



**NORSE  
PURE**

*It's all about the present future ©*

# This is us



## NorsePure AS strives to make this world a little better, by introducing our disinfectant products that are both sustainable and effective.

NorsePure distributes the surface disinfectant product Freebac®. A product that is unique with its complex formulation, that destroys microorganisms and removes biofilm fast and effective. The formulation uses hydrogen peroxide as an active disinfectant, however, unlike other silver-based stabilized products, Freebac® is stabilized with a gel that only uses food safe ingredients in the production process. This makes Freebac® 100% sustainable.

It is NorsePure AS's desire to offer a safe and effective disinfection to everyone, being at the same time respectful with our environment. Our company is in line with the United Nation's Sustainable Development Goals, which are vital for a recovery that leads to greener, more inclusive economies, and stronger, more resilient societies.

We are committed to change the present future of disinfection, making sustainable disinfectants accessible for all of us that are aware about the critical need of reducing our ecological footprint, making this planet habitable for all organisms now, and for the years to come.

### THE GLOBAL GOALS



### Distribution vision:

NorsePure is building up distribution in Norway, the Middle East, Africa, India and China, and are actively working and seeking cooperation partners globally. The company has signed big distribution agreements in China/Middle East.

**The production of Freebac® is carried out in the Netherlands according to high ISO standards:** ISO 9001:2015 for the scope: The development, storage, production and sales of: (disinfection) agents and equipment to fight microorganisms, environmentally friendly biostimulants, and processing aids for the preparation of food products.





# Efficient, versatile, safe and sustainable.

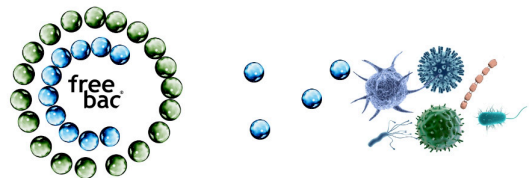
**Freebac<sup>®</sup> is a stabilised hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) disinfectant, but unlike other stabilised H<sub>2</sub>O<sub>2</sub> products, it only uses food grade stabilisers and packs the active substance in such a way as to make the product more versatile, more efficient, and genuinely sustainable.**

**The power of Freebac<sup>®</sup> comes from its unique formulation, so before discussing the benefits of the product, we need to have a short technical look at the product.**

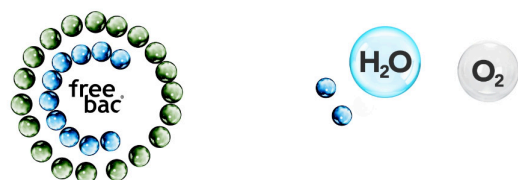
Freebac<sup>®</sup> uses a food grade stabiliser compound that packs the H<sub>2</sub>O<sub>2</sub> into a "gel" like compound at nanoscale. This means that the H<sub>2</sub>O<sub>2</sub> is perfectly safe and non-reactive until a disturbance in the "gelpack" takes place, through contact with microbes, at which point the H<sub>2</sub>O<sub>2</sub> is activated and disinfection occurs.

What does all this mean? It means a product that is more efficient, versatile in use, and is both safer and more sustainable than alternatives. More efficient due to reactions occurring when and where they are supposed to, more versatile due to a resilient yet gentle product, safer since the by-products are water (H<sub>2</sub>O) and oxygen (O<sub>2</sub>) with no heavy metals.

## CONTACT WITH MICROBES



## DISINFECTION OCCURS



## THE REMAINING PRODUCT WILL BE LEFT UNAFFECTED





# Efficient, versatile, safe and sustainable.

## Efficient

**The efficiency is evidenced whenever the product is used for water treatment, both for biofilm removal and for continuous dosing.**

Biofilm is a massive issue in most water treatment and only one product has so far had a near 100% success rate in its removal: **Freebac®**. Biofilm is where waterborne diseases such as legionella erupt, and the removal of biofilm is the first step towards a genuinely safe water system.

