SAFETY DATA SHEET

R-454C

Emisión: Mayo de 2025 Versión 2.1 Fecha: 29.05.2025

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name: **R-454C**
UFI: **3600-W0NS-G00M-481M**

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

Use of the substance/mixture: Refrigerant

Restrictions on use: For professional and industrial use only. Do not use this product for any purpose other than those specified above.

1.3. Details of the supplier of the safety data sheet

Name of suppler: GAS SERVEI S.A.
Address: C/ Motors, 151-155 nave nº 9
08038 Barcelona
ESPAÑA

Telephone: +34 (93) 2231377
Telefax: +34 (93) 2231479
www.gas-servei.com

Email address of the person responsible for the SDS: gas-servei@gas-servei.com

1.4. Emergency telephone number

National Institute of Toxicology and Forensic Sciences:+ 34 (91) 5620420

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

Criteria EC Regulation 1272/2008 (Classification, Labeling, and Packaging):

Flammable gas, Category 1B	H221: Flammable gas
Gases under pressure, Liquefied gas	H280: Contains gas under pressure; danger of explosion if heated.

2.2. Label elements

Hazard pictograms: Symbols: GHS02 GHS04

Signal word: Danger

Hazard statements: H221: Flammable gas.
H280: Contains pressurized gas; may explode if heated.

Precautionary statements: :

Prevention:
P210: Keep away from heat, hot surfaces, sparks, open flames, and other sources of ignition. No smoking.

Response:
P377: Flaming gas leak: Do not extinguish unless the leak can be stopped safely.
P381: In case of leak, remove all sources of ignition.

Storage:
P410+P403: Protect from sunlight. Store in a well-ventilated place.

Additional labeling: Contains fluorinated greenhouse gases (HFC-32, HFC-1234yf)

2.3. Other hazards

This substance/mixture does not contain components that are considered to be bioaccumulative and persistent toxic (PBT) or very bioaccumulative and very persistent (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components that have endocrine disrupting properties based on Article 57(f) of REACH or Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components that have endocrine disrupting properties based on Article 57(f) of REACH or Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Vapours are heavier than air and can cause asphyxiation by reducing oxygen in the air breathed.
Misuse or intentional inhalation abuse can cause death without warning symptoms, due to cardiac effects.
Rapid evaporation of the product may cause freezing.
Can displace oxygen and cause rapid asphyxiation.

SECTION 3. Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Components

Chemical name	Concentration (% by weight)	CAS No	EC No	N.º registration REACH	Classification
					Regulations CE nº1272/2008
2,3,3,3,-Tetrafluoropropene (HFC 1234yf)	78,5	754-12-1	468-710-7	01-0000019665-61-XXXX	2.2/1 Flam. Gas 1 H221 2.5 Press. Gas H280
Difluoromethane (HFC 32)	21,5	75-10-5	200-839-4	01-2119471312-47-XXXX	2.2/1 Flam. Gas 1 H221 2.5 Press. Gas H280

SECTION 4. First aid measures

4.1. Description of first aid measures

General recommendations: In case of accident or discomfort, seek medical attention immediately.
If symptoms persist or in case of doubt, seek medical advice.

Protection of first-aiders: No special precautions are required for first aiders.

In case of inhalation:	If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a doctor immediately.
In case of skin contact::	Thaw frozen parts with warm water. Do not rub the affected area. Consult a doctor immediately.
In case of eyes contact:	Consult a physician immediately.
In case of ingestion:	Ingestion is not considered a potential route of exposure.

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

May cause cardiac arrhythmia.
Other symptoms possibly related to misuse or abuse of inhalation are:

Cardiac sensitization	Anesthetic effects
Mild dizziness	Vértigo
Confusion	Lack of coordination
Drowsiness	Unconsciousness

The gas reduces the oxygen available for breathing.
Contact with the liquid or refrigerated gas may cause cold burns and frostbite.

