ABOUT BME

BME is a member of the Omnia Group, a JSE-listed diversified provider of specialised chemical products and services used in the mining, agriculture, and chemicals sectors. With over 30 years of experience, BME supplies explosives and related technical services to over 20 African countries, with additional operations in Indonesia, Australia, and South America. Our supply chain capacity consists of an extensive logistical network ensuring our customers with security and consistency of supply.

BME offers:
- A full range of bulk emulsions for surface and underground
- Packed explosives
- Initiating systems
- Electronic blasting systems
- Blasting related service equipment, such as mobile emulsion plants
- Technical services

BME pride themselves in providing world-class technical services to ensure every blast brings value to the customers.
BME
HAS A FOOTPRINT IN

Africa
• South Africa
• Lesotho
• Swaziland
• Botswana
• Zimbabwe
• Namibia
• Zambia
• Mozambique
• Malawi
• Tanzania
• DRC
• Rwanda
• Ghana
• Burkina Faso
• Sierra Leone
• Guinea
• Senegal
• Mauritania
• Mali

Outside of Africa
• Singapore
• Indonesia
• Australia
• USA
• Canada
• Colombia
• Peru
• Chile

FOR EXPLOSIVES, THINK BME.
CONTENTS

PAGE

05 SERVICES
- Down The Hole (DTH)
- Prime, Load, Tie, And Shoot (PLTS)
- Rock On Ground (ROG) Service
- Mine To Mill Optimisation

08 PRODUCTS
- Bulk Emulsions
- Packaged Explosives
- Initiating Systems
- Blasting Accessories
- Software & Information Technology
- Electronic Detonators

43 EQUIPMENT (SURFACE)
- Mobile Manufacturing Unit E Series
- Mobile Manufacturing Unit HA Series
- Stemming Truck
- Bulk Technical Support Vehicle
- Modularised Emulsion Plants
- Cruiser Charging Unit CCU

50 EQUIPMENT (UNDERGROUND)
- Vertical Pipeline
- Megacharger
- Emulsion Charging Unit LP 1500
- Emulsion Charging Unit HP 2000
- Emulsion Charging Unit HP 3000
- Development Charging Unit Rail Bound
- Maxicharger T3000
- Filling Station
- Maxicharger
- Minicharger
- Centralized Blasting System (CBS)
- Xplolog™ Pump Controller
Blasting Services to Deliver Improved Mining Experience

BME delivers a wide range of service packages that deliver real quantifiable value through optimal blasts by leveraging BME’s knowledge base and best in class technology, products, and equipment. Additional customised services are available to meet unique customer requirements. Visit www.bmeexplosives.com for more information.

Down the Hole (DTH)

BME’s DTH service delivers INNOVEX®️, our high-quality, reliable bulk emulsion explosives, to blast holes, using our mobile manufacturing units (MMU). We ensure fit-for-purpose products are pumped to achieve improved and consistent fragmentation.

Clients can also make use of BME’s extensive range of initiating systems and our market-leading AXXIS™️ electronic detonation system. Blast quality can be further enhanced by using BME’s BLASTMAP™️ III software.

Prime, Load, Tie, and Shoot (PLTS)

BME’s PLTS service is designed for customers who require BME’s team to perform a full blasting service. This service ensures that skilled resources are available to the customer to achieve the best blasting results.

This service option is ideal for companies whose core business is not blast planning and execution. BME takes on the responsibility for the full operation, safety, and management of the blast service.
In this comprehensive service to the client, BME takes full responsibility from blast design to analysing fragmented rock (excluding drilling), allowing the client to outsource this function with value being measured on fragmentation quality and volume of broken rock. We provide the materials, equipment, and skilled staff required to deliver cost-effective and quality blasting, allowing the client to focus on their core business.

MINE TO MILL OPTIMISATION

BME’s exclusive M2M service offering delivers the full range of benefits across the mining value chain. Blast designs can be optimised to achieve required fragmentation, blast movement, and muckpile shape, delivering improved loading, crushing, and milling rates. M2M will reduce overall mining costs by ensuring that downstream productivity is increased. The customer can be assured that the professionals who design the blasts and those who apply the designs in the field will be competent and fully conversant with the project requirements. Benefits include closer management of downstream costs and overall systems optimisation, offering a cradle-to-grave view of the entire mining process in consultation with mine and plant personnel.
BULK EMULSIONS

INNOVEX™ 100
High energy bulk emulsion explosive

PRODUCT DESCRIPTION
INNOVEX™ 100 base emulsion is a class 5.1 oxidizing agent with UN classification number 3375. When sensitised with the gassing agent, INNOVEX™ 100 becomes a booster-sensitive emulsion designed for opencast mines. INNOVEX™ 100 is a low viscosity black emulsion specially formulated using recycled oil / alternative fuel. It is sensitised to a cup density of 0.9 – 1.2 g/cm³ by using a suitable sensitising agent.

<table>
<thead>
<tr>
<th>Product</th>
<th>Water resistance</th>
<th>Nominal bulk density (g/cm³)</th>
<th>Relative weight strength</th>
<th>Relative bulk strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNOVEX™100</td>
<td>Excellent</td>
<td>1.46 – 1.50</td>
<td>84</td>
<td>126</td>
</tr>
</tbody>
</table>

Calculated at a density of 1.2 g/cm³ and a pressure of 100 MPa. Relative to ANFO at a density of 0.8 g/cm³.

PRODUCT FEATURES

APPLICATION
INNOVEX™ 100 is designed for blasting in opencast mines

FEATURES
- Minimum initiation – 150 g booster-sensitive when sensitised for holes having a diameter of 127 mm and less. Holes with a diameter larger than 127 mm and a depth greater than 6 m require a 400 g booster
- VOD – 3500 – 5500 m/s, dependent on hole and rock characteristics
- Critical diameter – 64 mm
- Sensitisation – The emulsion can be sensitised to densities between 0.95 – 1.25 g/cm³
- Excellent water resistance

RECOMMENDATIONS
- Shelf life – 3-6 months when stored under recommended storage conditions
- Sleep life – 21 days in the hole
- First Aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations

PACKAGING
- INNOVEX™100 is transported and stored as bulk product class 5.1, UN number 3375, oxidizing material

PRODUCT RISK PROFILE
- Classified as hazardous substance, Class 5.1: oxidizing substances
- Non-detonalbe in the non-sensitised, unconfined bulk form
- Will not readily burn on its own, but if subjected to extreme external heat for a period of time, water may be driven off resulting in an explosion risk
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

UN CLASSIFICATION (TRANSPORT)
- Base Emulsion: Class 5.1, UN No. 3375, OXIDIZING MATERIAL
- Sensitising Agent: Class 5.1, UN No. 3099, OXIDIZING LIQUID, TOXIC, N.O.S.
INNOVEX™ 100C
High energy bulk emulsion explosive

PRODUCT FEATURES

APPLICATION
INNOVEX™ 100 is designed for blasting in opencast mines.

FEATURES
- Minimum initiation – 150 g booster-sensitive when sensitised for holes having a diameter of 127 mm and less. Holes with diameter larger than 127 mm and depth greater than 6 m require a 400 g booster.
- VOD – 3500 – 5500 m/s, dependent on hole and rock characteristics.
- Critical diameter – 64 mm.
- Sensitisation – The emulsion can be sensitised to densities between 0.95 – 1.25 g/cm³ using the recommended sensitising agent.
- Excellent water resistance.

RECOMMENDATIONS
- Shelf life – 3-6 months when stored under recommended storage conditions.
- Sleep life – 21 days in the hole.
- First aid – refer to Safety Data Sheet for first aid information.
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly.
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations.

PACKAGING
- INNOVEX™ 100 is transported and stored as bulk product class 5.1, UN No. 3375, oxidizing material.

PRODUCT RISK PROFILE
- Classified as hazardous substance, Class 5.1 oxidizing substances.
- Non-detonable in the non-sensitised, unconfined bulk form.
- Will not readily burn on its own, but if subjected to extreme external heat for a period of time, water may be driven off resulting in an explosion risk.
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE.

UN CLASSIFICATION (TRANSPORT)
- Base Emulsion: Class 5.1, UN No. 3375, OXIDIZING MATERIAL.
- Sensitising Agent: Class 5.1, UN No. 3099, OXIDIZING LIQUID, TOXIC, N.O.S.
INNOVEX™ RG
Water in oil emulsion

PRODUCT DESCRIPTION
INNOVEX™ RG is a specially formulated product for reactive ground conditions. INNOVEX™ RG contains certain additives to inhibit exothermic reactions in ground containing sulphides or other reactive materials. INNOVEX™ RG base emulsion is a class 5.1 oxidizing agent with UN Classification number 3375. When sensitised with the gassing agent, INNOVEX™ RG becomes a booster sensitive emulsion designed for opencast mines. It is sensitised to a cup density of 0.9 – 1.2 g/cm³ by using a suitable sensitising agent.

<table>
<thead>
<tr>
<th>Product</th>
<th>Water resistance</th>
<th>Nominal bulk density (g/cm³)</th>
<th>Relative weight strength</th>
<th>Relative bulk strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNOVEX™ RG</td>
<td>Excellent</td>
<td>1.20</td>
<td>78</td>
<td>116</td>
</tr>
</tbody>
</table>

Calculated at a density of 1.2 g/cm³ and a pressure of 100 MPa. Relative to ANFO at a density of 0.8 g/cm³.

