

(*) oncly chemical-announcement

(**) to be filled either 3.1 or 3.2

SECTION 1: IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier	
Product name	R23
Chemical name, formula	Trifluoromethane, CHF ₃ 100 % (% by weight)
CAS No, EC No, REACH-reg.no	CAS 75-46-7, EU: 200-872-4, Reach 01-2119971823-29

1.2 Relevant identified uses of the substance	
Identified uses	Industrial and professional use. Perform risk assessment prior to use. Refrigerant. Transfilling gas or liquid. Using gas alone or in mixtures for the calibration of analysis equipment. Formulation of mixtures with gas in pressure receptacles.
Use advised against	Consumer use.

1.3 Details of the supplier of the safety data sheet and the producer	
Supplier of SDS: Darment Oy	
VAT	FI09368266
Address	Ruosilantie 18
Postal code and city	00390 HELSINKI
Telephone	+358 20 5588 250
E-mail	info@darment.fi
www-site, www-shop site	darment.fi, kauppa.darment.fi

Emergency telephone numbers in Finlandtel. **112**tel. **0800 147 111**, HUS Poison Information Center (free calls), tel. **09 471 977**, open 24 h/day.**Germany: tel. 112****SECTION 2: HAZARDS IDENTIFICATION****2.1 Classification of the substance or mixture****Classification accordint to Regulation (EU) N:o 1272/2008 as amended.****Physical Hazards**

Gases under pressure

Liquefied gas

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

2.2 Label Elements

<p>GHS Hazard Pictogram(s)</p>  <p>Signal Word: Warning</p>	<p>Hazard Statement(s): H280 Contains gas under pressure; may explode if heated.</p> <p>Precautionary Statements</p> <p><i>Prevention</i> None <i>Response</i> None <i>Storage</i> P410 + P403 Protect from sunlight. Store in a well-ventilated place. <i>Disposal</i> None</p> <p>Supplemental label information: Asphyxiant in high concentrations.</p>
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2.3 Other hazards

Vapors are heavier than air and may accumulate in wells and cause asphyxiation.
Contact with evaporating liquid may cause frostbite or freezing of skin.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Chemical name, trade name	CAS No, EC-No, REACH Reg. No	Purity	Classification CLP
Trifluoromethane, CHF ₃ , R23	CAS No 75-46-7 EC No 200-872-4 REACH No: 01-2119971823-29	100% * for classification only	Press. Gas Liquefied Gas; H280

All concentrations are nominal. Classification, CLP Regulation No. 1272/2008.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility or consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor or 112. Apply artificial respiration if breathing stopped. DO NOT give epinephrine (adrenaline).

Skin contact: Contact with evaporating liquid may cause frostbite or freezing of skin.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance.

Ingestion: Ingestion is not considered a potential route of exposure. But In case of ingestion, seek medical advice immediately and show the safety data sheet for this product.

4.2 Most important symptoms an effects, acute and delayed

Because of may cause cardiac arrhythmia, catecholamine drugs, such as epinephrine should be used with special caution and only in case of emergency life support.

4.3 Indication of any immediate medical attention and special treatment needed

Do not give adrenaline or similar drugs

SECTION 5: FIREFIGHTING MEASURES**5.1 Extinguishing media**

Material will not burn.

Heat may cause the containers to explode.

In case of fire in the surroundings: Use appropriate extinguishing agent.

Unsuitable Extinguishing media: None.

5.2 Special hazards arising from the substance or mixture

Fire or excessive heat may produce hazardous decomposition products.

Hazardous Combustion Products: If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:

- Carbon monoxide
- Carbonyl difluoride
- Hydrogen fluoride

5.3 Advice for firefighters

In case of fire: stop leak if safe to do so. Continue spraying water from protected position until container stays cool. Use extinguishant. Isolate the source of the fire or let it burn out.

Follow the internal emergency plan and general accident and emergency guidelines.

Depending on the intensity of the fire, it may be necessary to wear full protective clothing and self-contained breathing apparatus. Safety equipment and first aid equipment must be available at the minimum level.

Firefighters must wear standard protective equipment: a fire-resistant jacket, a helmet with a face shield, gloves and rubber boots even in an enclosed area with an oxygen device.

