

Blasting Plan
311 Rockland Street
Hingham MA.
Dig Safe # 2024 -401-4842
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General

Construction Drilling Services Corp (CDS) 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. The project specifications and conditions have been reviewed. Details of procedures for pre-blast surveys, explosives use, blast security, seismic monitoring and licensing documentation are enclosed.

Pre-Blast Surveys / Notifications

Pre-blast surveys will be offered to all property owners within 250-foot radius of the blast location. Appropriate notices will be given, and appointments arranged for those owners who desire a survey. A Company Representative will conduct pre-blast surveys. Results of those surveys will be documented through video or still photographs and appropriate narration or written reports. 5 SURVEYS ARE REQUIRED AT THIS LOCATION.

Blast Monitoring

Construction Drilling Services or Seismic Monitoring Services (independent monitoring company.) who has been properly trained in the setup and use of seismic monitoring equipment will monitor all blasts. At least three (3) seismographs will be used at this location. Placement of the monitoring equipment will be at the nearest structures to the blast site. Monitoring equipment will consist of InstanTel type seismographs. Results of blast will typically be available before the next blast, usually immediately following the blast. Results can be viewed, and modifications can be made to the blast design for the next blast if necessary.

sequence of Blasting

All blasting operations will be strictly coordinated with the Mass highway Engineer, State and Local Police and the local Fire Department. Emphasis will be on the safe and efficient removal of the rock existing on this project without impact to surrounding structures, roadway or environmental impact to marine life. The Blast design will be developed to create adequate relief, which will minimize ground vibrations and offer the greatest protection possible to the surrounding structures. The duration of anticipated blasting will be 3 weeks

Blasting Procedures

1. Blasting operations shall commence after 9:00 AM and cease before 2:00 PM, Monday through Friday. OR as stated on the Mass Highway blasting permit.
2. 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.
3. Warning and all clear signals of different character that are audible within a range of one-half mile from the point of the blast shall be given. All persons within the permit area shall be notified of the meaning of the signals through appropriate instructions and signs posted at the office trailer on site.
4. Access to blasting area shall be regulated to protect the public from the effects of blasting. Access to the blasting area shall be controlled to prevent unauthorized entry before each blast and until the perimeter's authorized representative has determined that no unusual circumstances exist after the blast. Access to and travel in or through the area can then safely resume.
5. Areas in which charged holes are awaiting firing shall be guarded, barricaded and posted, or flagged against unauthorized entry.
6. All blast shall be made in the direction of the stress relieved face previously marked out or previously blasted.
7. All stemming material shall be at a minimum as specified using clean 3/8" crushed stone.
8. Blasting mats will be used as necessary to cover blast.
9. The blasting Contractor shall insure that the blaster will prevent the simultaneous blasting of numerous holes while exercising extra safety and judgment.

Blasting Mats

Blasting mats will be used to control excessive amounts of rock movement when blasting near structures. The blaster typically determines placement and number of mats. Mats will be placed to protect all people and structures on or surrounding the blast site and property. Rubber tire type mats will be utilized on this project and will be approximately 10' x 20' in size. Approximately 6000 lbs. each.

Blast Security and Warning Whistles

Each blast will be preceded by a security check of the effected area and then a series of warning whistles. Communications will be made with Quarry site supervisors and local officials as required to ensure the safest possible operation. All personnel in the vicinity closest to the blast area will be warned. The warning whistles will follow the following sequence:

3 Whistles – 5 Minutes prior to Blast

2 Whistles - 1 Minute prior to Blast

1 Whistle - 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

Explosives will be delivered to the job site daily. There will be no overnight storage. Only the 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. A list of explosive products along with SDS sheets are attached

Blaster Qualifications

All CDS blasters on this job will be licensed in the Commonwealth of Massachusetts and have received various amounts of training in the safe, use and handling of explosives. Additionally, all CDS blasters are familiar with all OSHA and MSHA Regulations, State Regulations, and Federal Regulations regarding construction and quarry site safety, including transportation, use, and handling of explosives materials.

Blasting Personnel

Experienced, trained and competent persons who understand the hazards involved shall conduct all blasting operations. Persons working with explosives materials shall:

1. Have demonstrated knowledge of, and a willingness to comply with, safety and security requirements.
2. Can use 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 have obtained a Certificate of Competency or a license as required by State law.

Licenses and Permits

CDS is fully licensed and insured for the transportation, use, and handling of explosives. Evidence of insurance is available. Blasting permit FP006 will be applied for as required from the local authorities along with Mass Highway blasting Permit by the CDS Blaster/Foreman 2 months before blasting is about to begin.

Blast Vibration

Blast vibration will be monitored typically at the nearest structure(s) and Utility closet to the blast site. Vibration limits will closely follow limits described in the project specifications Blast Design Plan established by State Regulations. Blast designs will be modified as required to stay within those guidelines and meet the project schedules as well. Blasting operations will be modified accordingly when approaching buildings and utilities. Enclosed are preliminary vibrations calculations based on known distances to the structures of concern and anticipated initial blast design.

Blast Reports

CDS Blast Report. This report will be filled out for each blast and copies supplied as needed.

