Self Destruct Fuze for M864 Projectiles / MLRS Rockets

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Self Destruct Fuze

- Why is SDF Important?
- Current Programs
  - GMLRS
  - M864
- ATK Solutions
  - Design
  - Safety
- Test Results
Why is SDF Important?

- The occurrence of Unexploded Ordnance (UXO) on the battlefield is too high
  - Published estimates place dud rate of current fuze (M223) at 4%
  - Based on Operation Desert Storm (ODS) data, just a 2% dud rate would leave approx. 170,000 duds on the battlefield*
  - Costs to clear UXO from combat areas is extremely high
  - UXO is both a combat and a humanitarian issue
  - DoD Policy is to reduce UXO to less than 1% beginning in FY05

- Self-destruct fuze required to meet the < 1% UXO DoD policy

* US GAO Report, September 2002
Current US Army Programs to Reduce UXO

- **GMLRS Rocket**
  - Provide SDF’s on new and recapitalized M77 grenades
  - Support US and NATO production of GMLRS beginning in FY05
  - Support FMS for inclusion in MLRS and ERMLRS

- **M864 Artillery**
  - Provide SDF’s on recapitalized M42/M46 grenades
  - Support US recapitalization of M864 artillery rounds
  - Recapitalize 180,000 M864 rounds with SDF’s
Program Requirements

➢ GMLRS
   • Primary Mode Reliability – 95% minimum
   • Hazardous Duds – 1% maximum
   • Primary mode with self-destruct and self-neutralization functions
   • Compatible with M77 grenade
   • Meet MIL-STD-1316E

➢ M864
   • Primary Mode Reliability – 97% minimum
   • Self Destruct Reliability – 95% minimum
   • Unexploded Ordnance (UXO) – 1% maximum
   • Primary mode with self-destruct and self-neutralization functions
   • Compatible with M42/M46 grenades
   • Meet MIL-STD-1316E
ATK Solution - Fuze Functions

Arming Stage I

Neutralization

Arming Stage II

Impact

Self Destruct
ATK Solution - Fuze Safety

- Two Independent Arming Safeties
- Two Removable Safeties
- Third Arming Safety When Loaded

**GMLRS**
- Safety Pin
- Firing Pin
- Safety Clip
- Neutralizing Pin

**M864**
- Safety Pin
- Centrifugal Lock
- Firing Pin
- Safety Clip

Adjacent Grenade
ATK Solution

- Low part count increases reliability
- Robust fuze housing withstands expulsion environment
- Design has evolved from highly successful M85 SD Fuze, with proven reliability of < 1% Hazardous Duds in over 60 Million fielded units worldwide
- GMLRS - Long delay time and zero spin environment
- M864 - Arming requires no stored energy

Safe, Proven Design – Ready for Production
Excellent Stabilization Provides Impact Reliability

Perpendicular Impact Produces Desired Lethal Effects
### GMLRS Fuze Results

<table>
<thead>
<tr>
<th>Rocket</th>
<th>Range</th>
<th>Temp</th>
<th>Fired</th>
<th>Funct'd</th>
<th>% Funct'd</th>
<th>Neut'd</th>
<th>% Neut'd</th>
<th>Dud</th>
<th>% Dud</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65km</td>
<td>Cold</td>
<td>101</td>
<td>98</td>
<td>97.03%</td>
<td>3</td>
<td>2.97%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>65km</td>
<td>Hot</td>
<td>101</td>
<td>94</td>
<td>93.07%</td>
<td>7</td>
<td>6.93%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>19km</td>
<td>Cold</td>
<td>101</td>
<td>92</td>
<td>91.09%</td>
<td>6</td>
<td>5.94%</td>
<td>3</td>
<td>2.97%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>303</td>
<td>284</td>
<td>93.73%</td>
<td>16</td>
<td>5.28%</td>
<td>3</td>
<td>0.99%</td>
</tr>
</tbody>
</table>

Meets Requirement of < 1% Hazardous Duds
## M864 Fuze Results

<table>
<thead>
<tr>
<th>Mode</th>
<th>Range</th>
<th>Charge</th>
<th>Fired</th>
<th>Funct'd</th>
<th>% Funct'd</th>
<th>UXO</th>
<th>% UXO</th>
<th>Haz Dud</th>
<th>% Haz Dud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>24km</td>
<td>5-H</td>
<td>60</td>
<td>56</td>
<td>93.33%</td>
<td>4</td>
<td>6.67%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SD</td>
<td>24km</td>
<td>5-H</td>
<td>240</td>
<td>240</td>
<td>100.00%</td>
<td>3</td>
<td>1.25%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Tactical</td>
<td>24km</td>
<td>5-H</td>
<td>132</td>
<td>130</td>
<td>98.48%</td>
<td>2</td>
<td>1.52%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>432</td>
<td>426</td>
<td></td>
<td>9</td>
<td>2.08%</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

No Hazardous Duds
ATK’s Self Destruct Fuze for GMLRS and M864

- Designed to replace existing M223 fuze for DPICM grenades
- Adds features for self destruct and self neutralization
- ATK Team has production experience with over 60 Million pyrotechnic delay fuzes

Proven Capability to Lower Hazardous Dud Rate
From 4% to Less Than 1%
End of Presentation