Address: www.chemtronicsindia.com/coronavirus/safety-compliance

Title: (MID can help us in Title)

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Keyword: (MID can help us in Keyword)

H1 - MATERIAL SAFETY DATA SHEET [formerly MSDS]

1. PRODUCT IDENTIFICATION

Product Name: ECO + BOI generator

Common Names/Synonyms: Triatomic Oxygen + Hydroxyl Radical + Ions

Company : Chemtronics Technologies (India) Pvt. Ltd.

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Jogeshwari (East), Mumbai – 400 060, INDIA.

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Product Use: This MSDS is limited to ECO + BOI produced in gaseous form on site by an ECO + BOI generator, in varying concentrations, in either air or aqueous solution, for the purposes of odor abatement, oxidation of organic compounds, or antimicrobial intervention, in a variety of applications.

2. HAZARD IDENTIFICATION

Physical	Health:	Environmental:
Oxidizing Gas	Skin Irritation – Category 3 Eye Irritation – Category 2B Respiratory System Toxicity – Category 1 (Single & Repeated)	Acute Aquatic Toxicity – Category I

NOTE: Severe respiratory toxicity will develop before skin or eye irritation go beyond listed categories. **Anyone with chronic pulmonary problems, especially asthma, should avoid exposure to ECO + BOI.**

WHMIS Classifications (Workplace Hazardous Materials Information System, Canada): C, D1A, D2A, D2B, F

Source: CCOHS CHEMINFO Record Number 774

3. COMPOSITION

Chemical name = Ozone + Hydroxyl Radical + Oxygen

Common names = Triatomic oxygen + Hydroxyl Radical + Oxygen

Chemical Formula = O3 + OH + O2

CAS Registry Number = 10028-15-6 + 14280-30-9 + 7782-44-7

4. FIRST AID MEASURES

Route of Entry		Symptoms	First Aid
Skin Contact	YES	Irritation	Rinse with water
Skin Absorption	NO	NA	NA
Eye Contact	YES	Irritation	Rinse with water, remove contacts
Ingestion	NO	NA	NA
Inhalation	YES	Headache, cough, heavy chest, shortness of breath	Remove to fresh air, provide oxygen therapy as needed

For severe cases, or if symptoms don't improve, seek medical help.

5. FIRE FIGHTING MEASURES

ECO + BOI itself is not flammable. As a strong oxidant it may accelerate, even initiate, combustion, or cause explosions. Use whatever extinguishing agents are indicated for the burning materials.

6. ACCIDENTAL RELEASE MEASURES

Turn off the ECO + BOI generator, and ventilate the area. Evacuate until ECO + BOI levels subside to a safe level (<0.1 ppm).

7. HANDLING AND STORAGE

ECO + BOI must be contained within ECO + BOI -resistant tubing and pipes from the generation point to the application point.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OSHA Permissible Exposure Limit: 8 hour TWA 0.1 ppm

ANSI/ASTM: 8 hour TWA 0.1 ppm, STEL 0.3 ppm

ACGIH: 8 hour TWA 0.1 ppm; STEL 0.3 ppm

NIOSH: ELCV 0.1 ppm light; 0.08 ppm moderate; 0.05 ppm, heavy Light, moderate, heavy work TWA <= 2 hours: 0.2 ppm Immediately Dangerous to Life or Health (IDLH) 5 ppm

Respiratory Protection: Use full face self-contained breathing apparatus for entering areas with high concentration.

Engineering control: Use ECO destruct unit for off gassing of ECO.

9. PHYSICAL AND CHEMICAL PROPERTIES

a. ECO

Physical state	Gas	**pH**	NA
Molecular Weight	48.0	**Decomposition temperature**	NA
Appearance	Clear at low concentration, blue at higher concentration	**Evaporation rate**	NA
Odor	Distinct pungent odor	**Flash point**	NA
Odor threshold	0.02 to 0.05 ppm; exposure desensitizes	**Auto-ignition temperature**	NA
Melting point	-193^{o}C/-315^{o}F	**Relative density**	NA
Boiling point	-112^{o}C/-169^{o}F	**Partition coefficient**	NA
Vapor pressure	> 1 atm	**Flammability**	NA
Vapor density	1.6 (air = 1)	**Explosive limits**	NA
Solubility in water	570 mg/L @20^{o}C & 100% O3; 0.64 @0^{o}C	**Viscosity**	NA

b. Oxygen

Physical state	Gas	**pH**	NA
Molecular Weight	48.0	**Decomposition temperature**	NA
Appearance	Colorless	**Evaporation rate**	NA
Odor	Odorless	**Flash point**	NA
Odor threshold	Nil	**Auto-ignition temperature**	NA
Melting point	-218^{o}C/-361^{o}F	**Relative density**	NA
Boiling point	-182^{o}C/-297^{o}F	**Partition coefficient**	NA
Vapor pressure	Above critical temp	**Flammability**	NA
Vapor density	8	**Explosive limits**	NA
Solubility in water	40 mg/L @25^{o}C	**Viscosity**	NA

10. STABILITY AND REACTIVITY

ECO + BOI is highly unstable and highly reactive. Avoid contact with oxidizable substances. ECO + BOI will readily react and spontaneously decompose under normal ambient temperatures.

11. TOXICOLOGICAL INFORMATION

Likely routes of exposure: Inhalation, eyes, skin exposure.

Effects of Acute Exposure: Discomfort, including headache, coughing, dry throat, shortness of breath, pulmonary edema; higher levels of exposure intensify symptoms. Possible irritation of skin and/or eyes.

Effects of Chronic Exposure: Similar to acute exposure effects, with possible development of chronic breathing disorders, including asthma.

LC50: mice, 12.6 ppm for 3 hours; hamsters, 35.5 ppm for 3 hours

Irritancy of ECO + BOI	YES
Sensitization to ECO + BOI	NO
Carcinogenicity (NTP, IARC, OSHA)	NO
Reproductive Toxicity, Teratogenicity, Mutagen city	Not Proven
Toxicologically Synergistic Products	Increased susceptibility to allergens, pathogens, irritants

12. ECOLOGICAL INFORMATION

The immediate surrounding area may be adversely affected by an ECO + BOI release, particularly plant life. Discharge of ECO + BOI in water solution may be harmful to aquatic life. Due to natural decomposition, bioaccumulation will not occur, and the area affected will be limited.

13. DISPOSAL CONSIDERATIONS

Off-gassing of ECO should be through an ECO destruct unit which breaks ECO down to oxygen before release into the atmosphere.

14. TRANSPORT INFORMATION

NOT APPLICABLE, as ECO + BOI is unstable and either reacts or decomposes, and must be generated at the location and time of use.

15. REGULATORY INFORMATION

SARA Title III Section 302 EHS TPQ: 100 lbs.

SARA Title III Section 304, EHS RQ: 100 lbs.

SARA Title III Section 313: > 10,000 lbs. used/year.

Source: EPA List of Lists

16. OTHER INFORMATION

Half-life of ECO + BOI in water at 20^{o}C = 20 min; in dry still air at 24^{o}C = 25 hr; decreases significantly with increase in humidity, presence of contaminants, air movement, and/or increase in temperature.

Preparer: Mr. Meet Shah – Electrical Engineer - Chemtronics

Date of Preparation: 01/April/2020

Disclaimer:

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