

# Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

## H2S Quad with Methane LEL≤3% CO2

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Supersedes:

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SDS reference: 456

**Warning**



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

#### 1.1. Product identifier

Trade name : H2S Quad with Methane LEL≤3% CO2  
 SDS no : 456  
 Part Number : 10050744,10102853, 10128181

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

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.  
 Test gas/Calibration gas.  
 Contact supplier for more information on uses.  
 Uses advised against : Consumer use.

#### 1.3. Details of the supplier of the safety data sheet

Company identification : MSA Europe GmbH  
 8645 Rapperswill-Jona  
 Schlüsselstrasse 12  
 Schwitserland  
[www.msasafety.com](http://www.msasafety.com)

#### 1.4. Emergency telephone number

Emergency telephone number : Chem-Tel, INC: 1-813-248-0585 International

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

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

Physical hazards : Gases under pressure : Compressed gas H280

#### 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.

Precautionary statements (CLP)

- Storage : P403 - Store in a well-ventilated place.



## H2S Quad with Methane LEL≤3% CO2

**2.3. Other hazards**

: None.

**SECTION 3: Composition/information on ingredients****3.1. Substances** : Not applicable**3.2. Mixtures**

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Nitrogen	(CAS-No.) 7727-37-9 (EC-No.) 231-783-9 (EC Index-No.) (REACH-no) *1	72.9	Press. Gas (Comp.), H280
oxygen	(CAS-No.) 7782-44-7 (EC-No.) 231-956-9 (EC Index-No.) 008-001-00-8 (REACH-no) *1	≤ 21	Ox. Gas 1, H270 Press. Gas (Comp.), H280
Carbon dioxide	(CAS-No.) 124-38-9 (EC-No.) 204-696-9 (EC Index-No.) (REACH-no) *1	≤ 3	Press. Gas (Liq.), H280
methane	(CAS-No.) 74-82-8 (EC-No.) 200-812-7 (EC Index-No.) 601-001-00-4 (REACH-no) 01-2119474442-39	≤ 2.5	Flam. Gas 1A, H220 Press. Gas (Comp.), H280
hydrogen sulphide	(CAS-No.) 7783-06-4 (EC-No.) 231-977-3 (EC Index-No.) 016-001-00-4 (REACH-no) 01-2119445737-29	≤ 0.5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280 Acute Tox. 2 (Inhalation:gas), H330 STOT SE 3, H335 Aquatic Acute 1, H400
carbon monoxide	(CAS-No.) 630-08-0 (EC-No.) 211-128-3 (EC Index-No.) 006-001-00-2 (REACH-no) 01-2119480165-39	≤ 0.1	Flam. Gas 1A, H220 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360D STOT RE 1, H372

Full text of H-statements: see section 16

*Contains no other components or impurities which will influence the classification of the product.*

\*1: Listed in Annex IV / V REACH, exempted from registration.

\*2: Registration deadline not expired.

\*3: Registration not required: Substance manufactured or imported &lt; 1t/y.



## H2S Quad with Methane LEL≤3% CO2

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

- Inhalation : Adverse effects not expected from this product.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

: Refer to section 11.

#### 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

- Specific hazards : Supports combustion.  
Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : Sulphur dioxide.

#### 5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.  
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- : Act in accordance with local emergency plan.  
Stay upwind.

#### 6.2. Environmental precautions

: None.

#### 6.3. Methods and material for containment and cleaning up

: None.

#### 6.4. Reference to other sections



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: See also sections 8 and 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Safe use of the product

- : The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.
- Do not breathe gas.
- Avoid release of product into work area.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- 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.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

#### 7.2. Conditions for safe storage, including any incompatibilities

- : Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps should be in place.
- Containers should be stored in the vertical position and properly secured to prevent them from falling over.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.

#### 7.3. Specific end use(s)

- : None.



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## SECTION 8: Exposure controls/personal protection

## 8.1. Control parameters

hydrogen sulphide (7783-06-4)			
OEL : Occupational Exposure Limits			
EU	TWA IOELV (EU) 8 h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA IOELV (EU) 8 h [ppm]	5 ppm	
	STEL IOELV (EU) 15 min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	STEL IOELV (EU) 15 min [ppm]	10 ppm	
Austria	TWA (AT) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (AT) OEL 8h [ppm]	5 ppm	
	STEL (AT) OEL 15min [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	STEL (AT) OEL 15min [ppm]	5 ppm	
Regulatory reference	BGBl. II Nr. 186/2015		
Belgium	TWA (BE) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (BE) OEL 8h [ppm]	5 ppm	
	STEL (BE) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	STEL (BE) OEL 15min [ppm]	10 ppm	
Regulatory reference	Koninklijk besluit/Arrêté royal 02/09/2018		
Bulgaria	TWA (BG) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	STEL (BG) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр.73 от 4 септември 2018 г.)	
Estonia	TWA (EE) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (EE) OEL 8h [ppm]	5 ppm	
	STEL (EE) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	STEL (EE) OEL 15min [ppm]	10 ppm	
	Regulatory reference	Vabariigi Valitsuse 18. septembri 2001. a määruse nr 293 (RT I, 30.11.2011, 5)	
France	STEL (FR) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	STEL (FR) OEL 15min [ppm]	10 ppm	
	TWA (FR) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (FR) OEL 8h [ppm]	5 ppm	
	Note (FR)	Valeurs réglementaires contraignantes	
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 984, 2016)		
Germany	TRGS 900 Local name	Hydrogensulfid	
	Occupational exposure limit value (mg/m <sup>3</sup> )	7.1 mg/m <sup>3</sup>	
	Occupational exposure limit value (ppm)	5 ppm	
	TRGS 900 Remark	EU;DFG;AGS;Y	
TRGS 900 Regulatory reference	TRGS900		
Greece	TWA (GR) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (GR) OEL 8h [ppm]	5 ppm	
	STEL (GR) OEL 15min [mg/m <sup>3</sup> ]	10 mg/m <sup>3</sup>	
	STEL (GR) OEL 15min [ppm]	14 ppm	
	Regulatory reference	Π.Δ. 12/2012	
ACGIH	ACGIH TWA (ppm)	1 ppm	
	ACGIH STEL (ppm)	5 ppm	
	Remark (ACGIH)	TLV® Basis: URT irr; CNS impair	
	Regulatory reference	ACGIH 2019	
Italy	TWA (IT) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>	
	TWA (IT) OEL 8h [ppm]	5 ppm	
	STEL (IT) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>	
	STEL (IT) OEL 15min [ppm]	10 ppm	
	Regulatory reference	Allegato XXXVIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.	