### Before



### After



Using Freebac® as a shock treatment has already shown efficiency in hotels, sports centres, ships, farms, schools, etc., even users who were adamant that no biofilm would exist in their system have had biofilm removed from their system with the use of Freebac®. Combined with continuous dosing of the same product, at a lower concentration, drinking water is kept disinfected, and safe.

After Efficient biofilm removal, with subsequent dosing, also means removal of legionella, one of the major water issues in the world today. Legionella bacteria occurs naturally, but is generally never an issue until it occupies space in human made water system. In our water systems it can build up in biofilm to then "burst" from the biofilm in large enough numbers to cause disease. Freebac® has proven in Norway on several occasions to be the only product to remove biofilm efficiently, enough to completely remove legionella problems and prevent biofilm rebuilding with continuous dosing.







# Efficient, versatile, safe and sustainable.

## Versatility

Freebac® is a highly versatile product, as it does not break down easily, yet is gentle enough to not have adverse effects on materials and animals (dependent on correct usage and dosage). Taking a farm as an example:

Buying a single product, Freebac 35 (with a 35% H<sub>2</sub>O<sub>2</sub> concentration), the farmer can do multiple disinfection steps, by deluting after need. **First**, shock treatment of the water system to remove existing biofilm. **Second**, dosing the product into new water to ensure clean, disinfected water, with no new biofilm build up. **Third**, using the product in the misting system to completely disinfect the entire barn/greenhouse/etc. **Fourth**, using the product as a direct spray on all equipment; tables, feeders, tools, etc. **Fifth**, using the product in a booth bath for the really clean areas.

Essentially the farm can be completely disinfected by the use of a single product.

## Safety

Freebac® is powerful enough to get rid of biofilm, yet safe enough (dependent on correct use and dosage) to be used directly on skin. Freebac 1.5, with a 1.5% H<sub>2</sub>O<sub>2</sub> concentration, is freely available to be used by anyone for hand and surface disinfection. The stabilizer, packing the H<sub>2</sub>O<sub>2</sub> at a nanoscale, ensures that on human skin are not noticeable. Unlike H<sub>2</sub>O<sub>2</sub>, which decomposes very quickly without a stabilizer, and causes skin inflammation.

## Sustainability

Hydrogen peroxide is already well known to be one of the best disinfectants to tackle the growing challenges in sustainability for the planet. Chemically hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) consists only of two atoms; hydrogen (H) and oxygen (O), which lead to one of the more easily created and most stable molecules we know of; water (H<sub>2</sub>O) and oxygen (O<sub>2</sub>). Freebac takes this fact, and pushes it further by being a product that is more useful than pure medicine grade H<sub>2</sub>O<sub>2</sub>, while only using food grade ingredients to its stabiliser. When Freebac has served its purpose and disinfected your water system, farm, food processing, or one of the many other uses, the only by-products left behind are water and oxygen. No heavy metals, no harmful disinfection by-products, just the most natural and useful of molecules. It's also important to note that hydrogen peroxide is an unstable product and therefore requires a stabilizer to prevent rapid decomposition.





# Water treatment

## Used for water treatment, Freebac can serve two main uses:

Water treatment is one of the newest branches of use for Freebac, but still a successful one. Freebac has been used and tested for a lot of different areas within water treatment, including:

- **Shock treatment**

- Which cleans existing biofilm out of the system, leaving a fully disinfected and microbe free system

- **Continuous dosing**

- Which keeps a fully disinfected system free of microbes and keeps biofilm from rebuilding.

Shock treatment is always the first step, and here Freebac has the advantage of being able to go much higher in either concentration or contact time, depending on the needs and preferences of the customer. Because of the way the product is stabilised, the reaction to most materials is so low that it can be used without any form of damage to the system. Shock treatment can therefore be done in such a way that it guarantees complete removal of all biofilm, rather than being hampered by procedure requirements of the disinfection product used. Continuous dosing keeps a shock treated system from ever again forming biofilm by removing all the microbes in the water system well before anything is allowed to settle.

