

Dyno Nobel Americas

CAPABILITIES GUIDE



DYNO[®]
Dyno Nobel

Groundbreaking Performance[®] Through Practical Innovation



FAST FACTS

#1 supplier of industrial explosives in North America

180+ years of practical innovations

LARGEST number of ammonium nitrate plants

#2 supplier of industrial explosives in Australia

3,000+ employees worldwide

ONLY full-line explosives manufacturer

SERVICES EXPLOSIVES SOLUTIONS

Dyno Nobel is a global leader in commercial explosives, aimed at solving the industry's toughest challenges.


Incitec Pivot Limited



Global Headquarters: **Melbourne, Australia**

Dyno Nobel Americas Headquarters: **Salt Lake City, Utah, USA**

Dyno Nobel Asia Pacific Headquarters: **Brisbane, Australia**



INDUSTRIES WE SERVE:

Metal & Mineral Mining

Coal Mining

Quarry & Stone Mining

Construction & Pipeline

Oil & Gas Exploration

Agriculture & Industrial Chemicals

WHO WE ARE

OUR VALUES ► Our Company Value, *Zero Harm for Everyone Everywhere*, reflects our commitment to the highest standards of safety, ensuring the well-being of our people, both at work and at home.

COMPLETE BLASTING EXPERTISE

RESEARCH & DEVELOPMENT

ENGINEERING

MANUFACTURING

DISTRIBUTION

BLASTING SERVICES

CUSTOMER VALUE CHAIN OPTIMIZATION

CUSTOMER SUPPORT

*Groundbreaking Performance®
Through Practical Innovation*

LEGACY: INNOVATION

180+ YEARS OF PRACTICAL INNOVATION ►

Our groundbreaking technological developments have shaped the modern explosives industry more than any other effort in history.



Alfred Nobel



William Bickford

Our legacy of safety innovation began in 1865 with Swedish inventor, Alfred Nobel, whose invention of dynamite and blasting caps, saved the lives of countless miners, as did William Bickford's invention of the safety fuse in 1831. Previously, miners were exposed to the dangers of black powder and nitroglycerin. We are proud of this legacy and strive every day to continue the tradition of safety innovation.



INNOVATION LINEAGE

| | | |
|--|------|---|
| Safety Fuse | 1831 | |
| | 1865 | Blasting Cap |
| Dynamite | 1867 | |
| | 1936 | Detonating Cord |
| Water-Based Slurry Explosives | 1956 | |
| | 1960 | Site Mixed Pump Trucks for Slurry Explosives |
| NONEL® Detonator | 1973 | |
| | 1980 | Bulk and Packaged Emulsion |
| DYNOMINER® | 2001 | |
| | 2003 | TITAN® Bulk Emulsion Explosives |
| DYNOBULK® End-of-Hose Gassing | 2005 | |
| | 2006 | Modular Emulsion Plants |
| Electronic Initiation Systems | 2007 | |
| | 2008 | DYNOBULK XL Jumbo Trucks |
| TITAN DIFFERENTIAL ENERGY™ | 2012 | |
| | 2016 | BlastWeb™ Underground Networking System |
| DigiShot Plus 4G® Electronic Initiation System | 2018 | |
| | 2019 | EZshot® Shock Tube Initiated Electronic Detonator |

