

# SAFETY DATA SHEET

## Ammonia, anhydrous

Version 1.0

Revision Date: 15.08.2013



## SAFETY DATA SHEET AMMONIA, ANHYDROUS

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

#### 1.1. Product Identifier

**Product name:** AMMONIA, ANHYDROUS  
**EC Number:** 231-635-3  
**REACH Registration Number:** 01-21-19488876-14-0014  
**CAS Number:** 7664-41-7

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

**Use:** Refrigerant

#### 1.3. Details of the supplier of the safety data sheet

**Company name:** National Refrigerants Ltd.  
4 Watling Close  
Sketchley Meadows Business Park  
Hinckley LE10 3EZ  
**Tel:** +44(0)1455 630790  
**Fax:** +44(0) 1455 630791  
**Email:** [sds@nationalref.com](mailto:sds@nationalref.com)

#### 1.4. Emergency telephone number

Emergency Tel: +44(0) 1865 407333

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1. Classification of the substance of mixture

**Classification according to Regulation (EC) No. 1272/2008/EC (CPL/GHS):** Press Gas (liquefied gas) – Contains gas under pressure; may explode if heated.  
Flam. Gas 2 – Flammable gas  
Acute Tox. 3 – Toxic if inhaled.  
Skin Corr. 1B – Causes severe skin burns and eye damage.  
Acute Tox, 1 – Very toxic to aquatic life.  
Corrosive to respiratory tract.

**Classification according to Directive 67/548/EEC & 1999/45/EC** R10  
T;R23  
C; R34  
N; R50  
Flammable  
Toxic by inhalation.  
Causes burns (to eyes, respiratory system and skin).  
Very toxic to aquatic organisms.

#### 2.2. Label elements

##### Hazard Pictograms (CLP):



**Signal word:** Danger

**Hazard statements:** H280: Contains gas under pressure; may explode if heated

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H221: Flammable gas.  
H331: Toxic if inhaled  
H314: Causes severe skin burns and eye damage.  
H400: Very toxic to aquatic life.  
EUH071: Corrosive to the respiratory tract.

### Precautionary statements

#### Precautionary statements: prevention

P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P260: Do not breathe gas, vapours.  
P273: Avoid release to the environment.

#### Precautionary statements: response

P377: Leaking gas fire: Do not extinguish unless leak can be stopped safely.  
P381: Eliminate all ignition sources if safe to do so.  
P303+P361+P353+P315: IF ON SKIN (or hair): Remove/ take off immediately all contaminated clothes. Rinse skin with water/shower. Get immediate medical advice/attention.  
P304+P340+P315: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing, Get immediate medical advice/attention.  
P305+P351+P338+P315: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

#### Precautionary statements: storage

P403: Store in a well-ventilated place.  
P405: Store locked up.

### 2.3. Other hazards

Contact with liquid may cause cold burns/frost bite

## SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1. Substances

**Hazardous Ingredient:** Chemical Name: Ammonia, anhydrous  
CAS No.: 7664-41-7  
EC No.: 231-635-3  
Index no.: 007-001-00-5  
REACH Registration No.: 01-2119488876-14-0000  
Contains no other component or impurity which will influence the classification of the product.

## SECTION 4: FIRST AID MEASURES

### 4.1. 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 has stopped.

**Inhalation:** Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing has stopped.

**Skin/eye contact:** May cause severe chemical burns to skin and cornea. Suitable first aid treatment should be immediately available. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Immediately flush eyes thoroughly with water for at least 15 minutes. Obtain medical assistance.

**Ingestion:** No considered a route of exposure.

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

<b>Inhalation:</b>	Intense pain in nose and throat, lacrimation, sneezing, coughing, cramps, or swelling of the larynx and respiratory distress. Risk of loss of consciousness.
<b>Eye contact:</b>	Chemical burns.
<b>Skin contact:</b>	Serious chemical burns. Liquefied gas may cause frostbite.
<b>Ingestion:</b>	May cause pain in the mouth and throat.
<b>Delayed/immediate effects:</b>	Risk of irreversible damage to the lungs and respiratory tract. Pulmonary oedema can occur more than one day after exposure.