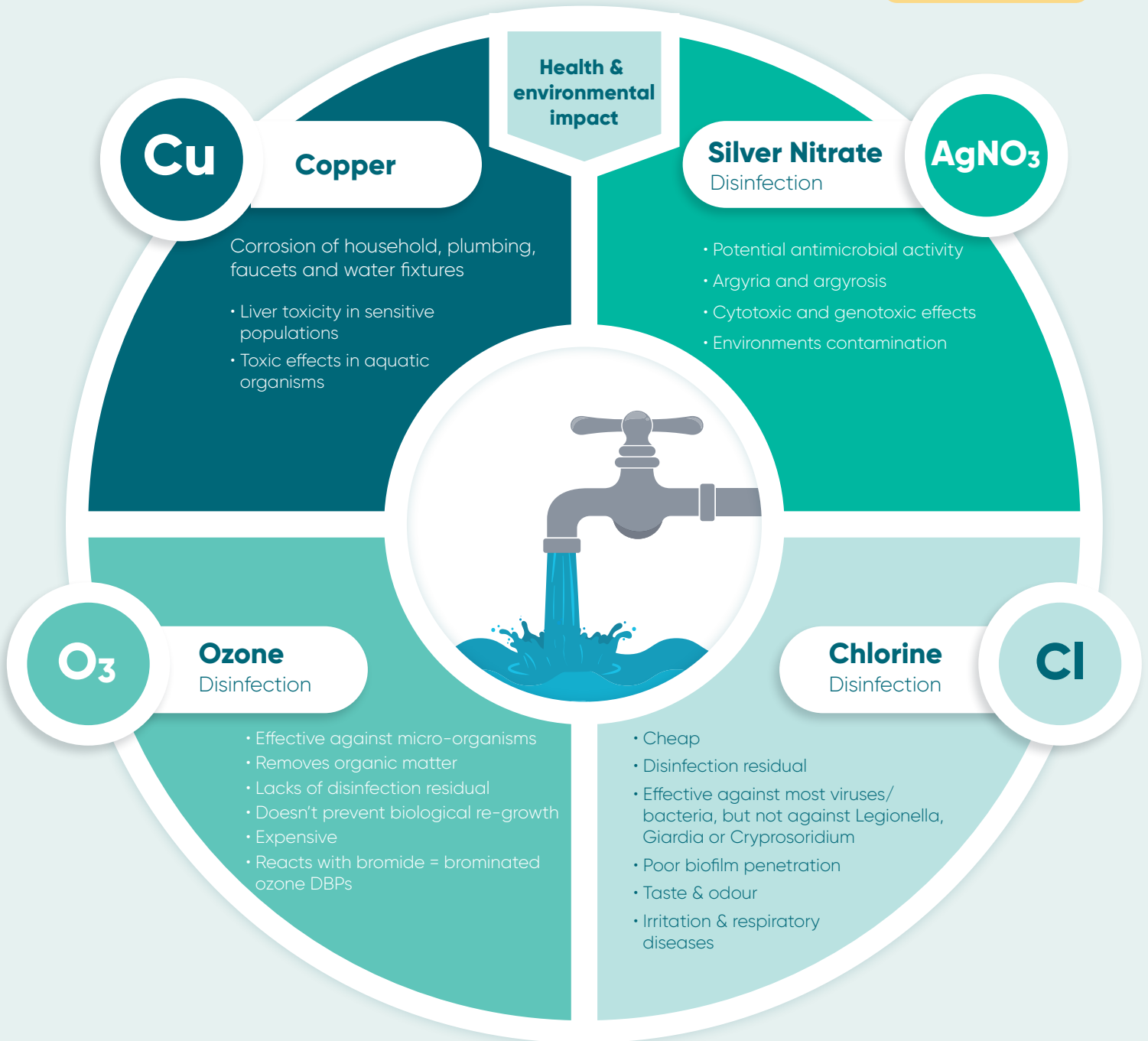
## This combination has already had success, including in locations with known problems like legionella:

- **A psychiatric hospital ward** with a known legionella issue for over 10 years was shock treated and continuously dosed with Freebac 35, while legionella monitoring continued for another 6 months. The legionella was removed, and no new legionella was ever found.
- **The sports hall** of a school where the hot water system of showers had developed legionella due to a system fault. Shock treatment and continuous dosing of Freebac 35 was implemented and the problem removed.
- **A newly built sports hall with an indoor football field** (astro turf) immediately started using Freebac 35 in the main water intake to avoid issues with showers not being used as often. As a side-effect to this a build-up of mould from the indoor football field was ceased and cleared up.

Beyond simply disinfecting water, Freebac can also be incorporated into a full drinking water monitoring system. As the product is highly stable any major loss of product would be attributable to problems in the drinking water system, either contamination or water loss.



# CHEMICAL HAZARDS in drinking water



The combination of **chlorine with organic compounds in drinking water produces chlorination disinfection by-products (DBPs)**. At least 600 DBPs have been identified, but the most common and measured ones are trihalomethanes (THMs). **Exposure to DBPs has been linked to cancer (especially bladder cancer) and adverse reproductive outcomes.**

Standards for THMs are set to drive changes in water supply practice that will reduce the overall load of chlorination by-products, according to the WHO international guidelines for safe drinking water.



## Hand and surface

**While Freebac® was originally intended for use by industry professionals in larger scale operations such as water treatment, it does not mean that the product has no use for private consumers. With the product Freebac 1.5, with a lower concentration of hydrogen peroxide, private individuals can now experience all the benefits that professional users have discovered.**

Commonly the private market uses alcohol-based disinfection, which smells, dries up the skin, and is highly flammable. Freebac 1.5 has none of these issues, while being just as efficient as the water treatment counterparts. Used on surfaces, the product can be left alone without the need to rinse or wipe, without leaving any kind of smell in the room. Used on hands the product does not dry out skin, especially noticeable to workers in the health sector, while leaving an active residue that provides protection over a longer period.

Surface disinfection can also be taken a step further by adding Freebac® to fogging and misting systems, these provide a potential to disinfect entire rooms, public transport, and so on. Being a no-rinse product Freebac is safe to use in any location imaginable, with only precautions required during the actual misting/fogging procedure.

Freebac® is versatile enough to be used by anyone, meaning that everyone can now be sustainable in their disinfection.







## Farming and agriculture

**Freebac<sup>®</sup> has been used extensively in farming and agriculture and is one of the main current uses of the product. There are two main uses of Freebac<sup>®</sup> in agriculture currently:**

- **Farming**

Water disinfection and full farm disinfection, providing a healthier live stock with increased growth on less feed, with reduced use of antibiotics.

- **Greenhouse**

Disinfection of drip system water and full greenhouse disinfection, giving better growth conditions and hardier plants, especially when combined with probiotic and immune strengthening supplements.

Both of these uses can be generalised towards animal husbandry and plant-based agriculture respectively, but these are the main current uses of the product within this field.

Chicken farming has been an especially successful use of the product. With a model farm in Norway, and a test in India both showing increased growth compared to previously, without the need for antibiotics. The farm in Norway had a 10.9% increase in growth, with a 61.% improvement in FCR (Feed Consumption Rate), compared to the national average. Overall, the Norwegian farm has increased its earnings due to a lowered feed cost.

The India project replaced chlorine with Freebac at an average chicken farm in India. The objective was to see if the change in drinking water would improve conditions on the farm, in particular mortality which had been a serious issue approaching near 10%. Not only was the mortality lowered to 3.81%, but the average carcass weight also increased by 81.% for the first batch with Freebac<sup>®</sup> and 12.4% for the second batch, compared to the first Freebac<sup>®</sup> batch, while improving the feed to weight efficiency. The important part of these numbers however, is that they were achieved using absolutely no antibiotics.