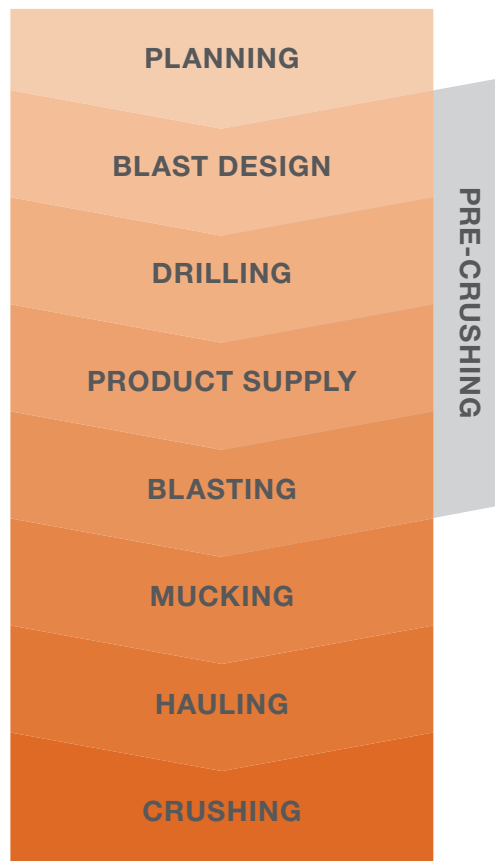


DYNO[®]
Dyno Nobel

REAL RESULTS

FULL CUSTOMER VALUE CHAIN EXPERTISE ►

COMMITTED PARTNERSHIP: To ensure our customers are well-equipped to compete in today's market, we are their reliable and collaborative partner, committed to optimizing their production efficiency, reducing their operating costs and improving their final product quality.



DynoConsult® ► At DynoConsult, we are undeterred in advancing our clients' success, we will always be the most highly respected and sought-

after blast consulting partner as a result of our unsurpassed technical and engineering expertise, the trust-based and collaborative relationships we build, and the innovative tools and solutions we deliver to ensure the operations we advise perform as safely, efficiently and productively as possible.

PRE-CRUSHING OPTIMIZATION ► Optimizing the blasting results has proven to show significant downstream improvements on moving and crushing, reducing overall costs and increasing production output.

- Improve fragmentation
- Reduce fines and oversize
- Manage vibration
- Reduce scaling
- Improve wall stability
- Abate post blast fumes
- Improve diggability
- Reduce fuel consumption
- Improve cycle time
- Optimize crusher throughput

RIGHT TIMING

INITIATION SYSTEMS ► We operate 5 initiation system manufacturing facilities in North America.

EZshot[®]
driven by **NONEL**

SHOCK TUBE INITIATED

ELECTRONIC DETONATOR: Our newest addition to Dyno Nobel's initiation portfolio. EZshot[®] offers users the benefits of accurate electronic timing with the ease of use of NONEL[®].



NONEL[®]

NONELECTRIC INITIATION: Our NONEL[®] detonator is the original patented nonelectric detonator.



ELECTRIC^{super}

ELECTRIC INITIATION: Our ELECTRIC SUPER[™] electric detonator is proven by generations of blasters and is the original electric "blasting cap."



Primacord[®]

DETONATING CORD:

Our PRIMACORD[®] is the world's most well-known and reliable detonating cord brand.



CAST BOOSTERS: Our TROJAN[®] cast boosters provide reliable initiation of non-detonator-sensitive blasting agents. We are the only North American producer of PETN used in cast boosters, detonators and detonating cord.



ELECTRONIC INITIATION ► Electronic delay timing is much more precise and accurate than pyrotechnic delay timing. Electronic delay timing can dramatically improve blasting results from fragmentation and vibration to wall stability and overall blasting safety.



digishot^φ

Small blasts, surface and underground



digishot^φ plus

Large blasts, surface and underground

digishot^φ plus.4G

Three robust wire choices – Standard, Deep Hole (surface coal applications) and Premium XTM (extreme loading conditions)

Standard Wire (Coil)



Deep Hole Wire (Spool)

Premium Wire (Coil)



driftshot^φ

Underground development and tunneling



geoshot^φ

Geophysical exploration

digishot^φ plus.4G

CE4 COMMANDER

BLASTING SYSTEM: The main component of this electronic initiation system is a multi-purpose device that is used as a Bench Commander, Repeater and Base Commander – it controls the entire blast and is wirelessly controlled by the CE4 Tagger or tablet.



blastweb^φ

BLASTWEB™ UNDERGROUND

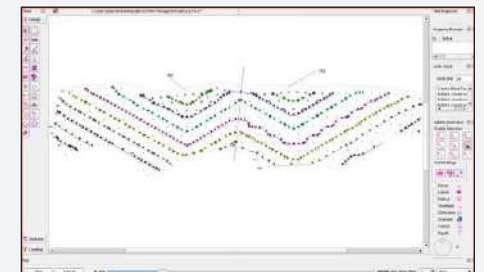
NETWORKING SYSTEM: The most sophisticated underground mining centralized electronic networking system available. Designed to save time in production and development blasting.



viewshot^φ

VIEWSHOT™ BLAST

DESIGN SOFTWARE: The industry's premier standalone blast design software packages, containing full design and diagnostic tools.



