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

1.1. Product identifier : Hydrogen sulphide

CAS No. : 7783-06-4

Chemical formula : H_2S

Synonyms : Hydrogen sulphide, Sulfuretted Hydrogen, Hydrogen Sulphide, Hydrosulfuric Acid, Sulfur Hydride, Sewer Gas

REACH Registration Number: 01-2119445737-29

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

Use of the Substance/Mixture : Industrial and professional use. Perform risk assessment prior to use.

Restrictions on Use : Not for consumer use.

1.3. Details of the supplier of the safety data sheet : Air Products Plc
2 Millennium Gate
Westmere Drive
Crewe
Cheshire

Email Address – Technical Information : GASTECH@airproducts.com

Telephone : +44(0)3457 020202

1.4. Emergency telephone number : +44(0)8085 020202
NHS Direct in England or Wales 0845 46 47 or NHS 24 in Scotland 08454 24 24 24

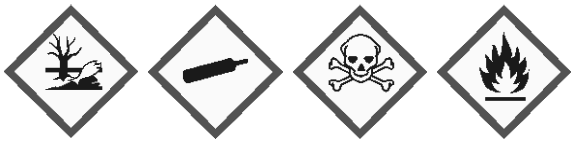
SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Flammable gases - Category 1A H220:Extremely flammable gas.
Gases under pressure - Liquefied gas. H280:Contains gas under pressure; may explode if heated.
Acute toxicity - Inhalation Category 2 H330:Fatal if inhaled.
Acute aquatic toxicity. - Category 1 H400:Very toxic to aquatic life
Specific target organ toxicity - single exposure - Category 3 H335:May cause respiratory irritation.

2.2. Label elements

Hazard pictograms/symbols



Signal Word: Danger

Hazard Statements:

H220:Extremely flammable gas.
H280:Contains gas under pressure; may explode if heated.
H330:Fatal if inhaled.
H335:May cause respiratory irritation.
H400:Very toxic to aquatic life

Precautionary Statements:

Prevention	:	P210:Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. P260:Do not breathe dust, fume, gas, mist, vapours, spray. P273:Avoid release to the environment.
Response	:	P304+P340 :IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P315 :Get immediate medical advice/attention. 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. P405:Store locked up.

2.3. Other hazards

Exposures to fatal concentrations could occur without any significant warning symptoms.
Distinctive rotten egg odor.
Olfactory fatigue may lead to loss of this warning property.
Symptoms may be delayed.
Use a back flow preventative device in the piping.
Use only with equipment purged with an inert gas or evacuated prior to discharge.
Use only with equipment of compatible materials of construction, rated for cylinder pressure.
Do not open valve until connected to equipment prepared for use.
When returning cylinder install valve outlet cap or plug leak tight.
Close valve after each use and when empty.
Extremely flammable liquefied gas.
May form explosive mixtures in air.
Vapors may spread long distances and ignite.
Immediate fire and explosion hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).
Do not breathe gas.
Direct contact with liquid can cause frostbite.
Self-contained breathing apparatus (SCBA) may be required.
Substance does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

Environmental Effects

Dangerous for the environment.

SECTION 3: Composition/information on ingredients

3.1. Substances

Components	EINECS / ELINCS Number	CAS Number	Concentration (Volume)
Hydrogen sulphide	231-977-3	7783-06-4	100 %

Components	Classification (CLP)	REACH Reg. #
Hydrogen sulphide	Flam. gas 1A ;H220 Press. Gas (Liq.) ;H280 Acute Tox. Inha 2 ;H330 Aquatic Acute 1 ;H400 Acute M = 10 Chronic M = 1	01-2119445737-29

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.

3.2. Mixtures : Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice : Prompt medical attention is required in all cases of exposure. 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 the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Keep eye wide open while rinsing.

Skin contact : Wash frost-bitten areas with plenty of water. Do not remove clothing. Cover wound with sterile dressing.

Ingestion : Ingestion is not considered a potential route of exposure.

Inhalation : Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. In case of shortness of breath, give oxygen. Consult a doctor.

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

Symptoms : Sensitivity to light. Halo-vision.

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

Treatment : Central nervous system toxicity may cause respiratory paralysis requiring

assisted ventilation. Irritation of the deep lung may cause chemical pneumonitis and pulmonary edema. If exposed or concerned: Get medical attention/advice.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Shutting off the source of the gas is the preferred method of control.
Be aware of the risk of formation of static electricity with the use of CO2 extinguishers and do not use them in places where a flammable atmosphere may be present.

Extinguishing media which must not be used for safety reasons. : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

: Gas is heavier than air and may collect in low areas or travel along the ground where there may be an ignition source present. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. If possible, shut off the source of gas and allow the fire to burn 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). Extinguish fire only if gas flow can be stopped. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out. Combustion by-products may be toxic. Do not allow run-off from firefighting to enter drains or water courses.

5.3. Advice for firefighters

: 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

: Evacuate personnel to safe areas. Remove all sources of ignition. Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits. Never enter a confined space or other area where the flammable gas concentration is greater the 10% of its lower flammable limit. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ventilate the area.

