

Product: Ammonia
UN No: 1005

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND THE COMPANY/UNDERTAKING

Product identifier : Ammonia
Chemical formula : NH₃
Synonyms : Ammonia, Anhydrous

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

Details of the Supplier : CK Special Gases Ltd
Ashby Suite, Wellington House
Leicester Road, Ibstock
Leicestershire
LE67 6HP

Email Address : sales@ckgas.com

Telephone : +44(0)1530 267209
Emergency Telephone (24 hours) : Web Version

2. HAZARDS IDENTIFICATION

Classification according to Regulation 1272/2008 (CLP)

Flammable gases – Category 1 H221: Flammable gas

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

Acute toxicity – Inhalation Category 3 H331: Toxic if inhaled

Skin corrosion - Category 1B H314: Causes severe skin burns and eye damage.

Serious Eye Damage - Category 1 H318: Causes serious eye damage.

Acute aquatic toxicity. - Category 1 H400: Very toxic to aquatic life

Label Elements according to Regulation 1272/2008 (CLP)

Hazard pictograms/symbols



Signal Word : Danger

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Hazard Statements :

H220: Extremely flammable gas
H314: Causes severe skin burns and eye damage.
H400: Very toxic to aquatic life
H221: Flammable gas.
H331: Toxic if inhaled.
EUH071: Corrosive to the respiratory tract.

Precautionary Statements :

Prevention

P210: Keep away from heat/sparks/open flames/hot surfaces.
No smoking
P260: Do not breathe dust/fume/gas/mist/vapours/spray
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response

P303+P361+P353 : IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
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.
P315 : Get immediate medical advice/attention.

Storage

P403: Store in a well-ventilated place.
P405: Store locked up

Classification (Directive)

N Dangerous to the environment

T Toxic

R10 Flammable

R23 Toxic by inhalation

R34 Causes Burns

R50 Vary toxic to aquatic organisms

Other Hazards

Flammable

Vapours may form explosive mixtures in air

Immediate fire and explosion risk hazard exists when mixed with air at concentrations exceeding the lower flammability limit (LFL).

Wear self-contained breathing apparatus and protective suit.

Direct contact with liquid can cause frostbite.

May react violently with water.

Do not breathe gas.

Corrosive to eyes, respiratory system and skin.

Compressed liquefied gas.

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Environmental Effects

Dangerous for the environment

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture :

Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (Volume)
Ammonia, anhydrous	231-635-3	7664-41-7	100%

Components	Classification (Directive)	Classification (CLP)	REACH Reg. #
Ammonia, anhydrous	T ; N R10 ; R23 ; R34 ; R50	Flam. Gas 2 Press. Gas Acute Tox. Inha 3 Skin Corr. 1B Aquatic Acute 1	

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 CK Special Gases technical specifications.

4. FIRST AID MEASURES

Description of first aid measures

General advice : Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Use chemically protected clothing.

Eye contact : Rinse immediately with plenty of water for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eyes wide open while rinsing.

Skin contact : Wash off immediately with plenty of water for at least 20 minutes. Cover wound with sterile dressing. If skin irritation persists, call a physician. Flush with copious amounts of water until treatment is available. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and badly.

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

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

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personnel should begin cardiopulmonary resuscitation immediately. If symptoms persist, call a physician. Keep patient warm and at rest. Use a barrier device.

Most important symptoms and effects, both acute and delayed

Symptoms : No data available.

Indication of any immediate medical attention and special treatment needed

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

5. FIRE-FIGHTING MEASURES

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.

Special hazards arising from the substance or mixture : Extinguish fire only if gas flow can be stopped. If possible, shut-off source of gas and allow the fire to burn itself out. Downwind personnel must be evacuated. Ammonia can form explosive compounds when combined with mercury. Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. 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 adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out. If possible, stop flow of product.

Advice for fire-fighters : In the event of fire, wear self-contained breathing apparatus. Use self-contained breathing apparatus and chemically protective clothing.

Further information : Use of water may result in the formation of very toxic aqueous solutions., Combustion by-products may be toxic., If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken(e.g. total evacuation to protect persons from cylinder fragments and toxic fumes) should a rupture occur., In the event of fire, cool tanks with water spray .

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6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective

equipment and emergency procedures : Evacuate personnel to safe areas. Remove all sources of ignition. Approach suspected leak areas with caution. 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. Ventilate the area.

