



Ammonium Nitrate (90% Solution)

ABN: 81 008 668 371

Section 1 – Identification of the Material and Supplier

Product Name

Ammonium nitrate (90% solution)

Other names

ANSOL. Company product code 2410.

Recommended use

Production of explosive emulsion

Company name

CSBP Limited

Address State Postcode Kwinana Beach Road, KWINANA Western Australia 6167

Telephone number Emergency telephone number

(08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas) 1800 093 333 (Australia), +61 8 9411 8444

Section 2 – Hazard Identification

Hazard Classification, including a statement of overall hazardous nature

HAZARDOUS SUBSTANCE.

Ammonium nitrate (90% solution) is not classified as hazardous and is not specified in the NOHSC List of Designated Hazardous Substances [NOHSC:10005(1999)]. However, its transport temperature range of 135 to 140 °C has the potential to cause serious burns if not handled correctly.

DANGEROUS GOODS.

Ammonium nitrate (90% solution) is classified for physicochemical hazards and specified as dangerous in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code), 7th Edition, (FORS, 2007).

GHS Classification(s)

Oxidising Liquid Category 3
Acute Toxicity Oral: Category 5
Serious Eye Damage / Category 2A

Eye Irritation

Label elements

Signal word WARNING

Pictogram(s)



Hazard statement(s)

H272 May intensify fire (oxidizing agent).
H303 May be harmful if swallowed.
H319 Causes serious eye irritation.

AUH044 Risk of explosion if heated under confinement.

AUH031 Contact with acids liberates toxic gas.





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Prevention statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P220 Keep/store away from clothing/incompatible materials/combustible materials.
 P221 Take any precaution to avoid mixing with combustibles/incompatible materials.

P264 Wash thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response statement(s)

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact

lenses, if present and easy to do. Continue rinsing.

P312 Call a POISON CENTER or doctor/physician if you feel unwell.

P337 + P313 If eye irritation persists: Get medical advice/attention. P370 + P378 In case of fire: Use appropriate media for extinction.

Storage statement(s)

None allocated.

Disposal statement(s)

P501 Dispose of contents/container in accordance with relevant regulations.

Other hazards

No information provided.

Section 3 – Composition/Information on Ingredients

Chemical identity of ingredients Proportion of ingredients

Ammonium nitrate 90% ($^{\text{wt}}/_{\text{wt}}$)

Water Remainder

CAS Number for ingredients

6484 -52-2

Section 4 – First Aid Measures

First Aid

Due to its transport temperature range of 135 to 140 $^{\circ}$ C, ammonium nitrate (90% solution) has the potential to cause severe burns to eyes and any flesh with which it comes into contact, if not handled correctly. The solution is moderately toxic if large amounts are swallowed. If contact is made with this product or more than a small quantity has been swallowed seek medical attention. Training on handling ammonium nitrate (90% solution) incidents using this MSDS should be provided before any ammonium nitrate (90% solution) handling or use commences.

First Aid Facilities

First aid procedures, equipment, medication and training for the treatment of injury by ammonium nitrate (90% solution) should be in place BEFORE the use commences.

Equipment in place should be:

- Safety shower and eyewash stations immediately accessible in the workplace;
- Eye-wash bottle;
- Fresh, clean cool drinking water;
- Oxygen;
- "Space" or thermal blankets for treating patients for shock;
- Personal protective equipment for use by first aid personnel.



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FIRST AID PROCEDURES FOR DEALING WITH THIS PRODUCT AND EXPOSURE TO IT

1. Personal Protection By First Aid Personnel

First aid personnel providing first aid treatment to a patient injured by ammonium nitrate (90% solution) should observe the following precautions for their own personal protection:

- Avoid contact with ammonium nitrate (90% solution) by wearing protective gloves;
- Wear chemical goggles to prevent ammonium nitrate (90% solution) entering eyes;
- Wear P2 type canister respirator if rescue area is contaminated by airborne ammonium nitrate (90% solution) mist.