Instructions: EN 469 Protective clothing for firefighters. Requirements and test methods for fire rating. EN 15090 Safety footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in houses and others constructions. Standard EN 137 Compressed air breathing apparatus - Portable open circuit compressed air devices - Requirements, testing, marking.

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipments and emergency procedures**

Evacuate area. Provide adequate ventilation.

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Standard EN 137 Respiratory protective devices – Self-contained open-circuit compressed air breathing apparatus with full face mask – Requirements, testing, marking.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up

Provide adequate ventilation.

6.4 References to other sections

Refer to sections 8 and 13.

SECTION 7: HANDLING AND STORAGE**7.1 Precautions for safe handling**

- Only experienced and properly instructed persons should handle gases under pressure.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.
- Refer to supplier's handling instructions.
- The substance must be handled in accordance with good industrial hygiene and safety procedures.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- Do not remove or deface labels provided by the supplier for the identification of the container contents.
- When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc.
- Secure cylinders in an upright position at all times, close all valves when not in use.
- Provide adequate ventilation.
- Suck back of water into the container must be prevented.
- Do not allow backfeed into the container.
- Avoid suckback of water, acid and alkalis.
- Keep container below 50°C in a well ventilated place.
- Observe all regulations and local requirements regarding storage of containers.
- When using do not eat, drink or smoke.
- Observe all legal and local requirements for the storage of cylinders / containers.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Keep container valve outlets clean and free from contaminates particularly oil and water.
- If user experiences any difficulty operating container valve discontinue use and contact supplier.
- Never attempt to transfer gases from one container to another.
- Container valve guards or caps should be in place.

7.2 Conditions for safe storage including any incompatibilities

- Containers should not be stored in conditions likely to encourage corrosion.
- Stored containers should be periodically checked for general conditions and leakage.
- Container valve guards or caps should be in place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible material.
- Keep away from chemically reactive metals: potassium, calcium, powdered aluminium, magnesium and zinc.

7.3 Specific end use(s)

None.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limits

None of the components have assigned exposure limits.

DNEL Values

Critical ingredient	Type	Value	Remarks
Trifluoromethane	Worker – inhalative, longterm – systemic	1 439 mg/m ³	Repeated dose toxicity.
	General population – inhalative, longterm – systemic	358 mg/m ³	Repeated dose toxicity.

PNEC Values

Critical ingredient	Type	Value	Remarks
Trifluoromethane	Aquatic (freshwater)	155 µg/l	-
	Aquatic (intermit.releases)	1,545 mg/l	-
	Aquatic (marine water)	16 µg/l	-
	Sediment (freshwater)	665 µg/kg	-
	Sediment (marine water)	67 µg/kg	-
	Soil	43 µg/kg	

8.2 Exposure controls

Appropriate engineering controls

- Consider a work permit system e.g. for maintenance activities.
- Ensure adequate ventilation including exhaust ventilation to ensure that the specified exposure limit value is not exceeded.
- Systems under pressure should be regularly checked for leakages.
- Preferably use permanent leak tight connections (eg. welded pipes).
- Do not eat, drink or smoke when using the product.

Individual protection measures like personal protective equipment

General information: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Eye and face protection

To avoid exposure to liquid splashes, safety glasses, eye protection or face shields should be used in accordance with EN 166. (Instructions: EN 166 Personal Eye Protection.)

Skin protection: See beneath Hand protection.

Hand protection: Wear working gloves while handling containers. (Guidelines: EN 388 Protective gloves against mechanical risks)

Body protection: No special precautions.

Other: Wear safety shoes while handling containers. (Guideline: ISO 20345 Personal protective equipment – safety footwear.)

Respiratory protection: Not required.

Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: Waste disposal, see sec. 13.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**9.1. Information on basic physical and chemical properties**

Appearance, physical state, form and color	Liquefied gas, colorless.
Odor	Faint ethereal.
Odor threshold	No data available.
pH	No data available.
Melting point	- 155 °C
Boiling point	- 82,1 °C (101,3 kPa)
Flash point	Not applicable
Evaporation rate	Not applicable.
Flammability (solid, gas)	This product is not flammable.

