

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Tetrafluoromethane in Oxygen Gas Mixture

CHEMICAL NAME: 20% Tetrafluoromethane in Oxygen Gas Mixture or

30% Tetrafluoromethane in Oxygen Gas Mixture

SYNONYMS: Plasma Desmearing Gas

Halocarbon-14 or Carbon Tetrafluoride / Oxygen Gas Mixture

FORMULA: Oxygen: O₂ Tetrafluoromethane: CF₄

MANUFACTURER: Air Products and Chemicals, Inc.

7201 Hamilton Boulevard

Allentown, PA 18195-1501

PRODUCT INFORMATION: (800) 752-1597

MSDS NUMBER: 1090 **REVISION:** 3

REVIEW DATE: October 1998 **REVISION DATE:** October 1998

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Tetrafluoromethane in Oxygen Gas Mixture

CAS NUMBER: Oxygen: 7782-44-7 Tetrafluoromethane: 75-73-0

EXPOSURE LIMITS:

Oxygen Tetrafluoromethane

OSHA: PEL-TWA Not established Not established

ACGIH: TLV-TWA Not established Simple asphyxiant

NIOSH: IDLH Not established Not established

SECTION 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

This product is an oxidizing, colorless, compressed gas packaged in cylinders under pressure. It will vigorously accelerate combustion. Keep away from oil and grease. Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched (>23%) atmospheres, and that self-contained breathing apparatus (SCBA) may be required.

EMERGENCY TELEPHONE NUMBERS

(800) 523 - 9374 Continental U.S., Canada and Puerto Rico

(610) 481 - 7711 other locations

ACUTE POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE:

EYE CONTACT: May cause irritation.

INGESTION: Not applicable

INHALATION: Extended exposure to high concentrations of oxygen (>23%) may cause nasal stuffiness, dry cough, sore throat, chest pain, breathing difficulty, lung damage and central nervous system effects (CNS). CNS depression symptoms may include dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. May also cause prolongation of adaptation to darkness and reduced peripheral vision.

SKIN CONTACT: May cause irritation.

POTENTIAL HEALTH EFFECTS OF REPEATED EXPOSURE:

ROUTE OF ENTRY: Inhalation

TARGET ORGANS: None

SYMPTOMS: None

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None

CARCINOGENICITY: Components of this mixture are not listed in IARC, NTP, or OSHA Subpart Z as carcinogens or potential carcinogens.

SECTION 4. FIRST AID MEASURES

EYE CONTACT: Flush eyes with plenty of water for several minutes. Seek medical attention if irritation persists.

INGESTION: Not applicable

INHALATION: Remove person to fresh air. If not breathing, administer artificial respiration. Obtain prompt medical attention.

SKIN CONTACT: Wash skin with plenty of water for several minutes. Seek medical attention if irritation persists.

NOTES TO PHYSICIAN: Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT: AUTOIGNITION: FLAMMABLE LIMITS:

Not applicable Not applicable Not applicable

EXTINGUISHING MEDIA: This product is nonflammable but will support and vigorously accelerate combustion. Use extinguishing media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING INSTRUCTIONS: Evacuate all personnel from area. Do not approach area without self-contained breathing apparatus (SCBA) and protective clothing. If possible, shut off flow of gas which is supporting the fire. If possible, remove cylinders from fire area or cool with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxygen-enriched environments (greater than 23% oxygen) vigorously accelerate combustion. Some materials which are noncombustible in air will burn in the presence of an oxygen-enriched atmosphere. Fire resistant clothing may burn and offer no protection. Oxidizing mixtures may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

HAZARDOUS COMBUSTION PRODUCTS: None

SECTION 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate immediate area. Increase ventilation to release area and monitor oxygen level. Use appropriate protective equipment (SCBA). Do not enter areas of high oxygen concentration which could saturate clothing and increase its flammability. Personnel who have been exposed to high concentrations of oxygen should stay in a well-ventilated or open area for thirty minutes before going into a confined space or near an ignition source. Shut off source of leak if possible. Isolate any leaking cylinder. If leak is from container, pressure relief device or its valve, contact your supplier. If leak is in user's system, close cylinder valve and vent pressure before attempting repairs.

SECTION 7. HANDLING AND STORAGE

STORAGE: Store cylinders in a well-ventilated, secure area, protected from the weather. Cylinders should be stored upright with valve outlet seals and valve protection caps in place. Storage area temperatures should not exceed 125 ° F (52 ° C) and area should be free of combustible materials. Cylinders should be separated from flammable materials by a minimum distance of 20 ft. or by a barricade of non-combustible material at least five ft. high having a fire resistance rating of at least 1/2 hour. Storage should be away from heavily traveled areas and emergency exits. Full and empty cylinders should be segregated. Use a first-in first-out inventory system to prevent full containers from being stored for long periods of time.

HANDLING: Do not drag, roll, slide or drop cylinder. Use a suitable hand truck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator and separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Use piping and equipment adequately designed to withstand pressures to be encountered. Never apply flame or localized heat directly to any part of the cylinder. When preparing to connect cylinder for use, always loosen valve outlet seal slowly. Once cylinder has been connected to process, open cylinder valve slowly and carefully. Do not use rapid opening valves (i.e., ball valves). If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

All gauges, valves, regulators, piping and equipment to be used in enriched-oxygen service must be cleaned for oxygen service in accordance with Compressed Gas Association pamphlet G-4.1.

