Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • **Ammonia (0.0051-0.1%) in Hydrogen (Balance)**

Product Code • M-20431/E-1

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

Relevant identified use(s) • Please provide product use.

1.3 Details of the supplier of the safety data sheet

Manufacturer • Air Liquide

2700 Post Oak Blvd.
Houston, TX 77056
United States
www.us.airliquide.com
sds@airliquide.com

Telephone (Technical) • 713-896-2896

Telephone (Technical) • 800-819-1704

1.4 Emergency telephone number

Manufacturer • 800-424-9300 - CHEMTREC

Manufacturer • +1 703-527-3887 - Outside United States

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP • Flammable Gases 1 - H220
Compressed Gas - H280

DSD/DPD • Extremely Flammable (F+)

R12

2.2 Label Elements

CLP

DANGER

Hazard statements • H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated

Precautionary statements

Prevention • P210 - Keep away from heat, sparks, open flames and/or hot surfaces. - No smoking.

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

Storage/Disposal • P403 - Store in a well-ventilated place.

DSD/DPD

Risk phrases • R12 - Extremely flammable.

Safety phrases • S9 - Keep container in a well ventilated place
S16 - Keep away from sources of ignition - No Smoking.

2.3 Other Hazards

CLP • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

DSD/DPD • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
This product is considered dangerous according to the European Directive 67/548/EEC.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012 • Flammable Gases 1 - H220
Compressed Gas - H280
Simple Asphyxiant

2.2 Label elements

OSHA HCS 2012

DANGER

Hazard statements • Extremely flammable gas - H220
Contains gas under pressure; may explode if heated - H280
May displace oxygen and cause rapid suffocation.

Precautionary statements

Prevention • Keep away from heat, sparks, open flames and/or hot surfaces. - No smoking. - P210

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

Storage/Disposal • Store in a well-ventilated place. - P403

2.3 Other hazards

OSHA HCS 2012 • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Compressed Gas - A
  Flammable Gases - B1

2.2 Label elements

WHMIS

- Compressed Gas - A
  Flammable Gases - B1

2.3 Other hazards

WHMIS

- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
  In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

2.4 Other information

NFPA

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance in accordance with Regulation (EC) No 1272/2008.

3.2 Mixtures

Composition					
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**	**Comments**
Hydrogen	**CAS:**1333-74-0 **EC Number:**215-605-7 **EU Index:**001-001-00-9	99.9% TO 99.9949%	NDA	**EU DSD/DPD:** Annex I - F+; R12 **EU CLP:** Annex VI - Flam. Gas 1, H220; Press. Gas - Comp., H280 **OSHA HCS 2012:** Flam. Gas 1, Press. Gas - Comp.; Simp. Asphyx.	Balance
Ammonia	**CAS:**7664-41-7 **EC Number:**231-635-3 **EU Index:**007-001-00-5	0.0051% TO 0.1%	Inhalation-Rat LC50 • 2000 ppm 4 Hour(s)	**EU DSD/DPD:** Annex I - R10; T; R23; C; R34; N; R50 **EU CLP:** Annex VI - Flam. Gas 2, H221; Press. Gas - Liq., H280; Acute Tox. 3 *, H331; Skin Corr. 1B, H314; Aquatic Acute 1, H400 **OSHA HCS 2012:** Eye Dam. 1, Skin Corr. 1B, Flam. Gas 2; Press. Gas - Liq.; Acute Tox 3	51 - 1000 ppm

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin
- Although exposure is unlikely, in case of contact immediately flush skin with running water. If skin irritation develops get medical advice/attention.

Eye
- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If eye irritation persists: Get medical advice/attention.

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

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

4.4 Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- SMALL FIRES: Dry chemical or CO2.
  LARGE FIRES: Water spray or fog.

Unsuitable Extinguishing Media
- No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- EXTREMELY FLAMMABLE
  Will form explosive mixtures with air.
  Vapors may travel to source of ignition and flash back.
  Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
  Containers may explode when heated.
  Ruptured cylinders may rocket.

