SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **NONEL NON-ELECTRIC DETONATORS**

Synonyms NONEL EZTL ● NONEL LP ● NONEL MS ● NONEL MS CONNECTOR ● NONEL MS HD ● NONEL MS HT ● NONEL PRIMAFIRE ● NONEL STARTER

1.2 Uses and uses advised against

Uses DELAY IN DETONATOR ASSEMBLIES ● DETONATORS

1.3 Details of the supplier of the product

Supplier name **DYNO NOBEL ASIA PACIFIC LIMITED**

Address 282 Paringa Rd, Gibson Island, Murarrie, QLD, 4172, AUSTRALIA

Telephone (07) 3026 3900

Fax (07) 3026 3999

Website http://www.dynonobel.com

1.4 Emergency telephone numbers

Emergency 1800 098 836

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Explosives: Division 1.1

Health Hazards

Acute Toxicity: Oral: Category 4
Skin Sensitisation: Category 1
Acute Toxicity: Inhalation: Category 4
Germ Cell Mutagenicity: Category 2
Carcinogenicity: Category 1
Toxic to Reproduction: Category 1A
Specific Target Organ Toxicity (Repeated Exposure): Category 2

Environmental Hazards

Aquatic Toxicity (Acute): Category 2
Aquatic Toxicity (Chronic): Category 2

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H201	Explosive; mass explosion hazard.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Prevention statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P230	Keep wetted.
P240	Ground/bond container and receiving equipment.
P250	Do not subject to grinding/shock/friction/rough handling.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response statements

P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P321	Specific treatment is advised - see first aid instructions.
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P370 + P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P373	DO NOT fight fire when fire reaches explosives.
P391	Collect spillage.

Storage statements

P401	Store in accordance with relevant site and storage provisions.
P405	Store locked up.

Disposal statements

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

2.3 Other hazards

The components contained within the unit will not represent a safety hazard under normal operating conditions. Exposure to components may only result if the integrity of the unit is compromised. Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
CYCLOTETRAMETHYLENE TETRANITRAMINE (HMX)	2691-41-0	220-260-0	1 to 95%
PENTAERYTHRITOL TETRANITRATE (PETN)	78-11-5	201-084-3	1 to 95%
ALUMINIUM POWDER (PYROPHORIC)	7429-90-5	231-072-3	<10%
ANTIMONY	7440-36-0	231-146-5	<10%
BARIUM CHROMATE	10294-40-3	233-660-5	<10%
BARIUM SULPHATE	7727-43-7	231-784-4	<10%
DIATOMACEOUS EARTH	61790-53-2	612-383-7	<10%
LEAD	7439-92-1	231-100-4	<10%
LEAD (II) CHROMATE	7758-97-6	231-846-0	<10%

LEAD AZIDE	13424-46-9	236-542-1	<10%
LEAD TETROXIDE	1314-41-6	215-235-6	<10%
POTASSIUM PERCHLORATE	7778-74-7	231-912-9	<10%
SELENIUM	7782-49-2	231-957-4	<10%
SILICON	7440-21-3	231-130-8	<10%
TITANIUM DIOXIDE	13463-67-7	236-675-5	<10%
TUNGSTEN	7440-33-7	231-143-9	<10%
MOLYBDENUM	7439-98-7	231-107-2	<10%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Exposure is considered unlikely unless casing is damaged. Flush gently with running water. Seek medical attention if irritation develops.

Inhalation Due to product form / nature of use, an inhalation hazard is not anticipated.

Skin Exposure is considered unlikely unless casing is damaged. Gently flush affected areas with water. Seek medical attention if irritation develops.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). Due to product form and application, ingestion is considered unlikely.

First aid facilities Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

DO NOT attempt to extinguish burning explosives. Evacuate area immediately. Notify trained emergency response personnel.

5.2 Special hazards arising from the substance or mixture

EXPLOSIVE. Will explode under specific conditions. May evolve toxic gases (carbon/ nitrogen/ lead oxides) when heated to decomposition or detonated. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, etc when handling. CAUTION: Will explode if exposed to heat or with heavy impact. May evolve sulphides, chromates, antimony and various oxides and complex oxides of metals when heated to decomposition or detonated.

5.3 Advice for firefighters

Evacuate area and contact emergency services. Exposure to heat may result in detonation, however effects are expected to be limited to the package. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Do not attempt to fight fire if other explosives are present. Use waterfog to cool unexploded cartridges.

