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NEUTHOX ®

1. Process, Description and Principle
2. Product Stability Study
3. Applications, Toxicology, Biodegradability and Safety Sheet

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1. Process, Description and Principle.

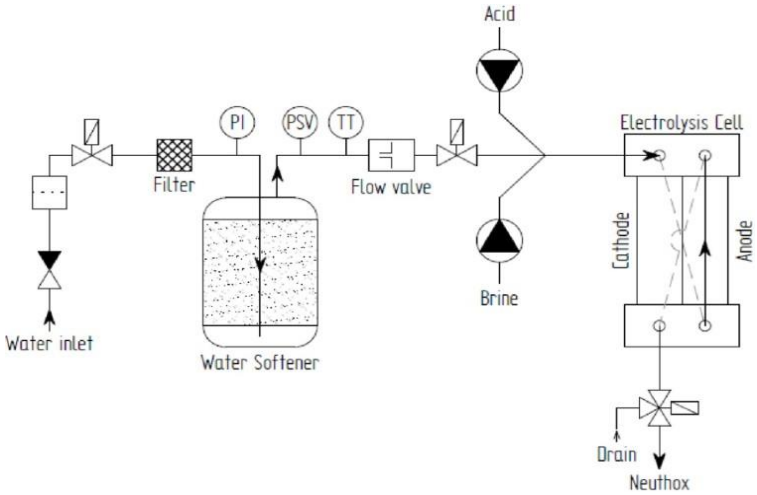
1.1 Principle of Technology - NEUTHOX®

The disinfectant generation system works through the electrolysis of salt water, using a patented membrane technology for this purpose. It is capable of producing a totally safe, profitable and environmentally friendly disinfectant. The disinfectant is produced under the registered name Neuthox®.
This contains hypochlorous acid which is a very powerful oxidant and can be used as a biocide in any type of application with complete safety and confidence.

Chemical electrolysis is the method in which a non-spontaneous process is carried out by applying a direct current to the membrane. For the generation of Neuthox, this current is used to divide the chlorine (Cl) from the sodium (Na), into the salt used (NaCl).

The generator uses an integrated water softener to prevent limescale generation on the membrane. The disinfectant production process is carefully controlled by an electronic device, incorporated to supply a uniform product with the lowest possible residual chlorides, throughout the process.

The following simplified P&ID diagram shows the process. Water enters the machine through a built-in filter and the hardness of the water is removed in the softener. The flow of soft water is automatically regulated to the capacity of the membrane and the salt (NaCl) is mixed with the water before entering the electrolysis membrane, and once the process is carried out inside the membrane, finally it is obtained Neuthox.



What makes Neuthox special is that all the liquid is exposed to both sides of the membrane. First the liquid passes through the negative cathode and then through the positive anode. The flow is never divided during this process, therefore the risk creating chlorine gas is eliminated. Additionally, the final product is approximately 8.3 pH - close to neutral pH.

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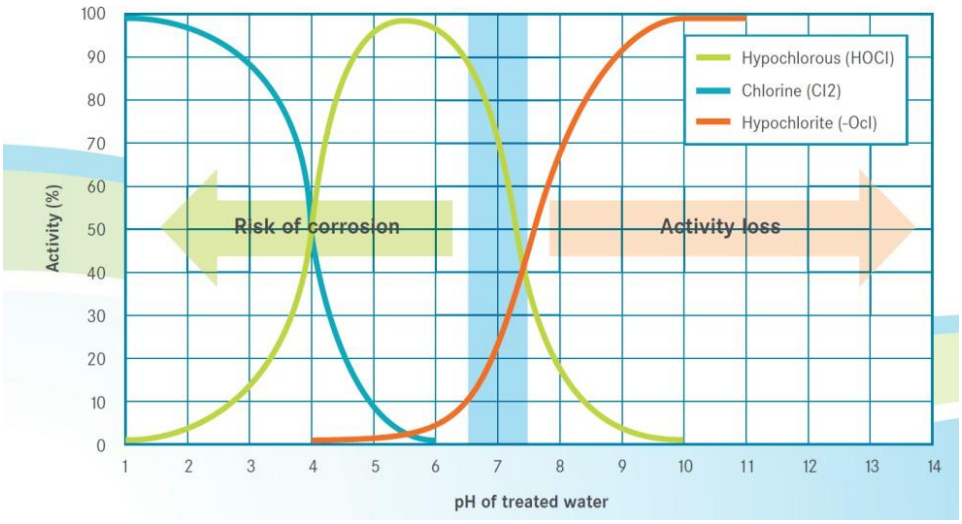
1.2 Comparison of Electrolysis Technologies

There are several electrolysis technologies, among which the following are the most common and best known:

