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25800 Science Park Drive
Cleveland, Ohio, USA 44122
Phone: 216-464-2400
Fax: 216-464-4418
Email: info@austinpowder.com

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www.austinpowder.com/blastersguide
<table>
<thead>
<tr>
<th>PIB Title</th>
<th>Catalog Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>E ★ Star Seismic Detonator</td>
<td>3-7</td>
</tr>
<tr>
<td>Enviroseis</td>
<td>8-9</td>
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<tr>
<td>Seis-Gel</td>
<td>10-11</td>
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<tr>
<td>Seismic Detonating Cord</td>
<td>12-13</td>
</tr>
<tr>
<td>Seisprime</td>
<td>14-15</td>
</tr>
<tr>
<td>Static ★ Star Detonators</td>
<td>16-17</td>
</tr>
</tbody>
</table>
E★Star® Seismic Detonators

DESCRIPTION

E★Star Seismic electronic detonators have been designed to provide the precise control necessary to produce the most accurate and consistent seismic record. The E★Star Seismic detonator may be programmed in 1-millisecond increments from 1 millisecond to 10 seconds using the dedicated DLG 1600-100-S Logger. Unique serial number for each E★Star Seismic detonator provides “Cradle to Grave” traceability.

BENEFITS

- 750 mg PETN base charge far exceeds the standard #8 strength detonator.

- Industries most user-friendly and rugged electronic seismic detonator.

- Designed to fire pattern shots up to ten detonators simultaneously.

- Legwire - HDPE insulation for added protection from current leakage. 0.8 mm diameter copper wire (#20 AWG).

- Advanced pre-fire diagnostics coupled to the communication protocol.

E★Star Seismic Detonators contain a capacitor, a logic and timing circuit, and pyrotechnic ignition system manufactured by Austin Star Detonator. This electronic ignition module is integrated with Austin Powders’ detonator technology to provide a complete unit. When the capacitor is charged by the DBM 10-S Digital Blasting Machine, the internal capacitor provides the energy that initiates the “bridge wire” and subsequently detonates the base charge.
E★Star Seismic Detonators

DLG1600-100S E★Star Seismic Logger

DBM 10-S Digital Blasting Machine

WARNING: Use of this logger requires operator trained in blasting techniques. CONNECT ONLY TO E★STAR DETONATORS.
E★Star DBM 10-S DIGITAL BLASTING MACHINE

WARNING: Use of this machine requires operator trained and certified in blasting techniques. CONNECT ONLY TO E★STAR DETONATORS. Do NOT use this machine with standard or other electronic detonators.

Maximum load: 10 E★STAR detonators

E★STAR BLASTING MACHINE
Model DBM10-S
Serial No.
Austin Powder Co., Cleveland, OH

OPERATING INSTRUCTIONS
READ THESE INSTRUCTIONS BEFORE USE.
Refer to Operation Manual for additional detailed information.

1. Ensure that no more than TEN (10) detonators are connected.
2. Batteries alone can fire detonators. KEEP BATTERIES AWAY FROM THE BLASTING CIRCUITS.
3. Never connect blasting circuit to Blasting Machine until you are ready to fire.
4. MAKE SURE BLAST AREA IS CLEAR AND ALL PERSONNEL HAVE BEEN REMOVED TO A SAFE LOCATION.
5. If Blasting Machine is on Standby (STANDBY indicator is flashing), go to step 7.
6. Depress C/N/OFF switch to turn Blasting Machine on.
7. Depress ARM switch to verify and charge detonators.
8. Observe display. If "FAILED LINE TEST" or "LINE OVERLOAD" appears, standard electric detonators may be connected, or the blasting circuit has excessive leakage current.
9. The ARMING indicator is on steady during verifying and charging.
10. The Blasting Machine is ready to receive the high voltage fire signal when the READY TO FIRE indicator comes on.
11. The Blasting Machine goes to Standby 30 seconds after the fire signal is received.
12. The Blasting Machine turns off after 30 minutes of inactivity.
13. The Blasting Machine may be turned off by depressing the C/N/OFF switch until the unit powers down.
14. If the Blasting Machine should fail to fire, notify personnel of the blast delay and receive all issues.

Power: External 10-18VDC 0.7A
Austin Powder Company - Cleveland, Ohio
WARNING: Use of this logger requires operator trained in blasting techniques. CONNECT ONLY TO E*STAR DETONATORS.

