

## Section 1. Chemical product and company identification

<b>Product name</b>	: Nonflammable Gas Mixture: Chlorine 1ppm-5.8% / Nitrogen 94.2-99%
<b>Supplier</b>	: Gas Dynamics, LLC 46410 Continental Drive New Baltimore, MI 48047 www.GasDynamics.com (586) 840-3225
<b>Product use</b>	: Synthetic/Analytical chemistry.
<b>MSDS #</b>	: 003001
<b>Date of Preparation/Revision</b>	: <b>5/6/2010.</b>
<b>In case of emergency</b>	: (800) 424-9300

## Section 2. Hazards identification

<b>Physical state</b>	: Gas.
<b>Emergency overview</b>	: <b>DANGER!</b>  CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF INHALED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CONTENTS UNDER PRESSURE.  Do not puncture or incinerate container. Do not breathe gas. Do not get on skin or clothing. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container closed. Do not get in eyes, on skin or on clothing. Avoid breathing gas. Wash thoroughly after handling.  Contact with rapidly expanding gases can cause frostbite.
<b>Target organs</b>	: Contains material which may cause damage to the following organs: lungs, upper respiratory tract, skin, eyes.
<b>Routes of entry</b>	: Inhalation Dermal Eyes
<b>Potential acute health effects</b>	
<b>Eyes</b>	: Severely corrosive to the eyes. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
<b>Skin</b>	: Severely corrosive to the skin. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
<b>Inhalation</b>	: Toxic by inhalation. Severely corrosive to the respiratory system.
<b>Ingestion</b>	: Ingestion is not a normal route of exposure for gases
<b>Potential chronic health effects</b>	: <b>CARCINOGENIC EFFECTS:</b> Classified A4 (Not classifiable for humans or animals.) by ACGIH [chlorine]. <b>MUTAGENIC EFFECTS:</b> Not available. <b>TERATOGENIC EFFECTS:</b> Not available.
<b>Medical conditions aggravated by over-exposure</b>	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
<b>See toxicological information (section 11)</b>	

## Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Nitrogen	7727-37-9	94.2 - 99	Oxygen Depletion [Asphyxiant]
Chlorine	7782-50-5	0.0001 - 5.8	<b>ACGIH TLV (United States, 1/2009).</b> STEL: 2.9 mg/m <sup>3</sup> 15 minute(s). STEL: 1 ppm 15 minute(s). TWA: 1.5 mg/m <sup>3</sup> 8 hour(s). TWA: 0.5 ppm 8 hour(s). <b>NIOSH REL (United States, 6/2009).</b> CEIL: 1.45 mg/m <sup>3</sup> 15 minute(s). CEIL: 0.5 ppm 15 minute(s). <b>OSHA PEL (United States, 11/2006).</b> CEIL: 3 mg/m <sup>3</sup> CEIL: 1 ppm <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 3 mg/m <sup>3</sup> 15 minute(s). STEL: 1 ppm 15 minute(s). TWA: 1.5 mg/m <sup>3</sup> 8 hour(s). TWA: 0.5 ppm 8 hour(s).

## Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

## Section 5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:  
nitrogen oxides  
halogenated compounds
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
- Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

**Nonflammable Gas Mixture: Chlorine 1ppm-5.8% / Nitrogen 94.2-99%**

## Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Do not get in eyes, on skin or on clothing. Keep container closed. Do not get on skin or clothing. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

## Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

### Personal protection

- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.  
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

### Product name

nitrogen  
chlorine

Oxygen Depletion [Asphyxiant]  
**ACGIH TLV (United States, 1/2009).**  
STEL: 2.9 mg/m<sup>3</sup> 15 minute(s).  
STEL: 1 ppm 15 minute(s).  
TWA: 1.5 mg/m<sup>3</sup> 8 hour(s).  
TWA: 0.5 ppm 8 hour(s).  
**NIOSH REL (United States, 6/2009).**  
CEIL: 1.45 mg/m<sup>3</sup> 15 minute(s).  
CEIL: 0.5 ppm 15 minute(s).  
**OSHA PEL (United States, 11/2006).**  
CEIL: 3 mg/m<sup>3</sup>  
CEIL: 1 ppm  
**OSHA PEL 1989 (United States, 3/1989).**  
STEL: 3 mg/m<sup>3</sup> 15 minute(s).  
STEL: 1 ppm 15 minute(s).