Hazardous Combustion Products
- No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
  Wear positive pressure self-contained breathing apparatus (SCBA).
  DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED
  Move containers from fire area if you can do it without risk.
  FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.
FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.
FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.
FIRE INVOLVING TANKS: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. LARGE SPILL: Consider initial downwind evacuation for at least 800 meters (1/2 mile)

6.2 Environmental precautions

- Prevent spreading of vapors through sewers, ventilation systems and confined areas.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- All equipment used when handling the product must be grounded.
  Stop leak if you can do it without risk.
  If possible, turn leaking containers so that gas escapes rather than liquid.
  Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
  Do not direct water at spill or source of leak.
  Isolate area until gas has dispersed.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Keep away from heat and ignition sources – No Smoking. Take precautionary measures against static charges. All equipment used when handling the product must be grounded. Use only non-sparking tools. Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Use explosion-proof - electrical, ventilating and/or lighting equipment. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52C (125F). Cylinders must be protected from the environment, and preferably kept at room temperature approximately 21C (70F). Protect cylinders against physical

damage. Cylinders should be firmly secured to prevent falling or being knocked-over. Store locked up.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	**ACGIH**	**Canada Ontario**	**Canada Quebec**	**China**	**China Highly Toxic Goods**
Ammonia (7664-41-7)	STELs	35 ppm STEL	35 ppm STEL	35 ppm STEV; 24 mg/m3 STEV	30 mg/m3 STEL	30 mg/m3 STEL
	TWAs	25 ppm TWA	25 ppm TWA	25 ppm TWAEV; 17 mg/m3 TWAEV	20 mg/m3 TWA	20 mg/m3 TWA

Exposure Limits/Guidelines (Con't.)						
	Result	**France**	**Germany DFG**	**Germany TRGS**	**Ireland**	**Israel**
Ammonia (7664-41-7)	STELs	20 ppm STEL [VLCT] (restrictive limit); 14 mg/m3 STEL [VLCT] (restrictive limit)	Not established	Not established	50 ppm STEL (anhydrous); 36 mg/m3 STEL (anhydrous)	35 ppm STEL
	TWAs	10 ppm TWA [VME] (restrictive limit); 7 mg/m3 TWA [VME] (restrictive limit)	Not established	20 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2); 14 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2)	20 ppm TWA (anhydrous); 14 mg/m3 TWA (anhydrous)	25 ppm TWA
	Ceilings	Not established	40 ppm Peak; 28 mg/m3 Peak	Not established	Not established	Not established
	MAKs	Not established	20 ppm TWA MAK; 14 mg/m3 TWA MAK	Not established	Not established	Not established

Exposure Limits/Guidelines (Con't.)						
	Result	**Italy**	**NIOSH**	**OSHA**	**OSHA Vacated**	**Portugal**
Ammonia (7664-41-7)	STELs	50 ppm STEL; 36 mg/m3 STEL	35 ppm STEL; 27 mg/m3 STEL	Not established	35 ppm STEL; 27 mg/m3 STEL	35 ppm STEL [VLE-CD
	TWAs	20 ppm TWA; 14 mg/m3 TWA	25 ppm TWA; 18 mg/m3 TWA	50 ppm TWA; 35 mg/m3 TWA	Not established	25 ppm TWA [VLE-MP]

Exposure Limits/Guidelines (Con't.)			
	Result	**Spain**	**Sweden**
	STELs	50 ppm STEL [VLA-EC]; 36 mg/m3 STEL [VLA-EC]	Not established

Ammonia (7664-41-7)	TWAs	20 ppm TWA [VLA-ED] (indicative limit value); 14 mg/m3 TWA [VLA-ED] (indicative limit value)	20 ppm LLV; 14 mg/m3 LLV
	Ceilings	Not established	50 ppm CLV (5 min); 36 mg/m3 CLV (5 min)

Exposure Control Notations

Portugal

•Hydrogen (1333-74-0): **Simple Asphyxiants:** (Simple Asphyxiant)

Ireland

•Hydrogen (1333-74-0): **Simple Asphyxiants:** (Asphyxiant)

Spain

•Hydrogen (1333-74-0): **Simple Asphyxiants:** (simple asphyxiant)

Germany DFG

•Ammonia (7664-41-7): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof - electrical, ventilating and/or lighting equipment.

