KEEN JOHNSON™

DISINFECTANT LIQUIDS
(Safe & Effectiveness)

Products Specifications

What is **Hydrogen Peroxide** (H_2O_2)?

- **Hydrogen peroxide** was first discovered in the early 19th century and produced since 1894. Today, this chemical is produced in quantities of more than 2 million tons worldwide each year.
- **Hydrogen peroxide** is available most commonly as an aqueous solution, usually at 3 to 9% concentrations is safe for household use.
- In laboratories, 30 % is used. Commercial-grade at as high as 98% purity is also available for industrial processes applications such as food processing, Cosmetics & Medicine, etc.

What is **Hydrogen Peroxide** (H_2O_2)?

- Pure **hydrogen peroxide** is a crystalline solid below 12 °F (-11.11 °C) and a colourless liquid with a bitter taste above 12 (-11.11 °C). In other words, it is impossible to get pure hydrogen peroxide at room temperature of 25 °C.

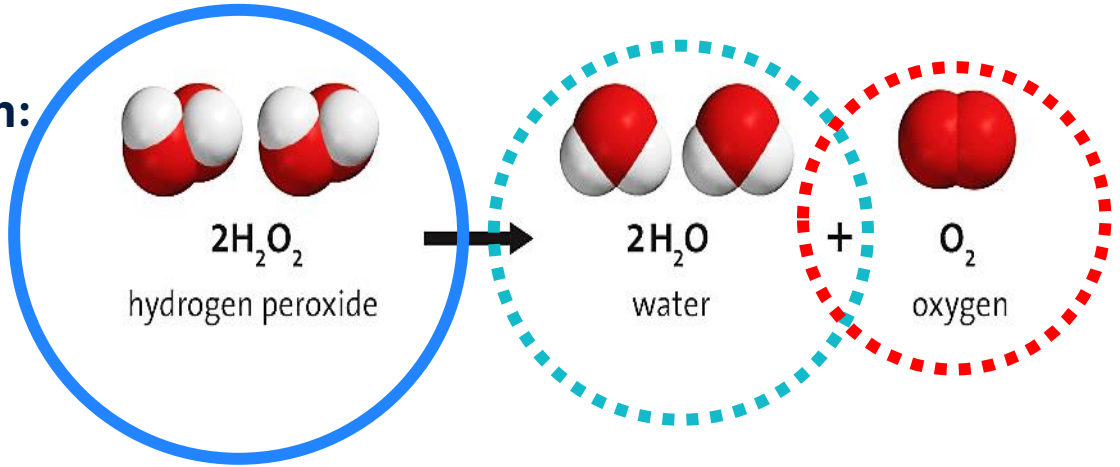
- **Hydrogen peroxide** is unstable in the lights, will be **decomposing readily to oxygen and water** with release of heats.

- **Hydrogen peroxide** is non-flammable.

Leaving No Residues after decompositions!

Hydrogen Peroxide Reaction (Leaving No residues)

- **Hydrogen peroxide** is a very pale blue liquid at room temperature.
- **Hydrogen peroxide** can easily break down, or decompose, into **water** and **oxygen**
- **Chemical Equation:**



Hydrogen Peroxide Reaction (Leaving No residues)

What happens to hydrogen peroxide when it enters the environment?

- **Hydrogen peroxide** released to the atmosphere will react very rapidly with other compounds found in air.
- Hydrogen peroxide breaks down rapidly in water.

- If **Hydrogen peroxide** released to soil, it will be easily broken down by reacting with other compounds. Thus it is very environmentally friendly.

