## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**1.1 Product identifier:**
Product name: Ozone
EC-nr: 233-069-2
CAS-nr: 10028-15-6
UFI-kod: NQ31-9WK9-M30Q-KAKY

**1.2 Relevant identified uses of the substance or mixture and uses advised against**
This SDS is limited to ozone produced in gaseous form on site by an ozone generator, in varying concentrations in either air or aqueous solution, for the purposes of odor abatement, oxidation of organic and inorganic compounds, or antimicrobial intervention, in a variety of applications, from food processing to groundwater remediation.

**1.3. Details of the supplier of the safety data sheet**
Manufacturer/supplier:
Arrow Lake AB
Stillmansgatan 12
212 25 Malmö
Sweden
+46 (0) 730 489630
E-mail: info@arrowlake.se
Web: www.arrowlake.se

**1.4 Emergency telephone number**
Emergency number: 112 (Sweden)

## SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**
2.1.1 Classification according to regulation (EC) nr 1272/2008 (CLP)
Oxidizing gas, Ox. Gas 1
Acute toxicity via inhalation, Acute tox 1
Eye Irritation, Category 2
Specific target organ toxicity-single exposure, STOT SE1
Acute Aquatic Toxicity, Category I

**2.2 Label elements**




Signal word: **Danger**
Hazard statements:
H270 May cause or intensify fire; oxidizer
H330 Fatal if inhaled
H319 Causes serious eye irritation
H370 Causes damage to organs
H400 Very toxic to aquatic life

Precautionary statements:
P244 - Keep reduction valves/valves and fittings free from oil and grease

P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P264 - Wash exposed body part thoroughly after handling
P284 - [In case of inadequate ventilation] wear respiratory protection.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310 Immediately call a POISON CENTER/doctor/…
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337+P313 - If eye irritation persists: Get medical advice/attention

**2.3 Other hazards N/A**

**SECTION 3: Composition/information on ingredients**

| Substance name | Cas-nr | EC-nr | Concentration | Classification | M-factor |
|---|---|---|---|---|---|
| Ozone | 10028-15-6 | 233-069-2 | 0-100 g/Nm3 | Oxidizing gas, Ox. Gas 1<br>Acute toxicity via inhalation, Acute tox 1<br>Eye Irritation, Cat 2<br>Specific target organ toxicity-single exposure, STOT SE1<br>Acute Aquatic Toxicity, Cat I | 100 |

Residual air or oxygen, depending on the feed gas. Concentration of the outlet from the ozone generator can range from a few ppm (fan distributed generator), to <100g/Nm3 with oxygen as the feed gas.

**SECTION 4: First aid measures**

General information:
Ozone is not only mainly, but exclusively absorbed via the mucous membrane of the respiratory tract (and eyes). Remove victim(s) to fresh air while protecting yourself. After contact with solutions containing ozone, take off immediately all contaminated clothing. In case of feeling unwell, get medical advice.
Keep at rest, prevent from heat loss.
After inhaling small amounts of ozone: Remove victim(s) to fresh air.
After inhaling larger amounts of ozone: Remove victim(s) to fresh air and keep at rest while protecting yourself (respiratory protection device, full protection suit, gloves). Check consciousness.
In case of shortness of breath: Let the victim inhale oxygen.
In case of apnea: Reanimation, artificial respiration. Provide for quick medical help.
Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

| **SECTION 5: Firefighting measures** |
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| While ozone itself is not flammable, it is a strong oxidant and may accelerate, even initiate, combustion, or cause explosions. Use whatever extinguishing agents are indicated for burning materials. |
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| **SECTION 6: Accidental release measures** |
| Turn off ozone generator, and ventilate the area. Evacuate the area until ozone levels subside.<br>*6.1 Personal protective measures, protective equipment, and emergency procedures.*<br>*Protective equipment: Full face mask (respirator) is required in emergencies when entry into the room is necessary.* |
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| **SECTION 7: Handling and storage** |
| **7.1 Precautions for safe handling**<br>Ozone 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. |
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| **SECTION 8: Exposure controls/personal protection** |
| **8.1 Control parameters**<br>OSHA: Permissible Exposure Limit: 8 hour Time Weighted Average **0.1 ppm**, Short Term Exposure Limit **0.3 ppm**<br>ACGIH: Exposure Limit Ceiling Value **0.1 ppm** light work; **0.08 ppm** moderate work; **0.05 ppm**, heavy work;<br>OSHA: Light, moderate, heavy workloads: >= 2 hours, **.20 ppm**<br>NIOSH: Immediately Dangerous to Life or Health **5 ppm**<br><br><u>Swedish Work Environment Authority´s provision (AFS) 2018:1</u>:<br>Time Weighted Average **0.1 ppm, 0.2 mg/m$^3$**<br>Short Term Exposure Limit **0.3 ppm, 0.6 mg/m$^3$**<br><br>**8.2 Exposure controls**<br>8.2.1 Use ozone destruct units (thermal and/or catalytic) for off gassing ozone. Install gas alarms.<br>8.2.2 Use full face self-contained breathing apparatus for entering areas with high concentration of ozone. |
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| **SECTION 9: Physical and chemical properties** |
| Physical state: Gas<br>Molecular Weight: 48,0<br>Appearance: Clear at low concentrations, blue at higher concentrations<br>Odor: Distinctive pungent odor<br>Odor threshold: 0.02 to 0.05 ppm; exposure desensitizes<br>Melting point: -193 °C/-315 °F<br>Boiling point: -112 °C/-169 °F<br>Vapor pressure: > 1 atm<br>Vapor density: 1,6 (air = 1) |

Solubility in water: 570 mg/L @20°C, 100% O3; 0,64 @0°C (vol/vol)
pH: NA
Flash point: NA
Evaporation rate: NA
Flammability: NA
Explosive limits: NA
Relative density: NA
Partition coefficient: NA
Auto-ignition temperature: NA
Decomposition temperature: NA
Viscosity: NA

## SECTION 10: Stability and reactivity

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

## SECTION 11: 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/or eyes is also possible.
Effects of Chronic Exposure: Similar to acute exposure effects, with possible development of chronic breathing disorders, including asthma.
Inhalation LC50: mice, 12.6 ppm for 3 hours; hamsters, 35.5 ppm for 3 hours

## SECTION 12: Ecological information

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

## SECTION 13: Disposal considerations

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

## SECTION 14: Transport information

NOT APPLICABLE as ozone is generated ”in-situ” and used in place. (i.e. no transport takes place)

| **SECTION 15: Regulatory information** |
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| EU regulations: Biocide regulation 528/2012, Reach regulation 1907/2006, CLP regulation 1272/2008.<br>Swedish regulations: The Environmental Code (1998:808), Pesticides Ordinance (2014:425), KIFS 2022:3 Pesticides Regulations, KIFS 2017:7 Chemical products and Biotechnical Organisms Regulations |
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| **SECTION 16: Other information** |
| The half-life of ozone 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 ozone dissolved in water at 20°C, and a half-life of approximately 25 hours for ozone 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 ozone in air could be 1 hour or less. Further, ventilation of a closed space to other areas will also disperse the ozone, so that concentration levels can rapidly decrease after generation ceases. |