

Date: April 22, 2025 Rev. 3

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Unisolv-YD
Ingredient: Hydrofluoroolefin
Supplier Information: Unistar Chemical Inc.
425 Huehl Road, Bldg 1,
Northbrook, IL, 60062
1-847-724-8869
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2. HAZARD IDENTIFICATION

Signal word: WARNING



Hazard classification:

Specific Target Organ Toxicity (single exposure) Category 3 (anesthetic)

HAZARDS

H336 May cause drowsiness or dizziness
H402 Harmful to aquatic life

PRECAUTIONARY STATEMENTS

P233 Keep container tightly closed
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P270 Do not eat, drink, or smoke when using this product
P271 Use only outdoors or in a well-ventilated area
P273 Avoid release into the environment
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.

RESPONSE

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. If you feel ill, contact your doctor. If there is a concern of exposure or exposure, consult a physician.

STORAGE AND DISPOSAL

P403 + P433 + P235 + P410 Keep containers sealed, away from direct sunlight, and in a cool place with good ventilation
P501 Subject the contents and containers to a specialist waste disposal contractor with permission from the local governor.

Other hazards which do not result in classification:

Inhalation may cause cough, dizziness, malaise, sleepiness, and headache. Inhalation of higher concentrations of gas can cause heart beat irregularities and central nervous system disorders, coma, unconsciousness, respiratory failure or death. In addition, continuous exposure may cause hepatic dysfunction. On direct contact with the skin, irritation accompanied by itching, redness, etc. may be felt. Severity of respiratory organs when aspirating fine aerosol/spray sprays (mists) of 10 µm or less the substance may cause damage. 1)

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by weight
(E)-1-chloro-2,3,3-trifluoropropene	1263679-71-5	100%

4. FIRST AID MEASURES

Inhalation: If you breathe in vapors, gases, etc. and become sick, transfer to a fresh place of air to rest in a breathable posture and contact a doctor. If respiration is weak or stopped, loosen clothing and perform artificial respiration. In some cases, oxygen should be inhaled and followed immediately by medical attention

Skin Contact: Wash the affected area with plenty of water with mild soap. Do not use solvents or thinners. If irritation is continued, refer to medical attention. Quickly remove or remove contaminated clothing, shoes, etc.

Eye Contact: Consult a doctor as soon as possible. Gently rinse the affected eyes with clean water for at least 15 minutes lifting upper and lower eyelids occasionally. Remove contact lenses, if present and easy to do. Remove contact lenses if present and easy to do.

Ingestion: Get immediate medical advice/attention. Do not induce vomiting. Rinse the mouth with water and consult a doctor promptly.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: This product itself does not burn. In the event of a fire in the vicinity, extinguish the fire using appropriate extinguishing agents according to the situation.

Fire extinguishing methods: During combustion, harmful gases (hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide, carbonyl halide, etc.) that are irritating and corrosive may be generated.

Specific to the specific hazards of a fire:	Sprinkle water into containers and surrounding equipment, etc., and cool. The substance is non-flammable and does not ignite, but if the area around the container is fire, remove the container quickly to a safe place.
Advice for firefighters:	Be careful not to suck toxic gases decomposed by flame when gases are ejected from the container due to superheating. Use a gas mask. Wear self-contained breathing apparatus and protective clothing. All skin surfaces should be covered with protective equipment

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions,
Environmental Precautions, and
emergency measures:

Use the necessary personal protective equipment when handling. Immediately evacuate from the site if any spill or leak is noticed. The surrounding person is also allowed to evacuate. Do not attempt to wipe it off as soon as possible. Keep away any person who is not concerned. Indoor processing operations may involve high-concentration gas suction and acid deficiency. Wear a gas mask and perform operations under sufficient ventilation, such as station exhaust operation and opening windows. Wear an air respirator whenever adequate ventilation is not possible.