Hydrogen Peroxide Reaction (Leaving No residues)

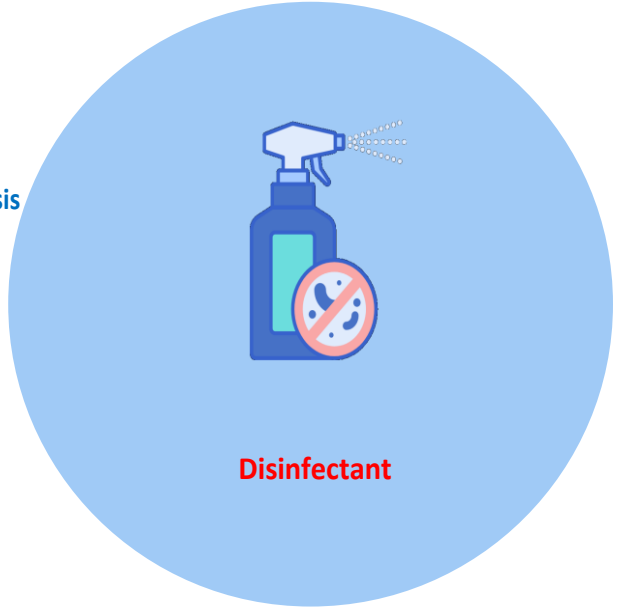
What happens to hydrogen peroxide when it enters the environment?

01	**Hydrogen peroxide** released to the atmosphere will react very rapidly with other compounds found in air.	**Suitable to be used as air borne disinfectant in hospital wad without leaving allergen.**
02	**Hydrogen peroxide** easily breaks down rapidly in water.	**Commonly use in water treatment application.**
03	If released to soil, **hydrogen peroxide** will be broken down by reacting with other compounds in the soil.	**Widely used for soil treatment to treat root rot disease of plants. .**
04	**Hydrogen peroxide** does not accumulate in the food chain.	**One of the common Food Disinfectant.**

Common uses of **Hydrogen Peroxide**

Hydrogen peroxide is used in a variety of applications:

- Water Treatment
- Paper and pulp
- Laundry bleach
- Chemical Synthesis
- Hair bleach
- Acne treatment
- Flour Procesing
- First Aid
- Microelectronics
- Textiles
- Dental
- Food Processing

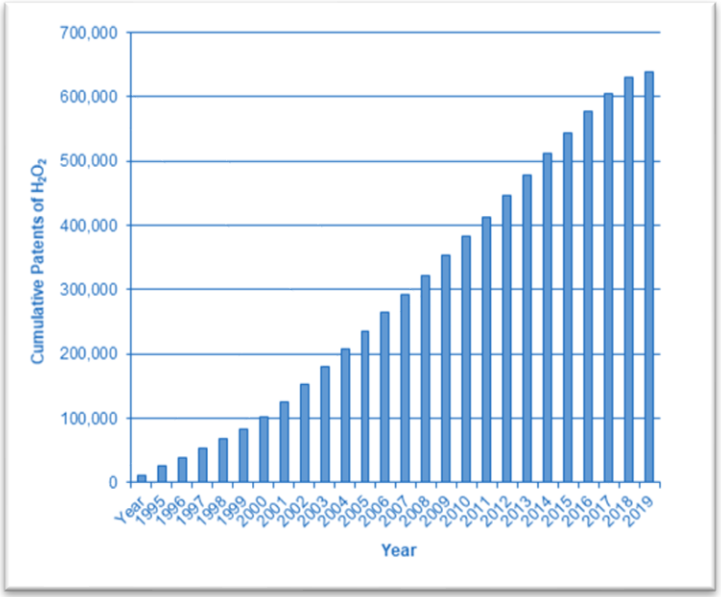


Common uses of **Hydrogen Peroxide**

Hydrogen peroxide (H_2O_2) patents worldwide

- Since 1995 until 2019, with the total H_2O_2 patent more than 700,000. Usage of H_2O_2 is the modern trend and gaining popularity (Data from Scopus)

- This shows that H_2O_2 is highly effective products with more applications to be discovered.



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Hydrogen peroxide for Disinfection Purpose

Hydrogen peroxide for Disinfection

- **Hydrogen peroxide** has been recognized by many institutions, agencies and researchers that H_2O_2 is a very effective disinfectant to kill dangerous germs.

- **Hydrogen peroxide** works as a disinfectant by oxidizes and destroy essential components (protein & genetic material) of germ cells, and can deactivate a wide range of microorganisms, including bacteria, viruses, fungi, and spores.

Hydrogen peroxide for Disinfection

- Typically 3-5% **hydrogen peroxide** concentration can be used as a disinfectant, or you can dilute it to a 0.5% concentration, which still has some effectiveness.

