SAFETY DATA SHEET
PHOTOPLASMA
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Revision Date: 2021-02-02
Revision No: 1.1

SECTION 1: Product and Company Identification

Product name:	PHOTOPLASMA
Components: [SYNONYMS] oxygen], trioxygen]	Hydroxyl radicals (•OH) [troposphere detergent], free oxygen atoms (•O) [atomic superoxide ions (O2-) [hyperoxide, dioxide(1-)], ozone (O3) [triatomic oxygen,
Relevant Products:	UVMATIC® and UVMATIC® Plus
Distributor:	DDC Dolphin Ltd The Fulcrum, Vantage Way, Poole, Dorset, UK BH12 4NU
Emergency phone:	+44 1202 731555
Fax:	+44 1202 731666
Email:	info@ddcdolphin.com
Product Use: UVMATIC, in odour variety of	This SDS is limited to Photoplasma produced in gaseous form on site by the varying concentrations in either air or aqueous solution, for the purposes of abatement, oxidation of organic compounds, or antimicrobial intervention, in a applications, from food processing to ground water remediation.
Section 1 Notes:	Contact information above provided for use worldwide.

SECTION 2: Composition / Information on Ingredients

Chemical Names: [Common Names]	Hydroxyl radicals [neutral form of the hydroxide ion, troposphere detergent] Free oxygen atoms [atomic oxygen] Superoxide ions [hyperoxide, dioxide(1-)] Ozone [triatomic oxygen, trioxygen]
Chemical Formula	Hydroxyl radicals: •OH Free oxygen atoms: O Superoxide ions: O_2- Ozone: O_3
CAS Registry Number	Hydroxyl radicals: 14280-30-9 Free oxygen atoms: 17778-80-2 Superoxide ions: 11062-77-4 Ozone: 10028-15-6
Section 2 Notes:	

PHOTOPLASMA

SECTION 3: Hazards Identification

GLOBALLY HARMONIZED SYSTEM (GHS) CLASSIFICATIONS:

Physical Hazards	Health Hazards	Environmental Hazards
	Skin Irritation – Category 3	Acute Aquatic Toxicity – Category I
	Eye Irritation – Category 2B	
	Respiratory Systemic Toxicity – Category 1 (Acute & Repeated Exposures)	

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM , CANADA (WHMIS):

D1A	Acute lethality – Very toxic, immediately	**C**	**Oxidising**
D2A	Chronic Toxicity –Very Toxic	F	Dangerously Reactive
D2B	Mutagenicity – Toxic		

Section 3 Notes:

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 ozone.

SECTION 4: First Aid Measures

Route of Entry		Symptoms	First Aid
Skin Contact	Yes	Irritation	Rinse with water
Skin Absorption	No	N/A	N/A
Eye Contact	Yes	Irritation	Rinse with water, remove contacts
Ingestion	No	N/A	N/A
Inhalation	Yes	Headache, cough, dry throat, congestion, heavy chest, shortness of breath	Remove to fresh air, provide oxygen therapy as needed

Section 4 Notes: For severe cases, or when symptoms don't improve, seek medical help.

SECTION 5: Fire Fighting Measures

Fire Fighting Measures: While Photoplasma itself is not flammable, it is a combination of strong oxidants
and may accelerate the rate of burning. Use whatever extinguishing agents are indicated
for burning materials.

Section 5 Notes:

SECTION 6: Accidental Release Measures

Steps to be taken in case material is released or spilled:

Turn off Photoplasma generator and ventilate the area. Evacuate the area until Photoplasma levels subside.

Section 6 Notes:

SECTION 7: Handling and Storage

Handling:	Photoplasma must be contained within ozone-resistant tubing and pipes from
the generation	point to the application point. Any leaks must be repaired before further use

Section 7 Notes:

SECTION 8: Exposure Controls / Personal Protection

OSHA Permissible Exposure Limit:	8 hour Time Weighted Average 0.1 ppm
ANSI/ASTM:	8 hour TWA 0.1 ppm, Short Term Exposure Limit 0.3 ppm
ACGIH:	8 hour TWA 0.1 ppm; STEL 0.3 ppm
NIOSH:	Exposure Limit Ceiling Value 0.1 ppm light; 0.08 ppm moderate; 0.05 ppm, heavy;
Light,	moderate, heavy work TWA <= 2 hours, 0.2 ppm
HSE:	Workplace Exposure Limit, Short-term 0.2 ppm
Engineering Controls:	Use standard ozone destruction units (thermal and/or catalytic) for off-gassing
Photoplasma.	

Personal Protective Equipment for Routine Handling:

Use full face self-contained breathing apparatus for entering areas with high concentration of Photoplasma.

Section 8 Notes:
Exposure control and protection information are provided for ozone only, as the other components of Photoplasma are not regulated. Immediately dangerous to life or health at or above 5.0 ppm. When UVMATIC is used as directed in occupied areas, ozone concentration in the treated area will be less than 0.05 ppm.