- Direct electrolysis without membrane, produces a more basic product pH 9.00 – 9.5 in a total chlorine concentration between 1500 – 5000 ppm depending on the process, in this type of electrolysis the product generated is a hypochlorite. WITH HIGH CHLORIDE CONTENT
- Electrolysis with double chamber membrane. Generation by this method results in an Anolytic and a Catolytic product, the anolytic is generated at a pH of 3.5- 4.0 with an ORP of 900- 950 mV. And a Catolytic product with a pH of 12.00 and an ORP – 900 mV. (negative). In this type of electrolysis the product generated is mostly Cl gas.
- Electrolysis with a monomembrane built in two anolytic and catholytic chambers, in this case the flow is never divided therefore the possibility or risk of generating Chlorine gas is eliminated. The final product is an anolytic of pH 8.2 ORP 750-850 mV . (pH close to neutral)

1.3 Limitations of Electrolysis Technology

The production of Hypochlorous Acid is necessarily dependent on the pH of both the generation pH and the final pH where the product will carry out its Oxide – Reduction action. Hypochlorous acid is a product that behaves stably at neutral pH, which is why it is important to generate it at a pH not far from neutral. The following graph shows how HOCL at different pH changes its concentration and some percentage is It transforms into chlorine gas when it approaches the acidic side and hypochlorite when it approaches the basic side. the ideal Ph for an efficient oxidation action of hypochlorous acid it is between 5.5 – 7.5.



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Why is generation pH important?

The ideal is a neutral pH or the closest to neutral at this pH the stability of the product is the highest, as you can see in the graph, generating an acidic product pH4 is NOT an efficiency problem, it is a problem of loss of concentration Due to gasification, this product should be recommended for immediate use or for generation in low concentration of total chlorine (ppm) between 50-
100 ppm. Generate at high pH (pH 10) as can be seen there is a loss of activity and efficiency.

How does technology influence the stability and efficiency of the product?

There is a big difference in the stability of Hypochlorous acid depending on the technology. Electrolysis without a membrane, known as direct, is a technology for the production of FAC (Total Chlorine) in concentrations above 1500 ppm up to 5000 ppm, but the use of the product must be immediate. , since the stability is less than 4 days.

Electrolysis with a membrane in two chambers (anode/cathode) with this technology separates two solutions, the anolytic one, which is acidic (pH4) and the catholytic solution (ph12). The anolytic acid solution is the disinfectant and has very good performance as such. However,
the solution is in the range of instability due to chlorine gasification (see graph).

And finally, electrolysis with a monomembrane in two chambers (Neuthox) where the solution is electrolyzed first at the cathode and then at the anode, generating a product of pH8.2-8.5 known in disinfection technology as a neutral pH.

How does Hypochlorous Acid react?

Hypochlorous acid and its efficiency are in direct relation to the pH of the solution in any case and applies to the three types of electrolysis, solutions must be treated between the range of 5-7.5 pH.

What is the difference between the 3 types of Hypochlorous Acid generated by the 3 types of electrolysis?

Definitely, the application of each solution is different, so the electrolysis product without a membrane has the advantage of being a product with high concentration, but the disadvantage of its instability, and the disadvantage of greater toxicity due to the concentration of chlorates.

The product resulting from membrane electrolysis in two separate chambers has the advantage of generating a highly efficient product, but the main disadvantage is the accelerated gasification of chlorine (Cl), however, the application of this product is very specific for direct application. and in low concentrations.
And finally, monomembrane electrolysis with two chambers (anode and cathode) has an average concentration of 500-1000 ppm and a pH close to Neuthox (8.3), which allows it to have more stability.

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1.4 Neuthox precursors

- **Sodium Chloride Salt 99.9%**

FEATURES	RESULT	TOLERANCE
Particle size / diameter	25%	25+/-2 mm.
Particle size / height	12%	10+/-3 mm.
Sodium Chloride (dry basis)	99,90%	*Min 99,50%*
Magnesium (Mg)	0,006%	*Max. 0,03%*
Sulfates	0,012%	*Max. 0,04%*
Calcium	0,020%	*Max. 0,03%*
Materials insoluble in water	0,0173%	*Max. 0,05%*
Humidity	0,05%	*Max 0,15%*
Color	white	white
Smell	n/a	*n/a*
Flavor Test validity in storage	Salty	Salty

- **Water (Features)**

FEATURES	OPTIMUM	TOLERANCE
Turbidity	< 2	*Max. 1*
Hardness (mg/lt) Grad Fr. Iron	500 mg/lt/ 50º Fr.	*Max. 55 º Fr.*
Manganese	0 mg/lt	*0,5 mg/lt*
Hardness (mg/lt) Grad Fr. Iron	0 mg/lt	*Max. 0,1 mg/lt.*

- **Electrolysis**

The Electrolysis process takes place in the reaction membrane anionic and cationic depending on the process flow, the necessary current (amperage) is supplied by the system to guarantee the process.

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- **Article 95 ECHA, DECISION OF INCLUSION IN THE LIST OF SUBSTANCES AND SUPPLIERS ARTICLE 95(1) EU REGULATION. No. 528/2012**

DECISION NUMBER: ACC-D-1179354-43-00/F CASE NUMBER: BC-CS07908-19 EU-0012407-0000

- Article 55(1) EU Regulation No. 528/2012 State of the Union Notification

European Sweden. / "The Sweeden Chemical Agency "Target Organism SARS-CoV-2 and other harmful organisms due to the risk of lack of disinfectants.