- **Keen Johnson Disinfectant Fogging Liquid** is made with active ingredient of **3.2 wt.% hydrogen peroxide (H_2O_2)** which disinfect effectively surface and air in enclosed area.

- **Keen Johnson Spray Tunnel Disinfectant Liquid** is made with active ingredient of **0.86 wt.% hydrogen peroxide (H_2O_2).**

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Hydrogen peroxide for Disinfection

- **National Environmental Agency Singapore** website mentioned it Effectiveness:

Table 1. Active Ingredients and Their Working Concentrations Effective Against Coronaviruses

S/N	Active Ingredient (A.I.)	Contact Time (min)
1	Accelerated hydrogen peroxide# (0.5%)[a]	1
2	Benzalkonium chloride* (0.05%)[b]	10
3	Chloroxylenol (0.12%)[c]	10
4	Ethyl alcohol (70%)[d]	10
5	Iodine in iodophor (50 ppm)[b]	10
6	Isopropanol (50%)[b]	10
7	Povidone-iodine (1% iodine)[d]	1
8	Sodium hypochlorite (0.05 – 0.5%)[d, e]	5
9	Sodium chlorite (0.23%)[b]	10

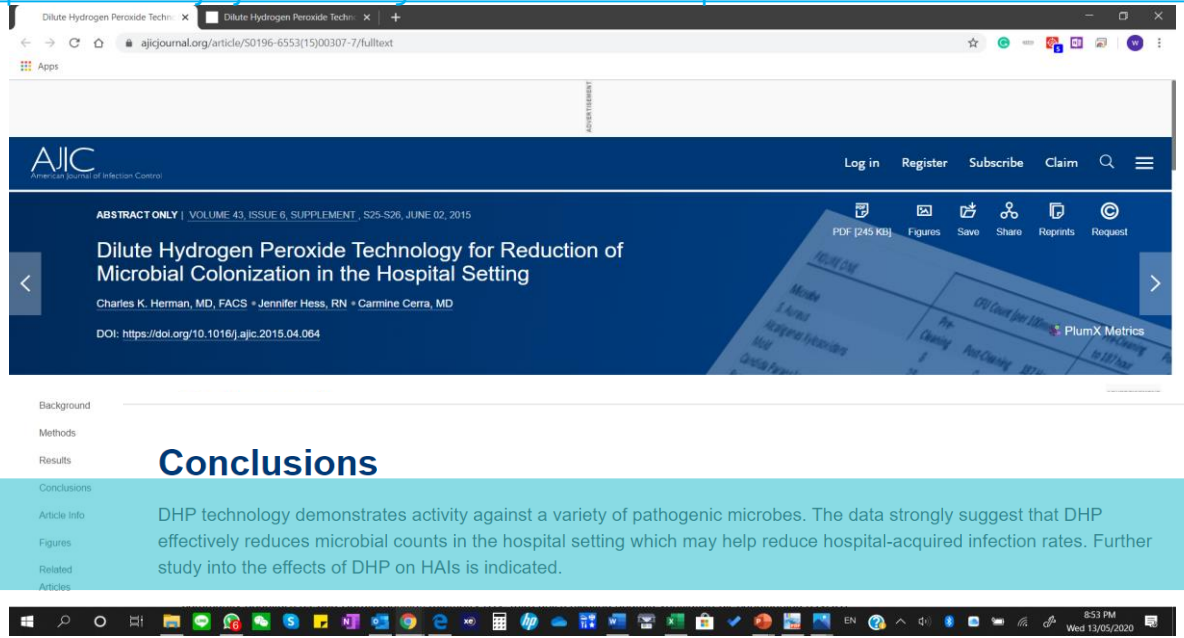
National Environment Agency
Safeguard · Nurture · Cherish

Source :

https://www.nea.gov.sg/our-services/public-cleanliness/environmental-cleaning-guidelines/guidelines/interim-list-of-household-products-and-active-ingredients-for-disinfection-of-covid-19

Hydrogen peroxide for Disinfection

- **American Journal of Infection Control** : https://www.ajicjournal.org/action/showPdf?pii=S0196-6553%2815%2900307-7