RIGHT ENERGY

PACKAGED PRODUCTS ►

Bagged ANFO: Our bagged ANFO is a prilled ammonium nitrate and fuel oil explosive, with a wide variety of applications in dry hole blasting conditions.



Dynamite: We are the ONLY manufacturer in North America. Nitroglycerine-based explosives perform reliably in extreme conditions.



Packaged Emulsion Explosives:

We manufacture a wide variety of packaged emulsion explosives. All products are detonator or booster sensitive with excellent water resistance.



A complete line of
packaged products for:

Surface
Blasting

Underground
Blasting

Geophysical
Exploration

BULK PRODUCTS ►

Ammonium Nitrate (AN): AN is the primary ingredient in many explosives and fertilizers. We manufacture a quality of ammonium nitrate prill that, in addition to having high performance characteristics, also utilizes an internal additive and external coating that are compatible with all emulsions explosives.

- We own 33% of North America's installed AN capacity.
- We manufacture more than 1 million tons annually.



BULK EXPLOSIVES ► We are the industry leading in bulk emulsion technology.

Ammonium Nitrate/Fuel Oil (ANFO)



TITAN® Bulk Emulsions



TITAN is the most efficient way to break large masses of rock. Our proprietary formulations are tailored to specific geologic conditions and customer needs.

TITAN 1000: Premium bulk emulsion designed for surface blasting applications.

TITAN 5000: Designed for pyritic ground.

TITAN SME: Designed for remote geography and distance constraints.

TITAN RU: Designed for underground applications.

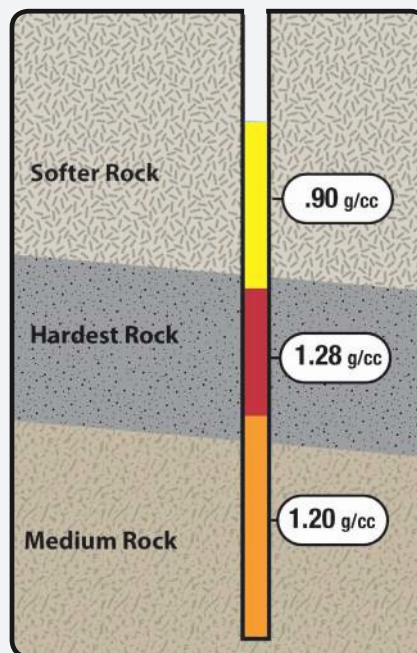
TITAN Augerable Blends



TITAN Pumpable Blends

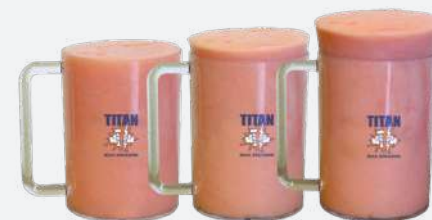


DIFFERENTIAL ENERGY™ (ΔE) ► Our newest innovative technology accurately controls the placement of explosive energy in the borehole to improve safety, solve environmental concerns and maximize productivity.