Environmental precautions:

Prevent spillage of leaked material into sewage, drainage ditches, and lowlands. Do not empty into drains or water. Provide ventilation and confine spill. Do not allow runoff to sewer. Dam and absorb spillage with sand, sawdust or other absorbent. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.

Spill Clean Up Methods:

Personal protection, see Sec. 8. Waste disposal, see Sec. 13. For small spill, absorb spills with inert materials, then place in a chemical waste containers. Any deposits, waste, etc. shall be treated in accordance with relevant laws and regulations. Absorb in dry sand, soil, or other non-flammable material and collect. A large amount of runoff should be surrounded by embankment to prevent runoff.

Prevention of secondary hazard:

Block the leak of the container to stop leaking if it can be performed without hazard. When the leak does not cease, transfer to an empty container that can be sealed or carry it out to an open, hazard-free place. Remove nearby ignition sources.

Recovery, neutralization:

A large amount of runoff is surrounded by a filling to prevent runoff, and is recovered by a pump or the like in a container which can be sealed.

7. HANDLING AND STORAGE

- Handling:** Wear appropriate protective equipment to avoid inhalation or contact with eyes, skin and clothing. Work as upwind as much as possible. Efforts shall be made to keep the working environment at or below the permissible concentration (see the column of exposure prevention measures) by minimizing vapor dissipation and providing adequate ventilation. Do not perform transfer filling operations in areas without ventilators. Open and close the lid of the filling container gently. Pressure may be applied to the interior.
- Care Instructions:** Rubber gloves, such as those made of nitrile rubber or natural rubber, may penetrate the solvent. Do not eat, drink, or smoke when handling. Do not inhale vapors, sprays, or mists. Keep away any source of flame, sparks, and heat. When it comes into contact with bare flames or metals superheated to high temperatures, it may thermally decompose and generate toxic gases. Therefore, handling is carried out in a place where these are not nearby. Non-corrosive, non-flammable liquids. The substance may evaporate in ambient air. Since vaporized vapor is heavier than air and stays on the floor surface, when used in a sealed room, ventilation of the room is sufficiently performed because there is a fear of suffocation due to a decrease in oxygen concentration. After handling, wash hands, face, etc. thoroughly, and do not bring gloves or other contamination protective equipment into rest rooms, etc. Before considering its use in aerosol applications, check with our product personnel.
- Storage Conditions:** Store away from incompatible substances. Keep container tightly closed, away from direct sunlight, and store in a cool, dry, wellventilated place. Since the boiling point is low, the container may bulge under the flame weather in summer, and when the stopper is opened, the liquid may erupt from the inside. Store in the container that has been delivered. Close the mouth of the container tightly. Store containers in a dry place to prevent corrosion by moisture or water droplets. Containers shall take measures to prevent impact and damage caused by falling over, etc. Do not expose to heat, sparks, or flames.
- Safe Container:** Polyethylene, etc.

8. EXPOSURE CONTROL AND PERSONAL PROTECTION

Engineering Controls: Not Set

Protective

Respiratory protection: Wear appropriate respirators if ventilation is inadequate.
 Wear gas masks for halogen gases.

Hand Protection: Suitable chemical resistant gloves must be worn. Suitable Material: Polyethylene Be careful as the liquid may penetrate through the gloves. It is desirable to replace frequently. If contaminated, replace immediately.

Eye Protection: Wear safety glasses (or goggles) with side shields as necessary.

Skin and body protection: Wear appropriate protective clothing.

Hygiene Measures: Do not eating and drinking or smoking while using this material.
 Wash hands after work.