Personal Protective Equipment

Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face

- Wear safety glasses.

Skin/Body

- Wear leather gloves when handling cylinders.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

LLV = Limit Level Value is the exposure limit for 8-hour work day

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

TWAEV = Time-Weighted Average Exposure Value

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with pungent odor.
Color	Colorless	Odor	Pungent
Odor Threshold	Not relevant		
General Properties			
Boiling Point	-252.8 C(-423.04 F)	Melting Point	-259.2 C(-434.56 F)
Decomposition Temperature	Data lacking	pH	Not relevant
Specific Gravity/Relative Density	Data lacking	Water Solubility	1.96 % @ 0 C(32 F)
Viscosity	Data lacking	Explosive Properties	Data lacking

Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	79 hPa @ -259 C(-434.2 F)	Vapor Density	0.07 Air=1
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	75 %
LEL	4 %	Autoignition	500 C(932 F)
Flammability (solid, gas)	Flammable gas.		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Excess heat, sparks, open flame.

10.5 Incompatible materials

- Copper, zinc, mercury and their alloys, and strong mineral acids. Oxidizing agents: hydrogen can react with some metals (i.e. hardened steel) to cause embritlement, alkaline materials, halogens.

10.6 Hazardous decomposition products

- None known.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Components		
Ammonia (0.0051% TO 0.1%)	7664-41-7	**Acute Toxicity:** Inhalation-Rat LC50 • 2000 ppm 4 Hour(s); Skin-Rat LD50 • 4840 mg/m³ 60 Minute(s); **Tumorigen / Carcinogen:** Ingestion/Oral-Rat TDLo • 1680 mg/kg 24 Week(s)-Continuous; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Gastrointestinal*:**Tumors**

GHS Properties	Classification
Acute toxicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Aspiration Hazard	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met

Carcinogenicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Germ Cell Mutagenicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Skin corrosion/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Skin sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
STOT-RE	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
STOT-SE	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Toxicity for Reproduction	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Respiratory sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Serious eye damage/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met

Potential Health Effects

Inhalation

Acute (Immediate)

- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

Chronic (Delayed)

- No data available

Skin

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Eye

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Ingestion

Acute (Immediate)

- Ingestion is not anticipated to be a likely route of exposure to this product.

Chronic (Delayed)

- No data available

Key to abbreviations

LC = Lethal Concentration
LD = Lethal Dose
TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN1054	Compressed gas, flammable, n.o.s. (Hydrogen)	2.1	NDA	NDA
TDG	UN1954	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen)	2.1	NDA	NDA
IMO/IMDG	UN1054	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen)	2.1	NDA	NDA
IATA/ICAO	UN1054	Compressed gas, flammable, n.o.s. (Hydrogen)	2.1	NDA	NDA

14.6 Special precautions for user

- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

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

- Not relevant.

14.8 Other information

DOT

- Ammonia has a reportable quantity of 100 lbs (45.4 kg) as listed in Appendix A to 49 CFR 172.101.

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Acute, Fire, Pressure(Sudden Release of)

State Right To Know				
Component	**CAS**	**MA**	**NJ**	**PA**
Ammonia	7664-41-7	Yes	Yes	Yes
Hydrogen	1333-74-0	Yes	Yes	Yes

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**China**	**EU EINECS**	**EU ELNICS**
Ammonia	7664-41-7	Yes	No	Yes	Yes	No
Hydrogen	1333-74-0	Yes	No	Yes	Yes	No

