

SECTION 1: Identification

1.1. Identification

Product form : Substance
 Substance name : Anhydrous Ammonia
 Chemical name : Ammonia
 CAS No : 7664-41-7
 Product code : SG-1001-00035
 Formula : NH₃
 Other means of identification : Anhydrous ammonia

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

Use of the substance/mixture : Test gas/Calibration gas

1.3. Details of the supplier of the safety data sheet

Air Liquide USA LLC and its affiliates
 9811 Katy Freeway, Suite 100
 Houston, TX 77024 - USA
 T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable gases H221
 Category 2
 Gases under pressure H280
 Liquefied gas
 Acute toxicity H332
 (inhalation:gas)
 Category 4
 Skin corrosion/irritation H314
 Category 1B
 Serious eye H318
 damage/eye irritation
 Category 1

Full text of H statements : see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

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
 H332 - Harmful if inhaled
 CGA-HG22 - Corrosive to the respiratory tract

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood
 P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
 P260 - Do not breathe gas
 P262 - Do not get in eyes, on skin, or on clothing
 P271 - Use only outdoors or in a well-ventilated area
 P280 - Wear protective clothing, protective gloves, eye protection, face protection

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

P284 - Wear respiratory protection. Consult respirator supplier's product information for the selection of the appropriate respiratory protection
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep 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
P310 - Immediately call a doctor
P312 - Call a doctor if you feel unwell
P332+P313 - If skin irritation occurs: Get medical advice/attention
P337+P313 - If eye irritation persists: Get medical advice/attention
P363 - Wash contaminated clothing before reuse
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
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG20 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%	GHS-US classification
Anhydrous Ammonia (Main constituent)	(CAS No) 7664-41-7	> 99	Flam. Gas 2, H221 Liquefied gas, H280 Acute Tox. 4 (Inhalation:gas), H332 Skin Corr. 1B, H314 Eye Dam. 1, H318

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration with bag and mask if breathing stopped. Immediately call a poison center or doctor/physician.
- First-aid measures after skin contact : IF ON SKIN : Gently wash with plenty of soap and water. Get immediate medical advice / attention. Remove/Take off immediately all contaminated clothing. Wash contaminated clothing before reuse.
- First-aid measures after eye contact : Get medical advice/attention if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation occurs, seek medical attention. If eye irritation persists: Get medical advice/attention.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries after inhalation : Harmful if inhaled. Corrosive to the respiratory tract.
- Symptoms/injuries after skin contact : Causes severe skin burns and eye damage.
- Symptoms/injuries after eye contact : Causes serious eye damage.
- Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.
- Symptoms/injuries upon intravenous administration : Not known.
- Chronic symptoms : None known.

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : This product is flammable.
- Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
- Reactivity : None known.

5.3. Advice for firefighters

- Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
- Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

- Protective equipment : Wear protective equipment consistent with the site emergency plan.
- Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

- Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
- Emergency procedures : Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

6.2. Environmental precautions

Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up

- For containment : Try to stop release if safe to do so.
- Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Close valve after each use and when empty.
- Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Eliminate all ignition sources if safe to do so. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Comply with applicable regulations.
- Storage conditions : Store locked up. Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage.
- Incompatible products : None known.

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Incompatible materials : Acids. Oxidizing materials.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls	: Ensure exposure is below occupational exposure limits. Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider work permit system e.g. for maintenance activities.
Hand protection	: Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection. In addition wear chemically resistant protective gloves when making or breaking process connections.
Eye protection	: Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection. Wear goggles and faceshield when transfilling or breaking transfer connections.
Skin and body protection	: Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.
Respiratory protection	: Wear a respirator when performing non-routine tasks not limited to line breaking or sampling. Wear a respirator during routine operations if determined to be necessary during a process-specific review. Consult respirator suppliers' product information or their representatives for the selection of the appropriate respirator. See Sections 5 & 6.
Thermal hazard protection	: None necessary during normal and routine operations.
Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.
Other information	: Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Clear, colorless gas.
Color	: Colorless
Odor	: Pungent.
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: -33 °C
Critical temperature	: 132 °C
Critical pressure	: 11350 kPa
Flash point	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: See Section 2.1 and 2.2
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Vapor pressure	: 860 kPa
Relative density	: No data available
Relative vapor density at 20 °C	: No data available
Molecular mass	: 17 g/mol
Relative gas density	: Lighter or similar to air
Solubility	: No data available
Log Pow	: No data available
Auto-ignition temperature	: 630 °C
Decomposition temperature	: No data available
Viscosity	: No data available

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Viscosity, kinematic : No data available
Viscosity, dynamic : No data available

9.2. Other information

Additional information : None

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Acids. Oxidizing materials.

10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Inhalation
Acute toxicity : Inhalation:gas: Harmful if inhaled.

