

Technical Bulletin

PERsanMAX5%

Hydrogen Peroxide and Peroxyacetic Acid Mixture Liquid Peroxygen Sanitiser

Product Description:

PERsanMAX5% is a powerful liquid sanitizer formulated from a stabilised blend of peracetic acid and hydrogen peroxide. PERsanMAX5% solutions are used cold and exhibit broad spectrum activity against all types of aerobic and anaerobic bacteria (including spore formers), fungi, yeasts, algae and viruses. PERsanMAX5% solutions are colourless, non-staining, free rinsing and virtually odourless at use concentrations. PERsanMAX15% solutions decompose to form water, oxygen, and acetic acid which is readily biodegradable. Using PERsanMAX5% as a sanitiser presents no environmental problems with disposal of used solutions.

1. Non foaming formulation makes PERsanMAX5% ideally suited to CIP applications.
2. Products of decomposition present no problems on food contact surfaces - can be safely used in no rinse sanitation procedures. It drains freely to leave no residues.
3. Products of decomposition present no environmental problems with discharge of effluent waters. Effluent waters contain low levels of BOD. It is beneficial to effluent.
4. Rapid activity against wide range of micro-organisms, even at low temperatures.
5. Easy to use. Can be used for CIP systems, flood filling, spray balls and fogging. Harmless to plant. Passivates stainless steel. Will not cause corrosion.

Application:

PERsanMAX5% decomposes to form water, oxygen and acetic acid and can be used in no rinse procedures in the food industry for final sanitation of cleaned surfaces. PERsanMAX5% finds application in the food processing industries. It is suitable for use with fresh cut and processed fruit and vegetables. It is suitable for the sanitation of all food contact surfaces such as kettles, conveyors, fillers, blanches, slicers, eviscerating tables, conveyors, mincers, ovens, tanks, boning tables, syrup pans and mixers. PERsanMAX5% is non-foaming and is ideal for CIP sanitation in dairy, food, water treatment and cooling plants, laundries, animal health laboratories, soft drink, wineries and brewing industries. PERsanMAX5% may be used in animal houses for the sanitation of breeder boxes, incubators, feeders, drinking water supply lines and other surfaces PERsanMAX5% can also be used for continuous sanitation of the drinking water in animal houses.

PERsanMAX5% solutions are relatively unaffected by organic matter. It kills micro-organisms such as aerobic and anaerobic bacteria and their spores, yeasts, moulds, fungi and their spores and viruses on contact. There are no resistant species. PERsanMAX5% solutions leave no residue and have little cleaning ability. For optimum sanitation results surfaces should be adequately precleaned prior to sanitation with PERsanMAX5%.

It should not be exposed to heat, direct sunlight, sources of ignition or contamination. It is incompatible with acids, alkalis, reducing agents, oxidising agents, rust, resins and combustible materials. PERsanMAX5% exhibits optimum biocidal activity at pH < 7. Adequate rinsing of alkali cleaned surfaces should be carried out prior to final rinse sanitation with PERsanMAX5%

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There is no need to post rinse after sanitising surfaces with PERsanMAX5%. If post rinsing of surfaces is required it should be done with sterile water to prevent recontamination of the surfaces. PERsanMAX5% solutions should be used within one hour after dilution and should not be reused. PERsanMAX5% solutions should be used at ambient temperature (about 20°C) but are effective over the range of 5 - 40°C. PERsanMAX5% is typically used at dilutions of 0.15 - 6% v/v with contact times of 10 - 30 minutes. PERsanMAX5% may be fogged onto equipment, walls, floors and into the air to kill surface and dust borne microbes.

Use Concentrations:

| | |
|--|----------|
| Final rinsing of surfaces | 0.21%v/v |
| Process water streams | 0.15%v/v |
| Fruit and vegetable surfaces | 0.15%v/v |
| Sanitation of animal house drinking waters | 0.06%v/v |

EFFECT ON MATERIALS OF CONSTRUCTION

PERsanMAX5% can be used to sanitise plants containing stainless steel, glass, polyethylene, PVC, PTFE (Teflon), Viton and fluorinated silicone rubbers. It should not be used with brass, copper and its alloys, nickel and its alloys, mild steel, aluminium, natural rubbers, nitrile rubbers, neoprene or ABS.

BACTERIACIDAL EFFECTIVENESS

How does peracetic acid disinfectant work?

Peracetic acid as a disinfectant oxidizes the outer cell membranes of microorganisms. The oxidation mechanism consists of electron transfer. When a stronger oxidant is used, the electrons are transferred to the microorganism much faster, causing the microorganism to be rapidly deactivated.