DYNOBULK® ΔE TRUCK:

Proprietary technology that allows for accurate placement of explosive energy



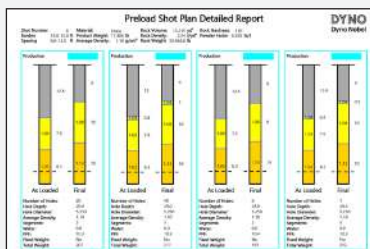
TITAN ΔE BULK EMULSION:

Specifically designed emulsion explosive that can have variable energy densities



DeltaE² ► An easy to use system that utilizes data from drills or other sources that characterize rock properties to allow targeted placement of

energy in the blast hole. ΔE^2 allows mine blasting load plans to be sent directly to the loading equipment to help ensure boreholes are loaded as designed.



ΔE^2 improves operator efficiency by simplifying the loading process.

ΔE^2 gives control of the loading process back to the engineer or blaster through easy to use software that sends loading instructions directly to the loading equipment.

RIGHT TECHNOLOGY

Surface Delivery Equipment ►



- **DYNOBULK® JUMBO:** TITAN® bulk emulsions, for a variety of applications – DIFFERENTIAL ENERGY™ and inhibited (hot reactive ground) capable
- **DYNOBULK SME:** Patented technology to make and mix TITAN SME emulsion on-site for quarry, coal and metal mines – DIFFERENTIAL ENERGY capable
- **DYNOBULK QUARRY:** Proprietary technology to mix TITAN emulsion on-site for quarry mines – DIFFERENTIAL ENERGY Capable and inhibited (hot reactive ground) capable



DYNOBULK JUMBO



DYNOBULK SME



DYNOBULK QUARRY



Underground Delivery Equipment ►

DYNOMINER®

- **DYNOMINER® PROFILE:** Stoping unit with specialized, high accuracy uphole/downhole loading technology – advanced feed head and hose retraction with extendable boom for safe operation
- **DYNOMINER ADVANCE:** Development unit for smaller holes – gassing and string loading capability allowing decoupled loading in perimeter holes or possibility of changing energy across pattern
- **DYNOMINER APS:** Stand alone, air operated units designed for mine development applications
- **DYNOMINER SHAFT:** Stand alone, air operated units designed for shaft sinking applications – manifold with four ports that can be operated simultaneously for fast cycle times



DYNOMINER PROFILE – Modular



DYNOMINER PROFILE – Cassette



DYNOMINER ADVANCE



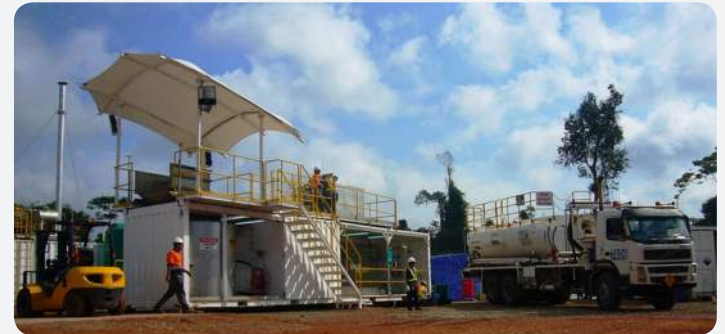
DYNOMINER APS



DYNOMINER SHAFT



MODULAR EMULSION PLANTS: Our unique containerized design reduces cost and allows for easier relocation. These are built in a controlled environment for fast deployment to remote sites and are compatible with a wide variety of AN sources.



Tropical Site



Arctic Site

MODULAR NONEL® ASSEMBLY EQUIPMENT: Our specialized, modular production and assembly equipment for NONEL shock tube detonators allows for on-site NONEL assembly.

REAL RESULTS

DEMONSTRATING DECADES OF SUCCESS ►

We strive to improve our customers' profitability through optimizing blasting outcomes.

- Fragmentation analysis and control
- Cast blasting optimization
- Vibration analysis and control
- Ore dilution control
- Final wall and over-break control
- Blasting education
- Safety training

VALUE IMPROVEMENT PROCESS

VIP PROGRAM ►

Value Improvement Process (VIP) is a collaborative

partnership designed to improve operating efficiency and reduce operating costs across your entire value chain—and equally important—measure that value. VIP is tailored to your needs, focusing on areas where the greatest value can be gained.







DynoNobel.com

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