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Project : CLYDE RIVER HARBOUR CONSTRUCTION
DFO ETO-025-222050
Project No. : 2022-034

Subject : **Quarry Development Plan**

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Supplier No :

Comments :

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QUARRY DEVELOPMENT PLAN

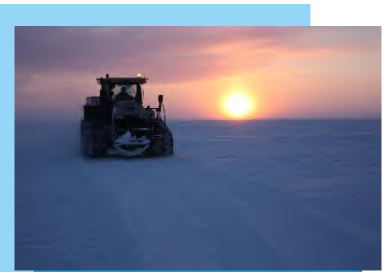
Clyde River Harbour Development

DFO ET025-222050/A

Submitted to:

Public Services and Procurement Canada

Revision: August 2022



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1. INTRODUCTION

The purpose of this document is to present the Quarry Development Plan in order to describe the design and operation of the quarry from initial development through to final reclamation.

The construction project was awarded to Pilitak Enterprises Ltd (PEL) in May 2022 by Public Services and Procurement Canada (PSPC) for the Department of Fisheries and Ocean (DFO). At the end of August 2022, heavy equipment, camp facilities and material will be delivered by sealift to Clyde River. The project consists mainly of the construction of two large breakwaters, a fixed wharf structure, two lines of float wharf modules, a retrofit of the existing sealift ramp and improvements to the uplands. The new marine infrastructure will be constructed during the summers of 2023, 2024 and 2025 while preparation work will be carried out during the fall of 2022.

This plan is in effect from August 2022 and will be updated accordingly, as needed.

1.1 OBJECTIVE AND DEFINITIONS

The main objectives of this plan are described below:

- Present the development steps of the quarry;
- Detail the drilling and blasting procedures;
- Explain the explosive management;
- Present the reclamation plan at the end of our operations.

The existing quarry is located about 2 kilometers southwest of the air terminal. The quarry is accessible through two roads, both connected to the airport road. The current foot print of the quarry represents approximately 3,800 square meters. The quarry floor is currently at the elevation ±20 m with faces ranging from 4 meters high on the north side and up to 12 meters high on the south side.

The total volume of rock needed for this project could be roughly estimated to 150,000 cubic meters including losses for rejected material. The total volume will be higher in the case where the rock would be highly fractured. Assuming an average depth of 8 meters, a surface of 18,750 square meters would be needed to produce the rocks and the granular material for the project. The current permitting for the quarry allows a potential expansion of about 40,000 square meters, which seems sufficient to cover the needs for this project.

1.2 EXISTING SURFACE AND BEDROCK CONDITIONS

According to the results of the geotechnical investigation realized by Canadrill for this project, the overburden thickness within the quarry expansion would range from 100mm to 460mm. The overburden consists mainly in a thin layer of rootmat and silty sand. This was observed in 7 boreholes that were drilled within the quarry expansion limits. The bedrock consists of granitic gneiss that could be moderately fractured, as observed in the current quarry faces.

1.3 TOPOGRAHY AND HYDROGEOLOGY

In regard to the topography of the area included within the quarry expansion, the west half is mainly flat at an elevation of 33 meters while the eastern half is sloping toward North east to reach an elevation of 18 meters at the limit of the expansion area. It is expected that any surface water would follow the natural slope of this area, ending into a drainage path that leads to the Clyde River.

The current elevation of the quarry floor is about 20 meters. It allows the water to drain out to the north end. It is expected that the floor will be kept to the same elevation during the development phases of the quarry. However, a minimum slope will be kept toward the north end in order to maintain a positive drainage in this direction.

2. QUARRY DEVELOPMENT

2.1 CLEARING AND GRUBBING

Prior the development of a quarry section, the organic vegetation mat and upper soil horizon material will be grubbed and stockpiled for further site rehabilitation. The quarry development will be initiated prior to the arrival of migratory birds (breeding season mid-May to mid-August) such that the quarry and surrounding area becomes unattractive for nesting. Buffers or exclusion zones shall be implemented, in the event a sensitive species or feature (e.g., nest) is identified, to ensure wildlife are not disturbed.
During grubbing, care will be taken to ensure that grubbed material will not be pushed into areas which are to be left undisturbed.

2.2 SNOW REMOVAL AND LOCAL WATER MANAGEMENT

Positive drainage will be incorporated in the quarry design as development progresses. As mentioned earlier, the pit floor will also have a positive grade applied for drainage to flow and to minimize ponding effects. Grades will not exceed 2% to avoid adverse flow and erosion problems. The drainage will exit the pit floor to natural ground elevations at the north end of the quarry.

At the end of each season, rocks will be removed from the pit floor in order to facilitate the snow removal at the beginning of the next construction season. The accumulated snow during the winter will be cleared out from the pit floor and stockpiled outside of the work area. Erosion and sediment control measures will be implemented where needed, according to the site conditions and to the Erosion and Sediment Control Plan (ESCP).

2.3 DEVELOPMENT PHASES AND PROCESSING

2.3.1 Development phases

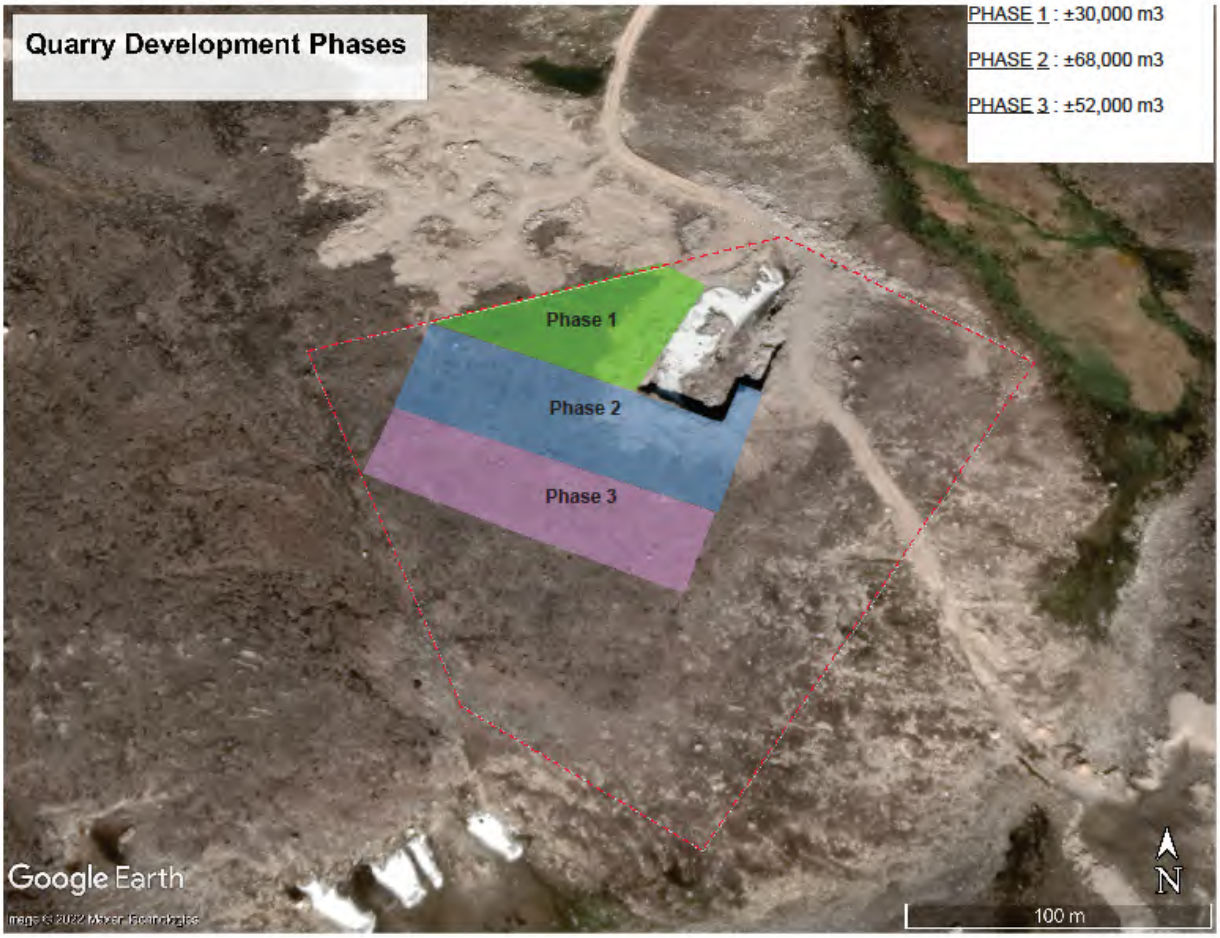
The quarry site development will be a drill and blast (rock) site and the pit will be developed uniformly up the face of the deposit, using the quarry section already opened. It is anticipated that the deposit is consistent through the quarry perimeters. Extraction will be consistent with the drilling pattern and bench design working up the face of the ridge.

