



Blasting Plan

Barton Mines

13th Lake Road

North River NY

January 12, 2023

Prepared by: Maine Drilling and Blasting

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Introduction

The purpose of this plan is to delineate the “Blasting Best Practices” that will effectively allow for mining of a natural resource while protecting neighboring property, person, the environment and those involved in the resource recovery operation. Maine Drilling & Blasting, Inc considers safety as the priority during all phases of blasting operations. We are knowledgeable of and will follow all local, state and federal regulations related to transportation and use of explosives. (NYSDOL CR 39) Details of tools, products, procedures, and process, including Industry and Regulatory guidelines have been included in this plan. Elements included in this plan have found success not only in relatively remote application like this project but have been successfully deployed in densely populated, vibration and/or environmentally sensitive, research, manufacturing, academic, historic and medical settings.

Blast Monitoring

All blasts will be monitored by a representative of Maine Drilling and Blasting who has been properly trained in the setup and use of seismic monitoring equipment. At least one seismograph will be in use at all times. The primary monitoring device will be located at the closest residence /receptor. In the event a unit fails upon set up, a second seismograph will be utilized.. If the unit does not trigger a monitor log will be provided. Prior to commencement of blasting operations, permission to monitor will be sought from the home / facilities owner or representative. If access should be denied, an alternate accessible location on public or adjacent property will be selected and the DEC will be consulted. To best represent the ground and air response at the restricted access structure, the chosen location should match to the degree possible the distance and direction to the initially identified structure. Placement, set-up and use of monitoring equipment will be as specified by the manufacturer and delineated in the 2009 ISEE Field Practice Guidelines for Blasting Seismographs (Guidelines attached). These Guidelines were developed by a Standards Committee comprised of seismograph manufacturers, researchers, regulatory personnel and seismograph users. As stated in the opening page of the document. “The goal of the Field Practice Guidelines for Blasting Seismographs is to develop uniform and technically appropriate standards for seismograph performance. The intent is to improve accuracy and consistency in ground vibration and air wave measurement”. The above paragraph concludes with the statement, “Seismograph performance is affected by how the seismograph is build and how it is placed in the field”. In Part II. Ground Vibration Monitoring, particular emphasis is given to two critical factors: placement and coupling. The sensor must be placed within 10 ft of the structure, in undisturbed or soil matching sensor density. The sensor must couple effectively to the earth. Acceleration level and soil medium affect proper coupling. The guidelines spell out stepped levels of installation measures required to insure coupling. Collection of accurate data is not only expected from a compliance perspective but is instrumental in accurate evaluation of design performance. Post event, ground and air response data is analyzed along with other shot performance indicators allowing blast design to be a dynamic process of refinement.

Seismographs that meet or exceed ISEE performance standards for blasting seismographs will be used (find performance specifications attached).

Sequence of Blasting

All blasting operations will be strictly coordinated with the site supervision and local regulatory authorities. Emphasis will be on the safe and efficient removal of the rock without impact to surrounding structures. Blasts will be developed so as to create adequate relief which will minimize ground vibrations, the generation of fly rock and offer the greatest protection possible to the surrounding structures.

Hours of Operations

1. Drilling operations shall commence after 7:00 am and cease before 3:30 pm, Monday through Friday.
2. Blast events will be scheduled between the hours of 9:00 am and 4:00 pm Monday through Saturday only. Blasting will not occur on legal holidays or during times of an atmospheric inversion, unless the atmospheric inversion has persisted for more than 72 hrs.
3. Blasting cannot be conducted at times different from those announced in the blasting schedule except in emergency situations, such as electrical storms or public safety required unscheduled detonation. All exceptions to these hours will require prior approval by the NYSDEC.

Frequency of Blasting

Blasting frequency will greatly depend on customer demand with anticipated average frequency of up to three blasts per month.

Drill Noise Analysis

Using the “inverse square law,” with every doubling of a distance, sound pressure levels decrease by 6 dB.

There are many variables for measuring sound in an outside environment. Site factors such as time of year, weather, wind direction, etc. all have an effect on the measure of sound pressure. Below is an example of predicted sound at distance. An Epiroc T40-11 style drill produces 129 dB at the source. Assuming at 50 feet, the sound pressure has reduced to 125 dB, use the following chart to get the sound at the closest structure(s)

Distance in Feet:	Sound Pressure Level:
50	125 dB
100	119 dB
200	113 dB
400	105 dB
800	99 dB
1600	93 dB

Blast Security and Warning Whistles

The Blaster in Charge along with site management will develop a written Site Security Plan (template enclosed) identifying as a minimum the blast area, equipment requiring removal, blast area access points, sentry locations and designated “safe area(s)”. Areas in which charged holes are awaiting firing shall be guarded, barricaded and posted with appropriate signage per MSHA regulations, and/or flagged against unauthorized entry.

Each blast will be preceded by a security check of the affected area and then a series of warning whistles audible to all personnel in the affected Blast Area. Communications will be made with job site management, local authority and neighbors as required to ensure the safest possible Blast Operations. All personnel in the vicinity closest to the blast area will be warned. The warning signal sequence will be:

3 Audible Signal Pulses - 5 Minutes to Blast

2 Audible Signal Pulses - 1 Minute to Blast

1 Audible Signal pulse - All Clear

The blast site will be examined by the blaster prior to the *all-clear* signal to determine that it is safe to resume work. No blast will be fired until the area has been secured and determined safe.

Explosives

All explosives will be delivered to the job site on a daily basis. There will be no overnight storage. Only the necessary amount of explosives required to perform the day's work will be brought to the site. All explosives will be stored in approved magazines when not in use.

MSDS sheets for the explosive products proposed for use on this project are attached.

Blaster Qualifications

All Maine Drilling & Blasting, Inc blasters on this job will be licensed in the State of NY and have received various amounts of training in the safe use and handling of explosives.

Additionally, Maine Drilling & Blasting, Inc blasters are familiar with all MSHA/OSHA Regulations, State Regulations, and Federal Regulations regarding construction site safety, including transportation, use, and handling of explosive materials.

Blasting Personal

All blasting operations shall be conducted by experienced, trained and competent persons who understand the hazards involved. Persons working with explosive materials shall:

1. Have demonstrated knowledge of, and a willingness to comply with, safety and security requirements.
2. Be capable of using mature judgment in all situations.
3. Be of good physical condition and not addicted to intoxicants, narcotics, or other similar type of drugs.
4. The person(s) responsible for the explosives shall possess current knowledge of the local, State and Federal laws and regulations applicable to his work.
5. The person(s) responsible for the explosives shall have obtained a Certificate of Competency or a license as required by State law.

Licenses and Permits

Maine Drilling & Blasting, Inc is fully licensed and insured for the transportation, use, and handling of explosives. Evidence of insurance is available. Blasting permits will be applied for as required from the local authorities by the Maine Drilling & Blasting, Inc Blaster/Foreman when blasting is about to begin.

Safe Limits for Ground and Air Response

Safe limits that have been adopted by industry and regulatory body alike were developed from 40 years research done by US Bureau of Mines (USBM) and documented in the Bureau of Mines Report of Investigations 8507. These limits provide frequency based protection for sensitive construction materials (plaster) found in older and historic homes. The Safe Limit for old plaster is 0.50 in/s (below 10 Hz). One of the authors of RI 8507 and RI 8485, Dr Siskind, stated 20 years later in his publication, **Vibrations from Blasting**, “Research done since RI’s 8485 and 8507 by the USBM and others has reaffirmed the conclusions from those studies even when the authors’ intentions were to find exceptions (Siskind 1991)”. In part the USBM research have with stood the scrutiny of time because the recommended levels produce strains less that those generated by natural and man-made forces (see attached research references for “Natural and Human Induced Vibrations in Homes”).

Flyrock, material traveling through the air or along the ground, will not be cast from the blast site beyond the secured blast area or beyond the permit boundary. All blasts will be video recorded and made available to the NY DEC upon request.

The “Safe Levels” for vibration from blasting developed in the RI 8507 study, depicted below, are embedded in the compliance modules of all blasting seismographs.

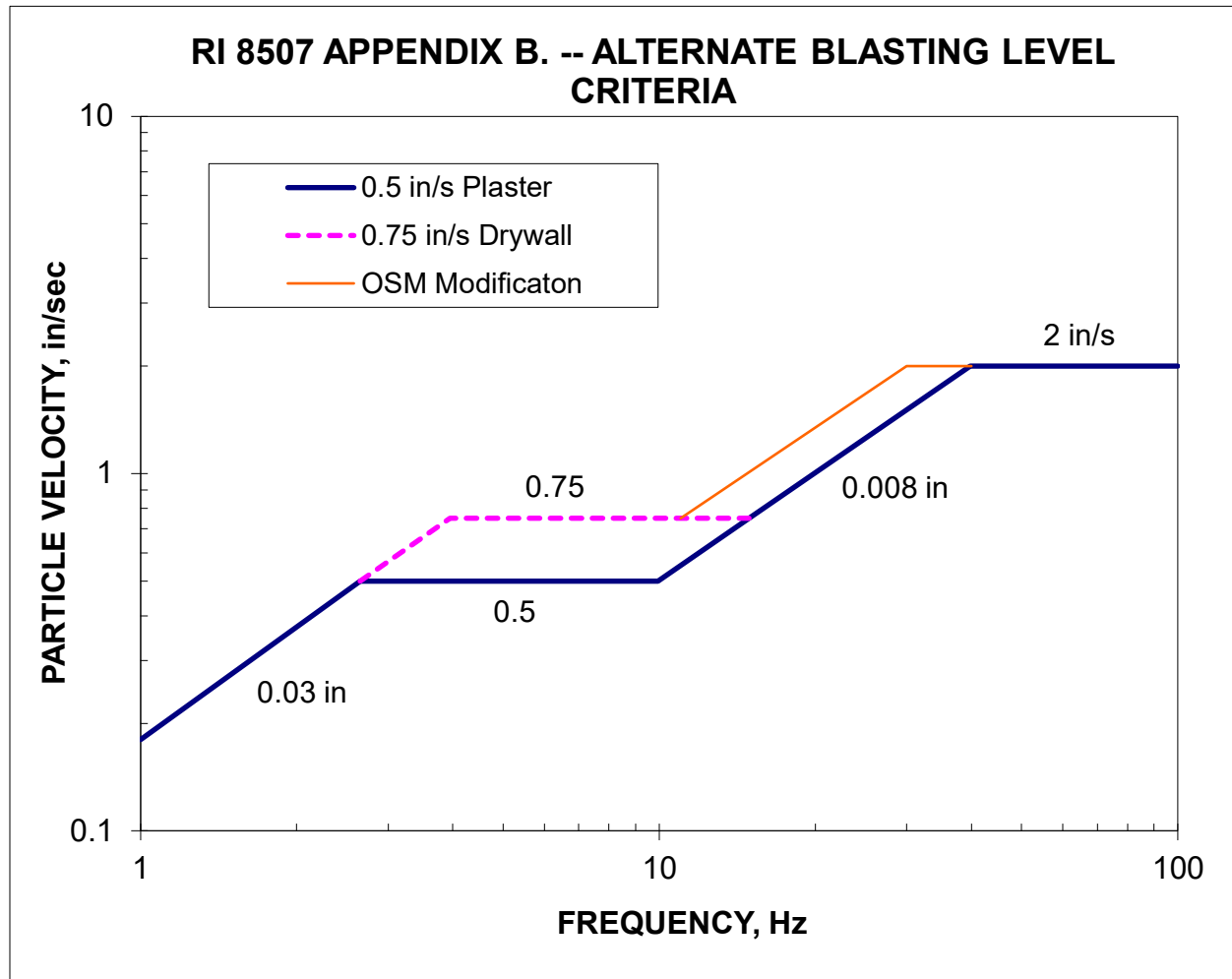


Figure B – 1. – Safe levels of blasting vibration using a combination of velocity and displacement

Blast design will be modified as necessary to ensure compliance.

In RI 8485 The Bureau of Mines built on research that had previously determined “Safe Limits” for air response. In the Bureaus’ conclusions on page 67 of the Report the authors indicate that the former “Safe Level” of 140 dB was “high enough to for significant annoyance” The new recommended level was designed to provide “annoyance acceptability”. The recommended annoyance limit from this study for air response as measured by ISEE approved blasting seismographs is 133 peak dB (linear). In the report the authors indicate a 20 mph gust can increase the pressure in the direction of the receiver 10 – 20 dB. The RI 8485 research concluded wind direction and speed have the greatest effect on air overpressure transmission. They identified thermal inversions as the second most influential factor. In addition to identifying natural influences, the report identifies the primary source of overpressure as an Air Pressure Pulse generated by the expansion of rock volume in the fragmentation process displacing the surrounding air mass. The audio is a fundamental part of the process and cannot be appreciably reduced. Two other sources related to confinement can be influenced by design. Because the acoustics of any given blast are complex and are comprised of both controllable and uncontrollable elements, it is not uncommon for overpressure histories from well-designed blasts to range 30 dB at a given receiver. However we can take comfort that recommended annoyance (133dB) limit is less than the pressure generated by a 20 mph gust of wind and well below levels that could be damaging. The proposed mine is orientated favorably with respect to prevailing wind and is relatively remote from private residences.

Environmental Considerations

All explosives will be handled according to the current version of the IME Best Practices (attached).

There will be no explosives containing perchlorates used on this site at any time.

Dust control during drilling operations is facilitated through the use of integrated dust control and vapor systems installed by the manufacturer of the drilling equipment.

Post blast dust can be expected under certain conditions but ultimately will be impacted by moisture content in the ground at the time of blasting and the prevailing winds. Effective removal of overburden soil during stripping operations will minimize the amount of particulate available to become air borne during a blast event. The elevation of existing topography of the north rim with respect to operating elevations will aid containment. The scaled size of the operation will minimize the amount of dust that could become airborne in a blast event. Prevailing winds are generally from the west and southwest during the warmer portion of the year. This is a favorable direction considering the nearest residential dwellings are located to the north. When existing measures (natural and designed) fail to control dust migration, operational management and control of moisture content of mine processes and surfaces agitated by excavation, haulage and blasting will mitigate dust migration.

Proposed Blast Design

Enclosed are proposed blast designs for this project. Hole size, depths, spacing, products used and loading information is provided. These designs provide a sound calculated starting point. During the excavation development, design refinements are made, when required in response to performance indicators and encountered conditions, including: ground and air response; ease of excavation: floor grading requirements; geology variation; fracture and water.

Blast Design Data

The following information is provided as site specific data relative to the proposed blasting on this site:

- a. Receptor overview

Attached.

- b. Rock Type: Granite

- c. Blast Hole Diameter.

3.5”-5.5” (See attached blast designs for proposed design elements and projected vibration estimates at closest dwellings).

- d. Initiation system to be utilized.

Non-Electric/Electronic

- e. Proposed explosives to be used.

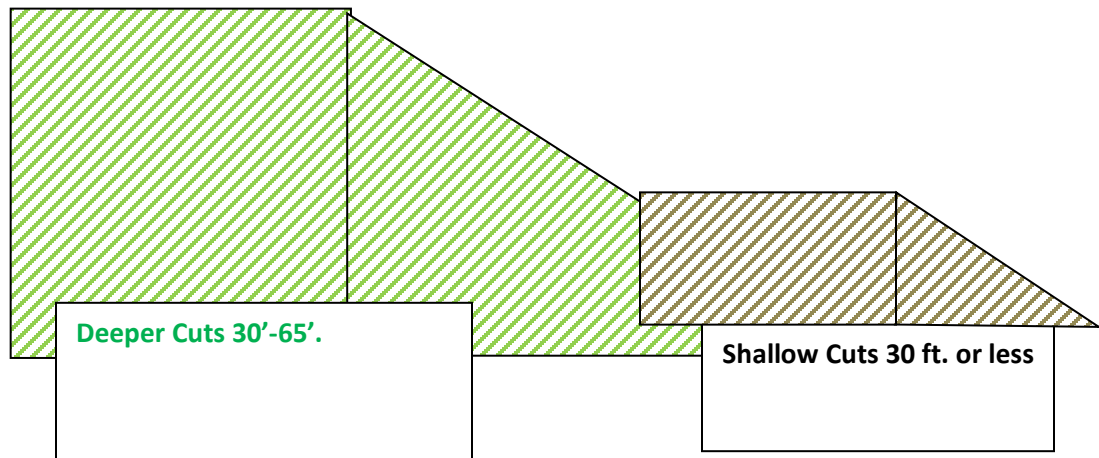
Cast Boosters

Packaged Emulsions

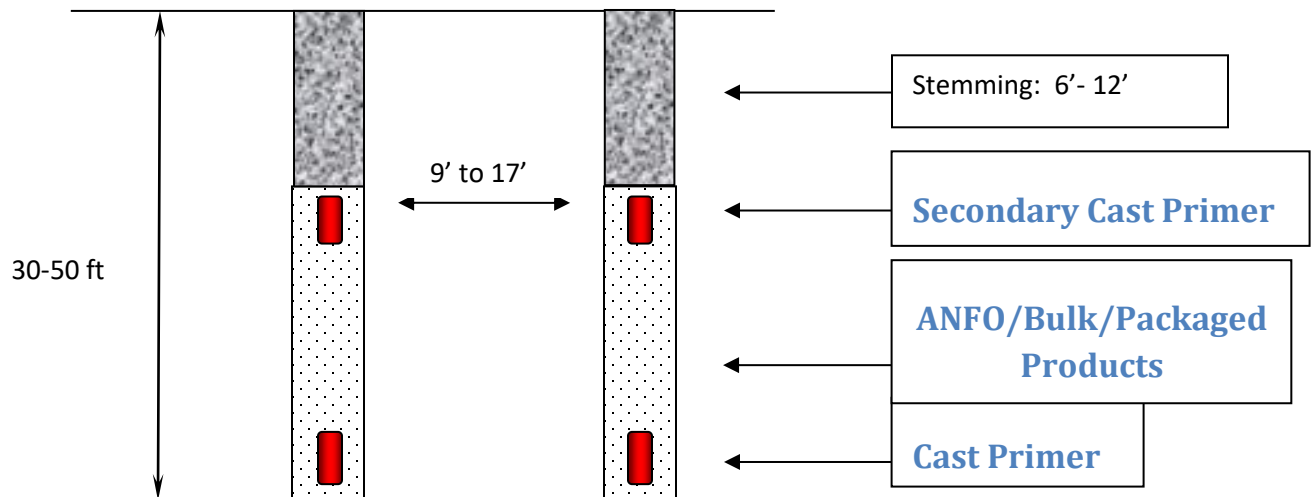
Bulk Products

MSDS attached

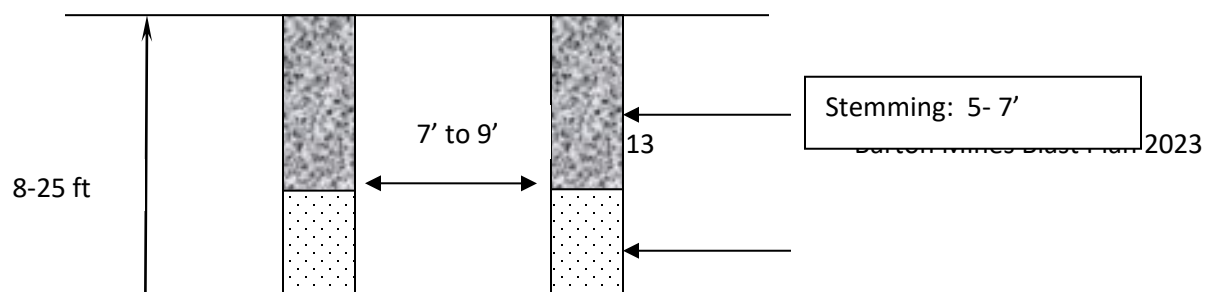
Cross Section (Conceptual)



- Typical Column Section Deeper Cuts @ 4 to 5.5" Diameter



- Typical Column Section Shallow Cuts @ 3.5"-4" Diameter





**ANFO/Bulk/Packaged
Products**

Cast Primer

Attachment 1
Blasting SDS's

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: dнна.hse@am.dynonobel.com www.dynonobel.com

SDS #: 1062

Date: 07/20/2020

Supersedes: 11/01/2018

Product Identifier

Product Form: Mixture

Product Name: Bulk Emulsion Explosive

Other Means of Identification

Synonyms:

DYNO® RU	TITAN® 2000 LD
DYNO® RU Alaska	TITAN® 2000 SD
DYNO® RU SX	TITAN® PB 2000 LD
DYNO® RU Uphole	TITAN® PB 2000 SD
EXTRAMITE 2000	TITAN® 7000 RU
FRAGMITE	TITAN® 7000 RU-A
TITAN® 1000 LD-E2	TITAN® 7000 RU-SX
TITAN® 1000 LD	TITAN® 5000 LD
TITAN® 1000 LD GREEN	TITAN® 7000
TITAN® 1000 SD	TITAN® 7000 A
TITAN® 1000 SD GREEN	TITAN® 7000 SX
TITAN® PB 1000 LD	DX5103
TITAN® PB 1000 SD	DX5108

Intended Use of the Product

Industrial 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
Acute Tox. 4 (Oral)	H302
Skin Irrit. 2	H315
Eye Irrit. 2B	H320
Carc. 2	H351
STOT RE 2	H373
Asp. Tox. 1	H304

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US)



Signal Word (GHS-US)

: Danger

Hazard Statements (GHS-US)

: H205 - May mass explode in fire
H302 - Harmful if swallowed

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H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H320 - Causes eye irritation
H351 - Suspected of causing cancer
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary Statements (GHS-US)

: P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P220 - Keep/Store away from clothing, combustible materials, combustibles
P221 - Take any precaution to avoid mixing with combustible materials, clothing, combustibles
P233 - Keep container tightly closed
P260 - Do not breathe dust, fume, mist, spray, vapors
P264 - Wash exposed areas thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352 - IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P370+P380 - In case of fire: Evacuate area
P372 - Explosion risk in case of fire
P373 - DO NOT fight fire when fire reaches explosives
P401 - Store local, regional, national, and international regulations
P403+P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/container according to local, regional, national, and international regulations

Other Hazards

Hazards Not Otherwise Classified (HNOC): Not available

Other Hazards: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Mixture			
Name	Product identifier	% (w/w)	Ingredient Classification (GHS-US)
Ammonium nitrate	(CAS No) 6484-52-2	30 - 80	Ox. Sol. 3, H272 Eye Irrit. 2A, H319
Calcium nitrate	(CAS No) 10124-37-5	0.1 - 35	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Dam. 1, H318
Sodium nitrate	(CAS No) 7631-99-4	0.1 - 18	Ox. Sol. 3, H272 Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319
*Fuels, diesel, no. 2	(CAS No) 68476-34-6	0.1 - 8	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332

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			Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 Asp. Tox. 1, H304
Distillates, petroleum, chemically neutralized light naphthenic	(CAS No) 64742-35-4	0.1 - 6	Asp. Tox. 1, H304
<p>* This ingredient is not used in GREEN-named products.</p> <p>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 de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).</p> <p>Full text of H-phrases: see section 16</p>			

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: If symptoms occur, go into fresh air and ventilate suspected area. Seek medical attention.

Skin Contact: Remove contaminated clothing. Wash with soap and water followed by rinsing with water. Seek medical attention if irritation develops or persists. 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. Seek medical attention immediately.

Most Important Symptoms and Effects Both Acute and Delayed

General: May be harmful if swallowed. Causes serious eye damage. Skin irritation.

Inhalation: May cause respiratory irritation.

Skin Contact: May cause skin irritation.

Eye Contact: Causes eye irritation.

Ingestion: May be harmful if swallowed. May be harmful if swallowed and enters airways.

Chronic Symptoms: Contains an ingredient that may cause cancer. Causes damage to organs through prolonged or repeated exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If symptoms occur, seek medical attention.

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES.

Unsuitable Extinguishing Media: Not available

Special Hazards Arising from the Substance or Mixture

Fire Hazard: In case of fire involving explosives: Evacuate area. DO NOT fight fires involving explosives. Consult the most current Emergency Response Guidebook (ERG), Guide 112 for additional information. Extreme risk of explosion from shock, friction, fire or other sources of ignition.

Explosion Hazard: Extreme risk of explosion by shock, friction, fire, impact, heat or other sources of ignition.

Reactivity: Accelerates the rate of burning materials.

Advice for Firefighters

Precautionary Measures Fire: 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.

Hazardous Combustion Products: Nitrogen oxides. Carbon oxides (CO, CO₂). Ammonia.

Other information: 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.

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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: Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security.

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: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up

For Containment: Contain any spills with dikes as necessary to prevent migration and entry into sewers or streams. Do not take up in combustible material such as: saw dust or cellulosic material.

Methods for Cleaning Up: Collect spillage for possible reuse. Clean up spills immediately and dispose of waste in accordance with appropriate State, Federal and local regulations.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling: It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

Additional Hazards When Processed: When heated to decomposition, emits toxic fumes. Do not puncture or incinerate container.

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.

Conditions for Safe Storage, Including Any Incompatibilities

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from combustible materials, extremely high temperatures, direct sunlight, ignition sources, incompatible materials.

Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Fuels, diesel, no. 2 (68476-34-6)

USA ACGIH	ACGIH TWA (mg/m ³)	100 mg/m ³
Alberta	OEL TWA (mg/m ³)	100 mg/m ³
British Columbia	OEL TWA (mg/m ³)	100 mg/m ³
Manitoba	OEL TWA (mg/m ³)	100 mg/m ³
Newfoundland & Labrador	OEL TWA (mg/m ³)	100 mg/m ³
Nova Scotia	OEL TWA (mg/m ³)	100 mg/m ³
Ontario	OEL TWA (mg/m ³)	100 mg/m ³
Prince Edward Island	OEL TWA (mg/m ³)	100 mg/m ³
Saskatchewan	OEL STEL (mg/m ³)	150 mg/m ³
Saskatchewan	OEL TWA (mg/m ³)	100 mg/m ³

Exposure Controls

Appropriate Engineering Controls: Ensure all national/local regulations are observed. Ensure adequate ventilation,

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especially in confined areas.

Personal Protective Equipment: Protective goggles. Gloves. Insufficient ventilation: wear respiratory protection. Protective clothing.



Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: Wear chemically resistant protective gloves.

Eye Protection: Chemical goggles or face shield.

Skin and Body Protection: Not available

Respiratory Protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of vapor or mist are expected to exceed exposure limits.

Other Information: When using, do not eat, drink or smoke.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	: Liquid
Appearance	: White, yellow or pink opaque viscous liquid.
Odor	: Slight fuel oil odor.
Odor Threshold	: Not available
pH	: Not available
Relative Evaporation Rate (butylacetate=1)	: < 1
Melting Point	: Not available
Freezing Point	: Not available
Boiling Point	: Not available
Flash Point	: Not available
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20 °C	: Not available
Relative Density	: Not available
Specific Gravity	: 1.00 - 1.45 g/cc
Solubility	: Water: Nitrate salts are completely soluble, but emulsion dissolution is very slow.
Partition coefficient: n-octanol/water	: Not available
Viscosity	: Not available
Explosion Data – Sensitivity to Mechanical Impact	: Not sensitive to mechanical impact. May be sensitive to supersonic explosively driven projectile impacts.
Explosion Data – Sensitivity to Static Discharge	: Not sensitive to static discharge.

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SECTION 10 - STABILITY AND REACTIVITY

Reactivity: Accelerates the rate of burning materials. Oxidizer. May react violently with strong acids, strong oxidizing and reducing agents.

Chemical Stability: May intensify fire; oxidizer. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight. Extremely high temperatures. Heat. Sparks. Overheating. Open flame. Combustible materials. Sources of ignition. Incompatible materials.

Incompatible Materials: Corrosives, strong acids, strong bases and alkalis.

Hazardous Decomposition Products: Nitrogen oxides. Toxic vapors. Ammonia. Carbon monoxide.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Harmful if swallowed.

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Causes serious eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Contains an ingredient suspected of causing cancer.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: May be fatal if swallowed and enters airways.

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: May be harmful if swallowed. May be harmful if swallowed and enters airways. Aspiration into the lungs can occur during ingestion or vomiting and may cause lung injury.

Chronic Symptoms: Contains an ingredient that may cause cancer. Causes damage to organs through prolonged or repeated exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)

LD50 Oral Rat	2217 mg/kg
LC50 Inhalation Rat	> 88.8 mg/l/4h
ATE CLP (oral)	2217.000 mg/kg body weight

Sodium nitrate (7631-99-4)

LD50 Oral Rat	1267 mg/kg
ATE CLP (oral)	1267.000 mg/kg body weight

Fuels, diesel, no. 2 (68476-34-6)

ATE CLP (vapors)	11.000 mg/l/4h
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Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)

LD50 Oral Rat	> 5000 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg

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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])

Calcium nitrate (10124-37-5)

LC50 Fish 1	10000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
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Fuels, diesel, no. 2 (68476-34-6)

LC50 Fish 1	35 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
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Persistence and Degradability

Bulk Emulsion

Persistence and Degradability	Not established.
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Sodium nitrate (7631-99-4)

Persistence and Degradability	Readily biodegradable in water.
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Bioaccumulative Potential

Bulk Emulsion

Bioaccumulative Potential	Not established.
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Ammonium nitrate (6484-52-2)

BCF fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

Sodium nitrate (7631-99-4)

Log Pow	-3.8 (at 25 °C)
Bioaccumulative Potential	Not expected to bioaccumulate.

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Treatment Methods: Contact manufacturer for advice on proper disposal methods.

Waste Disposal Recommendations: Collect spillage for possible reuse. Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Clean up even minor leaks or spills if possible without unnecessary risk.

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



Safety Data Sheet

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

Bulk Emulsion

SARA Section 311/312 Hazard Classes

Immediate (acute) health hazard
 Reactive hazard
 Delayed (chronic) health hazard
 Fire hazard

Ammonium nitrate (6484-52-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Sodium nitrate (7631-99-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Calcium nitrate (10124-37-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Fuels, diesel, no. 2 (68476-34-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Ammonium nitrate (6484-52-2)

U.S. - Massachusetts - Right To Know List
 U.S. - New Jersey - Right to Know Hazardous Substance List
 U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
 U.S. - Pennsylvania - RTK (Right to Know) List

Sodium nitrate (7631-99-4)

U.S. - Massachusetts - Right To Know List
 U.S. - Pennsylvania - RTK (Right to Know) List

Calcium nitrate (10124-37-5)

U.S. - New Jersey - Right to Know Hazardous Substance List

Fuels, diesel, no. 2 (68476-34-6)

U.S. - New Jersey - Right to Know Hazardous Substance List

Canadian Regulations

Bulk Emulsion

WHMIS Classification : Class C - Oxidizing Material
 Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Safety Data Sheet



Ammonium nitrate (6484-52-2)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects
----------------------	---

Sodium nitrate (7631-99-4)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Listed on the Canadian Ingredient Disclosure List

WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects
----------------------	---

Calcium nitrate (10124-37-5)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Fuels, diesel, no. 2 (68476-34-6)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Distillates, petroleum, chemically neutralized light naphthenic (64742-35-4)

Listed on the Canadian DSL (Domestic Substances List) inventory.

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:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 2	Carcinogenicity Category 2
Expl. 1.5	Explosive Category 1.5
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Skin Corr. 1A	Skin corrosion/irritation Category 1A
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H205	May mass explode in fire
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H320	Causes eye irritation
H332	Harmful if inhaled
H351	Suspected of causing cancer
H373	May cause damage to organs through prolonged or repeated exposure

Safety Data Sheet

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

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: dнна.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.

Safety Data Sheet

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 de minimus 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

Safety Data Sheet

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-ventilated 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

Safety Data Sheet

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 de minimus 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

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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)

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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

Safety Data Sheet

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

Safety Data Sheet

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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: CAST BOOSTERS

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

www.dynonobel.com

SDS #: 1108

Date: 08/26/2020

Supersedes: 07/20/2020

1.1 Product Identifier

Trade Name: CAST BOOSTERS

Article Number:

No other identifiers

1108

Other Product Identifiers:

DYNO® CORD SENSITIVE BOOSTERS - CS35, CS45, CS90, CS135

TROJAN® SPARTAN®

TROJAN® SPARTAN® Slider

TROJAN® Stinger

TROJAN® NB

TROJAN® NB UNIVERSAL

TROJAN® Twinplex

TROJAN® SPARTAN® SR

TROJAN® SPARTAN® Cone

TROJAN® Ringprime

TROJAN® SPARTAN® CSU

TROJAN® WB

TROJAN® SHIELD™

1.2 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.

1.3. Emergency Telephone Number

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

SECTION 2 – HAZARD(S) IDENTIFICATION

2.1 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

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS



E; Explosive

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.

2.2 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:

: pentaerythritol tetranitrate (PETN)

: octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)

: perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

: 2,4,6-trinitrotoluene (TNT)

: aluminium powder (pyrophoric)

: H201 Explosive; mass explosion hazard.

: P210 - Keep away from heat/sparks/open flames/hot surfaces.
- No smoking.

P250 - Do not subject to grinding/shock/friction.

P280 - Wear protective gloves/protective clothing/eye protection/face protection.

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.

Hazard statements

Precautionary Statements

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.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

HMIS Long Term Health Hazard Substances

None of the ingredients are listed.

2.3 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

3.1 Mixtures

Description: Mixture of substances listed below with nonhazardous additions.

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: 118-96-7 EINECS: 204-289-6 Index number: 609-008-00-4	2,4,6-trinitrotoluene (TNT)  T R23/24/25;  E R2;  N R51/53 R33  Expl. 1.1, H201  Acute Tox. 3, H301; Acute Tox. 3, H311; Acute Tox. 3, H331  STOT RE 2, H373  Aquatic Chronic 2, H411
CAS: 7429-90-5	aluminum metal  F R15  Water-react. 1, H260
CAS: 121-82-4 EINECS: 204-500-1	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)  T R25;  E R2  Expl. 1.1, H201  Acute Tox. 3, H301
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

Additional Information: For the wording of the listed risk phrases refer to section 16.

For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

SECTION 4 – FIRST AID MEASURES

4.1 Description of First Aid Measures

General Information: No special measures required.

After Inhalation: 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: Do not induce vomiting; call for medical help immediately.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

Blast injury if mishandled.

Hazards: Danger of blast or crush-type injuries.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

SECTION 5 – FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

Suitable Extinguishing Agents: DO NOT fight fire when fire reaches explosives.

For Safety Reasons Unsuitable Extinguishing Agents: None.

5.2 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.

5.3 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

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Evacuate area.

Wear protective clothing.

Ensure adequate ventilation.

Keep away from ignition sources.

Protect from heat.

Isolate area and prevent access.

6.2 Environmental Precautions

No special measures required.

6.3 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.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

6.4 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

7.1 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: Keep ignition sources away - Do not smoke. Protect from heat.
Prevent impact and friction. Emergency cooling must be available in case of nearby fire.

7.2 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.
Store away from oxidising agents.

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.

7.3 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.

8.1 Control Parameters

Ingredients with Limit Values that Require Monitoring at the Workplace:

118-96-7 2,4,6-trinitrotoluene (TNT)

PEL (USA)	Long-term value: 1,5 mg/m ³ Skin
REL (USA)	Long-term value: 0,5 mg/m ³ Skin
TLV (USA)	Long-term value: 0,1 mg/m ³ Skin; BEI-M
EL (Canada)	Long-term value: 0,1 mg/m ³ Skin
EV (Canada)	Short-term value: 0,2 mg/m ³ , 0,02 ppm Long-term value: 0,1 mg/m ³ , 0,01 ppm Skin

7429-90-5 aluminum metal

PEL (USA)	Long-term value: 15*; 15** mg/m ³ *Total dust; ** Respirable fraction
REL (USA)	Long-term value: 10* 5** mg/m ³ as Al*Total dust**Respirable/pyro powd./welding f.
TLV (USA)	Long-term value: 1* mg/m ³ as Al; *as respirable fraction
EL (Canada)	Long-term value: 1,0 mg/m ³ respirable, as Al

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

EV (Canada)	Long-term value: 5 mg/m ³ aluminium-containing (as aluminium)
121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	
REL (USA)	Short-term value: 3 mg/m ³ Long-term value: 1,5 mg/m ³ Skin
TLV (USA)	Long-term value: 0,5 mg/m ³ Skin
EL (Canada)	Long-term value: 0,5 mg/m ³ Skin
EV (Canada)	Long-term value: 0,5 mg/m ³ Skin

DNELs: No further relevant information available.

PNECs: No further relevant information available.

Ingredients with biological limit values:

118-96-7 2,4,6-trinitrotoluene (TNT)

BEI (USA)	1,5 % of hemoglobin Medium: blood Time: during or end of shift Parameter: Methemoglobin (background, nonspecific, semi-quantitative)
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Additional Information: The lists valid during the making were used as basis.

8.2 Exposure Controls

Personal Protective Equipment:

General Protective and Hygienic Measures: The usual precautionary measures are to be adhered to when handling chemicals.

Keep ignition sources away - Do not smoke.

Keep away from foodstuffs, beverages and feed.

Wash hands before breaks and at the end of work.

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.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

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 cannot be calculated in advance and has therefore to be checked prior to the application.

Penetration Time of Glove Material: The exact break through time must 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.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

General Information

Appearance

Form	: Solid material
Colour	: According to product specification
Odour	: Odourless
Odour Threshold	: Not determined.
pH- Value	: Not applicable.

Change in Condition

Melting point/Melting range	: 80 °C (176 °F) (trinitrotoluene)
Boiling point/Boiling range	: Undetermined.

Flash Point	: Not applicable.
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Flammability (solid, gaseous)	: Explosive; mass explosion hazard.
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Auto/Self-ignition temperature	: Not determined.
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Decomposition temperature	: Not determined.
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Self-igniting	: Product is not self-igniting.
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Danger of explosion	: Risk of explosion by shock, friction, fire or other sources of ignition.
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Explosion limits

Lower	: Not determined.
Upper	: Not determined.

Vapour pressure	: Not applicable.
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Density at 20 °C (68 °F)	: 1,55 - 1,65 g/cm ³ (12,935 - 13,769 lbs/gal)
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Relative density	: Not determined.
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Vapour density	: Not applicable.
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Evaporation rate	: Not applicable.
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Solubility in / Miscibility with water	: Variable, dependent upon product composition and packaging.
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Partition coefficient (n-octanol/water)	: Not determined.
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Viscosity

Dynamic	: Not applicable.
Kinematic	: Not applicable.

9.2 Other Information	: No further relevant information available.
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SECTION 10 – STABILITY AND REACTIVITY

10.1 Reactivity:

10.2 Chemical Stability:

Thermal Decomposition / Conditions to be Avoided: No decomposition if used and stored according to specifications. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

10.3 Possibility of Hazardous Reactions: Danger of explosion. Toxic fumes may be released if heated above the decomposition point.

10.4 Conditions to Avoid: Keep ignition sources away - Do not smoke.

10.5 Incompatible Materials: No further relevant information available.

10.6 Hazardous Decomposition Products: Carbon monoxide and carbon dioxide
Nitrogen oxides Hydrocarbons.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

Acute toxicity:

LD/LC50 values relevant for classification: None.

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.

Acute Effects (Acute Toxicity, Irritation and Corrosivity): Danger of blast or crush-type injuries.

Repeated Dose Toxicity: No further relevant information available.

SECTION 12 – ECOLOGICAL INFORMATION

12.1 Toxicity

Aquatic Toxicity: Toxic for aquatic organisms

12.2 Persistence and Degradability: No further relevant information available.

12.3 Bioaccumulative Potential: No further relevant information available.

12.4 Mobility in Soil: No further relevant information available.

Ecotoxicological effects:

Remark: Toxic for fish

Additional Ecological Information:

General Notes: Water hazard class 3 (German Regulation) (Self-assessment): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.

Danger to drinking water if even extremely small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Toxic for aquatic organisms

Due to available data on eliminability/decomposition and bioaccumulation potential prolonged term damage of the environment cannot be excluded.

12.5 Results of PBT and vPvB Assessment PBT: Not applicable.

vPvB: Not applicable.

12.6 Other Adverse Effects: No further relevant information available.

SECTION 13 – DISPOSAL CONSIDERATIONS

13.1 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

14.1 UN-Number

DOT, ADR, IMDG : UN0042

IATA : FORBIDDEN

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

14.2 UN Proper Shipping Name

DOT, IMDG : Boosters, without detonator
ADR : 0042, BOOSTERS, WITHOUT DETONATOR
IATA : FORBIDDEN

14.3 Transport Hazard Class(es)

DOT, ADR, IMDG
Class : 1.1
Label : 1.1D



IATA
Class : FORBIDDEN

14.4 Packing Group

DOT, ADR, IMDG : II
IATA : FORBIDDEN

14.5 Environmental Hazards:

Marine Pollutant: : No
Special Marking (IATA): : Prohibited from Transport in Passenger Aircraft.

14.6 Special Precautions for User: Not applicable.

EMS Number: : F-B,S-X

14.7 Transport in Bulk According to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

Transport/Additional information:

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" : UN0042, BOOSTERS, WITHOUT DETONATOR, 1.1D, II

SECTION 15 – REGULATORY INFORMATION

15.1 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)

7429-90-5 aluminum metal

TSCA (Toxic Substances Control Act)

All ingredients are listed.

Proposition 65 (California)

Chemicals known to cause cancer

118-96-7 2,4,6-trinitrotoluene (TNT)

Chemicals known to cause reproductive toxicity for females

None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

None of the ingredients are listed.		
Chemicals known to cause developmental toxicity		
None of the ingredients are listed.		
Carcinogenic Categories		
EPA (Environmental Protection Agency)		
118-96-7	2,4,6-trinitrotoluene (TNT)	C
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	C
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	D
IARC (International Agency for Research on Cancer)		
118-96-7	2,4,6-trinitrotoluene (TNT)	3
TLV (Threshold Limit Value established by ACGIH)		
7429-90-5	aluminum metal	A4
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	A4
NIOSH-Ca (National Institute for Occupational Safety and Health)		
None of the ingredients are listed.		
Canada		
Canadian Domestic Substances List (DSL)		
All ingredients are listed.		
Canadian Ingredient Disclosure list (limit 0.1%)		
None of the ingredients are listed.		
Canadian Ingredient Disclosure list (limit 1%)		
118-96-7 2,4,6-trinitrotoluene (TNT)		
7429-90-5 aluminum metal		
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		
None of the ingredients are listed.		
15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.		

SECTION 16 – OTHER INFORMATION

Revision Date : 22/05/2015

Other Information :

Relevant Phrases

- H200 Unstable explosives.
- H201 Explosive; mass explosion hazard.
- H260 In contact with water releases flammable gases which may ignite spontaneously.
- H301 Toxic if swallowed.
- H311 Toxic in contact with skin.
- H331 Toxic if inhaled.
- H315 Causes skin irritation.
- H373 May cause damage to organs through prolonged or repeated exposure.
- H411 Toxic to aquatic life with long lasting effects.
- R15 Contact with water liberates extremely flammable gases.
- R2 Risk of explosion by shock, friction, fire or other sources of ignition.
- R22 Harmful if swallowed.

Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS
Trade Name: CAST BOOSTERS

- R23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
- R24 Toxic in contact with skin.
- R25 Toxic if swallowed.
- R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
- R33 Danger of cumulative effects.
- R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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
- Water-react. 1: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1
- Acute Tox. 3: Acute toxicity, Hazard Category 3
- STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2
- Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2

Sources

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Safety Data Sheet

According to: 1907/2006/EC (REACH), 1272/2008/EC (CLP), and OSHA GHS

Trade Name: CAST BOOSTERS

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