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Latvia	TWA (LV) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (LV) OEL 8h [ppm]	5 ppm
	STEL (LV) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (LV) OEL 15min [ppm]	10 ppm
	Regulatory reference	Ministru kabineta 2007.gada 15.maija noteikumiem Nr.325 (Grozījumi Ministru kabineta 2011.gada 1.februārī noteikumiem Nr.92)
Luxembourg	TWA (LU) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (LU) OEL 8h [ppm]	5 ppm
	STEL (LU) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (LU) OEL 15min [ppm]	10 ppm
	Regulatory reference	Mémorial A N° 684 de 2018
Slovenia	TWA (SL) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (SL) OEL 8h [ppm]	5 ppm
	Peak exposure limitation factor (SL)	2
	Regulatory reference	Uradni list RS, št. 78/2018 z dne 4.12.2018
	Spain	TWA (ES) OEL 8h [mg/m <sup>3</sup> ]
TWA (ES) OEL 8h [ppm]		5 ppm
STEL (ES) OEL 15min [mg/m <sup>3</sup> ]		14 mg/m <sup>3</sup>
STEL (ES) OEL 15min [ppm]		10 ppm
NotesNotes		VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
Regulatory reference		Límites de Exposición Profesional para Agentes Químicos en España 2019. INSHT
Switzerland	STEL (CH) OEL 15min [mg/m <sup>3</sup> ]	14.2 mg/m <sup>3</sup>
	STEL (CH) OEL 15min [ppm]	10 ppm
	TWA (CH) OEL 8h [mg/m <sup>3</sup> ]	7.1 mg/m <sup>3</sup>
	TWA (CH) OEL 8h [ppm]	5 ppm
	Remark	Notationen: SS <sub>c</sub>
	Regulatory reference	www.suva.ch, 01.11.2018
Netherlands	MAC TWA 8H (NL) [mg/m <sup>3</sup> ]	2.3 mg/m <sup>3</sup>
	Regulatory reference	Arbeidsomstandighedenregeling 2018
United Kingdom	WEL - LTEL - UK [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	WEL - LTEL - UK [ppm]	5 ppm
	WEL - STEL - UK [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	WEL - STEL - UK [ppm]	10 ppm
	Regulatory reference	EH40/2005 (Third edition, 2018). HSE
Czech Republic	TWA (CZ) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (CZ) OEL 8h [ppm]	5 ppm
	STEL (CZ) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (CZ) OEL 15min [ppm]	10 ppm
	Regulatory reference	Nařízení vlády č. 361/2007 Sb. (zpracovány změny č. 246/2018 Sb.)
Denmark	TWA (DK) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (DK) OEL 8h [ppm]	5 ppm
	Regulatory reference	BEK nr 655 af 31/05/2018
Finland	TWA (FI) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (FI) OEL 8h [ppm]	5 ppm
	STEL (FI) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (FI) OEL 15min [ppm]	10 ppm
	Regulatory reference	HTP-ARVOT 2018 (Sosiaali- ja terveystieteiden ministeriö)
	Hungary	TWA (HU) OEL 8h [mg/m <sup>3</sup> ]
STEL (HU) OEL 15min [mg/m <sup>3</sup> ]		14 mg/m <sup>3</sup>
Megjegyzések (HU)		i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát); EU3 (2009/161 /EK irányelvben közölt érték)
Regulatory reference		25/2000. (IX. 30.) EüM-SZCSM együttes rendelet a munkahelyek kémiai biztonságáról



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Iceland	Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 1296/2012)
Ireland	OEL (IE)-(8-hour reference period) [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	OEL (IE)-(8-hour reference period) [ppm]	5 ppm
	OEL (IE)-(15min reference period) [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	OEL (IE)-(15min reference period) [ppm]	10 ppm
	Notes (IE)	IOELV (Indicative Occupational Exposure Limit Values)
	Regulatory reference	Code of Practice for the Chemical Agents Regulations 2018
Lithuania	TWA (LT) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (LT) OEL 8h [ppm]	5 ppm
	STEL (LT) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (LT) OEL 15min [ppm]	10 ppm
	Ceiling value (LT) OEL [mg/m <sup>3</sup> ]	20 mg/m <sup>3</sup>
	Ceiling value (LT) OEL [ppm]	15 ppm
	Remark (LT)	Ū (ūmus poveikis)
	Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Malta	TWA (MT) OEL 8h [mg/m <sup>3</sup> ]	7 mg/m <sup>3</sup>
	TWA (MT) OEL 8h [ppm]	5 ppm
	STEL (MT) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (MT) OEL 15min [ppm]	10 ppm
	Regulatory reference	S.L.424.24 (L.N.57 of 2018)
	Norway	TWA (NO) OEL 8h [mg/m <sup>3</sup> ]
Norway	TWA (NO) OEL 8h [ppm]	5 ppm
	Ceiling value (NO) OEL [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	Ceiling value (NO) OEL [ppm]	10 ppm
	Merknader (NO)	E (EU har en veiledende grenseverdi for stoffet)
	Regulatory reference	FOR-2018-08-21-1255
	Poland	TWA (PL) OEL 8h [mg/m <sup>3</sup> ]
Poland	STEL (PL) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	Regulatory reference	Dz. U. 2018 poz. 1286
	Romania	TWA (RO) OEL 8h [mg/m <sup>3</sup> ]
Romania	TWA (RO) OEL 8h [ppm]	5 ppm
	STEL (RO) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (RO) OEL 15min [ppm]	10 ppm
	Regulatory reference	Hotărârea nr. 584/2018
	Slovakia	Maximum permissible exposure limit, average, 8h (SK) [mg/m <sup>3</sup> ]
Slovakia	Maximum permissible exposure limit, average, 8h (SK) [ppm]	5 ppm
	Regulatory reference	Nariadenie vlády č. 33/2018 Z.z.
	Sweden	TWA (SV) OEL 8h [mg/m <sup>3</sup> ]
Sweden	TWA (SV) OEL 8h [ppm]	5 ppm
	STEL (SV) OEL 15min [mg/m <sup>3</sup> ]	14 mg/m <sup>3</sup>
	STEL (SV) OEL 15min [ppm]	10 ppm
	Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
	Portugal	TWA (PT) OEL 8h [ppm]
Portugal	STEL (PT) OEL 15min [ppm]	5 ppm
	Regulatory reference	Norma Portuguesa NP 1796:2014
	<b>carbon monoxide (630-08-0)</b>	
OEL : Occupational Exposure Limits		
EU	TWA IOELV (EU) 8 h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA IOELV (EU) 8 h [ppm]	20 ppm