Other: Permissible concentration AEL (provisional) 250 ppm (8-h time-weighted average) AEL (provisional)

9. PHYSICAL AND CHEMICAL PROPERTIES (NOT A SPECIFICATION)

Physical state	Liquid
Shape	No data
Color	COLOURLESS
Odor	Weak
pH	No data
Melting Point	-82.3°C
Boiling point, initial boiling point and boiling range	54°C
Flash point	No flash point
Autoignition temperature	446°C
Combustible (solid, gas) Explosion range	7-14vol% (ASTM E681 at 60°C)
Vapour pressure at 25°C	32kPa
Vapour density	>1
Evaporation rate (butyl acetate = 1)	No data
Specific gravity (density)	1.39
Solubility	No data
Octanol-water partition coefficient	LogPow=1.9
Decomposition temperature	No data
Viscosity	No data
Dust explosion lower limit concentration	No data
Minimum ignition energy	No data
Volume resistivity (conductivity)	No data
Solubility in water	5,960mg/L (20°C)
Oxidizing properties	No oxidizing

10. STABILITY AND REACTIVITY

Stability:	Stable at normal temperature and pressure
Conditions to avoid:	Avoid high temperatures, heating, and sparks. Avoid direct sunlight
Materials to avoid:	Strong acids, strong bases Fine aluminum powder. Sodium, potassium, calcium, barium, lithium, strong oxidants. Do not allow contact with alkaline substances, alkali metals, or alkaline earth metals.
Hazardous decomposition products:	In fire, decomposition products may include: carbon monoxide, carbon dioxide, carbonyl halides, hydrogen fluoride
Reaction hazard:	In fire, decomposition products may include: carbon monoxide, carbon dioxide, carbonyl halides, hydrogen fluoride

11. TOXICOLOGICAL INFORMATION

Acute toxicity:	LD50 (oral): rat > 2000 mg/kg (Z-body) LD50 (oral): rat > 2000 mg/kg (E-body) LC50 (inhaled): Rats 2500-20,000ppm However, LC50 is considered to be more than 10,000ppm and less than 20,000ppm, since no more than half of the deaths occurred at 10,000ppm/6hr in a 14-day repeated inhalation study.
Skin corrosion/irritation:	Mild irritation (rabbit). However, it shows recoverability and does not fall under the GHS category.
Serious eye damage/irritation:	Mild irritation (rabbit) However, it shows recoverability and does not fall under the GHS category.
Skin sensitization:	No skin sensitization
Germ Cell Mutagenicity:	Ames test: Negative (E-body, Z-body) Chromosomal aberration test: negative (CHL) (E, Z)
Reproductive toxicity specific target organ toxicity (single exposure):	No reproductive toxicity in the screening test (OECD421). Reduced locomotor activity following inhalation exposure to 20,000ppm Transient fluffiness after a single oral dose of 2000 mg/kg. (Z) No abnormalities (E-body) after a single oral dose of 2000 mg/kg.
Specific target organ toxicity (repeated exposure)	
7-day repeated dose oral study:	No effect at 1000 mg/kg (E, Z).
28-day repeated dose oral study:	NOAEL = 200 mg/ kg/day (Z) Reduced locomotor activity and decreased grip strength in males at 1000 mg/kg. NOAEL = 1000 mg/ kg/day (E) 1000 mg/kg, no abnormalities in all cases
14 day repeated inhalation exposure:	Somnolence at 10,000ppm, gait ataxia

90 day repeated inhalation test: NOAEL=2,500ppm
Carcinogenicity: No data

12. ECOLOGICAL INFORMATION

When leaking or disposing of the product, care should be taken to handle it because it may affect the environment. In particular, ensure that products and cleaning water do not flow directly to the ground, rivers or drains.