Anhydrous Ammonia (7664-41-7)

ATE US (gases)	3669.000 ppmV/4h
Skin corrosion/irritation	: Causes severe skin burns and eye damage.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified.
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified
Symptoms/injuries after inhalation	: Harmful if inhaled. Corrosive to the respiratory tract.
Symptoms/injuries after skin contact	: Causes severe skin burns and eye damage.
Symptoms/injuries after eye contact	: Causes serious eye damage.
Symptoms/injuries after ingestion	: Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration	: Not known.
Chronic symptoms	: None known.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.
- Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.
- Additional information : None.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

- Transport document description : UN1005 Ammonia, anhydrous, 2.2
- UN-No.(DOT) : UN1005
- Proper Shipping Name (DOT) : Ammonia, anhydrous
- Class (DOT) : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115
- Hazard labels (DOT) : 2.2 - Non-flammable gas



- DOT Packaging Non Bulk (49 CFR 173.xxx) : 304
- DOT Packaging Bulk (49 CFR 173.xxx) : 314;315
- DOT Symbols : D - Proper shipping name for domestic use only, or to and from Canada
- DOT Special Provisions (49 CFR 172.102) : 13 - The words Inhalation Hazard shall be entered on each shipping paper in association with the shipping description, shall be marked on each non-bulk package in association with the proper shipping name and identification number, and shall be marked on two opposing sides of each bulk package. Size of marking on bulk package must conform to 172.302(b) of this subchapter. The requirements of 172.203(m) and 172.505 of this subchapter do not apply T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter
- DOT Packaging Exceptions (49 CFR 173.xxx) : None
- DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
- DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden
- DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded
- DOT Vessel Stowage Other : 40 - Stow "clear of living quarters",52 - Stow "separated from" acids,57 - Stow "separated from" chlorine
- Other information : No supplementary information available.

TDG

- Transport document description : UN1005 ANHYDROUS AMMONIA, 2.3
- UN-No. (TDG) : UN1005
- TDG Proper Shipping Name : ANHYDROUS AMMONIA

Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

TDG Primary Hazard Classes	: 2.3 - Class 2.3 - Toxic Gas.
TDG Subsidiary Classes	: 8
TDG Special Provisions	: 23 - (1) A consignor of these dangerous goods must include, except for UN1005, ANHYDROUS AMMONIA, the words "toxic by inhalation" or "toxic — inhalation hazard" or "toxique par inhalation" or "toxicité par inhalation" in the following places, unless the words are already part of the shipping name: (a) on a shipping document, immediately after the description of the dangerous goods; (b) on a small means of containment, next to the shipping name of the dangerous goods; and (c) on a large means of containment, next to the placard for the primary class of the dangerous goods or the placard for the subsidiary class, if any. For example, the notation on a shipping document would be "UN1935, CYANIDE SOLUTION, N.O.S., Class 6.1, PG I, toxic by inhalation". (2) This special provision does not apply to a person who transports these dangerous goods in accordance with an exemption set out in sections 1.15, 1.17 or 1.17.1 of Part 1 (Coming Into Force, Repeal, Interpretation, General Provisions and Special Cases). (3) A consignor of UN1005, ANHYDROUS AMMONIA, must include the words "inhalation hazard" or "dangereux par inhalation": (a) on a shipping document, immediately after the shipping name of the dangerous goods; and (b) on a small means of containment, next to the shipping name of the dangerous goods. When UN1005, ANHYDROUS AMMONIA, is contained in a large means of containment on which is affixed the anhydrous ammonia placard, the words "Anhydrous Ammonia, Inhalation Hazard" or "Ammoniac anhydre, dangereux par inhalation" must be displayed next to the placard in accordance with paragraph 4.18.2(b). SOR/2014-306
ERAP Index	: 3 000
Explosive Limit and Limited Quantity Index	: 0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	: Forbidden
Passenger Carrying Ship Index	: Forbidden

Transport by sea

UN-No. (IMDG)	: 1005
Proper Shipping Name (IMDG)	: Ammonia, Anhydrous
Class (IMDG)	: 2.3 - Toxic gases
Subsidiary risks (IMDG)	: 8

Air transport

UN-No. (IATA)	: 1005
Proper Shipping Name (IATA)	: Ammonia, Anhydrous
Class (IATA)	: 2.3 - Gases : toxic
Subsidiary risk (IATA)	: 8

SECTION 15: Regulatory information

15.1. US Federal regulations

No additional information available

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

National regulations

No additional information available

15.3. US State regulations

No additional information available

SECTION 16: Other information

Other information	: This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.
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Anhydrous Ammonia

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Full text of H-phrases:

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
H332	Harmful if inhaled

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' 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 product 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.