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	STEL IOELV (EU) 15 min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL IOELV (EU) 15 min [ppm]	100 ppm
	Notes	SCOEL Recommendations (1995)
Austria	TWA (AT) OEL 8h [mg/m <sup>3</sup> ]	33 mg/m <sup>3</sup>
	TWA (AT) OEL 8h [ppm]	30 ppm
	STEL (AT) OEL 15min [mg/m <sup>3</sup> ]	66 mg/m <sup>3</sup>
	STEL (AT) OEL 15min [ppm]	60 ppm
	Regulatory reference	BGBI. II Nr. 186/2015
Belgium	TWA (BE) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (BE) OEL 8h [ppm]	20 ppm
	STEL (BE) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (BE) OEL 15min [ppm]	100 ppm
	Regulatory reference	Koninklijk besluit/Arrêté royal 02/09/2018
Bulgaria	TWA (BG) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	STEL (BG) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр.73 от 4 септември 2018 г.)
Estonia	TWA (EE) OEL 8h [mg/m <sup>3</sup> ]	40 mg/m <sup>3</sup> Allmaakaevandustes 25 mg/m <sup>3</sup> heitgaasina 23 mg/m <sup>3</sup>
	TWA (EE) OEL 8h [ppm]	35 ppm Allmaakaevandustes 20 ppm heitgaasina 20 ppm
	STEL (EE) OEL 15min [mg/m <sup>3</sup> ]	120 mg/m <sup>3</sup> Allmaakaevandustes 117 mg/m <sup>3</sup>
	STEL (EE) OEL 15min [ppm]	100 ppm Allmaakaevandustes 100 ppm
	Regulatory reference	Vabariigi Valitsuse 18. septembri 2001. a määruse nr 293 (21.08.2018)
France	TWA (FR) OEL 8h [mg/m <sup>3</sup> ]	55 mg/m <sup>3</sup>
	TWA (FR) OEL 8h [ppm]	50 ppm
	Note (FR)	Valeurs recommandées/admises; substance classée toxique pour la reproduction de catégorie 1A
	Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Germany	TRGS 900 Local name	Kohlenstoffmonoxid
	Occupational exposure limit value (mg/m <sup>3</sup> )	35 mg/m <sup>3</sup>
	Occupational exposure limit value (ppm)	30 ppm
	TRGS 900 Remark	DFG;Z
	TRGS 900 Regulatory reference	TRGS900
Greece	TWA (GR) OEL 8h [mg/m <sup>3</sup> ]	55 mg/m <sup>3</sup>
	TWA (GR) OEL 8h [ppm]	50 ppm
	STEL (GR) OEL 15min [mg/m <sup>3</sup> ]	330 mg/m <sup>3</sup>
	STEL (GR) OEL 15min [ppm]	300 ppm
	Regulatory reference	Π.Δ. 90/1999
ACGIH	ACGIH TWA (ppm)	25 ppm
	Remark (ACGIH)	TLV® Basis: COHb-emia. Notations: BEI
	Regulatory reference	ACGIH 2019
Latvia	TWA (LV) OEL 8h [mg/m <sup>3</sup> ]	20 mg/m <sup>3</sup>
	TWA (LV) OEL 8h [ppm]	17 ppm
	STEL (LV) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (LV) OEL 15min [ppm]	100 ppm
	Regulatory reference	Ministru kabineta 2007.gada 15.maija noteikumiem Nr.325 (Grozījumi Ministru kabineta 2018. gada 10. jūlijā noteikumiem Nr.407)
Luxembourg	TWA (LU) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (LU) OEL 8h [ppm]	20 ppm
	STEL (LU) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (LU) OEL 15min [ppm]	100 ppm
	Regulatory reference	Mémorial A N° 684 de 2018



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Slovenia	TWA (SL) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (SL) OEL 8h [ppm]	20 ppm
	Peak exposure limitation factor (SL)	2
	Regulatory reference	Uradni list RS, št. 78/2018 z dne 4.12.2018
Spain	TWA (ES) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup> 29 mg/m <sup>3</sup> Para este agente existe un periodo transitorio, que terminará, a más tardar, el 21 de agosto de 2023, para los sectores de la minería subterránea y la construcción de túneles.
	TWA (ES) OEL 8h [ppm]	20 ppm 25 ppm Para este agente existe un periodo transitorio, que terminará, a más tardar, el 21 de agosto de 2023, para los sectores de la minería subterránea y la construcción de túneles.
	STEL (ES) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (ES) OEL 15min [ppm]	100 ppm
	NotesNotes	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), TR1A (Cuando las pruebas utilizadas para la clasificación procedan principalmente de datos en humanos), VLB® (Agente químico que tiene Valor Límite Biológico), , r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el "Reglamento (CE) n° 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos" (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido).
	Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2019. INSHT
Switzerland	STEL (CH) OEL 15min [mg/m <sup>3</sup> ]	70 mg/m <sup>3</sup>
	STEL (CH) OEL 15min [ppm]	60 ppm
	TWA (CH) OEL 8h [mg/m <sup>3</sup> ]	35 mg/m <sup>3</sup>
	TWA (CH) OEL 8h [ppm]	30 ppm
	Remark	Kritische Toxizität: COHb; Messmethoden: NIOSH; Notationen: SS <sub>B</sub> , O <sup>L</sup> , B
	Regulatory reference	www.suva.ch, 01.11.2018
Netherlands	MAC TWA 8H (NL) [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	MAC STEL 15MIN (NL) [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	Regulatory reference	Arbeidsomstandighedenregeling 2018
United Kingdom	WEL - LTEL - UK [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup> 35 mg/m <sup>3</sup> Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
	WEL - LTEL - UK [ppm]	20 ppm 30 ppm Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
	WEL - STEL - UK [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup> 232 mg/m <sup>3</sup> Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
	WEL - STEL - UK [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
Czech Republic	TWA (CZ) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (CZ) OEL 8h [ppm]	20.08 ppm
	STEL (CZ) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>