# Aquaculture

**Aquaculture is one of the newest applications for Freebac<sup>®</sup>, yet it has proven to be quite successful. Freebac<sup>®</sup> has been used and tested in various aspects of aquaculture, including:**

- **Ice production**

Used in the water to produce ice-slurry that keeps the fish cool and fresh.

- **General area disinfection**

Can be in production sites, well boats, fish processing.

- **Water disinfection**

Disinfecting and clearing up water in fish holding.

- **Cleaning away fungal infections in fish and roe holding tanks**

The product has also been tested to ensure that it does not harm fish in any way. It was tested against salmon at potentially harmful salmon lice treatment procedures with no damage to the fish.

Hydrogen peroxide is already well tested for use in aquaculture but using Freebac<sup>®</sup> can expand the scope of that use and remove some of the most harmful chemicals still in use by the aquaculture industry. One example is the use of Freebac<sup>®</sup> to inhibit the growth of the fungus *Saprolegnia* spp. on salmon roe.

A test was conducted at a facility in Norway using a total of 400L of salmon roe divided into various treatment regimes including continuous dosing and batch treatment, as well as the standard treatment for the fungus. Where the continuous treatment regime continually showed a statistically significant difference compared to other treatment methods. The same type of effect has been seen in hatchery conditions with fry and fingerling, where Freebac<sup>®</sup> has shown major improvement over current treatment methods.





# Sustainable disinfection



Disinfection residual



Removes biofilm



Respectful to the environment



Hydrogen peroxide-based product stabilised within a gel



It does not contain nitrates or other heavy metals



It breaks down into water and oxygen



Effective against viruses, bacteria, fungi and protozoa.



Various industrial applications worldwide encompass the municipal sector (waterworks, public buildings, swimming facilities, etc.), aquaculture, agriculture, shipping, offshore and more will benefit greatly from using Freebac.












NSF/ANSI 60 Certification (Drinking Water-Health Effects)



Submitted to ECHA for authorisation under the BPR for diverse product types

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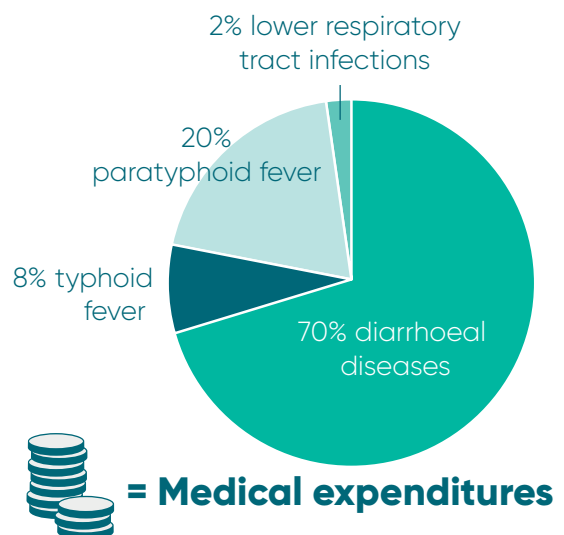
# Externalities of Water Pollution

	 <b>Commercial fishing</b>	<ul style="list-style-type: none"> <li>• Yield decrease</li> </ul>
	 <b>Recreational facilities</b>	<ul style="list-style-type: none"> <li>• Lost revenues</li> </ul>
	 <b>Water purification</b>	<ul style="list-style-type: none"> <li>• Inspection and treatment costs</li> </ul>
	 <b>Accidents/Spills</b>	<ul style="list-style-type: none"> <li>• Cleanup cost</li> </ul>
	 <b>Public health</b>	<ul style="list-style-type: none"> <li>• Medical services costs</li> </ul>
		<ul style="list-style-type: none"> <li>• Burden of diseases</li> </ul>
	 <b>Damage to ecosystems</b>	<ul style="list-style-type: none"> <li>• Biological diversity and sustainability</li> </ul>
		<ul style="list-style-type: none"> <li>• Loss or water regeneration by wetlands</li> </ul>

