

MATERIAL SAFETY DATA SHEET

No. U-1100A-18

Identity (As Used on Label and List)

- **Date Prepared:** August 18, 1992
- **Date Revised:** October 31, 2011

ASAHIKLIN AK- 225

1. PRODUCT AND COMPANY INFORMATION

Product Name: ASAHIKLIN AK- 225

Synonym: HCFC-225

General Use: solvent

MSDS Number: U-1100A

Manufacturer

Company Name: ASAHI GLASS CO., LTD.

Address: 1-5-1, Marunouchi, Chiyoda-ku, Tokyo 100-8405, Japan

Telephone Number for Information: +81-3-3218-5574

Facsimile Number for Information: +81-3-3218-7845

Supplier

Company Name: AGC Chemicals Americas, Inc.

Address: 55 East Uwchlan Ave. Suite 201, Exton, PA 19341, USA

24 Hour Medical Emergency Telephone #: (800)420-8479

24 Hour Transportation Emergency # (CHEMTREC): (800) 424-9300

Customer Service Number: (800) 424-7833

2. COMPOSITION/INFORMATION ON INGREDIENTS

| Components | CAS No. | % |
|---|----------|--------|
| 3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca) | 422-56-0 | 0~50 |
| 1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb) | 507-55-1 | 50~100 |

Note: This product does not contain any CFCs.

OSHA Hazardous Components (29 CFR 1910.1200)

None

3. HAZARDS IDENTIFICATION

This product is not hazardous in OSHA.

Potential Health Effects

- **Inhaled:** Inhalation of high concentrations of vapor is harmful and may cause hepatitis, heart irregularities, unconsciousness, or death. Intentional misuse can be fatal. Vapor reduces oxygen available for breathing and is heavier than air.
- **In contact with skin:** The compound may cause skin irritation.
- **In contact with eyes:** The compound may cause eye irritation.

4. FIRST AID MEASURES

- **Inhalation:** If high concentrations are inhaled, immediately remove to fresh air. Keep persons calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
- **Skin contact:** In case of skin contact, flush with water. Get medical attention if irritation is present.
- **Eye contact:** In case of eye contact, immediately flush eyes with plenty of water for 15minutes. Call a physician.
- **Ingestion:** No specific intervention is indicated as the compound is not likely to be hazardous by ingestion. Consult a physician if necessary. Do not induce vomiting because the hazard of aspirating the material into the lungs is considered greater than swallowing it.

5. FIRE-FIGHTING MEASURES

- **Suitable extinguishing media:** As appropriate for combustibles in area.
- **Unsuitable extinguish media/methods:** None
- **Hazardous combustion product or gases:** Containers may rupture under fire conditions. Decomposition of this product at temperature above 300deg.C (572deg.F) can form hydrogen fluoride (HF), but HF will only accumulate with continuous exposure to excess heat in a sealed vessel.
- **Special protective equipment for fire fighters:** Self-contained breathing apparatus (SCBA) is required if drums rupture and contents are spilled under fire conditions.
- **Additional information:** Use water spray to cool containers.
Move containers from fire areas if it can be done without risk.

6. ACCIDENTAL RELEASE MEASURES

In case of spill or other release:

NOTES: Review chapter 5, chapter 7 and chapter 8 before proceeding with clean up. Use appropriate Personal Protective Equipment during clean up.

Shut off flames in area.

Dike spill. Prevent liquid from entering sewers, waterways or low areas. Ventilate area. Collect on absorbent material and transfer to steel drums for recovery/disposal. Comply with Federal, State, and

local regulations on reporting releases.

Additional information:

Information for safe handling looks up chapter 7.

Information for disposal looks up chapter 13.

7. HANDLING AND STORAGE

Handling

Use with sufficient ventilation to keep employee exposure below recommended limits. Provide adequate ventilation for storage, handling, and use, especially for enclosed or low spaces. Avoid contact of liquid with eyes and prolonged skin exposure. Do not allow product to contact open flame or electrical heating elements because dangerous decomposition products may form.

Storage

Store in clean, dry, well-ventilated area. Do not heat above 30deg.C. (86deg.F)

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure guidelines:

- **ASAHIKLIN AK-225**

AEL*: 100ppm (8h-TWA)

MAK-Values: Not established

TLV-TWA (ACGIH): Not established

* AEL is the Acceptable Exposure Limit set by Asahi Glass Co., Ltd.

EEL*: 1000ppm (time limit 15 min.), 2000ppm (time limit 1 min.)

* EEL is the Emergency Exposure Limit set by Asahi Glass Co., Ltd.

