



Octo Marine

Fresh Water Safety on Yachts
Information Pack

Fresh Water Treatment Specialists

• AWARENESS

• TREATMENT

• ACTION PLAN

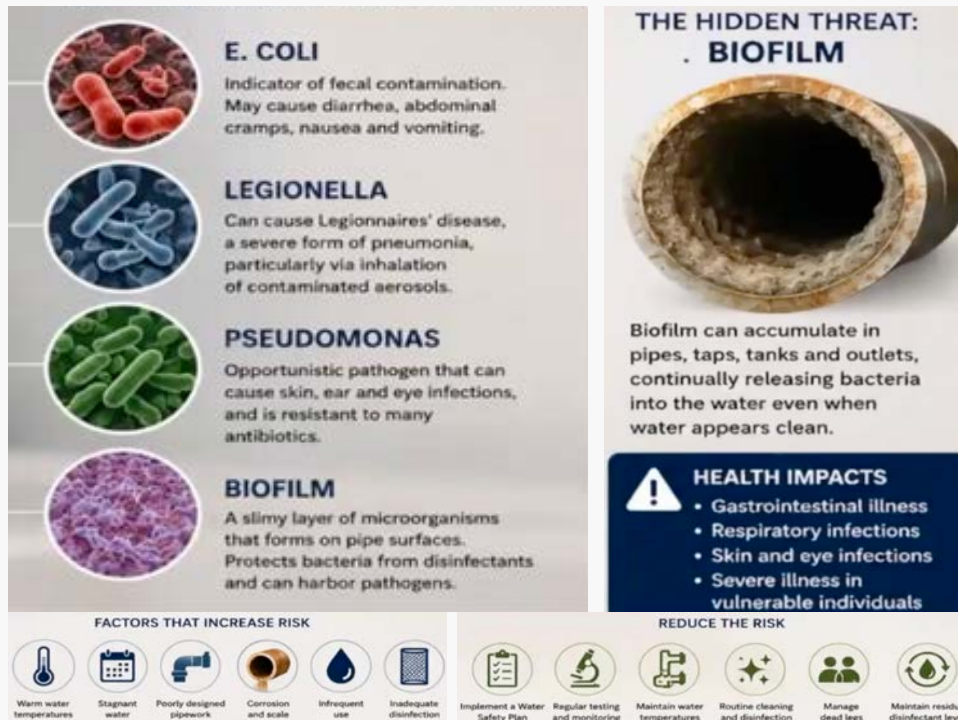


FRESH WATER SAFETY ON YACHTS

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The Hidden Threat in Maritime Water Systems

- Potential Microbiological Risks in Fresh Water
 - Running water can contain microorganisms that may pose a risk to human health, especially when systems are not properly managed



- Legionella can be a very serious issue and is contracted by breathing in contaminated water mist with legionella bacteria (from showers, washdowns, jacuzzis / hot tubs / ice-baths, unused water outlets, main water distribution system)
- Biofilm is effectively the eco-system that allows a full range of micro-organisms to live, breed, feed, and be protected from certain forms of disinfection
- A lot of the risks above can be increased significantly with warmer water temperatures in the water system, stagnation of water systems (not being used all the time), dead legs, corrosion & scale and inadequate methods of disinfection.

IMPACT



Crew / passenger illness

Increased risk of waterborne illness outbreaks on board.



Non-compliance with flag state or local requirements

Risk of detentions, fines and enforcement action.



Possible shore-side delays if the ship fails water testing

Operational disruption, missed charters and reputational impact.



Alternative drinking water supply – bottled water?

High cost, logistics, storage and environmental impact.

Large fleet x 100 vessels - 3 crew per vessel x 2l per day x 350 days x € 0.8 per bottle

= € 450k+ per annum

Impact of a poorly managed water system

- Any of the above micro-organisms could cause significant issues onboard both commercial / private vessels to crew / passengers.
- Vessels being stopped at port, not being allowed to sail due to non-compliance and enforcement to responsible parties, usually Chief Engineers or Captains.
- If your water testing fails, you could have operational disruption with potentially cancelled trips / charters and reputational impact for charter companies.



INCREASED RISK TO PEOPLE

Protecting the health and wellbeing of everyone on board.



INCREASED COST TO BUSINESS

Higher operational costs, fines, delays and potential claims.



LONG TERM REPUTATIONAL DAMAGE

Loss of trust, negative publicity and impact on future business.