Carbon steel, stainless steel, copper, brass, nickel and their alloys are materials of construction that can be used in enriched-oxygen service.

SPECIAL PRECAUTIONS: Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, Inc. (telephone 703-412-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

VENTILATION: Provide adequate ventilation and/or local exhaust to prevent accumulation of oxygen concentrations greater than 23%.

RESPIRATORY PROTECTION:

Emergency Use: Self-contained breathing apparatus (SCBA) or positive pressure air line with full-face mask.

EYE PROTECTION: Safety glasses are recommended when handling cylinders.

SKIN PROTECTION: Work gloves are recommended when handling cylinders.

OTHER PROTECTIVE EQUIPMENT: Safety shoes are recommended when handling cylinders. Clothing exposed to high concentrations may retain oxygen for thirty minutes or longer and become a potential fire hazard. Stay away from ignition sources.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Odorless, colorless gas.

VAPOR PRESSURE: Permanent gas mixture.

20% CF₄ / O₂

30% CF₄ / O₂

GAS DENSITY (At 68 ° F (20 ° C) and 1 atm) (lb/cf): 0.1122 0.1268

SPECIFIC GRAVITY (also called vapor density) (Air =1): 1.5 1.7

SPECIFIC VOLUME (At 68 ° F (20 ° C) and 1 atm) (lb/cf): 8.9 7.9

Oxygen

Tetrafluoromethane

BOILING POINT (1 atm) (° F):

-297.7

-198.5

FREEZING POINT (° F):

-361.9

-298.5

SECTION 10. REACTIVITY / STABILITY

CHEMICAL STABILITY: Stable

CONDITIONS TO AVOID: Cylinders should not be exposed to temperatures in excess of 125 ° F (52 ° C).

INCOMPATIBILITY: Oils, grease, hydrocarbons and flammable materials.

REACTIVITY:

A) HAZARDOUS DECOMPOSITION PRODUCTS: None

B) HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

At atmospheric concentration and pressure, oxygen poses no toxicity hazards.

Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage which may progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods (24 to 48 hours).

At two or more atmospheres, central nervous system (CNS) toxicity occurs. Symptoms include nausea, vomiting, dizziness or vertigo, muscle twitching, vision changes, and loss of consciousness and generalized seizures. At three atmospheres, CNS toxicity occurs in less than two hours, and at six atmospheres in only a few minutes

Tetrafluoromethane is a simple asphyxiant.

SECTION 12. ECOLOGICAL INFORMATION

This mixture does not contain any Class I or Class II ozone depleting chemicals.

SECTION 13. DISPOSAL CONSIDERATIONS

UNUSED PRODUCT / EMPTY CYLINDER: Return cylinder and unused product to supplier. Do not attempt to dispose of unused product. Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: Compressed gas, Oxidizing, N.O.S.

HAZARD CLASS: 2.2

IDENTIFICATION NUMBER: UN3156

SHIPPING LABEL(s): Nonflammable Gas, Oxidizer

PLACARD (When required): Nonflammable Gas, Oxidizer

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well-ventilated truck. Never transport in passenger compartment of a vehicle. Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. The filling and shipping of a compressed gas cylinder without the written consent of the cylinder's owner is in violation of federal law (49 CFR 173.301).

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

EPA - ENVIRONMENTAL PROTECTION AGENCY

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980

(40 CFR Parts 117 and 302)

Reportable Quantity (RQ): None

SARA TITLE III: Superfund Amendment and Reauthorization Act

SECTIONS 302/304: Emergency Planning and Notification (40 CFR Part 355)

Extremely Hazardous Substances: Oxygen and Tetrafluoromethane are not listed.

Threshold Planning Quantity (TPQ): None

Reportable Quantity (RQ): None

SECTIONS 311/312: Hazardous Chemical Reporting (40 CFR Part 370):

IMMEDIATE HEALTH: No PRESSURE: Yes

DELAYED HEALTH: No REACTIVITY: No

FIRE: Yes

SECTION 313: Toxic Chemical Release Reporting (40 CFR Part 372)

Oxygen and Tetrafluoromethane do not require reporting under Section 313.

CLEAN AIR ACT:

SECTION 112 (r): Risk Management Programs for Chemical Accidental Release

(40 CFR Part 68)

Oxygen and Tetrafluoromethane are not listed as regulated substances.

Threshold Planning Quantity (TPQ): None

TOXIC SUBSTANCE CONTROL ACT (TSCA):

Oxygen and Tetrafluoromethane are listed on the TSCA inventory.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA):

29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals.

Oxygen and Tetrafluoromethane are not listed in Appendix A as highly hazardous chemicals.

Threshold Planning Quantity (TPQ): None

STATE REGULATIONS:

CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances which the State of California requires warning under this statute.

SECTION 16. SUPPLEMENTAL INFORMATION

NFPA RATING:	O₂	CF₄	HMS RATING:	O₂	CF₄
HEALTH	0	1	HEALTH	0	0
FLAMMABILITY	0	0	FLAMMABILITY	0	0
REACTIVITY	0	0	REACTIVITY	0	0
SPECIAL	Ox	None			