## H2S Quad with Methane LEL≤3% CO2

	STEL (CZ) OEL 15min [ppm]	102.14 ppm
	Remark (CZ)	P (u látky nelze vyloučit závažné pozdní účinky)
	Regulatory reference	Nařízení vlády č. 361/2007 Sb. (zpracovány změny č. 246/2018 Sb.)
Denmark	TWA (DK) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (DK) OEL 8h [ppm]	20 ppm
	Anmærkninger (DK)	E (betyder, at stoffet har en EF-grænseværdi)
	Regulatory reference	BEK nr 655 af 31/05/2018
Finland	TWA (FI) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (FI) OEL 8h [ppm]	20 ppm
	STEL (FI) OEL 15min [mg/m <sup>3</sup> ]	87 mg/m <sup>3</sup>
	STEL (FI) OEL 15min [ppm]	75 ppm
	Huomautus (FI)	melu
	Regulatory reference	HTP-ARVOT 2018 (Sosiaali- ja terveystieteiden ministeriö)
Hungary	TWA (HU) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup> 33 mg/m <sup>3</sup> a föld alatti bányászat és az alagútúrás terén vonatkozó határértékek
	STEL (HU) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup> 66 mg/m <sup>3</sup> a föld alatti bányászat és az alagútúrás terén vonatkozó határértékek
	Megjegyzések (HU)	EU4 (2017/164 EU irányelvben közölt érték), BHM (biológiai hatásmutató)
	Regulatory reference	25/2000. (IX. 30.) EüM–SZCSM együttes rendelet a munkahelyek kémiai biztonságáról
Iceland	Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Ireland	OEL (IE)-(8-hour reference period) [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	OEL (IE)-(8-hour reference period) [ppm]	20 ppm
	OEL (IE)-(15min reference period) [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	OEL (IE)-(15min reference period) [ppm]	100 ppm
	Notes (IE)	Repr.1A (Substances which are known human reproductive toxicants), IOELV (Indicative Occupational Exposure Limit Values)
	Regulatory reference	Code of Practice for the Chemical Agents Regulations 2018
Lithuania	TWA (LT) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (LT) OEL 8h [ppm]	20 ppm
	STEL (LT) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (LT) OEL 15min [ppm]	100 ppm
	Remark (LT)	R (reprodukcijai toksiškas poveikis); Ū (ūmus poveikis)
	Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Malta	TWA (MT) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	TWA (MT) OEL 8h [ppm]	20 ppm
	STEL (MT) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (MT) OEL 15min [ppm]	100 ppm
	Regulatory reference	S.L.424.24 (L.N.57 of 2018)
Norway	TWA (NO) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup> 29 mg/m <sup>3</sup> For bransjene gruvedrift under jord og tunnelvirksomhet
	TWA (NO) OEL 8h [ppm]	20 ppm 25 ppm For bransjene gruvedrift under jord og tunnelvirksomhet
	STEL (NO) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	STEL (NO) OEL 15min [ppm]	100 ppm



