

"Refrigerant 11"

PRODUCT: UCON® Fluorcarbon 117

L-4782-B  
November 1966

VIII. SPECIAL PROTECTION INFORMATION

**RESPIRATORY PROTECTION (specify type):** Select in accordance with OSHA 29 CFR 1910.134 and ANSI Z98.2. For concentrations up to 10 times the applicable exposure limit say MOCOMBI-A approved supplied air respirator is recommended. Up to 50 times a MOCOMBI-A approved respirator fitted with a full face piece or self-contained breathing apparatus is recommended. For higher concentrations use only self-contained breathing apparatus operated in the pressure-demand mode.

VENTILATION	<b>LOCAL EXHAUST</b> — Preferred. Use local exhaust ventilation to maintain exposure below the applicable limit. See SPECIAL.
	<b>MECHANICAL (general)</b> — Acceptable. See SPECIAL.
	<b>SPECIAL</b> — Use in a closed system.
	<b>OTHER</b> — Not applicable. See SPECIAL.

PROTECTIVE GLOVES: Neoprene.

**EYE PROTECTION:** Select in accordance with OSHA 29 CFR 1910.133

**OTHER PROTECTIVE EQUIPMENT:** Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

IX. SPECIAL PRECAUTIONS

**CAUTION:** Liquefied gas under pressure. Can cause rapid suffocation due to oxygen deficiency. Use piping and equipment adequately designed to withstand pressures to be encountered. Store and use with adequate ventilation at all times. Use only in a closed system. Close cylinder valve when not in use and when empty. Do not smoke in areas where fluorocarbons are used. Wash hands thoroughly after handling fluorocarbons or materials sprayed with fluorocarbons especially before eating or drinking.

**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. Be sure to read and understand all labels and other instructions supplied with all containers of this product.

**NOTE:** Compatibility with plastics should be confirmed prior to use. For safety information on general handling of compressed gas cylinders, obtain a copy of pamphlet P-1, "Safe Handling of Compressed Gases in Containers" from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

**OTHER HANDLING AND STORAGE CONDITIONS:** Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

The opinions expressed herein are those of qualified experts within Union Carbide Industrial Gases. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Union Carbide Industrial Gases it is the user's obligation to determine the conditions of safe use of the product.

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Lithographed in U.S.A.

MATERIAL SAFETY DATA SHEET

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An explanation of the hazard levels is given in OSHA 29 CFR 1910.1201, which may be found in OSHA regional or area offices. (Similar to U.S. Department of Labor Form OSHA No. 1214-0072, and generally accepted in Canada for information purposes.) Do Not Duplicate This Form. Request an Original.



UNION CARBIDE  
LINDE  
INDUSTRIAL GASES

I. PRODUCT IDENTIFICATION

PRODUCT	UCON® Fluorcarbon 11		
CHEMICAL NAME	Trichlorofluoromethane	SYNONYMS	Fluorochloromethane, F-11, FC-11, Monotrifluoromethane, Fluorcarbon 11, Trichlorotrifluoromethane
FORMULA	CCl <sub>3</sub> F	CHEMICAL FAMILY	Fluorocarbon
		MOLECULAR WEIGHT	137.37
TRADE NAME	UCON® Fluorcarbon 11		

II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Safety Data Sheets (See Section IX).

MATERIAL (CAS NO.)	Vol. (%)	1967-1968 ACGIH TLV-TWA (OSHA-PEL)	
Trichlorofluoromethane (75-69-4)	100	Ceiling 1000 ppm	(1000 ppm)

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	23.77°C (74.79°F)	FREEZING POINT	-111.6°C (-157.8°F)
SPECIFIC GRAVITY (H <sub>2</sub> O = 1)	1.484 @ 17.2°C	VAPOR PRESSURE AT 21°C.	13.4 psia
VAPOR DENSITY (air = 1)	5.04 @ 25°C	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	High
APPEARANCE AND ODOR: Colorless liquid and vapor at normal temperature and pressure; slightly etheral odor.			

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times:  
In the USA 1-800-UCC-HELP (1-800-822-4357)  
In Canada 514-640-6400

For routine information contact your local supplier.

Union Carbide Industrial Gases requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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#### IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II.

##### EFFECTS OF SINGLE (ACUTE) OVEREXPOSURE:

**INHALATION** — An unlikely route of exposure. This product is a gas at normal temperature and pressure, but frostbite of the lips and mouth may result from contact with the liquid.

**SKIN ABSORPTION** — Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.

**INGESTION** — Asphyxiant. High concentrations can cause dizziness, nausea, vomiting, disorientation, confusion, incoordination, and narcosis. Very high concentrations may cause suffocation. Lack of oxygen can cause death.

**SKIN CONTACT** — An unlikely route of exposure. This product is a gas at normal temperature and pressure. Liquid may cause frostbite.

**EYE CONTACT** — An unlikely route of exposure. This product is a gas at normal temperature and pressure. Liquid may cause severe corneal injury.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

**ADVERSE EFFECTS OF OVEREXPOSURE:** At high concentrations may produce cardiac arrhythmias or arrest due to sensitization of heart to adrenalin and nor-adrenalin. This product is an asphyxiant. Lack of oxygen can cause death. Exposure to fluorocarbon may produce flu-like symptoms including chills, fever, weakness, muscular aches, headache, chest discomfort, sore throat, and dry cough. Complete recovery usually occurs within 24 hours after exposure.

**HEALTH CONDITIONS AGGRAVATED BY OVEREXPOSURE:** A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

**SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:** None currently available.

##### EMERGENCY AND FIRST AID PROCEDURES:

**INHALATION** — This product is a gas at normal temperature and pressure.

**SKIN** — For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

**INGESTION** — Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

**EYES** — For contact with the liquid, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

**NOTES TO PHYSICIAN:** Do not administer adrenalin due to the sensitizing effect of fluorocarbons on the myocardium. Treatment of overexposure should be directed at the control of symptoms and the clinical condition. Exposure to fluorocarbon pyrolysis products should be considered in the diagnostic evaluation of occupationally related fever of short duration and unknown origin. Signs of exposure include tachycardia, hyperpnea, and pharyngeal congestion; investigation may reveal pulmonary edema and leucocytosis.

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#### V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	Not applicable		AUTOIGNITION TEMPERATURE	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	Not applicable	UPPER	Not applicable

EXTINGUISHING MEDIA: UCON® Fluorocarbon 11 cannot catch fire. Use media appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING PROCEDURES:** Evacuate all personnel from danger area. Immediately drench containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** UCON® Fluorocarbon 11 cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are provided with pressure-relief devices that are designed to vent contents when they are subjected to specified temperatures. Toxic fumes may be produced when heated.

#### VI. REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID: Elevated temperatures (the presence of certain metals may promote catalytic decomposition of the gas).
UNSTABLE	STABLE	
	X	

**INCOMPATIBILITY (materials to avoid):** Magnesium and alloys of more than 2% Mg in presence of H<sub>2</sub>O. Natural rubber, Aluminum, Lithium and Barium.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition may produce toxic fumes of oxides and chlorides, possibly carbonyl halides.

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID: None currently known.
May Occur	Will not Occur	
	X	

#### VII. SPILL OR LEAK PROCEDURES

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:** Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

**WASTE DISPOSAL METHOD:** Prevent waste from contaminating surrounding environment. Keep personnel away. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal, State and local regulations.