



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont  
Material Safety Data Sheet

Page 1

-----  
"SUVA" MP39 (R401A) and "SUVA" MP66 (R401B)  
3030FR Revised 29-AUG-2001  
-----

-----  
CHEMICAL PRODUCT/COMPANY IDENTIFICATION  
-----

Material Identification

"SUVA" is a registered trademark of DuPont.

Corporate MSDS Number : DU004507  
Formula : CHClF2/CH3CHF2/CHClFCF3

Company Identification

MANUFACTURER/DISTRIBUTOR  
DuPont Chemical Solutions Enterprise  
1007 Market Street  
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515  
Transport Emergency : CHEMTREC 1-800-424-9300  
Medical Emergency : 1-800-441-3637

-----  
COMPOSITION/INFORMATION ON INGREDIENTS  
-----

Components

Material	CAS Number	%
"SUVA" MP39 (R-401A)		
* METHANE, CHLORODIFLUORO- (HCFC-22)	75-45-6	53
ETHANE, 1,1-DIFLUORO- (HFC-152a)	75-37-6	13
* ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO (HCFC-124)	2837-89-0	34
"SUVA" MP66 (R-401B)		
* METHANE, CHLORODIFLUORO- (HCFC-22)	75-45-6	61
ETHANE, 1,1-DIFLUORO- (HFC-152a)	75-37-6	11
* ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO (HCFC-124)	2837-89-0	28

\* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

-----  
HAZARDS IDENTIFICATION  
-----

## Potential Health Effects

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Liquid contact can cause frostbite.

## HUMAN HEALTH EFFECTS:

Skin contact may cause frostbite from exposure to the liquid. Inhalation may include nonspecific discomfort, such as nausea, headache, or weakness; or temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness.

Higher exposures to vapors may lead to these effects: temporary lung irritation effects with cough, discomfort, difficulty breathing, or shortness of breath; temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation; abnormal kidney function as detected by laboratory tests; or fatality from gross overexposure. Individuals with preexisting diseases of the central nervous system, cardiovascular system, lungs or kidneys may have increased susceptibility to the toxicity of excessive exposures.

## Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

-----  
FIRST AID MEASURES  
-----

## First Aid

## INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

## SKIN CONTACT

Flush skin with water for at least 15 minutes after excessive contact. Seek medical assistance if irritation is present. Wash contaminated clothing before reuse. Treat for frostbite if necessary by gently warming affected area.

## (FIRST AID MEASURES - Continued)

## EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

## INGESTION

Ingestion is not considered a potential route of exposure.

## Notes to Physicians

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should only be used with special caution in situations of emergency life support.

-----  
FIRE FIGHTING MEASURES  
-----

## # Flammable Properties

Flash Point : No flash point

Flammable Limits in Air, % by Volume:

LEL : None per ASTM E681

UEL : None per ASTM E681

Autoignition: 681 C (1258 F) R-401A

685 C (1265 F) R-401B

## Fire and Explosion Hazards:

Cylinders may rupture under fire conditions. Decomposition may occur.

Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

R-401A and R-401B are not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of these products with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. These products can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing these products and air, or these products in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, these products should not be allowed to exist with air above atmospheric pressure or at

## (FIRE FIGHTING MEASURES - Continued)

high temperatures; or in an oxygen enriched environment. For example: these products should NOT be mixed with air under pressure for leak testing or other purposes.

Experimental data have also been reported which indicate combustibility of HCFC-22, a component in these products, in the presence of chlorine.

## Extinguishing Media

Use media appropriate for surrounding material.

## Fire Fighting Instructions

Cool tank/container with water spray. Self-contained breathing apparatus (SCBA) may be required if cylinders rupture or release under fire conditions.

-----  
ACCIDENTAL RELEASE MEASURES  
-----

## Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Ventilate area, especially low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) if large spill or leak occurs.

## Spill Clean Up

Comply with Federal, State, and local regulations for reporting releases.

-----  
HANDLING AND STORAGE  
-----

## Handling (Personnel)

Avoid breathing vapors or mist. Avoid contact with eyes or skin. Use with sufficient ventilation to keep employee exposure below recommended limits.

## Storage

Store in a clean, dry place. Do not heat above 52 C (126 F).

