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

1.1 Product identifier

Trade name

R-1233zd

Substance name	trans-1-chloro-3,3,3-trifluoropropene
REACH registration no.	01-2119855084-38

Identification numbers

CAS no.	102687-65-0

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

Relevant identified uses of the substance or mixture

Industrial use
Professional uses
Refrigerant

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)

Aquatic Chronic 3; H412
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

102687-65-0 (trans-1-chloro-3,3,3-trifluoropropene)

Hazard pictograms

GHS04

Signal word
Warning

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P410+P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/container to a facility in accordance with local and national regulations.

Supplemental label elements
Contains fluorinated greenhouse gas

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. Misuse or intentional inhalation can be fatal, as a result of effects on the heart, without alarming symptoms. Rapid evaporation of product may produce frostbite. May displace oxygen and cause rapid asphyxiation.

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	trans-1-chloro-3,3,3-trifluoropropene
Degree of purity	100
Formula	C3H2ClF3
Molecular weight	130,5

Identification numbers

CAS no.	102687-65-0

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
Remove affected person from danger area, lay him down. Remove contaminated clothing and clean before reuse. Adhere to personal protective measures when giving first aid.

After inhalation
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
Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor. Ingestion is not considered a possible route of exposure.

4.2 Most important symptoms and effects, both acute and delayed
No data available.

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
The product is not flammable. Extinguishing measures to suit surroundings. recommended: alcohol resistant foam, CO2, powders, water spray/mist

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: Hydrogen fluoride (HF); Hydrogen chloride (HCl); Carbon monoxide and carbon dioxide; carbonyl halides; halogenated compounds; 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). Remove persons to safety. Cordon and mark contaminated area. Use personal protective clothing. Do not breathe gas. Keep away from ignition sources. Avoid skin contact with leaking liquid (danger of frostbite!).

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

6.2 Environmental precautions
Avoid release in the environment. Suppress gases/vapours/mists with water spray jet.

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

Only qualified and trained persons are authorised to handle. 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. 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. Remove soiled or soaked clothing immediately.

Advice on protection against fire and explosion
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. May form a flammable mixture with air at superatmospheric pressure.

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

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.
Appropriate Material steel; glass; High density polyethylene (HDPE)

Incompatible products
Substances to be avoided, see section 10.

Stoarge Class according TRGS 510
2A Gases (except aerosol dispensers and lighters)

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	**trans-1-chloro-3,3,3-trifluoropropene**			**102687-65-0** -	
	inhalative	Long term (chronic)	systemic	1779	mg/m³

DNEL value (consumer)

No	Substance name			CAS / EC no	
	Route of exposure	Exposure time	Effect	Value	
1	**trans-1-chloro-3,3,3-trifluoropropene**			**102687-65-0** -	
	oral	Long term (chronic)	systemic	109	mg/kg/day
	inhalative	Long term (chronic)	systemic	379	mg/m³

PNEC values

No	Substance name		CAS / EC no
	ecological compartment	Type	Value

1	**trans-1-chloro-3,3,3-trifluoropropene**		**102687-65-0** -	
	water	fresh water	0,038	mg/L
	water	marine water	0,004	mg/L
	water	fresh water sediment	0,691	mg/kg dry weight
	water	marine water sediment	0,069	mg/kg dry weight
	soil	-	0,126	mg/kg dry weight

8.2 Exposure controls

Appropriate engineering controls
Ensure adequate ventilation, local exhaust at the work station if necessary.

Personal protective equipment

Respiratory protection
In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.

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

Hand protection
Low-temperature-resistant gloves (EN 511). 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.

Other
Chemical-resistant work clothes. Protective shoes.

Environmental exposure controls
Avoid release into sewage and environment.

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
none

Odour threshold	
Not relevant	
Source	supplier

pH value	
Not applicable	
reason for missing pH	substance/mixture is a gas
Source	supplier

Boiling point / boiling range		
Value	19	°C

Method	OECD 103
Source	supplier

Melting point/freezing point		
Value	-90	°C
Source	supplier	

Decomposition temperature		
Value	250	°C
Source	supplier	

Flash point
Not applicable
Source: supplier

Ignition temperature
No data available

Oxidising properties
not classified
Source: supplier

Explosive properties
not explosive
Source: supplier

Flammability
The product is non-flammable.
Source: supplier

Lower explosion limit
none
Source: supplier

Upper explosion limit
none
Source: supplier

Vapour pressure		
Value	1065	hPa
Reference temperature	20	°C
Source	supplier	

Relative vapour density		
Value	6,1	
Reference temperature	20	°C
Source	supplier	
Comments	Air = 1	

Relative density
No data available

Density		
Value	1,27	g/cm³
Reference temperature	20	°C
Source	supplier	

Solubility in water		
Value	1,90	g/L
Reference temperature	20	°C
Source	supplier	

Solubility
No data available

Partition coefficient n-octanol/water (log value)				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
log Pow	appr.	2,2		
Reference temperature		25	°C	
with reference to	pH 7,4			
Method	OECD 117			
Source	ECHA			

Kinematic viscosity	
Not applicable	
Source	supplier

Particle characteristics	
Not applicable	
Source	supplier

9.2 Other information

Other information
critical temperature: 166.45 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
Dangerous reactions are not expected if the product is handled according to its intended use.