Inventory (Con't.)		
Component	**CAS**	**TSCA**
Ammonia	7664-41-7	Yes
Hydrogen	1333-74-0	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Ammonia	7664-41-7	A, B1, D1A, E; E (Ammonia solution, in water - 10-35% Ammonia, 35-50% Ammonia, >50% Ammonia)
• Hydrogen	1333-74-0	A, B1

Canada - WHMIS - Ingredient Disclosure List

• Ammonia	7664-41-7	1 %
• Hydrogen	1333-74-0	Not Listed

Environment

Canada - CEPA - Priority Substances List

• Ammonia	7664-41-7	Priority Substance List 2 (substance considered toxic, in the aquatic environment)
• Hydrogen	1333-74-0	Not Listed

China

Environment

China - Ozone Depleting Substances - First Schedule

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Ozone Depleting Substances - Second Schedule

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Ozone Depleting Substances - Third Schedule

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other

China - Annex I & II - Controlled Chemicals Lists

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

China - Dangerous Goods List

• Ammonia	7664-41-7	(anhydrous or solution including relative density <0.880 at 15 °C in water, with >35% but not >50% Ammonia, relative density between 0.880 and 0.957 at 15 °C in water; with >10% but not >35% Ammonia by mass or relative density <0.880 at 15 °C in water, with >50% Ammonia)
• Hydrogen	1333-74-0	(compressed or refrigerated liquid)

China - Export Control List - Part I Chemicals

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

• Ammonia	7664-41-7	R10 T; R23 C; R34 N; R50
• Hydrogen	1333-74-0	F+; R12

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling

• Ammonia	7664-41-7	T N R:10-23-34-50 S:(1/2)-9-16-26-36/37/39-45-61
• Hydrogen	1333-74-0	F+ R:12 S:(2)-9-16-33

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases

• Ammonia	7664-41-7	S:(1/2)-9-16-26-36/37/39-45-61
• Hydrogen	1333-74-0	S:(2)-9-16-33

Germany

Environment

Germany - TA Luft - Types and Classes

• Ammonia	7664-41-7	inorganic gas Substance: 5.2.4, Class III
• Hydrogen	1333-74-0	Not Listed

Germany - Water Classification (VwVwS) - Annex 1

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	ID Number 741, not considered hazardous to water

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Ammonia	7664-41-7	ID Number 211, hazard class 2 - hazard to waters
• Hydrogen	1333-74-0	Not Listed

Germany - Water Classification (VwVwS) - Annex 3

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

Portugal

Other

Portugal - Prohibited Substances

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

• Ammonia	7664-41-7	1000 kg
• Hydrogen	1333-74-0	Not Listed

Other

United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

United Kingdom - List of Dangerous Substances in Water

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Ammonia	7664-41-7	10000 lb TQ (anhydrous); 15000 lb TQ (solution, >44% Ammonia by weight)
• Hydrogen	1333-74-0	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Ammonia	7664-41-7	100 lb final RQ; 45.4 kg final RQ
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Ammonia	7664-41-7	100 lb EPCRA RQ
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Ammonia	7664-41-7	500 lb TPQ
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Ammonia	7664-41-7	1.0 % de minimis concentration (includes anhydrous Ammonia and aqueous Ammonia from water dissociable Ammonium salts and other sources, 10% of total aqueous Ammonia is reportable under this listing)
• Hydrogen	1333-74-0	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

• Ammonia	7664-41-7	
• Hydrogen	1333-74-0	Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

• Ammonia	7664-41-7	Not Listed
• Hydrogen	1333-74-0	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Relevant Phrases (code & full text)

- H221 - Flammable gas
  H314 - Causes severe skin burns and eye damage.
  H331 - Toxic if inhaled
  H400 - Very toxic to aquatic life
  R10 - Flammable.
  R23 - Toxic by inhalation.
  R34 - Causes burns.
  R50 - Very toxic to aquatic organisms.

Last Revision Date
- 08/September/2014

Preparation Date
- 08/September/2014

Disclaimer/Statement of Liability
- To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Key to abbreviations

NDA = No Data Available