-----  
EXPOSURE CONTROLS/PERSONAL PROTECTION  
-----

## Engineering Controls

Use sufficient ventilation to keep employee exposure below recommended limits. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

## Personal Protective Equipment

Lined butyl gloves should be used to avoid prolonged or repeated exposure.

Chemical splash goggles should be available for use as needed to prevent eye contact.

Under normal manufacturing conditions, no respiratory protection is required when using this product.

Self-contained breathing apparatus (SCBA) is required if a large release occurs.

## Exposure Guidelines

## Applicable Exposure Limits

METHANE, CHLORODIFLUORO- (HCFC-22)  
PEL (OSHA) : None Established  
TLV (ACGIH) : 1,000 ppm, 3,540 mg/m<sup>3</sup>, 8 Hr. TWA, A4  
AEL \* (DuPont) : None Established

ETHANE, 1,1-DIFLUORO- (HFC-152a)  
PEL (OSHA) : None Established  
TLV (ACGIH) : None Established  
AEL \* (DuPont) : 1000 ppm, 8 Hr. TWA  
WEEL (AIHA) : 1000 ppm, 8 Hr. TWA

ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO  
PEL (OSHA) : None Established  
TLV (ACGIH) : None Established  
AEL \* (DuPont) : 1000 ppm, 8 & 12 Hr. TWA  
WEEL (AIHA) : 1000 ppm, 8 Hr. TWA

\* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

## (Applicable Exposure Limits - Continued)

## Exposure Guideline Comments

## Applicable Exposure Limits for Mixtures:

"SUVA" MP39 (R-401A)  
Estimated AEL \* (DuPont) : 1000 ppm, 8 & 12 Hr. TWA \*\*

"SUVA" MP66 (R-401B)  
Estimated AEL \* (DuPont) : 1000 ppm, 8 & 12 Hr. TWA \*\*

\*\* Estimated AEL is calculated according to Appendix C of  
The ACGIH Handbook "THRESHOLD LIMIT VALUES for Chemical  
Substances and Physical Agents"

-----  
PHYSICAL AND CHEMICAL PROPERTIES  
-----

## Physical Data

Boiling Point  
of Saturated Liquid : -33 C (-27 F) "SUVA" MP39

Vapor Pressure  
of Saturated Liquid : 112.1 psia @ 25 C (77 F) "SUVA" MP39

Vapor Density : 3.3 (Air=1.0) @ 25 C (77 F) "SUVA" MP39  
Liquid Density : 1.194 g/cm3 @ 25 C (77 F) "SUVA" MP39

Boiling Point  
of Saturated Liquid : -34.6 C (-30.3 F) "SUVA" MP66

Vapor Pressure  
of Saturated Liquid : 118.8 psia @ 25 C (77 F) "SUVA" MP66

Vapor Density : 3.2 (Air=1.0) @ 25 C (77 F) "SUVA" MP66  
Liquid Density : 1.193 g/cm3 @ 25 C (77 F) "SUVA" MP66

% Volatiles : 100 WT%  
Evaporation Rate : >1 (CCl4=1.0)  
Solubility in Water : 0.1 WT% @ 25 C (77 F)  
Odor : Ether (slight).  
Form : Liquified Gas.  
Color : Clear, Colorless.

-----  
STABILITY AND REACTIVITY  
-----

## Chemical Stability

Stable.

## Conditions to Avoid

Avoid open flames and high temperatures.

## (STABILITY AND REACTIVITY - Continued)

## Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

## Decomposition

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides.

## Polymerization

Polymerization will not occur.

-----  
TOXICOLOGICAL INFORMATION  
-----

## Animal Data

The blend is untested.

## CHLORODIFLUOROMETHANE (HCFC-22)

Inhalation 4-hour LC50: 220,000 ppm in rats

The compound is a skin irritant and a slight eye irritant, but is not a skin sensitizer in animals.

Effects from single high exposures include central nervous system depression, anesthesia, rapid breathing, lung congestion and microscopic liver changes. Cardiac sensitization occurred in dogs at 50,000 ppm or greater from the action of exogenous epinephrine.

No toxic effects or abnormal histopathological observations occurred in rats repeatedly exposed to concentrations ranging from 10,000 to 50,000 ppm (v/v). Long-term exposures to 50,000 ppm (v/v) of vapors produced organ weight increases and a decrease in body weight gain, but no increased mortality or adverse hematological effects.