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

Treatment: Symptomatic treatment and supportive therapy as indicated.
Because of possible heart rhythm disturbances, catecholamines such as epinephrine, which may be used in emergency life support situations, should be used with special caution.

SECTION 5. Firefighting measures

5.1. Extinguishing media

Appropriate extinguishing media:	Sprayed water Alcohol-resistant foam Carbon dioxide (CO_2) Powdered chemical product
Extinguishing media not appropriate:	Do not use running water

5.2. Specific hazards arising from the substance or mixture

Specific hazards during the firefighting:	Vapors may form a flammable mixture with air. Exposure to combustion products may be hazardous to health Do not inhale the gases produced. Due to high vapor pressure, there is a risk of containers bursting if the temperature rises.
Hazardous combustion products:	Hydrogen fluoride Carbonyl fluoride Carbon oxides Fluorinated compounds

5.3. Advice for firefighters

Special protective equipment for firefighting personnel:	If necessary, use self-contained breathing apparatus for firefighting. Use personal protective equipment.

Specific extinguishing methods:	Use extinguishing measures that are appropriate for the local circumstances and surroundings. Fight the fire from a distance due to the risk of explosion.. Use water spray to cool closed containers. Remove intact containers from the fire area if it is safe to do so. Evacuate the area.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate personnel to safe areas.
Use self-contained breathing apparatus and appropriate personal protective equipment during spill cleanup
Avoid skin contact with dripping liquid (risk of frostbite).
Ventilate the area.
Follow the safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

6.2. Environmental precautions

Do not disperse into the environment.
Prevent the product from entering the soil/subsoil.
Prevent from entering surface water or sewage systems.
Prevent further leaks or spills safely.
Retain and remove contaminated water.
In the event of a gas leak or penetration into waterways, soil, or sewer systems, inform the responsible authorities.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up:	Ventilate the area. Tools that do not produce sparks must be used. Suppress gases/vapors/mists with water spray. Wash with plenty of water.
Materials of containment and clean-up:	Appropriate material for collection: absorbent material, organic, sand.

Local or national regulations may apply to the release and disposal of this material and to the materials and equipment used in cleaning up spills. You should determine which regulations apply.
Sections 13 and 15 of this safety data sheet provide information on certain local or national requirements.

6.4. Reference to other sections

See also sections 7, 8, 11, 12 y 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Technical measures:	Use equipment rated for cylinder pressure. Use a backflow prevention device on the pipe. Close the valve after each use and after emptying.
Local/total ventilation::	Use only with good ventilation. If there is insufficient ventilation, use in conjunction with local exhaust ventilation. If the assessment establishes a potential local exposure, use only in an area equipped with explosion-proof exhaust ventilation.
Tips for safe handling:	Avoid contact with skin and eyes. Avoid inhaling vapors and fumes from the fluid. Do not use empty containers that have not been previously cleaned.

Handle in accordance with good industrial safety and hygiene practices, based on the results of the workplace exposure assessment.
Keep the container tightly closed.
Wear insulated gloves and protective equipment for the face/eyes.
The protective valve caps and threaded plugs on the valve outlet must remain in place unless the container is secured with tvalve outlet connected to the point of use.
Use a check valve or trap (exhaust, siphon trap, interceptor) in the discharge line to prevent dangerous reverse flow into the cylinder.
Before performing transfer operations, ensure that there are no incompatible materials and/or residues in the containers.
Prevent gas from flowing back into the gas container.
Use a pressure regulator when connecting the cylinder to lower pressure systems or pipes.
Close the valve after each use and after emptying.
DO NOT change or force the connections.
Prevent water from entering the gas container.
Never attempt to lift the cylinder by its cap.
Do not drag, slide, or roll cylinders.
Use a suitable hand truck to move the cylinder.
Keep away from heat and sources of ignition.
The transfer of liquid refrigerant from refrigerant containers to systems and from systems may cause the generation of static electricity.
Ensure that there is an adequate ground connection. Avoid the accumulation of electrostatic charges.
Pay attention to mitigating the risk of high pressures developing in systems, caused by temperature increases when liquid is trapped between closed valves or when containers have been overfilled.
Avoid spillage and waste. Minimize release to the environment.
DO NOT smoke.