SECTION 9: Physical and Chemical Properties

Physical State:	Gas
Molecular weight**:**	48.0
Appearance**:**	Clear at low concentrations, blue at higher concentrations
Odor:	Distinctive pungent odor
Odor Threshold:	0.02 to 0.05 ppm; sensitivity decreases with exposure
Melting Point**:**	-193°C / -315°F
Boiling Point:	-112°C/-169°F
Vapor Pressure:	> 1 atm
Vapor Density:	1.6 (air = 1)
Solubility In Water:	570 mg/L @20°C, 100% O3; 0.64 @0°C (vol/vol)
pH:	N/A
Flashpoint:	N/A
Evaporation Rate:	N/A
Flammability:	N/A
Explosive Limits:	N/A
Relative Density:	N/A
Partition Coefficient:	N/A
Auto-Ignition Temperature:	N/A
Decomposition Temperature:	N/A
Viscosity:	N/A

Section 9 Notes:
Physical and chemical property information are provided for ozone only, as the other components of Photoplasma are not regulated.

SECTION 10: Stability and reactivity

Stability: Photoplasma is highly unstable and highly reactive. Avoid contact with oxidizable substances, including alkenes, benzene and other aromatic compounds, rubber, dicyanogen, bromine diethyl ether, dintrogen tetroxide, nitrogen trichloride, hydrogen bromide, and tetraluorohydrazine. Photoplasma will readily react and spontaneously decompose under normal ambient temperatures.

Section 10 Notes:

SECTION 11: Toxicological information

Toxicological Information**:** Likely routes of exposure: inhalation, eyes, skin exposure.

Effects of acute exposure: Discomfort, including headache; coughing; dry throat; shortness of breath; heavy feeling in chest, including possible pulmonary edema/fluid in the lungs. Higher levels of exposure intensify symptoms. Irritation of skin and eyes are also possible.

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

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

Irritancy of Ozone	Yes
Sensitization to Ozone	No
Carcinogenicity (NTP, IARC, OSHA)	No
Reproductive Toxicity	Not Proven
Teratogenicity	Not Proven
Mutagenicity	Not Proven
Toxicologically Synergistic Products	Increase susceptibility to allergens, pathogens, irritants

Section 11 Notes:

SECTION 12: Ecological Information

Ecological Infrormation: The immediate surrounding area may be adversely affected by a Photoplasma release, particularly plant life. Discharge of Photoplasma in water solution could also be harmful to any aquatic life. Due to natural decomposition, bioaccumulation will not occur, and the area affected would be limited.

Section 12 Notes:

SECTION 13: Disposal considerations

Disposal Method: Off-gassing of Photoplasma should be through an ozone destruction unit which uses heat and/or a catalyst to accomplish the breakdown of ozone to oxygen before release into the atmosphere.

Section 13 Notes:

SECTION 14: Transport

Transport class: This product does not require a classification for transport.

Section 14 Notes: Not applicable, as Photoplasma is unstable and either reacts with other substances in the environment or decomposes and therefore must be generated at the location and time of use.

SECTION 15: Regulatory information

SARA = Superfund Amendments and Renewal Act

SARA	Title III Section 302 Extremely Hazardous Substance TPQ: 100 lbs.
SARA	Title III Section 304, EHS RQ: 100 lbs.
SARA	Title III Section 313: Ozone is reportable if more than 10,000 lbs. are used/year. TPQ (Threshold Planning Quantity) requires emergency planning activities if this amount is on site at any time during year RQ (Reportable Quantity) requires any release of this amount into the environment to be reported to the National Response Centre.
Source:	EPA List of Lists
Section 15 Notes: the	National and international regulations have been consulted and considered in preparation of this document.

SECTION 16: Other Information

Other Information:	The half-life of Photoplasma is much shorter in water than in air. Increased temperature in either solvent decreases the half-life. Published research indicates a half-life of 20 minutes for Photoplasma dissolved in water at 20°C, and a half-life of approximately 25 hours for Photoplasma in dry air at 24°C (McClurkin & Maier, 2010). The practical half-life time is actually less, especially in air, due to air circulation, humidity, the presence of contaminants or walls with which to react, etc. In many situations, with air movement, warmer temperatures, and normal relative humidity, the half-life of Photoplasma in air could be 1 hour or less. Further, ventilation of a closed space to other areas will also disperse the Photoplasma, so that concentration levels can rapidly decrease after generation ceases. This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.

References

1. Canadian Centre for Occupational Health and Safety: Chemical Profiles: Ozone – http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/ozone
2. United Kingdom Health and Safety Executive: Ozone – http://www.hse.gov.uk/pubns/priced/eh40.pdf
3. Haz-Map: Occupational Exposure to Hazardous Agents: Ozone – http://hazmap.nlm.nih.gov/cgi-bin/hazmap_generic?tbl=TblAgents&id=68
4. International Chemical Safety Cards #0068: Ozone – http://www.cdc.gov/niosh/ipcsneng/neng0068.html
5. NIOSH Pocket Guide to Chemical Hazards: Ozone – http://www.cdc.gov/niosh/npg/npgd0476.html
6. United States of America Centres for Disease Control and Prevention: Ozone – http://www.cdc.gov/niosh/idlh/10028156.html
7. Guidance Note EH38 from the Health and Safety Executive: OZONE : Health Hazards and Precautionary Measures
8. McClurkin & Maier. Half-Life Time of Ozone as a Function of Air Conditions and Movement. Proceedings of the Tenth International Working Conference on Stored Product Protection, 27 June-2 July 2010, Estoril, Portugal
9. United States National Library of Medicine ChemIDplus Lite: Ozone – 10028-15-6 – http://chem.sis.nlm.nih.gov/chemidplus/ProxyServlet?objectHandle=DBMaint&actionHandle=default&nextPage=jsp/chemidlite/ResultScreen.jsp&TXTSUPERLISTID=0010028156

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