NOTIFICATION OF DEROGATION PURSUANT TO ARTICLE 55(1) OF REGULATION (EU) NO 528/2012

- Notifying Member State[1]

Sweden

- Competent Authority granting the temporary derogation

Organisation	**Email address**
The Swedish Chemicals Agency	kemi@kemi.se

- In case of repeated action: number of previous action(s)

0

- Product name

Disinfectants containing • Active chlorine generated from sodium chloride by electrolysis or • Active chlorine released from hypochlorous acid

- Product type

PT 1

- Active substance(s)

Active chlorine generated from sodium chloride by electrolysis Active chlorine released from hypochlorous acid

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- Description of danger the derogation is intended to address

☑ danger to public health

Justification:

- the break out of COVID-19,
- the recommendation from the Swedish government, the Public Health Agency of Sweden and WHO to use disinfectants to prevent spreading of the virus, as a complement to cleaning and hand washing.
- The risk of lack of disinfectants to limit the spread of Coronavirus SARS-CoV-2 that can cause Covid-19

On 20 March the Swedish Chemicals Agency issued a derogation based on article 55 Article 55(1) of the Regulation (EU) No 528/2012 allowing placing on the market and use of disinfectants in pt 1 containing active chlorine generated from sodium chloride by electrolysis or active chlorine released from hypochlorous acid with the following conditions:

The person responsible for the making available shall make sure that instructions are enclosed with the packaging. The instructions shall ensure that a sufficiently disinfecting effect is reached when using the products.

Sales to the general public may only be made

1. of ready-to-use solutions and
2. through pharmacies or grocery stores.

Based on the extract of article 55, the use is authorized in Persons, under dosage and professional indications, complying with the regulations of the CoV-2 reaction test of 0.025% - Neuthox 500 – 1:1 or hypochlorous acid 500 mg/lt 1: 1 with spraying limited to a maximum of 250 ml (cc) per person . and based on dermatological testing and approval Resolution 150- EU 1200-3456-0000

Types of ECHA products.

In Annex V of the Biocidal Regulation, biocidal products are classified into 22 types, grouped into four main groups.
As a result of excluding biocides used as preservatives for food and feed from the scope, this Regulation has one less product type than the directive that preceded it.

Number	kind of product	Description
Main group 1: Disinfectants These types of biocides exclude cleaning biocides that do not pursue a biocidal effect, including liquid and powder detergents and similar products.		
TP 1	Human hygiene	The products in this group are biocides used for human hygiene purposes, which are applied to or in contact with the skin or scalp, with the main purpose of disinfecting the skin or scalp.

https://echa.europa.eu/es/regulations/biocidal-products-regulation/product-types

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- Extract from the resolution of Article 55 of the European Union in Denmark for the use of Neuthox as a biocide for direct use on the skin, as mentioned in the clarification of the type of product.

1 Decision by the Danish EPA

ECA Consortium applied at 24. April 2020 for a derogation according to article 55 of Regulation (EU) no. 528/2012 for the production and marketing of the biocidal product Neuthox by Danish Clean Water A/S.

The evaluation performed by the Danish Environmental Agency has shown that sufficient data has been provided to verify the outcome and conclusions, and justify derogation for use of Neuthox according to the following conditions:

Use area

User	Application method	Product type
Non-professional	Hand hygienic disinfection	PT 1 (Human hygiene)

Authorisation is granted for production and marketing of the biocidal product Neuthox to use as a hand hygienic disinfectant to prevent spread of bacteria and viruses through contact by professional and non-professional users.

Application rates and frequency:

3 mL biocidal product is applied to clean; dry hands and rubbed thoroughly for 60 seconds. Frequency depends on the actual need for hand disinfectant.

The concentration of the active substance active chlorine in the biocidal product is 500 ppm. The source of the formulated active substance is Danish Clean Water A/S. Danish Clean Water A/S is part of ECA Consortium A/S, which is listed on article 95 of Regulation (EU) no. 528/2012 as a product supplier. Additionally, Danish Clean Water A/S is listed here as substance and product supplier.