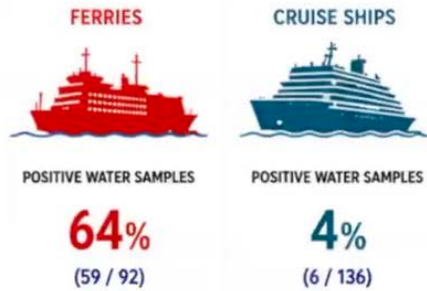
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Comparison studies in Commercial Industry

1 FERRIES VS CRUISE SHIPS

A tale of two risk profiles

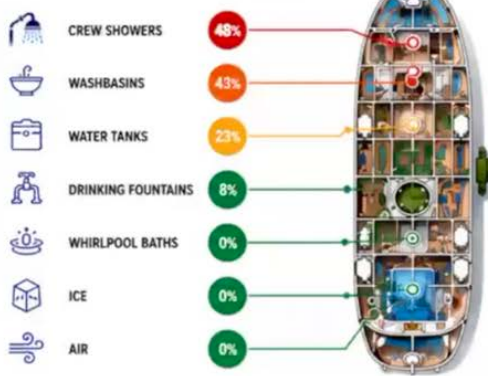


Ferries were **16 times** more likely to have Legionella-positive water samples.

Source: Ann Agric Environ Med. 2017; 24(2): 276-282

2 WHERE WAS *LEGIONELLA* FOUND?

Percentage of positive samples (all ships combined)



The greatest risk comes from routine activities.

3 CREW FACILITIES PRESENT GREATER RISK



Crew accommodation represented the highest exposure area.

4 WHAT HAPPENS WHEN *LEGIONELLA* IS FOUND?

Serogroup distribution among positive samples

FERRIES – 59 POSITIVE SAMPLES

	No. of samples	% of positive
● <i>L. pneumophila</i> Serogroup 1	21	36%
● <i>L. pneumophila</i> Serogroups 2–14	30	51%
● <i>L. pn</i> 1 + <i>L. pn</i> 2–14 (mixed)	8	13%

CRUISE SHIPS – 6 POSITIVE SAMPLES

	No. of samples	% of positive
● <i>L. pneumophila</i> Serogroup 1	4	67%
● <i>L. pneumophila</i> Serogroups 2–14	2	33%
● <i>L. pn</i> 1 + <i>L. pn</i> 2–14 (mixed)	0	0%



KEY MESSAGE

Cruise ships rarely tested positive, but when Legionella was detected, it was more often the disease-associated Serogroup 1.

Ferries, however, were far more likely to be contaminated in the first place.

5 IT'S NOT JUST PRESENCE. IT'S CONCENTRATION.

Legionella concentration in positive water samples (CFU/L) – all ships combined



Some ferries exceeded action thresholds considered critical.

6 WHY FERRIES PERFORMED WORSE

FERRY CHALLENGES



- Older vessels
- Galvanised pipework
- Difficult tank access
- Limited crew resources
- Less formalised maintenance
- Intermittently used outlets
- Greater biofilm formation

CRUISE SHIP STRENGTHS



- Water safety plans
- Dedicated engineering teams
- Frequent maintenance
- Structured monitoring
- Better system design and materials
- Regular disinfection and verification

Differences in design, maintenance and resources drive risk.

SCIENTIFIC EVIDENCE FROM THE MARITIME SECTOR

Legionella spp. Colonization on Non-Passenger Ships Calling at Belgian Ports (2022)



- PUBLISHED: December 2022 Medical Sciences Forum
- AUTHORS: Kourentis et al.
- STUDY LOCATION: Belgian Ports
- VESSEL TYPE: Non-passenger merchant vessels

RESEARCH TIMELINE



BELGIAN STUDY (Kourentis et al., 2022)



WHY THIS STUDY MATTERS

Commercial ships operate complex water systems that share many characteristics with ferries, cruise ships and superyachts, making the findings highly relevant to maritime water safety.





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Water Treatment Options

MARKET COMPARISONS

CHLORINE (SODIUM HYPOCHLORITE)

MOST WIDELY USED FOR WATER TREATMENT

- POOR STABILITY
- pH & TEMPERATURE AFFECTS PERFORMANCE
- POTENTIAL HARMFUL BY-PRODUCTS (THM'S)
- NOT BIODEGRADABLE – *REQUIRES NEUTRALISATION*
- RESTRICTED EFFICACY
- ODOUR & TASTE ISSUES
- CAN CAUSE ISSUES WITH SKIN, ASTHMA, EYES
- CORROSIVE TO MATERIALS OF SYSTEM



CHALLENGES WITH CHLORINE:

Effectiveness can be compromised by instability, environmental factors and the risk of harmful by-products.

- Potentially has harmful by-products. There are over 160 proven carcinogens as by-products of chlorine disinfection. Most well known are THMs, responsible for many cases of bowel and stomach cancers.
- Chlorine has little to no efficacy towards treating biofilms which house all the dangerous microorganisms as mentioned above.

