



RaDu - 50ppm H₂S, 500ppm CO, 2,2% CH₄, 18% O₂ in N₂

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
Issue date: 04/04/2023

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

1.1. Product identifier

Product form : Substance
Trade name : RaDu - 50ppm H₂S, 500ppm CO, 2,2% CH₄, 18% O₂ in N₂
Product code : #11288
Synonyms : Quad mix
Product group : Blend

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

1.2.1. Relevant identified uses

Main use category : Professional use

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

BUSE Gas BV
De Overmaat 21
6831 AE Arnhem

1.4. Emergency telephone number

Emergency number : +31-(0)263230740

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Gases under pressure : Compressed gas H280
Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

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

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) : Warning
Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.

2.3. Other hazards

Other hazards not contributing to the classification : None.

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SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type : Multi-constituent
Name : 50ppm Hydrogen Sulphide, 500ppm Carbon Monoxide, 2,2% Methane, 18% Oxygen in Nitrogen

Name	Product identifier	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Nitrogen	(CAS-No.) 7727-37-9 (EC-No.) 231-783-9 (REACH-no) *1	Press. Gas (Comp.), H280
oxygen (Note U)	(CAS-No.) 7782-44-7 (EC-No.) 231-956-9 (EC Index-No.) 008-001-00-8 (REACH-no) *1	Ox. Gas 1, H270 Press. Gas (Comp.), H280
methane (Note U)	(CAS-No.) 74-82-8 (EC-No.) 200-812-7 (EC Index-No.) 601-001-00-4 (REACH-no) 01-2119474442-39	Flam. Gas 1, H220 Press. Gas (Comp.), H280
carbon monoxide (Note U)	(CAS-No.) 630-08-0 (EC-No.) 211-128-3 (EC Index-No.) 006-001-00-2 (REACH-no) 01-2119480165-39	Flam. Gas 1, H220 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360D STOT RE 1, H372
hydrogen sulphide (Note U)	(CAS-No.) 7783-06-4 (EC-No.) 231-977-3 (EC Index-No.) 016-001-00-4 (REACH-no) 01-2119445737-29	Flam. Gas 1, H220 Press. Gas (Liq.), H280 Acute Tox. 2 (Inhalation:gas), H330 STOT SE 3, H335 Aquatic Acute 1, H400

Specific concentration limits:

Name	Product identifier	Specific concentration limits
hydrogen sulphide	(CAS-No.) 7783-06-4 (EC-No.) 231-977-3 (EC Index-No.) 016-001-00-4 (REACH-no) 01-2119445737-29	(1 ≤C < 100) STOT SE 3, H335

Full text of H-statements: see section 16

Note U (Table 3): When put on the market gases have to be classified as 'Gases under pressure', in one of the groups compressed gas, liquefied gas, refrigerated liquefied gas or dissolved gas. The group depends on the physical state in which the gas is packaged and therefore has to be assigned case by case.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Adverse effects not expected from this product.
First-aid measures after skin contact : Adverse effects not expected from this product.
First-aid measures after eye contact : Adverse effects not expected from this product.

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First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

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

No additional information available

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

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray or fog.
Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

No additional information available

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Act in accordance with local emergency plan. Stay upwind.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

None.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

No additional information available

7.2. Conditions for safe storage, including any incompatibilities

No additional information available

7.3. Specific end use(s)

None.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

carbon monoxide (630-08-0)

EU - Occupational Exposure Limits

Local name	Carbon monoxide
IOELV TWA (mg/m ³)	23 mg/m ³
IOELV TWA (ppm)	20 ppm
IOELV STEL (mg/m ³)	117 mg/m ³
IOELV STEL (ppm)	100 ppm
Notes	SCOEL Recommendations (1995)
Regulatory reference	COMMISSION DIRECTIVE (EU) 2017/164

United Kingdom - Occupational Exposure Limits

Local name	Carbon monoxide
WEL TWA (mg/m ³)	23 mg/m ³ 35 mg/m ³ Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL TWA (ppm)	20 ppm 30 ppm Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL STEL (mg/m ³)	117 mg/m ³ 232 mg/m ³ Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL STEL (ppm)	100 ppm 200 ppm Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
Remark (WEL)	BMGV (Biological monitoring guidance values are listed in Table 2)
Regulatory reference	EH40/2005 (Third edition, 2018). HSE

hydrogen sulphide (7783-06-4)

EU - Occupational Exposure Limits

Local name	Hydrogen sulphide
IOELV TWA (mg/m ³)	7 mg/m ³
IOELV TWA (ppm)	5 ppm
IOELV STEL (mg/m ³)	14 mg/m ³
IOELV STEL (ppm)	10 ppm
Regulatory reference	COMMISSION DIRECTIVE 2009/161/EU

United Kingdom - Occupational Exposure Limits

Local name	Hydrogen sulphide
WEL TWA (mg/m ³)	7 mg/m ³
WEL TWA (ppm)	5 ppm
WEL STEL (mg/m ³)	14 mg/m ³
WEL STEL (ppm)	10 ppm
Regulatory reference	EH40/2005 (Third edition, 2018). HSE

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8.2. Exposure controls

Appropriate engineering controls:

Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Consider the use of a work permit system e.g. for maintenance activities.

