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Revision Date: **03.11.2017**  
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MSDS Number: **300000000002**  
Print Date: **27.04.2018**

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

**1.1** Product identifier: Acetylene  
CAS number: 74-86-2  
Chemical formula: C<sub>2</sub>H<sub>2</sub>  
Synonyms: Acetylene (dissolved), Ethyne, welding gas  
REACH Registration no: 01-2119457406-36

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

Use of the substance/  
mixture: Manufacture of Substance - PROC 1, PROC 2, PROC 8a, PROC 8b Use as a Fuel - PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 16, PROC 19 Welding, cutting, heating, brazing and soldering applications - PROC 16 Metal coating by spray gun - PROC 16 Lubrication of moulds for manufacture of glass bottles - PROC 17 Low pressure carbonizing of steels - PROC 22 Fuel gas of the flame in analysers by atomic absorption (AAS) - PROC 3 Use for electronic component manufacture - PROC 1 Using gas alone or in mixtures for the calibration of analysis equipment - PROC 3 Using gas as feedstock in chemical processes - PROC 1

Restrictions on use: No data available

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

Address: Dixons Gas Ltd  
Newbiggin Lane  
Westerhope  
Newcastle upon Tyne  
Tyne and Wear  
NE5 1LX  
Email address: [Orders@dixonsgas.co.uk](mailto:Orders@dixonsgas.co.uk)  
Telephone: +44 (0)191 271 4888

### 1.4 Emergency telephone number

Telephone: +44 (0)191 271 4888  
Only available on weekdays during the hours of 08:00 to 17:00

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

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

## 2.2 Label elements

Hazard pictograms/  
symbols:



Signal word: Danger

Hazard statements: 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

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 :Eliminate all ignition sources if safe to do so.

Storage: P403: Store in a well-ventilated place

**2.3** Other hazards: High pressure gas.  
Can cause rapid suffocation.  
Extremely flammable.  
May form explosive mixtures in air.  
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).  
High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.  
Avoid breathing gas.  
Self contained breathing apparatus (SCBA) may be required.

Environmental effects: Not harmful

## SECTION 3: Composition/information on ingredients

### 3.1 Substances:

Components	EINECS/ELINCS number	CAS number	Concentration (volume)
Acetylene	200-816-9	74-86-2	100%

Components	Classification (CLP)	REACH reg. #
Acetylene	Flam. gas 1 ;H220 Chem. Unst. Gas A ;H230 Press. Gas (Diss.) ;H280	01-2119457406-36

Refer to Section 16 for full text of each relevant hazard statement (H)

Concentration is nominal. For the exact product composition, please refer to technical specifications. For safety reasons, the acetylene is dissolved in acetone (Flam. Liq. 2, Eye Irrit. 2, STOT SE 3) or dimethylformamide (Flam. Liq. 3, Repr. 1B, Acute Tox. 4, Eye Irrit. 2) in the gas receptacle. Vapour of the solvent is carried away as impurity when the acetylene is extracted from the gas receptacle. The concentration of the solvent vapour in the gas is lower than the concentration limits to change the classification of the acetylene. Dimethylformamide is on the Candidate List of Substances of Very High Concern (SVHC) that might be subject to authorization for future placing on the market and uses. The applicable information from the exposure scenarios for this product are contained in the main body of the SDS.

**3.2** Mixtures: Not applicable

## **SECTION 4: First aid measures**

### **4.1 Description of first aid measures**

General advice:	Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped
Eye contact:	In case of direct contact with eyes, seek medical advice.
Skin contact:	Adverse effect not expected from this product. If exposed or concerned, get medical advice/attention.
Ingestion:	Ingestion is not considered a potential route of exposure
Inhalation:	In case of shortness of breath, give oxygen. Move to fresh air. If breathing has stopped or is laboured, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Seek medical advice.

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

Symptoms:	Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.
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### **4.3 Indication of any immediate medical attention and special treatment needed**

Treatment:	If exposed or concerned, get medical attention/advice
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## **SECTION 5: Fire fighting measures**

### **5.1 Extinguishing media**

Suitable extinguishing media:	Water spray or fog. Dry powder
Extinguishing media which must not be used for safety reasons:	Halons. Do not use water jet to extinguish. Carbon Dioxide (CO2)

### **5.2 Special hazards arising from the substance or mixture:**

Incomplete combustion may form carbon monoxide. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Keep containers and surroundings cool with water spray. Extinguish fire only if gas flow can be stopped. If possible, shut off the source of gas and allow the fire to burn itself out. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until fire burns itself out. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken (e.g. total evacuation to protect persons from cylinder fragments and toxic fumes should a rupture occur).