Typical Blast Design

Enclosed is what would be considered a typical blast design for this project. Hole sizes, depths, spacing and loading information is provided. These designs are to be considered a good starting point. Modifications are usually made, if necessary, following the first blast to meet control and seismic considerations.

Blast Design Plan
 Blast Analysis for construction site
 Typical blast design for controlled blasting
 Description: SITE BLASTING

Typical Loaded production shot

<i>Est. # of Holes</i>	<i>15 to 20</i>
<i>Depth</i>	<i>4 to 12 FT</i>
<i>Hole Diameter</i>	<i>2.5 INCH</i>
<i>Burden</i>	<i>3 FEET</i>
<i>Spacing</i>	<i>3 FEET</i>
<i>Holes per Delay</i>	<i>1</i>
<i>Pounds per Delay</i>	<i>2.5 TO 9 LBS.</i>
<i>Pounds per Hole</i>	<i>2.5 TO 8.6 LBS</i>
<i>Total Est. Pounds</i>	<i>55 TO 150 LBS.</i>
<i>Powder factor</i>	<i>1.430 LBS/YD³</i>
<i>Decks</i>	<i>1 STEMMING 3 FT</i>

Blast Plan Notes 3 X 3 square pattern

Vibration prediction (formula based on Dupont Handbook)

Site factor (k)	<u>160</u>	Ground Constant based on Site/Rock Conditions
Distance ft. (d)	525 FEET	Distance to single family home
Lbs. per Delay (w)	8.6 LBS	LBS Explosives per 8-millisecond delay
Scaled Distance (SD)	76.724	(SD = d / square root of w)
Estimated PPV	0.154	ppv = k * SD ^ - 1.6)

TECHNICAL DATA SHEET



DYNAMAX™ PRO

Extra Gelatin Nitroglycerin Dynamite

Properties

SDS
#1019

Density (g/cc) Avg	1.45
Energy^a cal/g (cal/cc)	1,055 (1,510)
Relative Weight Strength^b	1.20
Relative Bulk Strength^b	2.10
Velocity^c m/sec (ft/sec)	5,275 (17,300)
Detonation Pressure^c (Kbars)	101
Gas Volume^a (moles/kg)	32
Water Resistance	Excellent
Fume Class	IME1

^a All Dyno Nobel Inc. energy and gas volume values are calculated using PRODET™ the computer code developed by Dyno Nobel Inc. for its exclusive use. Other computer codes may give different values.

^b ANFO = 1.00 @ 0.82 g/cc

^c Unconfined @ 50 mm (2 in) diameter.

^d IME Fume Class 1 in convolute paper shell only. Not Fume Class 1 in paper tube shell. Natural Resources Canada Fume Class approvals pending.

Hazardous Shipping Description

Explosive, Blasting, Type A 1.1D UN 0081 II



PRODUCT DESCRIPTION

DYNAMAX PRO is desensitized extra gelatin dynamite designed to satisfy the majority of explosive application requirements. DYNAMAX PRO is formulated to consistently deliver high detonation velocity and excellent water resistance while reducing cartridge to cartridge gap sensitivity and hole-to-hole propagation problems. DYNAMAX PRO is recommended for bottom loading and as the main explosive charge where high density and energy is required. DYNAMAX PRO is recommended for use as booster, bottom load or floor control solution.

APPLICATION RECOMMENDATIONS

- DYNAMAX PRO is an excellent primer for Dynamix (ANFO), Dynamix WR (WR ANFO) or other detonator sensitive packaged product and can be used as a secondary primer in hard seams or at the top of the explosive column.
- Minimum diameter is 32 mm (1¼ in).
- Minimum detonator is No. 8 strength.
- DYNAMAX PRO has been formulated to reduce susceptibility to sympathetic detonation when applied in very wet conditions where boreholes are closely spaced and/or where geological conditions promote this effect. Consult your Dyno Nobel representative for product recommendations where these conditions exist.
- Storage at elevated temperatures and/or high humidity for 12-18 months can reduce the performance of DYNAMAX PRO depending on the diameter. Consult your Dyno Nobel representative for specific recommendations.



Product Disclaimer: Please see reverse side.

DYNO[®]
Dyno Nobel

TECHNICAL DATA SHEET



DYNOMAX™ PRO

Extra Gelatin Nitroglycerin Dynamite

Packaging

Diameter x Length		Qty / Case	Case Type	Net Explosive Weight**	
mm	in			kg	lbs
32 x 200	1 1/4 x 8	88	DA	20	44
32 x 400	1 1/4 x 16	44	DA	20	44
40 x 200	1 1/2 x 8	60	DA	20	44
40 x 400	1 1/2 x 16	30	DB	20	45
50 x 200	2 x 8	34	DB	20	43
50 x 400 ^a	2 x 16 ^a	18	DB	22	48
65 x 400 ^a	2 1/2 x 16 ^a	10	DB	19	41
75 x 200	3 x 8 ^a	16	DE	20	44

^a Available in spiral tube shell with tapered end.

• Note: All weights are approximate.