The quarry development will be done in 3 phases, as presented in figure 2.3.1. It is currently planned to develop the phase 1 during the fall 2022 in order to test and adjust our processing methodology. During

the phase 1, the rock processing plant will be installed outside of the quarry limits. For the subsequent development phases, the rock processing plant will be installed directly into the quarry. The processing equipment will be removed while blasting.

The top perimeter of the quarry will be protected with boulders.

Figure 2.3.1



2.3.2 survey

An original ground topographic survey will be completed prior to quarry activities and repeated upon completion of quarrying to obtain a final measurement of the materials excavated from the quarry source.

2.3.3 Processing

The rocks meeting the requirements to be used for armour stones will be removed directly from the blasted section with an excavator, measured, transported and placed into two separate stockpiles on the west side of the quarry, the first one being for the 500-1500 Kg and the second one for the 2000-3000 Kg. The Oversize material will be left in the quarry and reprocessed with an excavator equipped with a hydraulic hammer in order to meet the armour stones specifications. In certain cases, the oversized material will be dealt with by the drilling and blasting crew by “popping” the material with a small charge to break it down into usable material.

Material too small to be used for armour stones will be processed with the rip rap plant which will be adjusted to produce either core stone, filter stones or rip rap. Each product will be transported and placed into separate stockpiles outside of the quarry limits. The rejected material will be transported to the rock crusher plant installed on the west side of the airport where the other types of material will be processed.

2.3.4 Equipment

Rock processing Plant

- Rip Rap Plant Lippman VGF6224
- Screener Plant and conveyor JCI-FT6203
- Excavator Komatsu PC-650-11
- Excavator PC-450 LC8
- Loader Komatsu W500-8
- Dump truck HM-300 (2)

Rock crushing plant

- Rock crusher Pioneer FT2650
- Rock crusher JCI FT 300
- Excavator Komatsu PC-400 LC7
- Loader Komatsu W500-6
- Dump truck HM-300

3. DRILLING AND BLASTING

The drilling pattern was preliminary established to 3.7 x 4.3 meters in order to obtain material in a size that can be used as armour stone for the construction of the breakwaters. The drill pattern will be adjusted according to the result of the first blast and when changes in the geological conditions are observed. Boreholes diameter will be 3 ½'' and the drilling depth will be reaching the current pit floor elevation.

3.1 PERMITTING

An explosive license for the acquisition and storage of explosives was obtain through Natural Resources Canada for the Clyde River Harbour Project.
Considering that the quarry is located in the alignment of the runway, an aeronautical assessment form was sent to transport Canada and a land use proposal to NAV Canada in order to advise them that blasting operations will be carried out at the quarry. These notifications shall be done at the beginning of each blasting season. A NOTAM (Notice to Airmen) agreement for blasting will be issued by NAV Canada when required.

3.2 EQUIPMENT AND EXPLOSIVES

The following equipment will be assigned to the drilling and blasting operations.

Equipment

- Drill Sandvik DX800
- Air compressor 950 CFM Atlas-Copco
- 2 explosive magazine, capacity 2,500Kg
- 2 explosive magazine, capacity 7,500Kg
- 6 explosive magazine, capacity 10,000Kg
- Pick up truck with explosive magazine, capacity 900 Kg

The following explosives and accessories will be used. The safety data sheets are presented in Appendix 1.

Explosives

- ANFO bags WR
- ANFO bags HD
- Packaged emulsion 1.5 Normite V 2.5'' x 35''
- Cast boosters AES 12 OZ
- Nonel detonators

3.3 EXPLOSIVE MANAGEMENT

High quality explosives have been selected for blasting operations. The explosives are packaged into marine containers specially built and identified for ground and marine transportation. Once arrived in Clyde River, the explosive containers will be transported nearby the quarry and their content transferred into certified explosive magazines. The explosive containers will be guarded 24 hours until their content has been transferred into magazines. When boreholes are ready to be loaded, the explosives will be transported from the storage caches to the quarry with a pickup truck equipped with an explosive magazine at the back. The following procedures apply for the transportation and the handling of the explosives:

- Transportation and handling of explosives to be done only by authorized and qualified personnel;
- No smoking or any source of light or fire shall be allowed near explosives;
- Explosives and detonators are to be transported into separate magazines;
- A daily Inventory of the explosives shall be done;
- Ensure the stock of explosives is rotated so that the oldest stock is used first;
- Explosive magazines are to be weekly inspected;
- Empty packages shall be removed immediately and destroyed;
- Proper signage to be installed on magazines and vehicles

During the project shut down for the winter period, a weekly inspection of the explosive magazines will be done by a local worker. The Hamlet will be informed of the explosive storage plan and conditions of the permit.

3.4 SAFETY PERIMETER

The quarry is located into an area where the access is limited by the Clyde River. There are only two access roads that lead to the quarry from the airport road. One access road is crossing the river by the bridge and the other one by the ford crossing. The airport is located 1.5 km from the quarry to the north and the nearest building is located at 1.4 km to the northwest. The nearest point of the airport road from the quarry is located at 1.2 km to the north. Before any blast, both access roads to the quarry will be temporary blocked at the junction of the airport road. Currently, the safety perimeter for workers and construction vehicles was established to an area of 300 meters away from the blast location. This perimeter could be adjusted according to the observed geological conditions.

3.5 BLASTING PROCEDURES

Blasting will be restricted to hours as agreed upon with the Hamlet. The blasting schedule will be submitted to the Hamlet for review and approval prior to commencing blasting.

When a Blast has been completely drilled, the following procedures will be applied by Pilitak before loading boreholes and blasting:

- The blaster in the morning will let the following people know the scheduled time of blast in accordance with the airport flight dispatcher.

AIRPORT (CARS)	(867) 924-6344
RCMP	(867) 980-0123
HAMLET RADIO	(867) 924-6264

- Two trucks will be assigned to block the access roads (2) to the quarry site, at junction of the airport road. Proper signage will be installed.
- The guards will be communicating to the blaster by radio to let him know that the entire blasting perimeter has been cleared and that it is safe to blast when he is ready.
- When all is cleared the blaster will sound the siren to let everybody know he is ready to blast. 30 seconds will pass then he will press on the button.
- No one is to leave their position until the blaster goes down to the blast site to make sure that all the explosives set off as properly.
- The blaster will then set off the siren again to let everybody know it is safe to go back to work.
- The trucks will then clear the way and the guards will remove the signs.

3.6 MISFIRE

Before drilling is commenced, the Blaster shall walk the complete pattern to check for any misfire/cut-off holes. The Blaster will look for any signs of explosives or lack of ground movement that might indicate a misfire or cut-off hole. Where an explosive charge has been misfired or cut-off, no work may be performed in the area other than that required making the area safe. Once the hole has been cleaned out, the hole may be re-charged, re-stemmed and blasted.

3.7 MONITORING

There is only one building located within 1.5 kilometers of the quarry. The Learning Center is located to 1.4 km to the northwest. A seismograph will be installed inside the building in order to monitor the vibrations during the entire progress of blasting operations.

3.8 EXPLOSIVE SPILL

When handling, transporting or storing explosives, care will be taken to avoid any spillage. Any spilled product will be promptly reported, cleaned up, and properly disposed. A spill report detailing the incident will be submitted. An incident report will be provided that details the basic cause of the spill and any corrective actions taken to minimize the type of incident from reoccurring.

3.9 INCIDENTS INVOLVING EXPLOSIVES

Any incident involving the transportation, the storage of explosives and restricted of explosives and restricted components shall be reported to the Chief Explosives Inspector as soon as circumstances permit. For an accident serious injury or major property damage, call (855) 912-0012 as soon as possible. All other accidents/incidents should be reported to (450) 773-3431. The completed Explosive Incident Report Form F07-01 and should be emailed to ERDmms@rncan.gc.ca or by fax to (450) 773-6226.

