1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: NONEL® NON-ELECTRIC DETONATORS

Company Name: Dyno Nobel Asia Pacific Pty Limited

Address: 262 Paringa Road, Gibson Island,
Murarrie, QLD 4172, Australia

Emergency Tel.: 1800 098 836

Telephone/Fax Number:
Tel: (07) 3026 3900
Fax: (07) 3026 3999

Recommended Use: Detonators, non-electric

2. HAZARDS IDENTIFICATION

Hazard Classification: Not classified as hazardous

DANGEROUS GOODS.
NON-HAZARDOUS SUBSTANCE.

Dangerous goods classification according to the Australian Dangerous Goods Code.
Hazard classification according to the criteria of NOHSC.

Risk Phrase(s): Not classified as hazardous

R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.

Safety Phrase(s):S34 Avoid shock and friction.
S36/37 Wear suitable protective clothing and gloves.
S53 Avoid exposure - obtain special instructions before use.

Other Information: This is a packaged product that will not result in exposure to the explosive material under normal conditions of use.
Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Name</th>
<th>CAS</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pentaeruthritol tetranitrate (PETN)</td>
<td>78-11-5</td>
<td>1-95 %</td>
</tr>
<tr>
<td></td>
<td>Cyclotetramethylenetetranitramine (HMX)</td>
<td>2691-41-0</td>
<td>1-95 %</td>
</tr>
<tr>
<td></td>
<td>Molybdenum</td>
<td>7439-98-7</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Lead</td>
<td>7439-92-1</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Lead azide</td>
<td>13424-46-9</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Silica (diatomaceous earth)</td>
<td>61790-53-2</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Tungsten</td>
<td>7440-33-7</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Antimony</td>
<td>7440-36-0</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Lead chromate</td>
<td>7758-97-6</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Potassium perchlorate</td>
<td>7778-74-7</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td></td>
<td>Selenium</td>
<td>7782-49-2</td>
<td>0-&lt;10 %</td>
</tr>
</tbody>
</table>
Safety Data Sheet

 Infosafe No™  LPWFO  Issue Date : May 2012  ISSUED by DYNO NOBEL

Product Name : NONEL NON-ELECTRIC DETONATORS

Not classified as hazardous

Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>7429-90-5</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td>Barium chromate</td>
<td>10294-40-3</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td>Lead Oxide Red</td>
<td>1314-41-6</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td>Barium sulphate</td>
<td>7727-43-7</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>0-&lt;10 %</td>
</tr>
<tr>
<td>Silicon</td>
<td>7440-21-3</td>
<td>0-&lt;10 %</td>
</tr>
</tbody>
</table>

Other Information

Not all delay periods contain perchlorate. Those that do contain between from about 4 to a maximum of about 60 mg perchlorate per detonator.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from contaminated area. Apply artificial respiration if not breathing. Seek medical attention.

Ingestion
If swallowed, DO NOT INDUCE VOMITING. Get the patient to rinse the mouth thoroughly with water. Seek medical attention.

Skin
Wash affected area extremely thoroughly with soap and water. Remove contaminated clothing and wash before reuse or discard. If symptoms develop and persist, seek medical attention.

Eye
If contact with the eye(s) occurs, wash with copious amounts of water holding eyelid(s) open. Take care not to rinse contaminated water into the non-affected eye. If symptoms persist seek medical attention.

First Aid Facilities
Eye wash and normal washroom facilities.

Advice to Doctor
Treat symptomatically.

5. FIRE FIGHTING MEASURES

Hazards from Combustion Products
Burning material may produce toxic vapours.

Specific Hazards
Can explode or detonate under fire conditions. Avoid extreme conditions of heat or shock.

Hazchem Code
E

Precautions in connection with Fire
Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers). Avoid breathing of fumes or gases generated.

