# Insensitive Energetics for Insensitive Munitions

## Outline

- **DMS IM explosives**
  - Press and cast fill

- **DMS IM technology for high-G application**
  - Basis pressable IM explosives

- **DMS PBX charges**
  - Theoretical Material Density
  - Initiation Threshold

- **High-G survivability**

- **IM Applications**
  - Small scale and 155 mm IM
  - Bullet Impact
  - Fast Cook-off
  - Shaped charge jet impact
Insensitive Energetics forInsensitive Munitions

DMS IM Fill Processes

PBX Cure Cast

PBX Pressing
## DMS PBX Family

STANAG 4170 qualified

<table>
<thead>
<tr>
<th>Blast</th>
<th>Fragments</th>
<th>High Speed Fragments</th>
<th>EFP</th>
<th>Booster</th>
</tr>
</thead>
<tbody>
<tr>
<td>87% RDX/HMX/Al</td>
<td>86% RDX/HMX</td>
<td>88 - 92% RDX/HMX</td>
<td>96% HMX</td>
<td>92 - 96% RDX/HMX</td>
</tr>
<tr>
<td>13% Binder</td>
<td>14% Binder</td>
<td>8-12% Binder</td>
<td>4% Binder</td>
<td>4-8% Binder</td>
</tr>
<tr>
<td>cast</td>
<td>cast</td>
<td>cast/pressed</td>
<td>pressed</td>
<td>pressed</td>
</tr>
</tbody>
</table>
DMS IM Technology for High-G Application

▷ Basis: pressable IM explosive fill

▷ Optimization of the WH manufacturing process for IM

▷ Specific warhead design for IM

▷ Packaging / Storage for IM
DMS pressed IM PBX

Example:

HE Charge Density
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DMS IM TECHNOLOGY

TMD [%]

Standard Quality: 98%
Special Quality: >99%
Extra Quality: >99.5%

PBX 96/4 HMX/Bi

HE Charge Density
DMS pressed IM PBX

Example:

Gap Test
DMS IM TECHNOLOGY

Initiation Pressure

[kbar]

Standard Quality Special Quality Extra Quality

20 28 40

PBX 96/4 HMX/Bi

Gap Test
DMS pressed IM PBX

Example:

High-G survivability
High-G Survivability

proof at -51°C / +21°C / +63°C

- Small scale, 76 mm with artificial gaps and cracks up to 50,000 g
- 155 mm IM artillery rounds up to 18,000 g
IM Application

Example:

Bullet Impact

155 mm HE
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DMS IM TECHNOLOGY

155 mm IM

Bullet Impact Test - 12.7 mm AP
IM Application

Example:

Fast Cook-off

155 mm HE
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DMS IM TECHNOLOGY

155 mm IM

Fast Cook-off
IM Application

Example:

Shaped Charge 38.7 mm with 10 mm mild steel barrier

120 mm HE
Insensitive Energetics for Insensitive Munitions

DMS IM TECHNOLOGY

120 mm HE

Shaped Charge Jet Impact Test
Summary

DMS pressable IM explosives for high-G application

- higher energetic than cure cast compositions
- as less vulnerable as cure cast compositions
- easier manufacturing process than cure cast

High-G launch successfully tested up to 18,000 g with 155 mm IM (-51°C / +21°C / +63°C)