6.2. Environmental precautions

: Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment

: Ventilate the area. Approach suspected leak areas with caution.

and cleaning up

Additional advice : Large releases may require considerable downwind evacuation. If possible, stop flow of product. 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.

6.4. Reference to other sections : For more information refer to Sections 8 & 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. 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. Installation of a cross purge assembly between the cylinder and the regulator is recommended. 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). Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture. Ensure equipment is adequately earthed.

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. Full containers should be stored so that oldest stock is used first. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Local codes may have special requirements for toxic gas storage. 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 whit local regulations. Provide sufficient air exchange and/or exhaust in work rooms.

7.3. Specific end use(s)

Refer to section 1 or the extended SDS if applicable.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limit(s)

Hydrogen sulphide	Time Weighted Average (TWA):	5 ppm	7 mg/m3	UK. EH40 Workplace Exposure Limits (WELs), as amended
Hydrogen sulphide	Short Term Exposure Limit (STEL)	10 ppm	14 mg/m3	UK. EH40 Workplace Exposure Limits (WELs), as amended
Hydrogen sulphide	Time Weighted Average (TWA):	5 ppm	7 mg/m3	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended
Hydrogen sulphide	Short Term Exposure Limit (STEL)	10 ppm	14 mg/m3	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended

Hydrogen sulphide	Short Term Exposure Limit (STEL)	10 ppm	14 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
Hydrogen sulphide	Time Weighted Average (TWA):	5 ppm	7 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended

If applicable, refer to the extended section of the SDS for further information on CSA.

DNEL: Derived no effect level (Workers)

Acute - local effects, inhalation	: 14 mg/m3
Acute - systemic effects, inhalation	: 14 mg/m3
Long-term - local effects, inhalation	: 7 mg/m3
Long-term - systemic effects, inhalation	: 7 mg/m3

PNEC: predicted no effect concentration

Aqua (freshwater)	: 0.00005 mg/l
Aqua (intermittent, freshwater)	: 0.0005 mg/l
Sewage treatment plant	: 1.33 mg/l

8.2. Exposure controls

Engineering measures

Handle product only in closed system or provide appropriate exhaust ventilation at machinery.
Provide natural or mechanical ventilation to prevent accumulation above exposure limits.

Personal protective equipment

Respiratory protection : Keep self-contained breathing apparatus readily available for emergency use. Users of breathing apparatus must be trained. Use gas filters and full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Gas filters do not protect against oxygen deficiency. Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known. Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136. Consult respiratory device supplier´s product information for the selection of the appropriate device. Self-contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Hand protection : Wear work gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
Butyl rubber, chlorinated polyethylene, neoprene, nitrile, or polyvinyl rubber

gloves.

Eye/face Protection	:	Safety glasses recommended when handling cylinders. Standard EN 166 - Personal eye-protection.
Skin and body protection	:	Acid resistant gloves (e.g. butyl rubber, neoprene, polyethylene) and splash suit when connecting, disconnecting or opening cylinders. Cold temperatures may cause embrittlement of protective material resulting in breakage and exposure. Contact with cold evaporating liquid on gloves or suit may cause cryogenic burns or frostbite. 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	:	Work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. Ensure adequate ventilation, especially in confined areas. Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits.
Environmental Exposure Controls	:	If applicable, refer to the extended section of the SDS for further information on CSA.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

(a/b) Physical state/Colour	:	Liquefied gas. Colorless.
(c) Odour	:	Rotten eggs. Odor can persist.
(d) Density	:	0.0014 g/cm3 (0.087 lb/ft3) at 21 °C (70 °F) Note: (as vapor)
(e) Relative Density	:	0.92 (water = 1)
(f) Melting point / freezing point	:	-126 °F (-88 °C)
(g) Boiling point/range	:	-76 °F (-60.2 °C)
(h) Vapor pressure	:	272.66 psia (18.80 bara) at 68 °F (20 °C)
(i) Water solubility	:	3.98 g/l
(j) Partition coefficient: n-octanol/water [log Kow]	:	Not applicable for inorganic gases.
(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	:	45.5 %(V) / 3.9 %(V)
(o) Flash point	:	Not applicable for gases and gas mixtures.
(p) Autoignition temperature	:	260 °C
(q) Decomposition temperature	:	Not applicable.

9.2. Other information

Explosive properties	:	Not applicable.
Oxidizing properties	:	Not applicable.
Molecular Weight	:	34 g/mol
Odor 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	:	0.7029 m3/kg (11.26 ft3/lb) at 21 °C (70 °F)
Upper flammability limit	:	45.5 %(V)
Lower flammability limit	:	3.9 %(V)
Relative vapor density	:	1.2 (air = 1) Heavier than air.

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	:	No data available.
10.4. Conditions to avoid	:	Heat, flames and sparks.
10.5. Incompatible materials	:	Oxidizing agents. Oxygen.