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

**Immediate/special treatment:** Obtain medical assistance. Treat with corticosteroid spray as soon as possible after inhalation.

## SECTION 5: FIRE-FIGHTING MEASURES

### 5.1. Extinguishing media

**Extinguishing media:** Do not extinguish burning gas. Cut off source of gas if safe to do so – IF NOT POSSIBLE LEAVE GAS TO BURN.  
Extinguish secondary fire with: Carbon dioxide (CO<sub>2</sub>), Powder, Sand, Foam.

**Improper extinguishing media:** Do not use water jet.

### 5.2. Special hazards arising from the substance or mixture

**Special hazards arising from the substance or mixture:** Flammable. May form explosive gas/air mixtures. Containers can burst violently when heated due to excess pressure build up.  
Fire or high temperatures create: Nitrous gases (NO<sub>x</sub>).

**Specific methods:**

### 5.3. Advice for fire-fighters

**Special protective equipment:** Use self-contained breathing apparatus and chemically protective clothing. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to EN 469 will provide a basic level of protection from chemical incidents,  
EN 469/2005: Protective clothing for fire-fighters: Performance requirements for protective clothing for fire-fighting

**Specific methods:** If possible, and safe to do so, stop flow of product. Move container away or cool with water spray from protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Use self-contained breathing apparatus and chemically protective clothing. Ensure adequate air ventilation. Monitor concentration of released product. Eliminate ignition sources.

### 6.2. Environmental precautions

**Environmental precautions:** Try to stop release. Reduce vapour with fog or fine water spray.

### 6.3. Methods and material for containment and cleaning up

**Clean-up procedures:** Ventilate area. Hose down with water. Wash contaminated equipment or sites of leak with copious quantities of water. Keep area evacuated and free from ignition sources until any

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spilled liquid has evaporated (Ground free from frost).

### 6.4. Reference to other sections

**Reference to other sections:** See also sections 8 and 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

**Handling requirements:** Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your supplier if in doubt. Do not allow feedback into the container. Suck back of water, acid and alkalis into the container must be prevented. Keep away from ignition sources (including static discharges). Purge air from system before introducing gas. Refer to suppliers instructions. Avoid exposure, obtain special instructions before use. Purge system with dry, inert gas (e.g, helium or nitrogen) before gas is introduced and when system is placed out of service. Assess the risk of potentially explosive atmosphere and the need for explosion proof equipment. Consider the use of only non-sparking tools. Do not smoke while handling product. Only experienced and properly instructed persons should handle gases under pressure. Protect cylinders from physical damage; do not drag or roll, slide or drop. Never use direct flame or electrical heating devices to raise the pressure of a cylinder. Do not remove or deface labels provided by the supplier for the identification of the cylinder content. When moving cylinders, even for short distances, use a mechanical device (E.g. sack truck, trolley etc.) designed to transport cylinders. Leave valve protective caps in place until the cylinder has been secured against either a wall or bench or placed in a cylinder stand and is ready for use. Ensure the complete gas system has been ( or is regularly) checked for leaks before use. If user experiences any difficulty operating the cylinder valve discontinue use and contact supplier. Close cylinder valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify cylinder valves or safety relief devices. Keep cylinder valve outlets clean and free from contaminants, particularly oil and water. Never attempt to transfer product from one cylinder to another. Installation of a cross purge assembly between the cylinder and regulator is recommended. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure equipment is adequately earthed.

### 7.2. Conditions for safe storage, including any incompatibilities

**Storage conditions:** Secure cylinders to prevent from falling. Keep cylinder below 50°C in a well-ventilated place. See General safety and Handling data at end of this SDS.