2. Swallowed

If person is conscious, rinse mouth thoroughly with water immediately and give water or milk to drink. DO NOT induce vomiting. Seek immediate medical assistance after swallowing.

3. Eyes

Immediately irrigate with copious quantities of water, while holding eyelids open, for at least 15 minutes. Seek medical immediate attention.

4. Skin

Wash affected areas with copious amounts of water. Remove all contaminated clothing and launder before reuse. Seek medical immediate attention.

5. Inhalation

Remove affected person from exposure to a well ventilated area. Keep warm and at rest. In emergency, if breathing is difficult give oxygen. If the affected person suffers cardiac arrest commence cardio-pulmonary resuscitation immediately. Seek urgent medical attention.

ADVICE TO DOCTOR.

Ammonium nitrate (90% solution) is transported at a temperature range of 135 to 140 °C. Any ingestion, or contact with eyes or skin will cause severe burns. If ingested, nitrates may be reduced to nitrites by intestinal bacteria. Nitrites may affect the blood (methaemoglobinaemia) and blood vessels (vasodilation and a fall in blood pressure). Effects peak within 30 minutes. Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methaemoglobin. Institute cardiac monitoring, especially in patients with coronary, artery or pulmonary disease.

Long Term Complications

No long term complications are known.

Further information about the treatment for exposure to this product can be obtained from the Poisons Information Centre on (08) 13 1126 (Australia only)

Section 5 – Fire Fighting Measures

Product flammability

Ammonium nitrate (90% solution) is not flammable under normal applications and is not considered a fire risk, but will support combustion in an existing fire by liberating oxygen – even if smothered. It is for this reason that fires involving ammonium nitrate cannot be extinguished by the prevention or air ingress (for example, smouldering with steam) because of the *in situ* provision of oxygen from the ammonium nitrate itself. Thermal decomposition may result in gases, such as oxides of nitrogen and ammonia, being produced.

Suitable extinguishing media

Water spray in large quantities. WARNING: explosion risk. DO NOT USE the following as extinguishing media: Dry agent -carbon dioxide, dry chemical powder. Extinguishing methods based on smothering are ineffective in the case of oxidising agents.

Hazard from combustion products

Decomposes on heating; emitting irritating white or orange & brown fumes of toxic oxides of nitrogen

Special protective precautions and equipment for fire fighters

Wear full protective clothing, including respiratory protection.

Inert chemical absorbent and substantial amounts of water will be required to clean up a large spill.

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Portable showers and eyewash may also be needed.

Prevent run-off into drains and waterways.

WARNING: Explosion risk in case of fire, especially if contaminated or confined. An adjacent detonation may also involve the risk of explosion. Molten product may explode from friction, shock, heat or containment. If safe to do so, prevent molten product being confined in drains, pipes, etc.

Fire-fighters to wear self-contained breathing apparatus and suitable protective clothing if there is a risk of exposure to products of combustion / decomposition.

WARNING: Explosion risk in case of fire. With an intense fire evacuate the area of all personnel to at least 1000 metres.

If safe to do so, remove containers from path of fire.

If safe to do so, prevent molten product being confined in drains, pipes, etc.

If safe to do so, keep containers and adjacent areas cool with water sprays

Prevent spillage or run-off from entering drains or water courses.

Hazchem Code

1Z (Note: 1Y has been approved by the Competent Authority)

IMDG EMS Fire: F-H; IMDG EMS Spill: S-Q



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Section 6 – Accidental Release Measures

Emergency procedures

Hazardous conditions may result if ammonium nitrate (90% solution) spill is managed improperly. Make plans in advance to handle possible emergencies, including obtaining stocks of inert absorbent materials, to avoid both human and environmental exposure. Always wear recommended personal protective equipment and respiratory protection.

