HARP® R717 (Ammonia)

Revision: 1
Revision date: December 2020

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

1.1 Product identifier

Product name	R717 (Ammonia)
REACH registration number	01-2119488876-14
CAS No.	7664-41-7
EC No.	231-635-3

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

Product use	Industrial and professional use. Refrigerant.
Restricted use	Consumer uses: Private households (= general public = consumers)
Description	Gas

1.3 Details of the supplier of the safety data sheet

Company	Harp International Limited
Address	Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX UK
Web	www.harpintl.com
Telephone	+44 (0) 1443 842 255
Fax	+44 (0) 1443 841 805
Email	harp@harpintl.com
Email of competent person	safety@harpintl.com

1.4 Emergency telephone number

Emergency telephone number	+44 (0) 1270 502 891 24 hours

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification – EC 1272/2008	Flammable gases - Category 2 H221: Flammable gas 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 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 Chronic aquatic toxicity – Category 2 H411: Toxic to aquatic life with long lasting effects

2.2 Label elements

Hazard pictograms	
Signal word	Danger
Hazard statement	H221 - Flammable gas H280 - Contains gas under pressure; may explode if heated H314 - Causes severe burns and eye damage H331 - Toxic if inhaled H411 - Toxic to aquatic life with long lasting effects EUH071 - Corrosive to the respiratory tract

Precautionary statement	P210 – Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P260 – Do not breathe dust/fume/gas/mist/vapours/spray P273 – Avoid release to the environment P280 – Wear protective gloves/protective clothing/eye protection/face protection 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 so. Continue rinsing. P315 – Get immediate medical advice/attention P377 – Leaking gas fire: Do not extinguish unless leak can be stopped safely P381 – Eliminate all ignition sources if safe to do so P403 – Store in a well-ventilated place P405 – Store locked up

2.3 Other hazards

Other hazards	Vapours may form explosive mixture with air. Contact with liquid may cause cold burns/frostbite. May react violently with water

SECTION 3: Composition/information on ingredients

3.1 Substances

EC 1272/2008

Chemical name	CAS No.	EC No.	REACH registration number	Concentration (%w/w)	Classification
Ammonia, anhydrous	7664-41-7	231-635-3	01-2119488876-14	90-100%	Flam. Gas 2: H221 Compressed gas: H280 Acute Tox. Inha 3: H331 Eye Dam 1: H318 Skin Corr 1B: H314 Aquatic Acute 1: H400 Aquatic Chronic 2: H411

The purity of the substance in this section is used for classification only and does not represent the actual purity of the substance as supplied.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation	Move the exposed person to fresh air. 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. 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.
Eye contact	Rinse immediately with plenty of water. 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

4.2 Most important symptoms and effects, both acute and delayed

Inhalation	Aspiration may cause pulmonary edema and pneumonitis. Coughing, irritation in the throat and nasal tract.
Eye contact	May cause severe chemical burns to cornea
Skin contact	May cause severe chemical burns to skin
Ingestion	Ingestion is not considered a potential route of exposure

4.3 Indication of any immediate medical attention and special treatment needed

Inhalation	Treat bronchospasm and laryngeal edema if present. Observe for delayed chemical pneumonitis, pulmonary hemorrhage or edema.
Eye contact	Seek medical attention
Skin contact	Seek medical attention
Ingestion	Ingestion is not considered a potential route of exposure

SECTION 5: Firefighting measures

5.1 Extinguishing media

	Water spray or fog. Foam. The product itself does not burn. Use extinguishing media appropriate to the surrounding fire conditions. Do not use water jet to extinguish.

5.2 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. Product is nonflammable and does not support combustion. 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 firefighting to enter drains or water courses.

5.3 Advice for firefighters

	If possible, stop flow of product. Wear self-contained breathing apparatus with full face mask and chemically protective clothing. Use of water may result in the formation of very toxic aqueous solutions. Combustion bi-products may be toxic. If flames are accidentally extinguished, explosive re-ignition may occur, therefore, appropriate measures should be taken should a rupture occur e.g. total evacuation to protect persons from cylinder fragments and toxic fumes. In the event of fire, cool tanks with water spray.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

	Remove all sources of ignition. Evacuate personnel to a safe area. 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 exposure limits.

6.2 Environmental precautions

	Should not be released to 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 clean up

	Ventilate the area. Wash contaminated equipment or site of leaks with copious quantities of water. Reduce vapour with fog or fine water spray. 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 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

	See section 8 Exposure controls / personal protection See section 13 Disposal considerations

SECTION 7: Handling and storage

7.1 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 temperature to exceed 50^{o}C. Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Before using the product, determine its identity be 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 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 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 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 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. 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

	Flammable storage areas should be separated from oxygen and other oxidizers by a minimum distance of 6.1m or by a barrier of non-combustible material at least 1.5m high, having a fire resistance rating of at least ½ hour. Post "No smoking or open flames" signs in 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. 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. Return empty containers in a timely manner. 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.