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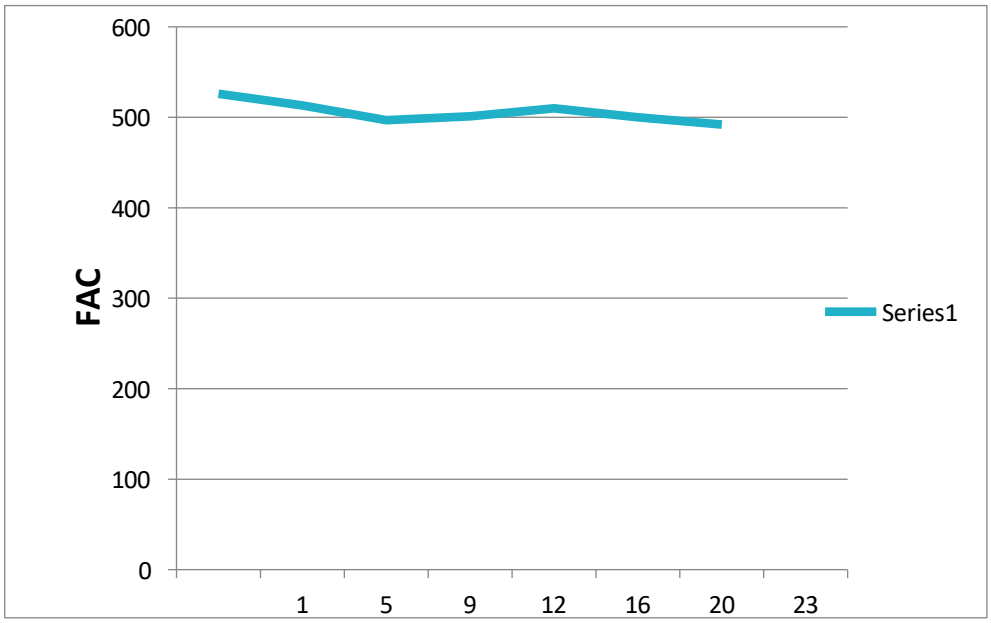
2. Product Stability Study

Neuthox 500 (100) shows stability in its parameters for up to 23 weeks

- Eurofins stability curve 03.12.2016 ref. 0076547899-000



Under this analysis it is summarized that the duration and stability of the product is due to the stabilization of the cathode and anode through membrane electrolysis. Product should be stored at room temperature, no higher than 25 degrees Celsius, and with complete blocking of direct sunlight.

As a recommendation, dark containers should be used, preferably double layer depending on the use of the product. If the product is for external use with susceptibility to high temperatures and/or direct solar radiation, a roof should be placed or the container should be painted with white paint.

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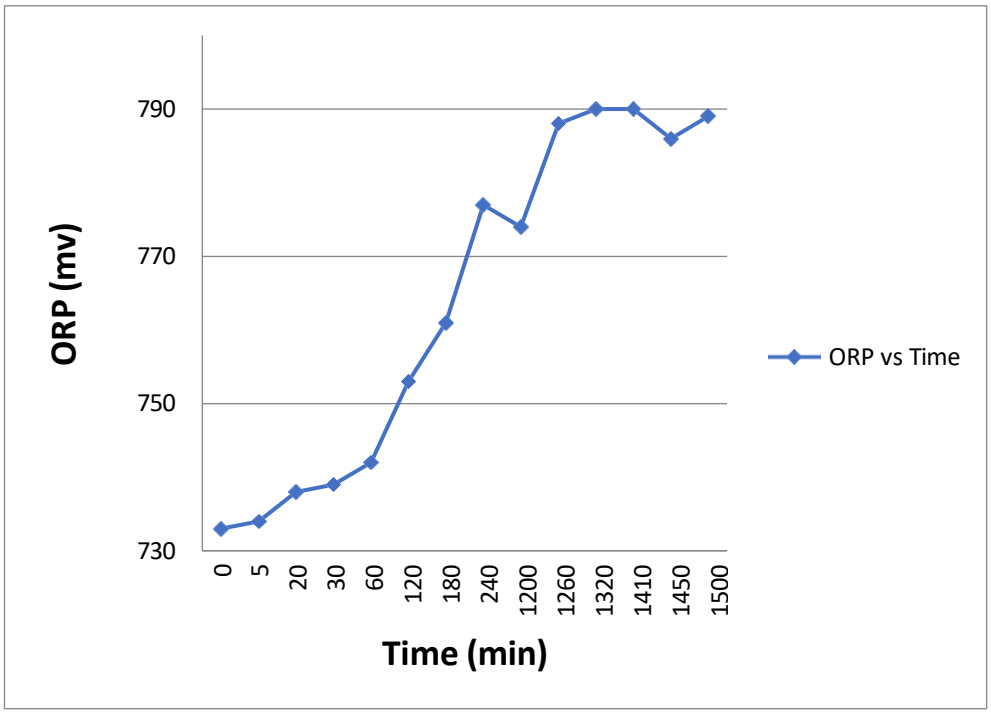
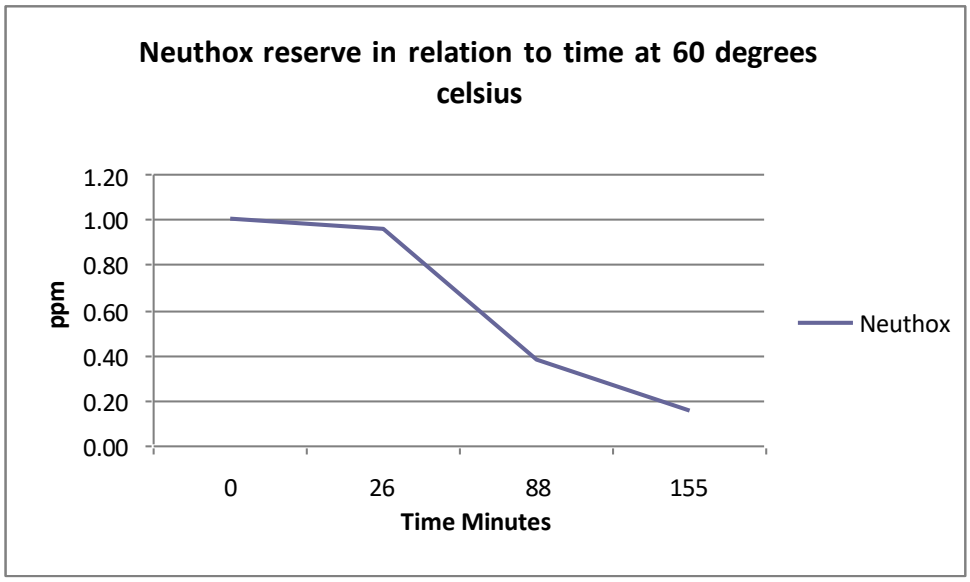
- Oxide Reduction Potential vs Storage Time appropriate.



