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

1.1 Product identifier

Trade name

R23

Substance name	trifluoromethane
REACH registration no.	01-2119971823-29

Identification numbers

CAS no.	75-46-7
EC no.	200-872-4

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

Relevant identified uses of the substance or mixture
Refrigerant
Industrial Use
Professional use

Uses advised against
Consumer use

1.3 Details of the supplier of the safety data sheet

Address
TEGA - Technische Gase und Gasetechnik GmbH
Werner-von-Siemens-Straße 18
97076 Würzburg

Telephone no.	+49 931 2093-220
Fax no.	+49 931 2093-180
e-mail	kaeltemittel@tega.de

Advice on Safety Data Sheet
sdb_info@umco.de

1.4 Emergency telephone number

For medical advice (in German and English):
+49 (0)551 192 40 (Giftinformationszentrum Nord)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification in accordance with Regulation (EC) No 1272/2008 (CLP)
Press. Gas liq.; H280

Classification information
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3 and 4 of Annex I to CLP.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)

Product identifier
75-46-7 (trifluoromethane)

Hazard pictograms

GHS04

Signal word
Warning

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.

Precautionary statement(s)

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

Supplemental label elements
Contains fluorinated greenhouse gases: HFC-23

2.3 Other hazards

This product does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher. Danger of suffocation by displacement of air / oxygen. Contact with the liquid can cause cold burns or frostbite. Abuse or intentional inhalation can be fatal as a result of effects on the heart without alarming symptoms.

PBT assessment
The product is not considered to be a PBT.

vPvB assessment
The product is not considered to be a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical characterization

Substance name	trifluoromethane
Formula	CHF3
Molecular weight	70

Identification numbers

CAS no.	75-46-7
EC no.	200-872-4

3.2 Mixtures

Not applicable. The product is not a mixture.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove affected person from danger area, lay him down. In case of accident or if you feel unwell, seek medical advice immediately.

After inhalation
Remove affected persons from dangerous area by observing suitable respiratory protection measures. Ensure supply of fresh air. Irregular breathing/no breathing: artificial respiration. Call a doctor immediately.

After skin contact
In case of contact with skin wash off immediately with soap and water. Rinse with much water in case of frostbites. Remove chlothes only after unfreezing. Cover wounds with sterile dressing. Call a doctor immediately.

After eye contact
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.

After ingestion

Unlikely mode of exposure. Rinse the mouth thoroughly with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
The following symptoms may occur: respiratory arrest. Shortness of breath; Light-headedness; muscle incoordination; Unconsciousness; cardiac arrhytmia; Nausea; headaches; Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. May be fatal if inhaled.

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

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Extinguishing measures to suit surroundings.

Unsuitable extinguishing media
High power water jet

5.2 Special hazards arising from the substance or mixture
In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; Liquefied gas: Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas.

5.3 Advice for firefighters
Use self-contained breathing apparatus. Wear full protective suit. Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Pressure increase, bursting and explosion hazard during heating. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Refer to protective measures listed in sections 7 and 8. Provide good room ventilation even at ground level (vapours are heavier than air). Do not breathe gas. Keep away from ignition sources. Use personal protective clothing. Cordon and mark contaminated area. Remove persons to safety.

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions
Avoid release in the environment. Dispose of contaminated water.

6.3 Methods and material for containment and cleaning up
Ensure adequate ventilation. Dispose of absorbed material in accordance with the regulations.

6.4 Reference to other sections
Information regarding safe handling, see section 7. Information regarding personal protective measures, see section 8. Information regarding waste disposal, see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Provide good ventilation at the work area (local exhaust ventilation, if necessary). To be used only according to instructions for use. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose containers heat or sources of ignition. In case of accidental release: danger due to low temperature of the liquid product. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Comply with the health and safety at work laws.

General protective and hygiene measures
Wash hands before breaks and after work. Do not inhale gases. Avoid product contact with skin, eyes and clothing; Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Provide eye wash fountain in work area. Have emergency shower available.

Advice on protection against fire and explosion
The product is not combustible. Isolate from sources of heat, sparks and open flame. Take precautionary measures against electrostatic loading (earthing necessary during loading operations). Electrical equipment should be protected to the appropriate standard.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed in a cool, well-ventilated place, open and handle carefully. Protect from heat and direct sunlight.

