

Date of issue: 09.06.2004

Reviewed on: 01.12.2009 5th Edition

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE (PREPARATION) AND OF THE COMPANY/UNDERTAKING**1.1 Identification of the substance / mixture (preparation)**

Commercial name: Ammonia
Chemical name: Ammonia, anhydrous
Registration number: not applicable.

1.2 Use of the substance / mixture (preparation)

Production of nitrogenous fertilizers, textile auxiliaries, plastics, artificial fibres, pharmaceuticals, plant protection substances, colouring agents, use in the cooling industry, in metallurgy for steel nitriding.

1.3 Company / undertaking identification

■ UNIPETROL RPA, s.r.o., Záluží 1, 436 70 Litvínov, Czech Republic

☎: +420 476 161 111
fax: +420 476 619 553
unipetrolrpa@unipetrol.cz
www.unipetrolrpa.cz

- Trade Division Director: ☎: +420 476 164 281 fax: +420 476 163 691
jaroslava.svobodova@unipetrol.cz
- Selling Clerk: ☎: +420 476 165 471 fax: +420 476 163 517
- Sales administrator: ☎: +420 476 164 939, 4 534 fax: +420 476 164 229

■ Person responsible for the MSDS ludmila.krejcikova@unipetrol.cz**1.4 Emergency telephone numbers in case of accident**

- UNIPETROL RPA, s.r.o. ☎: +420 476 163 111 (non stop)
☎: +420 476 162 111 (non stop)
- CENTRE OF THE CZECH MINISTRY OF HEALTH
Toxicological Information Centre Prague (TIS), CZ ☎: +420 224 919 293 (non stop)
Na bojišti 1, 128 08 Praha 2, Czech Republic ☎: +420 224 915 402 (non stop)
e-mail: tis@mbox.cesnet.cz
fax: +420 224 914 570

2. HAZARD IDENTIFICATION**2.1 Classification of the substance / mixture (preparation)**

Product is classified as dangerous according to the Czech Act No. 356/2003 Sb. and Regulation (EC) No 1272/2008 (Directive 67/548/EEC or Directive 1999/45/EC):

FLAMMABLE

TOXIC

CORROSIVE

DANGEROUS FOR THE ENVIRONMENT

R 10	T; R 23	C; R 34	N; R 50
------	---------	---------	---------

2.2 Information pertaining to particular dangers for human

Product has severe irritant to caustic effect on eyes, respiratory system mucous membranes, lungs and skin. Throat spasm or oedema could lead to suffocation. High concentrations lead to apneusis, in some cases cause pulmonary oedema. Contact with liquid gas causes burns and frostbites.

Date of issue: 09.06.2004

Reviewed on: 01.12. 2009 5th Edition

2.3 Information pertaining to particular dangers for the environment

Gas-escape causes air contamination in distances far away from the source. Causes contamination of grounds as well as water, product dissolves in water and even in great dilution creates caustic mixtures, above them dangerous vapours liberates. Product has harmful effect on water, is very toxic to aquatic organisms. The product can damage surrounding fauna and flora.

2.4 Other adverse effects

Slightly flammable substance. Gas release leads to generation of large amounts of cold mist heavier than air and to creation of caustic and explosive mixtures with air. Ignition possible when exposed to high temperature and strong energy source.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical substance (CAS No. 7664-41-7, ES No 231-635-3)

4. FIRST AID MEASURES

4.1 General advice

IMMEDIATE MEDICAL ATTENTION IS REQUIRED AFTER INHALATION, SKIN BURNING OR AFTER EYE CONTACT.

In case of health troubles or doubts, seek medical advice immediately and show this Material Safety Data Sheet. Ensure activity of vitally important functions until the arrival of the doctor (artificial respiration, inhalation of oxygen, heart massage). If patient is unconscious, or in case of danger of blackout (apsychia), transport patient in a stabilised position. In case of first degree burns (painful redness), and second degree burns (painful blisters), cool the affected area with cold running water for a long time. In case of third degree burns (redness, cracking pale skin, usually without pain), do not cool affected skin, dress the area with sterile dry gauze only.