Emergency Exposure Limits (EELs) are to be used for short-term emergency exposure control. They are concentrations of short periods which should not result in permanent adverse health effects or interfere with escape. They should not be confused with ACGIH TLV-TWA or TLV STEL values that are designed for repeated exposure guidelines. For the use of AK-225, daily exposure limits such as AEL as well as EEL are to be followed. The EEL for AK-225 is needed to avoid anesthetic effects which could prevent self-rescue. If an EEL is exceeded for specified duration, evacuation, sheltering in place or other mitigation steps should be taken.

Remarks

AELs (Asahi Glass Co., Ltd.) of HCFC-225ca and HCFC-225cb are 50 and 400ppm, respectively. Though no ACGIH TLV or OSHA PEL are assigned, Asahi Glass temporarily recommends that workplace exposure level should be maintained at 100ppm or less for the mixture (ca/cb=45/55) until the authorized control level such as ACGIH TLV or OSHA PEL are assigned.

Exposure controls

Occupational exposure controls

Engineering Controls:

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low places.

Personal protection:

- **Respiratory protection:** Use respiratory protection approved by NIOSH in USA or other equivalent in each country if exposure limits may be exceeded. Self-contained breathing apparatus (SCBA) is required if a large spill occurs.
- **Hand protection:** Impermeable gloves
- **Eye protection:** Chemical splash goggles

Other Precautionary Information

NPCA - HMIS (National Paint and Coating Association - Hazardous Materials Identification System) Hazard Rating

HMIS codes are intended for use in everyday workplace setting to provide a rapid indication of the occupational hazards associated with chemicals used in the workplace.

a) Flammability - 1, b) Health - 1, c) Reactivity- 0

9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance and Odor:** Clear, colorless liquid with slight ethereal odor.
- **Boiling point:** 54~56deg.C (129.2~132.8deg.F)
- **Flash point (method):** None (Tag Closed Cup & Cleveland Open Cup)
- **Lower explosive limit:** None
- **Upper explosive limit:** None
- **Autoignition temperature:** N/D
- **Freezing point:** -131~-116deg.C (-203.8~-176.8deg.F)
- **Vapor pressure (25deg.C):** 0.038 MPa
- **Specific Gravity (25deg.C):** 1.55
- **Solubility (25deg.C) in water:** 0.033g / 100g H₂O
- **pH value (20deg.C):** N/D
- **Partition coefficient: n-octanol / water:** 3.17 (HCFC-225ca), 3.13 (HCFC-225cb)
- **Vapor density:** 7.0
- **Evaporation rate (Diethyl ether=1):** 0.9

10. STABILITY AND REACTIVITY

Conditions to avoid: Material is stable. However, avoid open flames and high temperature.

Stability: Stable

Materials to avoid (Incompatibilities): Incompatible with alkali or alkaline earth metals and powdered Al, Zn, Be, etc.

Hazardous decomposition products:

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

Hazardous polymerization: will not occur

11. TOXICOLOGICAL INFORMATION

Animal Data:

3,3-Dichloro-1, 1,1,2, 2-pentafluoropropane (HCFC-225ca)

Inhalation: 4-h LC50: 37,300ppm in rats

Oral: LD50: >5 g/kg in rats

Dermal: LD50: >2g/kg in rabbit.

Eye: Not irritant up to 0.1ml in rabbit.

1,3-Dichloro-1, 1,2,2, 3-pentafluoropropane (HCFC-225cb)

Inhalation: 4-h LC50: 36,800ppm in rats

Oral: LD50: >5 g/kg in rats

Dermal: LD50: >2g/kg in rabbit.

Eye: Not irritant up to 0.1ml in rabbit.

Data from acute toxicity studies indicate that HCFC-225ca and HCFC-225cb have very low acute toxicity. Neither isomer causes eye irritation nor dermal toxicity in standardized tests; skin application of both isomers at high doses (2,000mg/kg body weight) produces no adverse effects. Therefore, the dermal LD50s are greater than 2,000mg/kg body weight. Oral administration of either isomer at high doses (5,000mg/kg body weight) does not cause any mortality and the oral LD50s are greater than 5,000mg/kg body weight. Both isomers also have very low acute inhalation toxicity as measured by the concentration that cause 50% mortality in experimental animals, the LC50, listed above. Cardiac sensitization response in dogs is observed at approximately 15,000ppm for the mixture of HCFC-225ca/HCFC-225cb (45/55 %) and 20,000ppm for HCFC-225cb.