APPLICATION
INNOVEX™ RG is designed for blasting in reactive ground opencast mines

FEATURES
• Minimum initiation – 150 g booster-sensitive when sensitised for holes having a diameter of 127 mm and less. Holes with diameter larger than 127 mm and depth greater than 6 m require a 400 g booster
• VOD – 3500 – 5500 m/s, dependent on hole and rock characteristics
• Critical diameter – 64 mm
• Sensitisation – The emulsion can be sensitised to densities between 0.95 – 1.25 g/cm³ using the recommended sensitising agent
• Excellent water resistance

RECOMMENDATIONS
• Shelf life – 3-6 months when stored under recommended storage conditions
• First aid – refer to Safety Data Sheet for first aid information
• Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
• Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations

PACKAGING
• INNOVEX™ RG is transported and stored as bulk product class 5.1, UN No. 3375, oxidizing material

PRODUCT RISK PROFILE
• Classified as hazardous substance, Class 5.1 oxidizing substances
• Non-detonable in the non-sensitised, unconfined bulk form
• Will not readily burn on its own, but if subjected to extreme external heat for a period of time, water may be driven off resulting in an explosion risk
• DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

UN CLASSIFICATION (TRANSPORT)
• Base Emulsion: Class 5.1, UN No. 3375, OXIDIZING MATERIAL
• Sensitising Agent: Class 5.1, UN No. 3099, OXIDIZING LIQUID, TOXIC, N.O.S

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INNOVEX™ 204 and INNOVEX™ 205 are high-energy blended emulsions containing 40% and 50% emulsion blended with ammonium nitrate prill. These products are formulated for surface mining and quarrying in dry hole application. They perform best in holes larger than 152 mm in diameter. INNOVEX™ 204 and INNOVEX™ 205 are transported and stored as bulk product. They are blended and sensitised in our explosives trucks on-site during application. BME is able to formulate any ratio of emulsion to prill to provide the energy and VOD to match your rock and blasting requirement. For more information, consult a BME Product Manager.

INNOVEX™ 204 and 205 is suitable for use in surface mining and quarrying

**FEATURES**

- Viscosity – 25 000-35 000 cP
- Density when sensitised – 1.15 g/cm³ dependent on hole depth
- VOD – 3000-4800 m/s dependent on hole and rock characteristics
- Critical diameter – 120 mm
- Minimum initiation – 400 g booster

**RECOMMENDATIONS**

- Sleep life – 21 days in the hole
- First Aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations

**PACKAGING**

- Bulk distribution

**PRODUCT RISK PROFILE**

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Detonation can occur from extreme friction or excessive heating after sensitisation or under confinement
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

**APPLICATION**

INNOVEX™ 204 and 205 is suitable for use in surface mining and quarrying

**PRODUCT DESCRIPTION**

INNOVEX™ 204 and INNOVEX™ 205 are high-energy blended emulsions containing 40% and 50% emulsion blended with ammonium nitrate prill. These products are formulated for surface mining and quarrying in dry hole application. They perform best in holes larger than 152 mm in diameter. INNOVEX™ 204 and INNOVEX™ 205 are transported and stored as bulk product. They are blended and sensitised in our explosives trucks on-site during application. BME is able to formulate any ratio of emulsion to prill to provide the energy and VOD to match your rock and blasting requirement. For more information, consult a BME Product Manager.

**PRODUCT RISK PROFILE**

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Detonation can occur from extreme friction or excessive heating after sensitisation or under confinement
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

**UN CLASSIFICATION (TRANSPORT)**

- Class 1.1 D, UN No. 0241, EXPLOSIVE, BLASTING, TYPE E
INNOVEX™ 206 and INNOVEX™ 207 are high-energy blended emulsions containing 60% and 70% emulsion blended with ammonium nitrate prill. These products are formulated for surface mining and quarrying in both wet and dry hole application. They perform best in holes larger than 127 mm in diameter. INNOVEX™ 206 and INNOVEX™ 207 are transported and stored as bulk product. They are blended and sensitised in our explosives trucks on-site during application. BME is able to formulate any ratio of emulsion to prill to provide the energy and VOD to match your rock and blasting requirement. For more information, consult a BME Product Manager.

**APPLICATION**
INNOVEX™ 206 and INNOVEX™ 207 are suitable for use in surface mining and quarrying.

**FEATURES**
- Viscosity – 25 000-35 000 cP
- Density when sensitised – 1.15 g/cm³ dependent on hole depth
- VOD – 3500-5000 m/s dependent on hole and rock characteristics
- Critical diameter – 120 mm
- Minimum initiation – 400 g booster

**RECOMMENDATIONS**
- Ground temperature – recommended for use in temperatures up to 60 °C
- Sleep time – 21 days in hole
- First Aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations

**PACKAGING**
- Bulk distribution

**PRODUCT RISK PROFILE**
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- INNOVEX™ 206 and INNOVEX™ 207 is non-detonable in non-sensitised, unconfined bulk form
- Detonation can occur from extreme friction or excessive heating after sensitisation or under confinement
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

**UN CLASSIFICATION (TRANSPORT)**
- Class 1.1 D, UN No. 0241, EXPLOSIVE, BLASTING, TYPE E

**PRODUCT DESCRIPTION**

<table>
<thead>
<tr>
<th>Product</th>
<th>Relative weight strength</th>
<th>Relative bulk strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNOVEX™ 206</td>
<td>93</td>
<td>140</td>
</tr>
<tr>
<td>INNOVEX™ 207</td>
<td>90</td>
<td>134</td>
</tr>
</tbody>
</table>

Calculated at a density of 1.2 g/cm³ and a pressure of 100 MPa. Relative to ANFO at a density of 0.8 g/cm³.
INNOVEX™ UG
Water in oil emulsion

INNOVEX™ UG is a class 5.1 oxidizing agent with UN classification number 3375. The gassed emulsion INNOVEX™ UG is a booster-sensitive bulk emulsion product designed for use in underground application. The emulsion is transported and stored in bulk.

INNOVEX™ uphole is a specifically developed product for use in underground uphole application.

<table>
<thead>
<tr>
<th>Product</th>
<th>Water resistance</th>
<th>Nominal bulk density</th>
<th>Relative weight strength</th>
<th>Relative bulk strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNOVEX™ LATERAL</td>
<td>Excellent</td>
<td>1.47 - 1.51 g/cm³</td>
<td>0.81</td>
<td>1.21</td>
</tr>
<tr>
<td>INNOVEX™ UP-HOLE</td>
<td>Excellent</td>
<td>1.47 - 1.51 g/cm³</td>
<td>0.81</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Calculated at a density of 1.15 g/cm³ and a pressure of 100 MPa. Relative to ANFO at a density of 0.8 g/cm³.

APPLICATION
INNOVEX™ UG is designed for blasting in underground applications

FEATURES
- Minimum initiation - 12 g booster sensitive
- VOD - 2500-4000 m/s dependent on hole and rock characteristics for underground operation
- Critical Diameter > 32 mm
- Sensitisation - the emulsion can be sensitised to achieve a blasting density between 0.9g/cm³ and 1.20g/cm³ depending on low or high energy requirements

RECOMMENDATIONS
- Shelf life - 3-6 months if stored correctly
- First aid - refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage - all explosives must be transported and stored in accordance with relevant regulations

PACKAGING
- This emulsion is transported and stored as a bulk product

PRODUCT RISK PROFILE
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- INNOVEX™ UG is non-detonable in non-sensitised, unconfined bulk form
- Detonation can occur from extreme friction or excessive heating after sensitisation or under confinement
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

UN CLASSIFICATION (TRANSPORT)
- Bulk emulsion
- Class 5.1
- UN number - UN3375
PGAN
Porous Granular Ammonium Nitrate

APPLICATION
• ANFO
• Heavy ANFO
• Emulsions

FEATURES
• Ammonium nitrate content – >99.5%
• Bulk density – 0.76 – 0.80 g/cm³
• Moisture content – < 0.20%
• Oil absorption – > 6.0%
• Particle size (1 mm-3 mm)* – >95%
*Particle size may change due to handling process.

RECOMMENDATIONS
• Shelf life – 12 months when stored under correct conditions
• Always store Porous Granular Ammonium Nitrate (PGAN) in dry areas. PGAN granules can degenerate due to moisture, humidity, significant temperature variations and pressure conditions, leading to caking or can form lumps
• First aid – refer to Safety Data Sheet for first aid information
• Safety – PGAN granules can break down due to moisture, humidity, huge temperature variations and pressure conditions. PGAN is an oxidiser and must be stored under dry and protected conditions, away from any combustible material
• Transportation and storage – Oxidiser (PGAN) must be transported and stored in accordance with relevant regulations

PACKAGING
• PGAN is transported and stored in the following formats, depending on user application: Bulk, semi-bulk bags; 25 kg and 50 kg bags

PRODUCT DESCRIPTION
Porous Granular Ammonium Nitrate (PGAN) is mainly designed for ANFO, heavy ANFO and emulsion applications. Bulk density of PGAN granules is in the range 0.76 – 0.80 g/cm³. In application, PGAN will offer high quality, reliable and consistent blasting results.

PRODUCT RISK PROFILE
• Classified as hazardous substance, Division 5.1: oxidising substances
• Non-detonable in the unfueled, unconfined bulk form
• Fire risk in the presence of combustible material
• DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

UN CLASSIFICATION (TRANSPORT)
• Class 5.1, UN no. 1942, Oxidiser

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INNOPAK™
Water in oil emulsion cartridged explosives

PRODUCT DESCRIPTION
INNOPAK™ packaged explosives provide reliable blasting solutions to hard rock mining, quarrying, and construction applications. The emulsion has a firm rheology and is packed into plastic sleeves of various dimensions and colours. The INNOPAK™ product range offers various high energy options and can be supplied in a number of different lengths and diameters or as a combo pack. Please contact a BME representative for customisation of packaging.

Product | Relative weight strength | Relative bulk strength | Nominal density (g/cm³)
--- | --- | --- | ---
INNOPAK™ Plus | 100 | 143 | 1.14
INNOPAK™ Super | 104 | 149 | 1.14
INNOPAK™ Super Plus | 111 | 158 | 1.14

Calculated at a density of 1.14 g/cm³ and a pressure of 100 MPa. Relative to ANFO at a density of 0.8 g/cm³

PRODUCT FEATURES

APPLICATION
INNOPAK™ is suitable for underground mining applications, blasting in open cast mines, and civil blasting operations.