SPECIAL MEANS TO PROVIDE IMMEDIATE TRETMENT AT THE WORKPLACE: eye shower, safety shower.

4.2 Inhalation

Remove patient to fresh air, rinse his mouth and sinus nasal with water, keep him warm and in order to rest quietly. Avoid walking. Seek medical advice.

SYMPTOMS AND EFFECTS: burning, pain and chemical burns in mucous membranes of the respiratory system, tenacious irritant coughing, breathlessness.

4.3 Skin contact

Flush affected area immediately with plenty of water and take off all contaminated clothing and footwear (if necessary cut hair and fingernails). Flush affected skin thoroughly but without great mechanical irritation with copious quantities of lukewarm water, not using soap and neutralisation medium and avoiding mechanical irritation; continue flushing affected area until the arrival of the physician (at least 20 minutes). If frostbites occur, do not rub affected areas. Burned or frostbitten areas dress with sterile dry gauze (or clean tissue). Seek medical advice.

SYMPTOMS AND EFFECTS: burning, pain, chemical burns.

4.4 Eye contact

Immediately flush eyes with clean lukewarm water and continue flushing until the arrival of the physician – keep the eyelids forcibly widely apart and flush from the inner to the outer canthus. Immediately remove contact lenses, if the patient wears them. Always seek medical advice.

SYMPTOMS AND EFFECTS: burning, pain, lachrymation, chemical burns.

4.5 Swallowing

Not applicable.

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media

Water mist, water spray, foam, powder.

5.2 Extinguishing media to be avoided

Water jet.

AMMONIA

Date of issue: 09.06.2004

Reviewed on: 01.12.2009 5th Edition

5.3 Caution about specific danger in case of fire and fire-fighting procedures

Danger of violent reaction or explosion. Thermal decomposition liberates nitrogen oxides, at temperatures above 450°C highly flammable hydrogen generates. Cool containers with ammonia with water jet and consider evacuation of the area in danger.

5.4 Special protective equipment for fire-fighters

Wear full chemical protective clothing and a self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

6.1 Person-related safety precautions

Isolate hazard area. Evacuate all unauthorised personnel not participating in rescue operations from the area. Avoid entry into danger area. Remove all possible sources of ignition. Stop traffic and switch off the motors of the engines. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid contact with the substance. Apply self-contained breathing apparatus and full protective personal equipment to paralyse the accident. When escaping from the contaminated area, wear mask with cartridge K against ammonia and its organic derivatives. In case of general average, evacuate personnel from danger area.

6.2 Precautions for protection of the environment

Prevent from further leaks of substance. Enclose and dike area. Do not allow substance to enter soil, water and sewage systems. In case of substance discharge to water courses or water containers, inform water consumers immediately, stop service and exploitation of water. Use water screen to reduce further spread of ammonia vapours.

6.3 Recommended methods for cleaning and disposal

Reduce escaping vapours with water screen. Whilst the substance is mixed with water, pump off substance safely, soak up residues with compatible porous material and forward for disposal in closed containers. Dispose of under valid legal waste regulations.

7. HANDLING AND STORAGE

7.1 Information for safe handling

Observe all fire-fighting measures (no smoking, do not handle with naked flame and remove all possible sources of ignition). Wear recommended personal protective equipment and observe instructions to prevent possible contact of substance with skin and eyes and inhalation. Avoid leak to environment.

7.2 Information for storage

Storerooms should meet the requirements for the fire safety of constructions and electrical facilities and should be in conformity with valid regulations. Store in closed pressure tanks in cool, well-ventilated place with effective exhaust, away from heat and all sources of ignition. Do not store together with air and oxygen sources. Avoid leak to environment.