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TWA: 1.5 mg/m<sup>3</sup> 8 hour(s).

TWA: 0.5 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

## Section 9. Physical and chemical properties

- Melting/freezing point** : -101.1°C (-150°F) This is based on data for the following ingredient: chlorine. Weighted average: -203.97°C (-335.1°F)
- Critical temperature** : Lowest known value: -146.9°C (-232.4°F) (nitrogen).
- Vapor density** : Highest known value: 2.4 (Air = 1) (chlorine). Weighted average: 1.05 (Air = 1)
- Gas Density (lb/ft<sup>3</sup>)** : Weighted average: 0.07

## Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Highly reactive with organic materials, alkalis.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
chlorine	LC50 Inhalation Gas.	Rat	293 ppm	1 hours
	LC50 Inhalation Gas.	Rat	293 ppm	1 hours
	LC50 Inhalation Gas.	Mouse	137 ppm	1 hours

- Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH [chlorine]. Contains material which may cause damage to the following organs: lungs, upper respiratory tract, skin, eyes.

- Other toxic effects on humans** : Hazardous by the following route of exposure: of skin contact (irritant), of eye contact (irritant), of inhalation (lung irritant).

### Specific effects

- Carcinogenic effects** : No known significant effects or critical hazards.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

## Section 12. Ecological information

### Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
chlorine	-	Acute LC50 0.75 mg/L Marine water	Crustaceans - Blue crab - Callinectes sapidus - Adult	48 hours
	-	Acute LC50 838 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
	-	Acute LC50 752 to 33400 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
	-	Acute LC50 380 to 3390 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days

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-	Acute LC50 354 to 488 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
-	Acute LC50 150 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 136 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
-	Acute LC50 130 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 120 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 116 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 110 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex	48 hours
-	Acute LC50 107 to 110 ug/L Fresh water	Fish - Brook trout - Salvelinus fontinalis - Juvenile (Fledgling, Hatchling, Weanling) - 7.5 to 10 cm	96 hours
-	Acute LC50 102 to 124 ug/L Fresh water	Fish - Brook trout - Salvelinus fontinalis - Juvenile (Fledgling, Hatchling, Weanling) - 10 to 15 cm	96 hours
-	Acute LC50 91 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex	48 hours
-	Acute LC50 90 ug/L Marine water	Fish - Spot - Leiostomus xanthurus	96 hours
-	Acute LC50 85 to 5670 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
-	Acute LC50 85 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 75 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex	48 hours
-	Acute LC50 40 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex	48 hours
-	Acute LC50 37 ug/L Marine water	Fish - Atlantic silverside - Menidia menidia	96 hours
-	Acute LC50 37 to 220 ug/L Marine water	Fish - Northern pipefish - Syngnathus fuscus	96 hours
-	Acute LC50 30 ug/L Fresh water	Daphnia - Water flea - Daphnia	48 hours

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-	Acute LC50 29 ug/L Fresh water	pulex Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
-	Acute LC50 14 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
-	Acute LC50 13.6 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
-	Acute LC50 2.03 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days
-	Acute LC50 4720 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus racovitzai	2 days

- Products of degradation** : Products of degradation: nitrogen oxides (NO, NO<sub>2</sub> etc.), halogenated compounds.  
**Environmental fate** : Not available.  
**Environmental hazards** : No known significant effects or critical hazards.  
**Toxicity to the environment** : Not available.