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

10.3 Possibility of hazardous reactions
No hazardous reaction when handled and stored according to provisions.

10.4 Conditions to avoid
Temperatures > 50°C. Heat, naked flames and other ignition sources. Contact with incompatible substances.

10.5 Incompatible materials
strong oxidizing agents; strong acids; Alkali metals

10.6 Hazardous decomposition products
None if stored, handled and transported properly. 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	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
LC50		120000	ppmV	
Duration of exposure		4	h	
State of aggregation	Gas			
Species	rat			
Method	OECD 403			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are not met.			

Skin corrosion/irritation			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**

Duration of exposure	4	h
Species	rabbit		
Method	OECD 404		
Source	ECHA		
Evaluation	non-irritant		
Evaluation/classification	Based on available data, the classification criteria are not met.		

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	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**

Type of examination	In vitro bacterial reverse mutation assay
Species	Salmonella typhimurium: TA 1535, TA 1537, TA 98, TA 100; Escherichia coli WP2 uvrA
Method	OECD 471
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.
Type of examination	in vitro gene mutation study in mammalian cells
Species	Human Lymphocyte
Method	OECD 473
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.
Type of examination	Genotoxicity in vivo
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.

Reproduction toxicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**

Route of exposure	inhalational		
NOEC	>=	15000	ppm
Type of examination	Two-Generation Reproduction Toxicity Study		
Species	rat		
Method	OECD 416		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
Route of exposure	inhalational		
NOEC	>=	15000	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	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**

Route of exposure	inhalational		
LOAEC		4000	ppm
Species	rat (male)		
Method	OECD 413		
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
Higher exposure may lead to effects on the central nervous system, drowsiness and dizziness.

Cardiac sensitization (dog): Highest test concentration with no observed effect - 100000 ppm.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (acute)				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
LC50	appr.	38		mg/l
Duration of exposure		96		h
Species	Oncorhynchus mykiss			
Method	OECD 203			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are met.			

Toxicity to fish (chronic)
No data available

Toxicity to Daphnia (acute)				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
EC50		82		mg/l
Duration of exposure		48		h
Species	Daphnia magna			
Method	OECD 202			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are met.			

Toxicity to Daphnia (chronic)
No data available

Toxicity to algae (acute)				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
EC50	>	215		mg/l
Duration of exposure		72		h
Species	Pseudokirchneriella subcapitata			
Method	OECD 201			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are not met.			

Toxicity to algae (chronic)
No data available

Bacteria toxicity
No data available

12.2 Persistence and degradability

Biodegradability				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
Type	aerobic biodegradation			
Value		1	%	
Duration		28	day(s)	
Method	OECD 301 D			
Source	ECHA			
Evaluation	not readily biodegradable			

12.3 Bioaccumulative potential

Partition coefficient n-octanol/water (log value)				
No	**Substance name**	**CAS no.**	**EC no.**	
1	**trans-1-chloro-3,3,3-trifluoropropene**	**102687-65-0**	**-**	
log Pow	appr.	2,2		
Reference temperature		25	°C	
with reference to	pH 7,4			
Method	OECD 117			
Source	ECHA			

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
Product Name	
R-1233zd	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.
Source	supplier

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

Other adverse effects
Product: Global warming potential within 100 years: 3.88

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

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 UN number or ID number

ADR/RID/ADN	UN3163
IMDG	UN3163
ICAO-TI / IATA	UN3163

14.2 UN proper shipping name

ADR/RID/ADN	LIQUEFIED GAS, N.O.S.
Technical name	trans-1-chloro-3,3,3-trifluoropropene
IMDG	LIQUEFIED GAS, N.O.S.
Technical name	trans-1-chloro-3,3,3-trifluoropropene
ICAO-TI / IATA	Liquefied gas, n.o.s.
Technical name	trans-1-chloro-3,3,3-trifluoropropene

14.3 Transport hazard class(es)

ADR/RID/ADN - Class	2
Label	2.2
Classification code	2A
Tunnel restriction code	C/E
Hazard identification no.	20
IMDG - Class	2.2
Label	2.2
ICAO-TI / IATA - Class	2.2
Label	2.2

14.4 Packing group

ADR/RID/ADN	-
IMDG	-
ICAO-TI / IATA	-

14.5 Environmental hazards

EmS	F-C, S-V

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

Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)	
VOC-value	100 %

Other regulations

REGULATION (EU) No 2024/573 on fluorinated greenhouse gases
Adhere to the national sanitary and occupational safety regulations when using this product.

National regulations

Water Hazard Class (Germany)

Class	1
Source	Classification according to AwSV (Regulation on facilities for handling substances that are hazardous to water).

Other regulations
Take into account: TRGS 510 "Storage of hazardous substances in non-stationary containers"

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.

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.

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.

Alterations/supplements:
Alterations to the previous edition are marked in the left-hand margin.

This document is an English translation of the legally compliant safety data sheet of the region Germany. This document, including UFI and emergency telephone number, may only be used for placing on the market in the region Germany.

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