

Sodiumnitrite

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: R0364

Version No: 2.4

Safety Data Sheet

Issue Date: 16/12/2019

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	Sodiumnitrite
Chemical Name	Not Applicable
Synonyms	Not Available
Proper shipping name	SODIUM NITRITE
Chemical formula	Not Applicable
Other means of identification	R0364

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

Relevant identified uses	Raw material, Intermediate, corrosion inhibitor, Surface treatment agent
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Chemicals AS
Address	Kirkeveien 578 3143 Kjoepmannskjaer Norway
Telephone	+47 33351500
Fax	Not Available
Website	www.wilhelmsenchemicals.com
Email	chemicals@wilhelmsen.com

Emergency telephone number

Sodiumnitrite

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300

Association / Organisation	Giftinformatjonssentralen 24 hour service
Emergency telephone numbers	+47 22 59 13 00
Other emergency telephone numbers	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Hazardous to the Aquatic Environment Acute Hazard Category 1, Serious Eye Damage/Eye Irritation Category 2, Acute Toxicity (Oral) Category 3, Oxidizing Solids Category 3
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Label elements

Hazard pictogram(s)	
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Signal word	Danger
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Hazard statement(s)

H400	Very toxic to aquatic life.
H319	Causes serious eye irritation.
H301	Toxic if swallowed.
H272	May intensify fire; oxidiser.

Precautionary statement(s) Prevention

P210	Keep away from heat.
P221	Take any precaution to avoid mixing with combustibles/organic material.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P330	Rinse mouth.
P370+P378	In case of fire: Use water jets to extinguish.

Precautionary statement(s) Storage

P405	Store locked up.
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Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

Sodiumnitrite

CAS No	%[weight]	Name
7632-00-0*	100	<u>sodium nitrite</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none">▶ Immediately hold eyelids apart and flush the eye continuously with running water.▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.▶ Transport to hospital or doctor without delay.▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none">▶ Immediately remove all contaminated clothing, including footwear.▶ Flush skin and hair with running water (and soap if available).▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none">▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.▶ Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none">▶ IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.▶ For advice, contact a Poisons Information Centre or a doctor.▶ Urgent hospital treatment is likely to be needed.▶ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.▶ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist.▶ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> <ul style="list-style-type: none">▶ INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. <p>NOTE: Wear a protective glove when inducing vomiting by mechanical means.</p>

Indication of any immediate medical attention and special treatment needed

Toxic myocarditis may follow ingestion of oxidizing agents such as peroxides.

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures .
- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ **DO NOT attempt neutralisation as exothermic reaction may occur.**
- ▶ Skin burns should be covered with dry, sterile bandages, following decontamination.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

FOR SMALL FIRE:

- USE FLOODING QUANTITIES OF WATER.
- **DO NOT** use dry chemical, CO₂, foam or halogenated-type extinguishers.

FOR LARGE FIRE

- Flood fire area with water from a protected position

Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> ▸ Avoid storage with reducing agents. ▸ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▸ Will not burn but increases intensity of fire. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ Heat affected containers remain hazardous. ▸ The material may provide sufficient oxygen to make the fire fierce and self sustaining. ▸ Smothering action may not be effective for established fire. ▸ Intense heat may cause spontaneous decomposition (detonation).

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▸ Clean up all spills immediately. ▸ No smoking, naked lights, ignition sources. ▸ Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
Major Spills	<ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus and protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<p>For oxidisers, including peroxides.</p> <ul style="list-style-type: none"> · Avoid personal contact and inhalation of dust, mist or vapours. · Provide adequate ventilation.
Other information	<ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed as supplied. ▸ Store in a cool, well ventilated area. <p>In addition, Goods of Class 5.1, packing group III should be stored in packages and be separated from buildings, tanks, and compounds containing other dangerous goods in tanks, and from property boundaries by a distance of at least 5 metres.</p>

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▸ DO NOT repack. Use containers supplied by manufacturer only. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p>
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Sodiumnitrite

Storage incompatibility

- ▶ Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials.
- ▶ Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents.
- ▶ Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers).
- ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.



- X — Must not be stored together
- O — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
sodium nitrite	6.4 mg/m3	71 mg/m3	240 mg/m3

Ingredient	Original IDLH	Revised IDLH
sodium nitrite	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
sodium nitrite	E	≤ 0.01 mg/m ³

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.

Personal protection



Sodiumnitrite

Eye and face protection	<ul style="list-style-type: none"> ▶ Chemical goggles. ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <ul style="list-style-type: none"> ▶ DO NOT wear cotton or cotton-backed gloves. ▶ DO NOT wear leather gloves. ▶ Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▶ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▶ Non sparking safety or conductive footwear should be considered.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	White powder		
Physical state	Divided Solid Powder	Relative density (Water = 1)	2.17
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Applicable

Continued...

Sodiumnitrite

pH (as supplied)	10	Decomposition temperature	>320
Melting point / freezing point (°C)	280	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Not Applicable
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (Not Available%)	8-9
Vapour density (Air = 1)	Not Applicable	VOC g/L	Not Applicable

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable under normal handling conditions. ▶ Prolonged exposure to heat.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p>
Ingestion	Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
Skin Contact	<p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p>

Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.	
	Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness. Lung shadows show on X-ray.	
Sodiumnitrite	TOXICITY	IRRITATION
	Not Available	Not Available
sodium nitrite	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 5.5 mg/m ³ /4H ^[2]	Eye (rabbit): 500 mg/24hr - mild
	Oral (Human)LDLo: 71 mg/kg ^[2]	
	Oral (Human)TDLo: 14 mg/kg ^[2]	
	Oral (man) TDLo: 1.71 mg/kg/70M ^[2]	
	Oral (Rat) LD50; 180 mg/kg ^[2]	
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

sodium nitrite	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. Tumorigenic - Carcinogenic by RTECS criteria.
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Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

Sodiumnitrite	Endpoint	Test Duration (hr)	Species	Value	Source
		Not Available	Not Available	Not Available	Not Available
sodium nitrite	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
	EC50	48h	Crustacea	ca.12.51mg/l	1
	NOEC(ECx)	672h	Fish	0.01mg/l	4
	LC50	96h	Fish	0.2mg/l	4
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Very toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
sodium nitrite	LOW	LOW

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Bioaccumulative potential

Ingredient	Bioaccumulation
sodium nitrite	LOW (LogKOW = 0.0564)




Mobility in soil

Ingredient	Mobility
sodium nitrite	LOW (KOC = 23.74)

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	<ul style="list-style-type: none"> ▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal. ▸ Bury residue in an authorised landfill. <p>For small quantities of oxidising agent:</p> <ul style="list-style-type: none"> ▸ Cautiously acidify a 3% solution to pH 2 with sulfuric acid. ▸ Gradually add a 50% excess of sodium bisulfite solution with stirring. ▸ Add a further 10% sodium bisulfite.
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SECTION 14 Transport information**Labels Required**

	 
Marine Pollutant	

Land transport (UN)

UN number	1500	
UN proper shipping name	SODIUM NITRITE	
Transport hazard class(es)	Class	5.1
	Subrisk	6.1
Packing group	III	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	Not Applicable
	Limited quantity	5 kg

Air transport (ICAO-IATA / DGR)

UN number	1500
UN proper shipping name	Sodium nitrite

Transport hazard class(es)	ICAO/IATA Class	5.1
	ICAO / IATA Subrisk	6.1
	ERG Code	5P
Packing group	III	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	A803
	Cargo Only Packing Instructions	563
	Cargo Only Maximum Qty / Pack	100 kg
	Passenger and Cargo Packing Instructions	559
	Passenger and Cargo Maximum Qty / Pack	25 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y546
	Passenger and Cargo Limited Maximum Qty / Pack	10 kg

Sea transport (IMDG-Code / GGVSee)

UN number	1500	
UN proper shipping name	SODIUM NITRITE	
Transport hazard class(es)	IMDG Class	5.1
	IMDG Subrisk	6.1
Packing group	III	
Environmental hazard	Marine Pollutant	
Special precautions for user	EMS Number	F-A, S-Q
	Special provisions	Not Applicable
	Limited Quantities	5 kg

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
sodium nitrite	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
sodium nitrite	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture**

sodium nitrite is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (sodium nitrite)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes

National Inventory	Status
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

Legend:
 Yes = All CAS declared ingredients are on the inventory
 No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	16/12/2019
Initial Date	13/12/2019

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

Version	Date of Update	Sections Updated
0.4	16/12/2019	Physical Properties, Name

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPA DEFOAMER

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 766540

Version No: 2.4

Safety Data Sheet

Issue Date: 25/06/2019

Print Date: 24/03/2022

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

Product Identifier

Product name	SPA DEFOAMER
Chemical Name	Not Applicable
Synonyms	766540
Chemical formula	Not Applicable
Other means of identification	766540

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

Relevant identified uses	Defoamer
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
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Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700
Association / Organisation	Dutch nat. poison centre		
Emergency telephone numbers	+ 31 30 274 88 88		
Other emergency telephone numbers	+ 31-10-4877700		

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Not Applicable
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Label elements

Hazard pictogram(s)	Not Applicable
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Signal word	Not Applicable
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Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7732-18-5*	10	<u>aqueous emulsion of: siloxane/silicone</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with water. ▶ If irritation continues, seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Continued...

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures**Extinguishing media**

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ▸ Use water delivered as a fine spray to control fire and cool adjacent area. ▸ Do not approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn.

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	<ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Control personal contact with the substance, by using protective equipment.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage**Precautions for safe handling**

Safe handling	<ul style="list-style-type: none"> ▸ Limit all unnecessary personal contact. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area.
Other information	

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▸ Polyethylene or polypropylene container. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed. None known



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available


Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
SPA DEFOAMER	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
aqueous emulsion of: siloxane/silicone	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	<p>Wear general protective gloves, eg. light weight rubber gloves.</p> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p>
Body protection	See Other protection below
Other protection	<p>No special equipment needed when handling small quantities.</p> <p>OTHERWISE:</p> <ul style="list-style-type: none"> ▶ Overalls. ▶ Barrier cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

SPA DEFOAMER

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

Continued...

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Not Available		
Physical state	Liquid	Relative density (Water = 1)	1
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	>100	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).	
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.	
SPA DEFOAMER	TOXICITY	IRRITATION
	Not Available	Not Available
aqueous emulsion of: siloxane/silicone	TOXICITY	IRRITATION
	Oral (Rat) LD50; >90000 mg/kg ^[2]	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

aqueous emulsion of: siloxane/silicone	No significant acute toxicological data identified in literature search.
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Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPA DEFOAMER	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
aqueous emulsion of: siloxane/silicone	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
aqueous emulsion of: siloxane/silicone	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material).
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SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
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Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
aqueous emulsion of: siloxane/silicone	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
aqueous emulsion of: siloxane/silicone	Not Available

SECTION 15 Regulatory information

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

aqueous emulsion of: siloxane/silicone is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (aqueous emulsion of: siloxane/silicone)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes

National Inventory	Status
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

Legend:
Yes = All CAS declared ingredients are on the inventory
No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	25/06/2019
Initial Date	13/05/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

Version	Date of Update	Sections Updated
1.4	25/06/2019	Classification, Physical Properties

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by Author!Te, from Chemwatch.

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 588947 - 782161

Version No: 2.4

Safety Data Sheet

Issue Date: 11/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 588947 - 782161
Proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Air mixture)
Chemical formula	Not Applicable
Other means of identification	588947 - 782161, 588947, 782161, 9851315

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7664-41-7	<=5.5	<u>ammonia anhydrous liquefied</u>
132259-10-0	<94	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

- SMALL FIRE:** Use extinguishing agent suitable for type of surrounding fire.
LARGE FIRE: Cool cylinder.
DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
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Storage incompatibility

Air (liquid or refrigerated):

- reacts, possibly violently with flammable materials
- may react explosively with charcoal, ether
- when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can react with combustible materials, reducing agents, combustible materials, organic substances, etc.