## H2S Quad with Methane LEL≤3% CO2

		tunnelvirksomhet
	Merknader (NO)	R (Kjemikalier som skal betraktes som reproduksjonstoksiske); E (EU har en veiledende grenseverdi for stoffet); S (Korttidsverdi er en verdi for gjennomsnittskonsentrasjonen av et kjemisk stoff i pustesonen til en arbeidstaker som ikke skal overskrides i en fastsatt referanseperiode. Referanseperioden er 15 minutter); 6) Enkelte bedrifter innen smelteverkindustrien vil av teknisk-økonomiske årsaker ikke kunne overholde denne korttidsverdien. Det er disse bedriftenes ansvar å dokumentere et forsvarlig arbeidsmiljø. Det skal utarbeides skriftlig instruks for arbeid i CO-atmosfære. For bransjene gruvedrift under jord og tunnelvirksomhet frem til 21.august 2023
	Regulatory reference	FOR-2018-08-21-1255
Poland	TWA (PL) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup>
	STEL (PL) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup>
	Regulatory reference	Dz. U. 2018 poz. 1286
Romania	TWA (RO) OEL 8h [mg/m <sup>3</sup> ]	20 mg/m <sup>3</sup> Exploatărilor miniere subterane și al șantierelor de săpare a tunelurilor și puțurilor 23 mg/m <sup>3</sup> (Pentru substanțe chimice în fază gazoasă sau de vapori, valoarea-limită este exprimată la 20°C și la 101,3 kPa)
	TWA (RO) OEL 8h [ppm]	17.5 ppm Exploatărilor miniere subterane și al șantierelor de săpare a tunelurilor și puțurilor 20 ppm
	STEL (RO) OEL 15min [mg/m <sup>3</sup> ]	30 mg/m <sup>3</sup> Exploatărilor miniere subterane și al șantierelor de săpare a tunelurilor și puțurilor 117 mg/m <sup>3</sup> (Pentru substanțe chimice în fază gazoasă sau de vapori, valoarea-limită este exprimată la 20°C și la 101,3 kPa)
	STEL (RO) OEL 15min [ppm]	26 ppm Exploatărilor miniere subterane și al șantierelor de săpare a tunelurilor și puțurilor 100 ppm
	Regulatory reference	Hotărârea nr. 584/2018
Slovakia	Maximum permissible exposure limit, average, 8h (SK) [mg/m <sup>3</sup> ]	35 mg/m <sup>3</sup> podzemnej ťažbe a razení tunelov 23 mg/m <sup>3</sup>
	Maximum permissible exposure limit, average, 8h (SK) [ppm]	30 ppm podzemnej ťažbe a razení tunelov 20 ppm
	Upozornenie (SK)	5) NPEL majú prechodné obdobie do 21. augusta 2023, ktoré sa týka expozície zamestnancov pri podzemnej ťažbe a razení tunelov
	Regulatory reference	Nariadenie vlády č. 33/2018 Z.z.
Sweden	TWA (SV) OEL 8h [mg/m <sup>3</sup> ]	23 mg/m <sup>3</sup> 25 mg/m <sup>3</sup> När det gäller underjord- eller tunnelarbete
	TWA (SV) OEL 8h [ppm]	20 ppm 20 ppm När det gäller underjord- eller tunnelarbete
	STEL (SV) OEL 15min [mg/m <sup>3</sup> ]	117 mg/m <sup>3</sup> 117 mg/m <sup>3</sup> När det gäller underjord- eller tunnelarbete
	STEL (SV) OEL 15min [ppm]	100 ppm 100 ppm När det gäller underjord- eller tunnelarbete
	Anmärkning (SE)	B (Ämnet kan orsaka hörselskada. Exponering för ämnet nära det befintliga yrkeshygieniska gränsvärdet och vid samtidig exponering för buller nära insatsvärdet 80 dB kan orsaka hörselskada); R (Ämnet är reproduktionsstörande. Med reproduktionsstörande ämnen avses ämnen som kan medföra skadliga effekter på fortplantningsförmågan eller avkommans utveckling); V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som



## H2S Quad with Methane LEL≤3% CO2

		inte bör överskridas)
	Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
Portugal	TWA (PT) OEL 8h [ppm]	25 ppm
	Regulatory reference	Norma Portuguesa NP 1796:2014

**methane (74-82-8)**

OEL : Occupational Exposure Limits

Belgium	TWA (BE) OEL 8h [ppm]	1000 ppm
	Regulatory reference	Koninklijk besluit/Arrêté royal 02/09/2018
Bulgaria	TWA (BG) OEL 8h [mg/m <sup>3</sup> ]	500 mg/m <sup>3</sup>
	Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр.73 от 4 септември 2018 г.)
ACGIH	Remark (ACGIH)	TLV® Basis: Simple Asphyxiant
	Regulatory reference	ACGIH 2019
Spain	TWA (ES) OEL 8h [ppm]	1000 ppm Hidrocarburos alifáticos alcanos (C1 – C4) y sus mezclas, gases (Butano; Etano; Metano; Propano)
	Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2019. INSHT
Switzerland	TWA (CH) OEL 8h [mg/m <sup>3</sup> ]	6700 mg/m <sup>3</sup>
	TWA (CH) OEL 8h [ppm]	10000 ppm
	Remark	Kritische Toxizität: Formal
	Regulatory reference	www.suva.ch, 01.11.2018
Finland	TWA (FI) OEL 8h [ppm]	1000 ppm
	Huomautus (FI)	Happea syrjäyttämällä tukahduttavat kaasut: Eräät kaasut voivat suurina pitoisuuksina vaikuttaa tukahduttavasti ilman muita merkittäviä fysiologisia vaikutuksia. Hapen puutetta voi ilmaantua työilman normaalin happipitoisuuden (noin 21 %) laskiessa alle 18 %:n. Erityisesti työtettyihin tiloihin kulkuun liittyy merkittävä tukehtumisriski ja hengenvaara. Liian alhaiselta happipitoisuudelta suojaudutaan valvomalla työilman happipitoisuutta ja tarkoituksenmukaisin teknisin järjestelyin sekä suojaimin, johon hengityskelpoista ilmaa saadaan letkuilla tai säiliöstä riippumatta ympäröivästä ilmasta. Erityisen herkkiä alhaiselle happipitoisuudelle voivat olla eräitä sydän- ja keuhkosairauksia sairastavat työntekijät. Jotkut tukahduttavista kaasuista, kuten vety ja asetyleeni, ovat erittäin helposti syttyviä jo pienemmissä pitoisuuksissa, ja myös tämän vuoksi niiden työilmapitoisuus on pidettävä alhaisena. Muita happea syrjäyttämällä tukahduttavia kaasuja ovat mm. helium, neon, argon ja jo edellä mainittu typpi.
	Regulatory reference	HTP-ARVOT 2018 (Sosiaali- ja terveysministeriö)
Ireland	OEL (IE)-(8-hour reference period) [ppm]	1000 ppm
	Notes (IE)	Asphx. (Gaseous chemical substances which may not produce significant physiological effects in the exposed employee, but when present in high concentrations will act as simple asphyxiants).
	Regulatory reference	Code of Practice for the Chemical Agents Regulations 2018
Romania	TWA (RO) OEL 8h [mg/m <sup>3</sup> ]	1200 mg/m <sup>3</sup>
	TWA (RO) OEL 8h [ppm]	1834 ppm
	STEL (RO) OEL 15min [mg/m <sup>3</sup> ]	1500 mg/m <sup>3</sup>
	STEL (RO) OEL 15min [ppm]	2292 ppm
	Regulatory reference	Hotărârea nr. 584/2018