4 Lines 20 Characters Liquid Crystal Display (LCD)

Power and Backlight On and Off Key

Keypad

Blasting Machine, Logger and Battery Charger Connector

Battery Charging Indicators (LED's)
E★Star Seismic Detonators

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Electro★Star Seismic Required Equipment

The use of this system requires specific training in all components. This training is in addition to the normal, required training that all blasters and blasting personnel have received.

Only equipment specifically designed for use with Austin Powder E★Star Seismic Detonators is permitted. The currently approved equipment is a DLG 1600-100-S logger and a DBM10-S Digital Blasting Machine* manufactured by Dan-Mar Co., Inc. An “operators” manual is to be available at all times when using this equipment.

*Warning: The DBM10-S Digital Blasting Machine is designed for use only with E★Star Seismic detonators. Do Not attempt to use this blasting machine with any other detonator. The misuse of this blasting machine with standard electric detonators may result in instantaneous detonator initiation.

<table>
<thead>
<tr>
<th>Electro★Star Packaging</th>
<th>Length Case Weight</th>
<th>Case Weight</th>
<th>Wire Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ft] [m] [lb] [kg]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>7.6 21.52 9.77</td>
<td>70 Fast 8</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>10.7 24.76 11.24</td>
<td>60 Fast 8</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>13.7 26.03 11.82</td>
<td>50 Fast 8</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>16.8 25.34 11.51</td>
<td>40 Fast 8</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>19.8 34.12 15.49</td>
<td>45 Spooled</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>25.9 42.94 19.50</td>
<td>45 Spooled</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>30.5 49.56 22.50</td>
<td>45 Spooled</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>36.6 27.91 12.67</td>
<td>20 Spooled</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>42.7 31.83 14.45</td>
<td>20 Spooled</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>48.8 35.75 16.23</td>
<td>20 Spooled</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>54.9 39.67 18.01</td>
<td>20 Spooled</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>61.0 43.59 19.79</td>
<td>20 Spooled</td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>67.1 47.51 21.57</td>
<td>15 Spooled</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>73.2 51.43 23.35</td>
<td>15 Spooled</td>
<td></td>
</tr>
</tbody>
</table>

STORAGE
Store in accordance with all applicable local, state, provincial and federal laws.

SHELF LIFE
For optimum accuracy, use within five years from date of manufacture under good storage conditions.

UN CLASSIFICATION
Shipping Name: Detonators, Electric
Class & Division: 1.4B
ID Number: UN 0255
DOT REFERENCE NUMBER
EX-0103067

For more information and service locations in your area, please contact Austin Powder Company’s headquarters:

Austin Powder Company
25800 Science Park Drive
Cleveland, Ohio, USA 44122

Phone: 1-800-321-0752
Fax: 1-216-464-4418
Web: www.austinpowder.com
Email: info@austinpowder.com
DESCRIPTION

Enviroseis is a detonator sensitive, high viscosity explosive packaged in paper shells or rigid plastic cartridges.

BENEFITS

- High detonation velocity produces excellent seismic pulse images.
- Does not contain molecular explosives, nitroglycerin or perchlorates.
- Predominate detonation by-products are water vapor, carbon dioxide and nitrogen.
- Desensitizes and decomposes in shorter time period as compared to conventional seismic explosives.

PROPERTIES

<table>
<thead>
<tr>
<th>Density [g/cc]</th>
<th>Temperature Sensitivity</th>
<th>Pressure [kb]</th>
<th>Water Resistance</th>
<th>VOD [ft/s] [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.16</td>
<td>-20 F / -29 C</td>
<td>100</td>
<td>Excellent</td>
<td>19,200 5,910</td>
</tr>
</tbody>
</table>

