

# ANEXO C

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|------------------|----------------|-------------------|
| <b>Product :</b> | <b>Ammonia</b> | Page : 1/5        |
| MSDS Nr : 002_AL | Version : 1.01 | Date : 31/07/2002 |

## 1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

|                         |                                      |
|-------------------------|--------------------------------------|
| MSDS Nr                 | 002_AL                               |
| Product name            | Ammonia                              |
| Chemical formula        | NH <sub>3</sub>                      |
| Company identification  | see heading and/or footer            |
| Emergency phone numbers | see heading and/or footer            |
|                         | see paragraph 16 "OTHER INFORMATION" |
|                         | see paragraph 16 "OTHER INFORMATION" |

## 2 COMPOSITION/INFORMATION ON INGREDIENTS

|                       |  |
|-----------------------|--|
| Substance/Preparation | Substance.   |
| Components/Impurities | Contains no other components or impurities which will influence the classification of the product. |
| CAS Nr                | 07664-41-7   |
| EEC Nr (from EINECS)  | 231-635-3  |

## 3 HAZARDS IDENTIFICATION

|                        |  |
|------------------------|--|
| Hazards identification | Liquefied gas<br>Toxic by inhalation.<br>Corrosive to eyes, respiratory system and skin. |
|------------------------|--|

## 4 FIRST AID MEASURES

|                  |   |
|------------------|---|
| Inhalation       | Toxic by inhalation.<br>Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.   |
| Skin/eye contact | May cause chemical burns to skin and cornea (with temporary disturbance to vision)<br>Immediately flush eyes thoroughly with water for at least 15 minutes.<br>Remove contaminated clothing. Drench affected area with water for at least 15 minutes<br>Obtain medical assistance |
| Ingestion        | Ingestion is not considered a potential route of exposure.  |

## 5 FIRE FIGHTING MEASURES

|  |   |
|--|---|
| Specific hazards                               | Non flammable<br>Exposure to fire may cause containers to rupture/explode.  |
| Hazardous combustion products                  | If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:<br>Nitric oxide/nitrogen dioxide |
| Suitable extinguishing media                   | All known extinguishants can be used.   |
| Specific methods                               | If possible, stop flow of product.<br>Move away from the container and cool with water from a protected position.                           |
| Special protective equipment for fire fighters | Use self-contained breathing apparatus and chemically protective clothing.  |

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|--|--|
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## 6 ACCIDENTAL RELEASE MEASURES

|                           |  |
|---------------------------|--|
| Personal precautions      | Evacuate area.<br>Ensure adequate air ventilation.<br>Use self-contained breathing apparatus and chemically protective clothing.   |
| Environmental precautions | Try to stop release.<br>Reduce vapour with fog or fine water spray.  |
| Clean up methods          | Ventilate area.<br>Wash contaminated equipment or sites of leaks with copious quantities of water.<br>Keep area evacuated and free from ignition sources until any spilled liquid has evaporated.<br>(Ground free from frost).<br>Hose down area with water. |

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## 7 HANDLING AND STORAGE

|                      |   |
|----------------------|---|
| Handling and storage | Keep container below 50°C in a well ventilated place.<br>Refer to supplier's container handling instructions.<br>Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.<br>Do not allow backfeed into the container.<br>Suck back of water into the container must be prevented.<br>Segregate from oxidant gases and other oxidants in store.<br>Keep away from ignition sources (including static discharges).<br>Purge air from system before introducing gas. |
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## 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

|                                  |  |
|----------------------------------|--|
| Exposure limit value -TLV(ACGIH) | 25 ppm (2000 edition)  |
| Exposure limit value for country | France: VLE: 50 ppm; VME: 25 ppm<br>Germany: MAK: 50 ppm<br>Great Britain: LTEL: 25 ppm; STEL: 35 ppm (EH 40/97)   |
| Personal protection              | Keep suitable chemically resistant protective clothing readily available for emergency use.<br>Keep self contained breathing apparatus readily available for emergency use.<br>Do not smoke while handling product.<br>Ensure adequate ventilation.<br>Protect eyes, face and skin from liquid splashes. |

