World Headquarters
Hach Company
P.O.Box 389
LovelandCO USA 80539
(970) 669-3050

Date Printed 9/23/00
MSDS No: M00525

Material Safety Data Sheet

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Digestion Solution for COD 0-15000 ppm Range
Catalog Number: 2415951

Hach Europe by Dr. Bruno Lange GmbH & Co. KG
Willstätterstrasse 11
40549 Düsseldorf, Germany
49-(0)211-52880

Emergency Telephone Numbers:
(Poison Information Center Main)
(49) (6131) 19240 24 HR

MSDS Number: M00525
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Date of MSDS Preparation:
Day: 08
Month: February
Year: 1999
Additional Emergency Response Numbers: Austria: 43-1-4064343, Belgium: 32-70-245245, France: 33-1-40370404, Italy: 39-02-66101029, Netherlands: 31-30-2748888, Switzerland: 41-1-2515151

2. COMPOSITION / INFORMATION ON INGREDIENTS

Mercuric Sulfate
CAS No.: 7783-35-9
EEC Number: 2319925
Percent Range: 0,1 - 1,0
Percent Range Units: weight / weight
Ingredient EEC Symbol: T - TOXIC
Ingredient R phrase(s): R 23/24/25 R 33
TLV: 0,05 mg/m³ (Hg)
PEL: 0,1 mg/m³ (Hg)

Demineralized Water
CAS No.: 7732-18-5
EEC Number: 2317912
Percent Range: 45,0 - 55,0
Percent Range Units: weight / weight
Ingredient EEC Symbol: Not applicable
Ingredient R phrase(s): Not applicable
TLV: Not established
PEL: Not established

Chromic Acid
CAS No.: 13530-68-2
EEC Number: 2368815
Percent Range: 0,1 - 1,0
Percent Range Units: weight / weight
Ingredient EEC Symbol: T - TOXIC
Ingredient R phrase(s): R 49
TLV: 0,05 mg/m³ (Cr^{+6})
PEL: 0,5 mg/m³ (Cr^{+6})

Silver Sulfate

CAS No.: 10294-26-5
EEC Number: 2336537
Percent Range: 0,1 - 1,0
Percent Range Units: weight / weight
Ingredient EEC Symbol: Not applicable
Ingredient R phrase(s): Not applicable
TLV: 0,01 mg/m³ (Ag)
PEL: 0,01 mg/m³ (Ag)

Sulfuric Acid
CAS No.: 7664-93-9
EEC Number: 2316395
Percent Range: 45,0 - 55,0
Percent Range Units: weight / weight
Ingredient EEC Symbol: C - CORROSIVE
Ingredient R phrase(s): R 35
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Turbid, light orange liquid
Odor: None
EU Symbols: T - TOXIC C - CORROSIVE
R PHRASES: R 49: May cause cancer by inhalation. R 23/24/25: Toxic by inhalation, in contact with skin and if swallowed. R 33: Danger of cumulative effects. R 35: Causes severe burns.