Recommended storage temperature

Value	<	50	°C

Storage stability

Value	>	10	a
Comments	When stored properly, the storage life is unlimited.		

Requirements for storage rooms and vessels
Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original.

Incompatible products
Substances to be avoided, see section 10.

7.3 Specific end use(s)
No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

DNEL, DMEL and PNEC values

DNEL values (worker)

No	Substance name			CAS / EC no
	Route of exposure	Exposure time	Effect	Value
1	**trifluoromethane**			**75-46-7** **200-872-4**
	inhalative	Long term (chronic)	systemic	1439 mg/m³

DNEL value (consumer)

No	Substance name			CAS / EC no
	Route of exposure	Exposure time	Effect	Value
1	**trifluoromethane**			**75-46-7** **200-872-4**
	inhalative	Long term (chronic)	systemic	358 mg/m³

PNEC values

No	Substance name		CAS / EC no
	ecological compartment	Type	Value
1	**trifluoromethane**		**75-46-7** **200-872-4**
	water	fresh water	0.115 mg/L

	water	marine water	0.016	mg/L
	water	fresh water sediment	0.665	mg/kg dry weight
	water	marine water sediment	0.067	mg/kg dry weight
	soil	-	0.043	mg/kg dry weight

8.2 Exposure controls

Appropriate engineering controls
Ensure adequate ventilation, local exhaust at the work station if necessary. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Respiratory protection
Self-contained breathing apparatus. In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.
Respiratory filter (gas) : AX

Eye / face protection
Tightly fitting safety glasses (EN 166).

Hand protection
Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves. Low-temperature-resistant gloves (EN 511).
Appropriate Material Leather

Other
Chemical-resistant work clothes. Protective shoes.

Environmental exposure controls
Information regarding waste disposal, see chapter 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

State of aggregation
gas

Form
liquified gas

Colour
colourless

Odour
slightly like ether

pH value
No data available

Boiling point / boiling range			
Value	appr.	-82	°C
Reference pressure		1013	hPa
Source	supplier		

Melting point/freezing point			
Value		-155.1	°C
Source	supplier		

Decomposition temperature
No data available

Flash point	
Not applicable	
Source	supplier

Ignition temperature
No data available

Oxidising properties
not oxidizing

Explosive properties
not explosive

Flammability
The product is non-flammable.

Lower explosion limit	
none	
Method	ASTM E 681
Source	supplier

Upper explosion limit	
none	
Method	ASTM E 681
Source	supplier

Vapour pressure		
Value	47054	hPa
Reference temperature	25	°C
Source	supplier	

Relative vapour density	
Value	2.4
Source	supplier
Comments	Air = 1

Evaporation rate	
Not applicable	
Source	supplier

Relative density
No data available

Density
No data available

Solubility in water		
Value	0.838	g/l
Reference temperature	25	°C
Source	supplier	

Solubility
No data available

Partition coefficient n-octanol/water (log value)			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trifluoromethane**	**75-46-7**	**200-872-4**

log Pow	0.84	
Reference temperature	25	°C
with reference to	pH 7	
Source	ECHA	

Kinematic viscosity	
Not applicable	
Source	supplier

Particle characteristics
No data available

9.2 Other information

Other information
No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity

Dangerous reactions are not expected if the product is handled according to its intended use. For the avoidance of thermal reaction does not overheat.

10.2 Chemical stability

Stable under recommended storage and handling conditions (See section 7).

10.3 Possibility of hazardous reactions

Stable under recommended storage and handling conditions (See section 7). Reacts with strong oxidizing agents.

10.4 Conditions to avoid

Temperatures > 50°C. Heat, naked flames and other ignition sources.

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

None, if handled according to intended use. In case of fire: see section 5.

SECTION 11: Toxicological information

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

Acute oral toxicity
No data available

Acute dermal toxicity
No data available

Acute inhalational toxicity				
No	**Substance name**	**CAS no.**		**EC no.**
1	**trifluoromethane**	**75-46-7**		**200-872-4**
LC50	>	663000		ppmV
Duration of exposure		4		h
State of aggregation	Gas			
Species	rat			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are not met.			

