Material Safety Data Sheet

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: ANE SERIES (AMMONIUM NITRATE EMULSION)

Other name(s): ANE 130, ANE 140, ANE 200, ANE 210, ANE 230, ANE 800, ANE Advantage, ANE Coal, ANE Gold, ANE Extra, Subtek Charge AN Emulsion, Subtek Eclipse AN Emulsion, Fortis Coal AN Emulsion, Fortis Advantage AN Emulsion, Centra Gold AN, Civec Drive ANE

Recommended Use: Emulsion phase ingredient for explosives. Various government controls may apply to this material.

Supplier: Orica Australia Pty Ltd
ABN: 004 117 828
Street Address: 1 Nicholson Street
Melbourne 3000
Australia
Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937
Emergency Telephone: 1 800 033 111 (ALL HOURS)

2. HAZARDS IDENTIFICATION

This material is hazardous according to criteria of ASCC; HAZARDOUS SUBSTANCE.

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Risk Phrases: Limited evidence of a carcinogenic effect.
Safety Phrases: Avoid contact with skin.
Poisons Schedule: None allocated.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components / CAS Number</th>
<th>Proportion</th>
<th>Risk Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels, diesel 68334-30-5</td>
<td>0 - &lt; 10%</td>
<td>R40 Carc. Cat. 3, R65, R66, R51/53</td>
</tr>
<tr>
<td>Mineral oil 8012-95-1</td>
<td>0 - &lt; 10%</td>
<td>-</td>
</tr>
</tbody>
</table>

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Substance No: 000000009028
Issued: 14/11/2007
Version: 5
4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (Phone eg. Australia 131 126; New Zealand 0 800 764766) or a doctor.

Inhalation: Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact: If skin contact occurs, remove contaminated clothing and wash skin with running water. If irritation occurs seek medical advice. Nitrates can be absorbed through cut, burnt or broken skin. Launder contaminated clothing before reuse. For skin burns, cover with a clean, dry dressing until medical help is available.

Eye Contact: If in eyes, wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

Ingestion: Rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek medical advice.

Medical attention and special treatment: Treat symptomatically. May cause methemoglobinemia. Clinical findings: The smooth muscle relaxant effect of nitrate salts may lead to headache, dizziness and marked hypotension. Cyanosis is clinically detectable when approximately 15% of the haemoglobin has been converted to methaemoglobin (ie. ferric iron).

Symptoms such as headache, dizziness, weakness and dyspnoea occur when methaemoglobin concentrations are 30% to 40%; at levels of about 60%, stupor, convulsions, coma and respiratory paralysis occur and the blood is a chocolate brown colour. At higher levels death may result. Spectrophotometric analysis can determine the presence and concentration of methaemoglobin in blood.

Treatment:
1. Give 100% oxygen.
2. In cases of (a) ingestion: use gastric lavage, (b) contamination of skin (unburnt or burnt): continue washing to remove salts.
3. Observe blood pressure and treat hypotension if necessary.
4. When methaemoglobin concentrations exceed 40% or when symptoms are present, give methylene blue 1 to 2 mg/kg body weight in a 1% solution by slow intravenous injection.
cyanosis has not resolved within one hour a second dose of 2 mg/kg body weight may be given.
The total dose should not exceed 7 mg/kg body weight as unwanted effects such as dyspnoea,
chest pain, vomiting, diarrhoea, mental confusion and cyanosis may occur. Without treatment
methaemoglobin levels of 20-30% revert to normal within 3 days.
5. Bed rest is required for methaemoglobin levels in excess of 40%.
6. Continue to monitor and give oxygen for at least two hours after treatment with methylene blue.
7. Consider transfer to centre where haemoperfusion can be performed to remove the nitrates from
the blood if the condition of the patient is unstable.
8. Following inhalation of oxides of nitrogen the patient should be observed in hospital for 24 hours
for delayed onset of pulmonary oedema.
Further observation for 2-3 weeks may be required to detect the onset of the inflammatory changes
of bronchiolitis fibrosa obliterans.

5. FIRE FIGHTING MEASURES

Hazards from combustion products: Non-combustible material. Oxidizing substance. Will support combustion of other
materials. Decomposes on heating emitting irritating white fumes. Brown fumes indicate the presence of toxic oxides of nitrogen.

Precautions for fire fighters and special protective equipment: Nitrate salts on their own are not combustible, however they will support the
combustion of other materials. Decomposes on heating emitting irritating white fumes. Brown fumes indicate the presence of toxic oxides of nitrogen. On detection of fire the compartment(s) should be opened up to provide maximum ventilation. Fire-fighters to
wear self-contained breathing apparatus and suitable protective clothing if there is a risk of exposure to products of combustion/decomposition. Fires should be fought from a protected location. Keep containers and adjacent areas cool with water spray. If safe to do so, remove containers from path of fire. A major fire may involve a risk of explosion. An adjacent detonation may also involve the risk of explosion. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire.

