East Asia Enviro SDN BHD (909959-K)
PMT 1159, LORONG PERUSAHAAN BUKIT MINYAK 22
PENANG SCIENCE PARK, 14100 SIMPANG AMPAT, PENANG
MALAYSIA
Tel: (604) 5057883 Fax: (604)-5059883

SAFETY DATA SHEET

Revised Date : Feb 11, 2022
Prepared Date : July 31, 2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Refrigerant Gas (R404A)

Synonyms: HFC-404A, Akashifron 404A

Manufacturer: East Asia Enviro Sdn. Bhd.
Address: PMT 1159, Lorong Perusahaan Bukit Minyak 22
Penang Science Park, 14100 Simpang Ampat,
Penang Malaysia

Emergency Phone: 60-4-5057883 (Office Hour)

2. HAZARDS IDENTIFICATION

Classification of the: substance / mixture: Gases under pressure, liquefied gas

Label Elements:

Hazard statements: H280: Contains gas under pressure; may explode if heated.

Storage Precautionary: statements: P410 + P403
Protect from direct sunlight. Store in a well-ventilated location.

Other hazards: Vapors are heavier than air and may cause suffocation due to depletion of oxygen necessary for breathing.

Cylinders may rupture under fire conditions. Decomposition may occur.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name:	Pentafluoroethane	1,1,1,2-tetrafluoroethane	1,1,1-trifluoroethane
Chemical Formula:	CHF_2CF_3	CH_2FCF_3	CH_3CF_3

Chemical Name	Chemical Formula	CAS No.	EC No.	Typical Wt %
Pentafluoroethane	CHF_2CF_3	354-33-6	206-557-8	44
1,1,1,2-tetrafluoroethane	CH_2FCF_3	811-97-2	212-377-0	4
1,1,1-trifluoroethane	CH_3CF_3	420-46-2	206-996-5	52

4. FIRST AID MEASURES

4.1 Eyes:
In the event of contact with eye/eyes, eye irritation or blurring of vision may occur.

Measures: Flush affected eye/eyes with running water for at least 15 minutes. If a contact lens is in place, remove it immediately or whenever able to. Use physiological saline if readily available. Keep affected eyelid/s open to allow evaporation of product. Consult an ophthalmologist in case of persistent ailment, seek medical attention if necessary.

4.2 Skin:
In the event of contact with skin, liquid may cause frostbite. Prolonged overexposure may cause de- fatting or dryness to affected skin area.

Measures: If in case of contact, allow evaporation of product before flushing affected area with lukewarm water. Do not use hot water. Contact a physician in case of persistent ailment, seek medical attention if necessary.

4.3 Inhalation:
Inhalation of high concentration of vapor is harmful and may cause heart irregularities, unconsciousness or death. Intentional misuse or deliberate inhalation may cause death without warning. Prolonged direct exposures may lead to temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross exposure may be fatal.

Individuals with pre-existing diseases of the central nervous of cardiovascular system may have increased susceptibility to the toxicity of excessive exposures.

Inhalation may include temporary nervous systems disorders such as depression. Other anesthetic effects such as dizziness, headache, confusion, in-coordination and loss of consciousness may also occur.

Measures: If in the event of inhalation, immediately evacuate affected personnel to open air area with sufficient fresh air. If not possible to access personnel, do not attempt aid unless personal breathing apparatus is available. Artificial ventilation by blowers or fans may be required. If affected personnel is conscious, try to keep personnel clam. If not breathing, give artificial respiration. If difficulty in breathing is observed, give oxygen if available. Seek medical attention if necessary.

4.4 Ingestion: If in the remote event of accidental ingestion, seek immediate medical attention.

4.5 Notes to Physicians: This material may cause heart to be more susceptible to conditions such as Arrhythmias. Catecholamine such as adrenaline and other compounds having similar effects are advised to be reserved for emergencies and only to be used with exceptional caution.

5. FIRE-FIGHTING MEASURES

Upper, Flammable Limits in Air (% by volume): Not applicable
Lower, Flammable Limits in Air (% by volume): Not applicable
Flash point: Will not burn
Auto-ignition Temperature: Not determined

Safety Group Classification under ASHARE 34-1997: A2

Extinguishing Media:
Use extinguishing media appropriate to extinguish or contain fire conditions.