For nitrogen:

- Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Carbon dioxide:

- reacts violently with strong bases and alkali metals (especially their dusts)
- may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium, diethylmagnesium
- is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
ammonia anhydrous liquefied	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
ammonia anhydrous liquefied	300 ppm	Not Available
air, compressed	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
ammonia anhydrous liquefied	E	≤ 0.1 ppm

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA


Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or

Continued...

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

more.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Protective gloves eg. Leather gloves or gloves with Leather facing ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the "Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:
SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

Material	CPI
BUTYL/NEOPRENE	A
CPE	A
VITON/NEOPRENE	A
SARANEX-23	B

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	Not Available

Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	1	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.</p> <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>

Chronic	Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.	
	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.	
	Principal route of occupational exposure to the gas is by inhalation.	
	Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.	
SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
ammonia anhydrous liquefied	TOXICITY	IRRITATION
	Inhalation(Rabbit) LC50; 4.55 ppm4h ^[2]	Not Available
	Oral (Rat) LD50; 350 mg/kg ^[2]	
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

AMMONIA ANHYDROUS LIQUEFIED	No significant acute toxicological data identified in literature search.
AIR, COMPRESSED	▶ Generally not applicable.
SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR & AMMONIA ANHYDROUS LIQUEFIED	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

	Endpoint	Test Duration (hr)	Species	Value	Source
	SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR	Not Available	Not Available	Not Available	Not Available
ammonia anhydrous liquefied	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	24h	Algae or other aquatic plants	0.068mg/l	4
	LC50	96h	Fish	0.068mg/l	2
	EC50	48h	Crustacea	>92.578mg/L	4
air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) -

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ammonia anhydrous liquefied	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
ammonia anhydrous liquefied	LOW (LogKOW = 0.229)

Mobility in soil

Ingredient	Mobility
ammonia anhydrous liquefied	LOW (KOC = 14.3)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Air mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956
UN proper shipping name	Compressed gas, n.o.s. * (Ammonia in Air mixture)

Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
ammonia anhydrous liquefied	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
ammonia anhydrous liquefied	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture**

ammonia anhydrous liquefied is found on the following regulatory lists

Not Applicable

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia	No (air, compressed)

Continued...

SPANGAS AMMONIA 5.5 PCT OR LESS IN AIR

National Inventory	Status
Non-Industrial Use	
Canada - DSL	No (air, compressed)
Canada - NDSL	No (ammonia anhydrous liquefied; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p>

SECTION 16 Other information

Revision Date	11/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 625780

Version No: 2.4

Safety Data Sheet

Issue Date: 11/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 625780 - 588954
Proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	625780, 588954, 63-2758

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
---------------------------------	--

Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
----------------	---------------------------------------

Label elements

Hazard pictogram(s)	
---------------------	---

Signal word	Warning
-------------	---------

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
------	---

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
-----------	--

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7727-37-9.	<94	<u>nitrogen</u>
7664-41-7	<=5.5	<u>ammonia anhydrous liquefied</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
-------------	--

Continued...

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Continued...

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage**Precautions for safe handling**

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
ammonia anhydrous liquefied	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
nitrogen	Not Available	Not Available
ammonia anhydrous liquefied	300 ppm	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
ammonia anhydrous liquefied	E	≤ 0.1 ppm

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

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Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Other protection

- ▶ Protective overalls, closely fitted at neck and wrist.
- ▶ Eye-wash unit.
- ▶ Ensure availability of lifeline in confined spaces.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Material	CPI
BUTYL/NEOPRENE	A
CPE	A
VITON/NEOPRENE	A
SARANEX-23	B

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	1	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
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SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.</p> <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▶ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▶ respiratory system complications may include tachypnoea and dyspnoea; ▶ cardiovascular effects may include circulatory collapse and arrhythmias; ▶ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
ammonia anhydrous liquefied	TOXICITY	IRRITATION
	Inhalation(Rabbit) LC50; 4.55 ppm4h ^[2] Oral (Rat) LD50; 350 mg/kg ^[2]	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN & AMMONIA ANHYDROUS LIQUEFIED	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.
NITROGEN & AMMONIA ANHYDROUS LIQUEFIED	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

ammonia anhydrous liquefied	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	24h	Algae or other aquatic plants	0.068mg/l	4
	LC50	96h	Fish	0.068mg/l	2
	EC50	48h	Crustacea	>92.578mg/L	4

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ammonia anhydrous liquefied	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
ammonia anhydrous liquefied	LOW (LogKOW = 0.229)

Mobility in soil


Ingredient	Mobility
ammonia anhydrous liquefied	LOW (KOC = 14.3)

Continued...

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Evaporate residue at an approved site. ▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information**Labels Required**

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Ammonia in Nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ammonia in Nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	

SPANGAS AMMONIA ANHYDROUS 5.5 PCT OR LESS IN NITROGEN

Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
nitrogen	Not Available
ammonia anhydrous liquefied	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
nitrogen	Not Available
ammonia anhydrous liquefied	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture**

nitrogen is found on the following regulatory lists

Not Applicable

ammonia anhydrous liquefied is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (nitrogen; ammonia anhydrous liquefied)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	11/07/2016
Initial Date	16/06/2016

Continued...

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 588939

Version No: 2.2

Safety Data Sheet

Issue Date: 11/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTADIENE 1 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 588939
Proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in air mixture)
Chemical formula	Not Applicable
Other means of identification	588939, 63-2058

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700
Association / Organisation	Dutch nat. poison centre		
Emergency telephone numbers	+ 31 30 274 88 88		
Other emergency telephone numbers	+ 31-10-4877700		

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
------	---

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
106-99-0	<=1	<u>1,3-butadiene</u>
132259-10-0	>=99	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
-------------	--

Continued...

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

Continued...

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

react with combustible materials, reducing agents, combustible materials, organic substances, etc.

For nitrogen:

- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Carbon dioxide:

- ▶ reacts violently with strong bases and alkali metals (especially their dusts)
- ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium
- ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	1,3-butadiene	1,3-Butadiene	2 ppm / 4.4 mg/m ³	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
1,3-butadiene	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
1,3-butadiene	2,000 ppm	2,000 ppm
air, compressed	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

For 1,3-butadiene:

Odour Threshold Value: 0.45 ppm (detection), 1.1 ppm (recognition)

Exposure at or below the TLV-TWA is thought to provide significant protection for workers against systemic toxicity including cancer.


US rubber workers reached an accord in 1996 to limit exposure to 1 ppm with a 15-minute, short-term limit of 5 ppm. This TLV-TWA is currently under review in light of a report of animal carcinogenicity at 6.25 ppm.

NOTE D: Certain substances which are susceptible to spontaneous polymerisation or decomposition are generally placed on the market in a stabilised form. It is in this form that they are listed on Annex I

When they are placed on the market in a non-stabilised form, the label must state the name of the substance followed by the words "non-stabilised"

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Protective gloves eg. Leather gloves or gloves with Leather facing ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the

computer-generated selection:

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

Material	CPI
BUTYL	A
VITON	A
NEOPRENE	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AG Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AG-AUS	-	AG-PAPR-AUS / Class 1
up to 50 x ES	-	AG-AUS / Class 1	-
up to 100 x ES	-	AG-2	AG-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
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SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Principal route of occupational exposure to the gas is by inhalation. Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
1,3-butadiene	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 128826.955 ppm4h ^[2] Oral (Rat) LD50; 5480 mg/kg ^[2]	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

1,3-BUTADIENE	Hallucinations, distorted perceptions, visual field changes, conjunctive irritation, cough, general anaesthesia, respiratory depression, papillary dilation, tremors, muscle weakness For 1,3-butadiene: Metabolism of 1,3-butadiene appears to be qualitatively similar across species, although there are quantitative differences in the amounts of putatively toxic metabolites formed; mice appear to oxidise 1,3-butadiene to the monoepoxide, and subsequently the diepoxide, metabolite to a greater extent than do rats or humans. However, there may also be inter-individual variation in metabolic capability for 1,3-butadiene in humans, related to genetic polymorphism for relevant enzymes. 1,3-Butadiene is of low acute toxicity in experimental animals. However, long-term exposure to 1,3-butadiene was associated with the development of ovarian atrophy at all concentrations tested in mice. WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS . Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002]
AIR, COMPRESSED	► Generally not applicable.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

1,3-butadiene	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	11mg/l	2
	LC50	96h	Fish	43mg/l	2
	EC50	72h	Algae or other aquatic plants	33mg/l	2
	EC50	48h	Crustacea	33mg/l	2
	EC50	96h	Algae or other aquatic plants	11mg/l	2

air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
1,3-butadiene	LOW (Half-life = 56 days)	LOW (Half-life = 0.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
1,3-butadiene	LOW (BCF = 19.1)

Mobility in soil

Ingredient	Mobility
1,3-butadiene	LOW (KOC = 43.79)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in air mixture)

SPANGAS BUTADIENE 1 PCT OR LESS IN AIR

Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (butadiene in air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
1,3-butadiene	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
1,3-butadiene	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture**1,3-butadiene is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	No (air, compressed)
Canada - DSL	No (air, compressed)
Canada - NDSL	No (1,3-butadiene; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i>

SECTION 16 Other information

Revision Date	11/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 589119

Version No: 2.2

Safety Data Sheet

Issue Date: 11/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 589119
Proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	589119, 63-2732

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
-------------	---------

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
106-99-0	<=1	<u>1,3-butadiene</u>
7727-37-9.	>=99	<u>nitrogen</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Continued...

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of: , nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. ▶ DO NOT transfer gas from one cylinder to another.
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	1,3-butadiene	1,3-Butadiene	2 ppm / 4.4 mg/m ³	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
1,3-butadiene	Not Available	Not Available	Not Available
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
1,3-butadiene	2,000 ppm	2,000 ppm
nitrogen	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

For 1,3-butadiene:

Odour Threshold Value: 0.45 ppm (detection), 1.1 ppm (recognition)

Exposure at or below the TLV-TWA is thought to provide significant protection for workers against systemic toxicity including cancer.


US rubber workers reached an accord in 1996 to limit exposure to 1 ppm with a 15-minute, short-term limit of 5 ppm. This TLV-TWA is currently under review in light of a report of animal carcinogenicity at 6.25 ppm.

NOTE D: Certain substances which are susceptible to spontaneous polymerisation or decomposition are generally placed on the market in a stabilised form. It is in this form that they are listed on Annex I

When they are placed on the market in a non-stabilised form, the label must state the name of the substance followed by the words "non-stabilised"

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Recommended material(s)**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Material	CPI
BUTYL	A
VITON	A
NEOPRENE	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AG Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AG-AUS	-	AG-PAPR-AUS / Class 1
up to 50 x ES	-	AG-AUS / Class 1	-
up to 100 x ES	-	AG-2	AG-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

Continued...

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information**Information on toxicological effects**

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
1,3-butadiene	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 128826.955 ppm4h ^[2]	Not Available
	Oral (Rat) LD50; 5480 mg/kg ^[2]	
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

1,3-BUTADIENE	Hallucinations, distorted perceptions, visual field changes, conjunctive irritation, cough, general anaesthesia, respiratory
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SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

	<p>depression, papillary dilation, tremors, muscle weakness</p> <p>For 1,3-butadiene:</p> <p>Metabolism of 1,3-butadiene appears to be qualitatively similar across species, although there are quantitative differences in the amounts of putatively toxic metabolites formed; mice appear to oxidise 1,3-butadiene to the monoepoxide, and subsequently the diepoxide, metabolite to a greater extent than do rats or humans. However, there may also be inter-individual variation in metabolic capability for 1,3-butadiene in humans, related to genetic polymorphism for relevant enzymes.</p> <p>1,3-Butadiene is of low acute toxicity in experimental animals. However, long-term exposure to 1,3-butadiene was associated with the development of ovarian atrophy at all concentrations tested in mice.</p> <p>WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002]</p>
NITROGEN	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
1,3-butadiene	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	11mg/l	2
	LC50	96h	Fish	43mg/l	2
	EC50	72h	Algae or other aquatic plants	33mg/l	2
	EC50	48h	Crustacea	33mg/l	2
	EC50	96h	Algae or other aquatic plants	11mg/l	2
nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
1,3-butadiene	LOW (Half-life = 56 days)	LOW (Half-life = 0.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
1,3-butadiene	LOW (BCF = 19.1)

Mobility in soil

Ingredient	Mobility
1,3-butadiene	LOW (KOC = 43.79)

Continued...

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Evaporate residue at an approved site. ▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information**Labels Required**

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (butadiene in nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butadiene in nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN

Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
1,3-butadiene	Not Available
nitrogen	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
1,3-butadiene	Not Available
nitrogen	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****1,3-butadiene is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

nitrogen is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (1,3-butadiene; nitrogen)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	11/07/2016
Initial Date	16/06/2016

Continued...

SPANGAS BUTADIENE 1 PCT OR LESS IN NITROGEN**CONTACT POINT**

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by Author!Te, from Chemwatch.

SPANGAS BUTANE 2 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 588962- 589143 - 619957 - 756486

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTANE 2 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 588962 - 589143 - 619957 - 756486
Proper shipping name	COMPRESSED GAS, N.O.S. (butane in air mixture)
Chemical formula	Not Applicable
Other means of identification	588962- 589143 - 619957 - 756486, 588962, 589143, 619957, 63-2070, 756486

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
106-97-8.	<5	<u>butane</u>
132259-10-0	>94	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can

react with combustible materials, reducing agents, combustible materials, organic substances, etc.

For nitrogen:

- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Carbon dioxide:

- ▶ reacts violently with strong bases and alkali metals (especially their dusts)
- ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium
- ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	butane	Butane	800 ppm / 1900 mg/m ³	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
butane	Not Available	Not Available	Not Available


Ingredient	Original IDLH	Revised IDLH
butane	Not Available	1,600 ppm
air, compressed	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
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Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ Protective gloves eg. Leather gloves or gloves with Leather facing ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7

Hazardous decomposition products

See section 5

SECTION 11 Toxicological information**Information on toxicological effects**

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.</p>

SPANGAS BUTANE 2 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
butane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 658 mg/l4h ^[2]	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

AIR, COMPRESSED	▶ Generally not applicable.		
Acute Toxicity	✘	Carcinogenicity	✘
Skin Irritation/Corrosion	✘	Reproductivity	✘

Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS BUTANE 2 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2

air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
butane	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
butane	LOW (LogKOW = 2.89)

Mobility in soil

Ingredient	Mobility
butane	LOW (KOC = 43.79)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
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Marine Pollutant	NO
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Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butane in air mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (butane in air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butane in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
butane	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
butane	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information

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

butane is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (air, compressed)
Canada - DSL	No (air, compressed)
Canada - NDSL	No (butane; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#!/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 588970

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number:588970
Proper shipping name	COMPRESSED GAS, N.O.S. (butane in nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	588970, 63-2071

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
106-97-8.	<=2	<u>butane</u>
7727-37-9.	>=98	<u>nitrogen</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Continued...

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

Continued...

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	butane	Butane	800 ppm / 1900 mg/m ³	Not Available	Not Available	Not Available

Emergency Limits


Ingredient	TEEL-1	TEEL-2	TEEL-3
butane	Not Available	Not Available	Not Available
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
butane	Not Available	1,600 ppm
nitrogen	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▶ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▶ respiratory system complications may include tachypnoea and dyspnoea;
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SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

	<ul style="list-style-type: none"> ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Principal route of occupational exposure to the gas is by inhalation.

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
butane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 658 mg/l4h ^[2]	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

NITROGEN	No significant acute toxicological data identified in literature search.
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Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2
nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Continued...

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data
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DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
butane	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
butane	LOW (LogKOW = 2.89)

Mobility in soil

Ingredient	Mobility
butane	LOW (KOC = 43.79)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> ▶ Evaporate residue at an approved site. ▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butane in nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (butane in nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (butane in nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
butane	Not Available
nitrogen	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
butane	Not Available
nitrogen	Not Available

SECTION 15 Regulatory information

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

butane is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

nitrogen is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (butane; nitrogen)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)

Continued...

SPANGAS BUTANE 2 PCT OR LESS IN NITROGEN

National Inventory	Status
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

Legend:
Yes = All CAS declared ingredients are on the inventory
No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 620062

Version No: 4.6

Safety Data Sheet

Issue Date: 03/02/2017

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTANE 8% CO2 15% IN NITROGEN
Chemical Name	Not Applicable
Synonyms	620161
Proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains carbon dioxide, nitrogen and butane)
Chemical formula	Not Applicable
Other means of identification	620062, 600062, 620161, 632073

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

Relevant identified uses	Calibration and bump testing
--------------------------	------------------------------

Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS BUTANE 8% CO2 15% IN NITROGEN


Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700
Association / Organisation	Dutch nat. poison centre		
Emergency telephone numbers	+ 31 30 274 88 88		
Other emergency telephone numbers	+ 31-10-4877700		

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Flammable Gases Category 1, Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
Signal word	Danger

Hazard statement(s)

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
------	--

Precautionary statement(s) Response

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
106-97-8.	8	<u>butane</u>
124-38-9	15	<u>carbon dioxide</u>
7727-37-9.	77	<u>nitrogen</u>

SECTION 4 First aid measures

Description of first aid measures

<p>Eye Contact</p>	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
<p>Skin Contact</p>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.
<p>Inhalation</p>	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
<p>Ingestion</p>	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).

For poisons (where specific treatment regime is absent):

BASIC TREATMENT

Continued...

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 L/min.
- Monitor and treat, where necessary, for pulmonary oedema.
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.
- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>-----</p> <p>GENERAL</p> <p>-----</p> <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▸ Containers may explode when heated - Ruptured cylinders may rocket ▸ May burn but does not ignite easily. ▸ Fire exposed cylinders may vent contents through pressure relief devices thereby increasing vapour concentration.. ▸ Fire may produce irritating, poisonous or corrosive gases. <p>Decomposition may produce toxic fumes of:</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▸ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▸ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▸ Clear area of all unprotected personnel and move upwind. ▸ Alert Emergency Authority and advise them of the location and nature of hazard. ▸ Wear full body clothing with breathing apparatus. ▸ Remove leaking cylinders to a safe place. ▸ Fit vent pipes. Release pressure under safe, controlled conditions ▸ Burn issuing gas at vent pipes. ▸ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Carbon dioxide:</p> <ul style="list-style-type: none"> ▶ reacts violently with strong bases and alkali metals (especially their dusts) ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives. ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures <p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. <p>Butane/ isobutane</p> <ul style="list-style-type: none"> ▶ reacts violently with strong oxidisers ▶ reacts with acetylene, halogens and nitrous oxides ▶ is incompatible with chlorine dioxide, conc. nitric acid and some plastics ▶ may generate electrostatic charges, due to low conductivity, in flow or when agitated - these may ignite the vapour. <p>Segregate from nickel carbonyl in the presence of oxygen, heat (20-40 C)</p> <ul style="list-style-type: none"> ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Continued...

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	butane	Butane	800 ppm / 1900 mg/m3	Not Available	Not Available	Not Available
Singapore Permissible Exposure Limits of Toxic Substances	carbon dioxide	Carbon dioxide	5000 ppm / 9000 mg/m3	54,000 mg/m3 / 30,000 ppm	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
butane	Not Available	Not Available	Not Available
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
butane	Not Available	1,600 ppm
carbon dioxide	40,000 ppm	Not Available
nitrogen	Not Available	Not Available


MATERIAL DATA

For carbon dioxide:

NOTE: Detector tubes for carbon dioxide, measuring in excess of 0.01 % vol., are commercially available. Long-term measurements (4 hrs) may be conducted to detect concentrations exceeding 250 ppm.

Studies using physically fit males in confined spaces indicate the TLV-TWA and STEL provides a wide margin of safety against asphyxiation and from undue metabolic stress, provided normal amounts of oxygen are present in inhaled air.

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Colourless
Physical state	Compressed Gas
Relative density (Water = 1)	Not Available
Odour	Not Available
Partition coefficient n-octanol / water	Not Available

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

Odour threshold	Not Available	Auto-ignition temperature (°C)	760
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	8.5	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1.5	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	>1	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Carbon dioxide is an odourless gas which gives very poor warning of exposure. The gas can produce rapid unconsciousness and death from oxygen deficiency at concentrations of 10% in air. Even concentrations of 3% may produce shortness of breath and headache.</p> <p>Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p>

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

	Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic	<p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of: some evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.</p> <p>There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>Although prolonged exposure to carbon dioxide, at levels up to 1.5% in inhaled air, are well tolerated, calcium/ phosphorus metabolism may be affected. Serum levels of calcium and urinary phosphorus progressively fall. Prolonged exposure at 2% concentration, may produce deepened respiration.</p>

SPANGAS BUTANE 8% CO2 15% IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
butane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 658 mg/l4h ^[2]	Not Available
carbon dioxide	TOXICITY	IRRITATION
	Not Available	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

NITROGEN	No significant acute toxicological data identified in literature search.
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Acute Toxicity	✘	Carcinogenicity	✘
Skin Irritation/Corrosion	✘	Reproductivity	✘
Serious Eye Damage/Irritation	✘	STOT - Single Exposure	✘
Respiratory or Skin sensitisation	✘	STOT - Repeated Exposure	✘
Mutagenicity	✘	Aspiration Hazard	✘

Legend: ✘ – Data either not available or does not fill the criteria for classification
 ✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS BUTANE 8% CO2 15% IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
carbon dioxide	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	35mg/l	1

Continued...

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

For carbon dioxide:

Environmental fate:

Carbon dioxide in earth's atmosphere is considered a trace gas currently occurring at an average concentration of about 385 parts per million by volume or 582 parts per million by mass. The mass of the Earth atmosphere is 5.14×10^{18} kg, so the total mass of atmospheric carbon dioxide is 3.0×10^{15} kg (3,000 gigatonnes). Atmospheric concentrations of carbon dioxide fluctuate slightly with the change of the seasons, driven primarily by seasonal plant growth.

For butane:

log Kow: 2.89

Koc: 450-900

BCF: 1.9

Environmental Fate

Terrestrial Fate: An estimated Koc value of 900, determined from a log Kow of 2.89 indicates that n-butane is expected to have low mobility in soil. Volatilisation of n-butane from moist soil surfaces is expected to be an important fate process given an estimated Henry's Law constant of 0.95 atm-cu m/mole, derived from its vapor pressure, 1820 mm Hg and water solubility, 61.2 mg/l. The potential for volatilisation of n-butane from dry soil surfaces may exist based upon its vapor pressure.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
butane	LOW	LOW
carbon dioxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
butane	LOW (LogKOW = 2.89)
carbon dioxide	LOW (LogKOW = 0.83)


Mobility in soil

Ingredient	Mobility
butane	LOW (KOC = 43.79)
carbon dioxide	HIGH (KOC = 1.498)

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information**Labels Required**

	
Marine Pollutant	NO

Land transport (UN)

UN number	
1954	

SPANGAS BUTANE 8% CO2 15% IN NITROGEN

UN proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains carbon dioxide, nitrogen and butane)	
Transport hazard class(es)	Class	2.1
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 392
	Limited quantity	0

Air transport (ICAO-IATA / DGR)

UN number	1954	
UN proper shipping name	Compressed gas, flammable, n.o.s. * (contains carbon dioxide, nitrogen and butane)	
Transport hazard class(es)	ICAO/IATA Class	2.1
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	10L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A1 A807
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	Forbidden
	Passenger and Cargo Maximum Qty / Pack	Forbidden
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1954	
UN proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains carbon dioxide, nitrogen and butane)	
Transport hazard class(es)	IMDG Class	2.1
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-D, S-U
	Special provisions	274 392
	Limited Quantities	0

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
butane	Not Available
carbon dioxide	Not Available
nitrogen	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
butane	Not Available
carbon dioxide	Not Available

Continued...

Product name	Ship Type
nitrogen	Not Available

SECTION 15 Regulatory information

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

butane is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

carbon dioxide is found on the following regulatory lists

FEI Equine Prohibited Substances List - Controlled Medication

Singapore Permissible Exposure Limits of Toxic Substances

FEI Equine Prohibited Substances List (EPSL)

nitrogen is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (butane; carbon dioxide; nitrogen)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	03/02/2017
Initial Date	03/02/2017

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 589036 - 712133

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS BUTYLENE 1 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 589036 - 712133
Proper shipping name	COMPRESSED GAS, N.O.S. (Butylene in air mixture)
Chemical formula	Not Applicable
Other means of identification	589036 - 712133, 589036, 63-2075, 712133

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
-------------	---------

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7727-37-9.	>=99	<u>nitrogen</u>
25167-67-3	<=1	<u>1-butene</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Continued...

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>,</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR



- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
1-butene	750 ppm	2900* ppm	17000*** ppm
1-butene	750 ppm	1,100 ppm	6,600 ppm
1-butene	750 ppm	2200* ppm	13000** ppm
1-butene	750 ppm	2400* ppm	14000** ppm

Ingredient	Original IDLH	Revised IDLH
nitrogen	Not Available	Not Available
1-butene	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

Type AG Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AG-AUS / Class1	-
up to 50	1000	-	AG-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AG-2
up to 100	10000	-	AG-3
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	0.02
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
1-butene	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >10000 ppm4h ^[1]	Not Available
Legend:	<p>1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances</p>	

NITROGEN & 1-BUTENE	No significant acute toxicological data identified in literature search.
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Acute Toxicity	×	Carcinogenicity	×
Skin Irritation/Corrosion	×	Reproductivity	×
Serious Eye Damage/Irritation	×	STOT - Single Exposure	×
Respiratory or Skin sensitisation	×	STOT - Repeated Exposure	×
Mutagenicity	×	Aspiration Hazard	×

Legend: × – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR

Toxicity

SPANGAS BUTYLENE 1 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

1-butene	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	504h	Crustacea	1.349mg/l	2
	LC50	96h	Fish	32.471mg/l	2
	EC50	96h	Algae or other aquatic plants	14.882mg/l	2

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
1-butene	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
1-butene	LOW (LogKOW = 2.4)

Mobility in soil

Ingredient	Mobility
1-butene	LOW (KOC = 43.79)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (Butylene in air mixture)
Transport hazard class(es)	Class 2.2
	Subrisk Not Applicable
Packing group	Not Applicable

Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Butylene in air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Butylene in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
nitrogen	Not Available
1-butene	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
nitrogen	Not Available
1-butene	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture**

nitrogen is found on the following regulatory lists

Not Applicable

Continued...

1-butene is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (nitrogen; 1-butene)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 620104

Version No: 3.4

Safety Data Sheet

Issue Date: 11/08/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 620104
Proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Air mixture)
Chemical formula	Not Applicable
Other means of identification	620104, 63-2077

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
132259-10-0	>=96.9	<u>air, compressed</u>
124-38-9	<=2.99	<u>carbon dioxide</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

Continued...

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. ▶ Vented gas is more dense than air and may collect in pits, basements.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. ▶ DO NOT transfer gas from one cylinder to another.
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can react with combustible materials, reducing agents, combustible materials, organic substances, etc. <p>Carbon dioxide:</p>

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

- ▶ reacts violently with strong bases and alkali metals (especially their dusts)
 - ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium
 - ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
 - ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
 - ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- For nitrogen:
- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
 - ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
 - ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.
 - ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	carbon dioxide	Carbon dioxide	5000 ppm / 9000 mg/m3	54,000 mg/m3 / 30,000 ppm	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
air, compressed	Not Available	Not Available
carbon dioxide	40,000 ppm	Not Available

MATERIAL DATA

May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.

CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly.

For carbon dioxide:

NOTE: Detector tubes for carbon dioxide, measuring in excess of 0.01 % vol., are commercially available. Long-term measurements (4 hrs) may be conducted to detect concentrations exceeding 250 ppm.


Studies using physically fit males in confined spaces indicate the TLV-TWA and STEL provides a wide margin of safety against asphyxiation and from undue metabolic stress, provided normal amounts of oxygen are present in inhaled air.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to
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Continued...

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

	provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ Protective gloves eg. Leather gloves or gloves with Leather facing ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	1.01	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
Ingestion	<p>Overexposure is unlikely in this form.</p> <p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
carbon dioxide	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

AIR, COMPRESSED	‡ Generally not applicable.
------------------------	-----------------------------

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon dioxide	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	35mg/l	1
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
carbon dioxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
carbon dioxide	LOW (LogKOW = 0.83)

Mobility in soil

Ingredient	Mobility
carbon dioxide	HIGH (KOC = 1.498)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Air mixture)

SPANGAS CARBON DIOXIDE 3 PCT OR LESS IN AIR

Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Carbon Dioxide in Air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
air, compressed	Not Available
carbon dioxide	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
air, compressed	Not Available
carbon dioxide	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture**air, compressed is found on the following regulatory lists**

Not Applicable

carbon dioxide is found on the following regulatory lists

FEI Equine Prohibited Substances List - Controlled Medication

Singapore Permissible Exposure Limits of Toxic Substances

FEI Equine Prohibited Substances List (EPSL)

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (air, compressed)
Canada - DSL	No (air, compressed)
Canada - NDSL	No (air, compressed; carbon dioxide)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i>

SECTION 16 Other information

Revision Date	11/08/2021
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

Version	Date of Update	Sections Updated
2.4	11/08/2021	Acute Health (inhaled), Acute Health (swallowed), Chronic Health, Environmental, Ingredients, Synonyms

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS CARBON DIOXIDE 6 PCT OR LESS IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 592584, 589127, 619999, 659973, 905661

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS CARBON DIOXIDE 6 PCT OR LESS IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 592584, 589127, 619999, 659973, 905661
Proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	592584, 589127, 619999, 659973, 905661, 589127, 592584, 619999, 63-2543, 659973, 905661

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS CARBON DIOXIDE 6 PCT OR LESS IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7727-37-9.	>=94	<u>nitrogen</u>
124-38-9	<=6	<u>carbon dioxide</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>,</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage**Precautions for safe handling**

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Carbon dioxide:</p> <ul style="list-style-type: none"> ▶ reacts violently with strong bases and alkali metals (especially their dusts) ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium

- ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
 - ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- For nitrogen:
- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
 - ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
 - ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.
 - ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together
 0 — May be stored together with specific preventions
 + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	carbon dioxide	Carbon dioxide	5000 ppm / 9000 mg/m3	54,000 mg/m3 / 30,000 ppm	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
nitrogen	Not Available	Not Available
carbon dioxide	40,000 ppm	Not Available

MATERIAL DATA

For carbon dioxide:
 NOTE: Detector tubes for carbon dioxide, measuring in excess of 0.01 % vol., are commercially available. Long-term measurements (4 hrs) may be conducted to detect concentrations exceeding 250 ppm.
 Studies using physically fit males in confined spaces indicate the TLV-TWA and STEL provides a wide margin of safety against asphyxiation and from undue metabolic stress, provided normal amounts of oxygen are present in inhaled air.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below

Hands/feet protection	▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	0.02
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	760
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-210-760	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	~-196-760	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be</p>
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	<p>damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Carbon dioxide is an odourless gas which gives very poor warning of exposure. The gas can produce rapid unconsciousness and death from oxygen deficiency at concentrations of 10% in air. Even concentrations of 3% may produce shortness of breath and headache.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of: some evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.</p> <p>There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS CARBON DIOXIDE 6 PCT OR LESS IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
carbon dioxide	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

NITROGEN	No significant acute toxicological data identified in literature search.		
Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS CARBON DIOXIDE 6 PCT OR LESS IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

carbon dioxide	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	35mg/l	1

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

For carbon dioxide:

Environmental fate:

Carbon dioxide in earth's atmosphere is considered a trace gas currently occurring at an average concentration of about 385 parts per million by volume or 582 parts per million by mass. The mass of the Earth atmosphere is 5.14×10^{18} kg, so the total mass of atmospheric carbon dioxide is 3.0×10^{15} kg (3,000 gigatonnes). Atmospheric concentrations of carbon dioxide fluctuate slightly with the change of the seasons, driven primarily by seasonal plant growth.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
carbon dioxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
carbon dioxide	LOW (LogKOW = 0.83)

Mobility in soil

Ingredient	Mobility
carbon dioxide	HIGH (KOC = 1.498)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Nitrogen mixture)

Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Carbon Dioxide in Nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon Dioxide in Nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
nitrogen	Not Available
carbon dioxide	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
nitrogen	Not Available
carbon dioxide	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture**nitrogen is found on the following regulatory lists**

Not Applicable

carbon dioxide is found on the following regulatory lists

FEI Equine Prohibited Substances List - Controlled Medication

Singapore Permissible Exposure Limits of Toxic Substances

FEI Equine Prohibited Substances List (EPSL)

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (nitrogen; carbon dioxide)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 620189 - 635367

Version No: 2.3

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 620189 - 635367
Proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	620189 - 635367, 620189, 63-2759, 635367

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7727-37-9.	>=94	<u>nitrogen</u>
630-08-0	<=6	<u>carbon monoxide</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For carbon monoxide intoxications:

- ▶ Administer pure oxygen by the best means possible. An oro-nasal mask is usually best. Artificial respiration is necessary wherever breathing is inadequate. Apnoeic patients have often been saved by persistent and efficient artificial ventilation. A patent airway must be carefully maintained. Patients with 40% carboxyhaemoglobin or more and an uncompensated metabolic acidosis (arterial pH less than 7.4) should be managed aggressively with ventilatory support/ hyperbaric oxygenation.
- ▶ Gastric aspiration and lavage early in the course of therapy may prevent aspiration pneumonitis and reveal the presence of ingested intoxicants.
- ▶ Avoid stimulant drugs including carbon dioxide. **DO NOT inject methylene blue.**
- ▶ Hypothermia has been employed to reduce the patient's oxygen requirement.
- ▶ Consider antibiotics as prophylaxis against pulmonary infection.
- ▶ A whole blood transfusion may be useful if it can be given early in the treatment program.
- ▶ Infuse sodium bicarbonate and balanced electrolyte solutions if blood analyses indicate a significant metabolic acidosis.
- ▶ Ancillary therapy for brain oedema may be necessary if hypoxia has been severe.

Continued...

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

- ▶ Ensure absolute rest in bed for at least 48 hours; in severe poisonings, 2 to 4 weeks in bed may prevent sequelae.
- ▶ Watch for late neurological, psychiatric and cardiac complications. GOSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products 5th Ed.

BIOLOGICAL EXPOSURE INDEX (BEI)

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Sampling time	Index	Comments
Carboxyhaemoglobin in blood	end of shift	3.5% of haemoglobin	B, NS
Carbon monoxide in end-exhaled air	end of shift	20 ppm	B, NS

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other material

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>-----</p> <p>GENERAL</p> <p>-----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>,</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure
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Continued...

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

	<p>indicators and vacuum or suction lines.</p> <ul style="list-style-type: none"> Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. Such compounds should be sited and built in accordance with statutory requirements. The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> Cylinder: Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances <p>Carbon monoxide:</p> <ul style="list-style-type: none"> forms an extremely explosive mixture with air is a strong reducing agent reacts violently or explosively with strong oxidisers, oxygen, bromine pentafluoride, bromine trifluoride, chlorine dioxide, chlorine trifluoride, halogens, iron oxide, nitrogen trifluoride, peroxydisulphuryl difluoride, silver oxide forms explosive compounds with caesium monoxide, copper perchlorate, potassium, oxygen difluoride, sodium - these are heat-, spark-, or water sensitive Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.



X — Must not be stored together
 0 — May be stored together with specific preventions
 + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	carbon monoxide	Carbon monoxide	25 ppm / 29 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
carbon monoxide	75 ppm	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
nitrogen	Not Available	Not Available
carbon monoxide	1,200 ppm	Not Available


MATERIAL DATA

NOTE: Detector tubes for carbon monoxide, measuring in excess of 2 ppm, are commercially available for detection of carbon monoxide. 200 ppm carbon monoxide in air will produce headache, mental dullness and dizziness in a few hours; 600 ppm will produce identical symptoms in less than half

and hour and may produce unconsciousness in 1.5 hours; 4000 ppm is fatal in less than an hour.

The TLV-TWA and STEL is recommended to keep blood carboxyhaemoglobin (CoHb) levels below 3.5% in workers so as to prevent adverse neurobehavioural changes and to maintain cardiovascular exercise.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-210-760	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	~-196-760	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.</p> <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>Acute carbon monoxide exposure can mimic acute gastroenteritis or food poisoning with accompanying nausea and vomiting. Rapidly fatal cases of poisoning are characterised by congestion and hemorrhages in all organs. The extent of the tissue and organ damage is related to the duration of the post-hypoxic unconsciousness.</p> <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p> <p>Manifestations of severe visual disturbance can occur in cases of acute carbon monoxide poisoning associated with a period of unconsciousness. The types of disturbances that occur may be placed into three categories: (a.) amaurosis or hemianopsia, (b.) constriction of the visual fields, and (c.) visual abnormalities associated with optic nerve disturbances. Retinal venous engorgement and peripupillary hemorrhage have also been reported.</p>
Chronic	<p>There is sufficient evidence to establish a causal relationship between human exposure to the material and subsequent developmental toxic effects in the off-spring.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>Long-term (chronic) exposure to low levels of carbon monoxide may produce heart disease and damage to the nervous system. Exposure of pregnant animals to carbon monoxide may cause low birthweight, increased foetal mortality and nervous system damage to the offspring.</p> <p>Carbon monoxide is a common cause of fatal poisoning in industry and homes.</p>

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

carbon monoxide	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 1807 ppm4h ^[2]	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

NITROGEN	No significant acute toxicological data identified in literature search.
CARBON MONOXIDE	- central nervous system effects

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
		Not Available	Not Available	Not Available	Not Available
nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon monoxide	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	124.4mg/l	2
	LC50	96h	Fish	672.6mg/l	2
	EC50	96h	Algae or other aquatic plants	124.4mg/l	2
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

For carbon monoxide:

Environmental fate:

Although carbon monoxide is not considered a greenhouse gas, it is a precursor to greenhouse gases. Carbon monoxide elevates the concentrations of methane (a greenhouse gas) and ozone in the atmosphere. It eventually oxidises into carbon dioxide.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▸ Evaporate residue at an approved site. ▸ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Carbon monoxide in Nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	

Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
nitrogen	Not Available
carbon monoxide	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
nitrogen	Not Available
carbon monoxide	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture**

nitrogen is found on the following regulatory lists

Not Applicable

carbon monoxide is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (nitrogen; carbon monoxide)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

Continued...

SPANGAS CARBON MONOXIDE 250-500 PPM IN NITROGEN

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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SPANGAS CARBON MONOXIDE 60 PPM IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 620039

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS CARBON MONOXIDE 60 PPM IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 620039
Proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Air mixture)
Chemical formula	Not Applicable
Other means of identification	620039, 7753820

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS CARBON MONOXIDE 60 PPM IN AIR


Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700
Association / Organisation	Dutch nat. poison centre		
Emergency telephone numbers	+ 31 30 274 88 88		
Other emergency telephone numbers	+ 31-10-4877700		

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
630-08-0	NotSpec.	<u>carbon monoxide</u>
132259-10-0	>=99	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
-------------	--

Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For carbon monoxide intoxications:

- ▶ Administer pure oxygen by the best means possible. An oro-nasal mask is usually best. Artificial respiration is necessary wherever breathing is inadequate. Apnoeic patients have often been saved by persistent and efficient artificial ventilation. A patent airway must be carefully maintained. Patients with 40% carboxyhaemoglobin or more and an uncompensated metabolic acidosis (arterial pH less than 7.4) should be managed aggressively with ventilatory support/ hyperbaric oxygenation.
- ▶ Gastric aspiration and lavage early in the course of therapy may prevent aspiration pneumonia and reveal the presence of ingested intoxicants.
- ▶ Avoid stimulant drugs including carbon dioxide. **DO NOT inject methylene blue.**

Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

- Hypothermia has been employed to reduce the patient's oxygen requirement.
- Consider antibiotics as prophylaxis against pulmonary infection.
- A whole blood transfusion may be useful if it can be given early in the treatment program.
- Infuse sodium bicarbonate and balanced electrolyte solutions if blood analyses indicate a significant metabolic acidosis.
- Ancillary therapy for brain oedema may be necessary if hypoxia has been severe.
- Ensure absolute rest in bed for at least 48 hours; in severe poisonings, 2 to 4 weeks in bed may prevent sequelae.
- Watch for late neurological, psychiatric and cardiac complications. GOSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products 5th Ed.

BIOLOGICAL EXPOSURE INDEX (BEI)

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Sampling time	Index	Comments
Carboxyhaemoglobin in blood	end of shift	3.5% of haemoglobin	B, NS
Carbon monoxide in end-exhaled air	end of shift	20 ppm	B, NS

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other material

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>-----</p> <p>GENERAL</p> <p>-----</p> <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus and protective gloves. ▸ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. ▸ Vented gas is more dense than air and may collect in pits, basements.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▸ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▸ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▸ Clear area of all unprotected personnel and move upwind. ▸ Alert Emergency Authority and advise them of the location and nature of hazard. ▸ Wear breathing apparatus and protective gloves. ▸ Remove leaking cylinders to a safe place. ▸ Fit vent pipes. Release pressure under safe, controlled conditions ▸ Burn issuing gas at vent pipes. ▸ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▸ Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure
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Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

	<p>and temperature</p> <ul style="list-style-type: none"> The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. Such compounds should be sited and built in accordance with statutory requirements. The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> Cylinder: Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> reacts, possibly violently with flammable materials may react explosively with charcoal, ether when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can react with combustible materials, reducing agents, combustible materials, organic substances, etc. <p>For nitrogen:</p> <ul style="list-style-type: none"> Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. <p>Carbon dioxide:</p> <ul style="list-style-type: none"> reacts violently with strong bases and alkali metals (especially their dusts) may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium, diethylmagnesium is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives. may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances <p>Carbon monoxide:</p> <ul style="list-style-type: none"> forms an extremely explosive mixture with air is a strong reducing agent reacts violently or explosively with strong oxidisers, oxygen, bromine pentafluoride, bromine trifluoride, chlorine dioxide, chlorine trifluoride, halogens, iron oxide, nitrogen trifluoride, peroxydisulfuryl difluoride, silver oxide forms explosive compounds with caesium monoxide, copper perchlorate, potassium, oxygen difluoride, sodium - these are heat-, spark-, or water sensitive Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
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Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	carbon monoxide	Carbon monoxide	25 ppm / 29 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
carbon monoxide	75 ppm	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
carbon monoxide	1,200 ppm	Not Available
air, compressed	Not Available	Not Available

MATERIAL DATA

May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.


CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly.

NOTE: Detector tubes for carbon monoxide, measuring in excess of 2 ppm, are commercially available for detection of carbon monoxide.

200 ppm carbon monoxide in air will produce headache, mental dullness and dizziness in a few hours; 600 ppm will produce identical symptoms in less than half an hour and may produce unconsciousness in 1.5 hours; 4000 ppm is fatal in less than an hour.

The TLV-TWA and STEL is recommended to keep blood carboxyhaemoglobin (CoHb) levels below 3.5% in workers so as to prevent adverse neurobehavioural changes and to maintain cardiovascular exercise.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Protective gloves eg. Leather gloves or gloves with Leather facing ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available

Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	1.01	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p> <p>Acute carbon monoxide exposure can mimic acute gastroenteritis or food poisoning with accompanying nausea and vomiting.</p> <p>Rapidly fatal cases of poisoning are characterised by congestion and hemorrhages in all organs. The extent of the tissue and organ damage is related to the duration of the post-hypoxic unconsciousness.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p>

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

	Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures.. Manifestations of severe visual disturbance can occur in cases of acute carbon monoxide poisoning associated with a period of unconsciousness. The types of disturbances that occur may be placed into three categories: (a.) amaurosis or hemianopsia, (b.) constriction of the visual fields, and (c.) visual abnormalities associated with optic nerve disturbances. Retinal venous engorgement and peripupillary hemorrhage have also been reported.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Principal route of occupational exposure to the gas is by inhalation. Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis. Long-term (chronic) exposure to low levels of carbon monoxide may produce heart disease and damage to the nervous system. Exposure of pregnant animals to carbon monoxide may cause low birthweight, increased foetal mortality and nervous system damage to the offspring. Carbon monoxide is a common cause of fatal poisoning in industry and homes.

SPANGAS CARBON MONOXIDE 60 PPM IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
carbon monoxide	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; 1807 ppm4h ^[2]	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

CARBON MONOXIDE	- central nervous system effects
AIR, COMPRESSED	▸ Generally not applicable.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS CARBON MONOXIDE 60 PPM IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon monoxide	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	124.4mg/l	2
	LC50	96h	Fish	672.6mg/l	2
	EC50	96h	Algae or other aquatic plants	124.4mg/l	2

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

	Endpoint	Test Duration (hr)	Species	Value	Source
air, compressed	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

For carbon monoxide:

Environmental fate:

Although carbon monoxide is not considered a greenhouse gas, it is a precursor to greenhouse gases. Carbon monoxide elevates the concentrations of methane (a greenhouse gas) and ozone in the atmosphere. It eventually oxidises into carbon dioxide.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients


Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information**Labels Required**

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Air mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Carbon monoxide in Air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Carbon monoxide in Air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
carbon monoxide	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
carbon monoxide	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information

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

carbon monoxide is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia	No (air, compressed)

Continued...

SPANGAS CARBON MONOXIDE 60 PPM IN AIR

National Inventory	Status
Non-Industrial Use	
Canada - DSL	No (air, compressed)
Canada - NDSL	No (carbon monoxide; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p>

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 782549 - 778174 - 682369

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 782549 - 778174 - 682369
Proper shipping name	COMPRESSED GAS, N.O.S. (Ethanol in Nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	782549 - 778174 - 682369, 63-2547, 782549

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7727-37-9.	>=94	<u>nitrogen</u>
64-17-5	<=6	<u>ethanol</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <p>,</p> <p>nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage**Precautions for safe handling**

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

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- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Singapore Permissible Exposure Limits of Toxic Substances	ethanol	Ethanol (Ethyl alcohol)	1000 ppm / 1880 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
ethanol	Not Available	Not Available	15000* ppm

Ingredient	Original IDLH	Revised IDLH
nitrogen	Not Available	Not Available
ethanol	3,300 ppm	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

For ethanol:

Odour Threshold Value: 49-716 ppm (detection), 101 ppm (recognition)

Eye and respiratory tract irritation do not appear to occur at exposure levels of less than 5000 ppm and the TLV-TWA is thought to provide an adequate margin of safety against such effects. Experiments in man show that inhalation of 1000 ppm caused slight symptoms of poisoning and 5000 ppm caused strong stupor and morbid sleepiness. Subjects exposed to 5000 ppm to 10000 ppm experienced smarting of the eyes and nose and coughing.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

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Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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Material	CPI
BUTYL	A
NEOPRENE	A
NITRILE	A
NITRILE+PVC	A
PE/EVAL/PE	A
PVC	B
NATURAL RUBBER	C
NATURAL+NEOPRENE	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 5 x ES	Air-line*	A-2	A-PAPR-2 ^
up to 10 x ES	-	A-3	-
10+ x ES	-	Air-line**	-

* - Continuous Flow; ** - Continuous-flow or positive pressure demand

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas with no odour.		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-210-760	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	--196-760	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>							
Ingestion	<p>Ingestion of ethanol may produce nausea, vomiting, gastrointestinal bleeding, abdominal pain and diarrhoea. Systemic effects:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Blood concentration:</th> <th style="text-align: left;">Effects:</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;"><1.5 g/l</td> <td style="padding: 2px;">Mild: Impaired visual acuity, coordination and reaction time, emotional lability</td> </tr> <tr> <td style="padding: 2px;">1.5-3.0 g/l</td> <td style="padding: 2px;">Moderate: Slurred speech, confusion, ataxia, emotional lability, perceptual and sensation disturbances possible blackout spells, and incoordination with impaired objective performance in standardised tests. Possible diplopia, flushing, tachycardia, sweating and incontinence.</td> </tr> </tbody> </table> <p>Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments</p>	Blood concentration:	Effects:	<1.5 g/l	Mild: Impaired visual acuity, coordination and reaction time, emotional lability	1.5-3.0 g/l	Moderate: Slurred speech, confusion, ataxia, emotional lability, perceptual and sensation disturbances possible blackout spells, and incoordination with impaired objective performance in standardised tests. Possible diplopia, flushing, tachycardia, sweating and incontinence.	
Blood concentration:	Effects:							
<1.5 g/l	Mild: Impaired visual acuity, coordination and reaction time, emotional lability							
1.5-3.0 g/l	Moderate: Slurred speech, confusion, ataxia, emotional lability, perceptual and sensation disturbances possible blackout spells, and incoordination with impaired objective performance in standardised tests. Possible diplopia, flushing, tachycardia, sweating and incontinence.							
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>							
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>							
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>Long-term exposure to ethanol may result in progressive liver damage with fibrosis or may exacerbate liver injury caused by other agents.</p> <p>Repeated ingestion of ethanol by pregnant women may adversely affect the central nervous system of the developing foetus, producing effects collectively described as foetal alcohol syndrome. These include mental and physical retardation, learning disturbances, motor and language deficiency, behavioural disorders and reduced head size.</p>							
SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN	TOXICITY	IRRITATION						
	Not Available	Not Available						

SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN

nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
ethanol	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 17100 mg/kg ^[1]	Eye (rabbit): 500 mg SEVERE
	Inhalation(Rat) LC50; 64000 ppm4h ^[2]	Eye (rabbit):100mg/24hr-moderate
	Oral (Rat) LD50; 7060 mg/kg ^[2]	Eye: adverse effect observed (irritating) ^[1]
		Skin (rabbit):20 mg/24hr-moderate
		Skin (rabbit):400 mg (open)-mild
		Skin: no adverse effect observed (not irritating) ^[1]
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

NITROGEN	No significant acute toxicological data identified in literature search.
ETHANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
ethanol	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	LC50	96h	Fish	>100mg/l	2
	EC50	72h	Algae or other aquatic plants	275mg/l	2
	EC50	48h	Crustacea	>79mg/L	4
	EC50	96h	Algae or other aquatic plants	<0.001mg/L	4
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)

SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN

Bioaccumulative potential

Ingredient	Bioaccumulation
ethanol	LOW (LogKOW = -0.31)

Mobility in soil

Ingredient	Mobility
ethanol	HIGH (KOC = 1)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ethanol in Nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (Ethanol in Nitrogen mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

SPANGAS ETHANOL 190 - 450 PPM IN NITROGEN

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (Ethanol in Nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
nitrogen	Not Available
ethanol	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
nitrogen	Not Available
ethanol	Not Available

SECTION 15 Regulatory information

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

nitrogen is found on the following regulatory lists

Not Applicable

ethanol is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (nitrogen; ethanol)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

National Inventory	Status
Legend:	<i>Yes = All CAS declared ingredients are on the inventory</i> <i>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i>

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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SPANGAS ETHYLENE 1 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 589101

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS ETHYLENE 1 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 589101
Proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in air mixture)
Chemical formula	Not Applicable
Other means of identification	589101, 63-2760

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS ETHYLENE 1 PCT OR LESS IN AIR


Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700
Association / Organisation	Dutch nat. poison centre		
Emergency telephone numbers	+ 31 30 274 88 88		
Other emergency telephone numbers	+ 31-10-4877700		

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
74-85-1	<1	<u>ethylene</u>
132259-10-0	>99	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
-------------	--

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- ▶ Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can

SPANGAS ETHYLENE 1 PCT OR LESS IN AIR

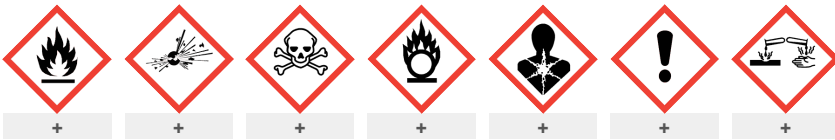
react with combustible materials, reducing agents, combustible materials, organic substances, etc.

For nitrogen:

- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Carbon dioxide:

- ▶ reacts violently with strong bases and alkali metals (especially their dusts)
- ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium
- ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
ethylene	600 ppm	6600* ppm	40000*** ppm

Ingredient	Original IDLH	Revised IDLH
ethylene	Not Available	Not Available
air, compressed	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.


For ethylene:

In view of its low toxicity, no TLV has been recommended; however, it is a simple asphyxiant as a result of lowering available oxygen concentrations. It should be noted that the major vapour hazard relates to its flammable and explosive nature.

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
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SPANGAS ETHYLENE 1 PCT OR LESS IN AIR

Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ Protective gloves eg. Leather gloves or gloves with Leather facing ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7

Hazardous decomposition products

See section 5

SECTION 11 Toxicological information**Information on toxicological effects**

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.</p>

SPANGAS ETHYLENE 1 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
ethylene	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >57000 ppm4h ^[1]	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

ETHYLENE	<p>For ethylene:</p> <p>Relevant studies have indicated a low toxicity of ethylene and no risk to human health has been identified neither from occupational exposure nor exposure of general public, either exposed directly or indirectly via the environment. There have been two preliminary but independent reports of increased miscarriage rates among women working in the petrochemical industry. Elevated ethylene concentrations were mentioned as a possible reason, but this has not been confirmed. No significant acute</p>
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SPANGAS ETHYLENE 1 PCT OR LESS IN AIR

	toxicological data identified in literature search.			
AIR, COMPRESSED	▶ Generally not applicable.			
Acute Toxicity	×	Carcinogenicity	×	
Skin Irritation/Corrosion	×	Reproductivity	×	
Serious Eye Damage/Irritation	×	STOT - Single Exposure	×	
Respiratory or Skin sensitisation	×	STOT - Repeated Exposure	×	
Mutagenicity	×	Aspiration Hazard	×	

Legend: **×** – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS ETHYLENE 1 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
ethylene	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	72h	Algae or other aquatic plants	13.9mg/l	2
	LC50	96h	Fish	126.012mg/l	2
	EC50	72h	Algae or other aquatic plants	40.5mg/l	2
	EC50	96h	Algae or other aquatic plants	30.327mg/l	2
air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethylene	LOW (Half-life = 56 days)	LOW (Half-life = 2.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
ethylene	LOW (BCF = 4.26)

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Disposal
	<ul style="list-style-type: none"> ▶ Evaporate residue at an approved site. ▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Continued...

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in air mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (ethylene in air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
ethylene	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
ethylene	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information

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

ethylene is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (air, compressed)
Canada - DSL	No (air, compressed)
Canada - NDSL	No (ethylene; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p>

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 589028

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 589028
Proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in nitrogen mixture)
Chemical formula	Not Applicable
Other means of identification	589028, 63-2569

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
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Signal word	Warning
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Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
74-85-1	<1	<u>ethylene</u>
7727-37-9.	>99	<u>nitrogen</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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Continued...

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Continued...

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of: , nitrogen oxides (NOx)</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>For nitrogen:</p> <ul style="list-style-type: none"> ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium. ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices. ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
ethylene	600 ppm	6600* ppm	40000*** ppm
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
ethylene	Not Available	Not Available
nitrogen	Not Available	Not Available

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

For ethylene:

In view of its low toxicity, no TLV has been recommended; however, it is a simple asphyxiant as a result of lowering available oxygen concentrations. It should be noted that the major vapour hazard relates to its flammable and explosive nature.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Protective overalls, closely fitted at neck and wrist. ▸ Eye-wash unit. ▸ Ensure availability of lifeline in confined spaces.

Respiratory protection

- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

Continued...

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▶ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▶ respiratory system complications may include tachypnoea and dyspnoea; ▶ cardiovascular effects may include circulatory collapse and arrhythmias; ▶ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p>
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SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Principal route of occupational exposure to the gas is by inhalation.

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
ethylene	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >57000 ppm4h ^[1]	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

ETHYLENE	For ethylene: Relevant studies have indicated a low toxicity of ethylene and no risk to human health has been identified neither from occupational exposure nor exposure of general public, either exposed directly or indirectly via the environment. There have been two preliminary but independent reports of increased miscarriage rates among women working in the petrochemical industry. Elevated ethylene concentrations were mentioned as a possible reason, but this has not been confirmed.
ETHYLENE & NITROGEN	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
ethylene	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	72h	Algae or other aquatic plants	13.9mg/l	2
	LC50	96h	Fish	126.012mg/l	2
	EC50	72h	Algae or other aquatic plants	40.5mg/l	2
	EC50	96h	Algae or other aquatic plants	30.327mg/l	2

Continued...

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethylene	LOW (Half-life = 56 days)	LOW (Half-life = 2.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
ethylene	LOW (BCF = 4.26)

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> ▶ Evaporate residue at an approved site. ▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in nitrogen mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956
UN proper shipping name	Compressed gas, n.o.s. * (ethylene in nitrogen mixture)

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (ethylene in nitrogen mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
ethylene	Not Available
nitrogen	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
ethylene	Not Available
nitrogen	Not Available

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****ethylene is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

nitrogen is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes

Continued...

SPANGAS ETHYLENE 1 PCT OR LESS IN NITROGEN

National Inventory	Status
Canada - DSL	Yes
Canada - NDSL	No (ethylene; nitrogen)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	<p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p>

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 620112 - 619932

Version No: 2.2

Safety Data Sheet

Issue Date: 12/07/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Product Part Number: 620112 - 619932
Proper shipping name	COMPRESSED GAS, N.O.S. (isobutane in air mixture)
Chemical formula	Not Applicable
Other means of identification	620112 - 619932, 619932, 620112, 63-2575

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

Relevant identified uses	Use according to manufacturer's directions.
---------------------------------	---

Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas), Serious Eye Damage/Eye Irritation Category 2A
----------------	--

Label elements

Hazard pictogram(s)	
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Signal word	Warning
-------------	---------

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
H319	Causes serious eye irritation.

Precautionary statement(s) Prevention

P280	Wear protective gloves, protective clothing, eye protection and face protection.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
75-28-5.	<=2	iso-butane
132259-10-0	>97	air, refrigerated liquid

SECTION 4 First aid measures

Description of first aid measures

<p>Eye Contact</p>	<ul style="list-style-type: none"> ▸ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▸ Take the patient to the nearest eye wash, shower or other source of clean water. ▸ Open the eyelid(s) wide to allow the material to evaporate. ▸ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. ▸ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▸ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▸ Transport to hospital or doctor. ▸ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▸ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▸ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
<p>Skin Contact</p>	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. <p>For hypothermia:</p> <ul style="list-style-type: none"> ▸ Move person to a warm place. ▸ Wrap in blankets. ▸ Shock may occur during the correction of hypothermia; cardiac dysrhythmias may be associated with severe hypothermia. ▸ Seek medical attention. ▸ Avoid direct heat. ▸ Arrange for admission to hospital for observation
<p>Inhalation</p>	<ul style="list-style-type: none"> ▸ Following exposure to gas, remove the patient from the gas source or contaminated area. ▸ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▸ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▸ If the patient is not breathing spontaneously, administer rescue breathing. ▸ If the patient does not have a pulse, administer CPR. ▸ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▸ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▸ Keep the patient warm, comfortable and at rest while awaiting medical care. ▸ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▸ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
<p>Ingestion</p>	<ul style="list-style-type: none"> ▸ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia)

For frost-bite caused by liquefied petroleum gas:

- If part has not thawed, place in warm water bath (41-46 C) for 15-20 minutes, until the skin turns pink or red.
- Analgesia may be necessary while thawing.
- If there has been a massive exposure, the general body temperature must be depressed, and the patient must be immediately rewarmed by whole-body immersion, in a bath at the above temperature.
- Shock may occur during rewarming.
- Administer tetanus toxoid booster after hospitalization.
- Prophylactic antibiotics may be useful.
- The patient may require anticoagulants and oxygen.

[Shell Australia 22/12/87]

For gas exposures:

 BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary oedema .

Continued...

- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ▶ Cryogenics can be particularly dangerous during fires. ▶ Cryogenic liquids can freeze water very rapidly. ▶ Careless use of water can lead to heavy icing, possibly blocking pressure relief valves.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. ▶ Vented gas is more dense than air and may collect in pits, basements.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ Anyone who handles, stores or transfers cryogenic liquids requires instruction on safe handling practices. Specific areas of instruction should include: <ol style="list-style-type: none"> 1. properties of the cryogen both as a liquid and a gas 2. specific instructions on the equipment being used, including safety devices
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	<ul style="list-style-type: none"> 3. approved materials that are compatible with the cryogen 4. selection, use and care of protective equipment and clothing 5. first aid, including self-treatment 6. dealing with emergencies such as fires, leaks and spills 7. good housekeeping practices <ul style="list-style-type: none"> ▶ Inspect all incoming containers containing cryogenic liquids before storing to ensure they are not damaged and are properly labelled. Do not accept delivery of defective containers ▶ Store, handle and use cryogen containers securely fastened in place in the upright position. <ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. ▶ DO NOT transfer gas from one cylinder to another.
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Equipment must be able to withstand process pressure and especially cryogenic temperature. ▶ Commonly used materials are copper or stainless steel. ▶ Mild steel must NOT be used. ▶ Cylinder: <ul style="list-style-type: none"> · Ensure the use of equipment rated for cylinder pressure. · Ensure the use of compatible materials of construction. · Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can react with combustible materials, reducing agents, combustible materials, organic substances, etc. ▶ Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials. ▶ Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents. ▶ Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent. ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions. ▶ Avoid storage with reducing agents. ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



X — Must not be stored together

O — May be stored together with specific precautions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Continued...

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

Ingredient	TEEL-1	TEEL-2	TEEL-3
iso-butane	5500* ppm	17000** ppm	53000*** ppm

Ingredient	Original IDLH	Revised IDLH
iso-butane	Not Available	Not Available
air, refrigerated liquid	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
air, refrigerated liquid	E	≤ 0.1 ppm

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.


MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.

CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly.

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. For cryogenic liquids: <ul style="list-style-type: none"> ▶ The eyes are the most sensitive body part to the extreme cold of the liquid and vapours. ▶ A full face shield over safe glasses is recommended when handling cryogenics.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Insulated gloves: NOTE: Insulated gloves should be loose fitting so that may be removed quickly if liquid is spilled upon them. Insulated gloves are not made to permit hands to be placed in the liquid; they provide only short-term protection from accidental contact with the liquid. <ul style="list-style-type: none"> ▶ Protective gloves eg. Leather gloves or gloves with Leather facing ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	For cryogenic liquids <ul style="list-style-type: none"> ▶ Cryogenic liquids flow very freely and can penetrate woven or other porous clothing much faster than water ▶ Wear a non-porous, knee length laboratory coat, without pockets or cuffs which could catch the liquid. ▶ If using larger quantities of cryogenic liquids, wear an apron of a non-woven material such as leather. ▶ Wear boots with tops high enough to be covered by pants without cuffs. ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Cryogenic liquid; Such liquids are defined as those with a normal boiling point below -150 deg. C Liquefied refrigerated gases are generally cryogens. These gases must be cooled below room temperature before an increase in pressure can liquefy them.		
	Cryogenic liquid; Such liquids are defined as those with a normal boiling point below -150 deg. C Liquefied refrigerated gases are generally cryogens. These gases must be cooled below room temperature before an increase in pressure can liquefy them.		
	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	1.01	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
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SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

Ingestion	Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Principal route of occupational exposure to the gas is by inhalation. Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
iso-butane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >13023 ppm4h ^[1]	Not Available
air, refrigerated liquid	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
iso-butane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2

Continued...

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

air, refrigerated liquid	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.).

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
iso-butane	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
iso-butane	LOW (BCF = 1.97)

Mobility in soil

Ingredient	Mobility
iso-butane	LOW (KOC = 35.04)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (isobutane in air mixture)	
Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956
UN proper shipping name	Compressed gas, n.o.s. * (isobutane in air mixture)

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (isobutane in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
iso-butane	Not Available
air, refrigerated liquid	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
iso-butane	Not Available
air, refrigerated liquid	Not Available

SECTION 15 Regulatory information

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

iso-butane is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

air, refrigerated liquid is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	No (air, refrigerated liquid)
Canada - DSL	No (air, refrigerated liquid)

SPANGAS ISOBUTANE 2 PCT OR LESS IN AIR

National Inventory	Status
Canada - NDSL	No (iso-butane; air, refrigerated liquid)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, refrigerated liquid)
Japan - ENCS	No (air, refrigerated liquid)
Korea - KECI	No (air, refrigerated liquid)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, refrigerated liquid)
USA - TSCA	No (air, refrigerated liquid)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, refrigerated liquid)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, refrigerated liquid)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	12/07/2016
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 63-2583

Version No: 2.2

Safety Data Sheet

Issue Date: 19/10/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN
Chemical Name	Not Applicable
Synonyms	Product Part Number: 656389 - 673715 - 682351 - 711952 , 63-2583
Proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains nitrogen and methane)
Chemical formula	Not Applicable
Other means of identification	63-2583, 656389, 673715, 682351, 711952

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

Relevant identified uses	The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
---------------------------------	--

Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Wilhelmsen Ships Service AS* Central Warehouse	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen
Address	186 Pandan Loop Singapore 128376 Singapore	Willem Barentszstraat 50 Rotterdam Netherlands	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway
Telephone	+65 6395 4545	+31 10 4877 777	Not Available
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.rotterdam@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com

Registered company name	Wilhelmsen Maritime Services
Address	PO Box 33 Lysaker Norway NO-1324 Norway
Telephone	+47 67 58 40 00
Fax	+47 67 58 47 30
Website	Not Available
Email	chemicals@wilhelmsen.com

Emergency telephone number

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN


Association / Organisation	24hrs - Chemtrec	Dutch nat. poison centre	24hrs - Chemtrec
Emergency telephone numbers	+31-10-4877700	+ 31 88 7558561	+31-10-4877700
Other emergency telephone numbers	+31-10-4877700	+ 31 10 4877700	+1 800 424 9300

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Aerosols Category 1
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Label elements

Hazard pictogram(s)	
---------------------	---

Signal word	Danger
-------------	--------

Hazard statement(s)

H222	Extremely flammable aerosol.
------	------------------------------

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.
-----------	--

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
74-82-8	>=14.3	<u>methane</u>
7727-37-9.	20-70	<u>nitrogen</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners. ▶ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to
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Continued...

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

	<p>prevent further damage.</p> <ul style="list-style-type: none"> ▶ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▶ Transport to hospital or doctor. ▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▶ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ Following exposure to gas, remove the patient from the gas source or contaminated area. ▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If the patient is not breathing spontaneously, administer rescue breathing. ▶ If the patient does not have a pulse, administer CPR. ▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▶ Keep the patient warm, comfortable and at rest while awaiting medical care. ▶ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For gas exposures:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures**Extinguishing media**

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p> <ul style="list-style-type: none"> , carbon monoxide (CO) , carbon dioxide (CO₂) , nitrogen oxides (NO_x) , other pyrolysis products typical of burning organic material. <p>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
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SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

Storage incompatibility

For nitrogen:

- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Methane:

- ▶ reacts violently with oxidizing agents such as chlorine, bromine pentafluoride, oxygen trifluoride and nitrogen trifluoride in the presence of catalysts or sources of ignition.
- ▶ contact with chlorine dioxide causes spontaneous explosion.
- ▶ contact with liquid fluorine causes spontaneous explosion, even at very low temperatures (-19 deg.C).
- ▶ Avoid reaction with oxidising agents
- ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
methane	65000*** ppm	230000*** ppm	400000*** ppm
nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm

Ingredient	Original IDLH	Revised IDLH
methane	Not Available	Not Available
nitrogen	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

Other protection

- ▶ Protective overalls, closely fitted at neck and wrist.
- ▶ Eye-wash unit.
- ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquefied pressure gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Applicable
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Common, generalised symptoms associated with non-toxic gas inhalation include :</p> <ul style="list-style-type: none"> ▶ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▶ respiratory system complications may include tachypnoea and dyspnoea;
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SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

	<ul style="list-style-type: none"> ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting. <p>Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure. The paraffin gases C1-4 are practically nontoxic below the lower flammability limit, 18,000 to 50,000 ppm; above this, low to moderate incidental effects such as CNS depression and irritation occur, but are completely reversible upon cessation of the exposure.</p>
Ingestion	<p>Overexposure is unlikely in this form. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures.. Exposure to H₂S may produce pain, blurred vision, and irritation. These symptoms are temporary in all but severe cases. Eye irritation may produce conjunctivitis, photophobia, pain, and at higher concentrations blurred vision and corneal blistering</p>
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN	TOXICITY	IRRITATION
	Not Available	Not Available
methane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >13023 ppm4h ^[1]	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

METHANE & NITROGEN	No significant acute toxicological data identified in literature search.
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Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
methane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2

Continued...

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2
nitrogen	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Sulfide ion is very toxic to aquatic life, threshold concentration for fresh or saltwater fish is 0.5ppm. The product therefore is very toxic to aquatic life. The major decomposition product, hydrogen sulfide, is damaging to vegetation at 5ppm for 24 hours

For methane:

log Kow : 1.09

Koc : 753

Half-life (hr) air : 21600

Half-life (hr) H2O surface water : 1.17-14

Half-life (hr) soil : 1680

ThOD : 3.99

Environmental Fate

Terrestrial fate: An estimated Koc value of 90, determined from a log Kow of 1.09 indicates that methane is expected to have high mobility in soil. Volatilisation is expected to be the most important fate process for methane in soil based on its vapor pressure of 4.7×10^{-5} mm Hg at 25 deg C. Volatilisation of methane from moist soil surfaces is expected to be an important fate process given an estimated Henry's Law constant of 0.66 atm-cu m/mole derived from its vapor pressure, and water solubility, 22 mg/l. Utilisation of methane by soil microorganisms has been detected from five soil samples collected from sites near Adelaide, South Australia(6).

Aquatic fate: The estimated Koc value indicates that methane is not expected to adsorb to suspended solids and sediment(. Volatilisation from water surfaces is expected to be the dominant fate process in aqueous systems based upon an estimated Henry's Law . Using this Henry's Law constant volatilisation half-lives for a model river and model lake are both 2 hrs. An estimated BCF of 1, derived from its log Kow suggests the potential for bioconcentration in aquatic organisms is low. The biodegradation half-life of methane was estimated to range from 70 days to infinity based on gas exchange biodegradation experiments conducted in model estuarine ecosystems.

Atmospheric fate:: Methane exists in the gas-phase in the ambient atmosphere with a vapor pressure of 4.7×10^{-5} mm Hg.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
methane	LOW (LogKOW = 1.09)

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations


Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▸ Evaporate residue at an approved site. ▸ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
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SECTION 14 Transport information

Labels Required

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

	
Marine Pollutant	NO

Land transport (UN)

UN number	1954	
UN proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains nitrogen and methane)	
Transport hazard class(es)	Class	2.1
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 392
	Limited quantity	0

Air transport (ICAO-IATA / DGR)

UN number	1954	
UN proper shipping name	Compressed gas, flammable, n.o.s. * (contains nitrogen and methane)	
Transport hazard class(es)	ICAO/IATA Class	2.1
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	10L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A1 A807
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	Forbidden
	Passenger and Cargo Maximum Qty / Pack	Forbidden
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1954	
UN proper shipping name	COMPRESSED GAS, FLAMMABLE, N.O.S. (contains nitrogen and methane)	
Transport hazard class(es)	IMDG Class	2.1
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-D, S-U
	Special provisions	274 392
	Limited Quantities	0

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
methane	Not Available

Continued...

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN

Product name	Group
nitrogen	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
methane	Not Available
nitrogen	Not Available

SECTION 15 Regulatory information

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

methane is found on the following regulatory lists

Not Applicable

nitrogen is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (methane; nitrogen)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (nitrogen)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	19/10/2021
Initial Date	18/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#!/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

Version	Date of Update	Sections Updated
1.2	19/10/2021	Acute Health (eye), Acute Health (inhaled), Acute Health (swallowed), Classification, Disposal, Engineering Control, Environmental, Fire Fighter (extinguishing media), Fire Fighter (fire/explosion hazard), Fire Fighter (fire fighting), Handling Procedure, Ingredients, Personal Protection (other), Personal Protection (Respirator), Personal Protection (eye), Spills (major), Spills (minor), Storage (storage requirement), Synonyms, Transport

SPANGAS METHANE 14.3 PCT OR MORE IN NITROGEN**Other information**

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

SPANGAS METHANE 5 PCT OR LESS IN AIR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 589085 - 620005 - 619965 - 620070 - 620153 - 65633

Version No: 3.3

Safety Data Sheet

Issue Date: 11/08/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

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

Product Identifier

Product name	SPANGAS METHANE 5 PCT OR LESS IN AIR
Chemical Name	Not Applicable
Synonyms	Not Available
Proper shipping name	COMPRESSED GAS, N.O.S. (methane in air mixture)
Chemical formula	Not Applicable
Other means of identification	589085 - 620005 - 619965 - 620070 - 620153 - 65633, 589085, 619965, 620005, 620070, 620153, 63-2576, 656330

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

Relevant identified uses	Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	Wilhelmsen Ships Service (S) Pte. Ltd.	Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen	Wilhelmsen Ships Service AS* Central Warehouse
Address	186 Pandan Loop Singapore 128376 Singapore	-----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+65 6395 4545	Not Available	+31 10 4877 777
Fax	Not Available	Not Available	Not Available
Website	http://www.wilhelmsen.com/services/maritime/compan	http://www.wilhelmsen.com	http://www.wilhelmsen.com
Email	wss.singapore@wilhelmsen.com	wss.global.sdsinfo@wilhelmsen.com	wss.rotterdam@wilhelmsen.com

Registered company name	Wilhelmsen Ships Service AS* Central Warehouse
Address	Willem Barentszstraat 50 Rotterdam Netherlands
Telephone	+31 10 4877 777
Fax	Not Available
Website	http://www.wilhelmsen.com
Email	wss.rotterdam@wilhelmsen.com

Emergency telephone number

SPANGAS METHANE 5 PCT OR LESS IN AIR

Association / Organisation	24hrs - Chemtrec	24hrs - Chemtrec	Dutch nat. poison centre
Emergency telephone numbers	+31-10-4877700	+31-10-4877700	+ 31 88 7558561
Other emergency telephone numbers	+31-10-4877700	+1 800 424 9300	+ 31 10 4877700


Association / Organisation	Dutch nat. poison centre
Emergency telephone numbers	+ 31 30 274 88 88
Other emergency telephone numbers	+ 31-10-4877700

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification	Gases Under Pressure (Compressed Gas)
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Label elements

Hazard pictogram(s)	
---------------------	---

Signal word	Warning
-------------	---------

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
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Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
74-82-8	<5	<u>methane</u>
132259-10-0	>94	<u>air, compressed</u>

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<ul style="list-style-type: none"> ▶ If product comes in contact with eyes remove the patient from gas source or contaminated area. ▶ Take the patient to the nearest eye wash, shower or other source of clean water. ▶ Open the eyelid(s) wide to allow the material to evaporate. ▶ Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head
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	<p>back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.</p> <ul style="list-style-type: none"> ▸ The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage. ▸ Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s) ▸ Transport to hospital or doctor. ▸ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur. ▸ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage. ▸ Ensure verbal communication and physical contact with the patient. <p>DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice DO NOT use hot or tepid water.</p>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▸ Following exposure to gas, remove the patient from the gas source or contaminated area. ▸ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer. ▸ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures. ▸ If the patient is not breathing spontaneously, administer rescue breathing. ▸ If the patient does not have a pulse, administer CPR. ▸ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen. ▸ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction. ▸ Keep the patient warm, comfortable and at rest while awaiting medical care. ▸ MONITOR THE BREATHING AND PULSE, CONTINUOUSLY. ▸ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.
Ingestion	<ul style="list-style-type: none"> ▸ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For "the bends"

- Patient must be placed in a raised atmospheric pressure (decompression chamber) as soon as possible. Intravenous plasma, plasma substitutes, heparin and steroids may be useful.

(ILO Encyclopedia

For gas exposures:

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary oedema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Advice for firefighters

Fire Fighting	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Fight fire from a safe distance, with adequate cover.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Containers may explode when heated - Ruptured cylinders may rocket ▶ Fire exposed containers may vent contents through pressure relief devices. ▶ High concentrations of gas may cause asphyxiation without warning. ▶ May decompose explosively when heated or involved in fire. <p>Decomposition may produce toxic fumes of:</p>

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▶ DO NOT enter confined spaces where gas may have accumulated.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of all unprotected personnel and move upwind. ▶ Alert Emergency Authority and advise them of the location and nature of hazard. ▶ Wear breathing apparatus and protective gloves. ▶ Remove leaking cylinders to a safe place. ▶ Fit vent pipes. Release pressure under safe, controlled conditions ▶ Burn issuing gas at vent pipes. ▶ DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> · Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines. · Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. <p>▶ DO NOT transfer gas from one cylinder to another.</p>
Other information	<ul style="list-style-type: none"> ▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. ▶ Such compounds should be sited and built in accordance with statutory requirements. ▶ The storage compound should be kept clear and access restricted to authorised personnel only.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Cylinder: ▶ Ensure the use of equipment rated for cylinder pressure. ▶ Ensure the use of compatible materials of construction. ▶ Valve protection cap to be in place until cylinder is secured, connected.
Storage incompatibility	<p>Air (liquid or refrigerated):</p> <ul style="list-style-type: none"> ▶ reacts, possibly violently with flammable materials ▶ may react explosively with charcoal, ether ▶ when stored over long periods may concentrate oxygen as a result of nitrogen evaporation; oxygen, a strong oxidiser, can

react with combustible materials, reducing agents, combustible materials, organic substances, etc.

For nitrogen:

- ▶ Avoid reaction with alkalis, barium oxide, lithium, silicon, calcium, strontium, barium, ozone, titanium and beryllium.
- ▶ Stable when temperature protected and kept isolated as a compressed gas in cylinders equipped with pressure relief safety devices.
- ▶ Forms cyanides when heated with carbon in the presence of alkalis or barium oxide.

Carbon dioxide:

- ▶ reacts violently with strong bases and alkali metals (especially their dusts)
- ▶ may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium , diethylmagnesium
- ▶ is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- ▶ may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- ▶ may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures
- ▶ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances



- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
methane	65000*** ppm	230000*** ppm	400000*** ppm

Ingredient	Original IDLH	Revised IDLH
methane	Not Available	Not Available
air, compressed	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below

Hands/feet protection	<ul style="list-style-type: none"> ▶ Protective gloves eg. Leather gloves or gloves with Leather facing ▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Protective overalls, closely fitted at neck and wrist. ▶ Eye-wash unit. ▶ Ensure availability of lifeline in confined spaces.

Respiratory protection

- ▶ Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- ▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Compressed gas		
Physical state	Compressed Gas	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-210	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	~196	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Available	Taste	Not Available
Evaporation rate	Not Available BuAC = 1	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	pH as a solution (Not Available%)	Not Available
Vapour density (Air = 1)	0.97	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control
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	<p>measures be used in an occupational setting.</p> <p>The occupational disease known as the "bends" is produced in compressed-air workers and divers following too rapid decompression as a result of which nitrogen bubbles are formed in the bloodstream and body tissues. Symptoms associated with the bends include headache, vertigo, fatigue, vomiting, dyspnea, a burning sensation in the chest, cough, pulmonary oedema, cutaneous irritation, itching, mottling and oedema, cutaneous irritation, itching, mottling and oedema, macular eruptions, visual defects, deafness, muscle pain, tingling, numbness, weakness or paralysis of the limbs, angina, hypotension, convulsions, unconsciousness, coma and death.</p> <p>Aseptic bone necrosis may occur following a compression/ decompression episode.</p>
Ingestion	<p>Overexposure is unlikely in this form.</p> <p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..</p>
Chronic	<p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Air is intrinsically non-toxic in industrial situation. Hazards generally relate to pressure effects. Repeated or prolonged exposure to compressed air at pressures exceeding atmospheric pressure may produce aseptic bone necrosis progressing to joint collapse and osteoarthritis.</p> <p>Principal route of occupational exposure to the gas is by inhalation.</p>

SPANGAS METHANE 5 PCT OR LESS IN AIR	TOXICITY	IRRITATION
	Not Available	Not Available
methane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >13023 ppm4h ^[1]	Not Available
air, compressed	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

METHANE	No significant acute toxicological data identified in literature search.
AIR, COMPRESSED	↳ Generally not applicable.

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✗
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

Continued...

SPANGAS METHANE 5 PCT OR LESS IN AIR	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

methane	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
	LC50	96h	Fish	24.11mg/l	2
	EC50	96h	Algae or other aquatic plants	7.71mg/l	2

air, compressed	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Sulfide ion is very toxic to aquatic life, threshold concentration for fresh or saltwater fish is 0.5ppm. The product therefore is very toxic to aquatic life. The major decomposition product, hydrogen sulfide, is damaging to vegetation at 5ppm for 24 hours

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
methane	LOW (LogKOW = 1.09)

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Evaporate residue at an approved site. Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (UN)

UN number	1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (methane in air mixture)

Transport hazard class(es)	Class	2.2
	Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274; 378; 392
	Limited quantity	120 ml

Air transport (ICAO-IATA / DGR)

UN number	1956	
UN proper shipping name	Compressed gas, n.o.s. * (methane in air mixture)	
Transport hazard class(es)	ICAO/IATA Class	2.2
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	2L
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A202
	Cargo Only Packing Instructions	200
	Cargo Only Maximum Qty / Pack	150 kg
	Passenger and Cargo Packing Instructions	200
	Passenger and Cargo Maximum Qty / Pack	75 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	1956	
UN proper shipping name	COMPRESSED GAS, N.O.S. (methane in air mixture)	
Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 378 392
	Limited Quantities	120 mL

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
methane	Not Available
air, compressed	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
methane	Not Available
air, compressed	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture**methane is found on the following regulatory lists**

Not Applicable

air, compressed is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (air, compressed)
Canada - DSL	No (air, compressed)
Canada - NDSL	No (methane; air, compressed)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (air, compressed)
Japan - ENCS	No (air, compressed)
Korea - KECI	No (air, compressed)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (air, compressed)
USA - TSCA	No (air, compressed)
Taiwan - TCSI	Yes
Mexico - INSQ	No (air, compressed)
Vietnam - NCI	Yes
Russia - FBEPH	No (air, compressed)
Legend:	<i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i>

SECTION 16 Other information

Revision Date	11/08/2021
Initial Date	16/06/2016

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

Version	Date of Update	Sections Updated
2.3	11/08/2021	Acute Health (inhaled), Acute Health (swallowed), Chronic Health, Classification, Environmental, Ingredients

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

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