



**AIR LIQUIDE**

# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards*

## 1. PRODUCT AND COMPANY INFORMATION

**CHEMICAL NAME; CLASS: AIR**

**SYNONYMS:** Medical Air, Breathing Air, Compressed Air

**CHEMICAL FAMILY NAME:** Non-Flammable Gas

**FORMULA:** Not applicable.

**NOTE:** Air may be either compressed, atmospheric air, or a mixture of 21% oxygen and 79% Nitrogen

**NOTE:** Air may be supplied by pipeline.

**PRODUCT USE:**

Document Number: 10003  
Breathing, purging or general analytical  
or synthetic chemical uses.

**MANUFACTURED/SUPPLIED FOR:**

**ADDRESS:**

**EMERGENCY PHONE:**

**BUSINESS PHONE:**

General MSDS Information: 1-713/896-2896

Fax on Demand: 1-800/231-1366



**AIR LIQUIDE**

2700 Post Oak Drive  
Houston, TX 77056-8229  
CHEMTREC: 1-800-424-9300

## 2. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Air is a colorless, odorless gas. The main health hazards associated with exposure to this gas are related to the high pressure. Contact with rapidly expanding gases from a cylinder that is suddenly released can cause frostbite to exposed skin or damage to eyes. Air is generally considered non-flammable, however, Air will support combustion. A moderate cylinder rupture hazard exists when Air, which is under pressure, is subject to heat or flames.

## 2. HAZARD IDENTIFICATION (Continued)

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for air is by inhalation at elevated or reduced pressure.

**INHALATION:** Air is non-toxic and necessary to support life. Inhalation of Air in high pressure environments, such as underwater diving or hyperbolic chambers can result in symptoms similar to over-exposure to pure oxygen. These symptoms include tingling of the fingers and toes, abnormal sensations, along with impaired coordination and confusion. Decompression sickness, "bends", is possible following rapid decompression.

**CONTACT WITH SKIN or EYES:** Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. Contact with the rapidly expanding vapors released the high pressure cylinder may cause freezing of the eye. Permanent eye damage or blindness could result.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Over-exposure to Air may cause the following health effects:

**ACUTE:** The most significant hazards associated with air is the pressure hazard.

**CHRONIC:** There are currently no known adverse health effects associated with chronic exposure to this gas.

**TARGET ORGANS:** ACUTE: None. **CHRONIC:** None.

## 3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
Air (compressed, atmospheric)	132259-10-0	100%	There are no specific exposure limits applicable to air.					
Mixed Air is a mixture of gases. The primary components of air, and the approximate concentration of each component, are listed below.								
Nitrogen	7727-37-9	79%	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	21%	There are no specific exposure limits for Oxygen.					

**This material is classified as hazardous under OSHA regulations in the United States and the WHMIS in Canada.**

NE = Not Established. NIC = Notice of Intended Change See Section 16 for Definitions of Terms Used.

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 4 FIRST-AID MEASURES

As the opportunity for injury from exposure to Air is limited to inhalation of Air in high pressure environments, such as underwater diving or hyperbolic chambers, the first-aid measures would be for over-pressure accidents, or rapid decompression-induced decompression sickness. In the event of such accidents, seek immediate and qualified medical attention.

In case of frostbite, place the frostbitten part in warm water. **DO NOT USE HOT WATER.** If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** A knowledge of the available information suggest that over-exposure to Air is unlikely to aggravate existing medical conditions.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure if air is breathed in high pressure environment, (i.e. illness associated with decompression, bends, or caisson disease). Decompression equipment may be required.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Non-flammable. Air will support combustion of flammable materials. Use extinguishing media appropriate for surrounding fire.

Water Spray: YES

Carbon Dioxide: YES

Dry Chemical: YES

Halon: YES

Foam: YES

Other: Any "ABC" Class.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Air does not burn; however, cylinders, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Incipient fire responders should wear eye protection. Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, shut-off the flow of Compressed Air supporting the fire. Immediately cool the cylinders with water spray from maximum distance. When cool, move cylinders from fire area, if without risk.