### **5.3 Advice for fire fighters:**

In confined space use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

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## SECTION 6: Accidental release measures

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|------------|---|--|
| <b>6.1</b> | Personal precautions, protective equipment and emergency procedures:            | Evacuate personnel to safe areas. Remove all sources of ignition. Never enter a confined space or other area where the flammable gas concentration is greater than 10% of its lower flammable limit. Ventilate the area  |
| <b>6.2</b> | Environmental precautions:  | Do not discharge into any place where its accumulation could be dangerous. Should not be released into the environment. Prevent further leakage or spillage if safe to do so   |
| <b>6.3</b> | Methods and material for containment and cleaning up:<br><br>Additional advice: | Ventilate the area. Approach suspected leak areas with caution<br><br>Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs |
| <b>6.4</b> | Reference to other sections:  | For more information refer to sections 8 and 13  |
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## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Acetylene cylinders are heavier than other cylinders because they are packed with a porous filler material and acetone or dimethylformamide. Never use acetylene in excess of 15 psig pressure. Ensure adequate ventilation. Solvent may accumulate in piping systems. For maintenance activities use appropriate resistant gloves, assess the necessity to use a respiratory filter device (specify gloves and filters for DMF or acetone use), and wear safety goggles. Avoid breathing the vapour of the solvent. Provide adequate ventilation. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. 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. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact 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. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Purge air from system before introducing gas. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Ensure equipment is adequately earthed.

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## 7.2 Conditions for safe storage, including any incompatibilities

Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Smoking should be prohibited within storage areas or while handling product or containers. Display "No Smoking or Open Flames" signs in the storage areas. The amounts of flammable or toxic gases in storage should be kept to a minimum. Return empty containers in a timely manner.

### Technical measures/precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material. All electrical equipment in the storage areas should be compatible with flammable materials stored. Containers containing flammable gases should be stored away from other combustible materials. Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition.

## 7.3 Specific end use(s)

Refer to section 1 or the extended MSDS if applicable

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## SECTION 8: Exposure controls/personal protection

**8.1** Control parameters: If applicable, refer to the extended section of the MSDS for further information on CSA

### 8.2 Exposure controls

Engineering measures: Provide natural or explosion-proof ventilation that is adequate to ensure flammable gas does not reach its lower explosive limit.

#### Personal Protective Equipment

Respiratory protection: High concentrations that can cause rapid suffocation are within the flammable range and should not be entered.

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

Eye/face protection: Safety glasses recommended when handling cylinders.  
Standard EN 166 - Personal eye-protection.

Skin/body protection: Consider the use of flame resistant anti-static safety clothing.  
Standard EN ISO 14116 - Limited flame spread materials.  
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.  
Safety shoes are recommended when handling cylinders.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

Special instructions for protection and hygiene: Ensure adequate ventilation, especially in confined areas

Environmental exposure controls remarks: If applicable, refer to the extended section of the MSDS for further information on CSA.

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## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

(A/B) Physical state/colour: Dissolved gas. Colourless gas

(C) Odour: Garlic-like. Poor warning properties at low concentrations

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(D) Density:	0.0011 g/cm <sup>3</sup> (0.069 lb/ft <sup>3</sup> ) at 21 °C ( 70 °F) Note: as vapour
(E) Relative density:	Not applicable
(F) Melting point/freezing point:	-113 °F (-80.8 °C)
(G) Boiling point/range:	-120 °F (-84.7 °C)
(H) Vapour pressure:	638.14 psia (44.00 bara) at 68 °F (20 °C)
(I) Water solubility:	1.185 g/l
(J) Partition coefficient: N-octanol/water [log Kow]	0.37
(K) pH:	Not applicable for gases and gas mixtures
(L) Viscosity:	No reliable data available
(M) Particle characteristics:	Not applicable for gases and gas mixtures
(N) Upper and lower explosion/flammability limits:	100 %(V) / 2.3 %(V)
(O) Flash point:	Not applicable for gases and gas mixtures
(P) Autoignition temperature:	305 °C
(Q) Decomposition temperature:	780 °C

## 9.2 Other information

Explosive properties:	Not applicable
Oxidizing properties:	Not applicable
Molecular weight:	26 g/mol
Odour threshold:	Odour threshold is subjective and inadequate to warn of overexposure
Evaporation rate:	Not applicable for gases and gas mixtures
Flammability (solid, gas):	Refer to product classification in section 2
Specific volume:	0.9221 m <sup>3</sup> /kg (14.77 ft <sup>3</sup> /lb) at 21 °C ( 70 °F)
Upper flammability limit:	100 %(V)
Lower flammability limit:	2.3 %(V)
Relative vapour density:	0.899 (air = 1) Lighter or similar to air.

