SAFETY DATA SHEET

REFRIGERANT R452A

Compilation date: 30/12/2025

Revision No: 1

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: REFRIGERANT R452A

Synonyms: OPTEON XP44

SOLSTICE R452A

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.3. Details of the supplier of the safety data sheet

Company name: **FRIOFLOR Group Co.,Limited.**

Add.: New Youth Mansion,Wucheng Area,Jinhua City,Zhejiang,China

Tel: 0086-15088239500

1.4. Emergency telephone number

Emergency tel: (0570) 8076952

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Press. Gas: H280

Most important adverse effects: Contains gas under pressure; may explode if heated.

2.2. Label elements

Label elements:

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

Hazard pictograms: GHS04: Gas cylinder



Signal words: Warning

Precautionary statements: P410+403: Protect from sunlight. Store in a well-ventilated place.

[cont...]

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

PENTAFLUOROETHANE - REACH registered number(s): 01-2119485636-25

EINECS	CAS	PBT / WEL	CLP Classification	Percent
206-557-8	354-33-6	Substance with a Community workplace exposure limit.	Press. Gas: H280	50-70%

2,3,3,3-TETRAFLUOROPROP-1-EN - REACH registered number(s): 01-0000019665-61

-	754-12-1	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	10-30%

DIFLUOROMETHANE

200-839-4	75-10-5	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	10-30%

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Do not use hot water. If frostbite has occurred call a physician.

Eye contact: Bathe the eye with running water for 15 minutes. Consult a doctor.

Ingestion: Not applicable.

Inhalation: Remove casualty from exposure ensuring one's own safety whilst doing so. If unconscious, check for breathing and apply artificial respiration if necessary. Consult a doctor.

4.2. Most important symptoms and effects, both acute and delayed

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: There may be a feeling of tightness in the chest with shortness of breath. Drowsiness or mental confusion may occur. There may be loss of consciousness. Breathing may stop.

4.3. Indication of any immediate medical attention and special treatment needed

Immediate / special treatment: Do not give drugs from adrenaline-ephedrine group.

Section 5: Fire-fighting measures

[cont...]

5.1. Extinguishing media

Extinguishing media: Suitable extinguishing media for the surrounding fire should be used. Alcohol resistant foam. Water spray. Carbon dioxide. Dry chemical powder. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: Non flamable gas. Pressure build up. Fire or intense heat may cause violent rupture of packages. In combustion emits toxic fumes.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: If outside keep bystanders upwind and away from danger point. Ventilate the area, especialy low or enclosed places where heavy vapours might collect. Refer to section 8 of SDS for personal protection details.

6.2. Environmental precautions

Environmental precautions: Should not be released into the environment. Stop release if safe to do so. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Do not use equipment in clean-up procedure which may produce sparks. Material evaporates. Ventilate the area, especialy low or enclosed places where heavy vapours might collect.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Ensure there is sufficient ventilation of the area. Avoid the formation or spread of mists in the air.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area. Store at a temperature not exceeding 45°C. Keep container tightly closed.

Suitable packaging: Must only be kept in original packaging.

7.3. Specific end use(s)

Specific end use(s): No data available.

[cont...]

Section 8: Exposure controls/personal protection

8.1. Control parameters

Hazardous ingredients:

PENTAFLUOROETHANE

Workplace exposure limits: **Respirable dust**

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
EU	1000 ppm	-	-	-

2,3,3,3-TETRAFLUOROPROP-1-EN

EU	500 ppm	-	-	-

DIFLUOROMETHANE

UK	1000 ppm	-	-	-

DNEL/PNEC Values

Hazardous ingredients:

PENTAFLUOROETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	16444 mg/m3	Workers	Systemic
DNEL	Inhalation	1753 mg/m3	Consumers	Systemic
PNEC	Fresh water	0.1 mg/l	-	-
PNEC	Fresh water sediments	0.6 mg/kg	-	-

2,3,3,3-TETRAFLUOROPROP-1-EN

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	273 mg/m3	Workers	-
PNEC	Fresh water	> 0.1 mg/l	-	-
PNEC	Marine water	> 0.01 mg/l	-	-
PNEC	Fresh water sediments	> 1.77 mg/kg	-	-
PNEC	Soil (agricultural)	> 1.54 mg/kg	-	-

DIFLUOROMETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation (developmental tox)	16444 mg/m3	Workers	Systemic
DNEL	Inhalation (developmental tox)	1753 mg/m3	Consumers	Systemic

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area.

Respiratory protection: Vapours are heavier than air and can cause suffocation by reducing the oxygen available for breathing. Respiratory protection complying with EN 137 Self-contained breathing apparatus must be available in case of emergency.

[cont...]

Hand protection: Protective gloves. Material: Leather gloves. The suitability for a specific workplace should be discussed with the producers of the protective gloves. Material: Low temperature resistant gloves.

Eye protection: Safety glasses with side-shields. Safety goggles. Face-shield. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Environmental: Gas escapes to be kept to the minimum by engineering processes and operating methods.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquified gas

Colour: Colourless

Odour: Characteristic odour

Boiling point/range°C: <-47

Flammability limits %: lower: Not applicable.

upper: Not applicable.

Flash point°C: Not applicable.

Vapour pressure: 13159 hPa at 25oC

Relative density: 1.13 at 25oC

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions. Stable at room temperature.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions. Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Sources of ignition. Flames.

10.5. Incompatible materials

Materials to avoid: Strong bases. Finely powdered metals. Strong oxidising agents.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of hydrogen fluoride.

Section 11: Toxicological information

11.1. Information on toxicological effects

[cont...]

Hazardous ingredients:

PENTAFLUOROETHANE

GASES	RAT	4H LC50	800000	ppmV

2,3,3,3-TETRAFLUOROPROP-1-EN

GASES	RAT	4H LC50	> 400000	ppmV

DIFLUOROMETHANE

GASES	RAT	LD50	520000	ppmV

Toxicity values: No data available.

Symptoms / routes of exposure

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: There may be a feeling of tightness in the chest with shortness of breath. Drowsiness or mental confusion may occur. There may be loss of consciousness. Breathing may stop.

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

ALGAE	96H LC50	> 100	mg/l
Daphnia magna	48H EC50	> 83	mg/l
FISH	96H ErC50	>197	mg/l

DIFLUOROMETHANE

ALGAE	96H ErC50	142	mg/l
Daphnia magna	48H EC50	652	mg/l
FISH	96H LC50	1.057	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Readily absorbed into soil.

[cont...]

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Ozone Depletion Potential (ODP): 0 (R11 = 1) R452A Global Warming Potential (GWP) = 2141 (CO_2=1)

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Product evaporates.

Recovery operations: Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licenced instalation.

Disposal of packaging: Return to supplier.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

14.1. UN number

UN number: UN1078

14.2. UN proper shipping name

Shipping name: REFRIGERANT GAS, N.O.S.
(PENTAFLUOROETHANE; 2,3,3,3-TETRAFLUOROPROP-1-EN)

14.3. Transport hazard class(es)

Transport class: 2

14.4. Packing group

14.5. Environmental hazards

Environmentally hazardous: No **Marine pollutant:** No

14.6. Special precautions for user

Special precautions: No special precautions.

Tunnel code: C/E

Transport category: 3

Section 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Specific regulations: Not applicable.

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

[cont...]

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: H220: Extremely flammable gas.

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

Legal disclaimer: FRIOFLOR Group Co.,Limited.. believes that the information and recommendations contained herein (including data and statments) are accurate as of the date hereof.

NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated. FRIOFLOR Group Co.,Limited. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.