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## 9 PHYSICAL AND CHEMICAL PROPERTIES

|                          |   |
|--------------------------|---|
| Molecular weight         | 17  |
| Melting point            | -77.7 °C  |
| Boiling point            | -33 °C  |
| Critical temperature     | 132 °C  |
| Relative density, gas    | 0.6 (air=1)   |
| Relative density, liquid | 0.7 (water=1)   |
| Vapour Pressure 20°C     | 8.6 bar   |
| Solubility mg/l water    | Hydrolyses.   |
| Appearance/Colour        | Colourless gas  |
| Odour                    | Ammoniacal  |
| Autoignition temperature | 630 °C  |
| Flammability range       | 15-30 vol% in air.  |
| Other data               | Although this substance has flammability data, it is difficult to ignite in air and is classified as non-flammable. |

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## 10 STABILITY AND REACTIVITY

|                          |   |
|--------------------------|---|
| Stability and reactivity | May react violently with oxidants.<br>May react violently with acids.<br>Reacts with water to form corrosive alkalis.<br>Can form explosive mixture with air. |
|--------------------------|---|

## 11 TOXICOLOGICAL INFORMATION

|               |   |
|---------------|---|
| General       | May cause inflammation of the respiratory system and skin.<br>Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudomembrane formation. |
| LC50/1h (ppm) | 4000 ppm  |

## 12 ECOLOGICAL INFORMATION

|         |   |
|---------|---|
| General | May cause pH changes in aqueous ecological systems. |
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## 13 DISPOSAL CONSIDERATIONS

|         |   |
|---------|---|
| General | Avoid discharge to atmosphere.<br>Do not discharge into any place where its accumulation could be dangerous.<br>Do not discharge into areas where there is a risk of forming an explosive mixture with air.<br>Waste gas should be flared through a suitable burner with flash back arrestor.<br>Gas may be scrubbed in sulphuric acid solution.<br>Gas may be scrubbed in water.<br>Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere.<br>Contact supplier if guidance is required. |
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## 14 TRANSPORT INFORMATION

|                             |  |
|-----------------------------|--|
| Proper shipping name        | Ammonia, anhydrous   |
| UN Nr                       | 1005   |
| Class/Div                   | 2.3  |
| Subsidiary risk             | 8  |
| ADR/RID Classification code | 2, 2 <sup>+</sup> TC   |
| ADR/RID Hazard Nr           | 268  |
| Labelling ADR               | Label 6.1: toxic substance.<br>Label 8: corrosive substance.   |
| Other transport information | Avoid transport on vehicles where the load space is not separated from the driver's compartment.<br>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.<br>Before transporting product containers ensure that they are firmly secured and:<br>- cylinder valve is closed and not leaking |

- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

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## 15 REGULATORY INFORMATION

|                                 |   |
|---------------------------------|---|
| Number in Annex I of Dir 67/548 | 007-001-00-5.   |
| EC Classification               | R10(T);R23(C);R34(N);R50  |
| -Symbols                        | T: Toxic<br>N: Dangerous for the environment  |
| -Risk phrases                   | R10 Flammable<br>R23 Toxic by inhalation.<br>R34 Cause burns (to eyes, respiratory system and skin).<br>R50 Very toxic to aquatic organisms.  |
| -Safety phrases                 | S9 Keep container in well ventilated place.<br>S16 Keep away from ignition sources - No smoking.<br>S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.<br>S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.<br>S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).<br>S61 Avoid release to the environment. Refer to special instructions/Safety data sheets. |

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## 16 OTHER INFORMATION

Ensure all national/local regulations are observed.

Ensure operators understand the toxicity hazard.

Users of breathing apparatus must be trained.

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

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.

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.

This MSDS is for information purposes only and is subject to change without notice. [Prior to purchase of products, please contact your local Air Liquide office for a complete MSDS (with Manufacturer's name and emergency phone number).]

AIR LIQUIDE S.A.

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