Hydrogen peroxide for Disinfection

- **American Journal of Infection Control** :
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Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

State of the Science Review

Do we know how best to disinfect child care sites in the United States? A review of available disinfectant efficacy data and health risks of the major disinfectant classes

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Mark D. Miller MD, MPH [a,d]

[a] University of California San Francisco Division of Occ
[b] University of California Berkeley Division of Epidemic
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[d] Western States Pediatric Environmental Health Speci
[e] California Poison Control System, San Francisco, CA

Results: Coverage of these organisms varied both between disinfectant classes (defined by active ingredient), as well as within classes. The 3 most common active ingredients in the database—quaternary ammonias, bleaches, and hydrogen peroxides—had 251, 63, and 31 products, respectively. Quaternary ammonias and bleaches are both known asthmagens, with the potential for toxic gas release when mixed. Quaternary ammonias may also cause reproductive toxicity. Disinfectant-grade peroxides have relatively low inhalational toxicity.

Conclusions: A clear rationale is needed to establish policies for determining preferable disinfection products for use in child care settings, based on efficacy against relevant pathogens, toxicity, ease of use, and cost. When other factors are equal, the use of peroxide-based disinfectant products is recommended to minimize inhalational toxicity.

KEEN JOHNSON™ for Disinfection

American Journal of Infection Control 47 (2019) 82–91

Contents lists available at ScienceDirect

American Journal of Infection Control

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Stephanie M. Holm MD, MPH [a,b,c], Victoria Leonard RN, PhD [d], Timur Durrani MD, MPH [a,d,e], Mark D. Miller MD, MPH [a,d]

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[d] Western States Pediatric Environmental Health Specialty Unit–University of California San Francisco, San Francisco, CA
[e] California Poison Control System, San Francisco, CA

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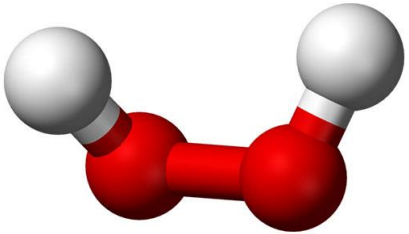
Products Safety

Possible Hazards Associated with **Hydrogen Peroxide?**

- **Just like other chemicals** used for Disinfections process, **if higher Concentration is used may cause hazards.**

- **Hydrogen peroxide** is poorly absorbed through intact skin. When used for household disinfectant purposes **(Concentration of 3% to 5%),** it is mildly irritating to the skin and mucous membranes.

- **At a concentration of 10%,** which is found in some hair-bleaching solutions, it is strongly irritating and may be corrosive.



Why **our products** is safe from Possible Hazards?

We produced our products strongly adhere to the following international Standard and Guidelines:

- **OSHA PEL** (permissible exposure limit): 1 ppm (averaged over an 8-hour work shift)
- **NIOSH IDLH** (immediately dangerous to life or health) = 75 ppm
- **AIHA ERPG-2** (emergency response planning guideline) (maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action) = 50 ppm

Why **our products** is still safe from Possible Hazards ?

Disinfectant Fogging Liquid:

- Concentration use: **3.2%** (Calculated the efficiency lost due to processing devices as well environmental factors)
- As described in Keen Johnson Disinfectant Fogging Liquid instruction, this liquid is only suitable for fogging purpose and **not for direct contact with skin**. So mild **irradiating effect will not occur**.
- It is recommended the fogging frequency of Keen Johnson Disinfectant Fogging Liquid is every 3-4 hours to avoid over exposure concern.

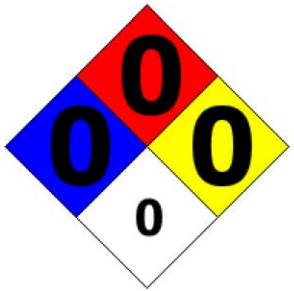
KEEN JOHNSON™ Fogging Disinfection Liquid
Products MSDS Hazards identifications

WHMIS

C

D2B

NFPA/HMIS



NFPA SCALE (0-4)

HMIS RATINGS (0-4)

Why our products is still safe from Possible Hazards ?