Personal protective equipment:

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: PPE compliant to the recommended EN/ISO standards should be selected.

Hand protection:

Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk.

Eye protection:

Wear safety glasses with side shields. Standard EN 166 - Personal eye-protection - specifications

Respiratory protection:

Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known. Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Gas filters do not protect against oxygen deficiency. Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .

Thermal hazard protection:

None in addition to the above sections.

Environmental exposure controls:

None necessary.

Other information:

Wear safety shoes while handling containers. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Molecular mass	: Not applicable for gas mixtures.
Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable for gases and gas mixtures.
Melting point	: Not known.
Freezing point	: No data available
Boiling point	: Not known.
Flash point	: Not applicable for gases and gas mixtures.
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
Flammability (solid, gas)	: Non flammable.
Vapour pressure	: Not applicable.
Vapour pressure at 50 °C	: Not applicable.
Relative vapour density at 20 °C	: Not applicable.
Relative density	: No reliable data available.
Relative gas density	: Lighter or similar to air.
Solubility	: Water: No reliable data available.
Partition coefficient n-octanol/water (Log Pow)	: Not applicable for gas mixtures.
Partition coefficient n-octanol/water (Log Kow)	: Not applicable for gas mixtures.
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No reliable data available.
Explosive properties	: Not applicable.

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Oxidising properties : Not applicable.
Explosive limits : Non flammable.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

For additional information on compatibility refer to ISO 11114.

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

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

carbon monoxide (630-08-0)

LC50 inhalation rat (ppm)	3760 ppm/1h
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hydrogen sulphide (7783-06-4)

LC50 inhalation rat (ppm)	356 ppm/4h
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Skin corrosion/irritation : No known effects from this product.
pH: Not applicable for gases and gas mixtures.
Serious eye damage/irritation : No known effects from this product.
pH: Not applicable for gases and gas mixtures.
Respiratory or skin sensitisation : May cause sensitization by inhalation. Irritation to the respiratory tract. May cause irritation to the respiratory tract. (Inconclusive data)
Germ cell mutagenicity : No known effects from this product.
Carcinogenicity : No known effects from this product.
Reproductive toxicity : Not classified
STOT-single exposure : Classification criteria are not met.
STOT-repeated exposure : Classification criteria are not met.
Aspiration hazard : Not applicable for gases and gas mixtures.

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SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: Classification criteria are not met.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

carbon monoxide (630-08-0)

EC50 96h algae (1)	124,4 mg/l Test organisms (species): other:Green algae, no further details
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hydrogen sulphide (7783-06-4)

EC50 Daphnia 1	0,12 mg/l Test organisms (species): Daphnia sp.
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12.2. Persistence and degradability

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2

Persistence and degradability	No data available.
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carbon monoxide (630-08-0)

Persistence and degradability	Will not undergo hydrolysis. Not readily biodegradable.
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methane (74-82-8)

Persistence and degradability	The substance is readily biodegradable. Unlikely to persist.
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oxygen (7782-44-7)

Persistence and degradability	No ecological damage caused by this product.
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hydrogen sulphide (7783-06-4)

Persistence and degradability	Not applicable for inorganic products.
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Nitrogen (7727-37-9)

Persistence and degradability	No ecological damage caused by this product.
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12.3. Bioaccumulative potential

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2

Partition coefficient n-octanol/water (Log Pow)	Not applicable for gas mixtures.
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Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
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Bioaccumulative potential	No data available.
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carbon monoxide (630-08-0)

Partition coefficient n-octanol/water (Log Pow)	1,78
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Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
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Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
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methane (74-82-8)

Partition coefficient n-octanol/water (Log Pow)	1,09
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Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

oxygen (7782-44-7)

Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
Bioaccumulative potential	No data available.

hydrogen sulphide (7783-06-4)

Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
Bioaccumulative potential	No data available.