Methods and Materials for containment and clean up

For all spills, evacuate unprotected personnel upwind and out of danger. Remove sources of heat and ignition. Restrict access to spill site. Any spillage should be promptly contained with sand, earth, or vermiculite and recovered. Recovered material may be returned to CSBP for recycling or use as fertiliser on a farm. Do not allow to mix with sawdust and other combustible organic substances. Remove sources of heat and ignition.

Small Leaks

If possible contain the area of the spill, recover into a clean labelled open container when cooled and returned to CSBP for recycling, or disposed of as fertiliser on a farm.

Large Spills

If possible contain the area of the spill. Material will solidify once cooled. A front end loader may be required to scoop up spill into clean containers when cooled. Return to CSBP if possible. Depending on the degree and nature of contamination, dispose of by use as fertiliser on farm or authorised waste facility.

Wash down area and prevent run-off into drains, sewers or waterways. Soak up wet material using absorbent material such as vermiculite or sand and dispose at authorised waste facility.

Section 7 – Handling and Storage

Precautions for safe handling

Ammonium nitrate (90% solution) spills may appear to crystallise rapidly and form a crust. However, the product may still be liquid and hot underneath the crust. Personal protective equipment should be worn and care should be taken to avoid severe burns with the hot solution. Wash down area and prevent run-off into drains, sewers, or waterways.

If ammonium nitrate (90% solution) has cooled and set hard, avoid excessive generation of dust during clean up. Avoid contamination by combustible (e.g., diesel oil, grease, etc.) and incompatible materials, which may cause fires.

Conditions for safe storage, including any incompatibilities

Store in accordance with Australian Standard AS 4326 *The storage and handling of oxidizing agents*. Store away from sources of heat or fire, especially in a confined space – the heating may cause an explosion.

Keep away from combustible materials and substances mentioned in *Precautions for safe handling* section above. Avoid storage and contamination with chlorine bleaches, pool chlorine and hypochlorite's as a reaction, leading to the formation of explosive nitrogen trichloride, may occur.

Ammonium nitrate (90% solution) can initiate a fire in hay, straw, grain, diesel oil, greases, wood articles, etc., on coming into contact with them, and should not be stored together.

Do not permit smoking and the use of naked lights in the storage area for ammonium nitrate (90% solution). Any building used for the storage of ammonium nitrate (90% solution) should be dry and well ventilated.

This material is a security sensitive product and needs to be securely stored and accurately accounted for.





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Section 8 – Exposure Controls/Personal Protection

National exposure standards

No specific official limit. ACGH recommended value for inhalable particulate:

ES-TWA		ES-STEL		ES-Peak	
No data available	10 mg/m^3	No data available	No data available	No data available	No data available

Biological limit values

No data available.

Engineering controls

Provide ventilation where necessary.

Personal protective equipment

Personal protective equipment (PPE) should be used where other control measures are not practicable or adequate to control exposure. It should be chosen to prevent routine exposure and to protect workers in the case of accidental contact with ammonium nitrate (90% solution).

Eye/face protection: Wear chemical safety goggles to prevent eye contact.

<u>Skin protection:</u> Wear PVC gloves when handling the product to prevent contact. Wear long trouser and long sleeves to prevent contact.

Respiratory protection: Use P2 type canister respirator where mist or fumes are a problem.

<u>Personal hygiene</u>: Change and wash clothing and PPE, if contaminated, or before storing and/or re-using. Wash hands and face thoroughly after handling and before work breaks, eating, drinking, smoking and using toilet facilities.



Section 9 – Physical and Chemical Properties

Appearance (colour, physical form, shape)

Clear, colourless very hot liquid with a transport temperature range of 135 to 140 °C.

Odour

Slight ammoniacal odour.

рH

pH of 10% solution: 5 - 6.

Vapour pressure

22.5 kPa at 100 °C.

Vapour density

Not applicable.

Boiling point/range

148 °C.

Freezing/melting point

Ammonium nitrate commences crystallizing out of ammonium nitrate (90% solution) at 98 °C.