Flammability limit upper / lower	Not applicable.
Vapor pressure 21,1°C	4298,2 kPa
Vapor density (air=1)	2,4
Relative density	No data available
Solubility (ies), 25°C	0,838 g/l
Partition coefficient, n-oktanol/water	0,84
Autoignition temperature	No data available
Viscosity, kinematich / dynamic	Not applicable.
Explosive properties	Not explosive.
Oxidizing properties	Not classified as oxidizing.

9.2 Other information

Gas/vapour is heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Can react with strong oxidizing agents.

10.4 Conditions to avoid

Heat, hot surfaces, flames and sparks.

10.5 Incompatible materials

Oxidizing agents.

10.6 Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects**

General information: None.

Acute toxicity / Oral

Product: Based on the available data, the classification criteria are not met.

Acute toxicity / Dermal

Product: Based on the available data, the classification criteria are not met.

Acute toxicity / Inhalation

Trifluoromethane	LC ₅₀ (Rat 4 h)	663 000 ppm
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Repeated dose toxicity

Trifluoromethane	NOAEL (Rat)	10 000 ppm
	LOAEL (Rat)	10 000 ppm

Skin corrosion / irritation

Product: Based on the available data, the classification criteria are not met.

Serious eye damage / eye irritation

Product: Based on the available data, the classification criteria are not met.

Respiratory or skin sensitization

Product: Based on the available data, the classification criteria are not met.

Germ cell mutagenicity

Product: Based on the available data, the classification criteria are not met.

Carcinogenicity

Product: Based on the available data, the classification criteria are not met.

Reproductive toxicity

Product: Based on the available data, the classification criteria are not met.

Specific target organ toxicity – single exposure

Product: Based on the available data, the classification criteria are not met.

Specific target organ toxicity – repeated exposure

Product: Based on the available data, the classification criteria are not met.

Aspiration hazard

Product: Based on the available data, the classification criteria are not met.

Other relevant toxicity information

- Light hydrocarbons have been associated with cardiac sensitization in abuse situations.
- Hypoxia or the injection of adrenaline-like substances enhances effects.
- May produce irregular heart beat and nervous symptoms.

SECTION 12: ECOLOGICAL INFORMATION**12.1 Toxicity****Acute toxicity – Fish:**

Trifluoromethane: LC₅₀ (4 days) 633,26 mg/l

Acute toxicity – Aquatic invertebrates:

Trifluoromethane:: LC₅₀ (48 h) 323,05 mg/l

Toxicity to Aquatic Plants

Trifluoromethane: EC₅₀ (4 days) 154,54 mg/l

12.2 Persistence and degradability

Not readily biodegradable

12.3 Bioaccumulative potential

log Pow: 0,84

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB

Not classified as PBT or vPvB.

12.6 Other adverse effects

Ozone Depletion Potential: 0 (R11 = 1)

Global Warming Potential: 14800

Contains fluorinated greenhouse gases. When discharged in large quantities may contribute to the greenhouse effect. For GWP value of mixture and quantities, refer to container label.

Trifluoromethane: EU. Annexes I, II (F-gases subject to emission control / notification), Regulation 517/2014 / EU on fluorinated greenhouse gases -Global warming potential: 1430 ANNEX I: FLUORINATED GREENHOUSE GASES REFERRED TO IN ARTICLE 2 (1); Group 1: Hydrofluorocarbons (HFCs).

SECTION 13: DISPOSAL CONSIDERATIONS**13.1. Waste treatment methods**

Waste type (EU Commission Regulation 1357/2014): Not hazardous. Waste type: Not applicable.

General information:

Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations.

Disposal methods

Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", <http://www.eiga.org>) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes:

Container: 14 06 01*: Chlorofluorocarbons, HCFCs, HFCs.

EU legislation: Directive 2008/98/ETY, 2014/955/EU, EU Commission Regulation nr 1357/2014.

National legislation (FI): Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.