- FAC stability test at 60 degrees Celsius.



The tests and graphs have been extracted from the Eurofins document 03.12.2016 ref. 0076547899-000 and may not be copied or reproduced, the validity of this information belongs only to this document and is the property of Danish Clean Water A/S Denmark.

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3. Applications, Toxicology, Biodegradability and Safety Sheet.

NEUTHOX (HOCl) is a strong oxidant due to its composition and classification as a mixed oxidant with free radicals. Neuthox in its composition has the presence of chlorine dioxide (Cl2O), Hypochlorite (OCl), Hydrogen peroxide (H2O2), and traces of Ozone. (O3), Dissolved Oxygen (DO). This makes Neuthox an effective biocide with broad action against pathogenic microorganisms such as bacteria, fungi, yeasts, and viruses.

Toxicology, carried out by the Tallinn Chemical Institute – Estonia 37262204342 /2019 The Objective was made to determine the presence of Chlorates and Chlorites using CVET 3007 Ion Chromatography with a 6 x 600 mm analytical column. Which contained HIKS-1. 2.4 mM Na2CO3 in aqueous solution, flow rate 4.5 ml/min pressure 40-50 atm. With NaClO3 solution ClO3- ion concentration of 29.15 and 7.29 mg/lt as standard treatment > Neuthox in concentration of 500 mg/lt and 1000 mg/lt. Dilutions 1:200, 1:100. 1:20. No presence of Chlorate was observed in all dilutions.

Application test as a Topical treatment – In vitro / in Vivo tests show a variety of anti-inflammatory effects, and uses for pruritus, ulcers caused by diabetes, burns, among others. NO DERMATOLOGICAL CONTRAINDICATION IS FOUND DUE TO IRRITATION, INTOXICATION AND/OR ALLERGY. The biocidal action on the skin is very effective due to the action of the acid hypochlorous pH dependent, the skin is in a range of 5-6 pH, the action biocide would be in the highest concentration of HOCl.

Biodegradability. Neuthox is 100% biodegradable, the residuality and biodegradability test shows, It is not possible to measure.

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MAIN ADVANTAGES OF NEUTRAL ANOLYTIC (Neuthox®) REGARDING THE HYPOCHLORITE SOLUTION (HPCS)

FEATURES	HPCS	NEUTHOX®
Active components	ClO^-	$HClO$, $ClO^{\cdot}$, ClO^{-}, $Cl^{\cdot}$, $HO_2^{\cdot}$, HO_2, $HO^{\cdot}$, $H^{\cdot}$, H_2O_2, O_3, O_2^{-}, $^1O_2$, $O^{\cdot}$
Concentration of active components	0. 5%	0.02%
Antimicrobial activity		
Bacterium	+	+
Virus	+	+
Causative agents of tuberculosis	+	+
Fungus	+	+
Candida	+	+
Spores	+	-
Biological compatibility	No	Yes
Environmentally friendly	No	Yes
Powerful cleaner	No	Yes
Global mineralization of the active solution	2.5%	0.3%
Allergenic properties	Yes	No
"Wet walls" post-treatment effect	Yes	No
Certified scopes of application		
Disinfection	+	+
Cleaning and pre-sterilization	-	+
Sterilization	-	+
Certified disinfection applications		
Surfaces	+	+
Linen	+	+
Utensils	+	+
Medical equipment	+	+
Thermolabile instruments	+	+
Flexible endoscopes	-	+
Optical devices	-	+
Dental equipment	-	+
Skin, surgeons hands	-	+
General equipment	+	+
Water	-	+
Air	-	+
Meat processing equipment	-	+
Milk processing equipment	-	+
Swimming pool water	-	+
Wastewater from tuberculosis prophylactic centers	-	+
Stored vegetables and fruits	-	+
Period that the solution maintains its biocidal properties	More than 3 months	23 weeks / 5 months

