1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: OSEIS ELECTRONIC DETONATORS (1.1B)

Recommended use of the chemical and restrictions on use: Initiator for detonator sensitive explosives.

Supplier: Orica Australia Pty Ltd
ABN: 99 004 117 828
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

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

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Explosives - Division 1.1

SIGNAL WORD: DANGER

Hazard Statement(s):
H201 Explosive; mass explosion hazard.

Precautionary Statement(s):

Prevention:
P210 Keep away from heat / sparks / open flames / hot surfaces. No smoking.
P230 Keep wetted with water.
P240 Ground / bond container and receiving equipment.
P250 Do not subject to grinding / shock / friction / impact / electrical energy from extraneous source (lighting, static electricity, stray currents, galvanic electricity or electromagnetic radiation) or any form of heating.
P280 Wear protective gloves / protective clothing / eye protection / face protection.

Response:
P370+P380 In case of fire: Evacuate area.
P372 Explosion risk in case of fire.
P373 DO NOT fight fire when fire reaches explosives.

Storage:
P401 Store in accordance with Hazardous Substances (Class 1 to 5) Control Regulations 2001.

Disposal:
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
3. COMPOSITION/INFORMATION ON INGREDIENTS

Product Description: Metal alloy tube closed at one end with a moulded plastic plug and attached electric lead wires at the opposite end.

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Proportion</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinitrotoluene (TNT)</td>
<td>118-96-7</td>
<td>&lt;1.0%</td>
<td>H201 H331 H311 H301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H373 H411</td>
</tr>
<tr>
<td>Pentaerythritol tetranitrate (PETN)</td>
<td>78-11-5</td>
<td>&lt;1.0%</td>
<td>H200 H360DF H332</td>
</tr>
<tr>
<td>Lead azide</td>
<td>13424-46-9</td>
<td>&lt;0.1%</td>
<td>H302 H373 H400 H410</td>
</tr>
<tr>
<td>Lead chromate</td>
<td>7758-97-6</td>
<td>&lt;0.1%</td>
<td>H350 H360DF H373</td>
</tr>
<tr>
<td>Metal and plastic components</td>
<td>-</td>
<td>&gt;90%</td>
<td>-</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Construction of the product normally prevents contact with explosive component, however, in the event of exposure: For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:
In the case of inhalation of blasting fumes: 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. Seek medical advice if effects persist.

Skin Contact:
If irritation occurs seek medical advice. One component (TNT) enclosed in detonator can be absorbed through the skin with resultant toxic effects. Seek immediate medical advice if exposure to detonator contents has occurred.

Eye Contact:
Not applicable.

Ingestion:
Get to a doctor or hospital quickly.

Indication of immediate medical attention and special treatment needed:
Treat symptomatically. Detonator assemblies are explosive - handle with care. Explosive material containing lead. Long term exposure to detonation fumes may result in lead poisoning. Shrapnel from detonation may cause burns, wounds and bruises - treat symptomatically.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Do not fight fires involving explosives.

Hazchem or Emergency Action Code: E

Specific hazards arising from the substance or mixture:
Explosive material. Avoid all ignition sources. Avoid stray currents. Risk of explosion by shock, friction, fire or other sources of ignition. On burning will emit toxic fumes, including those of oxides of lead, oxides of nitrogen, oxides of chromium and oxides of carbon.
6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:
Shut off all possible sources of ignition. Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact.

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).

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Collect and seal in properly labelled containers.

7. HANDLING AND STORAGE

Precautions for safe handling:
Detonators are explosive - handle with care. Do NOT subject the material to impact, friction between hard surfaces nor to any form of heating. Take precautionary measures against static discharges. Keep out of reach of children.

Conditions for safe storage, including any incompatibilities:
Store material in a well ventilated magazine suitably licensed for Class 1.1B explosives. Do not store detonators in an explosives magazine. Protect containers from physical damage. Store away from sources of heat or ignition. Store away from incompatible materials described in Section 10.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for constituent(s) at or below 1%:

Lead, inorganic dusts & fumes (as Pb): 8hr TWA = 0.15 mg/m³
Lead chromate (as Cr): 8hr TWA = 0.05 mg/m³, Carcinogen Category 2
2,4,6-Trinitrotoluene (TNT): 8hr TWA = 0.5 mg/m³, Sk

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

`Sk' (skin) Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

Carcinogen Category 2 - probable human carcinogen. There is sufficient evidence to provide a strong presumption that human exposure may result in the development of cancer. This evidence is generally based on appropriate long term animal studies, limited epidemiological evidence or other relevant information.

These Workplace 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 workplace 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.
Biological Exposure Indices: Inorganic lead. Inorganic chromium. Biological Exposure Index (2,4,6-Trinitrotoluene, TNT)(methemoglobin inducers): Methemoglobin in blood = 1.5% of hemoglobin, During or end of shift.