Environmental precautions :

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

Methods and material for containment and cleaning up :

Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost.) Ventilate the area. Wash contaminated equipment or sites of leaks with copious quantities of water. Reduce vapour with fog or fine water spray.

Additional advice :

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 CK Special Gases emergency telephone number. If the leak is in the user's system, close the cylinder valve and safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Precautions for safe handling

Use equipment rated for cylinder pressure. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment.

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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 shocks which may cause damage to their valve or safety devices. 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 contaminants 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 air from system before introducing gas. 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 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). Prolonged periods of cold temperature below -30°C (-20°F) should be avoided. 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.

Conditions for safe storage, including any incompatibilities

Flammable storage areas should be separated from oxygen and other oxidizers by a minimum distance of 20 ft. (6.1 m.) or by a barrier of non-combustible material at least 5 ft. (1.5 m.) high, having a fire resistance rating of at least 1/2 hour. Post "No Smoking or Open Flames" signs in the storage areas. Full containers should be stored so that oldest stock is used first. Containers should be stored in a purpose built compound which should be well ventilated, preferably in the open air. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Local codes may have special requirements for toxic gas storage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Return empty containers in a timely manner.

Technical measures/Precautions

Containers containing flammable gases should be stored away from other combustible materials. Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition. Provide sufficient air exchange and/or exhaust in work rooms. Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations.

Specific end use(s)

Refer to section 1 or the extended SDS if applicable

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Exposure limit(s)

Ammonia, anhydrous	Time Weighted Average (TWA): EH40 WEL	25 ppm	18 mg/m ³
Ammonia, anhydrous	Short Term Exposure Limit (STEL): EH40 WEL	35 ppm	15 mg/m ³
Ammonia, anhydrous	Time Weighted Average (TWA): EU ELV	20ppm	15mg/m ³
Ammonia, anhydrous	Short Term Exposure Limit (STEL): EU ELV	50ppm	36mg/m ³

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

Exposure controls

Engineering measures

Handle product only in closed systems or provide appropriate exhaust ventilation machinery.
 Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.
 Provide readily accessible eye wash stations and safety showers.

Personal protective equipment

Respiratory protection :	Keep self-contained breathing apparatus (SCBA) readily available for emergency use. 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. Users of breathing apparatus must be trained.
Hand protection :	Sturdy work gloves are recommended for handling cylinders. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection :	Safety glasses recommended when handling cylinders. A full face shield should be worn in addition to safety glasses when connecting, disconnecting or opening cylinders.
Skin and body protection :	Use chemically protective clothing. Safety shoes are recommended when handling cylinders. Encapsulated chemical protective suit in emergency situations.
Special instructions for protection and hygiene :	Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits. Ensure adequate ventilation, especially in confined areas.

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9. PHYSICAL

Information on basic physical and chemical properties

Appearance :	Liquefied gas. Colourless gas
Odour :	Ammoniacal.
Odour threshold :	No data available.
pH :	Not applicable.
Melting point/range :	-108 °F (-77.7 °C)
Boiling point/range :	-28 °F (-33.5 °C)
Flash point :	Not applicable.
Evaporation rate :	Not applicable.
Flammability (solid, gas) :	No data available.
Upper/lower explosion/flammability limit :	28 % (V) / 15 % (V).
Vapour pressure :	124.73 psia (8.60 bar) at 68°F (20°C).
Water solubility :	Hydrolyses.
Relative vapour density :	0.588 (air = 1)
Relative density :	0.7 (water=1)
Partition coefficient (n-octanol/water)	Not applicable.
Autoignition temperature :	630°C.
Decomposition temperature :	No data available.
Viscosity :	Not applicable.
Explosive properties :	No data available.
Oxidizing properties :	No data available.
Molecular Weight :	17.03 g/mol
Density :	0.0007 g/cm ³ (0.044 lb/ft ³) at 21°C (70°F)
Specific Volume :	1.4040 m ³ /kg (22.49 ft ³ /lb) at 21°C (70°F)

10. STABILITY AND REACTIVITY

Reactivity :	Refer to possibility of hazardous reactions and/or incompatible materials sections.
Chemical Stability :	Stable under normal conditions.
Possibility of hazardous reactions :	No data available.
Conditions to avoid :	Heat, flames and sparks.
Incompatible materials :	Copper, silver, cadmium and zinc and their alloys; mercury, tin, acids, alcohols, aldehydes, halogens and oxidizers. Ammonia can form explosive compounds when combined with mercury. May react violently with oxidants. May react violently with acids. Reacts with water to form corrosive alkalis. Overexposure to the atmosphere results in water absorption.
Hazardous decomposition products :	No data available.