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COMPARISON OF THE CHARACTERISTICS OF Neuthox® AND DIFFERENT SANITIZING SOLUTIONS

Name, country of manufacturer	Solution concentration,% (dark areas show concentration ratio)	Characteristics of antimicrobial antimicrobial effect					Allergenic and toxicity characteristics: GOST classes 12.1.00776 (dark areas show relative toxicity levels)	Combination of disinfectant properties and detergent capacity	Habituation (adaptation of microorganisms to the solution)
		Bacterium	Microbacteria	Virus	Fungus	Spores			
Neuthox® (DK)	0.01 – 0.05	+	+	+	+	+	IV	SI	NO
Sodium hypochlorite (Russia, USA, and others)	0.1 – 0.5	+	+	+	+	-	IV	NO	YES
Precept (USA)	0.5	+	+	+	-	-	III	NO	YES
Chloramine (Russia)	1.0 – 3.0	+	+	+	+	-	IV	NO	YES
Chlorhexydine bigluconate (Russia)	0.5 – 4.0	+	+	+	-	-	IV	NO	YES
Lysoforminspecial (Switzerland)	0.5 – 4.0	+	-	+	-	-	III	NO	YES
Vircon KPKA (Slovenia)	0.5 – 2.0	+	-	+	-	-	III	NO	YES
Lysetol-AF (Germany)	2.0 – 5.0	+	+	+	+	-	III	NO	YES
Sidex (USA)	2.0	+	+	+	+	-	III	NO	YES
Cold Spore (USA)	2.0	+	+	+	+	-	IV	NO	YES
Decanex 50FF (Switzerland)	0.5 – 4.0	+	+	+	+	-	III	NO	YES

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Toxicological test report of the anolytic product (Neuthox®) produced by the DCW– Neuthox® unit

Institute of Chemistry at Tallinn Technical University Department of Environmental Chemistry and Technology the Head of the Department, Prof., D.Sc. Rein Munter

The analyses were carried out by Senior Researcher, Ph.D. Marina Trapido Researcher, M.Sc. Yelena Veressinina, Engineer Viktor Ahelik
(Tel: +372 6204342/6204341)
Tallinn 2019

AIM

The objective of the present study is to verify the presence of toxic disinfection byproducts, chlorite (ClO_2^-) and chlorate (ClO_3^-) in the anolytic and measure the acute toxicity of the water treated by it.
Neuthox® was produced according to instructions given by representatives of DCW A/S. Two different regimens were tested and according to these regimens, Neuthox® is called Medium Anolytic (pH 2 - 3; ORP 1100 mV; Cac300 mg/l) and Strong Anolytic. (pH 2 - 3; ORP 1100 mV; Cac500 mg/l). The analysis for examination occurred immediately before testing.

Ion chromatography was used for the determination of chlorates and chlorites. The experiments were carried out using the CVET-3007 ion chromatograph with the 6x600 mm analytical column filled with HIKS-1 solvent. 2.4 mM Na_2CO_3 aqueous solution was used for elution.
The flow rate was 4.5 ml/min and the pressure 40-50 atm. The $NaClO_3$ solutions with the ClO_3^- -ion concentration of 29.15 and 7.29 mg/L were used as standards.
Preliminary runs demonstrated that under the conditions mentioned above ClO_3^- - ion could be successfully separated from chloride (Cl^-) and determined at a level of up to 0.5 mg/l.
Chlorates were determined directly in the diluted anolytic, chlorites were detected in diluted anolytic after heating at 100o C for 5 minutes to convert chlorines to chlorates.

The anolytic medium was diluted 1:200, 1:100 and 1:20. No peak responsible for the presence of chlorate was observed in all dilutions. Furthermore, tests with heated samples diluted in the same way did not show the presence of chlorate (see chromatograms 1-3). The strong anolytic was diluted 1:200, 1:100 and 1:20.
No peak responsible for the presence of chlorate was observed in all dilutions.

Furthermore, tests with heated samples diluted in the same way did not show the presence of chlorate (see chromatograms 4-6).

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CHEMICAL ANALYSIS

Both medium and strong anolytics were tested by chemical methods used by ENVIROLYTE (see pp. 11-13). According to the qualitative tests, for the analysis of chlorate and chlorite, the presence of chlorite and chlorate ions in the anolytic was not demonstrated.

It can be concluded that the anolytic obviously contains the following forms of active chlorine: hypochlorous acid (HClO), hypochlorous ion (ClO-), free chlorine (Cl2) and chloride ion (Cl-). The presence of chlorite and chlorate ions in the anolytic was not determined.

TOXICITY TESTS

Daphnia magna 24-hour acute toxicity tests were carried out, according to the Finnish standard SFS 5062.
The dilutions used were: Anolytic medium 1:100, 1:500 and 1:2000.