SECTION 14: TRANSPORT INFORMATION**ADR**

14.1 UN Number	UN 1984
14.2 UN Proper Shipping Name	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3 Transport Hazard Classes	2
14.4 Packing Group	–
Classification code	2A
Hazard No. (ADR)	20
Labels	2.2
Tunnel restriction code	(C/E)
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for users	–

RID

14.1 UN Number	UN 1984
14.2 UN Proper Shipping Name	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3 Transport Hazard Classes	2
14.4 Packing Group	–
Class	2A
Labels	2.2
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for user:	–

IMDG

14.1 UN Number	UN 1984
14.2 UN Proper Shipping Name	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3 Class	2.2
14.4 Packing Group	–
Labels	2.2
EmS No.	F-C, S-V
14.5 Environmental Hazards	Marine pollutant: no
14.6 Special precautions for user	–

IATA

14.1 UN Number	UN 1984
14.2 UN Proper Shipping Name	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)
14.3 Transport Hazard Classes	2.2
14.4 Packing Group	-
Labels:	Non-flammable, non-toxic gas
Passenger aircraft:	200
Cargo aircraft only:	200
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for user	-

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.

Additional identification:

- Avoid transport on vehicles where the load space is not separated from the driver's compartment.
- Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
- Before transporting product containers ensure that they are firmly secured.
- Ensure that the container valve is closed and not leaking.
- Container valve guards or caps should be in place.
- Ensure adequate air ventilation

SECTION 15: REGULATORY INFORMATION**15.1 Safety, health and environmental regulations / legislation specific for the substance or mixture****EU Regulations**

- Regulation (EC) No 517/2014 on fluorinated greenhouse gases
- Regulation (EC) No 1907/2006 – Annex XVII – Restrictions on manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.
- Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work.
- Regulation (EU) 2016/425 on personal protective equipment.
- Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).
- Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
- This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

National regulations:

- Chemicals Act 599/2013
- Act amending the Chemicals Act 554/2014, 746/2016, 199/2017, 656/2018, 756/2018, 711/2020.
- Classification and Labeling of Chemicals 807/2001: amendment 687/2005, 206/2007, 655/2008,6/2010
- Government Decree on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products 837/2005.
- Government Decree on the limitation of emissions to air from certain activities and Installations using organic solvents 64/2015

- Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.
- Concentrations known as harmful 268/2014

15.2 Chemical safety assessment

CSA has not carried out.

SECTION 16: OTHER INFORMATION

Revision information: no relevant

Data sources of this SDS

Safety Data Sheet provided by the manufacturer.

Legislation on hazardous chemicals valid at the time of writing.

European Chemicals Agency, Guidance on the compilation of safety data sheets / REACH Regulation (EU) 1907/2006, ARTICLE 31: Requirements for safety data sheets.

CLP Regulation (EU) N:o 1272/2008.

WWW-SOURCES

echa.europa.eu

eiga.org

esis.jrc.ec.europa.eu

eur-lex.europa.eu

atsdr.cc.gov

www.lvm.fi/en/home

<http://toxnet.nlm.nih.gov/>

<http://www.who.int/ipcs/en/>

www.ericards.net

Rating methods of classification

Regulation (EU) No 1272/2008 (CLP), Regulation on classification, labeling and packaging of substances and mixtures.

Regulation (EU) 1999/45 (DPD)

Wording of the H-statements (sec. 2-3)

SECTION 2:H280: Contains gas under pressure, may explode if heated.

SECTION 3: The statements are not related to the product, They are provided for information only with reference to the components mentioned in section 3.

Classification according to Regulation (EC) N:o 1272/2008 as amended

Press. Gas Liq. Gas, H280

Training information

It is recommended that persons handling the product have minimum training in the prevention and protection of work-related hazards. This makes it easier to understand and interpret the safety data sheet and product labels. Users of breathing apparatus must be trained. Ensure all operators understand the flammability hazard.

Other information

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Disclaimer:

This information is provided without warranty. The data is trusted to be flawless. This information should be used to make an independent determination of the practices that protect workers and the environment.

The information contained in this MSDS is based on sources, scientific and technical knowledge, existing national and EU legislation.

The release is intended to serve the safe use of the product. We do not know or control the working methods or conditions of the users of the product. The user is always ultimately responsible for taking measures to ensure compliance with the regulations in force in the handling, storage, use and disposal of chemicals.

In this context, it is noted that the information provided in the SDS also helps employers to fulfill their obligations under Directive 98/24 / EU10 on the protection of the health and safety of workers from the risks related to chemical agents at work.

On the basis of the safety data sheet, users should be able to take the necessary measures in the field of health and safety to ensure safety and protect the environment.

The Safety Data Sheet is provided for in Article 31 of REACH Regulation (EU) No 1907/2006 and in Annex II to the Regulation.