MARKET COMPARISONS

SILVER ION (KATADYN)



Key Factors Affecting Chloride Levels Post-SWRO (Sea Water Reverse Osmosis)

1. Typical Chloride Content in Mediterranean Seawater:
 - o The Mediterranean has a high salinity, with chloride levels ranging from 19,000 to 21,000 mg/L due to its relatively enclosed nature and high evaporation rates.
2. SWRO Rejection Efficiency:
 - o Modern SWRO membranes typically achieve 99.0% to 99.8% salt rejection, depending on the membrane design and operational parameters.
 - o Chloride ions, being small and highly charged, are among the more challenging ions to remove but still experience significant rejection.
3. Residual Chloride Concentration:
 - o With 99.4% Rejection Efficiency
Residual Chloride Concentration = Initial Chloride Concentration x (1 - Rejection Efficiency)
For Mediterranean seawater: Residual Chlorides = 20,000 mg/L x (1 - 0.994) = 120 mg/L
4. Permeate Water Chloride Range:
 - o In practice, the chloride concentration in the permeate (product water) is typically 100-210 mg/L depending on system performance, maintenance, and operating conditions.
5. Impact of Temperature:
 - o At 25°C, reverse osmosis membranes operate near their optimal performance. Higher or lower temperatures could slightly reduce rejection efficiency, leading to slightly higher chloride concentrations in the permeate.

- Over time, with ever improving technology, it has been proven that the silver ions complex with the high levels of chloride contained in R.O. (watermaker) product water, forming silver chlorides.
- No longer being in ionic form, these silver chlorides are heavier than water and drop to the bottom of the Fresh Water holding tanks, compromising the whole point of sterilisation.

MARKET COMPARISONS

ASHP (ADVANCED STABILISED HYDROGEN PEROXIDE)

SUSTAINABLE MARITIME WATER TREATMENT



- ✓ MOST STABLE – UP TO 5 WEEKS IN USE
- ✓ pH & TEMPERATURE **DOES NOT AFFECT** PERFORMANCE
- ✓ **NO** HARMFUL BY-PRODUCTS, ODOUR OR TASTE
- ✓ BIODEGRADABLE – **NO NEUTRALISATION**
- ✓ BROAD SPECTRUM EFFICACY INC BIOFILMS
- ✓ NON-CORROSIVE IN USE TO ALL MATERIAL
- ✓ ECO – CERTIFIED BIODEGRADABLE

(HYDRASIL Ag+)



KEY BENEFITS



Effective bactericide, fungicide & virucide



Biofilm removal



Biodegradable



No-rinse surface disinfection



No odour, no colour, no taste



Superior stability



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Hydrasil Ag+ usage in Fresh Water Treatment in the Maritime Industry

- Silver Stabilised Hydrogen Peroxide is recommended by the Maritime & Coastguard Agency (MCA) and is approved to be used in the guidance of the control of legionella bacteria by the Health and Safety Executive (HSE).
- HydrasilAg+ is unique in its chemical formula and the only Silver Stabilised Hydrogen Peroxide that has been tested and approved under the Biocidal Products Regulation (BPR, Regulation (EU) 528/2012) for (PT2, 3, 4, 5), under PT 5 (Drinking water - Used for the disinfection of drinking water for humans).
- It is the only Biocide registered for use in potable water systems intended for human consumption.
 - Be careful of other products of Silver Stabilised Hydrogen Peroxide as they are not all created equally. Check if they are for human consumption and compliant, currently HydrasilAg+ is the only one suitable on the market.
- With the addition of low-level proprietary elements to maintain silver ion stability, this allows Hydrasil to treat the water unaffected by any chloride that may be present, making it suitable for both bunkered and reverse osmosis water sterilisation. It has excellent stability and a rapid 4-5 log reduction of bacteria.
- One 10L drum of Hydrasil 35% will treat approx. 140,000L of fresh water @25ppm using a specific Hydrasil Dosing System.

catering staff and other persons processing food in the galley (Regulation 40)

6. Inspection of food and catering facilities (regulation 36)

7. Food and drinking water safety – information for crew

8. More detailed guidance

9. References to this notice in the MLC Minimum Requirements Regulations

10. More information

Annex 1 - Food safety and hygiene

Annex 2

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concentrations of free chlorine which may be further decreased within the ship environment. Although there is no requirement to do so, and control measures will be influenced by the quality of the source water, it is considered good practice to add chlorine as a routine when loading fresh water to a level that produces 0.2mg/L (ppm) residual free chlorine or 1.0mg/L (ppm) chloramine when chloraminated water is supplied. Chlorine should preferably be applied as a hypochlorite solution, using a commercial hypochlorinator designed for the purpose or by using an automatic chlorination unit in the ship's deck filling line. The concentration may also be achieved by the manual method using the formula contained in the "WHO's Guide to Ship Sanitation". A commercial test kit should be used to check the free chlorine or chloramine levels.