10.6. Hazardous decomposition products	:	Sulphur compounds. Hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure

Effects on Eye	:	Contact with liquid may cause cold burns/frostbite.
Effects on Skin	:	Contact with liquid may cause cold burns/frostbite.
Inhalation Effects	:	Inhalation may cause central nervous system effects. May cause respiratory tract irritation. Exposure to concentrations greater than 500 ppm can result in respiratory arrest, coma, unconsciousness and death. Severe exposures which do not result in death may cause long-term symptoms such as memory loss, paralysis of facial muscles, or nerve tissue damage. May be fatal if inhaled.
Ingestion Effects	:	Ingestion is not considered a potential route of exposure.
Symptoms	:	Sensitivity to light. Halo-vision.

Acute toxicity

Acute Oral Toxicity	:	No data is available on the product itself.
Acute Inhalation Toxicity	:	LC50 (1 h) : 712 ppm Species : Rat.
Acute Dermal Toxicity	:	No data is available on the product itself.
Skin corrosion/irritation	:	No data available.
Serious eye damage/eye irritation	:	No data available.
Sensitization.	:	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 systemic toxicity (single exposure)	:	Respiratory system. Skin. Central nervous system. Neurological disorders. Acute or chronic respiratory conditions. Eye disorders. Asthma.
Specific target organ systemic	:	Rats and mice that were exposed for 90 days to Hydrogen Sulfide at a

toxicity (repeated exposure)		concentration of 80 ppm had significantly decreased body weights compared to controls. Rats exposed to 80 ppm had depressed brain weights compared to controls. The only histological finding was inflammation of the nasal mucosa. This material was not mutagenic in a bacterial assay. Acute or chronic respiratory conditions, neurological or eye disorders.
Aspiration hazard	:	No data available.

SECTION 12: Ecological information

12.1. Toxicity

Aquatic toxicity	:	LC50 (96 h) : 0.0198 mg/l Species : Fish. EC50 (48 h) : 0.12 mg/l Species : Daphnia magna. EC50 (72 h) : 1.87 mg/l Species : Algae. May cause pH changes in aqueous ecological systems.
Toxicity to other organisms	:	No data is available on the product itself.

12.2. Persistence and degradability

No data available.

12.3. Bioaccumulative potential

Refer to Section 9 "Partition Coefficient (n-octanol/water)".

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

If applicable, refer to the extended section of the SDS for further information on CSA.

12.6. Other adverse effects

Very toxic to aquatic organisms. Endangering to drinking water.

Effect on the ozone layer	:	No known effects from this product.
Ozone Depleting Potential	:	None
Effect on global warming	:	No known effects from this product.
Global Warming Potential	:	None

SECTION 13: Disposal considerations

13.1. Waste treatment methods	:	In accordance with local and national regulations. Contact supplier if guidance is required. Return unused product in original cylinder to supplier. Must not be

discharged to atmosphere. 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 hazardous substances.

Contaminated packaging : Return cylinder to supplier.

SECTION 14: Transport information

14.1. UN number

UN/ID No. : UN1053

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : HYDROGEN SULPHIDE
Transport by air (ICAO-TI / IATA-DGR) : Hydrogen sulphide
Transport by sea (IMDG) : HYDROGEN SULPHIDE

14.3. Transport hazard class(es)

Label(s) : 2.3 (2.1)

Transport by road/rail (ADR/RID)
Class or Division : 2
ADR/RID Hazard ID no. : 263
Tunnel Code : (B/D)

Transport by sea (IMDG)
Class or Division : 2.3

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)
Marine Pollutant : Yes

Transport by air (ICAO-TI / IATA-DGR)
Marine Pollutant : Yes

Transport by sea (IMDG)
Marine Pollutant : Yes
Segregation Group : None

14.6. Special precautions for user

Transport by road/rail (ADR/RID)
** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition

of toxic to the aquatic environment.

Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Transport forbidden
Cargo Aircraft only : Transport forbidden

Transport by sea (IMDG)

* NOTE: This product contains a USDOT Hazardous Substance and will meet the Reportable Quantity definition when shipped to, from, or within the United States, in the amount specified in 49CFR 172.101 Appendix A.
** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment.

Further Information

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.

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

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

Management of Health and Safety at Work Regulations 1999 (S.I. number 3242)

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 Pressure Systems Safety Regulations 2000 (S.I. number 128) link to Pressure Equipment Directive (97/23/EC)

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 not yet been carried out.

SECTION 16: Other information

Ensure all national/local regulations are observed.

Hazard Statements:
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H330 Fatal if inhaled.
H400 Very toxic to aquatic life

Indication of Method:
Flammable gases Category 1A Extremely flammable gas. Calculation method

Gases under pressure Liquefied gas. Contains gas under pressure; may explode if heated. Calculation method

Acute toxicity Category 2 Fatal if inhaled. Calculation method

Acute aquatic toxicity. Category 1 Very toxic to aquatic life Calculation method

Specific target organ toxicity - single exposure Category 3 May cause respiratory irritation. 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 for data:
ECHA - Guidance on the compilation of safety data sheets
ECHA - Guidance on the application of the CLP Criteria
ECHA - Database of registered substances https://echa.europa.eu
ARIEL database

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For additional information, please visit our web site at http://www.airproducts.com

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).

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.