7.3 Information for specific use

Not applicable.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values

Czech Republic (Order-in-Council No 361/2007 Sb.):

Name	PEL [mg.m ⁻³]	NPK-P [mg.m ⁻³]
ammonia	14	36

PEL Permissible exposure level of a chemical substance in the environment air

NPK-P Highest permissible concentration of a chemical substance in the environment air

MATERIAL SAFETY DATA SHEET
AMMONIA

Date of issue: 09.06.2004

Reviewed on: 01.12. 2009 5th Edition

European Union (Directive 2006/15/EC):

Name	8hours limit value [mg.m ⁻³]	short term limit value [mg.m ⁻³]
ammonia	14	36

8hours limit value Measured or calculated in relation to a reference period of eight hours as a time-weighted average.
short term limit value A limit value above which exposure should not occur and which is related to a 15-minute period

Recommended determination method in the workplace atmosphere: spectrophotometry, detector tube

8.2 Occupational exposure controls

Collective protection measures

General and local ventilation, effective exhaust, automation, hermetisation.

Individual protection measures

Personal protective equipment (PPE) for the protection of eyes, hands and skin corresponding with the performed labour has to be kept at disposition for the employees. In cases, where the workplace exposure control limits cannot be observed with the help of technical equipment or where it is not possible to ensure that the respiratory system exposure does not represent a health hazard for the personnel, adequate respiratory protection have to be kept at disposition. In the case of continuous use of this equipment during constant work, safety breaks have to be scheduled, if the PPE-character requires this. All PPE have to be kept in disposable state and the damaged or contaminated equipment has to be replaced immediately.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

- *respiratory protection:* protective mask with organic vapour canister K (green coloured, against ammonia and his organic derivatives), self-contained breathing apparatus
- *eye protection:* safety goggles, full face-shield
- *hand protection:* protective gloves

	<i>glove material</i>	<i>layer thickness</i>	<i>breakthrough time</i>
routine work (possibility of staining)	nitrile	0,4 mm	10 Min.
outflow / accident disposal	butyl	0,7 mm	480 Min.

The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374, for example KCL 730 Camatril®Velours (splash contact) and 898 Butoject® -Velours (full contact). The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types. The recommended time applies to the product stated in the safety data sheet as well as to the purpose specified here. Under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL CZ s.r.o., Suderova 2013, 709 00 Ostrava 9, www.klc.de.)

- *skin protection:* impervious protective coveralls, sealed rubber boots
- *other:* eye shower, safety shower
- *General safety and hygienic measures:* Observe personal hygienic regulations. Do not eat, drink or smoke during work! Wash thoroughly hands and uncovered body parts with soap and water after handling and before eating or drinking, and treat skin with a mild skin restoring cream.

8.3 Environmental exposure controls

Proceed in accordance with valid air and water legislative regulations.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information

- *Physical state at 20°C:* gas
- *Colour:* colourless
- *Odour:* strongly pungent, irritant

Date of issue: 09.06.2004

Reviewed on: 01.12.2009 5th Edition

9.2 Important health, safety and environmental information

- *pH-value* - 1,00N aqueous solution: 11,6
- - 0,10N aqueous solution 11,1
- - 0,01N aqueous solution 10,6
- *Boiling point [°C]:* -33,4
- *Flash point [°C]:* not applicable (gas)
- *Inflammability:* flammable
- *Explosion limits - lower [Vol. %]:* 15
- - upper [Vol. %]: 28
- *Oxidising properties:* none
- *Vapour pressure at 20°C [kPa]:* 800
- *Density at -33,4°C [kg.m⁻³]:* 681
- at 0°C [kg.m⁻³]: 0,7710
- *Solubility* alcohols, diethyl ether, chloroform
- *Solubility in water [g.l⁻¹]:* 517
- *Partition coefficient n-octanol/ water [log Kow]:* not applicable
- *Vapour viscosity at 20°C [Pa.s]:* 100.10⁻⁷
- *Vapour density (air=1):* 0,597
- *Evaporation rate* not applicable

9.3 Other information

- *Melting point / solidification point [°C]:* -77,75
- *Ignition temperature [°C]:* 650
- *Maximum experimental safe gap [mm]:* 3,17
- *Heat value [MJ.kg⁻¹]:* 18,631
- *Heat class:* T1
- *Explosion class:* II A
- *Critical temperature [°C]:* 132,4
- *Critical pressure [kPa]:* 11270

10. STABILITY AND REACTIVITY

10.1 Conditions to avoid

Concentrations within the explosion limits, sources of ignition, high temperature, sun radiation.

