



5035 North Service Rd, #A10
Burlington, Ontario, Canada, L7L 5V2
Tel: (905) 332-7669
Fax: (905) 332-7502

MATERIAL SAFETY DATA SHEET

Revision: May 30, 2004

SECTION 1 – PRODUCT IDENTIFICATION

Product Name: Ozone
Synonymys: Triatomic Oxygen
Physical State: Colourless Gas with Characteristic Odour
Molecular Formula: O₃
Molecular Weight: 48.0

Ozone occurs naturally in the environment and ambient values range from 0.01 to 0.15 ppm. Areas near arc welders have shown levels of 10.0 ppm. Electrical equipment such as copying machines, motors and transformers can produce levels as high as 0.5 ppm.

SECTION 2 – INGREDIENTS AND OCCUPATIONAL EXPOSURE LIMITS

Components: Ozone Gas
Concentration: 0-6% by weight
Gas Registry Number: 10028-15-6

Permissible Exposure Limit: The current long term maximum exposure level to ozone allowed by the U.S. Occupational, Safety and Health Administration (OSHA) is 0.1 ppm averaged over an eight-hour work shift, five days per week. The ASHRAE maximum allowable concentration in an air conditioned space is 0.05 ppm. The OSHA short term exposure limit (STEL) is 0.3 ppm over a 15 minute period, not to be repeated more than two times in an eight hour period. Prolonged exposure of humans has produced no apparent ill effects at 0.2 ppm. However, a 60 minute exposure at 50 ppm would generally be considered as fatal. No criteria is set for the permissible concentration of ozone in water which is not considered a hazard.

SECTION 3 - PHYSICAL DATA

Boiling Point: -112°C

Melting Point: -193°C

Solubility in Water by weight at 20°C & 2% concentration in gas phase: 10 ppm

Gas Density: 2.144 grams/liter at 0°C

Appearance and Odor: Ozone is colorless at all concentrations experienced in industry. It has a very pungent characteristic odor usually associated with electrical sparks. The corona in the generator cell has a bluish color. Ozone odor is generally detectable at concentrations of 0.02-0.05 ppm. Prolonged exposure may desensitize an individual to the aroma of ozone. Producing 300 mg/hr of ozone in a clean 40 m³ room would result in a maximum concentration of about 1.0 ppm in 15 minutes.

SECTION 4 - FIRE/EXPLOSION HAZARDS DATA

Ozone is a powerful oxidizing agent and oxidation with ozone evolves more heat and usually starts at a lower temperature than oxidation with oxygen. It reacts with non-saturated organic compounds to produce ozonides, which are unstable and may decompose with explosive violence.

Ozone is an unstable gas which, at normal temperatures, decomposes to biatomic oxygen. At elevated temperatures and in the presence of certain catalysts such as hydrogen, iron, copper and chromium, this decomposition may be explosive.

FLASH POINT: Non flammable

AUTOIGNITION : Non flammable

FLAMMABILITY: Non Flammable but vigorously supports combustion.

EXTINGUISHING MEDIA: Depends on source media.

SECTION 5 – REACTIVITY DATA

Ozone is a very reactive gas. It will quickly corrode most metals (iron, copper and mild steel, for example), and will cause damage to most plastics if used without considerations of ozone compatibility. Natural rubber exposed to ozone will harden and crack. Gaskets, sealing compounds, and piping should be chosen with attention to ozone compatibility.

Conditions Contributing to Instability: Ozone spontaneously decomposes under all ordinary conditions, so that it is not encountered except in the immediate vicinity of where it was formed. The decomposition is speeded by solid surfaces and by many chemical substances. The half life in air in the absence of contaminants is from 4 to 12 hours depending on temperature and humidity. The half life in water varies between seconds and hours depending on temperature, pH, and water contaminants.

Incompatibilities: Ozone is a powerful oxidizing agent and reacts with all oxidizable materials, both organic and inorganic. Non-saturated organic compounds react to produce ozonides which are unstable and may decompose with explosive violence.

Hazardous Decomposition Products: None

Special Precautions: None

SECTION 6 – HEALTH HAZARD DATA

Ozone is not listed by the U.S. EPA, IARC, NTP or OSHA as either a confirmed or suspected carcinogen.

Symptoms of Exposure: Ozone is an irritant that can cause coughs, chest discomfort and irritation of the nose throat and trachea. Individuals exposed to concentrations between 0.10 and 0.40 have exhibited an adaptive response, at least in terms of lung function. At rates from 1.0 ppm to 2.0 ppm people may experience watering eyes, decreased pulse rate with a fall in blood pressure, cough, difficulty breathing, and other changes. Physical activity accentuates the effects. If the ozone concentrations continue to rise, more severe symptoms may develop. These may include headache, upset stomach, or vomiting, pain or tightness of the chest, shortness of breath or tiredness, which may last for several days or weeks. Finally, with higher levels of exposure, the lungs may be damaged and death may occur.

Toxicological Properties: Ozone is extremely irritating to the upper and lower respiratory tract. The characteristic odor is readily detectable at low concentrations. Ozone produces local irritation of the eyes and mucous membranes and may cause pulmonary edema at high exposure. Human tissue and animal studies have shown chromosomal changes and reproductive effects at higher concentrations. A partial tolerance appears to develop with repeated exposures. Although most effects are acute, the possibility of chronic lung impairment should be considered, based upon animal experimentation.

SECTION 7 – PREVENTIVE MEASURES

Leak Procedures (The following generally applies to water and wastewater applications only where large ozone generators may be in use)

Persons should be restricted from areas of leaks until cleanup has been completed. If ozone is leaked, the following steps should be taken:

Stop the flow of gas.

Ventilate area of leak to disperse gas.

Waste Disposal Method: Do not dispose of excessive ozone off gas to atmosphere without properly designed off gas destruct unit.

Engineering Controls: Ozone monitoring equipment should be installed that automatically shuts down the ozone generator.

Respiratory Protection - Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use where large ozone generators are installed.

Ventilation - All potential sources of ozone off gas should be collected with suitable collection and dispersion system. All ozone off gas should pass through a properly designed ozone off gas destruct unit prior to release to atmosphere.