Safety Data Sheet
122

Section 1: Product and Company Identification

Absolute Accuracy
4591 S Wayside Dr
Houston, TX 77087
(832) 571-2387

Product Code: 122

Synonyms: N/A
Recommended Use: CALIBRATION GAS
Usage Restrictions: INDUSTRIAL CALIBRATION GAS ONLY

Section 2: Hazards Identification

Danger

Hazard Classification:
Carcinogenicity (Category 1.B)
Eye Effects (Category 2.A)
Gases Under Pressure
Germ Cell Mutagenicity (Category 1.B)
Specific target organ toxicity (Single Exposure) (Category 3)

Hazard Statements:
Causes serious eye irritation
Contains gas under pressure; may explode if heated
May cause cancer
May cause genetic defects
May cause respiratory irritation;

Precautionary Statements
Prevention:
Wash thoroughly after handling.
Avoid breathing dust/fume/gas/mist/ vapors/spray.
[In case of inadequate ventilation] wear respiratory protection.
Do not handle until all safety precautions have been read and understood.
Use only outdoors or in a well-ventilated area.
Wear protective gloves, protective clothing, eye protection and face protection.
Obtain special instructions before use.

Response:
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Call a poison center or doctor if you feel unwell.
If exposed or concerned: Get medical advice/attention.

Storage:
Store in a well-ventilated place. Keep container tightly closed.
Protect from sunlight.
Store locked up.

Disposal:
Dispose of contents and/or container in accordance with applicable regulations.

Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Ethylene Oxide	75-21-8	10 PPM
Oxygen	7782-44-7	%20.9
Nitrogen	7727-37-9	BALANCE

	Chemical Substance	Chemical Family	Trade Names
Ethylene Oxide	ETHYLENE OXIDE	Epoxides	OXIRANE; DIHYROOXIRENE; DIMETHYLENE OXIDE; EPOXYETHANE; 1,2-EPOXYETHANE; ETHENE OXIDE; ETO; EO; OXACYCLOPROPANE; OXANE; OXIDOETHANE; ALPHA,BETA-OXIDOETHANE; OXIRAN; RCRA U115; STCC 4906610; UN 1040; C2H4O
Oxygen	OXYGEN, COMPRESSED GAS	Inorganic gases	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O2
Nitrogen	NITROGEN, COMPRESSED GAS	Inorganic gases	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Ethylene Oxide	If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.	Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.	Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Avoid mouth-to-mouth contact by using mouth guards or shields. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen. For ingestion, consider gastric lavage and activated charcoal slurry.
Oxygen	None expected	None expected	Not likely route of exposure	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	None

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Nitrogen	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

Section 5: Fire Fighting Measures

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Ethylene Oxide	Carbon dioxide, regular dry chemical, water Large fires: Use alcohol-resistant foam or flood with fine water spray.	Carbon monoxide, carbon dioxide and toxic and irritating fumes, carbon, acetaldehyde	▪ Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Full body chemical protective suit. ▪ Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Full body chemical protective suit.
Oxygen	Non-flammable. Use extinguishing agent appropriate for the material which is burning. Use water in large quantities for fires involving oxygen.	Oxides of burning material	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ None
Nitrogen	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	▪ Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
Ethylene Oxide	Keep unnecessary people away, isolate hazard area and deny entry.	Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers.	Stop leak if possible without personal risk. Reduce vapors with water spray. Do not get water inside container. Remove sources of ignition.
Oxygen	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid contact with combustible materials.	Stop leak if possible without personal risk.
Nitrogen	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	No significant effects from contamination expected.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information
Ethylene Oxide	Small spills: Flood with water. Large spills: Dike for later disposal.	Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA). Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

	Methods for Cleanup	Other Information
Oxygen	Stop leak and ventilate	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
Ethylene Oxide	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Store below 30 C. Store outside or in a detached building. Avoid contact with light. Store in a cool, dry place. Use diking sufficient to contain total contents plus 10%. Store with flammable liquids. Keep separated from incompatible substances. Grounding and bonding required. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30).	Keep separated from incompatible substances. Protect from physical damage.
Oxygen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Nitrogen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.

Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
Ethylene Oxide	ETHYLENE OXIDE: 1 ppm OSHA TWA 5 ppm OSHA excursion limit 15 minute(s) 0.5 ppm OSHA action level 1 ppm ACGIH TWA 0.1 ppm (0.18 mg/m3) NIOSH recommended TWA 10 hour(s) (not to exceed) 5 ppm (9 mg/m3) NIOSH recommended ceiling 10 minute(s)
Oxygen	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Ethylene Oxide	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing. Wear appropriate chemical resistant clothing.	Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Full body chemical protective suit.
Oxygen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
Nitrogen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
Ethylene Oxide	Gas	Colorless	Colorless	N/A	Gas	Sweet odor	N/A
Oxygen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
Ethylene Oxide	-4 F (-20 C) (CC) (pure ethylene oxide)	Not available	Not available	804 F (429 C)	1	0.03
Oxygen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Nitrogen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
Ethylene Oxide	50.7 F (10.4 C) (pure ethylene oxide)	-168 F (-111 C)	1095 mmHg @ 20 C	1.5 (Air=1)	0.8824 @ 10 C	Soluble	Not applicable	500 ppm	Not applicable	0.0095 cP @ 20 C
Oxygen	-297 F (-183 C)	-360 F (-218 C)	760 mmHg @ -183 C	1.1 (Air=1)	Not applicable	3.2% @ 25 C	Not applicable	Not available	Not applicable	0.02075 cP @ 25 C
Nitrogen	-321 F (-196 C)	-346 F (-210 C)	760 mmHg @ -196 C	0.967 (Air=1)	Not applicable	1.6% @ 20 C	Not applicable	Not available	Not applicable	0.01787 cP @ 27 C

