



SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Acetylene, dissolved

Issue Date: 10.07.2013
 Last revised date: 07.04.2022

Version: 1.5

SDS No.: 000010021936
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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Acetylene, dissolved
Trade name: Gasart 300 Acetylen, Gasart 306 Acetylen für Flammenphotometrie

Additional identification

Chemical name: Acetylene
Chemical formula: C₂H₂
INDEX No. 601-015-00-0
CAS-No. 74-86-2
EC No. 200-816-9
REACH Registration No. 01-2119457406-36-0008

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

Identified uses: Industrial and professional. Perform risk assessment prior to use.
 Fuel gas for welding, cutting, heating, brazing and soldering applications. Use as a fuel Use for electronic component manufacture. Using gas alone or in mixtures for the calibration of analysis equipment. Using gas as feedstock in chemical processes. Formulation of mixtures with gas in pressure receptacles. Metal coating by spray gun. Lubrication of moulds for the manufacture of glass bottles.
 Consumer use.

Uses advised against Fuel gas for welding, cutting, heating, brazing and soldering applications. Contact supplier for more information on uses. Uses other than those listed above are not supported.

1.3 Details of the supplier of the safety data sheet

Supplier
 Linde Gas GmbH Telephone: +43 50 4273
 Carl-von-Linde-Platz 1
 A-4651 Stadl-Paura

E-mail: office@at.linde-gas.com

1.4 Emergency telephone number: Emergency number UMC0: +49 89 220 61012 (German), +44 1865 407333 (English)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.



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Physical Hazards

Flammable gas	Category 1	H220: Extremely flammable gas.
Chemically unstable gases	Category A	H230: May react explosively even in the absence of air.
Gases under pressure	Dissolved gas	H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements



Signal Word: Danger

Hazard Statement(s): H220: Extremely flammable gas.
 H230: May react explosively even in the absence of air.
 H280: Contains gas under pressure; may explode if heated.

Precautionary Statements
 General

None.

Prevention: P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response: P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 P381: In case of leakage, eliminate all ignition sources.

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

Disposal P501: Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.



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2.3 Other hazards

For safety reasons, acetylene is dissolved in a solvent, either acetone (CAS No, 67-64-1) or N,N-dimethylformamide (DMF) (CAS No. 68-12-2). A small quantity of the solvent (as an impurity) may be carried over with the acetylene as it is used. The concentration of the solvent in the gas is below the limit which could affect the classification of the acetylene.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name: Acetylene
INDEX No.: 601-015-00-0
CAS-No.: 74-86-2
EC No.: 200-816-9
REACH Registration No.: 01-2119457406-36-0008
Purity: 100%

The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.

Trade name: Gasart 300 Acetylen, Gasart 306 Acetylen für Flammenphotometrie

Chemical name	Chemical formula	Concentration	CAS-No.	REACH Registration No.	M-Factor:	Notes
Acetylene	C ₂ H ₂	100%	74-86-2	01-2119457406-36-0008	-	

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.

This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

SECTION 4: First aid measures

General:

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation:

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.



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Eye contact: Adverse effects not expected from this product.
Skin 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: Respiratory arrest.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: None.
Treatment: None.

SECTION 5: Firefighting measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Water Spray or Fog. Dry powder. Foam.
Unsuitable extinguishing media: Carbon Dioxide.

5.2 Special hazards arising from the substance or mixture:

Fire or excessive heat may produce hazardous decomposition products. When involved in a fire, acetylene can begin to decompose, breaking down into its constituent elements of hydrogen and carbon. The decomposition reaction is exothermic and produces heat. Acetylene cylinders are designed to contain and inhibit decomposition of acetylene, however, if left unchecked decomposition could lead to cylinder failure. Acetylene may continue to be a hazard after a external fire has been extinguished, due to the decomposition of the acetylene within the cylinder, and requires specific operational procedures.

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



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5.3 Advice for firefighters

Special fire fighting procedures:

In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive reignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out. Acetylene cylinders that have been heated, damaged by fire or subjected to a flash back must not be moved until it has been demonstrated that there is no decomposition of the acetylene within the cylinder. Acetylene cylinders should be cooled with a water spray and a hazard zone designated around them. Water cooling should be continued for at least one hour. After a minimum of one hour of water cooling the cylinder's temperature should be checked to see if it has been effectively cooled. Effectively cooled means bringing the cylinder shell temperature down to ambient temperature. The "Wetting test" and/or thermal imaging equipment should be used to ascertain if the cylinder shell has been effectively cooled. When effective cooling of the cylinder shell has been achieved, water cooling should be stopped. The cylinder should still not be moved for a further one hour, during this time temperature checks of the cylinder shell should be made every 15 minutes. If any increase in temperature is observed a further one hour continuous water cooling should be applied to the cylinder before its temperature is re-checked. When the cylinder shell temperature remains at ambient temperature for one hour without being water cooled, and is not leaking, the cylinder may be moved.

Special protective equipment for fire-fighters:

Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres. In case of leakage, eliminate all ignition sources. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions:

Prevent further leakage or spillage if safe to do so.



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6.3 Methods and material for containment and cleaning up: Provide adequate ventilation. Eliminate sources of ignition.

6.4 Reference to other sections: Refer to sections 8 and 13.

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7/37**SECTION 7: Handling and storage:****7.1 Precautions for safe handling:**

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place. Avoid suckback of water, acid and alkalis. Solvent may accumulate in piping systems. For maintenance use appropriately chemically resistant gloves and goggles. Only equipment fitted with suitable means of preventing a 'flash back' should be fitted to the cylinders. Mechanical shock alone to a cold acetylene cylinder cannot initiate decomposition. For further information on safe use refer to IGA "Code of Practice: Acetylene" IGC Doc 123.



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7.2 Conditions for safe storage, including any incompatibilities:

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Acetylene cylinders should be stored vertically. If a cylinder has been transported horizontally, it should be stood upright for a minimum of 1 hour prior to use. This will allow the acetone to evenly re-distribute within the cylinder and prevent acetone being carried into the flame during use causing a 'flame thrower' effect.

7.3 Specific end use(s): None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

DNEL-Values

Critical component	Type	Value	Remarks
Acetylene	Worker - inhalative, long-term - systemic	2500 ppm	-
	Worker - inhalative, short-term - systemic	2500 ppm	-

8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below lower explosion limits. Gas detectors should be used when quantities of flammable gases or vapours may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system. Only use permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges.



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Individual protection measures, such as personal protective equipment

- General information:** A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Do not eat, drink or smoke when using the product.
- Eye/face protection:** Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.
- Skin protection**
- Hand Protection:** Guideline: EN 388 Protective gloves against mechanical risks.
Additional Information: Wear working gloves while handling containers
- Body protection:** Wear fire resistant or flame retardant clothing.
Guideline: ISO/TR 2801:2007 Clothing for protection against heat and flame -- General recommendations for selection, care and use of protective clothing.
- Other:** Wear safety shoes while handling containers
Guideline: ISO 20345 Personal protective equipment - Safety footwear.
- Respiratory Protection:** When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres
Guideline: EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
- Thermal hazards:** No precautionary measures are necessary.
- Hygiene measures:** Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
- Environmental exposure controls:** For waste disposal, see section 13 of the SDS.



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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	Gas
Form:	Dissolved gas
Color:	Colorless
Odor:	Garlic-like odor
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.
pH:	Not applicable.
Melting Point:	-80,7 °C Experimental result, Key study
Boiling Point:	-84,7 °C (101,3 hPa) Experimental result, Key study
Sublimation Point:	Not applicable.
Critical Temp. (°C):	35,0 °C
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	Flammable gas
Flammability Limit - Upper (%):	99,99 %(V) Experimental result, Key study
Flammability Limit - Lower (%):	2,3 %(V)
Vapor pressure:	4.535 kPa (22 °C) Experimental result, Key study
Vapor density (air=1):	0,91 AIR=1
Relative density:	0,377 (25 °C)
Solubility(ies)	
Solubility in Water:	1.200 mg/l (25 °C)
Partition coefficient (n-octanol/water):	0,37
Autoignition Temperature:	305 °C Experimental result, Key study
Decomposition Temperature:	635 °C
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,011 mPa.s
Explosive properties:	Not applicable.
Oxidizing properties:	Not applicable.

9.2 Other information:

None.
 Molecular weight: 26,02 g/mol (C2H2)



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SECTION 10: Stability and reactivity

10.1 Reactivity:	No reactivity hazard other than the effects described in sub-section below.
10.2 Chemical Stability:	Stable under normal conditions.
10.3 Possibility of hazardous reactions:	Can form a potentially explosive atmosphere in air. May react violently with oxidants. Forms explosive acetylides with copper, silver and mercury. Do not use alloys containing more than 65% copper.
10.4 Conditions to avoid:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. High temperature High pressure May decompose violently at high temperature and/or pressure or in the presence of a catalyst.
10.5 Incompatible Materials:	Air and oxidizers. For material compatibility see latest version of ISO-11114. Avoid contact with pure copper, mercury, silver and brass with greater than 65% copper. Do not use alloys containing more than 43% silver. For further information on safe use refer to EIGA "Code of Practice: Acetylene" IGC Doc 123.
10.6 Hazardous Decomposition Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: The following decomposition products may be produced: Carbon monoxide

SECTION 11: Toxicological information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral Product	Based on available data, the classification criteria are not met.
Acute toxicity - Dermal Product	Based on available data, the classification criteria are not met.
Acute toxicity - Inhalation Product	Based on available data, the classification criteria are not met.
Skin Corrosion/Irritation Product	Based on available data, the classification criteria are not met.



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Serious Eye Damage/Eye Irritation

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

Respiratory or Skin Sensitization

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

Germ Cell Mutagenicity

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

Carcinogenicity

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

Reproductive toxicity

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

Specific Target Organ Toxicity - Single Exposure

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

Specific Target Organ Toxicity - Repeated Exposure

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

Aspiration Hazard

Product Not applicable to gases and gas mixtures..

SECTION 12: Ecological information

General information: Not applicable

12.1 Toxicity

Acute toxicity

Product No ecological damage caused by this product.

Acute toxicity - Fish

Acetylene LC 50 (Various, 96 h): 545 mg/l Remarks: QSAR QSAR, Supporting study

Acute toxicity - Aquatic Invertebrates

Acetylene EC 50 (Water flea (Daphnia magna), 48 h): 242 mg/l

Toxicity to microorganisms

Acetylene EC 50 (Alga, 72 h): 57 mg/l



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**12.2 Persistence and Degradability
Product**

Not applicable to gases and gas mixtures..

**Biodegradation
Acetylene**

50 % (3 d) Detected in water. QSAR, Supporting study

**12.3 Bioaccumulative potential
Product**

The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

**Bioconcentration Factor (BCF)
Acetylene**

Bioconcentration Factor (BCF): 3 Aquatic sediment QSAR, Supporting study

**12.4 Mobility in soil
Product**

Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5 Results of PBT and vPvB
assessment
Product**

Not classified as PBT or vPvB.

12.6 Other adverse effects:

No ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information:

Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.

Disposal methods:

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



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European Waste Codes

Container: 16 05 04*: Gases in pressure containers (including halons) containing dangerous substances.

SECTION 14: Transport information

ADR

14.1 UN Number: UN 1001
 14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
 14.3 Transport Hazard Class(es)
 Class: 2
 Label(s): 2.1
 Hazard No. (ADR): 239
 Tunnel restriction code: (B/D)
 14.4 Packing Group: -
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -

RID

14.1 UN Number: UN 1001
 14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
 14.3 Transport Hazard Class(es)
 Class: 2
 Label(s): 2.1
 14.4 Packing Group: -
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -

IMDG

14.1 UN Number: UN 1001
 14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
 14.3 Transport Hazard Class(es)
 Class: 2.1
 Label(s): 2.1
 EmS No.: F-D, S-U
 14.4 Packing Group: -
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -



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IATA

14.1 UN Number: UN 1001
 14.2 Proper Shipping Name: Acetylene, dissolved
 14.3 Transport Hazard Class(es):
 Class: 2.1
 Label(s): 2.1
 14.4 Packing Group: -
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -
 Other information
 Passenger and cargo aircraft: Forbidden.
 Cargo aircraft only: Allowed.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable

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

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
Acetylene	74-86-2	100%

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, as amended.:

Chemical	CAS-No.	Lower-tier Requirements	Upper-tier Requirements
Acetylene	74-86-2	5 t	50 t



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Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
Acetylene	74-86-2	100%

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 2016/425/EEC on personal protective equipment Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX) Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
 This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.



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Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:
 Agency for Toxic Substances and Diseases Registry (ATSDR) (<http://www.atsdr.cdc.gov/>).
 European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
 European Chemical Agency: Information on Registered Substances <http://apps.echa.europa.eu/registered/registered-sub.aspx#search>
 European Industrial Gases Association (EIGA) Doc. 169 "Classification and Labelling guide", as amended.
 International Programme on Chemical Safety (<http://www.inchem.org/>)
 ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
 Matheson Gas Data Book, 7th Edition.
 National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
 The ESIS (European chemical Substances Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).
 The European Chemical Industry Council (CEFIC) ERICards.
 United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)
 Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
 Substance specific information from suppliers.
 Details given in this document are believed to be correct at the time of publication.

Wording of the H-statements in section 2 and 3

H220	Extremely flammable gas.
H230	May react explosively even in the absence of air.
H280	Contains gas under pressure; may explode if heated.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard.

Classification according to Regulation (EC) No 1272/2008 as amended.

Flam. Gas 1, H220
 Chem. Unst. Gas A, H230
 Press. Gas Diss. Gas, H280

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



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Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.



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Annex to the extended Safety Data Sheet (eSDS)

Content

Exposure Scenario 1)	Industrial:, Using gas for metal treatment., Lubrication of moulds for the manufacture of glass bottles., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel
Exposure Scenario 2)	Consumer, Welding, soldering, gouging, brazing flame cutting
Exposure Scenario 3)	Professional:, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.

Exposure Scenario 1)

Exposure Scenario worker

1.Industrial:, Using gas for metal treatment., Lubrication of moulds for the manufacture of glass bottles., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel

List of use descriptors	
Sector(s) of use	SU9: Manufacture of fine chemicals SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU19: Building and construction work
Product categories [PC]:	PC13: Fuels PC14: Metal surface treatment products PC21: Laboratory chemicals



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	PC24: Lubricants, greases, release products PC33: Semiconductors PC38: Welding and soldering products, flux products
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Name of contributing environmental scenario and corresponding ERC	<u>Industrial use:</u> ERC2: Formulation into mixture ERC6a: Use of intermediate ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
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Contributing Scenarios	<u>Industrial use:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16: Use of fuels PROC17: Lubrication at high energy conditions in metal working operations PROC22: Manufacturing and processing of minerals and/or metals at substantially elevated temperature
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2.1. Contributing exposure scenario controlling environmental exposure for: Industrial use, Metal coating by spray gun., Lubrication of moulds for the manufacture of glass bottles., Metal carburising., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel



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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	This information is not available.
Dynamic viscosity:	0,011 mPa.s

Amounts used

Annual amount per site	The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release
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Frequency and duration of use

Batch process:	260 Emission days
Continuous process:	260 Emission days

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

Other relevant operational conditions	not relevant
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See section 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Handle substance within a closed system. Effectiveness: 98 %.
Soil	not relevant
Water	not relevant
Sediment:	not relevant



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Remarks:	not relevant
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Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	not relevant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH Chemical Safety Report

Ensure operatives are trained to minimise releases
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2.2. Contributing exposure scenario controlling worker exposure for: Industrial use, Metal coating by spray gun., Lubrication of moulds for the manufacture of glass bottles., Metal carburising., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of



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mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16: Use of fuels PROC17: Lubrication at high energy conditions in metal working operations PROC22: Manufacturing and processing of minerals and/or metals at substantially elevated temperature
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	4535 kPa
Process temperature:	Approximate 21 °C
Remarks	not relevant

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Covers daily exposures up to 8 hours		5 days per week	PROC1, PROC8b, PROC16, PROC17, PROC22

Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Other relevant operational conditions:	. See section 8 of the SDS.
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See section 8 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Local exhaust ventilation				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Use of fuels
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Lubrication at high energy conditions in metal working operations
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Manufacturing and processing of minerals and/or metals at substantially elevated temperature



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Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS. Ensure operatives are trained to minimise exposures. Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH Chemical Safety Report

See section 7 of the SDS. Handle product within a closed system. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Industrial use, Metal coating by spray gun., Lubrication of moulds for the manufacture of glass bottles., Metal carburising., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel:

ERC2, ERC6a, ERC6b, ERC8b, ERC8e:

Compartment	Predicted environmental concentration (PEC)	Risk characterisation ratio (RCR)	Method	Remarks
Air		< 1	ECETOC TRA environment v2.0	Not classified as PBT or vPvB. As no environmental



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				hazard was identified no environmental-related exposure assessment and risk characterization was performed.
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Health:

Industrial use, Metal coating by spray gun., Lubrication of moulds for the manufacture of glass bottles., Metal carburising., Use for electronic component manufacture., Using gas as feedstock in chemical processes., Transfilling in pressure receptacles, Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid., Welding, soldering, gouging, brazing flame cutting, Use as a fuel:

PROC1, PROC8b, PROC16, PROC17, PROC22:

Route of Exposure	Specific condition	Exposure level	Risk characterisation ratio (RCR)	Method	Remarks
inhalation exposure	Indoor/Outdoor use.		< 1	ECETOC TRA worker v2.0	As no toxicological hazard was identified no human-related (worker/consumer) exposure assessment and risk characterization was performed.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 2)

Exposure Scenario consumer

1.Consumer, Welding, soldering, gouging, brazing flame cutting:

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	PC38: Welding and soldering products, flux products
Name of contributing environmental scenario and corresponding ERC	<u>Consumer use:</u> ERC8b: Widespread use of reactive processing aid (no inclusion into or



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	onto article, indoor) ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
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List of names of contributing worker scenarios and corresponding PROCs	<u>Consumer use:</u> PC38: Welding and soldering products
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2.1. Contributing exposure scenario controlling environmental exposure for: Consumer use, Welding, soldering, gouging, brazing flame cutting

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity	
Kinematic viscosity	This information is not available.
Dynamic viscosity	0,011 mPa.s

Amounts used

Amount per use	Not relevant.
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Frequency and duration of use

Batch process	< 260 Emission days
Continuous process	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

Other relevant operational conditions	not relevant
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See section 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Handle substance within a closed system. Effectiveness: 98 %.
Soil	not relevant
Water	not relevant
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	not relevant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks	Wastewater emission controls are not applicable as there is no direct release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		Dispose of container via supplier only.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks



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See section 13 of the SDS		Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.
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Additional good practice advice beyond the REACH Chemical Safety Report

Do not release into the environment.

2.2. Contributing exposure scenario controlling consumer exposure for: Consumer use, Welding, soldering, gouging, brazing flame cutting

Product Categories: PC38: Welding and soldering products, flux products

Product characteristics

Concentration of the substance in a mixture: Covers percentage substance in the product up to 100 %.

Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	4535 kPa
Process temperature:	Approximate 21 °C
Remarks	not relevant
Application:	not relevant

Amounts used

Handling of product in negligible amounts

Frequency and duration of use

	Use duration (h/d):	Frequency of use:	Remarks
Exposure duration	< 8 hrs	< 5 days per week	Welding, soldering, gouging, brazing flame cutting

Human factors not influenced by risk management

This information is not available.