6. ACCIDENTAL RELEASE MEASURES

Emergency Procedures
Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. Avoid breathing fumes or gases from detonation of explosives. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean approved container. Ensure that a complete account of product has been made and is verified. If loose explosive powder is spilled, such as from a broken detonator, only properly qualified and authorised personnel should be involved with handling and clean-up activities. Spilled explosive powder is extremely sensitive to initiation and may detonate. Dispose of waste according to federal, Environmental Protection Authority and state regulations. If the spillage enters the waterways contact the Environmental Protection Authority, or your local Waste Management Authority.

7. HANDLING AND STORAGE

Precautions for Safe Handling
Only properly qualified and authorised personnel should handle and use explosives. Handle with great care. Unintended detonation of explosives or explosive devices can cause serious injury or death. Use in designated areas with adequate ventilation. Avoid sources of shock, friction, heat and ignition. Avoid contact with oxidising materials. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency. Wear appropriate protection. Have emergency equipment (for spills, leaks, etc.) readily available. Label containers. Keep containers closed when not in use. Wear appropriate protective equipment to prevent inhalation, skin and eye contact. It is essential that all who come into contact with this material maintain high standards of personal hygiene ie. Washing hands prior to eating, drinking, smoking or using toilet facilities.
Conditions for Safe Storage

Store in cool, dry, well-ventilated location. Only properly qualified and authorised personnel should handle and use explosives. Store in a well-ventilated, clean, dry magazine. Handle with care. Do not subject materials to impact, sparks or any form of heating, ignition sources, friction, electrostatic discharge and strong shock. Have appropriate fire extinguishers available in and near the storage area. Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous. Reference should be made to AS 2187.1-1998 Explosives - Storage, transport and use - Storage. Reference should also be made to all State and Federal regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

National Exposure Standards

No exposure standards have been established for this material, however, the TWA National Occupational Health And Safety Commission (NOHSC) exposure standards for dust not otherwise specified is 10 mg/m³ and the exposure standards for ingredient are listed as following:

Australian National Occupational Health And Safety Commission (NOHSC) Exposure Standards:

<table>
<thead>
<tr>
<th>Substance</th>
<th>STEL (ppm)</th>
<th>STEL (mg/m³)</th>
<th>TWA (ppm)</th>
<th>TWA (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead, inorganic dusts &amp; fumes (as Pb)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.15</td>
</tr>
<tr>
<td>Selenium</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td>Lead chromate (as Cr)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.05</td>
</tr>
<tr>
<td>Molybdenum (insoluble compounds (as Mo))</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Tungsten, insoluble compounds (as W)</td>
<td>- 10</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Aluminium (metal dust) (elemental)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Antimony &amp; compounds (as Sb)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
</tr>
</tbody>
</table>

TWA (Time Weighted Average): The average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five-day week.

STEL (Short Term Exposure Limit): The average airborne concentration over a 15 minute period which should not be exceeded at any time during a normal eight-hour workday.

Biological Limit Values

No biological limit allocated.

Engineering Controls

Use in a well ventilated area. Provide enhanced ventilation after use if in underground mines or other enclosed area.

Respiratory Protection

Not required for conditions of use. Where exposure to fumes from blasting exists and ventilation is inadequate an approved respirator should be used. Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

Eye Protection

Safety glasses with side shields or chemical goggles or full-face shield as appropriate recommended. Final choice of appropriate eye/face protection will vary according to individual circumstances i.e. methods of handling or engineering controls and according to risk assessments undertaken. Eye protection should conform with Australian/New Zealand Standard AS/NZS 1337 - Eye Protectors for Industrial Applications.

Hand Protection

Wear gloves of impervious material. Final choice of appropriate gloves will vary according to individual circumstances i.e. methods of handling or according to risk assessments undertaken. Reference should be made to AS/NZS 2161.1: Occupational protective gloves - Selection, use and maintenance.

Body Protection

Wear appropriate clothing including chemical resistant apron where clothing is likely to be contaminated. It is advisable that a local supplier of personal protective clothing is consulted regarding the choice of material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Aluminum cylindrical shell with varying length and diameter of attached coloured plastic tubing. The detonator may be enclosed in a plastic housing, and an assembly may contain two detonators.

Odour

No odour
10. STABILITY AND REACTIVITY

Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact.