Some other treatments available include:

3.2 Silver stabilised hydrogen peroxide

The UK accepts silver stabilised hydrogen peroxide as a disinfectant for fresh water (see the HSE publication "Legionnaire's Disease Technical Guidance HSG 274 (2014) Part 2). It is considered good practice to add the silver stabilised hydrogen peroxide to a level recommended by the manufacturer when loading fresh water. An automatic dosing system should be employed to dose the disinfectant in proportion to the intake flow rate.

Maritime & Coastguard Agency





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What the yachting industry can do to help combat the issues

5 Point Action Plan for Crew :

1. Put in place a correct Bunkering Procedure
2. Ensure that the Sterilisation System is working and fit for purpose
3. Do Weekly Onboard Testing - Temperature, PH, TDS & Residual Sterilisation & LOG the results
4. Operate a Weekly Flushing Schedule
5. Do Regular Water Analysis by a Laboratory

How to improve water quality in the Yachting Industry

Standard Operating Procedures

SOPS

Fresh Water Procedures :

- Bunkering Procedure
- Softener Procedure
- Point of Use Drinking Systems Procedures
- Water Distribution & Flushing Procedure
- Sterilization Procedures
- Weekly Analysis Testing Onboard
- Watermaker Procedure
- Jacuzzi / Pool Procedure

What action the Yachting Industry can take :

- **Operational Water Safety Plans**
- **Fresh Water Budgets**

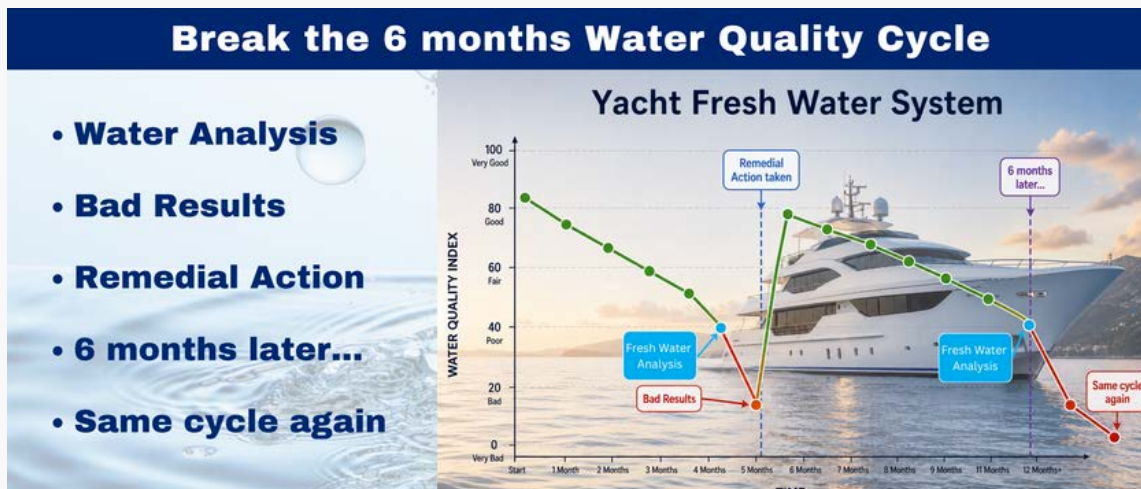
What management and shipyards can do to help combat the issues :

- From the build point of the vessel or new purchase stage, put in place a Water Safety Plan that is operational and a “living” document for crew to use and adhere to.
- Follow Standard Operating Procedures for each part of running the fresh water system onboard.
- Management companies and Captains can then assess a realistic “Fresh Water Budget” specific to each vessel that covers all necessary steps, equipment, maintenance and ongoing management for the safety of the yacht, crew, owners and guests.



FRESH WATER SAFETY ON YACHTS Info Pack

Break the 6 months cycle “yoyo” effect in water treatment on yachts



Implement an Operational Fresh Water Safety Plan with Octo Marine Safety Division

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- For more information on the “yoyo” effect, please refer to this article written by Dustin Wilson of Octo Marine “ [Why Potable Water Systems on yachts develop recurring water quality problems](#) ”.
- To watch the full webinar held by the Professional Yachting Industry (PYA) in June 2026 on Fresh Water Safety on Yachts, [please click this link](#).
- If you have any questions on how to help your yacht(s) manage safe onboard fresh water, please don’t hesitate to [contact us at Octo Marine](#).

For any questions, please contact Octo Marine Water Safety Division

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