7.3 Specific end use(s)

	See section 1.2 Relevant identified uses of the substance or mixture and uses advised against for further information.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters – exposure limit values

Component	CAS No.	Value type (form of exposure)	Exposure limit values	Source
Ammonia, anhydrous	7664-41-7	TWA	25ppm / 18mg/m^3	EH40

8.2 Exposure controls

Appropriate engineering controls	Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Provide natural or mechanical ventilation to prevent accumulation above exposure limits. Provide readily accessible eye wash stations and safety showers.
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 & body protection	Use chemically protective clothing. 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.
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 work 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.
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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance - Physical state	Gas
Appearance - Form	Liquefied gas
Colour	Colourless
Odour	Ammoniacal
Odour threshold	Odour threshold is subjective and inadequate to warn of over exposure
pH	Not applicable for gases and gas mixtures
Melting point	-77.7°C
Boiling point / range	-33°C
Flash point	Not applicable for gases and gas mixtures
Evaporation rate	Not applicable for gases and gas mixtures
Flammability (solid, gas)	15.4% (V) – 33.6% (V)
Vapour pressure	8.60 bara (20°C)
Vapour density	0.0007 g/cm^3 at 21°C
Relative vapour density	0.588 (air = 1)
Relative density	0.7 (water = 1)
Solubility(ies) **Water solubility**	517 g/l Hydrolyses
Partition coefficient: n-octanol/water	Not applicable for inorganic gases
Auto-ignition temperature	630°C

Decomposition temperature	No data available
Viscosity **Viscosity, kinematic**	No data available

9.2 Other information

Molecular weight	17.03 g/mol
Specific volume	1.4040 m^3/kg at 21°C

SECTION 10: Stability and reactivity

10.1 Reactivity

	No reactivity hazard other than the effects described in sub-sections below

10.2 Chemical stability

	Stable under normal conditions

10.3 Possibility of hazardous reactions

	Vapours may form explosive mixture with air

10.4 Conditions to avoid

	Heat, flames and sparks.

10.5 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

10.6 Hazardous decomposition products

	No decomposition if stored normally

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity	No data available
Skin corrosion/irritation	Causes skin burns
Serious eye damage/irritation	Risk of serious damage to eyes
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	No data available
Carcinogenicity	This product contains no listed carcinogens according to OSHA in concentrations of 0.1% or greater
Reproductive toxicity	No data available
STOT single exposure	No data available
STOT repeated exposure	No data available
Aspiration hazard	No data available

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SECTION 12: Ecological information

12.1 Toxicity

	May cause pH changes in aqueous ecological systems

12.2 Persistence and degradability

	Readily biodegradable

12.3 Bioaccumulative potential

	Refer to Section 9 “Partition Coefficient (n-octanol/water)”.

12.4 Mobility in soil

	No data available

12.5 Results of PBT and vPvB assessment

	Not classified as PBT or vPvB

12.6 Other adverse effects

	This product has no known eco-toxicological effects. When discharged in large quantities may contribute to the greenhouse effect. Ozone depleting potential: 0 Global warming potential: 0

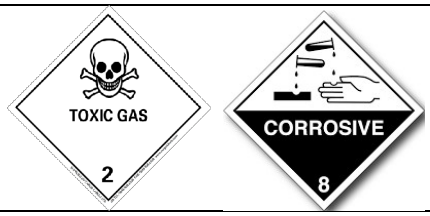
SECTION 13: Disposal considerations

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. EWC code: 16 05 04* Gases in pressure containers (including halons) containing hazardous substances

SECTION 14: Transport information

Hazard pictograms

14.1 UN number

	UN 1005

14.2 UN proper shipping name

	AMMONIA, ANHYDROUS

14.3 Transport hazard class(es)

ADR/RID	
Class	2
Labels	2.3 (8)
Hazard No. (ADR)	268
Tunnel category	(C/D)
IMDG	
Class	2.3

IATA	
Class	2.3
Packing instruction	-
Cargo	Forbidden
Passenger	Forbidden

14.4 Packing group

	Not applicable

14.5 Environmental hazards

Marine pollutant	Yes
Segregation group (IMDG)	Alkalis

14.6 Special precautions for user

	This product contains a substance that is regulated as a marine pollutant or meets the definition of toxic to the aquatic environment. 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.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

	Not applicable

SECTION 15: Regulatory information

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

Regulations	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.

15.2 Chemical safety assessment

	A CSA has been carried out.

SECTION 16: Other information

Other information

Text of Hazard Statements in Section 3	H221: Flammable gas H280: Contains gas under pressure; may explode if heated. H314: Causes severe skin burns and eye damage H318: Causes serious eye damage H331: Toxic if inhaled H400: Very toxic to aquatic life H411: Toxic to aquatic life with long lasting effects
Reference materials	HSE publication EH40/2005 Workplace exposure limits (latest edition)
Changes from previous versions	-

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Further information

	The information supplied in this safety data sheet is designed only as guidance for the safe use, storage and handling of the product. This information is correct to the best of our knowledge and belief at the date of publication however no guarantee is made of its accuracy. This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the material in the user's end product, if applicable.