The strong anolytic was diluted 1:50, 1:200 and 1:500. The corresponding data is presented in Table 8.

Table 8. Acute toxicity of anolytic liquid.

KIND OF ANOLYTIC	DILUTION	EC50; % (confidence limit)	EC50; % for initial anolytic
Medium Anolytic (c.ac 350mg/L)	1:100	25 (22.5-28)	0.25
	1:500	Not toxic	
	1:2000	Not toxic	
Strong Anolytic (c.ac 350mg/L)	1:50	13 (11-16)	0.26-0.28
	1:200	56 (52-59)	
	1:500	Not toxic	

The toxicity test demonstrated that there were no acute effects for the anolytic diluted 1:500 or more. No significant differences were observed in the toxicity of two anolytics (strong and medium). It should be noted that the Daphnia magna test used in the present study indicates acute toxicity, and chronic toxicity is determined by other specific tests.

REFERENCES

1. SF-standard 5062. Finnish Standard. Water quality. Determination of the acute toxicity with water flea, Daphnia magna Straus. 1984.
2. Hautman, DP, Bolyard, M. Using ino chromatography to analyze inorganic disinfection by-products.

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Neuthox® Product Safety Sheet

Review: 14-09-2018
Replaces: 17-02-2015
Version: 02.01 / EU_UK

SECTION 1: Identification of the substance/mixture and the company/company

1.1. Product identifier

Nombre comercial: NEUTHOX, pH 5,5 - 8,5

1.2. Relevant identified uses of the substance or mixture and non-relevant uses advised

Recommended uses: Disinfectant. Use biocides in a safe way. Always read the label and product information before use. This safety data sheet contains general information about the chemical, but specific instructions and guidelines are indicated on the product label and in the instructions for use.

1.3. Details of the supplier of the safety data sheet

Supplier: Danish Clean Water A/S Nørrekobbel 11 6400 Sønderborg Denmark Tel: +45 70290900
1.4.

Emergency telephone number: +45 70 29 09 00

Emergency telephone comments: The emergency telephone operates between 8 am and 4 pm on weekdays.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

CLP-classification (Regulation (EC) No 1272/2008): The product must not be classified as dangerous according to EU classification and labeling rules. More serious harmful effects: May cause slight irritation to the skin and eyes.

2.2. Label elements

The product
must not be classified as dangerous according to EU classification and labeling rules.

H-Phrases:-
P-Phrases:-

2.3. Other Hazards

The product does not contain PBT or vPvB substances.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

CAS Number/CLP Substance-Classification (Regulation (EC) No 1272/2008) w/w% EC
Registration Note No.
Does not contain substances subject to information requirements Please see section 16 for the full text of H-phrases

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SECTION 4: First aid measures

4.1. Description

of first aid measures Inhalation: Provide clean air. Consult your doctor in case of persistent discomfort.

Ingestion: Wash your mouth thoroughly and drink 1-2 glasses of water in small sips. Consult a doctor if symptoms persist.
Skin: Remove contaminated clothing. Wash skin with water. Consult a doctor if symptoms persist.

Eyes: Rinse with water (preferably using an eyewash kit) until irritation disappears. Consult a doctor if symptoms persist.
Other information: When receiving medical assistance, show the safety data sheet or label.

4.2. The most important symptoms and effects, acute and delayed.

May cause slight irritation to the skin and eyes.

4.3. Indication of any immediate medical attention and special treatment needed

Treat the symptoms. No special immediate treatment is required.

SECTION 5: Firefighting measures

5.1. Extinguishing Modes

Suitable extinguishing methods
The product is not directly flammable. Choose agents based on surrounding fire suppression.
Inappropriate extinguishing methods
Do not use water jet, as it could spread the fire.

5.2. Specific hazards arising from the substance or mixture

The product is not directly flammable. Avoid inhaling vapors and fumes – try to breathe clean air.

5.3. Recommendations for firefighters

Use with self-contained breathing apparatus (SCBA) with chemical resistant gloves.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment, and emergency procedures

For non-emergency personnel:
Wear gloves.
For emergency personnel: In addition to the above: It is recommended to use protective clothing equivalent to EN 469.

6.2. Environmental Caution

Do not discharge large quantities of concentrated spills and waste into drains.

6.3. Methods and materials for containment and cleaning up

Contain and absorb spill with sand or other absorbent material and transfer to appropriate waste containers. Wipe up minor spills with a cloth. Rinse with water.

6.4. Reference to other sections

See section 8 for type of protection. See section 13 for disposal instructions.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

An eyewash station and drinking water should be available. Wash your hands before breaks, before using the sink, and at the end of work.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a dry, cool, and well-ventilated place. Shelf life: 12 months. Keep the original container tightly closed.

7.3. Final specific purposes

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Legal basis: Directive 2000/39/EC and its amendments.
It does not contain substances subject to information requirements.

8.2. Exposure Controls

Appropriate Engineering Controls:
Use protective equipment specified below.
Personal protective equipment, eye/face protection: Wear safety glasses if there is a risk of splashing to the eyes. Eye protection must comply with EN 166.

