

Product: Deuterium Chloride
UN No: 3304

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

Product identifier : Deuterium Chloride
Chemical formula : DCI
Synonyms : Deuterium Chloride

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)

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 1A H314: Causes severe skin burns and eye damage.

Serious eye damage – Category 1 H318: Causes serious eye damage.

Label Elements according to Regulation 1272/2008 (CLP)

Hazard pictograms/symbols



Signal Word : Danger

Hazard Statements : H280: Contains gas under pressure; may explode if heated.
H314: Causes severe skin burns and eye damage.

SAFETY DATA SHEET

MSDS No: CKSG-01-3304

Product: Deuterium Chloride

UN No: 3304

H331: Toxic if inhaled.

EUH071: Corrosive to the respiratory tract.

Precautionary Statements :

Prevention

P260a: 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)

T Toxic

C Corrosive

R23 Toxic by inhalation.

R35 Causes severe burns.

Other Hazards

Reacts with water to form corrosive acids.

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.

Environmental Effects

Dangerous for the environment

SAFETY DATA SHEET

MSDS No: CKSG-01-3304

Product: Deuterium Chloride

UN No: 3304

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture :

Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (Volume)
Deuterium Chloride	231-715-8	7698-05-7	100%

Components	Classification (Directive)	Classification (CLP)	REACH Reg. #
Deuterium Chloride	T ; C R35 ; R37	Press. Gas Acute Tox. Inha 3 Skin Corr. 1A Skin Corr. 1B STOT SE 3	

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-phrases 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 and seek medical advice. Keep eye wide open while rinsing.

Skin contact :

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 :

Move to fresh air. If breathing has stopped or is laboured, 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. Use a barrier device. If unconscious place in recovery position and seek medical advice. In case of shortness of breath, give oxygen. Consult a doctor.

Product: Deuterium Chloride

UN No: 3304

Most important symptoms and effects, both acute and delayed

Symptoms : Irritating to eyes and respiratory system. Cough.

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 : Product is non-flammable and does not support combustion. 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 : Use self-contained breathing apparatus and chemically protective clothing.

Further information : No data available.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Evacuate personnel to safe areas. Ventilate the area. 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.

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.

Product: Deuterium Chloride**UN No: 3304**

Methods and material for containment and cleaning up :

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 :

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 CK Gas 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.

7. HANDLING AND STORAGE

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. 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. 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 suck-back of water, acid and alkalis. Installation of a cross purge

Product: Deuterium Chloride**UN No: 3304**

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

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

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

Storage Temperature < 71.6°F (22°C)

8. EXPOSURE CONTROLS / PERSONAL PROTECTIONControl parametersExposure Limit

Deuterium chloride	Time Weighted Average (TWA): EH40 WEL	5 ppm	8 mg/m ³
Deuterium chloride	Short Term Exposure Limit (STEL): EH40 WEL	10 ppm	15 mg/m ³
Deuterium chloride	Time Weighted Average (TWA): EU ELV	1 ppm	2 mg/m ³
Deuterium chloride	Short Term Exposure Limit (STEL): EU ELV	5 ppm	8 mg/m ³

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

Exposure controlsEngineering measures

Handle product only in closed systems or provide appropriate exhaust ventilation machinery.

Product: Deuterium Chloride**UN No: 3304**

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 :

Acid resistant gloves.
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 :

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. Encapsulated chemical protective suit in emergency situations.

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.

9. PHYSICAL

Information on basic physical and chemical properties

Appearance :	Liquefied gas. Gives off white fumes in moist air.
Odour :	Pungent.
Odour threshold :	No data available.
pH :	Not applicable.
Melting point/range :	-114 °F (-114.2 °C)
Boiling point/range :	-85 °F (-84.9 °C)
Flash point :	Not applicable.
Evaporation rate :	Not applicable.
Flammability (solid, gas) :	No data available.
Upper/lower explosion/flammability limit :	No data available.

Product: Deuterium Chloride
UN No: 3304

Vapour pressure :	617.84 psia (42.60 bar) at 68°F (20°C).
Water solubility :	Hydrolyses.
Relative vapour density :	1.259 (air = 1)
Relative density :	1.2 (water=1)
Partition coefficient (n-octanol/water)	Not applicable.
Autoignition temperature :	No data available.
Decomposition temperature :	No data available.
Viscosity :	Not applicable.
Explosive properties :	No data available.
Oxidizing properties :	No data available.
Molecular Weight :	36.46 g/mol
Density :	0.0015 g/cm ³ (0.094 lb/ft ³) at 21°C (70°F)
Specific Volume :	0.6586 m ³ /kg (10.55 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 :	No data available.
Incompatible materials :	Strong bases. Aluminium. Reacts with water to form corrosive acids. Brass.
Hazardous decomposition products :	No data available.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Likely routes of exposure	
Effects on Eye :	Irritating to eyes. Causes severe eye burns. May cause permanent eye injury.
Effects on Skin :	Contact with liquid may cause cold burns/frostbite. Causes skin irritation. Causes skin burns.
Inhalation Effects :	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 :	Irritating to eyes and respiratory system. Cough.

Acute toxicity

Acute Oral Toxicity :	No data is available on the product itself.
-----------------------	---

SAFETY DATA SHEET

MSDS No: CKSG-01-3304

Product: Deuterium Chloride**UN No: 3304**

Acute Oral Toxicity – Components	No data available.
Inhalation :	No data available.
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) :	Pregnant rats exposed for one hour to 300 ppm hydrochloric acid had a five-fold higher incidence of foetal death than control rats. In addition, the surviving rat pups showed disturbances in kidney function. Exposure may cause spasm of the larynx or bronchi. This product is toxic, causing severe irritation of the upper respiratory tract upon inhalation, and irritation of the eyes and the skin on contact.
Aspiration hazard :	No data available.

12. ECOLOGICAL INFORMATION

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.
Bioaccumulative potential :	No data is available on the product itself.
Bioaccumulation – Components	Deuterium chloride Negligible bioaccumulation potential.
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

Product: Deuterium Chloride**UN No: 3304**

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.

Contaminated packaging :

Return cylinder to supplier.

14. TRANSPORT INFORMATION**ADR**

UN/ID No. : UN3304
Proper shipping name : DEUTERIUM CHLORIDE, ANHYDROUS
Class or Division : 2
Tunnel Code : (C/D)
Label(s) : 2.3 (8)
ADR/RID Hazard ID no. : 268

IATA

Transport forbidden

IMDG

UN/ID No. : UN3304
Proper shipping name : DEUTERIUM CHLORIDE, ANHYDROUS
Class or Division : 2.3
Label(s) : 2.3 (8)

RID

UN/ID No. : UN3304
Proper shipping name : DEUTERIUM CHLORIDE, ANHYDROUS
Class or Division : 2.3
Label(s) : 2.3 (8)

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.

Product: Deuterium Chloride**UN No: 3304**

China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.
Japan	ENCS	Included on Inventory.

WGK Identification Number : 1 - slightly 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.

16. OTHER INFORMATION

Ensure all national/local regulations are observed.

R-phrases – Components

R23 Toxic by inhalation

R35 Causes severe burns.

Hazard Statements:

H314 Causes severe skin burns and eye damage.

H335 May cause respiratory irritation.

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.