Solubility

Miscible in all proportions in water: slightly soluble in alcohol; not soluble in acetone.

Specific gravity or density

Specific gravity 1.39 at 125 °C.

Flash point and method of detecting flash point

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Ammonium nitrate (90% solution) does not give off flammable vapours.

Upper and lower flammable (explosive) limits in air

Ammonium nitrate (90% solution) is not flammable.

Ignition temperature

Not determined.

Viscosity

1.7 mPa.s at 140 °C

Section 10 – Stability and Reactivity

Chemical stability

When stored and handled in accordance with Australian Standard AS 4326 *The storage and handling of oxidizing agents*, ammonium nitrate (90% solution) remains stable.

Conditions to avoid

Store away from sources of heat or fire. Keep away from combustible materials and organic substances. Avoid storage and contamination with chlorine bleaches, pool chlorine and hypochlorites. Ensure that ammonium nitrate (90% solution) is not stored near hay, straw, grain, diesel oil, greases. Do not permit smoking and the use of naked lights in the storage area for ammonium nitrate solution. Any building used for the storage of ammonium nitrate (90% solution) should be dry and well ventilated. Avoid contamination by combustible (e.g., diesel oil, grease, etc.) and incompatible materials.

Incompatible materials

Ammonium nitrate (90% solution) is incompatible with copper, zinc, or their alloys (i.e., bronze, brass, galvanised metals, etc.), aluminium powder and mild steel.

Hazardous decomposition products

When heated to decomposition (unconfined) produces nitrous oxide, white ammonium nitrate fumes and water. Other hazardous decomposition products include irritating toxic brown fumes of nitrogen oxides (NOx). May evolve nitrogen oxides (nitrous oxide) and ammonium nitrate when heated to decomposition

Hazardous reactions

Contamination of ammonium nitrate (90% solution) with chlorine bleaches, pool chlorine and hypochlorites may result in the formation of explosive nitrogen trichloride. When mixed with strong acid ammonium nitrate (90% solution) produces toxic brown nitrogen dioxide gas. Ammonium nitrate (90% solution) may react violently with nitrites, chlorates, chlorides and permanganates.

When molten, ammonium nitrate may decompose due to shock or pressure.

Section 11 – Toxicological Information

HEALTH EFFECTS

When handled in accordance with the guidelines in this material safety data sheet, ammonium nitrate (90% solution) should not present any health effects. If this product is mishandled, symptoms that may arise are:

Acute:

Ammonium nitrate (90% solution) is loaded for transport at 125 °C and will cause severe thermal burns in contact with eyes and flesh. Damage may be permanent. It has moderate toxicity if swallowed. It is not classified as hazardous according to criteria of WorkSafe Australia.

Inhalation:

Hot vapours, and high mist concentration of air-borne material, above hot solution may cause burns and irritation to the nose and upper respiratory tract. Lesions to the nasal septum, pulmonary oedema and pneumonitis may result. Symptoms may include coughing, sore throat and short breath. Prolonged exposure may be harmful and may result in severe scarring of tissue.

Skin:

Hot material will cause severe thermal burns, blistering and necrosis. Damage may be permanent. Residue



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from crystallised cold solution may cause irritation, redness and pain, mainly due to attrition, following contact.

Eye:

Hot material will cause severe eye burns and permanent damage. Residue from crystallised cold solution may cause irritation, redness and pain, mainly due to attrition, following contact.