Personal protective equipment, skin protection: Plastic or rubber gloves are recommended. Gloves must comply with EN 374 standard.

Personal protective equipment, respiratory protection: Not required.
Environmental exposure controls: Ensure compliance with local emissions regulations.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquid
Color: Clear/Transparent
Odor: Chlorine
Odor threshold: No data
pH (solution for use): No data
pH (concentration): 5.5 - 8.5 Melting point: 0°C
Initial boiling point and boiling range: 100°C
Flash point: No data
Evaporation rate: No data
Flammability (solid, gas): No data
Flammable limits No data
Upper/lower: Upper/lower
Explosion limits: No
Data Vapor pressure: 2.33 Pa
Vapor density: No data
Relative density: 1
Solubility:

Solubility in water: Completely miscible/mixable
Partition coefficient: No data
n-octanol/water: Spontaneous ignition
Temperature: No data
Decomposition temperature: No data
Viscosity: No data
Explosive properties: No data
Oxidizing properties: No data

SECTION 10: Stability and reactivity
10.1. Reactivity:
Non-reactive.
10.2. Chemical stability:
The product is stable if used according to the supplier's instructions.
10.3. Possibility of hazardous reactions:
None known.
10.4. Conditions to avoid:
None known.
10.5. Incompatible materials:
None known.
10.6. Hazardous decomposition products:
None known.

SECTION 11: Toxicological Information
11.1. Information on toxicological effects
Acute toxicity - oral: Ingestion of large quantities may cause discomfort. The product does not have to be classified. Test data not available Acute toxicity - dermal: The product does not have to be classified. Test data is not available.
Acute toxicity - inhalation: The product does not have to be classified. Test data is not available.
Skin corrosion/irritation: May cause slight irritation. The product does not have to be classified. Test data is not available. Serious eye damage/May cause eye irritation. The product does not have to be classified.
Eye irritation test data: not available.
Respiratory sensitization or skin sensitization: The product does not have to be classified. Test data is not available.
Germ cell mutagenicity: The product does not have to be classified. Test data is not available.
Carcinogenic properties: The product does not have to be classified. Test data is not available.
Reproductive toxicity: The product does not have to be classified. Test data is not available.
Inhalation of vapors may cause upper respiratory irritation.
The product does not have to be classified. Test data not available Repetitive STOT exposure: The product does not have to be classified. Test data is not available.
Aspiration hazard: The product does not have to be classified. Test data is not available.
Other toxicological effects: None known

SECTION 12: Ecological information
12.1. Toxicity
The product does not have to be classified. Test data is not available.

12.2. Persistence and degradability
Expected to be biodegradable. Test data is not available.
12.3. Bioaccumulative potential
Bioaccumulation is not expected. Test data is not available.
12.4. Mobility in soil
Test data is not available.
12.5. PBT and vPvB assessment results
The product does not contain PBT or vPvB substances.
12.6. Other adverse effects
None known.

SECTION 13: Disposal Considerations
13.1. Waste treatment methods
Do not discharge large quantities of concentrated waste and waste into drains. Contact local authorities.

CER code: Depends on the line of business and use, for example 16 03 04. Inorganic waste other than those specified in code 16 03 03.
Fabric/absorbent contaminated with the product: CER code: 15 02 03 Absorbents, filtration materials, cleaning cloths and protective clothing other than those specified in code 15 02 02.

Empty and cleaned packaging must be disposed of for recycling.

SECTION 14: Transport information
The product is not covered by the rules for the transport of dangerous goods.

14.1. UN number	-
14.2. Proper shipping name UN	-
14.3. Risk level for transportation	-
14.4. Packing group	-
14.5. Environmental hazards	-
14.6. Special precautions for users	-
14.7. Transport in bulk-according to Annex II of MARPOL 73/78 and the IBC Code	-

SECTION 15: Regulatory information

Regulation (EU) No 528/2012 of the European Parliament and of the Council of May 22, 2012 in relation to the making available on the market and use of biocides.

15.1. Safety, health, and environmental regulations/legislation specific to the substance or mixture
Special measures: None.

15.2. Chemical safety assessment Chemical safety assessment has not been carried out.

SECTION 16: Other information
Changes have been made to the following sections: 1.16

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Explanations of abbreviations:
PBT: Persistent, Bioaccumulative and Toxic

vPvB: Very Persistent and Very Bioaccumulative
STOT: Specific Target Organ Toxicity (STOT)

Classification method: Calculation based on the risks of known components.

H-phrases: There are no H-phrases (H-phrases => Hazard statements). Training: A thorough knowledge of this safety data sheet must be a precondition.

Other information: This safety data sheet has been prepared for this product and applies to this product only. It is based on our current knowledge and on the information that the supplier was able to provide about the product at the time of preparation. The safety data sheet complies with the legislation applicable to the preparation of safety data sheets in accordance with 1907/2006/EC (REACH) and subsequent amendments.

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