PRIMING

Use a high-strength detonator (Seismic*Star ESP™ or equivalent).
**PACKAGING**

<table>
<thead>
<tr>
<th>Cartridge Style</th>
<th>Cartridge Size</th>
<th>Cartridge Weight</th>
<th>Case Count</th>
<th>Case Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Shell *</td>
<td>27 x 1/8 in</td>
<td>.28 lb / .13 kg</td>
<td>160</td>
<td>44 / 20</td>
</tr>
<tr>
<td>Plastic Cartridge *</td>
<td>51 x 1/4 in</td>
<td>.55 lb / .25 kg</td>
<td>80</td>
<td>44 / 20</td>
</tr>
<tr>
<td>Plastic Cartridge *</td>
<td>51 x 1/2 in</td>
<td>1.1 lb / .50 kg</td>
<td>40</td>
<td>44 / 20</td>
</tr>
<tr>
<td>Plastic Cartridge</td>
<td>2 1/4 x 1.1 lb</td>
<td>*</td>
<td>40</td>
<td>44 / 20</td>
</tr>
<tr>
<td>Plastic Cartridge *</td>
<td>2 1/4 x 2 1/2 lb</td>
<td>*</td>
<td>20</td>
<td>50 / 22.7</td>
</tr>
<tr>
<td>Plastic Cartridge *</td>
<td>60 x 1 in</td>
<td>2.2 lb / 1.00 kg</td>
<td>20</td>
<td>44 / 20</td>
</tr>
<tr>
<td>Plastic Cartridge *</td>
<td>60 x 2 in</td>
<td>4.4 lb / 2.00 kg</td>
<td>10</td>
<td>44 / 20</td>
</tr>
</tbody>
</table>

* 60 mm Plastic Cartridge has a threaded fast lock connector.

**STORAGE**

Store in accordance with all applicable local, state, provincial and federal laws.

**SHELF LIFE**

One year from date of manufacture under good storage conditions.

**UN CLASSIFICATION**

- **Shipping Name:** Explosive, Blasting, Type E
- **Class & Division:** 1.1D
- **ID Number:** UN 0241

**DOT REFERENCE NUMBER**

EX-9305177

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DESCRIPTION

Seis-Gel is a high velocity, 60% seismic explosive. The special formulation of this nitroglycerin based product assures reliable detonation after prolonged immersion under high hydrostatic pressures. Seis-Gel is characterized by high velocity and consistent performance under severe winter conditions or in hot, humid areas.

BENEFITS

- Detonates consistently to produce a sharp pulse of seismic energy.
- Available in plastic threaded cartridges or paper shell.
- Ideal for deep hole work and prolonged sleep time.

PROPERTIES

<table>
<thead>
<tr>
<th>Density [g/cc]</th>
<th>Pressure [kb]</th>
<th>Water Resistance</th>
<th>VOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>115</td>
<td>Excellent</td>
<td>20,000 [ft/s]</td>
</tr>
</tbody>
</table>

PRIMING

Use a high-strength detonator (Seismic*Star ESP™ or equivalent).
### Seis-Gel

**PACKAGING**

<table>
<thead>
<tr>
<th>Cartridge Style</th>
<th>Cartridge Size</th>
<th>Case Count</th>
<th>Case Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Shell *</td>
<td>* 51 x ¼ kg</td>
<td>80</td>
<td>20 kg</td>
</tr>
<tr>
<td>Paper Shell *</td>
<td>* 51 x ½ kg</td>
<td>40</td>
<td>20 kg</td>
</tr>
<tr>
<td>Paper Shell</td>
<td>* 51 x 1 kg</td>
<td>20</td>
<td>20 kg</td>
</tr>
<tr>
<td>Paper Shell</td>
<td>* 51 x 2 kg</td>
<td>10</td>
<td>20 kg</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>2 ¼ x 1 lb</td>
<td>*</td>
<td>50 50 lb</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>2 ¼ x 2½ lb</td>
<td>*</td>
<td>20 50 lb</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>2 ¼ x 5 lb</td>
<td>*</td>
<td>10 50 lb</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>* 60 x ½ kg</td>
<td>40</td>
<td>20 lb</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>* 60 x 1 kg</td>
<td>20</td>
<td>20 lb</td>
</tr>
<tr>
<td>Plastic Threaded Cartridge</td>
<td>* 60 x 2 kg</td>
<td>10</td>
<td>20 lb</td>
</tr>
</tbody>
</table>

**STORAGE**

Store in accordance with all applicable local, state, provincial and federal laws.

**SHELF LIFE**

Two years from date of manufacture under good storage conditions.