Chemical Stability

Conditions to Avoid
Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock. Do not attempt to disassemble.

Incompatible Materials
Corrosives (acids and bases or alkalis).

Hazardous Decomposition Products
Toxic fumes may be generated as the product decomposes. Carbon monoxide, carbon dioxide, nitrous oxides, sulfides, chromates, lead, antimony and various complex oxides of metals.

11. TOXICOLOGICAL INFORMATION

Inhalation
Not a likely route of exposure. Inhalation of post detonation reaction products could cause systemic effects.

Ingestion
No exposure to chemical hazards anticipated with normal handling procedures. Some of the ingredients are toxic by ingestion. The Post-detonation reaction product residue is toxic by ingestion. Symptoms can include gastroenteritis with abdominal pain, nausea, vomiting and diarrhea.

Skin
No exposure to chemical hazards anticipated with normal handling procedures. Exposure to post-detonation reaction products may cause irritation.

Eye
No exposure to chemical hazards anticipated with normal handling procedures. Particulates in the eye may cause irritation, redness, swelling itching, pain and tearing.

Chronic Effects
Repeated inhalation or ingestion of post-detonation reaction products may lead to systemic effects such as respiratory tract irritation, ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremours. Heavy metal (lead) poisoning can occur. Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone.

Reproductive Toxicity
Ingredients of the product, Lead azide and lead chromate are classified as Toxic to reproduction.

Carcinogenicity
Ingredient, lead chromate is classified as Category 2 Carcinogens, substances that should be regarded as if they are carcinogenic to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Not available

Persistence / Degradability
Not available

Mobility
Not available
Product Name: NONEL NON-ELECTRIC DETONATORS

Not classified as hazardous

13. DISPOSAL CONSIDERATIONS

Disposal Considerations: Destruction of explosives must be carried out by suitably licensed personnel. Dispose of waste according to applicable local and national regulations.

14. TRANSPORT INFORMATION

Transport Information: This material is classified as a Class 1 (Explosives) Dangerous Goods according to The Australian Code for the Transport of Dangerous Goods by Road and Rail. (7th edition)

Class 1 Dangerous Goods are incompatible in a placard load with any of the following:
- Division 2.1, Flammable Gases
- Division 2.2, Non-flammable Non-toxic Gases
- Division 2.3, Toxic Gases
- Class 3, Flammable Liquids
- Division 4.1, Flammable Solids
- Division 4.2, Spontaneously Combustible Substances
- Division 4.3, Dangerous When Wet Substances
- Division 5.1, Oxidising Agents
- Division 5.2, Organic Peroxides
- Class 6, Toxic and Infectious Substances
- Class 7, Radioactive Substances
- Class 8, Corrosive Substances
- Class 9 - Miscellaneous Dangerous Goods
- Fire risk substances

U.N. Number: 0029
Proper Shipping Name: DETONATORS, NON-ELECTRIC
DG Class: 1.1B
Hazchem Code: E
Packing Group: see 'Other information' (*)
IERG Number: 02

(*) Unless specific provision to the contrary is made, the packagings used for explosives shall comply with at least the requirements for solids or liquids (as appropriate) of Packing Group II (medium danger). Further information related to packaging, IBCS and Unit loads for explosives can be obtained from Australian Explosives Code. This product can also be classified as UN0360 Detonator assemblies, non electric 1.1B or UN0361 Detonator assemblies, non electric 1.4B.

15. REGULATORY INFORMATION

Regulatory Information: Not classified as Hazardous according to criteria of National Occupational Health & Safety Commission (NOHSC), Australia. Not classified as a Scheduled Poison according to the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

Poisons Schedule: Not Scheduled
Hazard Category: Explosive

16. OTHER INFORMATION

Date of preparation or last revision of SDS: SDS reviewed: May 2012
DISCLAIMER: The information and suggestions above concern explosive products which should only be dealt with by persons having appropriate technical skills, training and licences. The results depend to a large degree on the conditions under which the products are stored, transported and used.

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...End Of SDS...