HMIS:
Health: 3
Flammability: 0
Reactivity: 2
Protective Equipment: X - See protective equipment, Section 8.
Potential Health Effects:
Eye Contact (EC): Causes severe burns
Skin Contact (EC): Causes severe burns
Skin Absorption (EC): Will be absorbed through the skin. Effects similar to those of ingestion
Target Organs (SA E): Central nervous system Kidneys
Ingestion (EC): Causes: May cause: severe burns abdominal pain circulatory disturbances diarrhea loosening of the teeth nausea vomiting rapid pulse and respirations toxic nephritis (inflammation of the kidneys) shock collapse kidney damage death
Target Organs (Ing E): Central nervous system Kidneys
Inhalation: Toxic Causes: severe burns May cause: difficult breathing mouth soreness teeth erosion Effects similar to those of ingestion.
Target Organs (Inh E): Central nervous system Kidneys Lungs Teeth
Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions Allergies or sensitivity to chromates or chromic acid.
Chronic Effects: Chronic overexposure may cause destruction of any tissue contacted erosion of the teeth mouth soreness chronic irritation or inflammation of the lungs accumulation of silver in body tissues which causes a slate-gray to bluish discoloration. cancer
Cancer / Reproductive Toxicity Information:
IARC Group 1: Recognized Carcinogen
Hexavalent Chromium Compounds Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.
Additional Cancer / Reproductive Toxicity Information: Contains: an experimental teratogen.
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.
Ingestion (First Aid): Do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Call physician immediately.
Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.
Hazardous Combustion Products: This material will not burn.
Fire / Explosion Hazards: May react violently with: strong bases Contact with metals gives off hydrogen gas which is flammable
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances should respond to a spill involving chemicals. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Releases of this material may contaminate the environment. Stop spilled material from being released to the environment. Absorb spilled liquid with non-reactive sorbent material. Dike the spill to contain material for later disposal.
Clean-up Technique: Mercury and its compounds are extremely toxic! Be extremely careful not to contact the spill or breathe any vapors. Absorb spilled liquid with non-reactive sorbent material. Dispose of all mercury contaminated material at an E.P.A. hazardous waste facility. Dispose of material in an E.P.A. approved hazardous waste facility. Decontaminate area with commercially available mercury absorbing compounds.
Evacuation Procedure: Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. Deny access to unnecessary and unprotected personnel. Remain up-wind from spilled material. If conditions warrant, increase the size of the evacuation.
D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.
Storage: Protect from: light contamination by organic materials (will affect product stability) heat Store at 10 - 30°C.

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use a fume hood to avoid exposure to dust, mist or vapor. Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: chemical splash goggles
Skin Protection: disposable latex gloves lab coat
Inhalation Protection: laboratory fume hood
Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: light organic materials heat Keep away from: alkalies metals other combustible materials oxidizers reducers

TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Turbid, light orange liquid
Physical State: Liquid
Odor: None
pH: < 0,5
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: 99°C (210°F)
Melting Point: freezes at -72°C (-98°F)
Flash Point: Not applicable
Method: Not applicable
Autoignition Temperature: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Specific Gravity (water = 1): 1,550
Evaporation Rate (water = 1): Not determined
Volatile Organic Compounds Content: None
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Miscible
Acid: Not determined
Other: Not determined
Metal Corrosivity:
Steel: 0,163 in/yr (4,14 mm/yr)
Aluminum: 3,92 in/yr (99,6 mm/yr)

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Exposure to light or contamination by organic materials will affect this product's stability.
Reactivity / Incompatibility: May react violently in contact with: caustics
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: mercury compounds sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
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Ingredient Toxicological Data: Sulfuric Acid: Oral rat LD_{50} = 2140 mg/kg, Inhalation rat LC_{50} = 87 ppm/4 hr; Chromic Acid: Oral rat LD_{50} = 80 mg/kg.

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

Special Instructions (Disposal): Dispose of all mercury contaminated material at an E.P.A. hazardous waste facility. Dispose of material in an E.P.A. approved hazardous waste facility.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

I.C.A.O.:
I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S. (Sulphuric Acid/Chromic Acid Solution)
ICAO Hazard Class: 8
ICAO Subsidiary Risk: NA
ICAO ID Number: UN3264
ICAO Packing Group: II
I.M.O.:
I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S. (Sulphuric Acid/Chromic Acid Solution)
I.M.O. Hazard Class: 8
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: UN3264
I.M.O. Packing Group: II
A.D.R.:
A.D.R. Substance Identity: Corrosive Liquid, Acidic, Inorganic, N.O.S. (Sulphuric Acid/Chromic Acid Solution)
Class(es): 8
A.D.R. Subsidiary Risk: NA
A.D.R. Hazard ID Upper: 80
Substance ID Lower: 3264
Marginals: 17°(b)

15. REGULATORY INFORMATION

National Inventories:
EEC Inventory Status: All ingredients used to make this product are listed on EINECS / ELINCS.
EEC Number: Not applicable
EEC LABEL COPY:
EU Symbols: T - TOXIC C - CORROSIVE
R PHRASES: R 49: May cause cancer by inhalation. R 23/24/25: Toxic by inhalation, in contact with skin and if swallowed. R 33: Danger of cumulative effects. R 35: Causes severe burns.
S PHRASES: S 13: Keep away from food, drink and animal feeding stuffs. S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 28a: After contact with skin, wash immediately with plenty of water. S 45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
BAG T Number:
Poison Class:

16. OTHER INFORMATION

Intended Use: Determination of Chemical Oxygen Demand

• *World Headquarters*
Hach Company
P.O.Box 389
LovelandCO USA 80539
(970) 669-3050

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. Lefevre, Marc J. First Aid Manual for Chemical Accidents, 2nd Ed. New York: Van Nostrand Reinhold Company, 1989. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Verschueren, Karel. Handbook of Environmental Data on Organic Chemicals. New York: Van Nostrand Reinhold Co., 1977.

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

MATERIAL SAFETY DATA SHEET

Chemifloc Ltd

Aluminium Sulphate Liquor

Section 1 Identification	
Trade Marks and Synonyms (if any) **Liquid Alum**	Chemical Names and Synonyms **Aluminium Sulphate**
Physical Form Colourless Liquid	Molecular Formula $Al_2(SO_4)_3.50H_2O$
Responsible Person: **Chemifloc Ltd,** **Smithstown Ind. Estate,** **Shannon,** **Co. Clare.** **061–362699**	Emergency Telephone: **Chemifloc Ltd,** **061–362699**

Section 2 Information on Ingredients		
Ingredients		Classification
$Al_2(SO_4)_3$	27.5%	
H_2O	72.5%	

Section 3 Hazards Identification	
Risk of damage to eyes. Prolonged contact with skin may cause possible dermatitis	
Occupational Exposure Limit (OEL)	Not Specified

Section 4 Physical and Chemical Properties			
Appearance and Odour:	Colourless Liquid with little or no odour.		
pH 1.0–1.5	Conc: 8% as Al_2O_3		
Boiling Point (deg. C) 105	Melting Point (deg. C) N/A	Flash Point (deg. C) None	Specific Gravity 1.32 @ 15 degC.
Autoignition (deg. C) None	Flammable Limit (% by Vol. in Air) Nonflammable	Vapour Pressure (mm Hg) N/A	
Solubility in Water Totality Soluble	Solubility in other Solvents	Oxidizing Properties	

Section 5 Stability and Reactivity

Stability			Conditions to Avoid
	Unstable		
	Stable	X	

Incompatibility (Materials and Conditions to Avoid) Some oxidising agents.eg Chlorites and Hypochlorites. Attacks most metals liberating Hydrogen.

Hazardous Decomposition Products
Could emit toxic oxides of Sulphur when heated to decomposition.

Section 6 Toxicity Data

Short term effects of over exposure when:

In contact with skin: Irritant – after prolonged contact with skin produces sores and possible dermatitis.

In contact with eyes: Irritates immediately and could cause severe damage which could lead to permanent visual defects or even total loss of vision.

Inhaled:

Ingested: Very astringent to mouth, nose and throat, normally followed by rapid expectoration.

Long Term Exposure:

Section 7 First Aid Measures

Skin Contact: Remove contaminated clothing and wash affected area with copious quantities of water.

Eye Contact: Immediately irrigate with water for at least 10 minutes, seek medical attention.

Inhalation:

Ingestion: Provided patient is conscious wash out mouth with water and give 5% Sodium Bicarbonate solution followed by a demulcent such as milk.

Further Medical Advice: If in doubt seek Medical Attention.

Would any material saturated with this product be subject to spontaneous combustion ?.	YES		Materials:
	NO	X	

Fire Extinguishing Data: Water or dry powder may be used on fires in the vicinity of Aluminium Sulphate, keep containers cool with copious amounts of water.

Fire Fighting Protective Equipment: Wear full protective clothing.

Unusual Fire and Explosive Hazards:
In contact with metals, Aluminium Sulphate may liberate the flammable gas Hydrogen.

Section 9 Personal Protection

General Precautions: Eye and Skin Protection should be used when handling Aluminium Sulphate.

Ventilation Requirements:	Respiratory Protection:
None	Not normally required.
Protective Clothing: Gloves and Acid resistant footwear are essential.	Eye Protection: Goggles or full face mask.

Section 10 Handling and Storage

Handling: Avoid contact with skin and eyes.
Keep away from metals, organic materials, nitrates, chlorates and carbides.

Storage: Bulk quantities should be stored in Stainless Steel, rubber–lined mild–steel or plastic tanks.
For small packages polyethylene or double skinned polyethylene containers are acceptable.

Section 11 Spillage/Accidental Release Measures

Small Spillage: Wash away with large quantities of water.

Large Spillage: Neutralise with Lime or Soda Ash then dispose of according to Local Regulations. Water can be used if washings can go to drain

Personal Precautions: Wear full protective clothing.

Neutralising Chemicals: Hydrated Lime or Soda Ash.

Section 12 Waste Disposal

Neutralise with Lime and Landfill in accordance with Local Regulations.

Section 13 Environmental Information

Environmental Fate and Distribution:

High tonnage material produced in wholly contained systems.
High tonnage material used in partially contained systems.
The substance is soluble in water.

Persistence and Degradation

Unlikely to cause harmful effects.
Remains indefinitely in the environment as Sulphate.

Toxicity — Large discharges may contribute to the acidification of water and soil and will injure aquatic life and soil micro–organisms.

Effect on Effluent Treatment

Large discharges may contribute to the acidification of effluent treatment systems and will injure treatment organisms. The product is a primary coagulant and may cause solid settlement in treatment systems.

Section 14 Regulatory Information

EEC Classification:	Hazard Symbol:

Risk Phrases:

Safety Phrases: · Keep out of reach of children (S2)
In case of contact with eyes, rinse immediately with plenty of water and seek medical advise. (S26).

Section 15 Transport Information

UN No. NR	UN Pack. Group	ICAO/IATA Class
IMDG Class	ADR/RID Class	ADR/RID Item

Section 16 Other Information

Date of Issue:

Important Note:

1. Before any product is used the label should be carefully read and current safety literature and information consulted.
2. The product information in this Data Sheet is to the best of our knowledge correct as at date of publication. User should contact CHEMIFLOC LTD for updated advice and in any event must satisfy oneself that the product is entirely suitable for their purpose.

CHEMIFLOC LTD,
Smithstown Industrial Estate,
Shannon,
Co. Clare.
Phone:061–362699
Fax:061–363253

HOLCHEM

SAFETY DATA SHEET

SOLAR PLUS

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY

PRODUCT NAME: SOLAR PLUS

PART No.: HLS9

SUPPLIER: Holchem Laboratories Limited
Premier House
175 Grane Road, Haslingden
Rossendale. Lancashire. BB4 5ER

TEL: 01706 222288
FAX: 01706 221550

EMERGENCY TELEPHONE(S): Medical Emergencies Only: NPIS Tel. 0171 635 9191. Fax. 0171 635 1053

2 COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS No.	CONTENTS	HEALTH (class)	RISK (R No.)
ANIONIC SURFACTANT (1)		1-5 %	Xi	36/38
DISODIUM METASILICATE	6834-92-0	10-30 %	C	34, 37
SODIUM CARBONATE	497-19-8	10-30 %	Xi	36
SODIUM PERBORATE	10486-00-7	10-30 %	Xi	36
NON IONIC SURFACTANT (7)		5-10 %	Xi, N	36/38, 50

3 HAZARDS IDENTIFICATION

Causes burns.

4 FIRST AID MEASURES

INHALATION: Remove victim immediately from source of exposure. Provide rest, warmth and fresh air. If breathing stops, provide artificial respiration. Get medical attention if any discomfort continues.

INGESTION: DO NOT INDUCE VOMITING! Rinse mouth thoroughly. Immediately give a couple of glasses of water or milk, provided the victim is fully conscious. Get medical attention.

SKIN: Immediately remove contaminated clothing. Wash the skin immediately with soap and water. Get medical attention if any discomfort continues.

EYES: Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.

5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: This material is not combustible. Use extinguishing media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:
Use air respirator if substance is involved in a fire.

UNUSUAL FIRE & EXPLOSION HAZARDS:
Contact with some metals can result in the generation of hydrogen which can form explosive mixtures with air.

HAZARDOUS DECOMPOSITION PRODUCTS:
Not known.

13 DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: Dispose of in accordance with Local Authority requirements.

14 TRANSPORT INFORMATION

ROAD:

UN No: 3262

HAZARD CLASS (ADR): Class 8: Corrosive substances. **HAZCHEM CODE:** 2X

PROPER SHIPPING NAME I: CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.

PROPER SHIPPING NAME II: Sodium Metasilicate

RAIL:

SEA:

SEA TRANSPORT CLASS No: 8 **SEA PACK GR:** III

AIR:

15 REGULATORY INFORMATION

LABEL FOR SUPPLY:

CORROSIVE

RISK PHRASES:	R-34	Causes burns.
SAFETY PHRASES:	S-22	Do not breathe dust.
	S-26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S-45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
	S-24/25	Avoid contact with skin and eyes.
	S-36/37/39	Wear suitable protective clothing, gloves and eye/face protection.

16 OTHER INFORMATION

INFORMATION SOURCES: Product is registered with the National Poison Information Service (NPIS).
Tel. 0171 635 9191. Fax. 0171 635 1053. Medical Emergencies Only.

REVISION DATE: December 1999

BOC GASES

SAFETY DATA SHEET

Propane

1 IDENTIFICATION OF THE SUBSTANCE/ PREPARATION AND OF THE COMPANY

Product name	Propane
Chemical formula	C_3H_8
Company identification	see footer
Emergency phone Nos	see footer

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/ Preparation	Substance
Components/ Impurities	May contain up to 0.5% dienes, which can include 1,3 butadiene, classified: F+;R12;T;R45
CAS Nr	00074-98-6
EEC Nr (from EINECS)	2008279
Specification	Supplied to BS 4250 and contains a stenchant

3 HAZARDS IDENTIFICATION

Hazards identification	Liquefied gas under pressure Extremely flammable May contain small concentrations of 1,3 butadiene, which may cause cancer by inhalation.

4 FIRST AID MEASURES

Inhalation

Toxic by inhalation. In high concentrations may cause asphyxiation and death. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin/eye contact	For liquid spillage - flush with water for at least 15 minutes. Apply a sterile, dry dressing and seek medical advice as soon as possible.
Ingestion	Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards	Exposure to fire may cause containers to rupture/explode. Inform Fire Brigade.
Hazardous combustion products	Incomplete combustion may form carbon monoxide.
Suitable extinguishing media	All known extinguishants can be used.
Specific methods	If possible, stop flow of product. Move container away or cool with water from a protected position. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Special protective equipment for fire fighters	In confined space use self-contained breathing apparatus

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Evacuate area	Ensure adequate air ventilation. Eliminate ignition sources.
Environmental precautions	Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Clean up methods	Ventilate area.

7 HANDLING AND STORAGE

Handling and storage

Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Do not allow backfeed into the container. Cylinders sizes A,B,D,E should remain upright at all times. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact BOC Gases if in doubt. Keep away from heat and ignition sources (including static discharges). Store cylinders upright in open air. Segregate from acetylene, oxidant gases and other oxidants in store. Refer to BOC Gases container handling instructions. Keep container below 50°C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

Propane Occupational Exposure Standard (OES):

Long Term Exposure Limit (LTEL)	1000ppm
Short Term Exposure Limit (STEL)	1250ppm

1,3 butadiene has a maximum exposure limit (MEL) of 10ppm

Personal protection	Ensure adequate ventilation. Do not smoke while handling product. Keep self-contained breathing apparatus readily available for emergency use.