## Social costs

# 1.8m deaths in 2015 worldwide

- Unsafe water sources
- Inadequate hand washing
- **Unsafe sanitation**





# Economic costs

Water pollution decreases **1/3** of the economic growth

## Environmental costs

Table 1. Estimated annual costs of water pollution in Europe

Country	Type of water quality impact	Annual cost (millions)		Source
		National currency	EUR	
Belgium	Drinking water treatment costs		120-190	Doaot et al. 2010
France	Eutrophication of surface and coastal waters		70-1000	Bommelaer 2010
Netherlands	Nitrate and phosphate pollution		403-754	Howarth et al. 2001
Spain	Nitrate and phosphate pollution		150	Hernandez-Sancho et al. 2010
Sweden	Coastal eutrophication Baltic Sea eutrophication		860 492-1466	Huhtala et al. 2009
Switzerland	Agricultural pollution	CHF 1000	608	Pillet et al. 2000
United Kingdom	Drinking water treatment costs, agricultural pollution of surface water estuaries	GBP 229	335	Jacobs et al. 2008
Europe	Human health and ecosystem impacts from nitrogen pollution of rivers and seas  Health costs of nitrate in drinking water - colon cancer		40-155  1000	Van Grinsven et al. 2013  Van Grinsven et al. 2010

## Market volume of chlorine worldwide

Production = **101 million metric tons**

# Certifications

## **Freebac® is certified to NSF/ANSI/CAN 60 by NSF.**

NSF is a global independent public health and safety organization dedicated to improving human health worldwide since its founding in 1944. NSF's standards team facilitates the development of public health standards, and separately, its service teams test, audit and certify products.

**NSF/ANSI/CAN 60:** Drinking Water Treatment Chemicals – Health Effects is a global standard that establishes minimum health effects requirements for the chemicals, chemical contaminants and impurities that are directly added to drinking water from drinking water treatment chemicals. This standard was adopted as an American and Canadian national standard because of its thorough nature.

## **BPR**

Freebac® is covered in the EU Biocidal Products Regulation for Product Type (PT) 01-05.

## **Norwegian approvals**

Freebac® is in Norway covered by the following approvals

- Use as a disinfectant in drinking water (Norwegian Food Safety Authority)
- For technical use in aquaculture (Norwegian Medicines Agency)
- For technical use in health services (Norwegian Medicines Agency)

## **EN-testing**

Freebac has been tested to the following European disinfectant efficacy standards conducted through certified laboratories.

- EN-1040
- EN-1275
- EN-1276
- EN-13610
- EN-13623
- EN-13624
- EN-13697
- EN-13704
- EN-13727
- EN-14348
- EN-14476\* (At 1.5% only enveloped viruses are covered)
- EN-1499
- EN-1500
- EN-1650



# Product information

## Identification and strength

Active substance	Molecular formula	CAS Number	CE (EINECS) Number
Hydrogen peroxide	H <sub>2</sub> O <sub>2</sub>	7722-84-1	231-765-0

Freebac® is delivered in four separate H<sub>2</sub>O<sub>2</sub> strengths: 35%, 19.4%, 4.9% and 1.5%

## Packaging

The product is delivered in 1000L IBC, 200L barrel, 20L kegs, 5L kegs, 1L bottle, 500mL bottle, 100mL bottle, and 50mL bottle.

## Storage

Keep in a cool, well-ventilated place. Maximum storage temperature is 25°C. Keep away from heat and sources of ignition.

## Safety

Before handling product always make sure to read and understand the Materials Safety Data Sheet.

Persons working with hydrogen peroxide should be familiar with safety and handling procedures.

Freebac® is an oxidising solution that can cause burns in high concentrations. In case of contact with skin or eyes, always rinse with plenty of water and consult a doctor if persistent symptoms occur.



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