Specific Hazards:
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 vapor from work area before using any open flame.

Mixtures of R404A with high concentrations of air at elevated pressure can become combustible at ambient temperature. As the temperature of the mixture is increased, lower pressure (but still greater than atmospheric pressure) can create the same effect. Therefore, R404A should not be mixed with air under pressure for leak testing or other purposes. In general, R404A should not be used or allowed to exist with high concentrations of air above atmospheric pressure.

Protection Actions For Fire Fighting Instructions:
Use water spray or fog to cool containers. Self –contained breathing apparatus (SCBA) is required if cylinders rupture or contents are released under fire conditions. Water runoff should be contained and neutralized prior to release.

Other Precautions
If safe to do so, remove the exposed containers, or cool with water.
If under fire conditions, avoid unnecessary proximity, maintain safe evacuation distance. Only attempt to ventilate and clean the rooms if there is no imminent danger present.

6. ACCIDENTAL RELEASE

MEASURES Personal Precautions:
Avoid contact with skin and eyes.
Do not smoke or light any open flames.
Do not breathe in the vapors.
Review firefighting measures given in section 5 before proceeding with clean up.
Use appropriate personal protective equipment.
Work from upwind, if possible.

Methods and materials for containment and cleaning up:
Prevent the product from spreading into the environment. Shut off the source of R404A. Ventilate spillage area, especially low or enclosed places where heavy vapors may collect and concentrate.
Restrict access to the area until completion of the clean-up procedure.
Let the product evaporate.
Remove open flames.
Use self-contained breathing apparatus (SCBA) for large spills or releases.

7. HANDLING AND STORAGE

Precaution for Safe Handling:
Avoid inhalation of vapors. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits. R404A should not be mixed with air for leak testing. In general, product should not be in area whereby high concentrations of air above atmospheric pressure is present. Contact with chlorine or other strong oxidizing agents should also be avoided.

Conditions for Storage: Keep in a clean, dry area. Do not heat above 52°C (125°F).

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:
Avoid inhalation of vapors. Avoid contact with skin or eyes. Use with sufficient ventilation to keep employee exposure below recommended exposure limit. Local exhaust should be used if large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal Protective Equipment:
Impervious 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 handling this product, unless ventilation is inadequate. Self-contained breathing apparatus (SCBA) is required if large release occurs.

Exposures Guidelines:

Pentafluoroethane	ACGIH (TLV)	None Established
	OSHA (PEL)	None Established
	AIHA (WEEL)	1000ppm, 4900mg/m^3, 8hr TWA
1,1,1,2-tetrafluoroethane	ACGIH (TLV)	None Established
	OSHA (PEL)	None Established
	AIHA (WEEL)	1000ppm, 4240mg/m^3, 8hr TWA
Difluoromethane	ACGIH (TLV)	None Established
	OSHA (PEL)	None Established
	AIHA (WEEL)	1000ppm, 3400mg/m^3, 8hr TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Appearance	Clear, Colorless liquid and vapor
Odor	Slightly ethereal
pH	Neutral
Boiling Point	-47.8°C (-54.0°F) @ 760 mmHg
Freezing Point	Not determined
Vapor Pressure	182.9 psia @ 25°C (77°F) Saturated
Vapor Density	3.43 @ 25°C (77°F) (Air=1)
Specific Gravity	1.08 @ 25°C (77°F) (H_2O=1)
Solubility in Water	Unknown
Molecular Weight	120

10. STABILITY AND REACTIVITY

Chemical Stability: This material is chemically stable under specific conditions, storage shipment and/or use.

Conditions to avoid: Open flames and high temperatures.

Incompatibility with other materials: Incompatible with alkali or alkaline earth metals – powdered Al, Zn. Be, etc

Possibility of hazardous reaction & products: This material can be decomposed in high temperatures (open flames, glowing metal surfaces, etc) thus, forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides. These materials are toxic and irritating. Contact should be avoided.

Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

1,1,1,2-Tetrafluoroethane:
No skin allergy was observed in guinea pigs following repeated exposure. Acute inhalation exposure produced anesthetic effects in mice, dogs, cats and monkeys. Repeated inhalation exposure produced no adverse effects in rats. Inhalation of this material, followed by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following long-term inhalation studies in rats, an increased incidence of benign tumors (at high concentrations) in the test was the only tumors observed. No birth defects were noted in the offspring of rats exposed to this material by inhalation during pregnancy, even at dosages that produced significant adverse effects in the mother. This material produced no genetic changes in standard tests using bacterial or animal cells and whole animals. Single exposure (acute) studies indicate:
Inhalation– Practically non-toxic to rats (4-hr LC50>500,000ppm; 30min LC50 ~ 750,000ppm)
Eye Irritation – Slightly irritating to rabbits
Skin Irritation – Slightly irritating to rabbits

1,1,1-Trifluoroethane:
Inhalation, follow by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following repeated inhalation exposure, lung irritant effects including mild bronchitis and pneumonia were observed in rats and guinea pigs. No adverse effects were observed in long-term oral studies with rats. No birth defects were noted in the offspring of rats or rabbits exposed by inhalation during pregnancy. No genetic changes were observed in standard tests using animal cells or whole animals. Both positive and negative results have been reported in tests using bacteria. Single exposure (acute) studies indicate:
Inhalation – Practically non-toxic to rats (4-hr LC50 > 800,000ppm)

Pentafluoroethane:
Inhalation, follow by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following repeated inhalation exposure, lung irritant effects including mild bronchitis and pneumonia were observed in rats. No adverse effects were observed in long-term oral studies with rats. No birth defects were noted in the offspring of rats or rabbits exposed by inhalation during pregnancy. No genetic changes were observed in standard tests using animal cells or whole animals. Both positive and negative results have been reported in tests using bacteria. Single exposure (acute) studies indicate:
Inhalation – Practically non-toxic to rats (4-hr LC50 > 800,000ppm)

12. ECOLOGICAL INFORMATION

1,1,1,2-Tetrafluoroethane:
Based on its low n-octanol/water partition coefficient (log Pow 1.06), bioaccumulation of this material is considered unlikely. When evaluated in a 28day activated sludge test, 3% degradation of this material was observed.

1,1,1-Trifluoroethane:
This material is practically non-toxic to Daphnia magna (48-hr LC50 300mg/l) and no more than slightly toxic to rainbow trout (96-hr LC50 > 40 mg/l).

ODP: 0
GWP: 3800 (relative to carbon dioxide for integration of 100years)

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13. DISPOSABLE CONSIDERATIONS

Prohibition
Do not allow the product to be released to the environment.

Waste Disposal
Comply with local regulations. Reclaim by distillation or remove to a permitted waste facility.

14. TRANSPORTATION INFORMATION

Shipping Information
DOT/IMO
Hazard Label :

Proper Shipping Name	:Refrigerant Gas R404A
DOT Name	: Refrigerant Gas R404A
IMO Class (Hazard Class)	: 2.2
UN no.	: 3337
DOT/IMO Label	: Non-Flammable Gas

15. REGULATORY INFORMATION

Hazard Categories under SARA Title III Rules (40CFR Part 370)

Acute	: Yes
Chronic	: Yes
Fire	: No
Reactivity	: No
Pressure	: Yes

Safety (S) Phrases:
S47: Keep at temperature not exceeding 52°C.
S41: In case of fire and/or explosion do not breathe fumes.
S57: Use appropriate containment to avoid environmental contamination
S59: Refer to manufacturer/supplier for information on recovery/recycling
S61: Avoid release to the environment. Refer to special instructions/safety data sheet.

Note: The regulatory information given above only indicates the principal regulations specifically applicable to the product described in the Safety Data Sheet. The user's attention is drawn to the possible existence of additional provisions, which complete these regulations. Refer to all applicable National, International and Local regulations or provisions.

16. OTHER INFORMATION

The information in this Safety Data Sheet only concerns the above-mentioned product and does not relate to use with other product(s) or in any process. This information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to ensure that the information is appropriate and correct for his special use of this product.

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