Hygiene measures:

If exposure to chemicals is likely during normal use, provide eye wash stations and safety showers near the work area..
Do not eat, drink, or smoke during use.
Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical requirements for Storage areas and containers:

Keep cylinders in a well-ventilated place away from fire hazards..
Cylinders must be stored upright and secured to prevent them from falling or being knocked over. Avoid knocking the containers.
Separate full containers from empty containers.
Do not store near combustible materials.
Avoid areas where salt and other corrosive materials are present.
Store in properly labeled containers.
Keep containers tightly closed.
Keep in a cool, well-ventilated place.
Keep away from direct sunlight.
Store in accordance with specific national regulations.
Keep away from heat and sources of ignition.

Advice on common storage:

Do not store with the following types of products:
Self-reactive substances and mixtures
Organic peroxides
Oxidants
Flammable liquids or solids
Pyrophoric liquids or solids
Substances and mixtures that undergo spontaneous heating.
Substances and mixtures which, in contact with water, emit flammable gases.

Explosives
Highly toxic mixtures and substances.
Mixtures and substances with chronic toxicity

Recommended Storage temperature: < 50 °C

Storage time: > 10 años

Further information on storage stability: The product has an indefinite shelf life when properly stored.

7.3. Specific end uses

Subject to Member States' regulations, the uses to which it may be applied are as follows:
Refrigerant.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Does not contain substances with occupational exposure limit values.

Level without derivative effect (DNEL) in accordance with Regulation (CE) No. 1907/2006:

Name of substance	CAS	Final use	Exposure route	Potential health effects	Value (mg/m^3)
2,3,3,3- Tetrafluoropropene	754-12-1	Workers	Inhalation	Long term - systemic effects	950
Difluoromethane	75-10-5	Workers	Inhalation	Long term - systemic effects	7.035
		Consumers	Inhalation		750

Planned gathering canceled (PNEC) in accordance with the Regulations (CE) No. 1907/2006:

Name of substance	N.º CAS	Environmental Compartment	Value
2,3,3,3- Tetrafluoropropene	754-12-1	Fresh water	0,1 mg/l
		Sea water	0,01 mg/l
		Release/discontinuous use	1 mg/l
		Freshwater sediment (dry weight)	1,51mg/kg
		Soil (dry weight)	1,49 mg/kg
Difluoromethane	75-10-5	Fresh water	0,142 mg/l
		Release/discontinuous use	1,42 mg/l
		Freshwater sediment (dry weight)	0,534 mg/kg

8.2. Exposure controls

Occupational exposure controls

Personal protective equipment must comply with current UNE standards: Respiratory protection UNE 136, 140, 149; Protective goggles/eye protection UNE 166; Protective clothing UNE 340, 463, 469, 943-1, 943-2; Protective gloves ISO 374, 511; Protective shoes ISO 20345.
Do not breathe vapours.

Engineering measures
Ensure adequate ventilation, especially in confined areas.
Minimize exposure concentrations in the workplace.

Personal protection

Respiratory protection: If adequate exhaust ventilation is not available or exposure assessment shows exposure outside recommended limits, self-contained breathing apparatus or positive pressure airline and mask.
The equipment shall comply with UNE 14387.

Filter type: Organic gas and low boiling vapour (AX) type.

Skin and body protection: Wash skin after all contact with the product.
Protective footwear should be worn when handling containers.

Hand protection:

Material: Low temperature resistant gloves (EN 511).

Remarks: Choose chemical protective gloves based on the quantity and concentration of hazardous substances to be handled in the workplace. It is recommended to check with the manufacturer of the protective gloves mentioned above whether they have the necessary resistance for applications with special chemicals. Wash hands before breaks and after finishing work. The break-through time is not determined for the product.
Change gloves frequently.