Disinfection Liquid for Spray Tunnel:

- Concentration use: **0.86%** (Calculated the efficiency lost due to processing devices as well environmental factors.)
- As described in Keen Johnson Disinfectant Fogging Liquid instruction, this liquid is only suitable for spray tunnel purposes and the **formulated concentration of only 0.86% is allowed for direct contact with skin.** So mild irradiating effect will not occur.
- It is recommended the spraying frequency of Keen Johnson Disinfectant Fogging Liquid is every 3-4 hours to avoid over exposure concern.

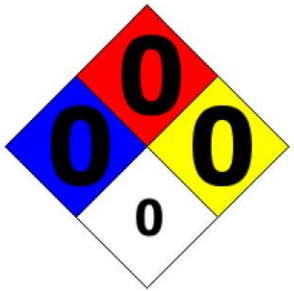
KEEN JOHNSON™ Spray Tunnel Disinfection Liquid
MSDS Hazards identifications

WHMIS

C

D2B

NFPA/HMIS



NFPA SCALE (0-4)

HMIS RATINGS (0-4)

Why **our products** is still safe from Possible Hazards ?

Keen Johnson Products are ready-to-use liquid

- Compare manual mixing products from highly concentrated solutions or tablets, we can 100% avoid human mistakes. No overdosage or under dosage!

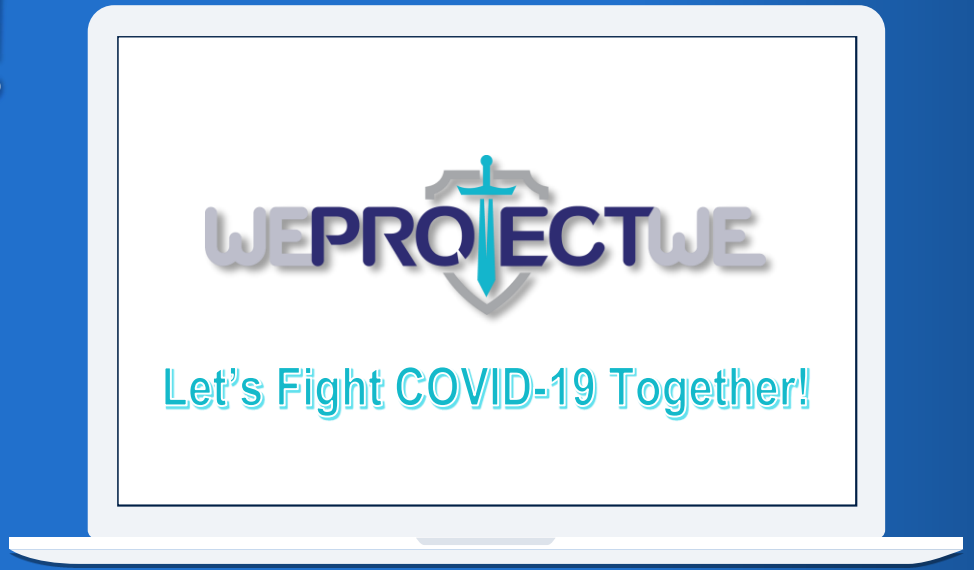
SAFER

EASY TO USE

SAVE TIMES

RELAX

Thanks!



Product Specification

KEEN JOHNSON™
Disinfectant Fogging Liquid

Features

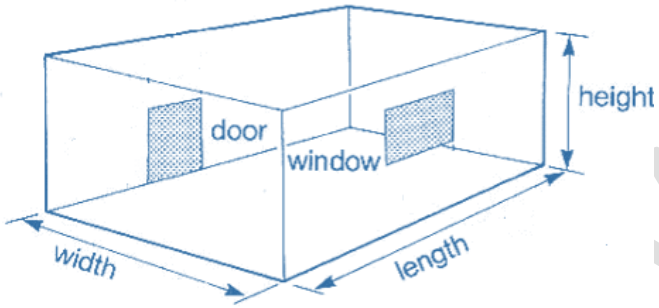
- ✓ Instantly kills dangerous germs with H_2O_2 action
- ✓ Designed Specially for NO Wet Surface and Floorings Application.
- ✓ No chloride or any chlorine compound
- ✓ No phosphate compound, VOCs and bleach content
- ✓ H_2O_2 turn into water and oxygen after reaction
- ✓ 100% alcohol free
- ✓ Suitable for Food Industry Disinfection
- ✓ Gentle to Human and Pets
- ✓ Environmental Friendly with No residues and Harmful Substances
- ✓ Low risk of allergies

Instruction for use

The Keen Johnson™ disinfectant fogging liquid is only suitable to be used with thermal fogging machine. Do not try different method to apply this disinfectant fogging liquid.