**Suitable packaging:** Keep only in original cylinder.

### 7.3. Specific end use(s)

**Specific end use(s)** None.

## SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1. Control parameters

**Hazardous ingredients:** AMMONIA, ANHYDROUS. CAS No. 7664-41-7  
EINECS No. 231-635-3

Workplace exposure limits

State	8 hour TWA, LTEL	15 min. STEL
UK	25 ppm	35 ppm

Source: EH 40/07

### Derived No Effect Levels (DNEL's)

Type application: Workers  
Exposure route: Short term dermal

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Health effects: Systemic  
Value: 6.8 mg/kg bw/day

Type application; Workers  
Exposure route; Long term inhalation.  
Health effects: Local  
Value: 36 mg/m<sup>3</sup>

Type application: Workers  
Exposure route: Long term inhalation  
Health effects: Local  
Value: 14 mg/cm<sup>3</sup>

**Predicted No Effect Concentration (PNEC)** Value: 1.1 µg/l  
Compartment: Fresh water

Value: 1.1 µg/l  
Compartment: Marine

### 8.2. Exposure controls

#### Engineering measures:

A risk assessment should be conducted in each work area to assess the risk related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Product should be handled in a closed system, Use only permanent leak-tight installations (e.g. welded pipes). Gas detectors should be used when toxic quantities may be released. Keep concentrations well below occupational exposure limits. Provide adequate general and local ventilation. Systems under pressure should be regularly checked for leaks. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider a work permit system e.g. for maintenance activities.

#### Respiratory protection:

Keep self-contained breathing apparatus (SCBA) readily available for emergency use. Use SCBA in the event of high concentrations. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. When allowed by the risk assessment Respiratory Protective Equipment (RPE) may be used. Guideline EN 136: Respiratory protective devices. Full face masks. Requirements, testing, and marking. Material: Filter K Guideline: EN 14387 Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, and marking.

#### Skin and Hand protection:

Advice: wear working gloves and safety shoes while handling gas cylinders. Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Materials suitable for prolonged, direct contact: Butyl rubber (Butyl), Min breakthrough time: 480 min. Glove thickness: 0.7 mm. Guideline: EN 374/1/2/3, Protective gloves against chemicals and microorganisms. Protective index: 6. Advice: Material suitable for short-term contact and/or liquid splashes. Material: CR (Chloroprene Rubber), Min Breakthrough time: 30 min. glove thickness: 0.5 mm Guideline: EN 374/1/2/3 Protective gloves against chemicals and microorganisms. Protection index: 2.

#### Eye protection:

Protect eye, face and skin from liquid splashes. Wear a face shield when trans-filling and breaking transfer connections. Safety eyewear, goggles or face shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Full face mask recommended. Guideline: CEN: EN136 Respiratory protective devices. Full face masks. Requirements, testing, and marking.

#### Body protection:

Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Guideline: EN 943 Protective clothing against liquid and gaseous chemicals, aerosols and solid particles.

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**Environmental:** Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods of waste gas treatment. Provide adequate general or local ventilation.

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on basic physical and chemical properties

<b>State:</b>	Liquefied gas
<b>Colour:</b>	Colourless gas
<b>Odour:</b>	Ammoniacal
<b>Odour threshold:</b>	Subjective and inadequate to warn for over exposure.
<b>pH value:</b>	If dissolved in water pH value will be affected.
<b>Melting point:</b>	-77.7°C
<b>Boiling Point:</b>	-33°C
<b>Flash Point:</b>	Not applicable for gases and gas mixtures.
<b>Flammability range:</b>	15% (v/v) – 30% (v/v)
<b>Vapour pressure 20°C:</b>	8.6 Bar
<b>Relative density, gas:</b>	0.6
<b>Solubility in water:</b>	Hydrolyses
<b>Partition coefficient (n-octanol/water):</b>	< 1 log <sub>POW</sub>
<b>Auto-ignition temperature:</b>	630°C
<b>Explosive properties:</b>	Explosive acc. EU legislation: Not explosive Explosive acc. Transp. Reg.: Not explosive
<b>Oxidising properties:</b>	Not applicable
<b>Molecular weight:</b>	17 g/mol
<b>Critical temperature:</b>	132.4°C
<b>Relative density, liquid:</b>	0.7

### SECTION 10. STABILITY AND REACTIVITY

#### 10.1. Reactivity

**Reactivity:** Unreactive under normal conditions

#### 10.2. Chemical stability

**Chemical stability:** Stable under normal conditions

#### 10.3. Possibility of hazardous reactions

**Hazardous reactions:** Can form potential explosive atmosphere in air. May react violently with oxidants.

#### 10.4. Conditions to avoid

**Conditions to avoid:** Keep away from heat/sparks/open flames/hot surfaces. No smoking.

#### 10.5. Incompatible material

**Materials to avoid:** Oxidising agents. Air, Oxidiser. May react violently with acids. Reacts with water to form corrosive alkalis. Corrosive to galvanised metal. Corrosive to brass, Cu, Zn, Au, Ag and Hg. For material compatibility see latest version of ISO-11114.