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## SECTION 10: Stability and reactivity

<b>10.1</b> Reactivity:	No reactivity hazard other than the effects described in sub-sections below
<b>10.2</b> Chemical stability:	Stable under normal conditions
<b>10.3</b> Possibility of hazardous reactions:	Unstable. Stable as shipped. Do not use at pressure above 15 psig.
<b>10.4</b> Conditions to avoid:	Cylinders should not be exposed to sudden shock or sources of heat. Heat, flames and sparks. May form explosive mixtures with air and oxidizing agents.

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- |   |  |
|---|--|
| <b>10.5</b> Incompatible materials:           | Under certain conditions, acetylene can react with copper, silver, and mercury to form acetylides, compounds which can act as ignition sources. Brasses containing less than 65% copper in the alloy and certain nickel alloys are suitable for acetylene service under normal conditions. Acetylene can react explosively when combined with oxygen and other oxidizers including all halogens and halogen compounds. The presence of moisture, certain acids, or alkaline materials tends to enhance the formation of copper acetylides. Oxygen. Oxidizing agents. |
| <b>10.6</b> Hazardous decomposition products: | Under normal conditions of storage and use, hazardous decomposition products should not be produced.   |
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## **SECTION 11: Toxicological information**

### **11.1 Information on toxicological effects**

#### **Likely routes of exposure**

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|---------------------|--|
| Effects on eye:     | In case of direct contact with eyes, seek medical advice   |
| Effects on skin:    | Adverse effects not expected from this product   |
| Inhalation effects: | May cause anaesthetic effects. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves. |
| Ingestion effects:  | Ingestion is not considered a potential route of exposure  |
| Symptoms:           | Exposure to oxygen deficient atmosphere may cause the following symptoms: Dizziness. Salivation. Nausea. Vomiting. Loss of mobility/consciousness.   |

#### **Acute toxicity**

- |                                    |  |
|------------------------------------|--|
| Acute oral toxicity:               | No data is available on the product itself |
| Acute inhalation toxicity:         | No data is available on the product itself |
| Acute dermal toxicity:             | No data is available on the product itself |
| Skin corrosion/irritation:         | No data available                          |
| Serious eye damage/<br>irritation: | No data available                          |
| Sensitisation:                     | No data available                          |

#### **Chronic toxicity or effects from long term exposures**

- |  |  |
|--|--|
| Carcinogenicity:   | No data available                          |
| Reproductive toxicity:   | No data is available on the product itself |
| Germ cell mutagenicity:  | No data is available on the product itself |
| Specific target organ<br>systemic toxicity (single<br>exposure): | No data available                          |
| Specific target organ<br>systemic toxicity (repeat<br>exposure): | No data available                          |
| Aspiration hazard:   | No data available                          |
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## SECTION 12: Ecological information

### 12.1 Toxicity

Aquatic toxicity: LC50 (96 h) : 545 mg/l Species : Fish.  
EC50 (48 h) : 242 mg/l Species : Daphnia magna.  
EC50 (72 h) : 57 mg/l Species : Algae.

Toxicity to other organisms: No data is available on the product itself

**12.2** Persistence and degradability: No data available

**12.3** Bioaccumulative potential: No data is available on the product itself

**12.4** Mobility in soil: No data available

**12.5** Results of PBT and vPvB assessment: If applicable, refer to the extended section of the MSDS for further information on CSA

**12.6** Other adverse effects: This product has no known eco-toxicological effects.

Global warming potential: No data available

Effect on the ozone layer:  
(Ozone depleting potential) No data available

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## SECTION 13: Disposal considerations

**13.1** Waste treatment methods: Contact supplier if guidance is required. Return unused product in original cylinder to supplier. 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. 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. List of hazardous waste codes: 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

**13.2** Contaminated packaging: Return cylinder to supplier

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## SECTION 14: Transport information