INNOPAK™ Combo Configurations
- INNOPAK™ Combo Super Plus 29 x 270 mm / Plus 29 x 580 mm
- INNOPAK™ Combo Super 27 x 270 mm / Plus 27 x 580 mm

FEATURES
- Nominal density – 1.14 ± 0.06 g/ml
- VOD – 3500 – 5000 m/s dependent on hole and rock characteristics
- Gap sensitivity – contact required for propagation

RECOMMENDATIONS
- Shelf life – 9 months from date of manufacturing
- Store under recommended storage conditions
- First aid - refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations

PRODUCT RISK PROFILE
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Risk of explosion by shock, friction, fire, or other ignition sources
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

UN CLASSIFICATION (TRANSPORT)
- Class 1.1 D, UN No. 0241, EXPLOSIVES, BLASTING, Type E

PACKAGING
- Cartridges are packed in boxes with a 25 kg mass (without tamping)

<table>
<thead>
<tr>
<th>Cartridge size (mm)</th>
<th>Nominal weight (g) (+3g)</th>
<th>Nominal count (Units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 x 200</td>
<td>111</td>
<td>227</td>
</tr>
<tr>
<td>27 x 270</td>
<td>186</td>
<td>135</td>
</tr>
<tr>
<td>27 x 580</td>
<td>404</td>
<td>62</td>
</tr>
<tr>
<td>29 x 270</td>
<td>202</td>
<td>125</td>
</tr>
<tr>
<td>29 x 580</td>
<td>434</td>
<td>58</td>
</tr>
<tr>
<td>32 x 270</td>
<td>246</td>
<td>102</td>
</tr>
<tr>
<td>32 x 580</td>
<td>529</td>
<td>47</td>
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<tr>
<td>38 x 270</td>
<td>346</td>
<td>72</td>
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<tr>
<td>38 x 580</td>
<td>747</td>
<td>33</td>
</tr>
<tr>
<td>45 x 200</td>
<td>358</td>
<td>70</td>
</tr>
<tr>
<td>45 x 270</td>
<td>484</td>
<td>52</td>
</tr>
<tr>
<td>45 x 580</td>
<td>1048</td>
<td>24</td>
</tr>
<tr>
<td>50 x 270</td>
<td>600</td>
<td>42</td>
</tr>
<tr>
<td>50 x 580</td>
<td>1293</td>
<td>19</td>
</tr>
</tbody>
</table>

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INNOFEX™

Packaged ammonium nitrate fuel oil (ANFO) blasting agent

PRODUCT DESCRIPTION

INNOFEX™ is a blend of porous ammonium nitrate prill and fuel oil. INNOFEX™ is a free flowing blasting agent used in dry blast holes. INNOFEX™ is oxygen balanced to offer optimal energy and it is suitable for small and medium-to-large diameter holes. INNOFEX™ is not suitable for use in wet holes.

APPLICATION

INNOFEX™ is used in dry blast hole conditions for both surface and underground blasting operations.

FEATURES

- Initiation – Pneumatically loaded INNOFEX™ can be initiated with a high strength detonator, INNOPAK™ cartridge, or a suitable booster
- Bulk density – 0.82 g/cm³
- Blow-loaded density – 0.95-1.05 g/cm³
- VOD – 3000-4200 m/s depending on hole diameter
- Water resistance – not resistant to water
- Relative weight strength* – 100
- Relative bulk strength* – 100
* The effective energy relative to ANFO at a density of 0.8 g/cm³ and energy of 3.82 MJ/kg (energy values are calculated using BME thermodynamic code – IPX)

RECOMMENDATIONS

- Hole temperature – recommended for use in temperature up to 60 °C
- Shelf life – 12 months in dry storage conditions
- First aid - refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported in accordance with relevant regulations and must be stored in cool, dry, well ventilated magazines

PACKAGING

- 25 kg in clear LDPE liner packed in a white poly-woven outer bag

UN CLASSIFICATION (TRANSPORT)

- Class 1.1 D, UN No. 0082, EXPLOSIVE, BLASTING, Type B

PRODUCT RISK PROFILE

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Severe detonation hazard when exposed to heat
- Detonation can occur from extreme impact, extreme friction, or excessive heating
- Hazardous gases are emitted (nitrogen oxides and carbon oxide) on thermal decomposition
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

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PRODUCT FEATURES

APPLICATION
VIPERDET™ LP series are designed to provide reliable initiation. These detonators are used in underground and surface mining applications

FEATURES
- Detonator strength – No. 8
- Shock tube – green colour, double extruded polyethylene
- Shock tube strength – resistant to abrasion and fully functional in hot and cold temperatures
- Delay timing – twenty different delay periods with no overlapping between adjacent delay numbers
- Connector – J-hook

RECOMMENDATIONS
- Shelf life – 36 months. Stored in original packaging and under dry conditions in a ventilated approved magazine
- First aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported in accordance with relevant regulations and must be stored in cool, dry, well ventilated magazines

UN CLASSIFICATION (TRANSPORT)
- Class 1.1 B, UN No. 0360, DETONATOR ASSEMBLIES NON-ELECTRIC

PACKAGING
Units are placed in plastic inner packaging that is heat sealed and packed in boxes.

<table>
<thead>
<tr>
<th>Length</th>
<th>Units/box</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 m</td>
<td>400</td>
</tr>
<tr>
<td>2.4 m</td>
<td>350</td>
</tr>
<tr>
<td>3.0 m</td>
<td>350</td>
</tr>
<tr>
<td>3.6 m</td>
<td>300</td>
</tr>
<tr>
<td>4.2 m</td>
<td>250</td>
</tr>
<tr>
<td>4.8 m</td>
<td>250</td>
</tr>
</tbody>
</table>

Other lengths available on request.

PRODUCT RISK PROFILE
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Severe detonation hazard when exposed to heat
- Detonation can occur from impact, friction and excessive heating
- May emit toxic fumes on thermal decomposition
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE
VIPERDET™ SD
Shock tube with two detonators

PRODUCT FEATURES

APPLICATION
VIPERDET™ SD series are designed to provide reliable sequential initiation of explosives charges in underground narrow reef stoping applications

FEATURES
- Detonator strength – Low strength No. 3 surface detonator, No. 8 in-hole detonator
- Shock tube – extruded polyethylene exterior over surlyn inner with min 19 kg tensile strength
- Water resistance – will function underwater if tube not damaged
- Delay timing – two different delay timings (out hole 200 ms, in hole 3800 ms)
- Connector – T-clip ratchet connector

RECOMMENDATIONS
- Shelf life – 36 months. Stored in original packaging and under dry conditions in a ventilated approved magazine
- First aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported in accordance with relevant regulations and must be stored in cool, dry, well ventilated magazines

UN CLASSIFICATION (TRANSPORT)
- Class 1.1B, UN No. 0360, DETONATOR ASSEMBLIES NON-ELECTRIC

PACKAGING
Units are placed in plastic inner packaging that is heat sealed and packed in boxes.

<table>
<thead>
<tr>
<th>Length</th>
<th>Units/box</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 m</td>
<td>400</td>
</tr>
<tr>
<td>2.4 m</td>
<td>350</td>
</tr>
<tr>
<td>3.0 m</td>
<td>350</td>
</tr>
<tr>
<td>3.6 m</td>
<td>300</td>
</tr>
<tr>
<td>4.2 m</td>
<td>250</td>
</tr>
<tr>
<td>4.8 m</td>
<td>250</td>
</tr>
</tbody>
</table>

Other lengths available on request.

PRODUCT RISK PROFILE
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Severe detonation hazard when exposed to heat
- Detonation can occur from impact, friction and excessive heating
- May emit toxic fumes on thermal decomposition
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE
VIPERDET™ MS (DOWN HOLE)

Shock tube with non-electric detonator

PRODUCT FEATURES

APPLICATION
VIPERDET™ MS DOWN HOLE detonator for surface mining

FEATURES
- Detonator strength – No. 8
- Shock tube - double extruded polyethylene exterior over surlyn inner with a min 19 kg tensile strength
- Water resistance – will function reliably in wet deep hole conditions
- Delay timing – two different delay timings (350 ms, 500 ms)

RECOMMENDATIONS
- Shelf life – 36 months. Stored in original packaging and under dry conditions in a ventilated approved magazine
- First aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported in accordance with relevant regulations and must be stored in cool, dry, well ventilated magazines

UN CLASSIFICATION (TRANSPORT)
- Class 1.1B, UN No. 0360, DETONATOR ASSEMBLIES NON-ELECTRIC

PRODUCT DESCRIPTION

VIPERDET™ MS DOWNHOLE assemblies consist of a specific length of green shock tube with a high strength delay detonator crimped to the one end and closed at the other end by means of an ultra-sonic seal. A colour coded label marked with the specific delay is attached to the shock tube within 10 cm from the seal.

PACKAGING

Units are placed in plastic inner packaging that is heat sealed and packed in boxes.

<table>
<thead>
<tr>
<th>Length</th>
<th>Units/box</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>400</td>
</tr>
<tr>
<td>4 m</td>
<td>300</td>
</tr>
<tr>
<td>6 m</td>
<td>200</td>
</tr>
<tr>
<td>8 m</td>
<td>180</td>
</tr>
<tr>
<td>10 m</td>
<td>150</td>
</tr>
<tr>
<td>12 m</td>
<td>120</td>
</tr>
<tr>
<td>15 m</td>
<td>100</td>
</tr>
<tr>
<td>18 m</td>
<td>80</td>
</tr>
<tr>
<td>21 m</td>
<td>50</td>
</tr>
<tr>
<td>24 m</td>
<td>50</td>
</tr>
</tbody>
</table>

Other lengths available on request.

PRODUCT RISK PROFILE

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Severe detonation hazard when exposed to heat
- Detonation can occur from impact, friction and excessive heating
- May emit toxic fumes on thermal decomposition
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

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VIPERDET™ MS
Millisecond non-electric detonators

PRODUCT DESCRIPTION
VIPERDET™ MS is a millisecond non-electric detonator consisting of orange shock tube, connector block and long rubber plugs for open pit mines, non-coal and non-methane underground mines for initiation of explosives as well as in construction and engineering works.