3.10 TRAINING

Training is seen as a key element in the safe usage and proper environmental management of explosives and blasting. All employees working on or around blasting operations will undergo rigorous employee orientation and training procedures for managing, transporting and loading explosives into blast holes. Experienced competent employees are an essential part of blasting best management practices

4. RECLAMATION

The operation of the quarry is anticipated to continue until 2025. The process of the quarry reclamation will be ongoing and not relegated to the end of operations. As a result, progressive reclamation will be employed as areas of the pit quarry become depleted and no longer used. The active quarry site will be kept clean, tidy, trimmed and free of any garbage and debris during the operational. All unused materials will be returned to the quarry, flattened and contoured at the time of final reclamation. Displaced and stored topsoil and overburden will also be returned and placed into selected areas where revegetation will be promoted.

4.1 WATER DIVERSION

As described previously, the quarry development includes a positive drainage management plan for the pit floor. On completion of the operations and final clean-up of the quarry, positive drainage will be maintained or improved to enhance the drainage requirements. Disruption of drainage courses will not be encountered in the development of the quarry. According to the Erosion and Sediment Control Plan (ESCP), adequate mitigation facilities will be installed to reduce the erosion at the discharge point, where the water is coming out from the quarry pit.

4.2 PERMAFROST PROTECTION

Soil permafrost conditions in the quarry are not anticipated. At the end of the quarry operation, the general appearance of the quarry will be of exposed rock, not prone to movement or erosion.

4.3 WILDLIFE HABITAT ENHANCEMENT

Working in conjunction with the environmental monitor, wildlife habitat enhancement will be considered in the reclamation plan. This includes specifics related to the enhancement of revegetation using locally stored materials and if required, reseeding and fertilization using the appropriate and approved mixtures.

4.4 FACE STABILIZATION AND EDGE PROTECTION

Each time a face section of the quarry is completed, loose rocks will be removed with the excavator in order to make sure to avoid future potential rock fall-off. Boulders and rocks will be placed along the top edge of the quarry faces in order to indicate the limit of the quarry perimeter.

APPENDIX 1
CLYDE RIVER HARBOUR CONSTRUCTION

APPENDIX 1

EXPLOSIVE PRODUCTS SAFETY DATA SHEETS

TECHNICAL DATA SHEET

NITROGEN PRODUCTS

AMMONIUM NITRATE

Industrial Grade

Properties

SDS #1020

AMMONIUM NITRATE % by weight typical	98.8–99.8
Water % by weight maximum	< 0.15
Bulk Density as manufactured	
g/cc	0.78 to 0.82
lbs/cuft	48.5 to 51.0
Bulk Density as received typical	
g/cc	0.80 to 0.86
lbs/cuft	50.0 to 53.0
Oil Absorption % by weight	> 6.0
Size Distribution as manufactured % by weight typical	U.S. Standard 6–20 > 98%
Total Organics % by weight	< 0.2%

Hazardous Shipping Description

- AMMONIUM NITRATE 5.1 UN1942 III or
- AMMONIUM NITRATE Fertilizer 5.1 UN2067 III

PRODUCT DESCRIPTION

Industrial Grade AMMONIUM NITRATE prills are specifically designed to be used as a solid oxidizer ingredient for explosive compositions such as ANFO, WR ANFO, Heavy ANFO emulsion and watergels. They are small-sized, low-moisture content, non-setting, porous spheres (prills) which are a lower density than agricultural grade AMMONIUM NITRATE used for fertilizer. The particle density of the prills is such that, when liquid fuel is properly applied to and mixed with them, the prills absorb the fuel uniformly which enhances reactivity. AMMONIUM NITRATE is highly soluble in water and does not precipitate with any common chemical. Industrial Grade AMMONIUM NITRATE is available in bulk by railcar or truck.

APPLICATION RECOMMENDATIONS

- Industrial Grade AMMONIUM NITRATE is used extensively in the mining industry and is intentionally made very porous to allow for the rapid uptake of liquid fuel oil. The prill is coated with a trace amount of waxy anti-caking material to enhance flowability and handling characteristics. Consult your Dyno Nobel representative for additional details, and information if needed.
- AMMONIUM NITRATE will decompose into ammonia and nitric acid fumes at 350°F.
- ALWAYS wash vessels containing AMMONIUM NITRATE thoroughly before attempting repairs requiring hot work.
- ALWAYS check with the bulk emulsion explosive or matrix manufacturer to ensure compatibility before using ANFO containing Industrial Grade prilled AMMONIUM NITRATE in Heavy ANFO or repumpable emulsion/ ANFO blends.
- ALWAYS keep doors, hatches and lids closed when not in use. Inspect all tanks and bins regularly for cracks and leaks.
- Industrial Grade prilled AMMONIUM NITRATE is susceptible to breakage from moisture, humidity, heat, temperature cycling, pressure and pneumatic or mechanical handling. Fines can result producing possible caking or lumping as well as decreased product flow characteristics / increased bulk density.

Product Disclaimer: Please see reverse side.

DYNO® Dyno Nobel

TECHNICAL DATA SHEET

AMMONIUM NITRATE

Industrial Grade

APPLICATION RECOMMENDATIONS - continued

- ALWAYS design storage and process facilities to minimize repeated pneumatic and mechanical handling. Whenever possible, choose mechanical rather than dispersed phase pneumatic methods to off-load or otherwise transfer AMMONIUM NITRATE prills.
- ALWAYS use an air transfer pressure of 7–8 psig to maintain prill quality where bulk deliveries are transferred to storage by pneumatic conveyance.
- NEVER exceed 8–10 psig air pressure in dispersed phase pneumatic transfer.
- ALWAYS use equipment especially designed to blend and load ANFO, Heavy ANFO or repumpable emulsion / ANFO blends. Bulk delivery equipment should be calibrated periodically to ensure quality.
- ALWAYS calibrate bulk delivery equipment to ensure quality.
- ALWAYS purge all hoses, piping, augers and especially bins or tanks that have integral augers before discontinuing loading or mixing. AMMONIUM NITRATE prill left in process equipment can make start up difficult and even cause damage.
- ALWAYS consider vibrators for bins, bulk trucks and railcars to assist with the flow of material.

TRANSPORTATION, STORAGE AND HANDLING

- Oxidizers must be transported, stored, handled and used in conformity with all applicable federal, state, provincial and local laws and regulations.
- For recommended good practices in transporting, storing, handling and using this product, see the Safety Library Publications of the Institute of Makers of Explosives and/or consult the many publications that address transportation, storage and handling of AMMONIUM NITRATE.
  - The Fertilizer Institute: AMMONIUM NITRATE Packaging, Handling, Transportation, Storage and Use.
  - Bureau of Mines: I 28.23:6773 Explosive Hazards of AMMONIUM NITRATE Under Fire Exposure.
  - International Fertilizer Industry Association: Handbook for the Safe Storage of AMMONIUM NITRATE Based Fertilizers.
  - Institute of Makers of Explosives: Recommendations for the Transportation of Explosives, Division 1.5 & AMMONIUM NITRATE Emulsions, Division 5.1 Bulk Packaging.
- NEVER allow unauthorized access to Industrial Grade AMMONIUM NITRATE at any step during transportation and storage.
- ALWAYS rotate inventory by using the oldest product first.
- ALWAYS choose bins and tanks that are designed to keep the weight of the bulk material from compacting into transfer augers that are located directly beneath them.
- ALWAYS empty and clean bulk tanks and bins routinely to prevent product build-up on walls.
- ALWAYS minimize inventory during warm weather and high humidity conditions. Packaged product may harden with temperature cycling; bulk material may cake, lump or break down (fines).
- ALWAYS keep prilled AMMONIUM NITRATE dry. Choose transportation, processing and storage containers or equipment without openings though which water or moisture can enter.

Industrial Grade AMMONIUM NITRATE is available in bulk by railcar or truck. lump or break down (fines).

- ALWAYS keep prilled AMMONIUM NITRATE dry. Choose transportation, processing and storage containers or equipment without openings though which water or moisture can enter.
- Industrial Grade AMMONIUM NITRATE is available in bulk by railcar or truck.

ADDITIONAL INFORMATION – Visit **dynonobel.com** for Brochures and Case Studies related to this product.