**Nitrogen (7727-37-9)**

OEL : Occupational Exposure Limits

Belgium	Remark (BE)	A: la mention "A" signifie que l'agent libère un gaz ou une vapeur qui n'ont en eux-mêmes aucun effet physiologique mais peuvent diminuer le taux
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## H2S Quad with Methane LEL≤3% CO2

		d'oxygène dans l'air. Lorsque le taux d'oxygène descend en dessous de 17-18 % (vol/vol) le manque d'oxygène provoque des suffocations qu'aucun symptôme préalable n'annonce. # A: de vermelding "A" betekent dat dit agens gas of damp vrijgeeft dat of die op zich geen fysiologische werking heeft, maar het zuurstofgehalte in de lucht verlaagt. Wanneer het zuurstofgehalte daalt onder de 17-18 % (vol/vol), veroorzaakt het zuurstoftekort verstikking, die zich manifesteert zonder dat er een waarschuwing aan voorafgaat.
	Regulatory reference	Koninklijk besluit/Arrêté royal 02/09/2018
ACGIH	Remark (ACGIH)	TLV® Basis: Simple Asphyxiant
	Regulatory reference	ACGIH 2019
Spain	NotesNotes	b (Asfixiantes simples. Ciertos gases y vapores presentes en el aire actúan desplazando al oxígeno y disminuyendo su concentración en el aire, sin efecto toxicológico. Estas sustancias no tienen un valor límite ambiental asignado y el único factor limitador de la concentración viene dado por el oxígeno disponible en el aire, que debe ser al menos del 19,5 % de O2 equivalente a nivel del mar. Este valor proporciona una cantidad adecuada de oxígeno para la mayoría de los trabajos realizados, incluyendo un margen de seguridad).
	Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2019. INSHT
Switzerland	Regulatory reference	www.suva.ch, 01.11.2018
Ireland	Notes (IE)	Asphx. (Gaseous chemical substances which may not produce significant physiological effects in the exposed employee, but when present in high concentrations will act as simple asphyxiants).
	Regulatory reference	Code of Practice for the Chemical Agents Regulations 2018

**Carbon dioxide (124-38-9)**

## OEL : Occupational Exposure Limits

EU	TWA IOELV (EU) 8 h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA IOELV (EU) 8 h [ppm]	5000 ppm
Austria	TWA (AT) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (AT) OEL 8h [ppm]	5000 ppm
	STEL (AT) OEL 15min [mg/m <sup>3</sup> ]	18000 mg/m <sup>3</sup>
	STEL (AT) OEL 15min [ppm]	10000 ppm
	Regulatory reference	BGBI. II Nr. 186/2015
Belgium	TWA (BE) OEL 8h [mg/m <sup>3</sup> ]	9131 mg/m <sup>3</sup>
	TWA (BE) OEL 8h [ppm]	5000 ppm
	STEL (BE) OEL 15min [mg/m <sup>3</sup> ]	54784 mg/m <sup>3</sup>
	STEL (BE) OEL 15min [ppm]	30000 ppm
	Remark (BE)	A: la mention "A" signifie que l'agent libère un gaz ou une vapeur qui n'ont en eux-mêmes aucun effet physiologique mais peuvent diminuer le taux d'oxygène dans l'air. Lorsque le taux d'oxygène descend en dessous de 17-18 % (vol/vol) le manque d'oxygène provoque des suffocations qu'aucun symptôme préalable n'annonce. # A: de vermelding "A" betekent dat dit agens gas of damp vrijgeeft dat of die op zich geen fysiologische werking heeft, maar het zuurstofgehalte in de lucht verlaagt. Wanneer het zuurstofgehalte daalt onder de 17-18 % (vol/vol), veroorzaakt het zuurstoftekort verstikking, die zich manifesteert zonder dat er een waarschuwing aan voorafgaat.
	Regulatory reference	Koninklijk besluit/Arrêté royal 02/09/2018
Bulgaria	TWA (BG) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на



## H2S Quad with Methane LEL≤3% CO2

		работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр.73 от 4 септември 2018 г.)
Estonia	TWA (EE) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (EE) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Vabariigi Valitsuse 18. septembri 2001. a määruse nr 293 (RT I, 30.11.2011, 5)
France	TWA (FR) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (FR) OEL 8h [ppm]	5000 ppm
	Note (FR)	Valeurs réglementaires indicatives
	Regulatory reference	Arrêté du 30 juin 2004 modifié (réf.: INRS ED 984, 2016)
Germany	TRGS 900 Local name	Kohlenstoffdioxid
	Occupational exposure limit value (mg/m <sup>3</sup> )	9100 mg/m <sup>3</sup>
	Occupational exposure limit value (ppm)	5000 ppm
	TRGS 900 Remark	DFG;EU
	TRGS 900 Regulatory reference	TRGS900
Greece	TWA (GR) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (GR) OEL 8h [ppm]	5000 ppm
	STEL (GR) OEL 15min [mg/m <sup>3</sup> ]	54000 mg/m <sup>3</sup>
	Regulatory reference	Π.Δ. 90/1999
ACGIH	ACGIH TWA (ppm)	5000 ppm
	ACGIH STEL (ppm)	30000 ppm
	Remark (ACGIH)	TLV® Basis: Asphyxia
	Regulatory reference	ACGIH 2019
Italy	TWA (IT) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (IT) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Allegato XXXVIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.
Latvia	TWA (LV) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (LV) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Ministru kabineta 2007.gada 15.maija noteikumiem Nr.325 (Grozījumi Ministru kabineta 2011.gada 1.februārī noteikumiem Nr.92)
Luxembourg	TWA (LU) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (LU) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Mémorial A N° 684 de 2018
Slovenia	TWA (SL) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (SL) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Uradni list RS, št. 78/2018 z dne 4.12.2018
Spain	TWA (ES) OEL 8h [mg/m <sup>3</sup> ]	9150 mg/m <sup>3</sup>
	TWA (ES) OEL 8h [ppm]	5000 ppm
	NotesNotes	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
	Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2019. INSHT
Switzerland	TWA (CH) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (CH) OEL 8h [ppm]	5000 ppm
	Remark	Kritische Toxizität: Asphyxie; Messmethoden: NIOSH
	Regulatory reference	www.suva.ch, 01.11.2018
Netherlands	MAC TWA 8H (NL) [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	Regulatory reference	Arbeidsomstandighedenregeling 2018
United Kingdom	WEL - LTEL - UK [mg/m <sup>3</sup> ]	9150 mg/m <sup>3</sup>
	WEL - LTEL - UK [ppm]	5000 ppm
	WEL - STEL - UK [mg/m <sup>3</sup> ]	27400 mg/m <sup>3</sup>
	WEL - STEL - UK [ppm]	15000 ppm
	Regulatory reference	EH40/2005 (Third edition, 2018). HSE
Czech Republic	TWA (CZ) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (CZ) OEL 8h [ppm]	5000 ppm
	STEL (CZ) OEL 15min [mg/m <sup>3</sup> ]	45000 mg/m <sup>3</sup>



## H2S Quad with Methane LEL≤3% CO2

	STEL (CZ) OEL 15min [ppm]	25020 ppm
	Regulatory reference	Nařízení vlády č. 361/2007 Sb. (zpracovány změny č. 246/2018 Sb.)
Denmark	TWA (DK) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (DK) OEL 8h [ppm]	5000 ppm
	Anmærkninger (DK)	E (betyder, at stoffet har en EF-grænseværdi)
	Regulatory reference	BEK nr 655 af 31/05/2018
Finland	TWA (FI) OEL 8h [mg/m <sup>3</sup> ]	9100 mg/m <sup>3</sup>
	TWA (FI) OEL 8h [ppm]	5000 ppm
	Regulatory reference	HTP-ARVOT 2018 (Sosiaali- ja terveystieteiden tutkimuskeskus)
Hungary	TWA (HU) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	Megjegyzések (HU)	EU2 (2006/15/EK irányelvben közölt érték)
	Regulatory reference	25/2000. (IX. 30.) EüM-SZCSM együttes rendelet a munkahelyek kémiai biztonságáról
Iceland	Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Ireland	OEL (IE)-(8-hour reference period) [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	OEL (IE)-(8-hour reference period) [ppm]	5000 ppm
	OEL (IE)-(15min reference period) [mg/m <sup>3</sup> ]	27000 mg/m <sup>3</sup>
	OEL (IE)-(15min reference period) [ppm]	15000 ppm
	Notes (IE)	IOELV (Indicative Occupational Exposure Limit Values)
	Regulatory reference	Code of Practice for the Chemical Agents Regulations 2018
Lithuania	TWA (LT) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (LT) OEL 8h [ppm]	5000 ppm
	Remark (LT)	Anglies dioksidas dažnai laikomas kaip indikatorius darbo patalpose, kuriose oro teršalai susidaro dėl žmonių buvimo jose.
	Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Malta	TWA (MT) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (MT) OEL 8h [ppm]	5000 ppm
	Regulatory reference	S.L.424.24 (L.N.57 of 2018)
Norway	TWA (NO) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (NO) OEL 8h [ppm]	5000 ppm
	Merknader (NO)	E (EU har en veiledende grenseverdi for stoffet)
	Regulatory reference	FOR-2018-08-21-1255
Poland	TWA (PL) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	STEL (PL) OEL 15min [mg/m <sup>3</sup> ]	27000 mg/m <sup>3</sup>
	Regulatory reference	Dz. U. 2018 poz. 1286
Romania	TWA (RO) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (RO) OEL 8h [ppm]	5000 ppm
	Regulatory reference	Hotărârea nr. 584/2018
Slovakia	Maximum permissible exposure limit, average, 8h (SK) [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	Maximum permissible exposure limit, average, 8h (SK) [ppm]	5000 ppm
	Regulatory reference	Nariadenie vlády č. 33/2018 Z.z.
Sweden	TWA (SV) OEL 8h [mg/m <sup>3</sup> ]	9000 mg/m <sup>3</sup>
	TWA (SV) OEL 8h [ppm]	5000 ppm
	STEL (SV) OEL 15min [mg/m <sup>3</sup> ]	18000 mg/m <sup>3</sup>
	STEL (SV) OEL 15min [ppm]	10000 ppm
	Anmärkning (SE)	V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör



## H2S Quad with Methane LEL≤3% CO2

		överskridas); 34 (Koldioxid används ofta som indikatorsubstans i arbetslokaler där luftföroreningar huvudsakligen uppkommer genom de personer som vistas där)
	Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
Portugal	TWA (PT) OEL 8h [ppm]	5000 ppm
	STEL (PT) OEL 15min [ppm]	30000 ppm
	Regulatory reference	Norma Portuguesa NP 1796:2014

<b>hydrogen sulphide (7783-06-4)</b>		
DNEL: Derived no effect level (Workers)		
Acute - local effects, inhalation		14 mg/m <sup>3</sup>
Acute - systemic effects, inhalation		14 mg/m <sup>3</sup>
Long-term - local effects, inhalation		7 mg/m <sup>3</sup>
Long-term - systemic effects, inhalation		7 mg/m <sup>3</sup>

<b>carbon monoxide (630-08-0)</b>		
DNEL: Derived no effect level (Workers)		
Acute - local effects, inhalation		100 ppm
Acute - systemic effects, inhalation		117 mg/m <sup>3</sup>
Long-term - local effects, inhalation		23 ppm
Long-term - systemic effects, inhalation		23 mg/m <sup>3</sup>

<b>hydrogen sulphide (7783-06-4)</b>		
PNEC: Predicted no effect concentration		
Aqua (freshwater)		0.00005 mg/l
Aquatic, intermittent releases		0.0005 mg/l
Micro-organisms in sewage treatment plant (STP)		1.33 mg/l

**8.2. Exposure controls****8.2.1. 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.

**8.2.2. Individual protection measures, e.g. 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.

- Eye/face protection
  - : Wear safety glasses with side shields.
  - Standard EN 166 - Personal eye-protection - specifications.
- Skin protection
  - Hand protection
    - : Wear working gloves when handling gas containers.
    - Standard EN 388 - Protective gloves against mechanical risk.
  - Other
    - : Wear safety shoes while handling containers.
    - Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- 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.
  - Consult respiratory device supplier's product information for the selection of the appropriate device.
  - Gas filters do not protect against oxygen deficiency.
  - Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .
- Thermal hazards
  - : None in addition to the above sections.





## H2S Quad with Methane LEL≤3% CO2

### 8.2.3. Environmental exposure controls

: None necessary.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

#### Appearance

- Physical state at 20°C / 101.3kPa : Gas
- Colour : Mixture contains one or more component(s) which have the following colour(s):  
Colourless.

Odour : There may be no odour warning properties, odour is subjective and inadequate to warn of overexposure.

Mixture contains one or more component(s) which have the following odour:  
Rotten eggs.

Odour threshold : Odour threshold is subjective and inadequate to warn of overexposure.

pH : Not applicable for gases and gas mixtures.

Melting point / Freezing point : Not applicable for gas mixtures.

Boiling point : Not applicable for gas mixtures.

Flash point : Not applicable for gases and gas mixtures.

Evaporation rate : Not applicable for gases and gas mixtures.

Flammability (solid, gas) : Non flammable.

Explosive limits : Non flammable.

Vapour pressure [20°C] : Not applicable.

Vapour pressure [50°C] : Not applicable.

Vapour density : Not applicable.

Relative density, gas (air=1) : Lighter or similar to air.

Partition coefficient n-octanol/water (Log Kow) : Not applicable for gas mixtures.

Auto-ignition temperature : Non flammable.

Decomposition temperature : Not applicable.

Viscosity, kinematic : Viscosity, kinematic

Explosive properties : Not applicable.

Oxidising properties : Not applicable.

### 9.2. Other information

Molar mass : Not applicable for gas mixtures.

Other data : None.

## 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

: Stable under normal conditions of use.

### 10.4. Conditions to avoid

: Avoid moisture in installation systems.



## H2S Quad with Methane LEL≤3% CO2

### 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** : Classification criteria are not met.

#### hydrogen sulphide (7783-06-4)

LC50 inhalation rat (ppm)	356 ppm/4h
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#### carbon monoxide (630-08-0)

LC50 inhalation rat (ppm)	3760 ppm/1h 1300 ppm/4h
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**Skin corrosion/irritation** : No known effects from this product.

**Serious eye damage/irritation** : No known effects from this product.

**Respiratory or skin sensitisation** : No known effects from this product.

**Germ cell mutagenicity** : No known effects from this product.

**Carcinogenicity** : No known effects from this product.

**Toxic for reproduction : Fertility** : No known effects from this product.

**Toxic for reproduction : unborn child** : Classification criteria are not met.

**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.

## SECTION 12: Ecological information

### 12.1. Toxicity

Assessment : Classification criteria are not met.

EC50 48h - Daphnia magna [mg/l] : No data available.

EC50 72h - Algae [mg/l] : No data available.

LC50 96 h - Fish [mg/l] : No data available.

#### hydrogen sulphide (7783-06-4)

EC50 48h - Daphnia magna [mg/l]	0.12 mg/l
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EC50 72h - Algae [mg/l]	1.87 mg/l
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LC50 96 h - Fish [mg/l]	0.007 - 0.019
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#### carbon monoxide (630-08-0)

EC50 48h - Daphnia magna [mg/l]	Study scientifically unjustified.
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EC50 72h - Algae [mg/l]	Study scientifically unjustified.
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LC50 96 h - Fish [mg/l]	Study scientifically unjustified.
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#### methane (74-82-8)

EC50 48h - Daphnia magna [mg/l]	69.4 mg/l
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EC50 72h - Algae [mg/l]	19.4 mg/l
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LC50 96 h - Fish [mg/l]	147.5 mg/l
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### 12.2. Persistence and degradability

Assessment : No data available.

### 12.3. Bioaccumulative potential

## H2S Quad with Methane LEL≤3% CO2

Assessment : No data available.

### 12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

### 12.6. Other adverse effects

Other adverse effects : No known effects from this product.

Effect on the ozone layer : None.

Effect on global warming : Contains greenhouse gas(es).

## SECTION 13: Disposal considerations

### 13.1. 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.  
List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 05 : Gases in pressure containers other than those mentioned in 16 05 04.

### 13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations.

## SECTION 14: Transport information

### 14.1. UN number

UN-No. : 1956

### 14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : COMPRESSED GAS, N.O.S. (Oxygen ; Nitrogen MIXTURE)

Transport by air (ICAO-TI / IATA-DGR) : Compressed gas, n.o.s. (Oxygen ; Nitrogen MIXTURE)

Transport by sea (IMDG) : COMPRESSED GAS, N.O.S. (Oxygen ; Nitrogen MIXTURE)

### 14.3. Transport hazard class(es)

Labelling :



2.2 : Non-flammable, non-toxic gases.

### Transport by road/rail (ADR/RID)

Class : 2

Classification code : 1A

Hazard identification number : 20

Tunnel Restriction : E - Passage forbidden through tunnels of category E



## H2S Quad with Methane LEL≤3% CO2

### Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2

### Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2

Emergency Schedule (EmS) - Fire : F-C

Emergency Schedule (EmS) - Spillage : S-V

### 14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

### 14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

### 14.6. Special precautions for user

#### Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200.

Cargo Aircraft only : 200.

Transport by sea (IMDG) : P200

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.

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

: Not applicable.

## SECTION 15: Regulatory information

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

#### EU-Regulations

Restrictions on use : None.

Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

#### National regulations

National legislation : Ensure all national/local regulations are observed.



## H2S Quad with Methane LEL≤3% CO2

Water hazard class (WGK) : 1 - Slightly hazardous to water

### 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 N°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  
 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

Training advice : None.

Further information : Classification using data from databases maintained by the European Industrial Gases Association (EIGA). Data is maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at : <http://www.eiga.eu>.  
 Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP.

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 1A	Flammable gases, Category 1A
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.



## H2S Quad with Methane LEL≤3% CO2

H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.

### DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Details given in this document are believed to be correct at the time of going to press.

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.

**End of document**