APPLICATION
VIPERDET™ MS is used for open-pit mines, non-coal and non-methane for initiation of explosives as well as in construction and engineering works

FEATURES

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell material</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Shock tube colour</td>
<td>Orange</td>
</tr>
<tr>
<td>Shock tube length</td>
<td>Varies</td>
</tr>
<tr>
<td>Remarks</td>
<td>Marking on the bottom of the shell consists of a letter S and a delay number</td>
</tr>
</tbody>
</table>

Initiation

| Nominal PETN charge weight (secondary charge): | 700 mg |
| Remarks                                      | For a safe and reliable initiation of a VIPERDET™ MS detonator it is advised to use a proper initiation equipment approved for such application (e.g. spark igniters) or other initiating means, such as non-electric surface detonators, electric detonating cord with nominal PETN charge of 6/12 g/m. |

Loading

| Loading into dry blastholes | Positive |
| Loading into wet blastholes | Positive |

Humid conditions and underwater

| Applicability in humid | Positive |
| Max. hydrostatic pressure | 0.30 MPa |

Other parameters

| VOD of explosive mixture inside the shock tube | 2000± 200m/s |
| Thermal stability in 75°C | 48hrs |

RECOMMENDATIONS

- Shelf life – 24 months from the date of production. Store under recommended storage conditions.
- Storage conditions - Minimum storage temperature (0°C) and Maximum storage temperature (+ 45°C). Product should be stored in original packaging.
- First aid – refer to Safety Data Sheet for first aid information.
- Safety – all explosives are classified as dangerous goods and can cause death, personal harm or damage to property if not used correctly.
- Transportation and storage – all explosives must be transported and stored in accordance with relevant regulations.
- Disposal - Non-electric detonator waste as well as expired product and its packaging should be disposed by authorized companies.

<table>
<thead>
<tr>
<th>Delay no.</th>
<th>Nominal delay time (ms)</th>
<th>Delay no.</th>
<th>Nominal delay time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>11</td>
<td>275</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>12</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>13</td>
<td>325</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>14</td>
<td>350</td>
</tr>
<tr>
<td>5</td>
<td>125</td>
<td>15</td>
<td>375</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>16</td>
<td>400</td>
</tr>
<tr>
<td>7</td>
<td>175</td>
<td>17</td>
<td>425</td>
</tr>
<tr>
<td>8</td>
<td>200</td>
<td>18</td>
<td>450</td>
</tr>
<tr>
<td>9</td>
<td>225</td>
<td>19</td>
<td>475</td>
</tr>
<tr>
<td>10</td>
<td>250</td>
<td>20</td>
<td>500</td>
</tr>
</tbody>
</table>
VIPERDET™ MS
Millisecond non-electric detonators

PRODUCT FEATURES

PACKAGING

<table>
<thead>
<tr>
<th>Packaging unit</th>
<th>PE bag filled with bundles of 5 or 10 sets of non-electric detonators with the same delay time (depending on the length of the tube).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping container</td>
<td>Cardboard box.</td>
</tr>
<tr>
<td>Cargo safety measures</td>
<td>Shipping containers placed on a wooden pallet, secured with stretch film.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Other packaging methods are available after agreement with customer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shock tube length [m]</th>
<th>Number of detonators in a bunch</th>
<th>Number of detonators in first/second bag</th>
<th>Number of detonators in a box</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8</td>
<td>10</td>
<td>130/130</td>
<td>260</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>125/125</td>
<td>250</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>100/100</td>
<td>200</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>70/70</td>
<td>140</td>
</tr>
<tr>
<td>18</td>
<td>5</td>
<td>60/60</td>
<td>120</td>
</tr>
<tr>
<td>20</td>
<td>5</td>
<td>50/50</td>
<td>100</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>40/40</td>
<td>80</td>
</tr>
<tr>
<td>30</td>
<td>-</td>
<td>40/40</td>
<td>80</td>
</tr>
<tr>
<td>35</td>
<td>-</td>
<td>35/35</td>
<td>70</td>
</tr>
<tr>
<td>40</td>
<td>-</td>
<td>30/30</td>
<td>60</td>
</tr>
</tbody>
</table>

PRODUCT RISK PROFILE

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Risk of explosion by shock, friction, fire or other ignition sources
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVE FIRE

UN CLASSIFICATION (TRANSPORT)

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>Detonator assemblies, non-electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>1</td>
</tr>
<tr>
<td>Division</td>
<td>1.1 B (UN 360)</td>
</tr>
<tr>
<td></td>
<td>1.4 B (UN 0361)</td>
</tr>
<tr>
<td></td>
<td>1.4 S (UN 0500)</td>
</tr>
</tbody>
</table>
VIPERDET™ Trunkline

Shock tube with short-period non-electric detonator

PRODUCT FEATURES

APPLICATION
Surface mining – provides accurate delay sequence for surface connections

FEATURES
- Detonator strength – No. 3
- Detonator shell – aluminium alloy
- Shock tube – double extruded, green in colour
- Shock tube strength – resistant to abrasion and fully functional in hot and cold temperatures
- Delay timing – nominal delay timing of 17 ms, 25 ms, 42 ms, and 67 ms
- Connector – colour coded to identify respective delay timing

RECOMMENDATIONS
- Shelf life – 36 months. Stored in original packaging and under dry conditions in a ventilated approved magazine
- First aid – refer to Safety Data Sheet for first aid information
- Safety – all explosives are classified as dangerous goods and can cause damage to property, personal harm or death if not used correctly
- Transportation and storage – all explosives must be transported in accordance with relevant regulations and must be stored in cool, dry, well ventilated magazine

UN CLASSIFICATION (TRANSPORT)
- Class 1.1B, UN No. 0360, DETONATOR ASSEMBLIES NON-ELECTRIC

PACKAGING
Units are placed in plastic inner packaging that is heat sealed and packed in boxes.

<table>
<thead>
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<th>Units/box</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
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</tr>
<tr>
<td>4 m</td>
<td>300</td>
</tr>
<tr>
<td>6 m</td>
<td>200</td>
</tr>
<tr>
<td>8 m</td>
<td>180</td>
</tr>
<tr>
<td>10 m</td>
<td>150</td>
</tr>
</tbody>
</table>

Other lengths available on request.

PRODUCT RISK PROFILE
- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage conditions
- Severe detonation hazard when exposed to heat
- Detonation can occur from impact, friction and excessive heating
- May emit toxic fumes on thermal decomposition
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE
VIPER BOOSTERS™ consist of an explosive charge of high strength and high detonation velocity, designed to be used in the explosive initiation sequence between an initiator or primer and the main charge, mostly non cap-sensitive blasting agents. Cast VIPER BOOSTERS™ are enclosed in a cylindrical printed shell and contain a mixture of RDX and TNT. A PETN capsule positioned internally near the detonator well ensures reliable initiation when using 3.6 g/m detonating cord.

### FEATURES

- **Appearance** – smooth and clean, with both ends covered
- **Cap well and cord tunnel** – smooth and straight with no distortion or blockage
- **Velocity of detonation** – minimum 8 000 m/s
- **Cast density** – minimum 1.8 g/cm³
- **Sensitivity** – reliable initiation by standard detonator or 3.6 g/m detonating cord
- **Water resistance** – retains sensitivity after being immersed in water at 100 PSI

### PACKAGING

<table>
<thead>
<tr>
<th></th>
<th>VIPER BOOSTER™ 150</th>
<th>VIPER BOOSTER™ 400</th>
<th>VIPER BOOSTER™ 800</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit weight</strong></td>
<td>150 gram</td>
<td>400 gram</td>
<td>800 gram</td>
</tr>
<tr>
<td><strong>Unit per case</strong></td>
<td>90 units</td>
<td>35 units</td>
<td>16 units</td>
</tr>
<tr>
<td><strong>Net weight per case</strong></td>
<td>13.5 kg</td>
<td>14 kg</td>
<td>12.8 kg</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>36 mm</td>
<td>54 mm</td>
<td>78 mm</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>125 mm</td>
<td>125 mm</td>
<td>120 mm</td>
</tr>
</tbody>
</table>

### PRODUCT RISK PROFILE

- Classified as hazardous substance, dangerous goods with mass explosion hazard
- Stable under normal storage and handling conditions
- May explode when exposed to fire, especially when confined
- May explode when subjected to high energy projectile impact
- May emit toxic and/or irritating fumes during thermal decomposition
- Incompatible with corrosives
- DO NOT ATTEMPT TO FIGHT AN EXPLOSIVES FIRE

### UN CLASSIFICATION (TRANSPORT)

- UN Classification Transport Boosters, without detonator Class 1.1D, UN No. 0042, BOOSTER, without detonator
BLASTMAP™ III
Blast Design Software

PRODUCT DESCRIPTION

Complete blast planning, design and analysis software. Powerful, easy to use, flexible, accurate.

BLASTMAP™ III is a software for designing blast timing for use with AXXIS™. It is a powerful and modern software that allows design of the blasts from hole layouts to charge quantities, deck charging and blast timing.

FEATURES

- Design a blast from scratch (pattern, hole diameters, explosives, rock type) using survey information about the block geometry and surface
- Carry out detailed charge and timing designs based on actual hole positions
- Calculate costs and quantities based on actual drilling information
- Import any text or xlsx data file
- Import AXXIS™ electronic detonator IDs, design timing
- Export design information to text/csc file. This allows for other software, such as drill navigation software to drill according to design
- Multiple deck capability for designing specialised blasts, such as layered blasts, and for vibration control needs
- Blast timing design and simulation. Both non-electric and electronic timing designs can be carried out
- The software is optimised for use with AXXIS™ electronic delay detonators
- Wave interference modelling for optimising timing for either vibration control or optimal fragmentation
- Powerful contouring capabilities for blast timing, surface, and floor elevations, vibration maps and energy distribution in a blast
- Powerful reporting capabilities for blast design records and communicating critical design issues such as costs, quantities, and energy

MINIMUM SOFTWARE REQUIREMENTS

- Operating system: Windows XP, Vista, Windows 7, Windows 8
- Microsoft Dot Net Framework 4.0

MINIMUM HARDWARE REQUIREMENTS

- Ram: 4 Gb
- Disk space: 500 Mb
- Processor: Dual Core 2.00 GHz
- Operating system type: 32 bit

RECOMMENDED HARDWARE REQUIREMENTS

- Ram: 8 Gb
- Disk space: 500 Mb
- Processor: Core i7 2.00 GHz
- Operating system type: 64 bit
PRODUCT DESCRIPTION

BME knows how important it is to gather blasting information in the field so that management can be presented with real-time data to make informed decisions about blast preparation quality. This information, when presented through the XPLOLOG™ reporting applications, allows management to react to problems in the field when they occur, rather than only being aware of problems when there is a bad blast outcome.