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
Ethylene Oxide	44.06	(C-H2)2-O	Not available	Not available	100%	1	Soluble: Alcohol, ether, acetone, benzene, carbon tetrachloride, organic solvents
Oxygen	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
Nitrogen	28.0134	N2	1.2506 g/L	Not available	100%	1	Soluble: Liquid ammonia

Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
Ethylene Oxide	May decompose explosively when heated above 427 C. Normally stable in the absence of catalysts.	May decompose explosively when heated above 427 C. Normally stable in the absence of catalysts.	Acids, combustible materials, bases, metal salts, metal oxides, amines, halo carbons, metals, cyanides, oxidizing materials, porous refractory insulation, alcohols

	Stability	Conditions to Avoid	Incompatible Materials
Oxygen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials, alkaline earth and alkali metals
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Ethylene Oxide	Oxides of carbon	May polymerize violently or explosively. May polymerize when heated. Avoid contact with incompatible materials.
Oxygen	Miscellaneous decomposition products	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Ethylene Oxide	72 mg/kg oral-rat LD50	Not available	Irritation, lack of sense of smell, tearing, nausea, vomiting, diarrhea, difficulty breathing, irregular heartbeat, headache, drowsiness, symptoms of drunkenness, disorientation, bluish skin color, lung congestion, lung damage, kidney damage, paralysis, reproductive effects, convulsions
Oxygen	Not established	Not established	Irritation, changes in body temperature, nausea, difficulty breathing, irregular heartbeat, dizziness, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, convulsions
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
Ethylene Oxide	Irritation (possibly severe), frostbite, tearing	Irritation (possibly severe), allergic reactions, blisters	Skin irritation, Category 2; H315: Causes skin irritation. Eye irritation, Category 2; H319: Causes serious eye irritation. Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Specific Target Organ Toxicity (single exposure), Category 3; H335: May cause respiratory irritation. Germ cell mutagenicity, Category 1B; H340: May cause genetic defects. Carcinogenicity, Category 1B; H350: May cause cancer.
Oxygen	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
Nitrogen	Contact with rapidly expanding gas may cause burns or frostbite	No information on significant adverse effects	Difficulty breathing

Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Ethylene Oxide	OSHA: Carcinogen; NTP: Known Human Carcinogen; IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 1; ACGIH: A2 - Suspected Human Carcinogen	Available.	Available.	No data
Oxygen	Not known.	Available.	Available.	No data
Nitrogen	Not hazardous	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Ethylene Oxide	Fish toxicity: Acute LC50 84000 to 96000 ug/L Fresh water Fish - Fathead minnow - Pimephales promelas 96 hours Invertibrate toxicity: 490000 ug/L 48 hour(s) LC50 (Mortality) Brine shrimp (Artemia sp) Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Oxygen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Low bioaccumulation	Not available
Nitrogen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

Section 13: Disposal Considerations

Ethylene Oxide	Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U115. Dispose in accordance with all applicable regulations.
Oxygen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Nitrogen	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Nitrogen, Oxygen)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	Non-Flammable Gas

Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Ethylene Oxide	ETHYLENE OXIDE; or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 degrees C	UN1040	2.3	Not applicable	2.3; 2.1	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone D
Oxygen	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
Ethylene Oxide	ETHYLENE OXIDE; or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 degrees C	UN1040	2.3; 2.1	Not applicable
Oxygen	Oxygen, compressed	UN1072	2.2; 5.1	Not applicable
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Ethylene Oxide	ETHYLENE OXIDE: 10 LBS RQ Acetaldehyde: 1000 LBS RQ ACETIC ACID: 5000 LBS RQ	1000 LBS TPQ	10 LBS RQ
Oxygen	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Ethylene Oxide	Yes	Yes	Yes	Yes	Yes
Oxygen	No	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Ethylene Oxide	ETHYLENE OXIDE
Oxygen	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Ethylene Oxide	ETHYLENE OXIDE: 5000 LBS TQ Acetaldehyde: 2500 LBS TQ
Oxygen	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Ethylene Oxide	WARNING: This product can expose you to chemicals including Ethylene Oxide, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
Oxygen	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Ethylene Oxide	A, B1, D1A, D2A, E, F
Oxygen	A,C
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	**TSCA 12b Export Notification**	**Canada Inventory (DSL/NDSL)**
Ethylene Oxide	Listed on inventory.	Not listed.	Not determined.
Oxygen	Listed on inventory.	Not listed.	Not determined.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Ethylene Oxide	HEALTH=3 FIRE=4 REACTIVITY=3
Oxygen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=OX
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard