. The test is performed on the following six metals: Carbon steel (St37), stainless steel 304, stainless steel 316, brass, copper and zinc.

### Results

The estimated corrosion rate (in  $\mu\text{m}/\text{year}$ ) for each of the six metals is shown alongside. It is clear, that addition of NEUTHOX in small amounts (1:500) will not contribute to an increase in the corrosivity of drinking water.

The final conclusion is therefore that NEUTHOX in small concentrations is not corrosive to any of the examined metals.



# Salt Composition

## Recommendations

Component	Chemical Symbol	Composition	Component	Chemical Symbol	Composition
Sodium Chloride	NaCl	99.7 %	Insoluble Sulfates	SO <sub>4</sub>	≤ 1500mg/kg
Potassium	K	≤ 70mg/kg	Magnesium	Mg	≤ 1mg/kg
Calcium	Ca	≤ 20mg/kg	Copper	Cu	≤ 0.1mg/kg
Iron (free)	Fe	≤ 2mg/kg			

## Technical characteristics and requirements of the generator

Generator type		T25N0040	T25N0080	T25N0120	T25N0250
Neuthox production	L/h	40	80	120	250
Free chlorine Minimum	mg/L	500	500	500	500
Approximate salt consumption*	kg/day	1 - 2	3 - 4	7 - 8	12 - 15
Brinetank	L	300	300	300	300
Water connection**	BSP male	½"	½"	½"	½"
Water supply	bar	3 - 7	3 - 7	3 - 7	3 - 7
Drain hose	inches	½"	½"	½"	½"
Drain hose length	m	5	5	5	5
Backpressure	bar	<0,2	<0,2	<0,2	<0,2
Power requirements ( 5 core )*** V		3 x 400	3 x 400	3 x 400	3 x 400
3 phase	A	16	16	16	16
	W	700	1060	1420	2740
External dosing pump max consumption.	W	2200	2200	2200	2200
Room ventilation	m <sup>3</sup> /h	> 15	> 24	> 33	> 66
Ambient temperature min/max	°C	+5 to +30	+5 to +30	+5 to +30	+5 to +30

Dimensions Generator					
Weight	kg	160	175	180	185
Width	mm	850	850	850	850
Height	mm	1490	1490	1490	1490
Depth	mm	460	460	460	460

\* 15 hours per day running time

\*\* Water shutoff valve located within 3 m

\*\*\* Power connection: Switched IP44 compliant within 3 m. The generator has a 5 m (5 core) 3 phase, ground (earth) and common (neutral) power lead.

Larger machines available by special order.



Danish Clean Water A/S  
c/o Danfoss A/S  
Nordborgvej 81  
L21, N12  
6430 Nordborg  
Denmark

Phone +45 70 29 09 00  
Fax +45 70 29 09 01

[info@danishcleanwater.dk](mailto:info@danishcleanwater.dk)  
[www.danishcleanwater.dk](http://www.danishcleanwater.dk)

© 2009. The written and pictorial material in this document is the property of Danish Clean Water A/S and its partners and may not be copied, disseminated or reproduced in any form without the written permission of Danish Clean Water A/S.