Information is collected in the field using a rugged mobile handheld device. These devices are easy to use and will sync data to a centralised database when in range of a data network. Management obtains up to date information through a reporting dashboard, as well as a summary of the data via an Android reporting application, which can be downloaded from the Google Play Store.

The BME XPLOLOG™ system features full integration with BME’s BLASTMAP™ III software, allowing users to view and edit XPLOLOG™ designs in BLASTMAP™ III, and to sync designs from BLASTMAP™ III to the XPLOLOG™ database. This allows you to use the powerful blasting simulation and design modules in BLASTMAP™ III to further analyse and improve blast outcomes.

PRODUCT FEATURES

DEVICE

Users are equipped with a rugged hand-held device that is suitable for everyday field use. It has a powerful 4500mAh non-removable battery offering extended usage time, compared to similar devices. The device is intended for use under rugged conditions and carries an IP-68 rating, meaning it is dust proof and up to 1.5 m waterproof.

SOFTWARE

The BME XPLOLOG™ field application is the data collection application which is loaded on rugged mobile devices and is used in the field to capture blast preparation data, such as hole depth, charge mass or stemming. The input parameters can be customised per client. The touch screen and user input on the device is optimised for field use, making it simple to record blast preparation progress.

The BME XPLOLOG™ reporter software is a web-based reporting application, which is designed to intelligently surface data recorded by the XPLOLoggers. It can be customised per site as required by each customer.

The BME XPLOLOG™ Mobile Application is a reporting application which runs on an Android mobile device. This is perfect for management, who need a high-level overview of blast preparation progress at any time.

DATA COLLECTION AND STORAGE

Each mine is allocated its own centralised database, with access to all the field data efficiently collected and stored in one place. All data is safely stored in a cloud hosted facility, offering dependable and real-time access to up to date information.
EQUIPMENT
**PRODUCT DESCRIPTION**

The AXXIS™ Blasting Box can be used as a stand-alone unit with a blasting line connected directly to the detonators, or in a wireless configuration with two or more AXXIS™ Blasting Boxes.

For a large blast, a total of twenty boxes can be linked together, for a total of up to 10 000 detonators.

**PRODUCT SPECIFICATIONS**

**VOLTAGE**
24-volt rechargeable Li-ion batteries

**BATTERY LIFE**
15 hours x 500 detonator blasts (battery life dependent on the number of detonators in each blast)

**OPERATING TEMPERATURE RANGE**
-20 to +60 °C

**USER INTERFACE**
Black and white LCD screen using two buttons to navigate through menus

**COMMUNICATIONS INTERFACE**
USB port

**NUMBER OF DETONATORS PER BLASTING BOX**
600 / link 500

**WIRELESS RANGE BETWEEN BOXES**
1000m-5000m line of site (depending on country’s frequency allocation)

**COMMUNICATION**
Two-way communication between blasting box and detonators. All detonators are interrogated before blasting time. The blast can be fired using wireless communication between a remote blasting box and the blast.
PRODUCT DESCRIPTION

The AXXIS™ GII™ detonator is a standard size detonator that will function in all standard sized boosters also used in non-electric blasting.

AXXIS™ GII™ detonators use 2-core double insulated downline cables. Higher resistance to electrostatic discharge and high induced ground currents make the GII™ detonator safer to use in all mining conditions.

PRODUCT SPECIFICATIONS

CASE OF DETONATOR
Magnesium aluminium alloy / copper alloy

DETONATOR SIZE
Fits any standard booster

CABLE TYPE
Twin core copper cable, double insulated

SPOOL DESCRIPTION
Cable spooled in shrink-wrapped spools with detonator feed from centre of spool for safety

STANDARD LENGHTS
10m - 20m - 30m - 40m - 50m - 60m - 70m (other lengths available on request)

CONNECTOR
Yellow pin-hinged two-way connector with intelligent electronic data capability

FIRING TIME RANGE
0 to 10 000ms / 0 to 15 000ms

ACCURACY
0 to 5000 ms < 1ms scatter

OPERATING TEMPERATURE
-20 to +60 °C

STORAGE TEMPERATURE
-30 to +50 °C

SHELF LIFE
At recommended storage temperature - 48 months

SAFETY FUNCTION
AXXIS™ GII™ detonators do not include any permanent energy source and there is no direct communication with the detonator during logging. AXXIS™ GII™ detonators will only function with AXXIS™ Blasting Boxes. Special security PIN codes are required to operate the system. A deadman’s switch disarms all detonators if the blast needs to be aborted at short notice.
PRODUCT DESCRIPTION

The AXXIS™ Logger is a small, robust unit that is used to scan each detonator connector and allocate a delay period to that connector.

The unit has a touch screen interface and a numeric keypad for entering detonator firing time values and connector IDs (should this be necessary if a connector has been damaged). The AXXIS™ Logger can be used directly to programme delays by blasters, but can also be used in conjunction with BLASTMAP™ III.

PRODUCT SPECIFICATIONS

VOLTAGE
9 volt Li-ion rechargeable battery

BATTERY LIFE
15 hours continuous room temperature operation

BATTERY CHARGING
4 to 4.5 hours to full charge

OPERATING TEMPERATURE RANGE
-30 to +60 °C

STORAGE
-40 to +70 °C

SHOCK
MIL-STD-810F, Method 503.4

LOGGING MODES
Manual / increments / double prime / BLASTMAP™ III Downloads

USER INTERFACE
Touch screen and numeric keys

COMMUNICATIONS INTERFACE
USB port
AXXIS™ Smart Line Tester

PRODUCT DESCRIPTION

The AXXIS™ Smart Line Tester is a small low current device that is used to test a surface line, and which has a number of detonators connected to it for leakage, current consumption, and functionality.

PRODUCT SPECIFICATIONS

FUNCTION
- Device for safely testing lines for leakage before blasting time
- Safely testing functionality of the detonators

MAXIMUM NUMBER OF DETONATORS
The maximum number of detonators on a line that can be tested is 50. The reason for this is that the leakage tester generates a very low energy current for safety reasons.

MAXIMUM CURRENT OUTPUT
20 mA

POWER SUPPLY
Li-ion Batteries
BLASTMAP™ III
Blast Design Software

PRODUCT DESCRIPTION
Complete blast planning, design, and analysis software. Powerful, easy to use, flexible, accurate.

BLASTMAP™ III is software for designing blast timing for use with AXXIS™. It is a powerful and modern software that allows design of the blasts from hole layouts to charge quantities, deck charging and blast timing.

FEATURES
- Design a blast from scratch (pattern, hole diameters, explosives, rock type) using survey information about the block geometry and surface
- Carry out detailed charge and timing designs based on actual hole positions
- Calculate costs and quantities based on actual drilling information
- Import any text or xlsx data file
- Import AXXIS™ electronic detonator IDs, design timing
- Export design information to text/csc file. This allows for other software, such as drill navigation software to drill according to design
- Multiple deck capability for designing specialised blasts, such as layered blasts, and for vibration control needs
- Blast timing design and simulation. Both non-electric and electronic timing designs can be carried out
- The software is optimised for use with AXXIS™ electronic delay detonators
- Wave interference modelling for optimising timing for either vibration control or optimal fragmentation
- Powerful contouring capabilities for blast timing, surface, and floor elevations, vibration maps and energy distribution in a blast
- Powerful reporting capabilities for blast design records and communicating critical design issues such as costs, quantities, and energy

MINIMUM SOFTWARE REQUIREMENTS
- Operating system: Windows XP, Vista, Windows 7, Windows 8
- Microsoft Dot Net Framework 4.0

MINIMUM HARDWARE REQUIREMENTS
- Ram: 4 Gb
- Disk space: 500 Mb
- Processor: Dual Core 2.00 GHz
- Operating system type: 32 bit

RECOMMENDED HARDWARE REQUIREMENTS
- Ram: 8 Gb
- Disk space: 500 Mb
- Processor: Core i7 2.00 GHz
- Operating system type: 64 bit
**AXXIS™ CENTRALIZED CONTROL BOX**

**PRODUCT DESCRIPTION**

The AXXIS™ Centralized Control Box is designed for Centralized firing of AXXIS™ Centralized Blasting Boxes. Additionally, it continuously monitors and has a dedicated uplink with all connected AXXIS™ Centralized Blasting Boxes underground and provides a real-time system status overview.

The real-time data of the system overview can be accessed via the AXXIS™ CBS Graphical User Interface (GUI) or remotely through a web browser.

The system overview allows the status of the system to be known without the need to venture underground to collect information. The information includes pre-and post-blasting data which will assist in the decision making around blasting.

**PRODUCT SPECIFICATIONS**

- **VOLTAGE**: 110 – 250 VAC mains supply
- **OPERATING TEMPERATURE RANGE**: -5 to +45°C
- **ENCLOSURE**: Lockable steel, IP65 rated
- **MASS**: 12.5 kg
- **NUMBER OF BLASTING BOXES PER CONTROL BOX**: 100
- **COMMUNICATION**: Copper or fiber network
**AXXIS™ CENTRALIZED BLASTING BOX**

**PRODUCT DESCRIPTION**

The AXXIS™ Centralized Blasting Box is specifically designed for the AXXIS™ CBS and is remotely controlled from the AXXIS™ Centralized Control Box installed on surface.

The AXXIS™ CBS provides reliable firing of up to 100 AXXIS™ Electronic Delay Detonators (EDDs) connected in parallel. It incorporates a cradle to allow for the reading of AXXIS™ EDD unique identifications (UIDs). The Box has automatic cable fault tracing and is able to isolate downstream cable faults.

**PRODUCT SPECIFICATIONS**

**VOLTAGE**
110 – 250 VAC mains supply

**BATTERY LIFE**
12 hours backup (built-in battery)

**OPERATING TEMPERATURE RANGE**
-5 to +45°C

**ENCLOSURE**
Lockable steel, IP65 rated

**MASS**
6.2 kg

**COMMUNICATIONS INTERFACE**
Bluetooth

**NUMBER OF BLASTING BOXES PER CONTROL BOX**
100

**RANGE BETWEEN BOXES**
400m

**COMMUNICATION**
Copper or Fiber

Manufactured By

34
**PRODUCT DESCRIPTION**

The AXXIS™ CBS Logger is a portable device that is used to read the UID and allocate delays to the AXXIS™ EDDs that will be used for blasting.

After the AXXIS™ EDDs are placed in drilled holes, the AXXIS™ Logger can be used to read their UIDs and allocate delays.

The delays can be fixed across all the AXXIS™ EDDs or individually allocated depending on the requirements of the user. The UID and delay information can then be transmitted via Bluetooth from the AXXIS™ Logger to the AXXIS™ Centralized Blasting Box that is connected to the AXXIS™ EDDs.

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**PRODUCT SPECIFICATIONS**

**VOLTAGE**
3.7 V Li-ion rechargeable battery

**OPERATING TEMPERATURE RANGE**
- Operation: -20 to +50°C
- Storage: -40 to +70°C

**THERMAL SHOCK**
- -40 to 70°C rapid transition

**SEALING**
- IP65

**LOGGING MODES**
- Manual / Automatic

**USER INTERFACE**
- Touch panel, finger or gloved finger input

**COMMUNICATION INTERFACE**
- Bluetooth

**MASS**
- 376 g
AXXIS™ PORTABLE CONTROL UNIT

PRODUCT DESCRIPTION

The AXXIS™ Portable Control Unit is designed as a portable blasting unit, in the event of the main unit being faulty, for controlled centralized firing of the AXXIS™ Centralized Blasting Boxes underground.

The AXXIS™ Portable Control Unit is designed for controlled firing of up to 100 AXXIS™ Centralized Blasting Boxes.

PRODUCT SPECIFICATIONS

VOLTAGE
110 – 250 VAC mains supply

OPERATING TEMPERATURE RANGE
-5 to +45°C

ENCLOSURE
Lockable plastic container, IP65 rated

MASS
2.5kg

NUMBER OF BLASTING BOXES PER CONTROL BOX
100
MOBILE MANUFACTURING UNITS (MMUs)
E Series - Emulsion Unit

PRODUCT DESCRIPTION
BME provides a full range of locally manufactured Mobile Manufacturing Units (MMUs), which cater for all surface mining and quarrying applications. BME’s MMUs are capable of pumping and auguring the full range of BME’s bulk explosives. All MMUs are designed to operate in the demanding environments encountered during normal mining operations. Design parameters include all necessary safety control systems, as well as ease of operation, maintenance, and reliability. BME’s MMUs are SABS approved and meet all transportation of hazardous goods legislation (European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)).

PRODUCT FEATURES

APPLICATION
The application of the MMU (E series) is in opencast mining and quarrying operations, with a requirement for emulsion bulk explosives products.

FEATURES
- PumpPro Pump Safety system for guarding against dead-head and dry-running
- Closed-loop hydraulic control system guarantees product quality
- Suitable chassis with all standard safety selected for rugged on-bench conditions

DESIGN FEATURES
- Closed-loop hydraulic system
- Independent pump safety control system (PumpPro)
- Maximum pump rate of 340 kg/min on 160 – 310 mm hole diameter
- Maximum pump rate of 140 kg/min on 89 – 127 mm hole diameter
- In-cab control system

PUMP SAFETY FEATURES
- Independent electronic PumpPro pump safety system monitoring and controlling down hole product pumps against:
  - Dead-head
  - Dry-running
  - Low and high pressures
  - High temperatures
  - In-line bursting disc
MOBILE MANUFACTURING UNITS (MMUs)

HA Series - Blend Unit

PRODUCT DESCRIPTION

BME provides a full range of local manufactured Mobile Manufacturing Units (MMUs), which cater for all surface mining and quarrying applications. BME MMUs are capable of pumping and auguring the full range of BME’s bulk explosives. All MMUs are designed to operate in the demanding environments encountered during normal mining operations. Design parameters include all necessary safety control systems, as well as ease of operation, maintenance, and reliability. BME’s MMUs are SABS approved and meet all transportation of hazardous goods legislation (European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)).

PRODUCT FEATURES

APPLICATION

Units are configured to deliver blended emulsions and Heavy ANFOs to open cast mining operations

FEATURES

- PumpPro Pump Safety system for guarding against dead-head and dry-running
- Close loop hydraulic control system guarantees product quality
- Suitable chassis with all standard safety selected for rugged on-bench conditions

DESIGN FEATURES

- Close loop hydraulic system
- Maximum auger rate of 900 kg/min on blend and ANFO products
- Maximum pump rate of 480 kg/min on pumpable Heavy ANFO formulations
- In-cab control system

PUMP SAFETY FEATURES

- Independent electronic PumpPro pump safety system monitoring and controlling down hole product pumps against:
  - Dead-head
  - Dry-running
  - Low and high pressures
  - High temperatures
  - In-line bursting disc
BME provides a stemming plant fitted on a Iveco 380 T42 WH 6x6 cab chassis or chassis specified by the client. The stemming truck is capable of delivering 15 to 18 cubic metres of crush aggregate. All stemming trucks are designed to operate in demanding environments encountered during normal mining operations. Design parameters to include all necessary safety control systems, as well as ease of operation, maintenance, and reliability. BME’s stemming trucks are SABS approved.

PRODUCT FEATURES

APPLICATION
The stemming truck is for opencast mining. This form of stemming will revolutionise stemming practices

FEATURES
- 600 mm wide positive drive conveyor
- Custom length placing conveyor to reach either side of truck for stemming
- In-cab control system identical to BME bulk MMUs to control belts and positioning, on/off and amount of stemming to be discharged
- Joystick control of the placing conveyor, inside or outside mounted
- Water spray system to control dust
- A metering system that can determine how much stemming to put in the hole on a meter basis
- Zero waste of aggregate
- Four emergency stops located around vehicle
- Camera system on discharge conveyor and truck rear for positioning and monitoring

DESIGN FEATURES
- Closed-loop control system
- Variable discharge rate
- In-cab control system
- Joystick control for stemming conveyor

SAFETY FEATURES
- Comply to BECSA FRCP (Fatal Risk Company Protocol)
BULK TECHNICAL SUPPORT VEHICLE

PRODUCT DESCRIPTION

BME provides a technical support vehicle, fitted on a 4.2 l 4x4 Toyota Land Cruiser.

The support vehicle is also retrofit with roll over protection systems (ROP's) and the necessary requirements to operate on all surface mining operations.

The technical support vehicle is fully equipped to provide full technical monitoring capabilities to enable client operations to optimise their blasting.

PRODUCT FEATURES

APPLICATION
Application of the Bulk Technical Support Vehicle is to provide an on-bench full technical service on request.

FEATURES
- Bore hole caliper to measure hole diameters from 127 mm up to 350 mm at a depth of 40 m
- VOD recorders (Velocity of detonation)
- Seismographs
- 3-D face profiling equipment
- High speed video photography camera
- Emulsion and ANFO testing kits
- Bench scale for truck calibration and auditing
- Reactive ground testing technology

DESIGN FEATURES FOR THE BORE HOLE CALIPER
- In-cab control system
- Dual power supply system
- External backup control system
- Easy access to probe and winch for maintenance

SAFETY FEATURES
- Comply to BECSA FRCP (Fatal Risk Company Protocol)
MODULARISED EMULSION PLANTS

BME Emulsion Plants are designed to be mobile, robust, and user friendly, making them ideally suited for the mining environment. All plants are divided into two primary systems: Steam generation to provide heat for the process and the production modules, which both generate the base solution from dry raw materials and manufacture the emulsions.

With the Emulsion Plants being modular in design we offer processes with two production outputs: The F1 plant, capable of producing 20T of emulsion in an eight hour shift, or the F3 plant, with a production capability of 40T per shift, which is a F1 plant with additional production and steam generation modules.

Most importantly, while all of our plants have been designed to be easily operated and maintained, they also include all the necessary safety controls to provide an operator friendly work environment.

PRODUCT FEATURES

BENEFITS AND FEATURES
- Proven reliability in remote locations
- Ease of installation in remote sites, as the modules are built into standard size containers to facilitate transport and handling
- Installed equipment protection devices to minimize safety risks

SAFETY FEATURES
- All critical pumps are fitted with an independent electronic pump protection system, which monitors and controls operating pressures and temperatures, thus protecting the system from dead-heading and dry-running scenarios
- All critical pumps are further fitted with mechanical pump protection devices to protect the system from a dead-heading scenario
- The boilers are fitted with all the necessary safety devices to minimise the risk of equipment failure, safety incidents and production losses
- Temperature monitoring systems are installed on the solution preparation tanks
- Emergency stops are situated at critical locations throughout the plant
CRUISER CHARGING UNIT (CCU) HP 1700

PRODUCT FEATURES

APPLICATION
The CCU was initially developed for use in underground development blasting where it was designed to pump at equivalent rates to traditional emulsion technology. The CCU has also found acceptance in small scale surface operations.

FEATURES
- Low capital outlay
- Low operating and maintenance costs on vehicle
- Low maintenance cost on charging unit
- Intrinsically safe pump operation in instances of:
  - Dry running
  - Dead heading
- Short lead time for manufacture
- ICR – Intelligent Control and Reporting

VEHICLE MODIFICATIONS
- Suspension upgrade (heavy duty)
- Front and rear impact protection
- Tow bar (drop pin)
- Fire suppression system
- Fire extinguisher (dry powder)
- Stop blocks
- Modified light configuration

UNDERGROUND VEHICLE MODIFICATIONS
- Emergency brake system (Zips-SABS)
- Rear hydraulic discs (Fail-safe)
- Emissions catalytic purifier
- Emissions fume diluter
- Raised working platform
- Underground light configuration
  - Low range 4 x 4
  - Gears 1-2 and reverse

DESIGN FEATURES
- Emulsion tank capacity: 700 kg
- Sensitiser tank capacity: 30 L
- Water tank capacity: 50 L
- Pumping rate: 45 kg/min
- Max hose length: 15 m (¾” HDPE)
- Compatible emulsions: INNOVEX™ UG Emulsions
- Pre-set mass of emulsion/hole

PRODUCT DESCRIPTION
BME’s Cruiser Charging Unit (CCU) is one of a range of compact charging systems available for use with BME’s INNOVEX™ range of emulsion formulations. The Model 2 CCU is fitted with BME’s new Mobile Pump Model 2 and Intelligent Control and Recording (ICR) System with recording and reporting functionality. This represents not only the forefront in mechanised emulsion technology, but significantly improves the safety of underground emulsion pump technology.

The positive displacement Mobile Pump on the CCU delivers both a double salt emulsion and sensitising solution mixed in the charging lance before entering the blast hole.

Though CCUs are limited in emulsion carrying capacity to 700 kg, they possess distinct advantages over traditional mechanised charging units in both mobility and daily operating expenses. This reduction in capital requirements and maintenance costs is made possible through the greatly improved efficiency of the new Mobile Pump over outdated progressive cavity pump technology. In order to allow for ease of use in high operating areas, a hydraulic lifting platform can also be installed on the vehicle.
PRODUCT DESCRIPTION

BME has designed a vertical pipeline system for the bulk transportation of non-sensitised base emulsion explosives from the surface to the underground workings of a mine. The system enables BME’s INNOVEX™ UG (Megapump) Lateral to be moved closer to the area where it is required, thus freeing up valuable shaft time. Emulsion can be stored on the surface and/or in the underground working of the mine.

PRODUCT FEATURES

FEATURES

- BME’s vertical pump line system is a simple design and can be adapted to suit mining conditions
- Electronic monitoring of the system allows for the capturing of all relevant data and information
- Bulk storage has been optimised to suit the road tankers in use and the time taken for the transfer of the emulsion
- In most cases a steel pipeline is used for the vertical transportation of the emulsion. The option to pipe the sensitiser in the same borehole is available

BENEFITS

- Time taken to fill up charging units is greatly reduced, as well as the travelling time to the underground emulsion filling station
- Underground emulsion refilling stations can also be used to optimise the output of the charging units and reduce the number of mobile units in use
- Utilisation rates of mobile equipment are improved in instances of decline shafts, where the charging unit is required to drive out from the underground working area to the surface silo area to refill
PRODUCT DESCRIPTION

BME’s industry-leading technology has been made possible through its class leading mobile pump technology in partnership with thought leaders in underground equipment manufacturing. Due to the light weight and low energy consumption of the mobile pump, it has been possible to develop a light weight, purpose built carrier to replace high capital, maintenance intensive carrier vehicles for use in underground mining operations. Variants of the new technology include both low profile and standard profile mechanised carriers with raised working platforms available for high reach development ends.

FEATURES

- Low capital outlay
- Low maintenance requirements
- High flow rate
- Double mobile pump configuration
- Increased reliability and reduced down time
- Intelligent pump control and data recording system
- Fully ROPS and FOPS certified vehicle
- 2 man lifting basket or compact charging platform
- ICR – Intelligent control and reporting

DESIGN SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td>Emulsion tank capacity</td>
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<td>Water tank capacity</td>
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<td>Drive system</td>
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<td>30 m (with hose lube)</td>
</tr>
<tr>
<td>Pre-set mass of emulsion/hole</td>
<td>INNOVEX™ UG Emulsions</td>
</tr>
</tbody>
</table>

FEATURES

- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Pressure bursting disk
- Failsafe control system
- Charging lance flushing system

MEGACHARGER

HP1500
EMULSION CHARGING UNIT (ECU) LP1500

PRODUCT DESCRIPTION

The Emulsion Charging Unit (ECU) LP1500 is one of a range of mechanised charging systems developed for use with BME’s INNOVEX™ UG emulsion formulations. The unit is fitted with two mobile pumps allowing for maximum safety in charging operations and reduced down time. This is ideal for low profile trackless operations where large quantities of explosives are required within each blast.

PRODUCT FEATURES

FEATUERS
- Double mobile pump configuration
- Increased reliability and reduced down time
- Low maintenance costs
- Intrinsically safe pump operation in instances of:
  - Dry running
  - Dead heading
- High flow rate
- Short lead time for manufacture
- ICR – Intelligent control and reporting

DESIGN FEATURES
- Emulsion tank capacity: 1500 kg
- Sensitiser tank capacity: 100 L
- Water tank capacity: 150 L
- Pumping rate: 45 kg/min
- Drive system: Hydraulic
- Max hose length: 15 m (No hose lube), 30 m (With hose lube)
- Compatible emulsions: INNOVEX™ UG Emulsions
- Pre-set mass of emulsion/hole

PUMP SAFETY FEATURES
- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Pressure bursting disk
- Fail safe control system
- Charging lance flushing system
The Emulsion Charging Unit (ECU) is one of a range of mechanised charging systems developed for use with BME’s INNOVEX™ UG emulsion formulations. The unit is fitted with two mobile pumps allowing for maximum safety in charging operations and reduced down time. The ECU is ideal for large trackless operations where large quantities of explosives are required within each blast. A basket, raised working platform or robotic arm can be fitted to the rear of the charging unit to reach high ends or inaccessible rings.

FEATURES
- Double mobile pump configuration
- Increased reliability and reduced down time
- Low maintenance costs
- Low capital requirements
- Intrinsically safe pump operation in instances of:
  - Dry running
  - Dead heading
- High flow rate
- Short lead time for manufacture
- ICR – Intelligent Control and Reporting

DESIGN FEATURES
- Emulsion tank capacity: 2000 kg
- Sensitiser tank capacity: 87 L
- Water tank capacity: 87 L
- Pumping rate: 45 kg/min
- Drive systems: Hydraulic
- Max hose length: 15 m (No hose lube) / 30 m (With hose lube)
- Compatible emulsions: INNOVEX™UG Emulsions
- Pre-set mass of emulsion/hole

PUMP SAFETY FEATURES
- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Pressure bursting disk
- Fail-safe control system
- Charging lance flushing system
PRODUCT DESCRIPTION

The Emulsion Charging Unit (ECU) is one of a range of mechanised charging systems developed for use with BME's INNOVEX™ UG emulsions formulations. The unit is fitted with two mobile pumps allowing for maximum safety in charging operations and reduced down time. The ECU is ideal for large trackless operations where large quantities of explosives are required within each blast. A basket, raised working platform or robotic arm can be fitted to the rear of the charging unit to reach high ends or inaccessible rings.

PRODUCT FEATURES

FEATURES
- Double mobile pump configuration
- Increased reliability and reduced down time
- Low maintenance costs
- High flow rate
- Short lead time for manufacture
- ICR – Intelligent control and reporting

DESIGN FEATURES
- Emulsion tank capacity: 3000 kg
- Sensitiser tank capacity: 100 L
- Water tank capacity: 200 L
- Pumping rate: 45 kg/min
- Drive system: Hydraulic
- Max hose length: 15 m (No hose lube), 30 m (With hose lube)
- Compatible emulsions: INNOVEX™ UG Emulsions
- Pre-set mass of emulsion/hole

PUMP SAFETY FEATURES
- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Pressure bursting disk
- Fail-safe control system
- Charging lance flushing system

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The Development Charging Unit (DCU) is one of a range of compact charging systems developed for use with BME’s INNOVEX™ UG emulsion formulations. BME’s Model 2 mobile pump utilised on the DCU is a positive displacement pump designed to deliver emulsion and sensitising solution simultaneously through the charging lance where it is sensitised to form an explosive on entering the blasthole.

Due to the low energy requirements necessary for the operation of BME’s mobile pump technology, the DCU can be powered through a range of energy sources while maintaining a rate of delivery equal to that of mechanised emulsion technology. This places the DCU in a class of its own and allows the unit to function with an independent hydraulic power pack driven by an electric motor, air, or hydro-power.

In order to eliminate down time and the possibility of lost blasts BME’s DCU has been designed to facilitate the operation of two mobile pumps on a single charging unit. These are in turn controlled through BME’s new Intelligent Control and Recording system (ICR) that allows a pre-determined mass of emulsion to be loaded per blasthole.

**PRODUCT FEATURES**

**FEATURES**
- Primarily for use in the underground development environment.
- Double mobile pump system optional
- Increased reliability and reduced down time
- Low maintenance costs
- Low capital requirements
- Intrinsically safe pump operation in instances of:
  - Dry running
  - Dead heading
- High flow rate
- Short lead time for manufacture
- ICR – intelligent Control and Reporting

**EMULSION**
- Emulsion tank capacity: 1800 L
- Sensitiser tank capacity: 40 L
- Water tank capacity: 100 L
- Pumping rate: 30 kg/min
- Drive systems: Electric/Air/Hydro
- Max. hose length: 15 m (5/8” – 1”)
- Compatible emulsions: INNOVEX™UG Emulsions
- Pre-set mass of emulsion/hole

**PUMP SAFETY FEATURES**
- Intrinsically safe pump technology
- Safe in instances of dry running
- Safe in instances of dead heading
- Pressure bursting disk
- Failsafe control system
- Charging lance flushing system
**MAXICHARGER T3000**

Rail bound

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**PRODUCT DESCRIPTION**

The MAXICHARGER is one of a range of compact charging systems developed for use with BME’s INNOVEX™ UG emulsion formulations. BME’s Mobile Pump Model 2 utilised on the MAXICHARGER is a positive displacement pump designed to deliver emulsion and sensitising solution simultaneously through the charging lance where it is sensitised to form an explosive on entering the blasthole.

Due to the low energy requirements necessary for the operation of BME’s mobile pump technology, the MAXICHARGER can be powered through a range of energy sources while maintaining a rate of delivery equal to that of mechanised emulsion technology. This places the MAXICHARGER in a class of its own and allows the unit to function with an independent hydraulic power pack driven by an electric motor, air or hydro-power.

In order to eliminate down time and the possibility of lost blasts BME’s MAXICHARGER has been designed to facilitate the operation of two Mobile Pumps on a single charging unit. These are in turn controlled through BME’s new Intelligent Control and Recording system (ICR) that allows a pre-determined mass of emulsion to be loaded per blasthole.

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**PRODUCT FEATURES**

**APPLICATION**

Primarily for use in the underground development environment.