Product Disclaimer: Dyno Nobel Inc. and its subsidiaries disclaim any warranties with respect to this product, the safety or suitability thereof, or the results to be obtained, whether express or implied, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND/OR OTHER WARRANTY. Buyers and users assume all risk, responsibility and liability whatsoever from any and all injuries (including death), losses, or damages to persons or property arising from the use of this product. Under no circumstances shall Dyno Nobel Inc. or any of its subsidiaries be liable for special, consequential or incidental damages or for anticipated loss of profits.

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MATERIAL SAFETY DATA SHEET
DYNO NOBEL INC.
11TH FLOOR CROSSROADS TOWER
SALT LAKE CITY, UTAH 84144
PHONE: 801-364-4800 FAX: 801-328-6452
E-MAIL: DNNA.HSE@AM.DYNONOBEL.COM
FOR 24 HOUR EMERGENCY CALL 800-424-9300

MSDS# 1009

DATE: 01/17/03

Supersedes MSDS
1009 03/01/02

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): ANFO
DYNOMIX™, DYNOMIX™ (U.G.)
DYNOMIX™ WR

Product Class: Bulk or packaged ANFO

Product Appearance & Odor: Pale, oil-covered prills with fuel oil odor.

DOT Hazard Shipping Description: Ammonium nitrate-fuel oil mixture 1.5D NA0331 II
For DYNOMIX™ WR: Explosive, blasting, type B 1.5D UN0331 II

NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	TLV-ACGIH
Ammonium Nitrate	6484-52-2	92-95	No Value Established
Fuel Oil	68476-34-6	4-7	No Value Established
Guar Gum* (Nuisance Dust)	9000-30-0	0-3	5 mg/m^3

*DYNOMIX™ WR is the only product containing guar gum.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations.

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Pressure: <5 mm Hg @ 75° F

Vapor Density: > 1

Density: 0.8 to 1.0 g/cc bulk density

Percent Volatile by Volume: < 8 (Fuel oil)

Solubility in Water: Ammonium Nitrate component completely soluble

Evaporation Rate (Butyl Acetate = 1): < 1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >120° F (49°C) **Flammable Limits:** Not Available

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Prolonged contact may cause irritation.

Ingestion: Large amounts may be harmful if swallowed.

Inhalation: May cause dizziness, nausea or intestinal upset.

Systemic or Other Effects: None known.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air.

Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.

Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).

Hazardous Decomposition Products: Carbon Monoxide (CO) and Nitrogen Oxides (NO_X)

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. 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 DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State and local spill reporting requirements. Contact of this product with water may result in a reportable release.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling. Forced ventilation may be necessary where natural ventilation is limited.

Respiratory Protection: None normally required. In a dusty environment, or in hot, enclosed areas, respiratory protection may be needed.

Protective Clothing: Gloves and work clothing that reduce skin contact are suggested.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated locations. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock.

Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library publications.

SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

DYNO NOBEL INC. Disclaimer
The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. While the information is believed to be correct, DYNO NOBEL INC. shall in no event be responsible for any damages whatsoever, directly or indirectly, resulting from the publication or use of or reliance upon the information contained herein. **(No warranty, either expressed or implied, of merchantability or fitness for a particular purpose, or of any nature with respect to the product, or to the information, is made herein.)**

Safety Data Sheet

SECTION 1 – IDENTIFICATION

Name, Address, and Telephone of the Responsible Party

Dyno Nobel Inc.
6440 S. Millrock Drive, Suite 150
Salt Lake City, Utah 84121
Phone: 801-364-4800 Fax 801-321-6703
E-Mail: dnna.hse@am.dynonobel.com www.dynonobel.com

SDS #: 1063
Date: 07/20/2020
Supersedes: 10/12/2018

Product Identifier
Product Form: Mixture
Product Name: Packaged Emulsion Explosives

Trade Name(s):
Synonyms:
BLASTEX®
BLASTEX® PLUS
BLASTEX® TX

Other Means of Identification
Product Class: Emulsion Explosives, Packaged

Intended Use of the Product:
Industrial blasting applications

Emergency Telephone Number
FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300
CANUTEC (CANADA) 613-996-6666

SECTION 2 – HAZARD(S) IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)
Expl. 1.5 H205

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) :

GHS07

Signal Word (GHS-US) : Danger
Hazard Statements (GHS-US) : H205 – May mass explode in fire
Precautionary Statements (GHS-US) : P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P264 - Wash exposed areas. thoroughly after handling
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P373 - DO NOT fight fire when fire reaches explosives
P370+P380 - In case of fire: Evacuate area
P372 - Explosion risk in case of fire
P401 – Store as defined in the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

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P501 - Dispose of contents/container according to local, regional, national, and international regulations

Other Hazards

Hazards Not Otherwise Classified (HNOC): Not available
Other Hazards: None

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Ingredient Classification (GHS-US)
Ammonium nitrate	(CAS No) 6484-52-2	65 - 85	Ox. Sol. 3, H272 Eye Irrit. 2A, H319
Sodium nitrate	(CAS No) 7631-99-4	0.1 – 10	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319
Aluminum	(CAS No) 7429-90-5	0.1 - 3	Comb. Dust, H232 Flam. Sol. 1, H228 Water-react. 2, H261
Mineral Oil	(CAS No) 64742-54-7	0 – 2	Asp. Tox. 1, H304
Wax (paraffin)	(CAS No) 8002-72-2	0.0 – 2.2	Not Classified

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).
Full text of H-phrases: see section 16

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures

This is a packaged product that will not result in exposure to the contents under normal conditions of use. In the event of contact, administer first aid appropriate for symptoms present.

General: Never give anything by mouth to an unconscious person. If exposed or concerned, seek medical advice and attention.

Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Gently wash with plenty of soap and water followed by rinsing with water for at least 15 minutes. Wash contaminated clothing before reuse.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do not induce vomiting. Immediately call a POISON CENTER or doctor/physician.

Most Important Symptoms and Effects Both Acute and Delayed

General: Avoid ingestion, contact with eyes or skin.

Inhalation: May cause respiratory irritation.

Skin Contact: May cause skin irritation.

Eye Contact: May cause serious eye irritation.

Ingestion: Seek medical attention.

Chronic Symptoms: None expected under normal conditions of use.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate

all personnel to a predetermined safe location, no less than 2,500 feet in all directions.
Unsuitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS
Special Hazards Arising From the Substance or Mixture
Fire Hazard: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.
Explosion Hazard: This product is an explosive with mass detonation hazard. Heating may cause an explosion.
Reactivity: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in a large quantity.

Advice for Firefighters
Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Guard against re-entry.
Protection During Firefighting: See above
Hazardous Combustion Products: Nitrogen Oxides (NO_x), Carbon Monoxide (CO). Ammonia.
Reference to Other Sections: Refer to section 9 for flammability properties.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
General Measures: Avoid all contact with skin, eyes, or clothing. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Eliminate every possible source of ignition.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.
For Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Eliminate ignition sources. Ventilate area.

Environmental Precautions
Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up
Methods for Cleaning Up: Protect from all ignition sources. If no fire danger is present, and product is undamaged and/or uncontaminated, pick up or sweep up and repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.
Reference to Other Sections
See heading 8, Exposure Controls and Personal Protection. Concerning disposal elimination after cleaning, see section 13.

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling
This is a packaged product that will not result in exposure to the contents under normal conditions of use.
Additional Hazards When Processed: This product is an explosive and should only be used under the supervision of trained and licensed personnel. Use accepted safe industry practices when handling and using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product.
Conditions for Safe Storage, Including Any Incompatibilities
Technical Measures: Store as defined in the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR Part 555.
Storage Conditions: Store in cool, dry, well-ventialated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of

heat. Isolate from incompatibles.
Incompatible Materials: Corrosives (strong acids and strong bases or alkalis)
Specific End Use(s) For industrial blasting applications.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Occupational Exposure Limits

Ingredients:	Product identifier:	ACGIH TLV-TWA	OSHA PEL-TWA
Ammonium nitrate	(CAS No) 6484-52-2	None	None
Sodium nitrate	(CAS No) 7631-99-4	None	None
Aluminum	(CAS No) 7429-90-5	10 mg/m^3 (dust)	15 mg/m^3 (total)
Mineral Oil	(CAS No) 64742-54-7	5 mg/m^3 (mist)	5 mg/m^3 (mist)
Wax (paraffin)	(CAS No) 8002-72-2	2-10 mg/m^3 (wax fume)	None

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

Exposure Controls
Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.