**UN CLASSIFICATION**

- **Shipping Name:** Explosive, Blasting, Type A
- **Class & Division:** 1.1D
- **ID Number:** UN 0081

**DOT REFERENCE NUMBER**

EX-1984110031

---

For more information and service locations in your area, please contact Austin Powder Company's headquarters:

**Austin Powder Company**

25800 Science Park Drive  
Cleveland, Ohio, USA 44122

Phone: 1-800-321-0752  
Fax: 1-216-464-4418  
Web: www.austinpowder.com  
Email: info@austinpowder.com

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DESCRIPTION

Austin Powder manufacturers a wide variety of detonating cord to meet the requirements of the seismic industry. Detonating cord is used to initiate detonator sensitive seismic explosives. Detonating cord is also used to provide a path of initiation for non-electric initiation. Detonating cord has a core of PETN (pentaerythritol tetranitrate) encased in multiple polypropylene yarns, over-extruded with a polyethylene jacket and high strength textile yarns.

BENEFITS

- Water and abrasion resistant.
- High tensile strength.
- Color coded for easy identification.
- Electronically & mechanically inspected.
- Insensitive to extraneous current.
- Assures reliable non-electric initiation.
- Ideally suited for use with 3-D Star SSD.

TYPICAL USES

Lite Line®: Downline under all but the most severe conditions.

A-Cord™: Small, medium and large hole downlines.

50 Reinforced™: Excellent general purpose detonating cord for reliable blast initiation under virtually all conditions.

All detonating cords are available with “FS” (Flash Suppressant outer jacket) upon request.
## Seismic Detonating Cord

### Properties & Packaging

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lite Line</td>
<td>15</td>
<td>3.2</td>
<td>0.155 +/- 0.015</td>
<td>230</td>
<td>(2) 2000' Spools</td>
<td>30</td>
<td>Pink</td>
</tr>
<tr>
<td>A-Cord</td>
<td>25</td>
<td>5.3</td>
<td>0.165 +/- 0.015</td>
<td>230</td>
<td>(2) 1000' Spools</td>
<td>22</td>
<td>Green</td>
</tr>
<tr>
<td>50 Reinforced</td>
<td>50</td>
<td>10.6</td>
<td>0.197 +/- 0.015</td>
<td>200</td>
<td>(2) 1000' Spools</td>
<td>30</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

* Available in other sizes upon request.

---

### Storage

Store in accordance with all applicable local, state, provincial and federal laws.

### Shelf Life

Five years from date of manufacture under good storage conditions.

### UN Classification

**Shipping Name:** Cord, Detonating  
**Class & Division:** 1.1D  
**ID Number:** UN 0065

### DOT Reference Number

EX-9303282

---

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[1/2/02 | 12/01/16]
Seisprime™

Seisprime is formulated of a composite of high density, high velocity molecular explosives. Seisprime is engineered to produce over 240 kilo bars of detonation pressure. The rigid threaded plastic Seisprime cartridge is designed to accept an anchor point or top anchor, and is provided with two detonator wells. Seisprime has the longest “sleep time” of any commercial seismic explosive. The formulation suits the requirements of mini-hole, as well as deep hole seismic exploration. Use a high-strength Seismic detonator of 720mg PETN or greater for reliable initiation.

**DESCRIPTION**

**BENEFITS**

- 24,500 fps detonation velocity produces excellent seismic pulse images.

- Formulated to achieve a higher detonation temperature and lower post detonation gas production than standard seismic Pentolite, Dynamites or Emulsions.

- Does not contain nitroglycerine or perchlorates.

- Full function reliability in all typical geophysical hole depths/water conditions.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7,538 / 24,500</td>
<td>240</td>
<td>619</td>
<td>6.33</td>
<td>1.73</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

*Detonation pressure, total gas generation and energy values are calculated using Tiger™, a well established thermodynamic computer code. Other computer codes may give different values.
Seisprime