10.2 Material to avoid

Vigorous reactions: BF₅, ClF₃, ethylene oxide, Mg(ClO₄)₂, 1,2-dichloroethane, O₂+Pt, N₂O₃, strong oxidising agents (HNO₃, Cl₂O, CrO₃, H₂O₂, F₂, N₂O₄, liquid O₂).

Hazardous reactions: Cl₂, HCl, CO₂, SO₂ and H₂.

Explosive mixtures: air+hydrocarbons, 1-chloro-2,4-dinitrobenzene, Ge derivatives, Cl₂, silver nitrate.

Explosive products with Br₂, I₂, heavy metals (ex. Ag, Hg) and their compounds.

Vigorous neutralisation with acids, attacks non-ferrous metals.

10.3 Hazardous decomposition products

Thermal decomposition liberates nitrogen oxides, at temperatures above 450°C highly flammable hydrogen generates.

11. TOXICOLOGICAL INFORMATION

11.1 Acute effects

Liquid as well as gas have strong irritant to caustic effect on eyes, respiratory mucous membranes, lungs and skin. Product may cause serious health problems. Throat spasm or oedema can lead to suffocation. High concentrations could cause temporary apnoea, but also sudden death. It may cause pulmonary oedema and eye irritation which may end with cornea injuries or even blindness. Contact with liquid gas causes burns and frostbite.

AMMONIA

Date of issue: 09.06.2004

Reviewed on: 01.12. 2009 5th Edition

Inhalation: burning, pain and chemical burns in mucous membranes of the respiratory system, tenacious irritant coughing, breathlessness.

Eyes: burning, pain, lachrymation, chemical burns.

Skin: burning, pain, chemical burns.

Swallowing: not applicable.

Acute toxicity

LC₅₀ inhalation - rat 2000 ppm / 4h

11.2 Repeated dose toxicity

Chronic exposure causes conjunctiva, rhino pharynx and bronchi irritation, may cause damage of liver and kidney.

11.3 Sensitisation

It has no sensitisation effects.

11.4 CMR effects (carcinogenity, mutagenicity, toxicity for reproduction)

It has no CMR effects.

11.5 Toxicokinetics, metabolism, distribution

Not applicable.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

EC₅₀, 25 h., daphnia: 60 mg.l⁻¹

EC₅₀, 100 h., daphnia: 20 mg.l⁻¹

12.2 Mobility

Not applicable.

12.3 Persistence and degradability

Degradable.

12.4 Bioaccumulative potential

Bioaccumulation in fish is not expected.

12.5 Results of PBT assessment

Not applicable.

12.6 Other adverse environmental effects

May cause contamination of grounds and water, can damage surrounding fauna and flora.

According to the Water-Act No 254/2001 Sb. the product is considered to be a defective substance and a hazardous substance according to Annex No 1 to the Water-Act.

13. DISPOSAL CONSIDERATIONS

13.1 Recommended disposal methods for the substance / mixture (preparation)

Product reuse and disposal in accordance with valid waste legislative regulations.

13.2 Recommended disposal methods for contaminated packaging

Product is transported in tank-vehicles or filled into reusable pressure cylinders.

13.3 Waste management measures that control exposure of humans and environment

Proceed in accordance with valid health, air and water legislative regulations.

13.4 Waste regulation

Czech Republic

Act No 185/2001 Sb. on wastes and on the amendment of some additional acts, as amended.

Regulation No 381/2001 Sb. establishing the Waste Catalogue, as amended.

European Union

Directive 2006/12/ES on waste

Date of issue: 09.06.2004

Reviewed on: 01.12. 2009 5th Edition

14. TRANSPORT INFORMATION

14.1 Transport classification

- Land transport (ADR / RID)
- Name: AMMONIA, ANHYDROUS
- UN-Number: 1005
- Class: 2
- Classification code: 2TC
- Packing group: not applicable
- Hazard identification No.: 268
- Symbol/label: 2.3 + 8

14.2 Special transport precautionary measures



Not applicable.