In 28-day inhalation studies with rat, the activity and responsiveness of the animals was reduced at 5,000ppm or greater for each isomer. Toxicity was otherwise confined to the liver; liver enlargement and induction of peroxisomes was seen following treatment with either of the isomers. HCFC-225ca was more potent than HCFC-225cb in eliciting these liver effects. In 90-day study of HCFC-225ca/HCFC-225cb mixture (45/55 %) with rat, toxic effects were observed in liver; liver enlargement and induction of peroxisomes. In 28-day study with marmoset, exposure to HCFC-225ca at 1,000ppm caused effects on the liver, such as slight fat deposition associated with changes in serum biochemical parameters. In the same study, exposure to HCFC-225cb at 5,000ppm caused somnolence during exposure and an increase of cytochrome P-450, indicative of an adaptive response to HCFC-225cb. However, no liver enlargement was seen and virtually no peroxisome induction was observed in either isomer.

Animal testing with HCFC-225ca/HCFC-225cb (=45/55) mixture indicates that the compounds are not teratogenic.

The compounds do not produce genetic damage in bacterial cell cultures (Ames Assay), CHL, and in-vivo unscheduled DNA syntheses assay. In one in-vitro study with mammalian cell cultures (human lymphocytes) HCFC-225ca caused genetic damage while HCFC- 225cb elicited a marginal response. However, the overall evidence from these studies implies that neither isomer is genotoxic.

Carcinogenicity

All ingredients are not listed by NTP, IARC or OSHA as carcinogens.

12. ECOLOGICAL INFORMATION

Biodegradability: 3 % (HCFC-225ca), 7% (HCFC-225cb) by BOD

Bioaccumulation: Bioconcentration factor <64/6 weeks (HCFC-225ca)

Other information:

Fish, Acute toxicity Test LC50 (*Oryzias latipes*) 83.5 mg/l/48h (HCFC-225ca)

13. DISPOSAL CONSIDERATIONS

Waste treatment: Recover by distillation or remove to permitted waste disposal facility.

Packaging treatment: Dispose of waste containers to authorized landfill, in accordance with local laws and regulations.

Comply with all federal, state and local regulations.

Do not dump this product into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

US DEPARTMENT OF TRANSPORTATION (DOT)

Hazardous Materials: N/A

Hazardous Materials Description and Proper Shipping Name: N/A

Hazardous Class or Division: Not classified

Identification Number: Not regulated

Packing Group: Not classified

Label(s) Required: Not classified

UN Number: N/A

IMDG Status: Not restricted

Marine Pollutant: No

ICAO/IATA Status: Not restricted

15. REGULATORY INFORMATION

For European Union

EEC Classification: Not classified

Hazard Symbol: Not established

Risk phrases: Not established

Safety phrases: Not established, but recommend 23 (Don't breath gas/fumes/vapor/spray), 24/25 (Toxic in contact with skin and if swallowed), 36/37 (Irritation to eyes and respiratory system)

Council Directive 92/32/EEC Status: These chemicals are listed on the EINECS(HCFC-225ca: 207-016-9, HCFC-225cb: 208-076-9).

For United States of America

SNAP Acceptable: HCFC-225ca and HCFC-225cb are listed as SNAP acceptable substitutes for CFCs in the Solvent Cleaning Sector of the Clean Air Act.

Non-VOC: HCFC-225ca and HCFC-225cb are exempted from VOC regulations in the Clean Air Act.

TSCA Status: These chemicals are listed on the TSCA Inventory.

SARA Section 302: None of the chemicals are Section 302 hazard.

SARA Section 311, 312: Acute = Yes
Chronic = Yes
Fire = No
Reactivity = No
Pressure = No

SARA Section 313 = Yes (HCFC-225ca, HCFC-225cb)

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. OTHER INFORMATION

- **N/E:** Not Established
- **N/A:** Not Applicable
- **N/D:** No Data
- **ACGIH:** American Conference of Governmental Industrial Hygienists

NFPA Hazard Code

NFPA codes are designed for use by firefighters, sheriffs, or other emergency response teams who are concerned with the hazards of burning or exploding materials. These NFPA codes are not intended to address the hazards of this product other than in a fire situation.

Decomposition of this product at temperature above 300 deg. C can form hydrogen fluoride (HF), but HF will only accumulate with continuous exposure to excess heat in a sealed vessel.

| Flammability | Hazard | Instability |
|--------------|--------|-------------|
| 0 | 2 | 0 |

Revision Summary: Section 1-16(2004.6) 1, 14(2006.9) 10(2007.1) 1(2009.4) 1(2009.9), 1,2,9(2011.10)

The product is not designed for special applications such as pharmaceutical, and medical uses.

The information given in this safety data sheet is for safety purposes only. It is given in good faith and based on the best knowledge and experience of the company at the date of issuing.

The company is not responsible for any loss or damage caused by the use of the product in applications for which it was not intended or for conditions of use contrary to the recommendations in this safety data sheet.

WARNINGS

This substance harms public health and environment by destroying ozone in the upper atmosphere.