Skin corrosion/irritation
No data available

Serious eye damage/irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trifluoromethane**	**75-46-7**	**200-872-4**

Type of examination	In vitro mammalian cell gene mutation test
Species	mouse lymphoma L5178Y cells
Method	OECD 476
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.
Type of examination	in vitro gene mutation study in bacteria
Species	Salmonella typh. TA98, TA100, TA1535, TA1537, TA1538
Method	OECD 471
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.

Reproduction toxicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trifluoromethane**	**75-46-7**	**200-872-4**
Route of exposure	inhalational		
NOAEC	50000	ppm	
Type of examination	Prenatal Developmental Toxicity Study		
Species	rat		
Method	OECD 414		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

Carcinogenicity
No data available

STOT - single exposure
No data available

STOT - repeated exposure			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trifluoromethane**	**75-46-7**	**200-872-4**
Route of exposure	inhalational		
LOAEL	> 10000	ppm	
Species	rat		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

Aspiration hazard
No data available

11.2 Information on other hazards

Endocrine disrupting properties
No data available.

Other information
No data available.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (acute)
No data available

Toxicity to fish (chronic)
No data available

Toxicity to Daphnia (acute)
No data available

Toxicity to Daphnia (chronic)
No data available

Toxicity to algae (acute)

No data available

Toxicity to algae (chronic)
No data available

Bacteria toxicity
No data available

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

Partition coefficient n-octanol/water (log value)			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trifluoromethane**	**75-46-7**	**200-872-4**

log Pow		0.84	
Reference temperature		25	°C
with reference to	pH 7		
Source	ECHA		

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

Other adverse effects
100-year global warming potential: 14800

12.8 Other information

Other information
Do not let enter the product into drains or waterways and do not store on public depositories.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.
dispose of in accordance with local regulation.

Packaging

Compressed gas packaging under pressure. Do not open by force. Do not heat above 50°C. Dispose of compressed gas packagings only if completely discharged. Do not burn empty compressed gas packagings. Do not pierce, cut or weld uncleaned containers. Take empty containers to an approved waste disposal facility for recovery or disposal. Return empty pressure vessels to the supplier.

SECTION 14: Transport information

14.1 Transport ADR/RID/ADN

Class	2
Classification code	2A
Hazard identification no.	20
UN number	UN1984
Proper shipping name	TRIFLUOROMETHANE REFRIGERANT GAS R 23
Tunnel restriction code	C/E
Label	2.2 RID: (+13)

14.2 Transport IMDG

Class	2.2
UN number	UN1984
Proper shipping name	TRIFLUOROMETHANE REFRIGERANT GAS R 23
EmS	F-C, S-V
Label	2.2

14.3 Transport ICAO-TI / IATA

Class	2.2
UN number	UN1984
Proper shipping name	REFRIGERANT GAS R 23
Label	2.2

14.4 Other information

No data available.

14.5 Environmental hazards

Information on environmental hazards, if relevant, please see 14.1 - 14.3.

14.6 Special precautions for user

To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

14.7 Maritime transport in bulk according to IMO instruments

Not relevant

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)
In accordance with the REACH regulation (EC) 1907/2006, the product does not contain any substances that are considered as subject to listing in annex XIV, inventory of substances requiring authorisation.

REACH candidate list of substances of very high concern (SVHC) for authorisation
In accordance with article 57 and article 59 of the Reach regulation (EC) 1907/2006, this substance is not considered as subject to listing in annex XIV, inventory of substances requiring authorisation ("Authorization list").

Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES
The substance is not subject to the provisions of annex XVII (restriction entries) of the Reach regulation (EC) 1907/2006.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances
This substance is not subject to Part 1 or 2 of Annex I

Other regulations
REGULATION (EU) No 517/2014 on fluorinated greenhouse gases Adhere to the national sanitary and occupational safety regulations when using this product.

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

SECTION 16: Other information

Sources of key data used to compile the data sheet:
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
Directives 2000/39/EC, 2006/15/EC, 2009/161/EU, (EU) 2017/164.
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.

The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding section.

Creation of the safety data sheet
UMCO GmbH

This information is based on our present knowledge and experience.
The safety data sheet describes products with a view to safety requirements.
It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

Prod-ID 794642