Eye protection: Wear the following personal protective equipment:
Chemical-resistant goggles must be worn..
Face shield.
The equipment must comply with UNE EN 166.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance:	Liquefied gas
Color:	Colorless
Smell:	Lightweight, similar to ether
Odor threshold:	No data available
pH:	No data available
Melting/freezing point:	No data available
Boiling point and boiling range:	-49,5 °C
Flash point:	Not applicable
Evaporation rate:	>1 (CCL4=1,0)
Flammability (solid, gas):	Flammable
Upper explosion limit / Upper flammability limit:	Upper flammability limit Method: ASTM E681 15,7% (v)
Lower explosion limit / Lower flammability limit::	Upper flammability limit Method: ASTM E681 7,7% (v)
Vapor pressure:	11.691 hPa (25 °C)
Relative vapor density::	3,2 (25 °C) (air=1)
Relative density:	0,99 (25 °C) (water =1)
Density:	0,987 g/cm³ (25 °C) (as a liquid)
Solubility (Water solubility):	Insoluble
Partition coefficient (non-aqueous/water):	Not applicable
Auto-ignition temperature:	444 °C

Decomposition temperature:	No data available
Viscosity:	Not applicable
Explosive properties:	Not explosive according to EC criteria
Oxidizing properties:	The substance or mixture is not classified as an oxidizer.
Particle size:	Not applicable

9.2. Other information

Critical temperature:	82,4 ºC
Absolute critical pressure:	41,5 bar
Hot surface ignition temperature (HSIT):	> 800 °C Method: ASTM D8211-18

SECTION 10. Stability and reactivity

10.1. Reactivity

Not classified as a reactivity hazard. Stable under normal conditions.

10.2. Chemical stability

Stable when used as directed. Follow the precautionary statements and avoid incompatible materials and conditions.

10.3. Possibility of hazardous reactions

vapors may form a flammable mixture with air.
Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.
It may react with strong oxidizing agents.
Flammable gas.

10.4. Conditions to avoid

Avoid heat, flames, and sparks.

10.5. Incompatible materials

Strong oxidizing agents (oxygen and peroxides), alkali metals and alkaline earth metals, and other metals and transition metals, powdered aluminum, zinc, etc.

10.6. Hazardous decomposition products

Carbon oxides, halogen compounds, hydrogen fluoride by thermal decomposition and hydrolysis.

SECTION 11. Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No. 1272/2008

Information on possible routes of exposure:	Inhalation Skin contact Eye contact

a. Acute toxicity

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropeno:

Acute toxicity by inhalation:	CL50 (Rat): > 405.800 ppm Exposure time: 4 h Atmosphere test: gas Method: Test guidelines OECD 403
	Concentration with no adverse effects observed (dog): 120.000 ppm Atmosphere test: gas

Observations: Cardiac awareness
Concentration with few adverse effects observed (dog): > 120.000 ppm
Atmosphere test: gas
Observations: Cardiac awareness

Cardiac sensitization threshold limit (dog): > 559.509 mg/m³
Atmosphere test: gas
Observations: Cardiac awareness

Difluoromethane:

Acute oral toxicity: Assessment: The substance or mixture does not exhibit acute oral toxicity.

Acute toxicity by inhalation: CL50 (Rat): > 520.000 ppm
Exposure time: 4 h
Atmospheric test: gas
Method: Test guidelines OECD 403

Concentration with no adverse effects observed (dog): 350.000 ppm
Atmosphere test: gas
Observations: Cardiac awareness
Concentration with few adverse effects observed (dog) : > 350.000 ppm
Atmosphere test: gas
Observations: Cardiac awareness
Cardiac sensitization threshold limit (dog): > 735.000 mg/m³
Atmosphere test: gas
Observations: Cardiac awareness

Acute dermal toxicity: Assessment: The substance or mixture does not exhibit any acute skin toxicity.

b. Skin corrosion or irritation

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

Result: Does not irritate the skin.