Suitable Extinguishing Media: Not combustible, however, if material is involved in a fire use: Water spray (large quantities).

Hazchem Code: 1[Y]E

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures: Clear area of all unprotected personnel. Shut off all possible sources of ignition. Wear protective equipment to prevent skin and eye contact and inhalation of vapours/dusts. If contamination of sewers or waterways has occurred advise local emergency services.

This material is classified as Security Sensitive Ammonium Nitrate (SSAN). Spillage recovery needs to be appropriately documented and material accurately accounted for.

In the case of a transport accident notify the Police, Explosives Inspector and Orica Australia Pty Ltd (Telephone: 1800 033 111 -- 24 hour service) and/or Orica New Zealand Pty Ltd (Telephone: 0800 734 607 -- 24 hour service).
Methods and materials for containment and clean up: Slippy when spilt. Avoid accidents, clean up immediately. Contain - prevent run off into drains and waterways. Use absorbent - inert material such as vermiculite, perlite or clean sand - NOT combustible absorbents such as sawdust. Addition of water is recommended. Collect in properly labelled containers, with loose fitting lids, for disposal.

7. HANDLING AND STORAGE

Conditions for safe storage: Store away from strong acids, strong alkalis, nitrites, chlorates, chlorides and permanganates. Ammonium Nitrate is incompatible with, and must be stored away from, tetratinomethane, dichloroisocyanuric acid, trichloroisocyanuric acid, any bromate, chlorate, chloride, hypochlorite or chloroisocyanurate or any inorganic nitrite. Store in cool place and out of direct sunlight. Keep containers closed when not in use - check regularly for leaks. Product Deterioration: The process of deterioration is a gradual crystallisation of the ammonium nitrate and a thickening of the emulsion. If heated for long periods the emulsion may segregate. Product which has deteriorated badly is unsuitable for use.

Ensure ammonium nitrate is stored securely and in accordance with regulations/controls issued by relevant authority. The secure storage of ammonium nitrate within Australia includes but is not limited to the use of site security plans, locking the facility/container with physical restraining items, validation and record keeping of all stock, and where deemed necessary through a risk management approach constant surveillance.

Within Australia all persons who have unsupervised access to Security Sensitive Ammonium Nitrate (SSAN), will require security clearances. The issuing of security clearances is controlled and issued through the local Government authorities. The checks include a criminal history check (CHC), and a politically motivated violence check (PMV).

Precautions for safe handling: Avoid skin and eye contact and breathing in vapour. Do NOT subject the material to impact, friction between hard surfaces nor to any form of heating. Avoid all contact with other chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits:
No value assigned for this specific material by the National Occupational Health and Safety Commission. However, Exposure Standard(s) for constituent(s):

Oil mist, refined mineral: 8hr TWA = 5 mg/m3

As published by the National Occupational Health and Safety Commission.

TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.
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Supplier recommended Exposure Standard: Diesel Oil: 500 mg/m^3 total vapour (approx 100 ppm) or 5 mg/m^3 stable aerosols for 8 hour time-weighted average (TWA). (1)

Engineering controls:
Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Exposure Standards.

Personal Protective Equipment:
The selection of PPE is dependant on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Orica Personal Protection Guide No. 1, 1998: B - OVERALLS, SAFETY SHOES, SAFETY GLASSES, GLOVES.

Wear overalls, safety glasses and impervious gloves. Use with adequate ventilation. If inhalation risk exists wear organic vapour respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical state:</th>
<th>Creamy emulsion. Material may be warm to hot (60-80°C).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odour:</td>
<td>Negligible</td>
</tr>
<tr>
<td>Solubility:</td>
<td>Insoluble in water.</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>0.3 - 1.25 @ 20°C</td>
</tr>
<tr>
<td>Flash Point (°C):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in water (g/L):</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Chemical stability:</th>
<th>Oxidising agent. Avoid contact with combustible substances.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions to avoid:</td>
<td>Avoid contact with combustible substances. Avoid exposure to heat, sources of ignition, and open flame.</td>
</tr>
<tr>
<td>Incompatible materials:</td>
<td>Incompatible with nitrites , chlorates , chlorides and permanganates . Incompatible with strong acids. Incompatible with strong alkalis. Incompatible with combustible materials. Ammonium nitrate is a powerful oxidising agent. It is incompatible with tetratintrmethane, dichloroisocyanuric acid, trichloroisocyanuric acid, any bromate, chlorate, chloride, hypochlorite or chloroisocyanurate, any inorganic nitrite and metal powders.</td>
</tr>
<tr>
<td>Hazardous decomposition products:</td>
<td>Oxides of nitrogen. Oxides of carbon. When heated to decomposition (unconfined) ammonium nitrate produces nitrous oxide, white ammonium nitrate fumes and water. When mixed with strong acids, and occasionally during blasting, it produces an irritating</td>
</tr>
</tbody>
</table>