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11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Likely routes of exposure

Effects on Eye :

Causes eye burns. Causes eye irritation. Irritating to eyes. Causes severe eye burns. May cause permanent eye injury.

Effects on Skin :

Irritating to skin. Contact with liquid may cause cold burns/frostbite. Causes skin irritation. Causes skin burns.

Inhalation Effects :

Corrosive to respiratory tract Irritating to respiratory system. Irritating to respiratory system. Can cause severe lung damage. May be fatal if inhaled. Delayed adverse effects possible. Prolonged exposure to small concentrations may result in pulmonary oedema. Delayed fatal pulmonary oedema possible.

Ingestion Effects :

No data available.

Symptoms :

No data available.

Acute toxicity

Acute Oral Toxicity :

No data is available on the product itself.

Inhalation :

LC50 (1h) : 7338 ppm Species : Rat.

Acute Dermal Toxicity :

No data is available on the product itself.

Skin corrosion/irritation :

No data available.

Serious eye damage/eye irritation :

No data available.

Sensitization. :

No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity :

No data available.

Reproductive toxicity :

No data is available on the product itself.

Germ cell mutagenicity :

No data is available on the product itself.

Specific target organ systemic toxicity (single exposure) :

No data available.

Specific target organ systemic toxicity (repeated exposure) :

No data available.

Aspiration hazard :

No data available.

12. ECOLOGICAL INFORMATION

Toxicity

Aquatic toxicity :

May cause pH changes in aqueous ecological systems.

Toxicity to other organisms :

No data is available on the product itself.

Persistence and degradability :

No data available.



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Bioaccumulative potential : No data is available on the product itself.

Mobility in soil : No data available.

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

Other adverse effects : No data available.

13. DISPOSAL CONSIDERATIONS

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

Contaminated packaging : Return cylinder to supplier.

14. TRANSPORT INFORMATION

ADR

UN/ID No. : UN1005
Proper shipping name : AMMONIA, ANHYDROUS
Class or Division : 2
Tunnel Code : (C/D)
Label(s) : 2.3 (8)
ADR/RID Hazard ID no. : 268
Marine Pollutant : Yes

NOTE 1: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment. For more information, contact an CK Special Gases customer service representative.

IATA

Transport forbidden

IMDG

UN/ID No. : UN1005
Proper shipping name : AMMONIA, ANHYDROUS
Class or Division : 2.3
Label(s) : 2.3 (8)
RQ Substance : Yes
Marine Pollutant : Yes

NOTE 1: 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. For more information, contact a CK Special Gases customer service representative.



SAFETY DATA SHEET

MSDS No: CKSG-01-1005

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NOTE 2: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment. For more information, contact a CK Special Gases customer service representative.

RID

UN/ID No. : UN1005
Proper shipping name : AMMONIA, ANHYDROUS
Class or Division : 2.3
Label(s) : 2.3 (8)
Marine Pollutant : Yes

NOTE 1: This product contains a substance that: 1) is regulated as a Marine Pollutant, or 2) meets the definition of toxic to the aquatic environment. For more information, contact a CK Special Gases customer service representative.

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 a CK Special Gases customer service representative.

15. REGULATORY INFORMATION

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.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.
Japan	ENCS	Included on Inventory.

WGK Identification Number : 2 - water endangering.

Chemical Safety Assessment

Refer to extended SDS for CSA information

If this product does not contain exposure scenarios, the components in this product are either exempt from REACH, does not meet the minimum volume threshold for a CSA, or the CSA has not yet been completed.



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16. OTHER INFORMATION

Ensure all national/local regulations are observed.

R-phrases – Components

R10 Flammable.

R23 Toxic by inhalation.

R34 Causes burns.

R50 Very toxic to aquatic organisms.

Hazard Statements:

H221 Flammable gas.

H280 Contains gas under pressure; may explode if heated.

H314 Causes severe skin burns and eye damage.

H331 Toxic if inhaled.

H400 Very toxic to aquatic life

Prepared by : CK Special Gases Ltd

For additional information, please visit our website at www.ckgas.com

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

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.