Nitrogen (7727-37-9)

Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	Not applicable for gas mixtures.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

RaDu - 50ppm H₂S, 500ppm CO, 2,2% CH₄, 18% O₂ in N₂

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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carbon monoxide (630-08-0)

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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methane (74-82-8)

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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oxygen (7782-44-7)

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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hydrogen sulphide (7783-06-4)

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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Nitrogen (7727-37-9)

Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.
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12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Other adverse effects : No known effects from this product.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste treatment methods : May be vented to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.
- Additional information : External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
UN 1956	UN 1956	UN 1956	UN 1956	UN 1956
14.2. UN proper shipping name				
COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO)	COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO)	Compressed gas, n.o.s. (Nitrogen, oxygen, CO)	COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO)	COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO)
Transport document description				
UN 1956 COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO), 2.2, (E)	UN 1956 COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO), 2.2	UN 1956 Compressed gas, n.o.s. (Nitrogen, oxygen, CO), 2.2	UN 1956 COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO), 2.2	UN 1956 COMPRESSED GAS, N.O.S. (Nitrogen, oxygen, CO), 2.2
14.3. Transport hazard class(es)				
2.2	2.2	2.2	2.2	2.2
				
14.4. Packing group				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards				
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No
No supplementary information available				

14.6. Special precautions for user

- Special transport precautions : 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 there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure valve is closed and not leaking, - Ensure valve outlet cap nut or plug (where provided) is correctly fitted, - Ensure valve protection device (where provided) is correctly fitted.

Overland transport

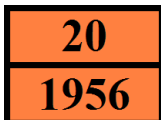
- Classification code (ADR) : 1A
Special provisions (ADR) : 274, 378, 655, 660, 662
Limited quantities (ADR) : 120ml
Excepted quantities (ADR) : E1
Packing instructions (ADR) : P200

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Mixed packing provisions (ADR)	: MP9
Portable tank and bulk container instructions (ADR)	: (M)
Tank code (ADR)	: CxBN(M)
Tank special provisions (ADR)	: TA4, TT9
Vehicle for tank carriage	: AT
Transport category (ADR)	: 3
Special provisions for carriage - Loading, unloading and handling (ADR)	: CV9, CV10, CV36
Hazard identification number (Kemler No.)	: 20
Orange plates	:



Tunnel restriction code (ADR)	: E
EAC code	: 2TE

Transport by sea

Special provisions (IMDG)	: 274, 378
Limited quantities (IMDG)	: 120 ml
Excepted quantities (IMDG)	: E1
Packing instructions (IMDG)	: P200
EmS-No. (Fire)	: F-C
EmS-No. (Spillage)	: S-V
Stowage category (IMDG)	: A

Air transport

PCA Excepted quantities (IATA)	: E1
PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: 200
PCA max net quantity (IATA)	: 75kg
CAO packing instructions (IATA)	: 200
CAO max net quantity (IATA)	: 150kg
Special provisions (IATA)	: A202
ERG code (IATA)	: 2L

Inland waterway transport

Classification code (ADN)	: 1A
Special provisions (ADN)	: 274, 378, 655, 662
Limited quantities (ADN)	: 120 ml
Excepted quantities (ADN)	: E1
Equipment required (ADN)	: PP
Number of blue cones/lights (ADN)	: 0

Rail transport

Classification code (RID)	: 1A
Special provisions (RID)	: 274, 378, 655, 660, 662
Limited quantities (RID)	: 120ml
Excepted quantities (RID)	: E1
Packing instructions (RID)	: P200
Mixed packing provisions (RID)	: MP9
Portable tank and bulk container instructions (RID)	: (M)
Tank codes for RID tanks (RID)	: CxBN(M)
Special provisions for RID tanks (RID)	: TA4, TT9
Transport category (RID)	: 3
Special provisions for carriage - Loading, unloading and handling (RID)	: CW9, CW10, CW36
Colis express (express parcels) (RID)	: CE3
Hazard identification number (RID)	: 20

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

Not applicable

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SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2 is not on the REACH Candidate List

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2 is not on the REACH Annex XIV List

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2 is not subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

RaDu - 50ppm H2S, 500ppm CO, 2,2% CH4, 18% O2 in N2 is not subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

Other information, restriction and prohibition regulations : Ensure all national/local regulations are observed.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes:

Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.

Abbreviations and acronyms:

	ATE - Acute Toxicity Estimate
	CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
	EINECS - European Inventory of Existing Commercial Chemical Substances
	CAS# - Chemical Abstract Service number
	PPE - Personal Protection Equipment
	LC50 - Lethal Concentration to 50 % of a test population
	RMM - Risk Management Measures
	PBT - Persistent, Bioaccumulative and Toxic
	vPvB - Very Persistent and Very Bioaccumulative
	STOT- SE : Specific Target Organ Toxicity - Single Exposure
	CSA - Chemical Safety Assessment
	EN - European Standard
	UN - United Nations
	ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
	IATA - International Air Transport Association
	IMDG code - International Maritime Dangerous Goods
	RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
	WGK - Water Hazard Class
	STOT - RE : Specific Target Organ Toxicity - Repeated Exposure

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Training advice : None.

Full text of H- and EUH-statements:

Acute Tox. 2 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 2
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Flam. Gas 1	Flammable gases, Category 1
Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Comp.)	Gases under pressure : Compressed gas
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
Repr. 1A	Reproductive toxicity, Category 1A
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H220	Extremely flammable gas.
H270	May cause or intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H360D	May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.

The classification complies with : ATP 12

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.