**ADR** UN/ID number: UN1001  
Proper shipping name: ACETYLENE, DISSOLVED  
Class or division: 2  
Tunnel code: (B/D)  
Label(s): 2.1  
ADR/RID hazard ID no: 239  
Marine pollutant: No

**IATA** UN/ID number: UN1001  
Proper shipping name: ACETYLENE, DISSOLVED  
Class or division: 2.1  
Label(s): 2.1



Marine pollutant: No

This material is forbidden from air transport in accordance with Air Products internal company safety policy

**IMDG** UN/ID number: UN1001  
Proper shipping name: ACETYLENE, DISSOLVED  
Class or division: 2.1  
Label(s): 2.1  
Marine pollutant: No  
Segregation group: None

**RID** UN/ID number: UN1001  
Proper shipping name: ACETYLENE, DISSOLVED  
Class or division: 2  
Label(s): 2.1  
Marine pollutant: No

Transport in bulk according to Annex II of Marpol and the IBC code

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. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact customer service.

## SECTION 15: Regulatory information

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

15.1	Country	Regulatory List	Notification
	USA	TSCA	Included on inventory
	EU	EINECS	Included on inventory
	Canada	DSL	Included on inventory
	Australia	AICS	Included on inventory
	Japan	ENCS	Included on inventory
	South Korea	ECL	Included on inventory
	China	SEPA	Included on inventory
	Philippines	PICCS	Included on inventory

### Other regulations

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Regulation (EC) No 1272/2008 the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

Control of Substances Hazardous to Health Regulations 2002 (as amended)

Health and Safety at Work etc. Act 1974

Management of Health and Safety at Work Regulations (Northern Ireland) 2000 c.388, and as amended

The Health and Safety at Work etc. Act 1974 (Application to Environmentally Hazardous Substances) Regulations 2002 (England and Wales and Scotland) 11 March 2002 c.282, and as amended

Health and Safety at Work Order (Application to Environmentally Hazardous Substances) Regulations (Northern Ireland) 2003 (Northern Ireland) 14 March 2003 c52, and as amended

The Control of Major Accident Hazards Regulations 2015 c483

The Control of Major Accident Hazards Regulations (Northern Ireland) 2015 c325

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2011 c1885, and as amended

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations with amendments (Northern Ireland) 2011 c365

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 c.407

The Water Environment Regulations (Northern Ireland) 2017 c.81

Pollution Prevention and Control Act 1999 c.24

The Fluorinated Greenhouse Gases Regulations 2015 c.310

The Fluorinated Greenhouse Gases Regulations (Northern Ireland) 2015 c.425

The Acetylene Safety (England and Wales and Scotland) Regulations 2014 c.1639

The Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972 c.917

The Highly Flammable Liquids and Liquefied Petroleum Gases Regulations (Northern Ireland) 1975 c.256

Dangerous Substances and Explosive Atmospheres Regulations (Northern Ireland) 2003 c.152

The Dangerous Substances and Explosive Atmospheres Regulations 2002 c.2776

Pollution Prevention and Control Act 1999

The Environmental Permitting (England and Wales) Regulations 2016

Ozone Depleting Substances Regulations 2015

**15.2** Chemical safety assessment: A CSA has been carried out. Applicable EXPOSURE SCENARIOS are available at the following link: [www.airproducts.com/esds/74-86-2](http://www.airproducts.com/esds/74-86-2)

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## **SECTION 16: Other information**

Ensure all national/local regulations are observed

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

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

### 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
ELINCS	European List of Notified Chemical Substances
CAS#	Chemical Abstract Service number
PPE	Personal Protection Equipment
Kow	Octanol-water partition coefficient
DNEL	Derived No Effect Level
LC50	Lethal Concentration to 50 % of a test population
LD50	Lethal Dose to 50% of a test population (Median Lethal Dose)
NOEC	No Observed Effect Concentration
PNEC	Predicted No Effect Concentration
RMM	Risk Management Measure
OEL	Occupational Exposure Limit
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and Very Bioaccumulative
STOT	Specific Target Organ Toxicity
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	International Maritime Dangerous Goods
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK	Water Hazard Class

### Key literature references and sources of data

ECHA Guidance on the compilation of safety data sheets  
ECHA Guidance on the application of the CLP Criteria  
ARIEL database

**Prepared by:** **Air Products and Chemicals, Inc. Global EH&S Department**

For additional information, please visit our Product Stewardship web site at  
**[Http://www.airproducts.com/productstewardship/](http://www.airproducts.com/productstewardship/)**

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws. COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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