In chronic inhalation studies, HCFC-22, at a concentration of 50,000 ppm (v/v), produced a small, but statistically significant increase of late-occurring tumors involving salivary glands in male rats, but not female rats or male or female mice. In the same studies, no increased incidence of tumors was seen in either species at concentrations of 10,000 ppm or 1000 ppm (v/v).

Long-term administration in corn oil produced no effects on body weight or mortality.

## (TOXICOLOGICAL INFORMATION - Continued)

HCFC-22 was mutagenic in some strains of bacteria in cell cultures, but not in mammalian cell cultures or animals. It did not cause heritable genetic damage in mammals.

A slight, but significant increase in developmental toxicity was observed at high concentrations (50,000 ppm) of HCFC-22, a concentration which also produced toxic effects in the adult animal. Based on these findings, and other negative developmental studies, HCFC-22 is not considered a unique hazard to the conceptus. Studies of the effects of HCFC-22 on male reproductive performance have been negative. Specific studies to evaluate the effect on female reproductive performance have not been conducted, however, limited information obtained from studies on developmental toxicity do not indicate adverse effects on female reproductive performance at concentrations up to 50,000 ppm.

## DIFLUOROETHANE (HFC-152a)

Inhalation 4-hour ALC : 383,000 ppm in rats  
Oral ALD : >1,500 mg/kg in rats

Effects of a single exposure to high levels include labored breathing, lung irritation, lethargy, incoordination and loss of consciousness. Cardiac sensitization occurred in dogs exposed to a concentration of 150,000 ppm in air and given an intravenous epinephrine challenge. Effects of repeated exposure include increased urinary fluoride, reduced kidney weight, and reversible kidney changes.

Effects of a single high oral dose include weight loss and lethargy.

Tests in animals demonstrate no carcinogenic activity or developmental effects. Tests in animals for reproductive effects have not been performed. This compound does not produce genetic damage in bacterial cell cultures but has not been tested in animals.

## CHLOROTETRAFLUOROETHANE (HCFC-124)

Inhalation 4-hour ALC : >230,000 ppm in rats

The effects in animals from single inhalation exposures by inhalation include central nervous system effects, anesthesia and decreased blood pressure. Cardiac sensitization occurred in dogs exposed to a concentration of 2.5% in air and given an intravenous epinephrine challenge. Repeated exposures produced increased liver weights, anesthetic effects, irregular respiration, poor coordination and nonspecific effects such as decreased body weight gain. However, no irreversible effects were seen as evidenced by histopathologic evaluation.



## (TOXICOLOGICAL INFORMATION - Continued)

Tests in animals suggest no developmental toxicity potential. HCFC-124 was not mutagenic in bacterial and mammalian cell cultures or whole animal studies.

-----  
ECOLOGICAL INFORMATION  
-----

## Ecotoxicological Information

## Aquatic Toxicity:

HCFC-22

48 hour EC50 - Daphnia magna: 433 mg/L

-----  
DISPOSAL CONSIDERATIONS  
-----

## Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Recover by distillation or remove to a permitted waste disposal facility.

-----  
TRANSPORTATION INFORMATION  
-----

## Shipping Information

## DOT/IMO/IATA

Proper Shipping Name : Liquefied Gas, N.O.S.  
(Chlorodifluoromethane and  
Chlorotetrafluoroethane)

Hazard Class : 2.2

UN No. : 3163

Label(s) : Nonflammable Gas

## Shipping Containers

Tank Cars.  
Cylinders.  
Ton Tanks.

-----  
REGULATORY INFORMATION  
-----

## U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes  
Chronic : No

## (REGULATORY INFORMATION - Continued)

Fire : No  
Reactivity : No  
Pressure : Yes

## HAZARDOUS CHEMICAL LISTS

SARA Extremely Hazardous Substance: No  
CERCLA Hazardous Substance : No  
SARA Toxic Chemical - See Components Section

-----  
OTHER INFORMATION  
-----

## NFPA, NPCA-HMIS

NPCA-HMIS Rating  
Health : 1  
Flammability : 0  
Reactivity : 1

-----  
The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsible for MSDS : MSDS Coordinator  
> : DuPont Chemical Solutions Enterprise  
Address : Wilmington, DE 19898  
Telephone : (800) 441-7515

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS