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

1.1. Product identifier : Chlorine

Chemical formula	:	Cl2
Synonyms	:	Chlorine
REACh Registration Number:		01-2119486560-35

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

Use of the Substance/Mixture	:	General Industrial
Restrictions on Use	:	No data available.

1.3 Details of the supplier of the safety data sheet : Air Products and Chemicals, Inc
7201 Hamilton Blvd.
Allentown, PA 18195-1501
GST No. 123600835 RT0001
QST No. 102753981 TQ0001

Email Address – Technical Information	:	GASTECH@airproducts.com
Telephone	:	1-610-481-4911

1.4. Emergency telephone number : 800-523-9374 USA
+1 610 481 7711 International

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Oxidizing gases - Category 1 H270:May cause or intensify fire; oxidiser.
Gases under pressure - Liquefied gas. H280:Contains gas under pressure; may explode if heated.
Acute toxicity - Inhalation Category 2 H330:Fatal if inhaled.
Skin irritation - Category 2 H315:Causes skin irritation.
Eye irritation - Category 2 H319:Causes serious eye irritation.
Specific target organ toxicity - single exposure - Category 3 H335:May cause respiratory irritation.
Acute aquatic toxicity. - Category 1 H400:Very toxic to aquatic life
Chronic aquatic toxicity - Category 1 H410:Very toxic to aquatic life with long lasting effects.

2.2. Label elements

Hazard pictograms/symbols

Signal Word: Danger

Hazard Statements:

H270:May cause or intensify fire; oxidiser.
H280:Contains gas under pressure; may explode if heated.
H315:Causes skin irritation.
H319:Causes serious eye irritation.
H330:Fatal if inhaled.
H410:Very toxic to aquatic life with long lasting effects.
EUH071:Corrosive to the respiratory tract.

Precautionary Statements:

Prevention	:	P244:Keep valves and fittings free from oil and grease. P260:Do not breathe dust/fume/gas/mist/vapours/spray. P280:Wear protective gloves/protective clothing/eye protection/face protection. P220:Keep away from clothing and other combustible materials. P273:Avoid release to the environment.
Response	:	P304+P340 :IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 :IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P302+P352 :IF ON SKIN: Wash with plenty of soap and water. P332+P313 :If skin irritation occurs: Get medical advice/attention. P370+P376 :In case of fire: Stop leak if safe to do so. P315 :Get immediate medical advice/attention.
Storage	:	P403:Store in a well-ventilated place. P405:Store locked up.

2.3 Other Hazards

Reacts with water to form corrosive acids.

Use a back flow preventative device in the piping.
Use only with equipment of compatible materials of construction, rated for cylinder pressure.
Do not open valve until connected to equipment prepared for use.
When returning cylinder install valve outlet cap or plug leak tight.
Close valve after each use and when empty.
Vigorously accelerates combustion.
May react violently with combustible materials.
Keep oil, grease, and combustibles away.
Do not breathe gas.
Compressed liquefied gas.

Environmental Effects

Dangerous for the environment.

SECTION 3: Composition/information on ingredients

Substance/Mixture : Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (Volume)
Chlorine	231-959-5	7782-50-5	100 %

Components	Classification (CLP)	REACH Reg. #
Chlorine	Ox. Gas 1 ;H270 Press. Gas (Liq.) Acute Tox. Inha 2 ;H330 Eye Irrit. 2 ;H319 Skin Irrit. 2 ;H315 STOT SE 3 ;H335 Aquatic Acute 1 ;H400 Aquatic Chronic 1 ;H410 Acute M = 100 Chronic M =	01-2119486560-35

If REACH registration numbers do not appear the substance is either exempt from registration, does not meet the minimum volume threshold for registration, or the registration date has not yet come due.
Refer to section 16 for full text of each relevant R-phrase and H-phrases.

Concentration is nominal. For the exact product composition, please refer to Air Products technical specifications.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : The potential for hydrogen chloride formation exists with every exposure, therefore its toxicity must be considered. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a

doctor. Apply artificial respiration if breathing stopped.

Eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Keep eye wide open while rinsing.

Skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and badly. Flush with copious amounts of water until treatment is available. Remove contaminated clothing. Drench affected area with water for at least 15 minutes.

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

Inhalation : Move to fresh air. In case of shortness of breath, give oxygen. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Mouth to mouth resuscitation is not recommended. If unconscious place in recovery position and seek medical advice. Consult a doctor.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Irritating to eyes and respiratory system. Cough.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat bronchospasm and laryngeal edema if present . Observe for delayed chemical pneumonitis, pulmonary hemorrhage or edema.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media : All known extinguishing media can be used.

Extinguishing media which must not be used for safety reasons. : No data available.

5.2 Special hazards arising from the substance or mixture

: Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Oxidant. Strongly supports combustion. May react violently with combustible materials. Gas is heavier than air and may collect in low areas or travel along the ground where there may be an ignition source present. Some materials which are noncombustible in air may burn in the presence of an oxidizer. Use of water may result in the formation of very toxic aqueous solutions. Move away from container and cool with water from a protected position. Keep containers and surroundings cool with water spray. Do not allow run-off from fire fighting to enter drains or water courses. If possible, stop flow of product.

5.3 Advice for fire-fighters

: Use self-contained breathing apparatus and chemically protective clothing. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. EN 943-2: Protective

clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures	:	Evacuate personnel to safe areas. Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Use chemically protective clothing. Ventilate the area.
6.2 Environmental precautions	:	Reduce vapor with fog or fine water spray. Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
6.3 Methods and material for containment and cleaning up	:	Ventilate the area. Approach suspected leak areas with caution.
Additional advice	:	Large releases may require considerable downwind evacuation. If possible, stop flow of product. Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the Air Products emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.
6.4 Reference to Other Sections	:	For more information refer to Sections 8 & 13

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Carbon steel, stainless steel, Monel or copper are suitable materials of construction when no moisture is present. Hastelloy, platinum or gold offer good resistance to corrosion when moisture is present. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure

regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Keep container valve outlets clean and free from contaminates particularly oil and water. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Avoid suckback of water, acid and alkalis. Installation of a cross purge assembly between the cylinder and the regulator is recommended. When returning cylinder install valve outlet cap or plug leak tight. Never permit oil, grease, or other readily combustible substances to come into contact with valves or containers containing oxygen or other oxidants. Do not use rapidly opening valves (e.g. ball valves). Open valve slowly to avoid pressure shock. Never pressurize the entire system at once. Use only with equipment cleaned for oxygen service and rated for cylinder pressure. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier. Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture.

7.2 Conditions for safe storage, including any incompatibilities

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

Technical measures/Precautions

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

7.3 Specific end use(s)

Refer to section 1 or the extended SDS if applicable

SECTION 8: Exposure controls / personal protection

8.1 Control parameters

Exposure limit(s)

Chlorine	Short Term Exposure Limit (STEL): EH40 WEL	0.5 ppm	1.5 mg/m3
Chlorine	Short Term Exposure Limit (STEL): EU ELV	0.5 ppm	1.5 mg/m3

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

8.2 Exposure controls

Engineering measures

Provide natural or mechanical ventilation to prevent accumulation above exposure limits.
Provide readily accessible eye wash stations and safety showers.

Personal protective equipment

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

Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
Wear chemically resistant protective gloves.
Standard EN 374 - Protective gloves against chemicals.
Consult glove manufacturer´s product information on material suitability and material thickness.
The breakthrough time of the selected gloves must be greater than the intended use period.
Gloves must be clean and free of oil and grease.
Acid resistant gloves.

Eye/face Protection : Wear safety glasses with side shields.
Wear goggles and a face shield when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection.

Skin and body protection : Acid resistant gloves (e.g. butyl rubber, neoprene, polyethylene) and splash suit when connecting, disconnecting or opening cylinders.
Cold temperatures may cause embrittlement of protective material resulting in breakage and exposure.
Contact with cold evaporating liquid on gloves or suit may cause cryogenic burns or frostbite.
Safety shoes are recommended when handling cylinders.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

		Keep suitable chemically resistant protective clothing readily available for emergency use. Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.
Environmental exposure controls	:	Reduce vapor with fog or fine water spray.
Special instructions for protection and hygiene	:	Ensure adequate ventilation, especially in confined areas. Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits.
Environmental Exposure Controls	:	If applicable, refer to the extended section of the SDS for further information on CSA.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

(a/b) Physical state/Colour	:	Liquefied gas. Greenish-yellow.
(c) Odour	:	Pungent.
(c) Odour	:	Mixture contains one or more component(s) which have the following odor: Pungent.
(d) Density	:	0.0030 g/cm3 (0.187 lb/ft3) at 21 °C (70 °F) Note: (as vapor)
(e) Relative Density	:	1.6 (water = 1)
(f) Melting point / freezing point	:	-150 °F (-101 °C)
(g) Boiling point/range	:	-29 °F (-33.8 °C)
(h) Vapor pressure	:	98.62 psia (6.80 bara) at 68 °F (20 °C)
(i) Water solubility	:	8.620 g/l
(j) Partition coefficient (n-octanol/water)	:	Not applicable.
(k) pH	:	Not applicable.
(l) Viscosity	:	Not applicable.
(m) Particle characteristics	:	No data available.
(n) Lower and upper explosion / flammability limits	:	No data available.
(o) Flash point	:	Not applicable.

(p) Autoignition temperature	:	No data available.
(q) Decomposition temperature	:	No data available.

9.2. Other information

Explosive properties	:	No data available.
Oxidizing properties	:	Ci =0.7
Molecular Weight	:	70.91 g/mol
Odor threshold	:	No data available.
Evaporation rate	:	Not applicable.
Flammability (solid, gas)	:	Refer to product classification in Section 2
Specific Volume	:	0.3365 m3/kg (5.39 ft3/lb) at 21 °C (70 °F)
Relative vapor density	:	2.448 (air = 1)

SECTION 10: Stability and reactivity

10.1 Reactivity	:	Refer to possibility of hazardous reactions and/or incompatible materials sections.
10.2. Chemical stability	:	Stable under normal conditions.
10.3. Possibility of hazardous reactions	:	No data available.
10.4. Conditions to avoid	:	No data available.
10.5. Incompatible materials	:	Water. Aluminium. Strong bases. Brass. May react violently with combustible materials. May react violently with reducing agents. Violently oxidises organic material. Reacts with water to form corrosive acids. May react violently with alkalis. With water causes rapid corrosion of some metals. Avoid oil, grease and all other combustible materials. Organic materials. Flammable materials.

10.6 Hazardous decomposition products : No data available.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Likely routes of exposure

Effects on Eye	:	May cause eye irritation. May cause permanent eye injury. May cause blindness.
Effects on Skin	:	Causes skin irritation. Causes skin burns. Contact with liquid may cause cold burns/frostbite.
Inhalation Effects	:	May be fatal if inhaled. Corrosive to respiratory tract If inhaled, remove to fresh air.
Ingestion Effects	:	No data available.
Symptoms	:	Irritating to eyes and respiratory system. Cough.

Acute toxicity

Acute Oral Toxicity	:	No data is available on the product itself.
Acute Inhalation Toxicity	:	LC50 (1 h) : 293 ppm Species : Rat.
Acute Dermal Toxicity	:	No data is available on the product itself.
Skin corrosion/irritation	:	No data available.
Serious eye damage/eye irritation	:	No data available.
Sensitization.	:	No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity	:	No data available.
Reproductive toxicity	:	Pregnant rats exposed for one hour to 300 ppm hydrochloric acid had a five-fold higher incidence of fetal death than control rats. In addition, the surviving rat pups showed disturbances in kidney function.
Germ cell mutagenicity	:	No data is available on the product itself.
Specific target organ systemic toxicity (single exposure)	:	No data available.