15. REGULATORY INFORMATION

15.1 Chemical Safety Assessment

Not applicable.

15.2 Labelling of the substance / mixture (preparation)

<i>name</i>	<p>AMMONIA AMMONIA ANHYDROUS EC Number: 231-635-3 “EC label“</p>
<i>graphic symbol of danger</i>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Toxic </div> <div style="text-align: center;">  Dangerous for the environment </div> </div>
<i>R-phrases</i>	<p>10-23-34-50</p> <p>Flammable Toxic by inhalation Causes burns Very toxic to aquatic organisms</p>
<i>S-phrases</i>	<p>(1/2-)9-16-26-36/37/39-45-61</p> <p>Keep locked up and out of the reach of children Keep container in a well-ventilated place Keep away from sources of ignition - No smoking In case of contact with eyes, rinse immediately with plenty of water and seek medical advice Wear suitable protective clothing, gloves and eye/face protection In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible) Avoid release to the environment. Refer to special instructions/safety data sheets</p>
Company:	<p>UNIPETROL RPA, s.r.o. Záluží 1, 436 70 Litvínov Czech Republic ☎: +420 476 161 111, +420 476 162 111, +420 476 163 111</p>

Date of issue: 09.06.2004

Reviewed on: 01.12.2009 5th Edition

15.3 Regulatory Data relating to the substance / mixture (preparation)

European Union

Regulation (EC) No 1907/2006 REACH

Regulation (EC) No 1272/2008

Czech Republic:

Act No 356/2003 Sb., on chemical substances and chemical preparations and on the amendment of some additional acts, in the wording of posterior regulations

Act No 258/2000 Sb. on the Protection of Public Health and on the amendments of some related acts, as amended.

Act No 254/2001 Sb., on Waters and on the amendment of some additional acts, as amended.

Order-in-Council No 361/2007 Sb., regulating Safety Occupational Health Conditions in the workplace, as amended.

16. OTHER INFORMATION

Full text of relevant R-phrases referred to under headings 2 and/or 3

- R 10 Flammable
- R 23 Toxic by inhalation
- R 34 Causes burns
- R 50 Very toxic to aquatic organisms

Fulfilling the obligations related to Regulation (EC) No. 1907/2006 - REACH

The stated chemical substance was pre-registered in accordance with the REACH regulation.

Training instructions

Personnel handling the product has to be acquainted demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles (Act No 258/2000 Sb., as amended).

Access to information

Employer must in accordance with Articles 35 of the Regulation (EC) No 1907/2006 enable access to the information from MSDS workers and their representatives who this product use or may be exposed to in the course of their work.

Sources of data used to compile the Material Safety Data Sheet

Record on the classification of hazardous properties of the product

Annex No. 1 to the Regulation No 232/2004 Sb., as amended.

Annex No VI to the Regulation (EC) No 1272/2008 (Table No 3.2)

Annex No 1F to the Directive No 2008/58/EC

Annex No 1A to the Directive No 2009/2/ES

First aid principles in case of exposition to chemical substances (doc. MUDr. Daniela Pelclová et al.)

Revised information

01.12.2006: Revised data under headings 1, 2, 4, 8, 12.5, 13, 15.2 and 16

01.03.2007: Revised data under headings 1 and 16

01.06.2007: General update according to Regulation (EC) No 1907/2006 REACH

01.12.2009: Revised data under headings 1, 2.1, 8.1, 15, 16 and "Statement"

Statement: This Material Safety Data Sheet has been elaborated in accordance with the Regulation (EC) No 1907/2006. This MSDS contains information necessary for the protection of health and environment. The information does not substitute the quality specification of products and should not be construed as any guarantee of suitability for particular applications. The data contained are based on the present state of knowledge and current national legislation. The user is responsible for ensuring that the requirements of relevant regional legislation are complied with.

According to an authorisation form on behalf of UNIPETROL RPA s.r.o., elaborated by:
Environmental and Standardisation Department HSE&Q, UNIPETROL SERVICES, s.r.o.