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Other given operational conditions affecting consumers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use				Provide adequate general and local exhaust ventilation.

Other relevant operational conditions	not relevant
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Risk management measures (RMM)

Conditions and measures related to information and behavioural advice to consumers

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				See section 8 of the SDS.

Conditions and measures related to personal protection, hygiene and health evaluation

See section 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH Chemical Safety Report

Keep away from children.

3. Exposure estimation and reference to its source

Environment:

Consumer use, Welding, soldering, gouging, brazing flame cutting:

ERC8b, ERC8e:

Compartment	Predicted environmental concentration (PEC)	Risk characterisation ratio (RCR)	Method	Remarks
Air		< 1	ECETOC TRA environment v2.0	Not classified as PBT or vPvB. As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.



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Health:

Consumer use, Welding, soldering, gouging, brazing flame cutting:

PC38:

Route of Exposure	Specific condition	Exposure level	Risk characterisation ratio (RCR)	Method	Remarks
inhalation exposure	Indoor/Outdoor use.		< 1	ECETOC TRA worker v2.0	As no toxicological hazard was identified no human-related (worker/consumer) exposure assessment and risk characterization was performed.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Observe consumer instruction/communication on safe use.

Exposure Scenario 3)

Exposure Scenario worker

1. Professional, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.

List of use descriptors

Sector(s) of use	SU15: Manufacture of fabricated metal products, except machinery and equipment SU19: Building and construction work SU24: Scientific research and development
Product categories [PC]:	PC38: Welding and soldering products, flux products PC13: Fuels PC21: Laboratory chemicals

Name of contributing environmental scenario and corresponding ERC	<u>Professional use:</u> ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
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	ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
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Contributing Scenarios	<u>Professional use:</u> PROC15: Use as laboratory reagent PROC16: Use of fuels
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2.1. Contributing exposure scenario controlling environmental exposure for: Professional use, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	This information is not available.
Dynamic viscosity:	0,011 mPa.s

Amounts used

Annual amount per site	The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release
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Frequency and duration of use

Batch process:	260 Emission days
Continuous process:	260 Emission days

Environment factors not influenced by risk management



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Other given operational conditions affecting environmental exposure

Other relevant operational conditions	not relevant
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See section 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Air	Handle substance within a closed system. Effectiveness: 98 %.
Soil	not relevant
Water	not relevant
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	not relevant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or



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		national regulations.
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Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH Chemical Safety Report

Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Professional use, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.

Process Categories:	PROC15: Use as laboratory reagent PROC16: Use of fuels
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
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Physical form of the product:	See section 9 of the SDS.
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Vapour pressure:	4535 kPa
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Process temperature:	Approximate 21 °C
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Remarks	not relevant
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Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Covers daily exposures up to 8		5 days per week	PROC15, PROC16



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hours			
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Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See section 8 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (10 to 15 air changes per hour).				Use as laboratory reagent
Local exhaust ventilation				Use as laboratory reagent
Provide a basic standard of general ventilation (1 to 3 air changes per hour).				Use of fuels

Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS. Ensure operatives are trained to minimise exposures.



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				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCS are being followed
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Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH Chemical Safety Report

See section 7 of the SDS. Handle product within a closed system. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Professional use, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.:

ERC8a, ERC8b, ERC8e:

Compartment	Predicted environmental concentration (PEC)	Risk characterisation ratio (RCR)	Method	Remarks
Air		< 1	ECETOC TRA environment v2.0	Not classified as PBT or vPvB. As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Health:

Professional use, Welding, soldering, gouging, brazing flame cutting, Use as a fuel, Fuel gas of the flame in analyzers by atomic absorption (AAS), Using gas alone or in mixtures for the calibration of analysis equipment.:

PROC15, PROC16:



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Route of Exposure	Specific condition	Exposure level	Risk characterisation ratio (RCR)	Method	Remarks
inhalation exposure	Indoor/Outdoor use.		< 1	ECETOC TRA worker v2.0	As no toxicological hazard was identified no human-related (worker/consumer) exposure assessment and risk characterization was performed.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>