5.4 Hazchem code

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Clear area of all unprotected personnel. Contact emergency services where appropriate. CAUTION: Heating, impact or static charge may cause explosion.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

If cartridges are spilt or containers damaged, contain spillage, then collect and place in suitable containers for disposal. Eliminate all sources of ignition.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a clean, dry magazine licensed for detonators. Detonators should not be stored with explosives. Store removed from incompatible materials and heat or ignition sources. Ensure the magazine is adequately placarded. Large storage areas should have appropriate ventilation and fire protection systems.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Aluminium & compounds	SWA [Proposed]	--	1	--	--
Aluminium (metal dust)	SWA [AUS]	--	10	--	--
Aluminium (welding fumes) (as Al)	SWA [AUS]	--	5	--	--
Aluminium, alkyls (NOC+) (as Al)	SWA [AUS]	--	2	--	--
Aluminium, pyro powders (as Al)	SWA [AUS]	--	5	--	--
Aluminium, soluble salts (as Al)	SWA [AUS]	--	2	--	--
Antimony & compounds (as Sb)	SWA [AUS]	--	0.5	--	--
Barium sulphate	SWA [AUS]	--	10	--	--
Barium sulphate (inhalable)	SWA [Proposed]	--	4	--	--
Barium sulphate (respirable)	SWA [Proposed]	--	1.35	--	--
Chromium (VI) (as Cr)	SWA [Proposed]	--	7E-6	--	--
Chromium (VI) compounds (as Cr)	SWA [AUS]	--	0.05	--	--
Diatomaceous earth (uncalcined) (a)	SWA [AUS]	--	10	--	--
Lead chromate (as Cr)	SWA [AUS]	--	0.05	--	--
Lead chromate (as Cr)	SWA [Proposed]	--	7E-6	--	--
Lead, inorganic dusts & fumes (as Pb)	SWA [AUS]	--	0.05	--	--
Molybdenum, insoluble compounds (as Mo)	SWA [AUS]	--	10	--	--
Molybdenum, soluble compounds (as Mo)	SWA [AUS]	--	5	--	--
Selenium compounds (as Se)	SWA [AUS]	--	0.1	--	--
Silicon	SWA [AUS]	--	10	--	--
Titanium dioxide (a)	SWA [AUS]	--	10	--	--
Tungsten, insoluble compounds (as W)	SWA [AUS]	--	5	--	10
Tungsten, soluble compounds (as W)	SWA [AUS]	--	1	--	3

Biological limits

Ingredient	Determinant	Sampling Time	BEI
BARIUM CHROMATE	Total chromium in urine	End of shift at end of workweek	25 µg/L
	Total chromium in urine	Increase during shift	10 µg/L
LEAD	Lead in blood	Not critical	200 µg/L
	Lead in blood (women of child bearing potential)	Not critical	10 µg/100ml
	Lead in blood (women of child bearing potential)	Not critical	10 µg/dL
	Lead in blood	Not critical	30 µg/dL
LEAD (II) CHROMATE	Total chromium in urine	End of shift at end of workweek	25 µg/L
	Total chromium in urine	Increase during shift	10 µg/L
	Total chromium in urine	Post shift	10 µmol chromium/mol creatinine in urine
	Total chromium in urine	End of shift at end of workweek	30 µg/L
	Total chromium in urine	End of shift at end of workweek	25 µg/L
PENTAERYTHRITOL TETRANITRATE (PETN)	Methemoglobin in blood	During or end of shift	1.5% of hemoglobin

Reference: ACGIH Biological Exposure Indices

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. When testing detonators, explosion proof mechanical extraction ventilation may be required in poorly ventilated areas. Maintain dust levels below the recommended exposure standard.

PPE

Eye / Face	Wear safety glasses.
Hands	Wear PVC or rubber gloves.
Body	Wear coveralls.
Respiratory	Not required under normal conditions of use.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	CYLINDRICAL SOLID
Odour	ODOURLESS
Flammability	EXPLOSIVE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Relative density	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	NOT RELEVANT
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT

9.1 Information on basic physical and chemical properties

Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	EXPLOSIVE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

No information provided.

10.3 Possibility of hazardous reactions

No information provided.

10.4 Conditions to avoid

No information provided.

10.5 Incompatible materials

May detonate if heated strongly or exposed to severe shock. Due to enclosed form, reaction with other materials is unlikely, however avoid contact with acids (e.g. nitric acid), metal powders, combustibles and oxidisers.