#### 10.6. Hazardous decomposition products

**Hazardous decomposition products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire, the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitrogen dioxide, Nitric oxide.

### SECTION 11: TOXICOLOGICAL INFORMATION

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### 11.1. Information on toxicological effects

<b>Acute oral toxicity:</b>	LD50/rat. Value: 350 mg/kg
<b>Acute inhalation toxicity:</b>	LC50/rat/1 h Value: 9 500 ppm LC50/rat/ 4 h Value: 2 000 ppm
<b>Acute dermal toxicity:</b>	Not applicable
<b>Acute toxicity other routes:</b>	Not applicable
<b>Skin irritant:</b>	Irritant
<b>Eye irritant:</b>	Irritant
<b>Sensitisation:</b>	Not classified as a sensitizer.
<b>Mutagenic assessment:</b>	There is no evidence of mutagenic potential.
<b>Carcinogenic assessment:</b>	There is no evidence of carcinogenic effects.
<b>Toxicity to reproduction assessment:</b>	No known effects from this product.
<b>Teratogenicity assessment:</b>	No indication of teratogenic effects.
<b>Other toxic information:</b>	May cause inflammation of the respiratory system and skin. Inhalation of large amounts leads to bronchospasm, laryngeal oedema and pseudo membrane formation. Irritating to the eyes.

### SECTION 12. ECOLOGICAL INFORMATION

#### 12.1. Toxicity

	Toxic to water organisms. Avoid release to the environment. Product is not allowed to be discharged into ground water or aquatic environment.
<b>Acute and prolonged toxicity to fish:</b>	LC50/96 h/rainbow trout: 0.16-1.1 mg/l NOEC/rainbow trout: 1.2 mg/l
<b>Acute toxicity to aquatic invertebrates:</b>	EC50/48 h/Daphnia magna: 25.4 mg/l NOEC/Daphnia magna: 0.79mg/l
<b>Toxicity to aquatic plants:</b>	EC50/432 h/Chlorella: 2700 mg/l
<b>Chronic toxicity to fish:</b>	31 d/Ictalurus punctatus: 0.048 mg/l Remarks: The statement of toxic effects relates to the analytically determined concentration.

#### 12.2. Persistence and degradability

<b>Persistence and degradability:</b>	The substance is biodegradable. Unlikely to persist.
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#### 12.3. Bio accumulative potential

<b>Bio-accumulative potential:</b>	The substance has no potential for bioaccumulation.
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#### 12.4. Mobility in soil

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**Mobility:** The substance has low mobility in soil. The substance is soluble in water.

### 12.5. Results of PBT and vPvB assessment

**PBT identification:** Not classified as PBT or vPvB.

### 12.6. Other adverse effects

**Other adverse effects:** May cause pH changes in aqueous ecological systems. Depending on local conditions and existing concentrations, disturbances in the biodegradation process of activated sludge are possible.

## SECTION 13. DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

Must not be discharged to atmosphere. Gas may be scrubbed in sulphuric acid solution. Gas may be scrubbed in water. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Refer to the EIGA code of practice (Doc. 30 "Disposal of gases" downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods. Contact supplier if guidance is required. Dispose of cylinder via gas supplier only. Gases in pressure containers (including halons) contain dangerous substances. EWC No. 16 05 04\*

## SECTION 14. TRANSPORT INFORMATION

### 14.1. ADR

**UN Number:** 1005  
**Proper Shipping Name:** AMMONIA, ANHYDROUS  
**Class/Division:** 2/2TC  
**Tunnel Code:** (C/D)  
**Hazard Identification Number:** 268  
**Labelling ADR:** 2.3+8  
**Further Information** Environmentally hazardous  
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 emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