Measures 20 ml of the Keen Johnson™ disinfectant fogging liquid. For every 20 ml of Keen Johnson™ disinfectant fogging liquid, it is suitable to cover disinfection of 300 m^3 space volume with 3 times per day for interval of 3 hours. Please follow this recommendation to avoid over-exposure causing acute health condition.

EXAMPLE OF APPLICATION FOR OFFICE AREA, LECTURE ROOM, LIVING HALL AND CLASSROOM



Area = Length 10 m × Width 10 m
Ceiling Height = 3 m
Space Volume = 10 m × 10 m × 3 m = 300 m^3

Recommended 20 ml Keen Johnson™ Disinfectant Fogging Liquid for 300 m^3

Keen Johnson™ Disinfectant Fogging Liquid contains 3.2 wt% H_2O_2

@ Density of 1.05 kg/litre contains of 33.6 g of H_2O_2

Recommended 20 ml Keen Johnson™ Disinfectant Fogging Liquid contains 0.672 g H_2O_2 or 672 mg H_2O_2.

Determine the exposure limits PEL

- Common space volume of 300 m^3
- 3 times a day
- Estimated fog effects finish after fogging activity is 1 hour with total 3 hours per day
- 8 hours working time

Exposure: $\frac{672\ \text{mg}\ H_2O_2}{300\ m^3} = 2.24\ \text{ppm}$ @ 1 hour

Permissible Exposure Limit : $\frac{2.24\ \text{ppm} \times 3\ \text{hours}}{8\ \text{hour working time}} = 0.84\ \text{ppm}$

OSHA PEL (permissible exposure limit): 1 ppm (averaged over an 8-hour work shift)

Disclaimer: The above calculation can be affected with the usage of ventilation and air conditioner. Please consult with the supplier to get more information.

Procedure

1. Estimate the space volume to be undergone disinfection
2. Shake well Keen Johnson™ disinfectant fogging liquid before usage. No dilution is needed.
3. For every space volume of 300 m^3, measure a cup of 20 ml Keen Johnson™ Disinfectant Fogging Liquid and pour into the machine.
4. Follow the standard operation procedure of thermal fogging machine as mentioned in the manufacturer's manual.
5. Once the heating of the fogging liquid is done, the fogging activity can be started.
6. **Caution:** Fogging should be avoided during pregnancy and lactation. If unavoidable, please keep away for at least 20 minutes from the fogging area.
7. **Caution:** Patient who suffers asthma need to keep away from fogging area for at least 20 minutes from the fogging area.
8. Fogging using Keen Johnson™ Disinfectant Fogging Liquid is safe to apply according to the instruction as mentioned above. Healthy person can stay in the fogging area but precaution need to be taken particularly when engaging activity requires extra attention to avoid any accident, i.e. driving of forklift because the fog can take sometimes to decompose slowly.
9. Recommended to wear glove, face mask and goggle for the person who is operating the fogging machine to avoid exceeding exposure limits.

Certification

SIRIM: BS EN 1040:2005

Environment

The containers are made of high density polyethylene HDPE As a result, sorting is possible for optimum recycling and do not reuse the containers to keep other contains.

Warning

It is dangerous to injection hydrogen peroxide into closed body cavities from which the released oxygen has no free exit. Strong solution of hydrogen peroxide produces irritating burns on the mucous membrane but the pain disappears in about an hour.

Pack Size

1 litre (0.26 gal) and 5 litres (1.32 gal)

Shelf life and Storage

36 weeks from production date. Keep away from sunlight and high temperature for best effects.

Revision Date: 12 March 2020