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular weight	44
Melting point	-188°C
Boiling point	-42.1°C
Critical temperature	97°C
Relative density, gas	1.5 (air=1)
Relative density, liquid	0.58 (water=1)
Vapour Pressure 20°C	8.3 bar
Solubility mg/l water	75 mg/l
Appearance/Colour	Colourless gas
Odour	Sweetish. Poor warning properties at low concentrations. Stenchant added.
Autoignition temperature	470°C
Flammability range	2.2-9.5 vol% in air.
Other data	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity	Can form explosive mixture with air. May react violently with oxidants.

SAFETY DATA SHEET

11 TOXICOLOGICAL INFORMATION

General	May contain small concentrations of 1,3 butadiene, which has a carcinogenic effect.

12 ECOLOGICAL INFORMATION

General	No known ecological damage caused by this product.

13 DISPOSAL CONSIDERATIONS

General

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. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. "Empty" cylinders still contain flammable vapour. Return empty cylinders to BOC Gases.

14 TRANSPORT INFORMATION

UN Nr	1978
Class/Div	2.1
ADR/RID Item Nr	2,3b
ADR/RID Hazard Nr	23
Tremcard Nr	27a
Groupcard Nr	20g11
Labelling ADR	Label 3: flammable gas
Other transport 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. Before transporting product containers ensure that they are firmly secured and: - cylinder valve is closed and not leaking - valve outlet cap nut or plug (where provided) is correctly fitted - valve protection device (where provided) is correctly fitted - adequate ventilation. - compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548	601-003-00-5.
EC Classification	F+;R12, T;R45
- Symbols	F+: Extremely flammable T: Toxic
-R Phrases	12
-S Phrases	9-16-33
Labelling of cylinders	
- Symbols	Label 3: flammable gas
- Risk phrases	R12 Extremely flammable.
- Safety phrases	S9/16/33A Keep container in well-ventilated place, away from ignition sources, including static discharge.

16 OTHER INFORMATION

Ensure all national/local regulations are observed.

Ensure operators understand the flammability hazard. Contact with liquid may cause cold burns and/or frostbite.

The hazard of asphyxiation is often overlooked and must be stressed during operator training.

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

Always leak check cylinders when first collected, delivered or used, using an approved leak detection fluid.

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.

For further safety information please refer to "Safe Under Pressure" and "Safe handling, storage and transport of industrial gas cylinders", both of which are available from your local BOC Gases outlet.

CYLINDER CHARACTERISTICS

Cylinder Size (see Note 1 & 2)	Outlet Connection (see Note 3)	Net Contents (kg)	Approx. Dimensions (see Note 4) (mm)	Approx. Weight Empty (see Note 5) (kg)
A		4.7	270x387	11
B	5/8" BSP	11.0	320x540	21
D	Female	23.2	320x910	33
D*	Left Hand	23.2	260x1370	43
E*	Cone	46.5	375x1250	61
E	Recessed	46.5	375x1250	36
F	11/4" ACME Right Hand Male	15.3	317x706	30
G	5/8" Left hand female	16.2	317x706	30

*Solid drawn shells. The remainder are all of welded construction.

NOTES

1 Not all cylinder sizes are available at all locations.

2 F&G [illegible]s are for use with fork[illegible]ks. F cylinders are liquid with[illegible]wal and G cylinders are vapour withdrawal. Cylinders A, B, D, E are vapour withdrawal.

3 For cylinders A, B, D, E this outlet connection is designed primarily to receive the gas pressure regulator. Each cylinder valve incorporates a saftey valve which operates at approximately 26 bar.

4 The height includes the valve and guard.

5 The approximate weight empty includes valve and guard. Cylinders are stamped with tare weight details.

6 Where manifolds of individual cylinders are required please consult BOC customer Engineering Services Department for details.

BOC GASES

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