Specific target organ systemic toxicity (repeated exposure)	:	Rats exposed 6 hours/day, 5 days/week for 6 weeks to Chlorine at a concentration of 1, 3, or 9 ppm exhibited respiratory tract effects and gained less weight than control animals. The severity of these effects was dose-related. In addition, liver and kidney effects were observed in the rats treated at > 3 ppm. Pregnant rats exposed for one hour to 300 ppm hydrochloric acid had a five-fold higher incidence of fetal death than control rats. In addition, the surviving rat pups showed disturbances in kidney function. Rats exposed 6 hours/day, 5 days/week for 6 weeks to Chlorine at a concentration of 1, 3, or 9 ppm exhibited respiratory tract effects and gained less weight than control animals. The severity of these effects was dose-related. In addition, liver and kidney effects were observed in the rats treated at > 3 ppm.
Aspiration hazard	:	No data available.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity	:	Toxic to aquatic organisms.May cause pH changes in aqueous ecological systems.
Toxicity to other organisms	:	No data is available on the product itself.

12.2. Persistence and degradability

No data available.

12.3. Bioaccumulative potential

No data is available on the product itself.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

Toxic to aquatic organisms.

Effect on the ozone layer

Ozone Depleting Potential	:	No data available.

Global Warming Potential : No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods : In accordance with local and national regulations. Return unused product in original cylinder to supplier. Contact supplier if guidance is required. Must not be discharged to atmosphere. Refer to the EIGA code of practice Doc. 30 "Disposal of Gases", downloadable at http://www.eiga.org for more guidance on suitable disposal methods. List of hazardous waste codes: 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

Contaminated packaging : Return cylinder to supplier.

SECTION 14: Transport information

ADR

UN/ID No.	:	UN1017
Proper shipping name	:	CHLORINE
Class or Division	:	2
Tunnel Code	:	(C/D)
Label(s)	:	2.3 (5.1, 8)
ADR/RID Hazard ID no.	:	265
Marine Pollutant	:	Yes

** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment.

IATA

Transport Forbidden

IMDG

UN/ID No.	:	UN1017
Proper shipping name	:	CHLORINE
Class or Division	:	2.3
Label(s)	:	2.3 (5.1, 8)
RQ Substance	:	Yes
Marine Pollutant	:	Yes

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

RID

UN/ID No.	:	UN1017

Proper shipping name : CHLORINE
Class or Division : 2
Label(s) : 2.3 (5.1, 8)
Marine Pollutant : Yes

** NOTE: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment.

Further Information
Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact an Air Products customer service representative.

SECTION 15: Regulatory information

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

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on Inventory.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

15.2 Chemical safety assessment
Applicable EXPOSURE SCENARIOS are available at the following link: www.airproducts.com/esds/7782-50-5

SECTION 16: Other information

Ensure all national/local regulations are observed.

Hazard Statements:
H270 May cause or intensify fire; oxidiser.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.
H400 Very toxic to aquatic life
H410 Very toxic to aquatic life with long lasting effects.

Indication of Method:
Oxidizing gases Category 1 May cause or intensify fire; oxidiser. Calculation method

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

Acute toxicity Category 2 Fatal if inhaled. Calculation method

Skin irritation Category 2 Causes skin irritation. Calculation method

Eye irritation Category 2 Causes serious eye irritation. Calculation method

Specific target organ toxicity - single exposure Category 3 May cause respiratory irritation. Calculation method

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

Chronic aquatic toxicity Category 1 Very toxic to aquatic life with long lasting effects. Calculation method

Abbreviations and acronyms:
ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
ELINCS - European List of Notified Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
Kow - octanol-water partition coefficient
DNEL - Derived No Effect Level
LC50 - Lethal Concentration to 50 % of a test population
LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose)
NOEC - No Observed Effect Concentration
PNEC - Predicted No Effect Concentration
RMM - Risk Management Measure
OEL - Occupational Exposure Limit
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT - Specific Target Organ Toxicity
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
IATA - International Air Transport Association
IMDG - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK - Water Hazard Class

Key literature references and sources for data:
ECHA - Guidance on the compilation of safety data sheets
ECHA - Guidance on the application of the CLP Criteria
ARIEL database

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

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

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws. Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.