Personal Protective Equipment: Gloves. Protective goggles. Protective clothing.
Materials for Protective Clothing: protective clothing.
Hand Protection: Protect against incidental skin contact.
Eye Protection: Chemical goggles or safety glasses.
Skin and Body Protection: Wear suitable protective clothing.
Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.
Environmental Exposure Controls: Do not allow the product to be released into the environment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Solid
Appearance	:	White or pink opaque semi-solid, which will appear gray if product contains aluminum. Typically paper or plastic chub packaging.
Odor	:	Faint petroleum odor
Odor Threshold	:	Not available
pH	:	Not applicable
Evaporation Rate	:	< 1
Melting Point	:	Not applicable
Freezing Point	:	Not applicable
Boiling Point	:	Not applicable
Flash Point	:	Not applicable

Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Ammonium nitrate: 210 °C (410 °F)
Flammability (solid, gas)	:	Not applicable
Lower Flammable Limit	:	Not applicable
Upper Flammable Limit	:	Not applicable
Vapor Pressure	:	Not applicable
Relative Vapor Density at 20 °C	:	Not applicable
Relative Density	:	Not applicable
Density	:	1.20 - 1.30 g/cc
Specific Gravity	:	Not applicable
Solubility	:	Partially soluble in water
Partition coefficient: n-octanol/water	:	Not available
Viscosity	:	Not available
Explosive properties	:	Explosive; mass explosion hazard
Explosion Data – Sensitivity to Mechanical Impact	:	Not sensitive
Explosion Data – Sensitivity to Static Discharge	:	Not sensitive

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in a large quantity.
Chemical Stability: Stable under normal temperature and pressure.
Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Incompatible Materials: Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product
Acute Toxicity: Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
Serious Eye Damage/Irritation: May cause eye irritation.
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not classified
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: May cause respiratory irritation.
Symptoms/Injuries After Skin Contact: May cause skin irritation.
Symptoms/Injuries After Eye Contact: Causes eye irritation.
Symptoms/Injuries After Ingestion: If ingested, seek medical attention.

Information on Toxicological Effects - Ingredient(s)
LD50 and LC50 Data:

Sodium nitrate (7631-99-4)

LD50 Oral Rat	> 2000 mg/kg
Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg
LC50 Inhalation Rat	> 88.8 mg/l/4h

SECTION 12: ECOLOGICAL INFORMATION

Toxicity Not classified

Sodium nitrate (7631-99-4)	
LC50 Fish 1	2000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
LC 50 Fish 2	994.4 - 1107 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])

Persistence and Degradability

Sodium nitrate (7631-99-4)	
Persistence and Degradability	**Readily biodegradable in water.**

Bioaccumulative Potential

Sodium nitrate (7631-99-4)	
Bioaccumulative Potential	Not expected to bioaccumulate.

Ammonium nitrate (6484-52-2)	
BCF fish 1	No bioaccumulation expected.

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

Toxicity Not classified

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

Additional Information: None

SECTION 14 - TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E or Agent blasting, Type E

Hazard Class : 1.5D

Identification Number : UN0332

Label Codes : 1.5D

Packing Group : II

ERG Number : 140

14.2 In Accordance with IMDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)

Hazard Class : 1.5D

Identification Number : UN0332

Label Codes : 1.5D
EmS-No. (Fire) : F-B
EmS-No. (Spillage) : S-Y

14.3 In Accordance with IATA
Proper Shipping Name : AGENT, BLASTING TYPE E
Identification Number : UN0332
Hazard Class : 1
Label Codes : 1.5D

ERG Code (IATA) : 1L

14.4 In Accordance with TDG
Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Packing Group : II
Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D

SECTION 15 - REGULATORY INFORMATION

US Federal Regulations

Packaged Emulsion Explosives

Bureau of Alcohol Tobacco & Firearms (BATF)
Department of Transportation (DOT)
Mine Safety & Health Administration (MSHA)

Canadian Regulations

Packaged Emulsions

WHMIS Classification	**Note: Explosives are not regulated under WHMIS. They are subject to the regulations of the Explosives Act of Canada.**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 07/20/2020
Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Expl. 1.5	Explosive Category 1.5
H205	May mass explode in fire

Party Responsible for the Preparation of This Document
Dyno Nobel Inc.
6440 S. Millrock Drive, Suite 150
Salt Lake City, Utah 84121
Phone: 801-364-4800

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Dyno Nobel SDS

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: NONEL® Non-electric Delay Detonators

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Name, Address, and Telephone of the Responsible Party

Dyno Nobel Inc.
6440 S. Millrock Drive, Suite 150
Salt Lake City, Utah 84121
Phone: 801-364-4800 Fax 801-321-6703
E-Mail: dnna.hse@am.dynonobel.com

SDS #: 1122
Date: 07/20/2020
Supersedes: 05/22/2015

Product identifier
Trade name: **NONEL® Non-electric Delay Detonators**
Article number: 1122
Other product identifiers:

NONEL® MS
NONEL® EZ DET®
NONEL® MS ARCTIC
NONEL® EZTL™
NONEL® LP NONEL® EZ DRIFTER ®
NONEL® SL
NONEL® SUPER
NONEL® TD
NONEL® MS CONNECTOR
NONEL® TWINPLEX™
NONEL® STARTER

Relevant identified uses of the substance or mixture and uses advised against
No further relevant information available.

Application of the substance / the mixture
Explosive product.
Commercial blasting applications

Emergency telephone number:
CHEMTREC 1-800-424-9300 (US/Canada)
+01 703-527-3887 (International)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
Classifications listed also are applicable to the OSHA GHS Hazard Communication Standard (29CFR1910.1200).


exploding bomb

Expl. 1.1 H201 Explosive; mass explosion hazard.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC


Xn; Harmful

R22: Harmful if swallowed.


E; Explosive

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R2: Risk of explosion by shock, friction, fire or other sources of ignition.

Information concerning particular hazards for human and environment: The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
Classification system: The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.
Additional information: There are no other hazards not otherwise classified that have been identified.
0 percent of the mixture consists of component(s) of unknown toxicity

Label elements
Labelling according to Regulation (EC) No 1272/2008
The product is additionally classified and labelled according to the Globally Harmonized System within the United States (GHS).
The product is classified and labelled according to the CLP regulation.
Hazard pictograms

GHS01

Signal word:	Danger
Hazard-determining components of labelling:	potassium perchlorate pentaerythritol tetranitrate (PETN)
Hazard statements:	H201 Explosive; mass explosion hazard.
Precautionary statements:	
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P250	Do not subject to grinding/shock/friction.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P240	Ground/bond container and receiving equipment.
P270	Do not eat, drink or smoke when using this product.
P373	DO NOT fight fire when fire reaches explosives.
P370 + P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P401	Store in accordance with local/regional/national/international regulations.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
Additional information:	EUH208 Contains diazodinitro phenol (DDNP). May produce an allergic reaction.
Hazard description:	
WHMIS-symbols:	Explosive products are not classified under WHMIS.
NFPA ratings (scale 0 - 4):	Not available.
HMIS-ratings (scale 0 - 4):	Not available

HMIS Long Term Health Hazard Substances	
13424-46-9	lead diazide

7439-92-1	lead
13463-67-7	titanium dioxide
7758-97-6	lead chromate
7778-74-7	potassium perchlorate

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Explosive Product Notice: PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES - The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING - All explosives are dangerous and must be carefully handled and used following approved safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state, and local laws, regulations, or ordinances. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures

Description: Mixture of substances listed below with nonhazardous additions.

Some delay periods may contain potassium perchlorate. Those that do contain between from about 4 to a maximum of approximately 60 mg perchlorate per detonator.

Dangerous components:	
CAS: 78-11-5 EINECS: 201-084-3 Index number: 603-035-00-5	pentaerythritol tetranitrate (PETN) E R3
	Unst. Expl., H200
CAS: 13424-46-9 EINECS: 236-542-1 Index number: 082-003-00-7	lead diazide T Repr. Cat. 1, 3 R61; Xn R62-20/22; E R3; N R50/53 R33
	Unst. Expl., H200 Carc. 1B, H350; Repr. 1A, H360Df; STOT RE 2, H373 Aquatic Acute 1, H400; Aquatic Chronic 1, H410 Acute Tox. 4, H302; Acute Tox. 4, H332
CAS: 7439-92-1 EINECS: 231-100-4	lead Repr. Cat. 1 R60-61-48/23/25; N R50/53
	Repr. 1A, H360FD; STOT RE 1, H372 Aquatic Acute 1, H400; Aquatic Chronic 1, H410
CAS: 7440-21-3 EINECS: 231-130-8	silicon R11
	Flam. Sol. 2, H228
CAS: 7782-49-2 EINECS: 231-957-4 Index number: 034-001-00-2	selenium R23/25 R33-53

	Acute Tox. 3, H301; Acute Tox. 3, H331 STOT RE 2, H373 Aquatic Chronic 4, H413
CAS: 1314-41-6 EINECS: 215-235-6 Index number: 082-001-00-6	orange lead T Repr. Cat. 1, 3 R61; Xn R62-20/22; N R50/53 R33
	Carc. 1B, H350; Repr. 1A, H360Df; STOT RE 2, H373 Aquatic Acute 1, H400; Aquatic Chronic 1, H410 Acute Tox. 4, H302; Acute Tox. 4, H332
CAS: 13463-67-7 EINECS: 236-675-5	titanium dioxide substance with a Community workplace exposure limit
CAS: 10294-40-3 EINECS: 233-660-5 Index number: 056-002-00-7	barium chromate Xn R20/22
	Carc. 1A, H350 Acute Tox. 4, H302; Acute Tox. 4, H332
CAS: 7758-97-6 EINECS: 231-846-0 Index number: 082-004-00-2	lead chromate T Carc. Cat. 2, Repr. Cat. 1, 3 R45-61; Xn R62; N R50/53 R33
	Carc. 1B, H350; Repr. 1A, H360Df; STOT RE 2, H373 Aquatic Acute 1, H400; Aquatic Chronic 1, H410
CAS: 7727-43-7 EINECS: 231-784-4	barium sulphate, natural substance with a Community workplace exposure limit
CAS: 7778-74-7 EINECS: 231-912-9 Index number: 017-008-00-5	potassium perchlorate Xn R22; O R9
	Ox. Sol. 1, H271 Acute Tox. 4, H302
CAS: 61790-53-2	Diatomaceous earth (Silica-Amorphous) substance with a Community workplace exposure limit
CAS: 7439-98-7 EINECS: 231-107-2	molybdenum substance with a Community workplace exposure limit
CAS: 7440-33-7 EINECS: 231-143-9	tungsten substance with a Community workplace exposure limit
CAS: 7429-90-5 EINECS: 231-072-3 Index number: 013-001-00-6	aluminium powder (pyrophoric) F R15-17
	Pyr. Sol. 1, H250; Water-react. 2, H261
CAS: 7440-36-0 EINECS: 231-146-5	antimony substance with a Community workplace exposure limit
CAS: 2691-41-0 EINECS: 220-260-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) T R24; Xn R22; E R2
	Expl. 1.1, H201 Acute Tox. 3, H301; Acute Tox. 3, H311
CAS: 4682-03-5	diazodinitro phenol (DDNP) Xi R36/38; Xi R43; E R3
	Unst. Expl., H200

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	Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317

SVHC	
13424-46-9	lead diazide
1314-41-6	orange lead
7758-97-6	lead chromate

Additional information: For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.
For the wording of the listed risk phrases refer to section 16.

SECTION 4: FIRST AID MEASURES

Description of first aid measures
General information: Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
After inhalation: Unlikely route of exposure.
Supply fresh air; consult doctor in case of complaints.
After skin contact: Generally the product does not irritate the skin. Wash with soap and water.
If skin irritation is experienced, consult a doctor.
After eye contact: Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
After swallowing: Rinse out mouth and then drink plenty of water.
Do not induce vomiting; call for medical help immediately.
Most important symptoms and effects, both acute and delayed Blast injury if mishandled.
Hazards
Danger of blast or crush-type injuries. Harmful if swallowed.
Danger of disturbed cardiac rhythm.
Indication of any immediate medical attention and special treatment needed
Medical supervision for at least 48 hours.
Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents: DO NOT fight fire when fire reaches explosives.
For safety reasons unsuitable extinguishing agents: None.
Special hazards arising from the substance or mixture
DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors. It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.
Explosive; mass explosion hazard.
Advice for firefighters
Protective equipment: Wear self-contained respiratory protective device.
Wear fully protective suit.
Additional information
Eliminate all ignition sources if safe to do so.
Flammability Classification: (defined by 29 CFR 1910.1200) Explosive. Can explode under fire conditions. Individual devices will randomly explode. Mass explosion of multiple devices is possible under certain conditions. Burning material may produce toxic and irritating vapors. In unusual cases, shrapnel may be thrown from exploding devices under

containment. See 2012 Emergency response Guidebook for further information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Remove persons from danger area.
Ensure adequate ventilation
Wear protective clothing.
Protect from heat. Evacuate area.
Isolate area and prevent access.
Environmental precautions
No special measures required.

Methods and material for containment and cleaning up
Pick up mechanically.
Send for recovery or disposal in suitable receptacles.
Dispose unusable material as waste according to item 13.
Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling
Open and handle receptacle with care.
Handle with care. Avoid jolting, friction and impact.
Use only in well ventilated areas.
Do not subject to grinding/shock/friction.
Information about fire - and explosion protection: Protect from heat.
Prevent impact and friction.
Emergency cooling must be available in case of nearby fire.
Conditions for safe storage, including any incompatibilities
Storage:
Requirements to be met by storerooms and receptacles: Store in a cool location.
Avoid storage near extreme heat, ignition sources or open flame.
Information about storage in one common storage facility: Store away from foodstuffs.
Further information about storage conditions: Store under lock and key and with access restricted to technical experts or their assistants only.
Keep away from heat.
Specific end use(s): No further relevant information available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Additional information about design of technical facilities: No further data; see item 7.

Control parameters

Ingredients with limit values that require monitoring at the workplace:	
13424-46-9 lead diazide	
PEL (USA)	Long-term value: 0,05 mg/m³ as Pb; See 29 CFR 1910,1025
REL (USA)	Long-term value: 0,05* mg/m³

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	as Pb;*8-hr TWA; See Pocket Guide App. C
TLV (USA)	Long-term value: 0,05 mg/m³ as Pb; BEI
EL (Canada)	Long-term value: 0,05 mg/m³ as Pb; IARC 2A, R
7439-92-1 lead	
PEL (USA)	Long-term value: 0,05* mg/m³ *see 29 CFR 1910,1025
REL (USA)	Long-term value: 0,05* mg/m³ *8-hr TWA,excl. lead arsenate;See PocketGuideApp.C
TLV (USA)	Long-term value: 0,05* mg/m³ *and inorganic compounds, as Pb; BEI
EL (Canada)	Long-term value: 0,05 mg/m³ R; IARC 2B
EV (Canada)	Long-term value: 0,05 mg/m³ as Pb, Skin (organic compounds)
7440-21-3 silicon	
PEL (USA)	Long-term value: 15* 5** mg/m³ *total dust **respirable fraction
REL (USA)	Long-term value: 10* 5** mg/m³ *total dust **respirable fraction
TLV (USA)	TLV withdrawn
EL (Canada)	Long-term value: 10* 3** mg/m³ *total dust;**respirable fraction
EV (Canada)	Long-term value: 10 mg/m³ total dust
7782-49-2 selenium	
PEL (USA)	Long-term value: 0,2 mg/m³ as Se
REL (USA)	Long-term value: 0,2 mg/m³ as Se
TLV (USA)	Long-term value: 0,2 mg/m³ as Se
EL (Canada)	Long-term value: 0,1 mg/m³
EV (Canada)	Long-term value: 0,2 mg/m³
1314-41-6 orange lead	
PEL (USA)	Long-term value: 0,05 mg/m³ as Pb; See 29 CFR 1910,1025
REL (USA)	Long-term value: 0,05* mg/m³ as Pb;*8-hr TWA; See Pocket Guide App. C
TLV (USA)	Long-term value: 0,05 mg/m³ as Pb; BEI
EL (Canada)	Long-term value: 0,05 mg/m³ as Pb; IARC 2A, R