## 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Minimum Personal Protective Equipment should be **Level D: safety glasses**. Locate and seal the source of the leaking gas. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

If leaking incidentally from the cylinder or its valve, contact your supplier.

## 7. HANDLING AND STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** Air intended for breathing must conform to CGA Standard G-7 (Compressed Air for Human Respiration) and Standard G-7.1, American National Standard Commodity Specification for Air. All other sources of compressed air must be treated as unfit for human consumption until tested for conformance with these standards.

**STORAGE AND HANDLING PRACTICES:** Compressed gases can present significant safety hazards. Store cylinders away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS:** Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable or combustible materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52 °C (125 °F). Isolate from incompatible materials including flammable materials. (see Section 10, Stability and Reactivity) for more information), which can burn violently. Use only storage cylinders and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Air. Do not store cylinders where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:

**Before Use:** Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in-place (where provided) until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

**After Use:** Close main cylinder valve. Replace valve protection cap (where provided). Mark empty cylinders "EMPTY".

**NOTE:** Use only DOT or ASME code cylinders. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner.

## 7. HANDLING AND STORAGE (Continued)

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:** Use the proper CGA connections, DO NOT USE ADAPTERS:

<u>THREADED:</u>	0-3000 psig	CGA 346 (alternative 590)
	3001-5500 psig	CGA 347
	5501 - 7500 psig	CGA 702
<u>PIN-INDEXED YOKE:</u>	0-3000 psig	CGA 950 (medical use)
<u>ULTRA HIGH INTEGRITY:</u>	1160	

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** None needed.

**RESPIRATORY PROTECTION:** None needed.

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** Wear gloves when handling cylinders of this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138 and appropriate Standards of Canada.

**BODY PROTECTION:** Use body protection appropriate for task. Safety shoes are recommended when handling cylinders. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

## 9. PHYSICAL and CHEMICAL PROPERTIES

**GAS DENSITY @ 21.1°C (70°F) and 1 atm:** 0.07493 lb/ ft<sup>3</sup> (1.2 kg/m<sup>3</sup>)

**FREEZING/MELTING POINT @ 10 psig:** -216.2°C (-357.2°F)

**MOLECULAR WEIGHT:** 28.975

**SOLUBILITY IN WATER, Vol/Vol at 0°C (32° F):** 0.0292

**pH:** Not applicable.

**SPECIFIC GRAVITY (air = 1) @ 21.1°C (70°F):** 1

**EXPANSION RATIO:** Not applicable.

**EVAPORATION RATE (nBuAc = 1):** Not applicable.

**ODOR THRESHOLD:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** Not applicable for Air; 13.8 (for Nitrogen)

**VAPOR PRESSURE @ 21.1°C (70°F):** Not applicable.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**APPEARANCE, ODOR AND COLOR:** This product is a colorless, odorless gas.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** There are no unusual warning properties associated with a release of this gas.

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable in gaseous state. Compressed Air which contains excess oxygen may present the same hazards as Liquid Oxygen and could react violently with organic materials, such as oil and grease.

**DECOMPOSITION PRODUCTS:** None.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Fuels may form explosive mixtures in air.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Contact with incompatible materials, as listed above. Avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** There are no specific toxicology data for Air.

**SUSPECTED CANCER AGENT:** Air is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and there fore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** Not applicable.

**SENSITIZATION OF PRODUCT:** Air is not a skin or respiratory sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of Air on the human reproductive system.

Mutagenicity: Air is not expected to cause mutagenic effects in humans.

Embryotoxicity: Air is not expected to cause embryotoxic effects in humans.

Teratogenicity: Air is not expected to cause teratogenic effects in humans.

Reproductive Toxicity: Air is not expected to cause adverse reproductive effects in humans.

## 11. TOXICOLOGICAL INFORMATION (Continued)

A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An *embryotoxin* is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A *teratogen* is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Biological Exposure Indices (BEIs) do not exist for Compressed Air.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** This gas will be dissipated rapidly in well-ventilated areas.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence of an adverse effect of air on aquatic life is currently available.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to Air Liquide. Do not dispose of locally.

For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors, away from all sources of ignition.