Swallowed:

Hot material will cause severe thermal burns to lips, mouth, throat, oesophagus and stomach, accompanied by severe burning sensation. Damage may be permanent. Severe scarring of tissue and death may result. Symptoms include bleeding, vomiting, abdominal pain, diarrhoea and fall in blood pressure. Cooled ammonium nitrate presents moderate toxicity, unless large amounts are ingested. Large amounts give large to gastro-intestinal irritation, with symptoms such as nausea, vomiting and diarrhoea. Large amounts may also cause dilation of blood vessels by direct smooth muscle relaxation and methaemoglobinaemia (excessive conversion of haemoglobin to methaemoglobin, which is incapable of binding and carrying oxygen — methaemoglobin is formed when iron in the haem molecule is oxidised from the ferrous to the ferric state). Symptoms include dizziness, abdominal pain, vomiting, bloody diarrhoea, weakness, convulsions and collapse. LD_{50} (Oral, rat) = 2,217 mg/kg, for ammonium nitrate.

Chronic

Prolonged or repeated exposure to hot vapours, and high mist concentration of air-borne material, above hot ammonium nitrate solution may result in pulmonary function effects, and will cause drying of the mucous membranes, irritation and blistering that may lead to dermatitis and necrosis. Prolonged or repeated exposure to residue from crystallised cold solution may cause drying of the skin with cracking and irritation that may lead to dermatitis.

Section 12 – Ecological Information

Ecotoxicity

Hot ammonium nitrate (90% solution) will cause severe thermal burns to animals and vegetation and may cause their death. When cooled, ammonium nitrate is a plant nutrient and large contamination may kill vegetation and cause poisoning in livestock and poultry.

Ammonium nitrate is of low toxicity to aquatic life and spills may cause algal blooms in static waters.

Persistence and degradability

When released into the soil, ammonium nitrate (90% solution) is not expected to evaporate significantly, but is expected to leach into groundwater. In damp soil the ammonium ion, NH_4^+ , is adsorbed by the soil. When released into water, ammonium nitrate (90% solution) is expected to readily biodegrade; the nitrate ion, NO_3^- , is mobile in water. The nitrate ion is the predominant form of plant nutrition. It follows the natural nitrification/denitrification cycle to give nitrogen.

Mobility

Very soluble in water. The NO₃ ion is mobile. The NH₄ ion is adsorbed by the soil.

Environmental fate (exposure)

Hot ammonium nitrate (90% solution) may cause trauma and death in aquatic animals due local sudden rise in temperature of local aquatic system when in contact with the hot solution.

Ammonium nitrate presents low toxicity to aquatic life. TL_m 96 between 10 – 100 ppm.

No effects on growth or feeding activities were observed in largemouth bass and channel catfish exposed to concentration of $400~\text{mg NO}_3^{-1}/\text{L}$.

Data below refers to ammonium nitrate:

Acute Toxicity to Fish

48 hr. LC₅₀ (*Cyprinus carpio*): 1·15 - 1·72 mg un-ionised NH₃/L; 95 – 102 mg total NH₃/L;

96 hr LC₅₀ (Chinook Salmon, rainbow trout, bluegill): 420 -1,360 mg NO₃⁻/L;

TL_m (Tadpoles): 910 mg NH₃/L.

Chronic Toxicity to Fish

7 day LC₅₀ (Fingerling rainbow trout): 1,065 mg/L.

Acute Toxicity to Aquatic Invertebrates

EC₅₀ (Daphnia magna): 555 mg/L; 124·9 mg total NH₃/L.

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Chronic Toxicity to Invertebrates

Up to 7 days NOEC (Bullia digitalis): 300 mg/L.

Bioaccumulative potential

Ammonium nitrate (90% solution) does not show any bio-accumulation phenomena.

Section 13 – Disposal Considerations

Disposal methods and containers

Refer to local State Land Waste Management Authority. Depending on degree and nature of contamination, dispose of by use as fertiliser on farm or to authorised waste facility. Empty containers (road tankers and isotainers) must be decontaminated by rinsing thoroughly with water. Rinsing water needs to be disposed of carefully. Avoid contaminating waterways.

Special precautions for landfill or incineration

No data available.