EV (Canada)	Long-term value: 0,05 mg/m³ as Pb, Skin (organic compounds)
13463-67-7 titanium dioxide	
PEL (USA)	Long-term value: 15* mg/m³ *total dust
REL (USA)	See Pocket Guide App. A
TLV (USA)	Long-term value: 10 mg/m³ withdrawn from NIC
EL (Canada)	Long-term value: 10* 3** mg/m³ *total dust;**respirable fraction; IARC 2B
EV (Canada)	Long-term value: 10 mg/m³ total dust
10294-40-3 barium chromate	
PEL (USA)	Long-term value: 0,005* mg/m³ Ceiling limit: 0,1** mg/m³ *as Cr(VI) **as CrO3; see 29 CFR 1910,1026
REL (USA)	Long-term value: 0,0002 mg/m³ as Cr; See Pocket Guide Apps. A and C
TLV (USA)	Long-term value: 0,01 mg/m³ as Cr
EL (Canada)	Long-term value: 0,01 mg/m³ as Cr; ACGIH A1 IARC 1
7758-97-6 lead chromate	
IOELV (EU)	Long-term value: 2 mg/m³ as Cr
PEL (USA)	Long-term value: 0,005* mg/m³ Ceiling limit: 0,1** mg/m³ *as Cr(VI) **as CrO3; see 29 CFR 1910,1026
REL (USA)	Long-term value: 0,0002 mg/m³ as Cr; See Pocket Guide Apps. A and C
TLV (USA)	Long-term value: 0,05* 0,012** mg/m³ *as Pb; BEI ; **as Cr
EL (Canada)	Long-term value: 0,05* 0,012** mg/m³ ACIGH A2, IARC 2A; R; *as Pb;**as Cr
EV (Canada)	Long-term value: 0,012* 0,05** mg/m³ *as Cr, **as Pb
7727-43-7 barium sulphate, natural	
PEL (USA)	Long-term value: 15* 5** mg/m³ *total dust **respirable fraction
REL (USA)	Long-term value: 10* 5** mg/m³ *total dust **respirable fraction
TLV (USA)	Long-term value: 5* mg/m³ *inhalable fraction; E
EL (Canada)	Long-term value: 10* 3** mg/m³ *total dust, **respirable fraction

EV (Canada)	Long-term value: 10 mg/m³ total dust
61790-53-2 Diatomaceous earth (Silica-Amorphous)	
PEL (USA) REL (USA) TLV (USA) EL (Canada) EV (Canada)	20mppcf or 80mg/m³ /%SiO^2 Long-term value: 6 mg/m³ See Pocket Guide App. C TLV withdrawn Long-term value: 4* 1,5** mg/m³ *total, **respirable Long-term value: 10* 3** mg/m³ uncalcined; *inhalable;**respirable
7439-98-7 molybdenum	
PEL (USA) TLV (USA) EL (Canada) EV (Canada)	Long-term value: 15* mg/m³ *Total dust Long-term value: 10* 3** mg/m³ as Mo; *inhalable fraction ** respirable fraction Long-term value: 3* 10** mg/m³ as Mo; *respirable **inhalable Long-term value: 10* 3** 0,5*** mg/m³ metal,insol.compd.:*inh;**resp;sol.compd.:***resp
7440-33-7 tungsten	
PEL (USA) REL (USA) TLV (USA) EL (Canada) EV (Canada) 	and insoluble compounds, as We Short-term value: 10 mg/m³ Long-term value: 5 mg/m³ as W Short-term value: 10 mg/m³ Long-term value: 5 mg/m³ as W Short-term value: 10 mg/m³ Long-term value: 5 mg/m³ as W Short-term value: 10* 3** mg/m³ Long-term value: 5* 1** mg/m³ (as tungsten; compds.:*water-insol.;**water-sol.
7429-90-5 aluminium powder (pyrophoric)	
PEL (USA) REL (USA) TLV (USA) EL (Canada) EV (Canada)	Long-term value: 15*; 15** mg/m³ *Total dust; ** Respirable fraction Long-term value: 10* 5** mg/m³ as Al*Total dust**Respirable/pyro powd./welding f. Long-term value: 1* mg/m³ as Al; *as respirable fraction Long-term value: 1,0 mg/m³ respirable, as Al Long-term value: 5 mg/m³ aluminium-containing (as aluminium)
7440-36-0 antimony	
PEL (USA) REL (USA)	Long-term value: 0,5 mg/m³ as Sb Long-term value: 0,5 mg/m³ as Sb

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TLV (USA) EL (Canada) EV (Canada)	Long-term value: 0,5 mg/m³ as Sb Long-term value: 0,5 mg/m³ Long-term value: 0,5 mg/m³
DNELs No further relevant information available. **PNECs** No further relevant information available.	
Ingredients with biological limit values:	
13424-46-9 lead diazide	
BEI (USA)	30 µg/100 ml Medium: blood Time: not critical Parameter: Lead
7439-92-1 lead	
BEI (USA)	30 µg/100 ml Medium: blood Time: not critical Parameter: Lead 10 µg/100 ml Medium: blood Time: not critical Parameter: Lead (women of child bearing potential)
1314-41-6 orange lead	
BEI (USA)	30 µg/100 ml Medium: blood Time: not critical Parameter: Lead
10294-40-3 barium chromate	
BEI (USA)	25 µg/L Medium: urine Time: end of shift at end of workweek Parameter: Total chromium (fume) 10 µg/L Medium: urine Time: increase during shift Parameter: Total chromium (fume)
7758-97-6 lead chromate	
BEI (USA)	30 µg/100 ml Medium: blood Time: not critical Parameter: Lead 10 µg/100 ml Medium: blood Time: not critical Parameter: Lead (women of child bearing potential)

Additional information: The lists valid during the making were used as basis.

Exposure controls
Personal protective equipment:
General protective and hygienic measures: The usual precautionary measures are to be adhered to when handling chemicals.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Respiratory protection: Not required under normal conditions of use.
Respiratory protection may be required after product use.
Protection of hands: Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.
Material of gloves: The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Penetration time of glove material: The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Eye protection:


Safety glasses

Face protection
Body protection: Impervious protective clothing
Limitation and supervision of exposure into the environment: No further relevant information available.
Risk management measures: Organizational measures should be in place for all activities involving this product.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
General Information

Appearance:	
Form:	Solid material
Colour:	According to product specification
Odour:	Characteristic
Odour threshold:	Not determined.
pH-value:	Not applicable.
Change in condition	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	Undetermined.
Flash point:	Not applicable.
Flammability (solid, gaseous):	Explosive; mass explosion hazard.
Auto/Self-ignition temperature:	Not determined.
Decomposition temperature:	Not determined.
Self-igniting:	Product is not self-igniting.
Danger of explosion:	Risk of explosion by shock, friction, fire or other sources of ignition.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Vapour pressure:	Not applicable.

Density:	Not determined.
Relative density	Not determined.
Vapour density	Not applicable.
Evaporation rate	Not applicable.
Solubility in / Miscibility with water:	Variable, dependent upon product composition and packaging.
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
Other information	No further relevant information available.

SECTION 10: STABILITY AND REACTIVITY

Reactivity
Chemical stability
Thermal decomposition / conditions to be avoided: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Possibility of hazardous reactions: Danger of explosion. Toxic fumes may be released if heated above the decomposition point.
Conditions to avoid: No further relevant information available.
Incompatible materials: No further relevant information available.
Hazardous decomposition products: Carbon monoxide and carbon dioxide Hydrocarbons Nitrogen oxides Chlorine compounds Leadoxide vapour Bariumoxide vapour Toxic metal oxide smoke Danger of forming toxic pyrolysis products.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity:
LD/LC50 values relevant for classification:
7439-92-1 lead
Oral LD50 >2000 mg/kg (rat)
7782-49-2 selenium
Oral LD50 6700 mg/kg (rat)
7758-97-6 lead chromate
Oral LD50 12000 mg/kg (mouse)
Primary irritant effect:
on the skin: Not a skin irritant in unused form. Vapors/particles from used product are possibly irritating to skin.
on the eye: Not an eye irritant in unused form. Vapors/particles from used product are possibly irritating to eyes.
Sensitisation: No sensitising effects known.
Subacute to chronic toxicity: No further relevant information available.
Additional toxicological information: The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version: Harmful
Acute effects (acute toxicity, irritation and corrosivity): Danger of blast or crush-type injuries.
Harmful if swallowed.
Repeated dose toxicity: No further relevant information available.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
Additional ecological information:
General notes: Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects: No further relevant information available.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Must not be disposed together with household garbage. Do not allow product to reach sewage system. Damaged materials pose a danger to anyone in the immediate area; consult experts for disposal of damaged products.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.
Uncleaned packaging:
Recommendation: Disposal must be made according to official regulations.

SECTION 14: TRANSPORT INFORMATION

UN-Number
DOT, ADR, IMDG: UN0360
IATA: FORBIDDEN
UN proper shipping name
DOT, IMDG: DETONATOR ASSEMBLIES, NON-ELECTRIC
ADR: 0360 DETONATOR ASSEMBLIES, NON-ELECTRIC
IATA: FORBIDDEN
Transport hazard class(es)
DOT
Class:

1.1
Label: 1.1
ADR, IMDG
Class:

1.1
Label: 1.1B
IATA
Class: FORBIDDEN
Packing group
DOT, ADR, IMDG: II

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IATA:	FORBIDDEN
Environmental hazards:	
Marine pollutant:	No
Special marking (IATA):	FORBIDDEN BY AIR.
Special precautions for user:	Not applicable.
EMS Number:	F-B,S-X
Segregation groups	Perchlorates
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	
Transport/Additional information:	Not applicable.

ADR	
Limited quantities (LQ)	0
Excepted quantities (EQ)	Code: E0 Not permitted as Excepted Quantity
Tunnel restriction code	1
IMDG	
Limited quantities (LQ)	0
Excepted quantities (EQ)	Code E0 Not permitted as Excepted Quantity
IATA	FORBIDDEN
UN "Model Regulation":	UN0360, DETONATOR ASSEMBLIES, NON- ELECTRIC, 1.1B, II

SECTION 15: REGULATORY INFORMATION

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

United States (USA)

SARA	
Section 355 (extremely hazardous substances):	
None of the ingredients are listed.	
Section 313 (Specific toxic chemical listings):	
13424-46-9	lead diazide
7439-92-1	lead
7782-49-2	selenium
1314-41-6	orange lead
10294-40-3	barium chromate
7758-97-6	lead chromate
7727-43-7	barium sulphate, natural
7429-90-5	aluminium powder (pyrophoric)
7440-36-0	antimony
TSCA (Toxic Substances Control Act):	
All ingredients are listed.	
Proposition 65 (California):	

Chemicals known to cause cancer:		
13424-46-9	lead diazide	
7439-92-1	lead	
1314-41-6	orange lead	
13463-67-7	titanium dioxide	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Chemicals known to cause reproductive toxicity for females:		
7439-92-1	lead	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Chemicals known to cause reproductive toxicity for males:		
7439-92-1	lead	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Chemicals known to cause developmental toxicity:		
13424-46-9	lead diazide	
7439-92-1	lead	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Carcinogenic Categories		
EPA (Environmental Protection Agency)		
13424-46-9	lead diazide	B2
7439-92-1	lead	B2
7782-49-2	selenium	D
1314-41-6	orange lead	B2
10294-40-3	barium chromate	A(inh), D(oral), K/L(inh), CBD(oral)
7758-97-6	lead chromate	K
7727-43-7	barium sulphate, natural	D, CBD(inh), NL(oral)
7778-74-7	potassium perchlorate	NL
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	D
IARC (International Agency for Research on Cancer)		
13424-46-9	lead diazide	2A
7439-92-1	lead	2B
7782-49-2	selenium	3
1314-41-6	orange lead	2A
13463-67-7	titanium dioxide	2B
10294-40-3	barium chromate	1
7758-97-6	lead chromate	1
61790-53-2	Diatomaceous earth (Silica-Amorphous)	3
TLV (Threshold Limit Value established by ACGIH)		

13424-46-9	lead diazide	A3
7439-92-1	lead	A3
1314-41-6	orange lead	A3
13463-67-7	titanium dioxide	A4
10294-40-3	barium chromate	A1
7758-97-6	lead chromate	A2
7439-98-7	molybdenum	A3
7429-90-5	aluminium powder (pyrophoric)	A4
NIOSH-Ca (National Institute for Occupational Safety and Health)		
13463-67-7	titanium dioxide	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Canada		
Canadian Domestic Substances List (DSL)		
Some components are listed on the NDSL.		
All ingredients are listed.		
Canadian Ingredient Disclosure list (limit 0.1%)		
7439-92-1	lead	
7782-49-2	selenium	
10294-40-3	barium chromate	
7758-97-6	lead chromate	
Canadian Ingredient Disclosure list (limit 1%)		
7439-98-7	molybdenum	
7440-33-7	tungsten	
7429-90-5	aluminium powder (pyrophoric)	
7440-36-0	antimony	
Other regulations, limitations and prohibitive regulations		
This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.		
Substances of very high concern (SVHC) according to REACH, Article 57		
13424-46-9	lead diazide	
1314-41-6	orange lead	
7758-97-6	lead chromate	

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16: OTHER INFORMATION

Phrases pertinentes

H200 Unstable explosives.	
H201 Explosive; mass explosion hazard.	
H228 Flammable solid.	

H250 Catches fire spontaneously if exposed to air.	
H261 In contact with water releases flammable gases.	
H271 May cause fire or explosion; strong oxidiser.	
H301 Toxic if swallowed.	
H302 Harmful if swallowed.	
H311 Toxic in contact with skin.	
H315 Causes skin irritation.	
H317 May cause an allergic skin reaction.	
H319 Causes serious eye irritation.	
H331 Toxic if inhaled.	
H332 Harmful if inhaled.	
H350 May cause cancer.	
H360Df May damage the unborn child. Suspected of damaging fertility.	
H360FD May damage fertility. May damage the unborn child.	
H372 Causes damage to organs through prolonged or repeated exposure.	
H373 May cause damage to organs through prolonged or repeated exposure.	
H400 Very toxic to aquatic life.	
H410 Very toxic to aquatic life with long lasting effects.	
H413 May cause long lasting harmful effects to aquatic life.	
R11 Highly flammable.	
R15 Contact with water liberates extremely flammable gases.	
R17 Spontaneously flammable in air.	
R2 Risk of explosion by shock, friction, fire or other sources of ignition.	
R20/22 Harmful by inhalation and if swallowed.	
R22 Harmful if swallowed.	
R23/25 Toxic by inhalation and if swallowed.	
R24 Toxic in contact with skin.	
R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.	
R33 Danger of cumulative effects.	
R36/38 Irritating to eyes and skin.	
R43 May cause sensitisation by skin contact.	
R45 May cause cancer.	
R48/23/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.	
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	
R53 May cause long-term adverse effects in the aquatic environment.	
R60 May impair fertility.	
R61 May cause harm to the unborn child.	
R62 Possible risk of impaired fertility.	
R9 Explosive when mixed with combustible material.	

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) IMDG: International Maritime Code for	

Dangerous Goods DOT: US Department of Transportation	
IATA: International Air Transport Association	
GHS: Globally Harmonised System of Classification and Labelling of Chemicals	
ACGIH: American Conference of Governmental Industrial Hygienists	
EINECS: European Inventory of Existing Commercial Chemical Substances	
ELINCS: European List of Notified Chemical Substances	
CAS: Chemical Abstracts Service (division of the American Chemical Society)	
NFPA: National Fire Protection Association (USA)	
HMIS: Hazardous Materials Identification System (USA)	
WHMIS: Workplace Hazardous Materials Information System (Canada)	
DNEL: Derived No-Effect Level (REACH)	
PNEC: Predicted No-Effect Concentration (REACH)	
LC50: Lethal concentration, 50 percent	
LD50: Lethal dose, 50 percent	
Expl. 1.1: Explosives, Division 1.1	
Unst. Expl.: Explosives, Unstable explosives	
Flam. Sol. 2: Flammable solids, Hazard Category 2	
Pyr. Sol. 1: Pyorphoric Solids, Hazard Category 1	
Water-react. 2: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 2	
Ox. Sol. 1: Oxidising Solids, Hazard Category 1	
Acute Tox. 3: Acute toxicity, Hazard Category 3	
Acute Tox. 4: Acute toxicity, Hazard Category 4	
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2	
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2	
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1	
Carc. 1A: Carcinogenicity, Hazard Category 1A Carc. 1B: Carcinogenicity, Hazard Category 1B	
Repr. 1A: Reproductive toxicity, Hazard Category 1A Repr. 1A: Reproductive toxicity, Hazard Category 1A	
STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1	
STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2	
Aquatic Acute 1: Hazardous to the aquatic environment - AcuteHazard, Category 1	
Aquatic Chronic 1: Hazardous to the aquatic environment - Chronic Hazard, Category 1	
Aquatic Chronic 4: Hazardous to the aquatic environment - Chronic Hazard, Category 4	

Sources
SDS Prepared by:
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Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: NONEL® Non-electric Delay Detonators

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