10.6 Hazardous decomposition products

May evolve toxic gases (carbon/ nitrogen/ lead oxides) when heated to decomposition or detonated.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity Harmful if swallowed and if inhaled. WARNING: May explode with shock, heat, friction or static charge. Serious damage may result from explosive fragments.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
CYCLOTETRAMETHYLENE TETRANITRAMINE (HMX)	50 mg/kg (rabbit)	630 mg/kg (rabbit)	--
PENTAERYTHRITOL TETRANITRATE (PETN)	1660 mg/kg (rat)	--	--
BARIUM SULPHATE	> 5000 mg/kg (rat)	> 2000 mg/kg (rat)	--
DIATOMACEOUS EARTH	> 5000 mg/kg (rat)	> 5000 mg/kg (rabbit)	--
LEAD	50 mg/kg to 600 mg/kg (calf)	--	--
LEAD (II) CHROMATE	12 g/kg (mouse)	--	--
SELENIUM	6700 mg/kg (rat)	--	--
TITANIUM DIOXIDE	5000 mg/kg (rat)	--	3.43 - 6.82 mg/L air (rat)
TUNGSTEN	> 2,000 mg/kg (rat)	> 2,000 mg/kg (rat)	> 5.4 mg/l/4hrs (rat)

Skin Not classified as a skin irritant. Due to product form, exposure can only occur during detonation. Serious damage may result from explosive fragments.

Eye Not classified as an eye irritant. Due to product form, exposure can only occur during detonation. Serious damage may result from explosive fragments.

Sensitisation Exposure to contents may cause skin sensitisation. This product is not classified as a respiratory sensitiser.

Mutagenicity Suspected of causing genetic defects. Due to product form (enclosed), the potential for exposure to contents is not anticipated.

Carcinogenicity Chromium (VI) compounds are classified as carcinogenic to humans (Group 1). Lead compounds (inorganic) are classified as probably carcinogenic to humans (IARC Group 2A). Selenium and Selenium compounds are not classifiable as to their carcinogenicity (IARC Group 3). Due to product form (enclosed), the potential for exposure to contents is not anticipated.

Lead and lead compounds are classified as damaging fertility or the unborn child. Due to product form

Reproductive	(enclosed), the potential for exposure to contents is not anticipated.
STOT - single exposure	Not classified as causing organ damage from single exposure. However, serious damage may result from explosive fragments.
STOT - repeated exposure	Lead is a cumulative poison, and symptoms are often delayed. Repeated exposure may result in lead poisoning. Symptoms may include blood, kidney and central nervous system/brain damage. Due to product form (enclosed), the potential for exposure to contents is not anticipated.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxic to aquatic life with long lasting effects.

12.2 Persistence and degradability
No information provided.

12.3 Bioaccumulative potential
No information provided.

12.4 Mobility in soil
No information provided.

12.5 Other adverse effects
No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	Waste must be disposed of in accordance with AS2187.2 as well as state regulatory and environmental legislation. Small quantities of damaged or deteriorated material may be destroyed by inclusion in a blast hole containing good explosives (by licensed personnel). Detonators should not be inserted into defective explosives. For large quantities, contact the manufacturer/supplier for additional information.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	0360	0360	PROH
14.2 Proper Shipping Name	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	Air transport PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in passenger and cargo aircraft.
14.3 Transport hazard class	1.1B	1.1B	None allocated.
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards
Marine Pollutant.

14.6 Special precautions for user

Hazchem code	E
EmS	F-B, S-X

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule Classified as a Schedule 6 (S6) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

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

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information

EXPLOSIVES & BLASTING AGENTS: Refer to Local State and Federal legislation that specifically relates to the use of Explosives. Users of products described in this ChemAlert Report are advised to ensure familiarity and compliance with the appropriate legal requirements (e.g. Regulations) prior to the use of this product. Where any further information is required, users may contact their local authority in Explosives and Dangerous Goods.

EXPLOSIONS: Fires involving explosives or explosive mixtures may undergo further explosions and rapid propagation. Police and emergency personnel should be notified immediately. Evacuate individuals to a safe sheltered area at least 800 metres away. If possible remove vehicles and further heat and ignition sources from the area. Do not return to areas until at least one hour after fire and explosions have ceased.

EXPLOSIONS: For further information please refer to Australian Standard 1216, for classification of explosives and Local and Federal Explosive and Dangerous Goods legislation (Act and Regulations).

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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