Difluoromethane:

Result: Does not irritate the skin.

c. Serious eye injury or irritation

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

Result: Does not irritate the eyes

Difluoromethane:

Result: Does not irritate the eyes

d. Respiratory or skin sensitization

Skin sensitization

Not classified according to available information.

Respiratory awareness

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

Exposure routes: Skin contact
Result: Negative

Difluoromethane:

Exposure routes: Skin contact
Result: Negative

e. Germ cell mutagenicity

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

In vitro genotoxicity:	Test Type: Reverse mutation test in bacteria (Ames test). Method: Test Guideline OECD 471 Result: Positive
	Test Type: In vitro chromosome aberration test Method: Test Guideline OECD 473 Result: Negative
In vivo genotoxicity:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay). Species: Mouse Route of Administration: Inhalation (gas) Method: Test Guideline 474 del OECD Result: Negative
	Test Type: In vivo alkaline comet assay in mammals.. Species: Rat Route of application: inhalation (gas) Method: Test Guideline 489 del OECD Result: Negative
	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Route of application: inhalation (gas) Method: Test Guideline 474 del OECD Result: Negative

Difluoromethane:

In vitro genotoxicity:	Test type: Reverse mutation test in bacteria (Ames test) Method: Test Guideline OECD 471 Result: Negative
	Type of test: In vitro chromosome aberration test Method: Test Guideline OECD 473 Result: Negative
In vivo genotoxicity:	Test Type: Micronucleus test in mammalian erythrocytes (in vivo cytogenetic assay) Species: Mouse Route of application: inhalation (gas) Method: Test Guideline OECD 474 Result: Negative
Mutagenicity in germ cells:	Assessment: The weight of evidence does not support classification as a germ cell mutagen.

f. Carcinogenicity

Not classified according to available information.

Components:

2,3,3,3-Tetrafluoropropene:

Result: Negative

Carcinogenicity

Assessment: The weight of evidence does not support classification as a carcinogen.

Difluoromethane:

Carcinogenicity

Assessment: The weight of evidence does not support classification as a carcinogen.

g. Reproductive toxicity

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

Effects on fertility:	Test type: Two-generation reproductive toxicity study Species: Rat Route of application: Inhalation Method: Test Guideline OECD 416 Result: Negative
Effects on fetal development:	Type of test: Prenatal developmental toxicity study (teratogenicity) Species: Rat Route of application: Inhalation Method: Test Guideline OECD 414 Result: Negative

Difluoromethane:

Effects on fertility:	Species: Mouse Route of application: Inhalation Result: Negative Observations: Based on data from similar materials.
Effects on fetal development:	Test Type: Repeated dose toxicity study combined with reproductive and developmental toxicity screening test Species: Rat Route of application: inhalation (gas) Method: Test Guideline OECD 414 Result: Negative Test Type: Repeated dose toxicity study combined with reproductive and developmental toxicity screening test Species: Rabbit Route of application: inhalation (gas) Method: Test Guideline OECD 414 Result: Negative

h. Specific target organ toxicity (STOT) - single exposure

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

Route of exposure: inhalation (gas)
Assessment: No significant health effects were observed in animals at concentrations of 20,000 ppmV/4h or less.

Difluoromethane:

Route of exposure: inhalation (gas)
Assessment: No significant health effects were observed in animals at concentrations of 20,000 ppmV/4h or less.

i. Specific target organ toxicity (STOT) - repeated exposure

Not classified based on available information.

Components:

2,3,3,3- Tetrafluoropropene:

Route of exposure: inhalation (gas)
Assessment: No significant health effects were observed in animals at concentrations of 250 ppmV/6h/d or less.

Difluoromethane:

Route of exposure: inhalation (gas)
Assessment: No significant health effects were observed in Animals at concentrations of 250 ppmV/6h/d or less.

j. Aspiration hazard

Not classified according to available information.

