Differential Energy

DYNO
Dyno Nobel
Groundbreaking Performance™
What is DIFFERENTIAL ENERGY?

A proprietary method for controlling the explosive energy profile in a blasthole.

**Energy Distribution Comparison**

<table>
<thead>
<tr>
<th>Bulk Explosives</th>
<th>ANFO</th>
<th>Heavy ANFO</th>
<th>Conventionally Gassed Emulsion Blend</th>
<th>Differentially Gassed Emulsion Explosive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effcient Rock Breakage in Dry Conditions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Highly Water Resistant</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduced NOx Fumes in Wet Conditions</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Highly Efficient Use of Energy</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Variable Energy Profile in a Single Pass</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Precise Control of Energy Distribution</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Broadest Density Range in the Blasthole</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Automated Computer-Controlled Gassing</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Highest Resistance to Groundwater Contamination</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Bulk Explosives Comparison Matrix**

- ANFO
- Heavy ANFO
- Conventionally Gassed Emulsion Blend
- Differentially Gassed Emulsion Explosive

**Differential Energy**

- TITAN 1000\AE Gassed Emulsion Explosive
- Differential Energy MPU with \AE Technology and Automated Controls
DIFFERENTIAL ENERGY breaks new ground in...

Metal Mining & Coal Mining

How does DIFFERENTIAL ENERGY improve safety, productivity, and the environment?

<table>
<thead>
<tr>
<th>SAFETY</th>
<th>PRODUCTIVITY</th>
<th>ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Product is not sensitised until it is delivered to the blasthole</td>
<td>• Single product for both wet and dry conditions</td>
<td>• Minimises post-blast NOx generation with high performance water resistant emulsion</td>
</tr>
<tr>
<td>• Reduces potential for flyrock by placing low density gassed emulsion near the collar and/or areas of low burden</td>
<td>• Reduces explosives inventory costs and simplifies budgeting</td>
<td>• Reduces groundwater contamination because thickened emulsion detonates completely</td>
</tr>
<tr>
<td>• Improves highwall stability, a result of accurate control of energy at the crest</td>
<td>• Blast pattern expansion possible, as a result of higher detonation pressure capabilities in the hole</td>
<td>• Performance isn’t compromised by wet conditions or long sleep times compared to ANFO and HANFO</td>
</tr>
<tr>
<td>• Thickened emulsion resists flowing into cracks and voids</td>
<td>• Optimises quantity of product and minimises overuse of explosives to achieve desired breakage</td>
<td>• Optimises blast fragmentation for increased productivity, reducing downstream processing costs</td>
</tr>
<tr>
<td>• Emulsion densities can be tailored to the hardness of the rock</td>
<td>• Precise energy placement for the application, rock hardness, and blast profile</td>
<td>• Improves blasthole loading accuracy and maximises blast energy efficiency</td>
</tr>
</tbody>
</table>

OPERATION COSTS BY 5% - 30%

SAFETY + PRODUCTIVITY + ENVIRONMENT =
DIFFERENTIAL ENERGY Success Stories

To see more customer success stories, visit dynonobel.com/apac

COAL MINE
CUSTOMER #1

- 10.8% Reduction POWDER FACTOR
- Improved FRAGMENTATION
- Eliminated NOx FUMES
- No Change CRUSHER THROUGHPUT

METAL MINE
CUSTOMER #2 – Gold

- 18% Reduction POWDER FACTOR
- 8% Increase SHOVEL PRODUCTIVITY
- Eliminated NOx FUMES
- No Change CRUSHER THROUGHPUT

METAL MINE
CUSTOMER #3 – Iron Ore

- 10% Reduction EXPLOSIVE LBS/HOLE
- Improved FRAGMENTATION
- Eliminated NOx FUMES
- 1.6% Increase EXPLOSIVE DENSITY AT TOE

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