Ecotoxicity (acute) immobilization: Daphnia 48 hr-EC50 = 39.7mg/mL (Z-body)
48 hr-EC50 = 55.9mg/mL (E-body)
Algal growth inhibition: 72hf-EC50>82.5mg/L NOEC > 13.4mg/L
Fish toxicity: 72 hf-EC50 >68.0mg/mL (E-body)
96 hr-LC50 = 110 mg/L (Z-form)
96 hr-LC50 = 88.3mg/L (E-form)

Persistence (OECD 301 C)
Bioaccumulation: No accumulation (logPow=1.9)
Ozone depletion potential: 0.00002 (Measured by the National Institute of
Advanced Industrial Science and Technology)
Global warming potential: 1 (Measured by the National Institute of Advanced
Industrial Science and Technology)

13. DISPOSAL CONSIDERATIONS

Residual Wastage: Remaining products (residual waste) are the Waste Disposal and Public Cleansing Act and prefectures Dispose of in accordance with municipal regulations. Do not release empty container and wash water into environment. Treatment or consignment of waste generated from wastewater treatment, incineration, etc. in accordance with the Waste Treatment and Cleaning Law and related laws and regulations. Contract with a specialized industrial waste disposal contractor approved by the prefectural governor when commissioned processing is to be carried out. When incinerated, hydrogen fluoride, hydrogen chloride, carbon monoxide, and the like occur during incineration, and therefore, an exclusion facility for combustion gas is required. Do not landfill or dump.

Container and Package: Empty container should be disposed of by industrial waste disposal contractor after the consignment contract. When disposing of containers, etc., dispose of them after completely removing the contents.

14. TRANSPORTATION INFORMATION

The instructions for handling and storage should be followed.

Ensure that containers are free from leaks, load them in such a way that they do not fall, fall, or damage, and ensure that they do not collapse

UN number:	Not applicable
UN classification:	Not applicable
Container grade:	Not applicable
Land transport:	Follow the transport methods stipulated in the Fire Service Law, the Industrial Safety and Health Law, and the Poisonous and Deleterious Substances Law, respectively.
Marine transport:	To comply with the provisions of the Ship Safety Law.
Air transport:	Comply with the provisions of the Civil Aeronautics Act.
National regulation:	Follow regulation in section 15 for domestic transportation. This product corresponds to the cargo listed in Appended Table 1, item 16 of the Export Trade Control Order of the Foreign Exchange and Foreign Trade Control Act. When exporting this product export permission is necessary if it corresponds to permission application requirements(objective requirements, inform requirements)
Other:	When transporting, keep the container at 40°C or below and be careful not to fall, drop, or damage.

15. REGULATORY INFORMATION

(in Japan)

Fire Service Law:	Not applicable
Poisonous and Deleterious Substances Control Act:	Not applicable
Industrial Safety and Health Act:	Not applicable
Pollutant Release and Transfer Register Law:	Not applicable

16. OTHER INFORMATION

Cited Document

1) On Aerosol to Inhalation Exposure Experiments in Occupational Health

Matters subject to restrictions

This product is an industrial product and has not been developed or manufactured for medical use.

Handling of Contents

The Safety Data Sheet (SDS) is a document intended for companies. Not all materials and literature were surveyed, so information may be leaked. In addition, new findings and revisions to conventional theories can lead to changes in the content. When it is used for important decisions, it is recommended that the source and other information be carefully examined or confirmed by testing. This document does not provide any assurance regarding the data or evaluation described in this document. In addition, the instructions are intended for normal handling. Therefore, when handling the product in a special manner, take safety measures appropriate for the new use and usage before handling the product.

Attach this SDS at the time of transfer of this product.

Disclaimer

The information is for this product only, and when it is used in combination with other materials, it is not necessarily applied. It is not that it is applied to the use by any process.

All specifications are to be created based on the information we can get at this time may be revised by new knowledge. The content, the physico-chemical property and so on are not a guaranteed-performance. It is not that it is applied to the use by any process. About the compatibility and the integrity, for the special use of the user, please judge it in responsibility of user.

Attention

The SDS is offered to company to handle as reference information to secure the safe handling about a dangerous harmful chemical. It is necessary for the company to take appropriate measures by own responsibility in reference. The content, the physico-chemical property and so on are not a guaranteed-performance. This information is not a security assurance book. All the information is made according to a law in USA as of the making, revision day.

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