Components:

2,3,3,3- Tetrafluoropropene:

No aspiration toxicity classification.

Difluoromethane:

No aspiration toxicity classification.

11.2. Information on other hazards

a. Endocrine-disrupting properties

Assessment: The mixture does not contain components that have endocrine-disrupting properties in accordance with Article 57(f) of REACH or Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 12. Ecological information

12.1. Toxicity

Components:

2,3,3,3- Tetrafluoropropene:

Toxicidad para peces: CL0 (Cyprinius carpio (Carpa)): > 197 mg/l
Exposure time: 96 h
Method: Test Guideline OECD 203

Toxicity to daphnia and other aquatic invertebrates: CE50 (Daphnia magna (Large sea flea)): > 100 mg/l
Exposure time: 48 h
Method: Test guidelines of the OECD 202

Toxicity to algae/aquatic plants: ErC50 (Green algae) > 170 mg/l
Exposure time:: 72 h
Method: Testing Guideline of the OCDE 201

NOEC (Green algae): > 100 mg/l
Exposure time:: 72 h
Method: Testing Guideline of the OCDE 201

Difluoromethane:

Toxicity to fish: CL50 (Pez): 1,507 mg/l
Exposure time: 96 h
Method: ECOSAR (Ecological Structure Activity Relationships)

Toxicity to daphnia and other aquatic invertebrates: CE50 (Daphnia (Dafnia)): 652 mg/l
Exposure time:: 48 h
Method: ECOSAR (Ecological Structure Activity Relationships)

Toxicity to algae/aquatic plants: CE50 (Green algae): 142 mg/l
Exposure time: 96 h
Method: ECOSAR (Ecological Structure Activity Relationships)

12.2. Persistence and degradability

Components:

2,3,3,3- Tetrafluoropropene:

Biodegradability: Result: Not readily biodegradable.
Method: Test Guideline OECD 301D

Difluoromethane:

Biodegradability: Result: Not readily biodegradable.
Method: Test Guideline OECD 301D

12.3. Bioaccumulative potential

Components:

2,3,3,3- Tetrafluoropropene:

Bioaccumulation: Observations: Bioaccumulation is unlikely.
Partition coefficient
(n-octanol/ water): log Pow: 2 (a 25ºC)

Difluoromethane:

Partition coefficient
(n-octanol/ water): log Pow: 0,714

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

Assessment: This mixture does not contain components that are considered to be persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6. Endocrine disrupting properties

Assessment: The mixture does not contain components that have endocrine-disrupting properties according to Article 57(f) of REACH or Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7. Other adverse effects

Regulation (EU) No. 2024/573 on fluorinated greenhouse gases

Product:

Global warming potential in 100 years: 146

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Product: Dispose of in accordance with local regulations. However, this product should be recycled or regenerated whenever possible.

Contaminated packaging: Empty pressure containers must be returned to the supplier. Operate in accordance with current local and national regulations.

13.2. Other data

Provisions relating to waste:

Directive 2006/12/CE; Directive 2008/98/CE
CE Regulation No. 1013/2006

Personal protective equipment, see section 8.

SECCIÓN 14. Transport information

14.1. UN number or ID number

ADN:	3161
ADR:	3161
RID:	3161
IATA:	3161
IMDG:	3161

14.2. UN proper shipping name

ADR/ADN/RID:	FLAMMABLE LIQUEFIED GAS, N.E.P (2,3,3,3- TETRAFLUOROPROPENE/ DIFLUOROMETHANE)
IMDG:	FLAMMABLE LIQUEFIED GAS, N.E.P (2,3,3,3- TETRAFLUOROPROPENE/ DIFLUOROMETHANE)
IATA (Load):	Flammable liquefied gas, n.e.p. (2,3,3,3- Tetrafluoropropene/Difluoromethane)
IATA (Passenger):	Flammable liquefied gas, n.e.p. Not permitted for transport

14.3. Transport hazard class(es)

	Class	Subsidiary risks	Classification code	Hazard identification number	Restricted tunnel code
ADR:	2	2.1	2F	23	(B/D)
ADN:	2	2.1	2F	23	
RID:	2	2.1, (13)	2F	23	
IMDG:	2.1				
IATA:	2.1(load)				
IATA:	Not permitted for transport (passengers)				

14.4. Packing group

Not assigned by regulation.