*Available upon request. Check with your Dyno Nobel representative should you have any questions.

**Add two pounds for Gross Case Weight

• Product density is 1.40 g/cc for package diameters less than 50mm (2 in). Use cartridge count to determine actual explosive charge weight.

• DYNOMAX PRO is available in a wide variety of sizes. Custom sizes are subject to surcharge and may require longer than usual lead times.

Case Dimensions

DA	17 ³ / ₈ x 13 ³ / ₈ x 6 ³ / ₈ in	34 x 34 x 17 cm
DB	17 ⁷ / ₈ x 13 ³ / ₈ x 5 ⁷ / ₈ in	45 x 34 x 15 cm
DE	17 ⁷ / ₈ x 13 ⁵ / ₁₆ x 6 ³ / ₄ in	45 x 34 x 17 cm

TRANSPORTATION, STORAGE AND HANDLING

- For maximum shelf-life, DYNOMAX PRO dynamite must be stored in cool, dry and well-ventilated magazines. Explosive inventory should always be rotated by using the oldest materials first. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.
- DYNOMAX PRO must be transported, stored, handled and used in conformity with all applicable federal, state, provincial and local laws and regulations.

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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NONEL® EZ DET 1.1B

Nonelectric Blast Initiation System

Properties

SDS
#1122

Net Explosive Content per 100 units 0.1125 kg
0.2480 lbs

Nominal Time msec	Nominal Time msec	Nominal Time msec	Connector Block Color
17 / 350*	17 / 500*	17 / 700*	Yellow
25 / 350*	25 / 500	25 / 700	Red
42 / 350*	42 / 500*	42 / 700	White
25 / 375*			Red

*Non-standard timing combinations are made to order by special request. Please contact your Dyno Nobel representative for details.

Hazardous Shipping Description

- Detonator assemblies nonelectric, 1.1B, UN 0360 PG II



PRODUCT DESCRIPTION

NONEL® nonelectric delay detonator EZ DET® units consist of a length of orange shock tube with a surface detonator attached to one end and an in-hole, High Strength, detonator on the other. The surface detonator is inside a color-coded plastic EZ™ Connector block to facilitate easy connections to up to 6 shock tube leads. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

NONEL EZ DET units can be easily connected to one another to satisfy basic blast design requirements in construction, mining, and quarry operations. They can also be used in combination with NONEL MS, NONEL EZTL™ and/or NONEL TD detonators to satisfy complex blast design requirements and minimize inventory of initiation system components.



APPLICATION RECOMMENDATIONS

- For detailed application recommendations, ALWAYS request a copy of Dyno Nobel's Product Manual: NONEL® and PRIMACORD® from your Dyno Nobel representative.
- ALWAYS select a NONEL EZ DET unit having more than enough tubing length to extend from the planned primer location in the borehole to the collar of the next hole.
- ALWAYS protect the plastic EZ Connector block and all shock tube leads from impact or damage during the loading and stemming operations. Use care when placing blasting mats and cover material on top of the blasting circuit. The EZ Connector block contains a detonator and is subject to detonation caused by abuse such as impact. Shock tube which has been cut, ruptured or damaged may cause misfires.
- ALWAYS be sure that the shock tube(s) are securely inserted, one at a time, into the EZ Connector block. The head of the EZ Connector block should rise to accept the shock tube and return to a closed position with an audible click.

Product Disclaimer: Please see reverse side.



NONEL® EZ DET 1.1B

Nonelectric Blast Initiation System

Properties Cont.

Packaging

Length		Case Type	Quantity/ Case
meters	feet		
3.5	12	D*	100
4.5	16	D*	90
7	24	D*	70
9	30	DC	120
12	40	DC	120
15	50	DC	90
18	60	DC	90
24	80	DC	40
30	100	DC	40
37	120	DC	30

- Length rounded to nearest one-half meter.
- Case weight varies by length & delay; see case label for exact weight.
- * Always shipped with 2 cases strapped together. Case dimension width doubles.

Case Dimensions

Detpak Case (DC)	48 x 45 x 26 cm	18 ¾ x 17 ¾ x 10 ¾ in
Detpak (D)	44 x 22 x 25 cm	17 ½ x 8 ¾ x 10 in

APPLICATION RECOMMENDATIONS - continued

- **ALWAYS** ensure that individual shock tubes remain aligned side by side in the connector channel and do not cross one over the another on insertion.
- **NEVER** use NONEL EZ DET units with detonating cord. The low strength surface detonator will not initiate detonating cord and may cause misfires.
- **NEVER** attempt to disassemble the delay detonator from the plastic EZ Connector block or use the detonator without the connector.
- **NEVER** place more than 6 shock tube leads into the plastic EZ Connector block. Misfires may result.
- **NEVER** pull, stretch, kink or put tension on shock tube such that the tube could break.
- **NEVER** splice NONEL EZ DET shock tube together to extend between holes.
- **NEVER** connect NONEL EZ DET units together until all holes have been primed, loaded and stemmed and the blast site has been cleared.

TRANSPORTATION, STORAGE AND HANDLING

- NONEL EZ Det must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL EZ Det must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

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