### 14.2. IATA

**UN Number:** 1005  
**Proper Shipping Name:** AMMONIA, ANHYDROUS  
**Class/Division:** 2.3  
**Packing group/instruction:** P200  
**Further Information** Environmentally hazardous

### 14.3. IMDG

**UN Number:** 1005  
**Proper Shipping Name:** AMMONIA, ANHYDROUS  
**Class/Division:** 2.3  
**Packing group/instruction:** P200  
**EmS:** F-C, S-U

## SECTION 15. REGULATORY INFORMATION



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### 15.1. Safety, health and environment regulations/legislation specific for the substance or mixture

Seveso Directive 96/82/EC listed.

### 15.2. Chemical Safety Assessment

A Chemical Safety Assessment has been carried out

### 16. OTHER INFORMATION

#### Other information:

This safety sheet is prepared in accordance with Commission Regulation (EU) No. 453/2010.

\* Indicates text in SDS which has changed since the last revision.

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.

**Legal disclaimer:** National Refrigerants Ltd. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.** The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other methods of use of the product and of the information referred to herein are beyond the control of National Refrigerants Ltd. National Refrigerants Ltd. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

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### GENERAL SAFETY & HANDLING DATA

#### 1. GENERAL

Only trained persons should handle compressed gases. Observe all regulations and local requirements regarding the storage of Cylinders. Do not remove or deface labels provided by the supplier for the identification of the Cylinder contents. Ascertain the identity of the gas before using it. Know and understand the properties and hazards associated with each gas before using it. When doubt exists as to the correct handling procedure for a particular gas contact the supplier.

#### HANDLING AND USE

Wear stout gloves. Never lift a Cylinder by the cap or guard unless the supplier states it is designed for that purpose. Use trolley or other suitable device or technique for transporting heavy Cylinders, even for a short distance. Where necessary wear suitable eye and face protection. The choice between safety glasses, chemical goggles, or full face shield will depend on the pressure and nature of the gas being used,

Where necessary for toxic gases see that self-contained positive pressure breathing apparatus or full face airline respirator is available in the vicinity of the working area. Employ suitable pressure regulating device on all Cylinders when gas is being emitted to systems with lower pressure rating than that of the Cylinder. Ascertain that all electrical systems in the area are suitable for service with each gas.

Never use direct flame or electrical heating devices to raise the pressure of a Cylinder, Cylinders should not be subjected to temperatures above 45°C. Never re-compress a gas mixture without consulting the supplier. Never attempt to transfer gases from one Cylinder to another. Do not use Cylinders as rollers or supports, or for any other purpose other than to contain the gas as supplied. Never permit oil, grease or other readily combustible substances to come into contact with valves of Cylinders containing oxygen or other oxidants. Keep Cylinder valves clean and free from contaminants particularly oil and water.

Do not subject Cylinders to mechanical shocks which may cause damage to their valves or safety devices.

Never attempt to repair or modify Cylinder valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close the Cylinder valve whenever gas is not required even if the Cylinder is still connected to the equipment.

#### 2. STORAGE

Cylinders should be stored in a well-ventilated area. Some gases will require a purpose built area. Store Cylinders in a location free from fire risk and away from sources of heat and ignition. Designate as a no smoking area.

Gas Cylinders should be segregated in the storage according to the various categories.

The storage area should be kept clear and access should be restricted to authorized persons only, the area should be clearly marked as a storage area and appropriate hazard warning signs displayed (Flammable, Toxic etc.).

The amount of flammable or toxic gases should be kept to a minimum. Flammable gases should be stored away from other combustible materials.

Cylinders held in storage should be periodically checked for general condition and leakage.

Cylinders in storage should be properly secured to prevent toppling or rolling. Vertical storage is recommended where the Cylinder is designed for this. Cylinder valves should be tightly closed and, where appropriate, valves should be capped or plugged. Protect Cylinders stored in the open against rusting and extremes of weather. Cylinders should not be stored in conditions likely to encourage corrosion. Store full and empty Cylinders separately and arrange full Cylinders so that the oldest stock is used first.