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Hazardous reactions: A major fire may involve a risk of explosion. An adjacent detonation may also involve the risk of explosion. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. Hazardous polymerisation will not occur.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing can result in nausea, vomiting, diarrhoea, and abdominal pain. Swallowing large amounts may result in headaches, dizziness and a reduction in blood pressure (hypotension).

Eye contact: May be an eye irritant.

Skin contact: Contact with skin may result in irritation. Will have a degreasing action on the skin. Repeated or prolonged skin contact may lead to irritant contact dermatitis. Can be absorbed through cut, broken, or burnt skin with resultant adverse effects. See effects as noted under ‘Inhalation’. Contact with hot material may cause skin burns.

Inhalation: Material may be irritant to the mucous membranes of the respiratory tract (airways). Breathing in vapour can result in headaches, dizziness, drowsiness, and possible nausea.

Absorption of ammonium nitrate by inhalation, ingestion or through burnt or broken skin may cause dilation of blood vessels by direct smooth muscle relaxation and may also cause methaemoglobinaemia.

Long Term Effects:
No information available for the product. Available evidence from animal studies indicate that repeated or prolonged exposure to a component of this material could result in effects on the skin. This material contains within the diesel oil component of this formulation polycyclic aromatic hydrocarbons (PAHs). Some PAHs have been implicated as potential skin carcinogens in humans under conditions of poor personal hygiene, prolonged or repeated skin contact and exposure to sunlight. Toxic effects are unlikely to occur if good personal hygiene is practised. (1)

Toxicological Data:
No LD50 data available for the product. For the constituent AMMONIUM NITRATE: (2):
Oral LD50 (rat): 2217 mg/kg
In humans and animals methaemoglobinaemia has occurred under untreated circumstances following the ingestion of nitrates. (2)

12. ECOLOGICAL INFORMATION

Ecotoxicity Avoid contaminating waterways.

13. DISPOSAL CONSIDERATIONS
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Disposal methods: Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. This emulsion can be destroyed by dispersion in a detergent solution. Small quantities of damaged or deteriorated explosives may be destroyed by inclusion in a blast hole containing good explosive(s). For large quantities of damaged or deteriorated explosives notify Orica Australia Pty Ltd and/or Orica New Zealand Pty Ltd.

14. TRANSPORT INFORMATION

Road and Rail Transport
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

UN No: 3375
Class-primary: 5.1 Oxidizing Agent
Packing Group: II
Proper Shipping Name: AMMONIUM NITRATE EMULSION
Hazchem Code: 1[Y]E

Marine Transport
Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 3375
Class-primary: 5.1 Oxidizing Agent
Packing Group: II
Proper Shipping Name: AMMONIUM NITRATE EMULSION

Air Transport
TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in passenger aircraft and cargo aircraft.

15. REGULATORY INFORMATION

Classification: This material is hazardous according to criteria of ASCC; HAZARDOUS SUBSTANCE.

Hazard Category: Xn: Harmful

Risk Phrase(s): R40: Limited evidence of a carcinogenic effect.

Safety Phrase(s): S24: Avoid contact with skin.

Poisons Schedule: None allocated.

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All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

Various regulations/controls/authorisations/licences may apply governing the manufacture, importation, exportation, use, handling, storage, sale/supply, transport and disposal of ammonium nitrate. Ammonium nitrate in Australia is considered a security sensitive material and loss, theft, attempted theft and unexplained discrepancies shall be reported to authorities. Record keeping and licensing of individuals shall be required and maintained.

16. OTHER INFORMATION

(1) Supplier Material Safety Data Sheet; 12/ 2002.
(2) Material Safety Data Sheet - Orica Australia Pty Ltd; 08/ 2004.
'Principles for the Regulation of Ammonium Nitrate COAG (Council of Australian Government)'.

This material safety data sheet has been prepared by SH&E Shared Services, Orica.

This material, as an ammonium nitrate emulsion, was formerly classified with UN No 3139, OXIDIZING LIQUID, N.O.S. (AMMONIUM NITRATE EMULSION). This UN No has now been replaced by UN No 3375.

Reason(s) for Issue:
Revised Primary MSDS
Addition/Change of synonymous name(s)

This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.