

Aqua-Tec Water Preservation Cell



Green benefits

- **Less hazardous:**
 - Reduces the need to use hazardous chemicals
 - Generates less hazardous waste than comparable germicidal products

Introduction

We are committed to designing our products with the environment in mind—it's part of how we enable our customers to make the world healthier, cleaner and safer. This fact sheet provides the rationale behind the environmental claims that the Thermo Scientific™ Aqua-Tec™ Water Preservation Cell reduces the need to use other hazardous materials and generates less hazardous waste than comparable products.

Product description

The Aqua-Tec Water Preservation Cell provides an easy, effective way to prevent microbial contamination in any CO₂ incubator or water bath



Figure 1. The Aqua-Tec Water Preservation Cell used in a CO₂ incubator to prevent microbial contamination.

reservoir without the need for chemical disinfection solutions. The Aqua-Tec cell uses natural ionic silver as an oxidation catalyst to work with naturally occurring oxygen in the water, to create free radicals that attack and destroy microorganisms. The Aqua-Tec cell is easy to use: simply remove it from the package and drop it into the incubator water reservoir (Figures 1 and 2). Each Aqua-Tec unit lasts for up to six months and self-regulates, only releasing silver ions into the water as needed to maintain the proper concentration. Ongoing use of the Aqua-Tec Water Preservation Cell means less time spent fighting common incubator contaminants, including bacteria and fungi. Water bath reservoirs still require regular cleaning to remove dirt and spilled media, which could interfere with the activity of the Aqua-Tec Water Preservation Cell. However, starting with sterilized distilled water and using the Aqua-Tec cell to keep the water clean allow cultures to grow without interruption.



Figure 2. The Aqua-Tec Water Preservation Cell used in a water bath reservoir.

Ongoing use of chemical disinfectants in the water of a CO₂ incubator can have negative effects [1]. Chemical disinfectants often include volatile organic compounds, and some leave residues that can elicit stress responses and induce toxicity in cultured cells [2]. Many of these disinfectants can also cause corrosion and pitting of stainless steel, damaging the CO₂ incubator over time.

Green feature

Less hazardous

The Aqua-Tec Water Preservation Cell uses a silver metal catalyst and naturally occurring oxygen in water to create reactive oxygen species (ROS). These ROS attack organic species and molecules in the water, breaking them down with a microelectric potential of 800 mV. This approach

Table 1. Comparison of Aqua-Tec Water Preservation Cell with other water disinfectants.

| Example | Type | Handling/use | Efficacy in CO ₂ incubator | Effects on CO ₂ incubator |
|--|----------------------------|--------------------------|---------------------------------------|---|
| Aqua-Tec Water Preservation Cell | Oxidation catalyst | None/as-is | ++ | None |
| Lysol™ No Rinse Sanitizer, Conflikt™ disinfectant, Fermacidal D2™ disinfectant | 10% or less | Manually dilute 1:100 | ++ | None |
| Copper sulfate | Solid crystals | Manually dilute to 1 ppm | + | Incubator corrosion over time |
| AquaClear™ water conditioner, SigmaClean™ treatment | 25–70% quaternary ammonium | Manually dilute 1:100 | ++ | Incubator corrosion within months [1] |
| 100% solid copper | Water pan | None/as-is | +++ | None |
| Ultraviolet light | Electromagnetic radiation | None/as-is | --[3] | None |
| Bleach | Chlorine disinfectant | Manually dilute 1:100 | +++ | Incubator corrosion within months, stress responses from cultured cells [1,2] |

offers broad-spectrum efficacy, unlike many chemical disinfectants. The Aqua-Tec Water Preservation Cell is registered with the United States Environmental Protection Agency and the European Union BioProducts Regulation as a biocidal product. It has been shown in multiple tests to be effective against common laboratory water microbial contaminants.

Many labs use diluted chemical disinfectants in the CO₂ incubator humidity water to minimize growth of microorganisms. As shown in Table 1, however, most of these chemicals have negative effects on the incubator over time, causing corrosion, and some can induce stress responses in cultured cells [2]. All chemical disinfectants require manual measuring and dilution, and many are hazardous at the stock concentrations. In contrast, the Aqua-Tec Water Preservation Cell is dropped directly into the water reservoir. The Aqua-Tec Cell will continuously help protect the incubator water for up to 6 months and has no negative effects on cultured cells or incubator components, unlike many chemical disinfectants. Therefore, the Aqua-Tec Water Preservation Cell reduces the need to use hazardous chemical disinfectants.

Use of the Aqua-Tec Water Preservation Cell also reduces hazardous waste generation. Each package of the Aqua-Tec Water Preservation Cell contains four small units that each last 6 months, totaling 2 years of use per package. The Aqua-Tec Water Preservation Cell does not require any special disposal protocol; at end of life it can simply be disposed of in landfill. In contrast, when using a

quaternary ammonium product for disinfection, on average 3.1 L of product diluted in water would be used over a 2-year time period (Table 2).

Table 2. Comparison of hazardous waste generation from the Aqua-Tec Water Preservation Cell* and a conventional water-disinfecting product.

| Disinfectant product | Stock volume | How to use in 3 L water pan | Total waste volume generated per 2 years |
|------------------------------------|---------------------|--|--|
| Aqua-Tec Water Preservation Cell | 4 units per package | 1 unit per 6 months | 1 package |
| Conflikt Ready to Use Disinfectant | 3.8 L (1 gallon) | 1:100 dilution each week, 30 mL per week | 3.1 L undiluted material |

* Per CO₂ incubator

The Aqua-Tec Water Preservation Cell easily and safely helps protect the water in cell culture incubators, does not cause incubator corrosion, and is safe for cultured cells. The product's design reduces the use and waste generation of hazardous chemicals, which is a win for our customers, our company, and our planet.

References

1. Thermo Scientific Technical Note: Proper care and maintenance for a cell culture incubator. Thermo Fisher Scientific TNC02CARE 1217, 2018.
2. Croute F et al. (2002) Volatile organic compounds cytotoxicity and expression of HSP72, HSP90 and GRP78 stress proteins in cultured human cells. *Biochim Biophys Acta* 1591:147–155.
3. Burgener J (2006) Position paper on the use of ultraviolet lights in biological safety cabinets. *Appl Biosaf* 11(4):228–230.

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