Tags

ADR/ADN/RID/IMDG: 2.1

IMDG / IATA: Flammable Gas

Packing instructions

IATA (load): 200

IATA (passengers): Not permitted for transport

Code EmS

IMDG: F-D, S-U

14.5. Environmental hazards

Not : (ADR/ADN/RID/IMDG)

14.6. Special precautions for user

The transport classification(s) listed are for informational purposes only and are based solely on the properties of the unpackaged/unpackaged material described in this Safety Data Sheet. Transport classifications may vary depending on the mode of transport, the size of the container/packaging, and variations in regional or country regulations.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15. Regulatory Information

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

REACH-Restrictions on the manufacture, marketing and use of certain hazardous substances, mixtures and articles (Annex XVII):
Not applicable.

REACH-List of candidate substances of very high concern for authorization (Article 59):
This product does not contain substances of very high concern above the corresponding legal concentration limit (≥ 0.1% w/w).

Regulation (EC) No. 2024/590 on substances that deplete the ozone layer:
Not applicable.

Regulation (EU) 2019/1021 on persistent organic pollutants (consolidated version):
Not applicable.

Regulation (EC) No. 649/2012 of the European Parliament and of the Council concerning the export and import of dangerous chemicals:
Not applicable.

REACH-List of substances subject to authorization (Annex XIV):
Not applicable.
Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances:

		Quantity 1	Quantity 2
P2	LIQUEFIED FLAMMABLE GASES	10t	50t

Regulation (EC) No. 2024/573 of the European Parliament and of the Council on fluorinated greenhouse gases:
R-454C gas must be supplied in returnable containers (tone tanks/cylinders).

15.2. Chemical safety assessment

A chemical safety assessment has been carried out for the substances that make up the product.

SECTION 16. Other information

This sheet cancels and replaces all previous editions.

Date of issue: 29 may 2025
Version: 2.1

This Safety Data Sheet has been prepared in accordance with:
Regulation (EC) No. 1907/2006 and its subsequent amendments:
Regulation (EU) No. 2015/830 and Regulation (EU) No. 2020/878

Text of the phrases used in section 3:

H221: Flammable gas.
H280: Contains gas under pressure; may explode if heated.

This document has been prepared by a competent person who has received adequate training.
The information provided herein is based on our knowledge as of the date indicated above. It refers exclusively to the product indicated and does not constitute a guarantee of particular qualities.

The user must ensure that this information is suitable and accurate for the specific use of the product.

The information is believed to be correct, but is not exhaustive and should be used only as a guide, based on current knowledge of the chemical substance or mixture and applicable to the appropriate safety precautions for the product.

The list of risks, legal, regulatory, and administrative texts is not exhaustive. The recipient or user of the product is solely responsible for referring to the official regulations for the storage, handling, and use of these products.

Glossary of abbreviations

ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
CMR: Carcinogenic, mutagenic or toxic to reproduction.
DIN: Standard of the German Institute for Standardization.
CEx: Concentration associated with x% response.
EmS: Emergency procedure.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
IATA: International Air Transport Association.
IBC: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
IMDG: International Maritime Dangerous Goods Code.
LC50: Lethal concentration for 50% of a test population.
NOAEL: No observable adverse effect level.
NOEL: No observed effect level.
NOEL: No observable effect level.
NOELR: No observable effect rate.
IMO: International Maritime Organization.
RID: Regulations concerning the International Carriage of Dangerous Goods by Rail (COTIF).
UN: United Nations.
VLA: Environmental Limit Values.
UNRTDG: United Nations Recommendations on the Transport of Dangerous Goods.