## 14. TRANSPORTATION INFORMATION

**THIS COMPRESSED AIR IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** ..... Air, compressed

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** ..... UN 1002

**PACKING GROUP:** ..... Not applicable.

**DOT LABEL(S) REQUIRED:** ..... Non-Flammable Gas

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996):** 122

**MARINE POLLUTANT:** Air is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** This gas is considered as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

**PROPER SHIPPING NAME:** Air, compressed

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1002

**PACKING GROUP:** Not Applicable

**HAZARD LABEL(S) REQUIRED:** 2.2 (Non-Flammable Gas)

**SPECIAL PROVISIONS:** 42

**EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:** 0.12

**ERAP INDEX:** None

**PASSENGER CARRYING SHIP INDEX:** None

**PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:** 75

**MARINE POLLUTANT:** Compressed Air is not a Marine Pollutant.

## 15. REGULATORY INFORMATION

### ADDITIONAL U.S. REGULATIONS:

**U.S. SARA REPORTING REQUIREMENTS:** Compressed Air is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Not applicable.

**U.S. TSCA INVENTORY STATUS:** Air is listed on the TSCA Inventory.

**U.S. CERCLA REPORTABLE QUANTITIES (RQ):** Not applicable.

### **OTHER U.S. FEDERAL REGULATIONS:**

- Air USP is regulated by the FDA as a prescription drug.
- Air does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Air is not subject to the reporting requirements of Section 112(r) of the Clean Air Act.
- Air is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical Releases.
- Air is not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65:** Compressed Air is not on the California Proposition 65 lists.

**U.S. STATE REGULATORY INFORMATION:** Air is not covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.	Minnesota - List of Hazardous Substances: No.	Pennsylvania - Hazardous Substance List: No.
California - Permissible Exposure Limits for Chemical Contaminants: No.	Missouri - Employer Information/Toxic Substance List: No.	Rhode Island - Hazardous Substance List: No.
Florida - Substance List: No.	New Jersey - Right to Know Hazardous Substance List: Air.	Texas - Hazardous Substance List: No.
Illinois - Toxic Substance List: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.	West Virginia - Hazardous Substance List: No.
Kansas - Section 302/313 List: No.		Wisconsin - Toxic and Hazardous Substances: No.
Massachusetts - Substance List: No.		

### ADDITIONAL CANADIAN REGULATIONS:

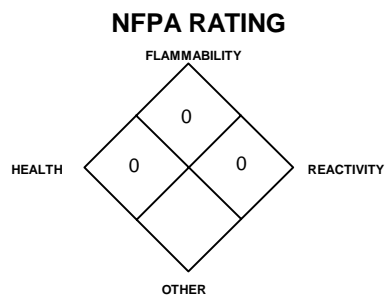
**CANADIAN DSL/NDL INVENTORY STATUS:** Compressed Air is included in the DSL Inventory.



**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS:** Compressed Air is not on the CEPA Priorities Substances Lists.

**WHMIS CLASSIFICATION:** Compressed Air is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

**OTHER CANADIAN REGULATIONS:** Not applicable.

## 16. OTHER INFORMATION



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
<b>HEALTH HAZARD</b>	(BLUE)	0	
<b>FLAMMABILITY HAZARD</b>	(RED)	0	
<b>PHYSICAL HAZARD</b>	(YELLOW)	0	
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Industrial Use and Handling Applications			

Atmospheric air that is compressed is composed of the following gases:

Nitrogen:	78%
Oxygen	21%
Argon	0.9%

Compressed air is also synthetically produced by mixing 79% nitrogen and 21% oxygen.

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about Air can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 4221 Walney Road 5<sup>th</sup> floor, Chantilly, VA 20151-2923. Telephone: (703) 788-2700.

- G-7            "Compressed Air for Human Respiration"
- G-7.1        "American National Standard Commodity Specification for Air"
- P-1            "Safe Handling of Compressed Gases in Containers"
- AV-1         "Safe Handling and Storage of Compressed Gases"

## 16. OTHER INFORMATION (Continued)

**PREPARED BY:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
PO Box 3519, La Mesa, CA 91944-3519  
619/670-0609

Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.