Appropriate engineering controls: When test firing, ensure ventilation is adequate and that air concentrations of components are controlled below quoted Exposure Standards. Natural ventilation should be adequate under normal use conditions.

Individual protection measures, such as Personal Protective Equipment (PPE): 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.

Containment of charge within metal tube prevents exposure. Wear protective clothes, gloves and eye protection when handling. Wash hands and exposed skin before meals and after work. DO NOT eat, drink or smoke in lead contaminated areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical state:</th>
<th>Article, Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour:</td>
<td>Metallic</td>
</tr>
<tr>
<td>Odour:</td>
<td>Odourless</td>
</tr>
<tr>
<td>Solubility:</td>
<td>Insoluble in water.</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative Vapour Density (air=1):</td>
<td>N Av</td>
</tr>
<tr>
<td>Vapour Pressure (20 °C):</td>
<td>N Av</td>
</tr>
<tr>
<td>Flash Point (°C):</td>
<td>N Appl</td>
</tr>
<tr>
<td>Flammability Limits (%):</td>
<td>N Appl</td>
</tr>
<tr>
<td>Autoignition Temperature (°C):</td>
<td>N Appl</td>
</tr>
<tr>
<td>Melting Point/Range (°C):</td>
<td>N Av</td>
</tr>
<tr>
<td>Decomposition Point (°C):</td>
<td>N Av</td>
</tr>
<tr>
<td>pH:</td>
<td>N Appl</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Chemical stability: Detonation may occur from impact, friction, excessive heating or by electrical energy from an extraneous source (lightning, static electricity, stray currents, galvanic electricity or electromagnetic radiation).

Possibility of hazardous reactions: Explosive material. Explosion may result due to shock, friction, fire and other sources of ignition. Explosion creates the potential for shrapnel. Hazardous polymerisation will not occur.

Conditions to avoid: Avoid exposure to heat. Avoid exposure to shock, friction, fire and other sources of ignition. Avoid build up of static electricity. Store away from explosive products.

Incompatible materials: Incompatible with other chemicals. Incompatible with oxidising agents.
11. TOXICOLOGICAL INFORMATION

The construction of these articles should prevent any chemical contamination. 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:** No information available.

**Eye contact:** May be an eye irritant. May cause physical irritation.

**Skin contact:** Not expected to be a skin irritant. Contact with metal tube contents may result in irritation or dermatitis. One component (TNT), enclosed within metal tube can be absorbed through the skin. Shrapnel from detonation may cause burns and wounds to the skin and eyes.

**Inhalation:** Not a likely route of exposure due to the physical form of the product. Test firing of detonators in poorly ventilated areas can cause presence of lead fume in air. Lead fumes may be irritant to mucous membranes and respiratory tract.

**Acute toxicity:** No LD50 data available for the product.

**Chronic effects:** Long term exposure to low concentrations of lead (by any route) may result in blood effects, anaemia, central and peripheral nervous system damage, gastrointestinal disturbances, renal injury, foetotoxicity, developmental deficiencies in neonates and children, and testicular damage including decreased sperm count.

Exposure to explosive charge material unlikely. The main hazard is the possibility of exposure to lead fumes when test firing detonators in a poorly ventilated area. The effects of lead poisoning may not be apparent immediately but significant absorption over a period of time may produce adverse effects as noted earlier due to accumulation of lead in the body.

12. ECOLOGICAL INFORMATION

**Ecotoxicity** Avoid contaminating waterways.

**Persistence/degradability:** Expected to be persistent in the environment. May cause bioaccumulation.

13. DISPOSAL CONSIDERATIONS

**Disposal methods:**
Refer to Waste Management Authority. Dispose of contents/container in accordance with local/regional/national/international regulations.

For small quantities: Cut off electric leads and place in a blast hole and explode during blasting. Large quantities should be returned to Orica Australia Pty Ltd or be disposed of in conjunction with the relevant State Dangerous Goods Branch.

14. TRANSPORT INFORMATION

**Road and Rail Transport**
Classified as Dangerous Goods by the criteria of the Australian Code for the Transport of Explosives by Road and Rail; DANGEROUS GOODS.
UN No: 0030
Transport Hazard Class: 1.1 B Explosive
Proper Shipping Name or Technical Name: DETONATORS, ELECTRIC
Hazchem or Emergency Action Code: 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: 0030
Transport Hazard Class: 1.1 B Explosive
Proper Shipping Name or Technical Name: DETONATORS, ELECTRIC

IMDG EMS Fire: F-B
IMDG EMS Spill: S-X

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 Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Explosives - Division 1.1

Hazard Statement(s):
H201 Explosive; mass explosion hazard.

Poisons Schedule (SUSMP): None allocated.

16. OTHER INFORMATION

This safety data sheet has been prepared by Orica Toxicology & SDS Services.

Reason(s) for Issue:
5 Yearly Revised Primary SDS
Alignment to GHS requirements
  Alignment to HSNO requirements
Safety Data Sheet

This SDS 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 handled, each user must, prior to handling, 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.