**FEATURES**

- Double mobile pump system
- Increased reliability and reduced down time
- Low maintenance costs
- Low capital requirements
- High flow rate
- Short lead time for manufacture
- ICR – Intelligent Control and Reporting

**DESIGN FEATURES**

<table>
<thead>
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<th>Feature</th>
<th>Specification</th>
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<tr>
<td>Emulsion tank capacity</td>
<td>3000 kg</td>
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<tr>
<td>Sensitiser tank capacity</td>
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<td>Water tank capacity</td>
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<tr>
<td>Pumping rate</td>
<td>45 kg/min</td>
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<tr>
<td>Drive systems</td>
<td>Electric/Air/Hydro</td>
</tr>
<tr>
<td>Max hose length</td>
<td>15 m (¾” – 1”)</td>
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<tr>
<td>Compatible emulsions</td>
<td>INNOVEX™ UG Emulsions</td>
</tr>
<tr>
<td>Pre-set mass of emulsion/hole</td>
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</tr>
</tbody>
</table>

**PUMP SAFETY FEATURES**

- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Pressure bursting disk
- Failsafe control system
- Charging lance flushing system
FILLING STATION
FS3000

PRODUCT DESCRIPTION
BME’s Filling Station is designed to operate in conjunction with BME’s Portable Charging Unit (PCU) in narrow reef mining operations. Filling Stations are permanently located near the entrance to operating sections and refilled through the use of mobile transfer cassettes. Through BME’s ‘Closed Emulsion System’, INNOVEX™ UG emulsion is pumped from the Filling Station into re-useable emulsion bags for distribution to working places where the bags are connected to the PCU to load the blastface. The stability of the INNOVEX™ formulation is fundamental to the success of the ‘Closed Emulsion System’, preventing the generation of waste through the transfer of emulsion and the contamination of emulsion before entering the PCU.

PRODUCT FEATURES

TECHNICAL INFORMATION
- Safety release on bag filling head
- Emulsion tank capacity 3000 kg
- Drive system Pneumatic/Electric
- Minimum operating pressure 3 Bar
- Compatible emulsions INNOVEX™ UG Emulsions

DESIGN SPECIFICATIONS
- Low maintenance requirements
- Low capital outlay
- Intrinsically safe pump operation in instances of:
  - Dry running
  - Dead heading
- Short lead time for manufacture

INNOVEX™ UG Emulsions

(UNDERGROUND)
PRODUCT FEATURES

APPLICATION
BME’s MAXICHARGER is designed primarily for use in the narrow reef mining environment for confined blasting practices, but is compatible with BME’s mechanised emulsion systems for larger developments. Due to the unit’s flexibility, it can be successfully applied to numerous blasting scenarios.

FEATURES
- Portable
- Reliable pump control mechanism
- Pre-set mass of explosives per blast hole
- Reduced charging time
- Simplified logistics through UN 5.1 classification
- Short lead time for manufacture
- BME advanced pump control system with data recording and reporting system for increasing operational efficiencies

SAFETY FEATURES
- Intrinsically safe pump technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Bursting disk pressure
- Non-flammable, biodegradable hydraulic oil

MAXICHARGER P120

PRODUCT DESCRIPTION
BME’s MAXICHARGER represents the forefront of pumpable emulsion technology available for use in narrow reef mining operations. BME’s MAXICHARGER is designed in-house for the delivery in BME’s range of INNOVEX™ UG emulsion formulations, increasing the safety of daily blasting practices through their UN 5.1 classification. The MAXICHARGER is a positive displacement pump designed to work with BME’s patented ‘Closed Emulsion System’ but can be modified to run off a traditional emulsion tank set-up for larger development ends. The system eliminates waste while simultaneously delivering a predetermined mass of double salt emulsion and sensitising agent to each blasthole, sensitising the emulsion as it enters the blasthole. The MAXICHARGER is manufactured for rough underground conditions but is compact enough to be carried and operated by mining personnel.

DESIGN SPECIFICATIONS
- Pre-set mass of explosives per hole: 820 g
- Emulsion capacity (bag configuration): 120 kg
- Emulsion flow rate: 45 kg/min
- Charging hose length – min: 2.5 m
- Charging hose length – max: 30 m
- MAXICHARGER P120 dimensions:
  - Length: 1.3 m
  - Width: 0.77 m
  - Height: 0.5 m
- Dry weight: 80 kg approx.
- Drive system: Pneumatic / Hydraulic
- Power requirement: 3 HP
- Minimum operating pressure: 5 bar
- Maximum operating pressure: 8 bar
- Compressed air requirements: 40 cfm

SPECIAL FEATURES
- Ability to run with emulsion bags or coupled to larger tanks
- High emulsion capacity – up to six emulsion bags at once (120 kg of emulsion)
- Ability to integrate with high capacity emulsion tanks fixed to underground carriers
- Can be used with charging lances’ in excess of 40 m
- High loading rate within confined charging operations
MINICHARGER PCU
Model PP-4

APPLICATION
BME’s PCU is designed primarily for use in the confined narrow reef mining environment, but is compatible with BME’s mechanised emulsion systems for confined blasting practices. In order to optimize the use of the PCU in confined environments the PCU can be operated by a single operator minimising labour requirements.

FEATURES
- Portable and light weight
- Intrinsically safe design
- Simple and fail-safe pump control mechanism
- Reduced charging time
- Low energy consumption
- Simplified logistics through UN 5.1 classification
- Low operating and maintenance costs
- Short lead time for manufacture

DESIGN SPECIFICATIONS
- Remote pump activation
- Pre-set mass of explosive per hole: 820 g
- Emulsion flow rate: 20 kg/min
- Charging hose length – min: 2.5 m (1.5 + 1)
- Charging hose length – max: 5.5 m (1.5 + 4)
- PCU dimensions:
  - Length: 700 mm
  - Width: 420 mm
  - Height: 290 mm
- Dry weight: 14 kg
- Drive systems: Air/Hydropower
- Power requirements: < 0.4 Kw
- Minimum operating pressure: 3.2 Bar (320 Kpa)
- Maximum operating pressure: 8.0 Bar (800 Kpa)
- Compressed air requirements: < 36 L/min
- High pressure water requirement: < 3 L/min
- Pre-set mass of explosive per blasthole

PRODUCT FEATURES

SPECIAL FEATURES
Supply of emulsion to the PCU is maintained through the use of BME’s patented ‘Closed Emulsion System’. The patented automatic valve system in the re-useable emulsion bag prevents spillage, contamination of emulsion and maximises the service interval of the PCU.

SAFETY FEATURES
- Intrinsically Safe Pump Technology
  - Safe in instances of dry running
  - Safe in instances of dead heading
- Bursting Disk Pressure
- Failsafe Control System

PRODUCT DESCRIPTION
BME’s MINICHARGER PCU represents the forefront of pumpable emulsion technology available for use in narrow reef mining operations. BME’s PCU is designed in house for the delivery of BME’s range of INNOVEX™ UG emulsion formulations, increasing the safety of daily blasting practices through their UN 5.1 classification. The PCU is a positive displacement pump designed to work with BME’s patented ‘Closed Emulsion System’. The system eliminates waste while simultaneously delivering a predetermined mass of double salt emulsion and sensitising agent to each blasthole, sensitising the emulsion as it enters the blasthole. The PCU is manufactured for rough underground conditions but is also light and compact enough to be carried and operated by mining personnel.
ELECTRIC CENTRALIZED BLASTING SYSTEM

FEATURES

The Centralized Blasting System is modular in design. It consists of:
- A Centralized Control Box which is installed on surface,
- Several Centralized Section Boxes (one for each level/section),
- Centralized Blasting Boxes located at blasting points throughout the mine.

The outgoing supply cable is independently fed from inter-level cable during the monitoring mode and enables easy fault finding. Information and data downloading occurs within the blasting boxes. The system operates over a wide supply voltage range of 160-250VAC.

SAFETY FEATURES

- Central point for blasting (centralized blasting), with the blasting signal power available from only this one point (surface control room)
- Can be individually isolated from the supply cable network using the key switch
- Unit will only fire if connected to a CBS
- The firing key is removable in the OFF position only, ensuring that unauthorised firing cannot take place
- Blasting Box enclosure cannot close with firing key in position
- Firing cannot be initiated when either a cable fault or an alarm is set.
- The cable fault and alarm condition must be cleared prior to switching to ready mode
- If mains is interrupted at any time the alarm light and buzzer will be activated until the reset button is pressed

PRODUCT DESCRIPTION

The BME Electric Centralized Blasting System (CBS) provides continuous near real-time local system monitoring with remote access monitoring capabilities. The continuous monitoring feature built into the system ensures that an up-to-date Centralized Blasting System status and overview is available. This feature greatly improves the pre- and post-blasting decision making process. It also provides section and / or level isolation and data information from the connected blasting boxes. Continuous outgoing monitoring of the downstream blasting boxes for short circuit and earth leakage detection.
The XPLOLOG™ pump controller is one of the electronic offerings that form part of the BME XPLOLOG™ underground electronic control and information systems. The pump controller is used to electronically control and monitor the delivery of emulsion from the charging vehicle to the face and is compatible with BME’s range of mechanised charging units. The controller is powered from the vehicle battery and is mounted onto the side near the rear of the vehicle. From the controller interface the delivery of emulsion can be customised and monitored as the face is loaded. Hole mass can be adjusted, the pump can be started and stopped, and samples can be taken. Environmental monitoring of pressure and temperature is also displayed on screen. All operational data is logged inside the controller and packaged for interpretation by BME.

**PRODUCT FEATURES**

**APPLICATION**
Primarily used for electronic control and monitoring of BME underground emulsions delivery systems.

**FEATURES**
- Wireless Bluetooth interface
- 7” Colour display
- Single or dual (uphole) pump control
- Dual density
- Data mining
- Link to BME informatics network

**DESIGN FEATURES**
- Single hole pump capacity: 99.9 kg
- Waterproof enclosure: IP67
- Connector grade: Military

**SAFETY FEATURES**
- Resettable electric fusing
- Short circuit protection
- Electronic pressure trip level
- Electronic temperature trip level
FOR EXPLOSIVES SERVICES AND ADVICE

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