**Section 13. Disposal considerations**

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

**Section 14. Transport information**

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-
<b>TDG Classification</b>	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		<b>Explosive Limit and Limited Quantity Index</b> 0.125  <b>Passenger Carrying Road or Rail Index</b> 75
<b>Mexico Classification</b>	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

## Section 15. Regulatory information

### United States

- U.S. Federal regulations** : TSCA 8(a) CAIR: chlorine  
TSCA 8(a) IUR: nitrogen  
**United States inventory (TSCA 8b)**: All components are listed or exempted.  
**SARA 302/304/311/312 extremely hazardous substances**: chlorine  
**SARA 302/304 emergency planning and notification**: chlorine  
**SARA 302/304/311/312 hazardous chemicals**: nitrogen; chlorine  
**SARA 311/312 MSDS distribution - chemical inventory - hazard identification**:  
nitrogen: Sudden release of pressure; chlorine: Fire hazard, Sudden release of pressure,  
Immediate (acute) health hazard  
**Clean Water Act (CWA) 307**: No products were found.  
**Clean Water Act (CWA) 311**: chlorine  
**Clean Air Act (CAA) 112 accidental release prevention**: chlorine  
**Clean Air Act (CAA) 112 regulated flammable substances**: No products were found.  
**Clean Air Act (CAA) 112 regulated toxic substances**: chlorine

### SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
<b>Form R - Reporting requirements</b>	: Chlorine	7782-50-5	0.0001 - 5.8
<b>Supplier notification</b>	: Chlorine	7782-50-5	0.0001 - 5.8

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

- State regulations** : **Connecticut Carcinogen Reporting**: None of the components are listed.  
**Connecticut Hazardous Material Survey**: None of the components are listed.  
**Florida substances**: None of the components are listed.  
**Illinois Chemical Safety Act**: None of the components are listed.  
**Illinois Toxic Substances Disclosure to Employee Act**: None of the components are listed.  
**Louisiana Reporting**: None of the components are listed.  
**Louisiana Spill**: None of the components are listed.  
**Massachusetts Spill**: None of the components are listed.  
**Massachusetts Substances**: The following components are listed: NITROGEN; CHLORINE  
**Michigan Critical Material**: None of the components are listed.  
**Minnesota Hazardous Substances**: None of the components are listed.  
**New Jersey Hazardous Substances**: The following components are listed: NITROGEN; CHLORINE  
**New Jersey Spill**: None of the components are listed.  
**New Jersey Toxic Catastrophe Prevention Act**: The following components are listed: Chlorine  
**New York Acutely Hazardous Substances**: The following components are listed: Chlorine  
**New York Toxic Chemical Release Reporting**: None of the components are listed.  
**Pennsylvania RTK Hazardous Substances**: The following components are listed: NITROGEN; CHLORINE  
**Rhode Island Hazardous Substances**: None of the components are listed.

### Canada

- WHMIS (Canada)** : Class A: Compressed gas.  
Class C: Oxidizing material.  
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).  
Class E: Corrosive material

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**CEPA Toxic substances:** None of the components are listed.  
**Canadian ARET:** None of the components are listed.  
**Canadian NPRI:** The following components are listed: Chlorine  
**Alberta Designated Substances:** None of the components are listed.  
**Ontario Designated Substances:** None of the components are listed.  
**Quebec Designated Substances:** None of the components are listed.

**Section 16. Other information**

**United States**

**Label requirements**

: CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.  
HARMFUL IF INHALED.  
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  
CONTENTS UNDER PRESSURE.

**Canada**

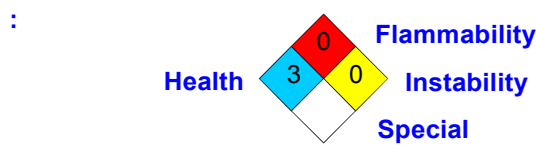
**Label requirements**

: Class A: Compressed gas.  
Class C: Oxidizing material.  
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).  
Class E: Corrosive material

**Hazardous Material Information System (U.S.A.)**

Health	* 3
Flammability	0
Physical hazards	0

**National Fire Protection Association (U.S.A.)**



**Notice to reader**

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.