Table 1: oxidation capacity of various disinfectants

| Disinfectant | EV (electronic volts) |
|--------------------|-----------------------|
| Peracetic acid | 1,81 |
| Chlorine dioxide | 1,57 |
| Sodium Hypchlorite | 1,36 |

Peracetic acid affectivity

Peracetic acid can be applied for the deactivation of a large variety of pathogenic microorganisms. It also deactivates viruses and spores. Peracetic acid activity is hardly influenced by organic compounds that are present in the water. However, pH and temperature do influence peracetic acid activity. Peracetic acid is more effective when the pH value is 7 than at a pH range between 8 and 9. At a temperature of 15°C and a pH value of 7, five times more peracetic acid is required to affectively deactivate pathogens than at a pH value of 7 and a temperature of 35 °C. PERsanMAX5% contains 5% peracetic acid. A 0.21% solution in water contains 100 ppm of peracetic acid. Test results below show that at this concentration it is effective against Staphylococcus aureus and Escherichia coli.

The antimicrobial efficacy of peracetic acid was determined using the procedure of the standard A.O.A.C. sanitizing test. The samples were diluted with 500 ppm hard water and employed at 25 degrees C. The bacteria used in the test procedure were S. aureus and E. coli, and TGE plating medium was employed. Exposure time of the compositions to the bacteria was 30 seconds. The neutralizer employed in the testing procedure contained 0.1% thiosulfate, 1.0% peptone, and 0.025% catalase. The antimicrobial activity is summarized in the table below.

The cidal activity of Peracetic acid is summarized below. At 176 ppm of product PERsanMAX5% with 5% peracetic acid there was about 27 ppm of peracetic acid. At 700 ppm of PERsanMAX5% product there was about 108 ppm of peracetic acid.

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Cidal Activity of Peracetic Acid

| Concentration Peracetic Acid | pH | Ave. Log reduction sup. (a) | |
|------------------------------|------|-----------------------------|---------|
| | | S.aureus | E. Coli |
| 27ppm | 3.90 | NMA. Sup (b) | NMA |
| 108ppm | 3.50 | 4.60 | >7.12 |
| 108ppm | 3.49 | 6.38 | 6.64 |
| 108ppm | 3.49 | 4.17 | ---- |
| 108ppm | 3.49 | 4.77 | 6.44 |

sup.(a) Log 4 reduction reduces a bacterial population from 1,000,000 to 100. Log 6 reduction reduces bacteria from 1,000,000 to 1. sup.(b) No measurable activity.

Peracetic acid has been reported to be effective against other bacteria including Legionella pneumophila. One reference (6139756) using peracetic acid at 200 ppm to backwash swimming pool filters gave the following results.

| Bacteria | 1 minute | 2 minute | 10 minute |
|------------------------|--------------|--------------|--------------|
| E. coli | No survivors | No survivors | No survivors |
| Coliform germs | No survivors | No survivors | No survivors |
| Pseudomonas aeruginosa | No survivors | No survivors | No survivors |
| Leionells pneumophilia | No survivors | No survivors | No survivors |

Listeria

In the last decade, listeriosis, caused by L. monocytogenes, has emerged a major food borne disease. Because the bacterium is resistant to low pH and high sodium chloride concentrations and grows at refrigeration temperatures, it is very difficult to eradicate from food processing plants. Treatment of L. monocytogenes is shown in the table below.

Treatment of Listeria monocytogenes Scott A

| Treatment | Time (min) | Log Count | Log Count |
|-----------------------------|------------|-----------|-----------|
| None | 0 | 5.85 | |
| 50ppm Peracetic acid pH 2.8 | 0.5 | <1 | >4.85 |
| | 1 | <1 | >4.85 |
| | 5 | <1 | >4.85 |

The treatment of 50 ppm Peracetic acid at pH 2.8 proved very effective against Listeria monocytogenes.

CHEMICAL AND PHYSICAL PROPERTIES

| | |
|------------------|--------------------------------|
| Appearance | Clear, colourless, thin liquid |
| Flash Point | Non-Flammable |
| Odour: | Concentrate Acrid odour |
| Odour: | Use solutions Almost odourless |
| Specific Gravity | 1.13 |
| pH (Concentrate) | 1 |
| pH (1% solution) | 3-5 |

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FOOD SAFETY STATEMENT

With regard to the use of this product as a cleaner and / or sanitiser that may have incidental contact with food:

- 1) The raw materials / ingredients of this product are permitted as 'processing aids' as listed under clause 12 of the Food Standard Code 1.3.3 (Food Standards Australia New Zealand FSANZ) or
- 2) Are Generally Regarded As Safe (GRAS) according to the US Food and Drug Administration (FDA) or are recognised in the US Code of Federal Regulations (CFR) Title 21 part 178 as indirect food additives.

When used in accordance with the directions described in this product technical bulletin, this product complies with these recognised food safety parameters.

Solutions, Chemistry, Service

SHELF LIFE: As a quality assured manufacturer, Castle Chemicals has a stringent Quality assurance programme. As part of this regime, the label on this product shows a batch number and date of manufacture. This product has a shelf life of 12 months from the label printed date of manufacture. This information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Castle Chemicals assumes no responsibility for personal injury or property damage to vendees, users or third parties caused by the material. Such vendees or users assume all risks associated with the use of material.

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