Section 14 – Transport Information

UN Number

2426

UN Proper shipping name

AMMONIUM NITRATE, LIQUID

Class and subsidiary risk

5.1 Oxidizing Agent

Packing group

None allocated

Special precautions for user

Not to be loaded with explosives (Class 1), flammable gases (Class 3), toxic gases (class $2 \cdot 3$), Flammable liquids (Class 3), flammable solids (Class $4 \cdot 1$), spontaneous combustible substances (Class $4 \cdot 2$), dangerous when wet substances (Class $4 \cdot 3$), organic peroxides (Class $5 \cdot 2$), toxic substances, where the toxic substances are fire risk substances (Class 6), radioactive substances (Class 7), corrosives (Class 8), miscellaneous dangerous goods, where the miscellaneous dangerous goods are fire risk substances (Class 9), and fire risk substances other than dangerous goods; however, exemptions apply.

Hazchem code

1Z (Note: 1Y has been approved by the Competent Authority)

IMDG EMS Fire: F-H; IMDG EMS Spill: S-Q

Section 15 – Regulatory Information

Australian regulatory information

Ammonium nitrate (90% solution) is not classified as hazardous and is not specified in the NOHSC List of Designated Hazardous Substances [NOHSC:10005(1999)].

Ammonium nitrate (90% solution) is not listed as a poison in the Standard for the Uniform Scheduling of Drugs and Poisons.

Additional national and/or international regulatory information

OSHA: Hazardous by definition of Hazard Communication Standard (40 CFR Part 370).

Classifications

SafeWork Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

Inventory listing(s)

AUSTRALIA: AICS (Australia Inventory of Chemical Substances)

All components are listed on the AICS; or are exempt.

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Section 16 – Other Information

Key / legend to abbreviations and acronyms used in the MSDS

NOHSC National Occupational Health and Safety Commission
SUSDP Standard for the Uniform Scheduling of Drugs and Poisons

ES-TWA Exposure Standard – Time weighted average ES-STEL Exposure Standard – Short term exposure level

ES-Peak Exposure Standard – Peak level FORS Federal Office of Road and Safety

LC₅₀: Lethal concentration 50, median lethal concentration

LD₅₀ Lethal dose 50. The single dose of a substance that causes the death of 50% of an animal

population from exposure to the substance by any route other than inhalation

 $\%(^{\text{wt}}/_{\text{wt}})$ Percent amount on a weight per weight basis $\%(^{\text{wt}}/_{\text{vol}})$ Percent amount on a weight per volume basis

PPM Parts per million

TLm Median Toxic Limit is similar to LC but refers specifically to the concentration which kills

50% of the organisms, in other words the LC_{50}

Zone 1 Class 1 An area in which an explosive gas atmosphere can be expected to occur periodically or

occasionally during normal operation.

(More than 10 hours per year but less than 1000 hours per year)

Literature references

Occupational Safety and Health Regulations 1996, State Law Publisher, Western Australia.

Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals, Safe Work Australia, December 2015

Australian Code for the Transport of Dangerous Goods by Road and Rail, 7th Edition, Australian Government Publishing Service, Canberra, October 2015.

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Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NHSC:1003(1991)].

Hazardous Materials Handbook for Emergency Responders, Onguard Training for Life, J. Varela (Editor), Van Nostrand Reinhold, New York, 1996.





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Chemwatch www.chemwatch.net

Guidance for the Compilation of Safety Data Sheets for Fertilizer Materials, European Fertilizer Manufacturers Association, online at www.efma.org/Publications/Guidance/Index.asp

Sources for data

No data available.

Important Notes

- 1. To the best of our knowledge this document complies with the National Code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition [NOHSC:2011 (2003)].
- 2. This material safety data sheet summarizes our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this material safety data sheet and consider the information in the context of how the product will be handled and used in the workplace, including in conjunction with other products.
- 3. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact the Safety and Emergency Services Department, CSBP Limited on (08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas).
- 4. Our responsibility for products sold, is subject to our terms and conditions, a copy of which is sent to our customers, and is also available on request.
- 5. CSBP reserves the right to make change to material safety data sheets without notice.