PACKAGING

<table>
<thead>
<tr>
<th>Product (kg / lbs.)</th>
<th>Cartridge Size** (mm / in.)</th>
<th>Quantity per case</th>
<th>Case Weigh (kg / lbs.)</th>
<th>Case Size (cm / inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seisprime (0.5 / 1.1)</td>
<td>57 / 2 ¼</td>
<td>40</td>
<td>21.5 / 47.4 lb</td>
<td>32.4 x 44.4 x 29.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 ¾ x 17 ½ x 11 ¾</td>
</tr>
<tr>
<td>Seisprime (1.0 / 2.2)</td>
<td>57 / 2 ¼</td>
<td>20</td>
<td>21.5 / 47.4 lb</td>
<td>32.4 x 44.4 x 29.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 ¾ x 17 ½ x 11 ¾</td>
</tr>
<tr>
<td>Seisprime (2.0 / 4.4)</td>
<td>57 / 2 ¼</td>
<td>10</td>
<td>21.5 / 47.4 lb</td>
<td>33 x 78.1 x 11.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 x 30 ¾ x 4 ¾</td>
</tr>
<tr>
<td>Seisprime (2.5 / 5.5)</td>
<td>57 / 2 ¼</td>
<td>10</td>
<td>25.9 / 57.0 lb</td>
<td>33 x 78.1 x 11.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 x 30 ¾ x 4 ¾</td>
</tr>
</tbody>
</table>

*Available in other sizes upon request.

STORAGE
Store in accordance with all applicable local, state, provincial and federal laws.

SHELF LIFE
Indefinite from date of manufacture under good storage conditions.

UN CLASSIFICATION
Shipping Name: Boosters
Class & Division: 1.1D
ID Number: UN 0042

DOT REFERENCE NUMBER
EX-1993030285

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[12/01/16]
DESCRIPTION

The Static★Star detonator is specifically designed for the harsh conditions encountered in a modern 3-D seismic survey. The two part pressed fit sealing plug, combined with a newly designed adhesion compound, ensures protection from the environment of salt and brackish waters for extended periods of time. With the largest base charge in the industry, Static★Star electric detonators will initiate all detonator sensitive seismic explosives.

BENEFITS

- 900 mg RDX and/or PETN base charge far exceeds the standard #8 strength detonator.
- Designed for extended sleep time in salt / brackish water use.
- Consistent break time when firing with 3-10 amperes DC current.
- No fire current of 0.45 amperes for extra protection from electrostatic discharge.
- Two part sealing plug for protection from water.
- Resistant to temperature extremes from -40°F / -40°C to 150°F / 66°C.
- # 20 AWG, high abrasion resistant, Yellow HDPE insulated wire.
- Protected primary explosive charge.
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Properties & Packaging

<table>
<thead>
<tr>
<th>Length</th>
<th>Ohms Resistance (Ω)</th>
<th>Case Count</th>
<th>Case Weight</th>
<th>NEQ per Case (gr)</th>
<th>Wire Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ft</td>
<td>Mt</td>
<td>Lbs</td>
<td>Kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3.7</td>
<td>0.84</td>
<td>20</td>
<td>5.3</td>
<td>2.4</td>
</tr>
<tr>
<td>24</td>
<td>7.3</td>
<td>1.08</td>
<td>20</td>
<td>5.7</td>
<td>2.6</td>
</tr>
<tr>
<td>35</td>
<td>10.7</td>
<td>1.31</td>
<td>15</td>
<td>5.7</td>
<td>2.6</td>
</tr>
<tr>
<td>45</td>
<td>13.7</td>
<td>1.50</td>
<td>10</td>
<td>4.5</td>
<td>2.1</td>
</tr>
<tr>
<td>55</td>
<td>16.8</td>
<td>1.72</td>
<td>10</td>
<td>5.4</td>
<td>2.5</td>
</tr>
<tr>
<td>65</td>
<td>19.8</td>
<td>1.92</td>
<td>10</td>
<td>6.3</td>
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</table>

*Other lengths available upon request

Case Dimension: 11 ¼” x 7 5/8” x 5” 286mm x 194mm x 127mm

**STORAGE**

Store in accordance with all applicable local, state, provincial and federal laws.

**SHELF LIFE**

For optimum accuracy, use within five years from date of manufacture under good storage conditions.

**DOT REFERENCE NUMBER**

EX-2014020188

**UN CLASSIFICATION**

*Shipping Name*: Detonators, Electric  
*Class & Division*: 1.4B  
*ID Number*: UN 0255

For more information and service locations in your area, please contact Austin Powder Company’s headquarters:

Austin Powder Company  
25800 Science Park Drive  
Cleveland, Ohio, USA 44122  
Phone: 1-800-321-0752  
Fax: 1-216-464-4418  
Web: www.austinpowder.com  
Email: info@austinpowder.com