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BGT Defence

2009 Insensitive Munitions & Energetic Materials

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Press Technology of IHE Charges

A cost effective economical manufacturing method for IM

Richard Wild, Diehl-BGT-Defence

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IMC – Maasberg is member of the IMEMG

An association of

European industrial companies

working on the field of Insensitive Munitions.

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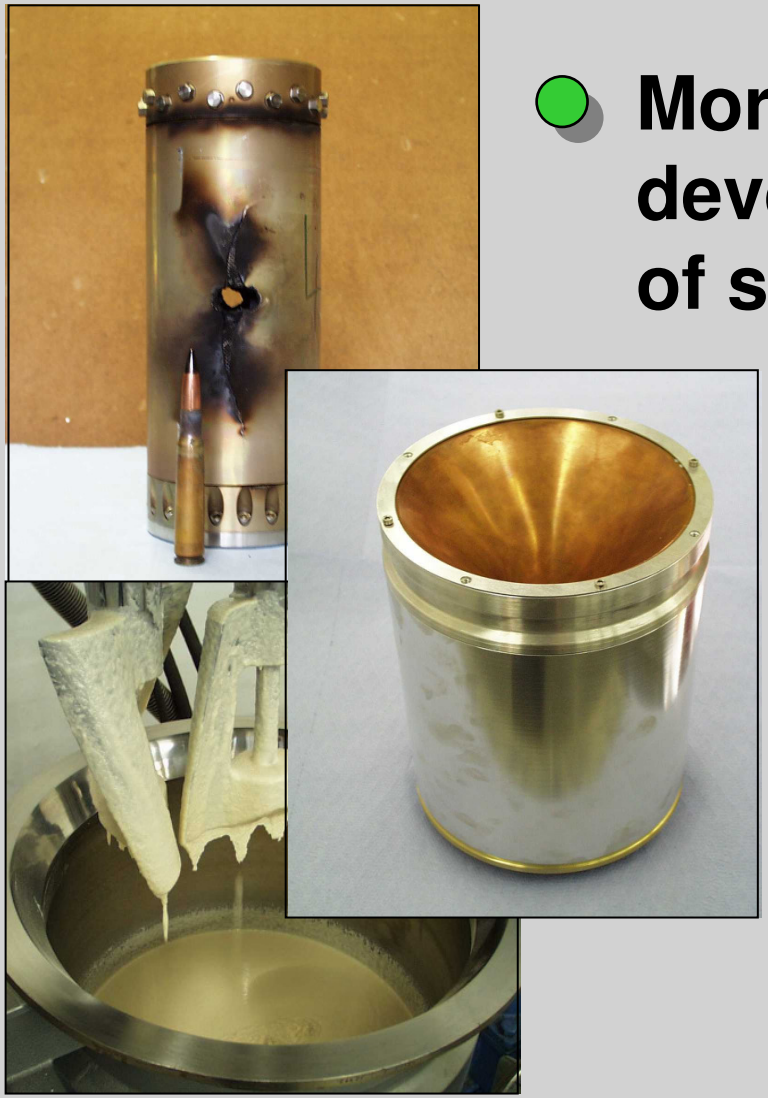

- More than 40 years in development and production of safe ammunition
- STANAG 4170 qualified PBX compositions
- PBX filled Insensitive Munitions
- Test ranges for IM optimization

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- Press Fill

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Press fill is

Efficient

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Press Fill, Molding Powder

- **Water Slurry**
  - safe coating process
- **Granules**
  - homogeneous coating
  - adjustable size
  - no segregation
- **Bulk Material**
  - no dust
  - free flowing
  - high bulk density

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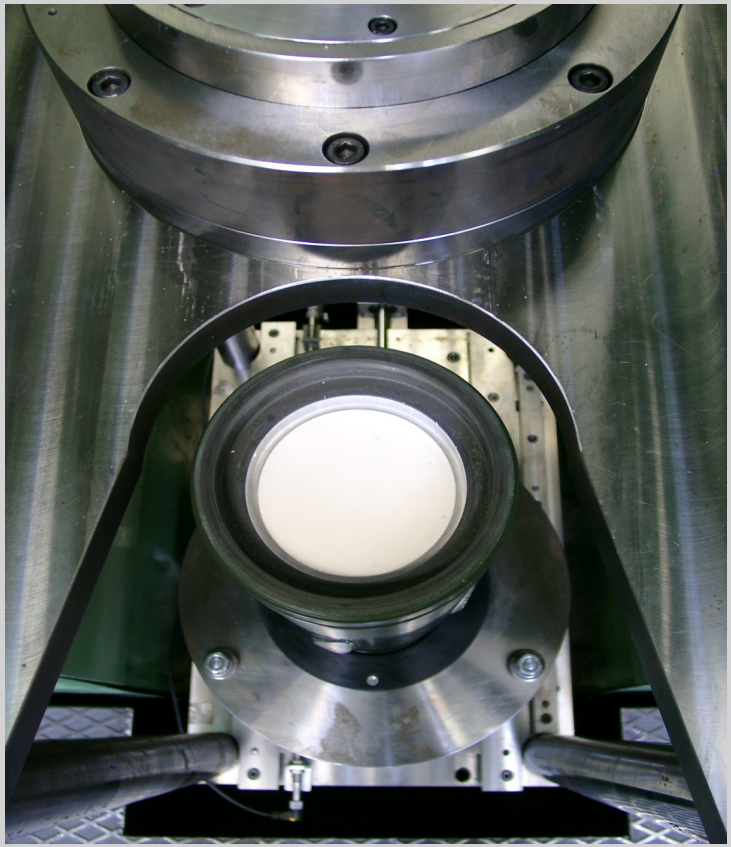
Press Fill, Compacting



- **Pressure**
  - less than 1kbar
  - for 5-10 seconds
  - at ambient temperature
- **Direct into the shell**
  - Compacting from one side
- **Final shape**

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Press fill is

Efficient

- molding powder from a safe and separate water slurry process
- free flowing granules suitable for high speed dosing
- compacting direct into the shell
- final shape compacting
- minor need of cleaning

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Press fill is

Efficient

Economic

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PBX Processing

Press Fill

- Dosing of the Granules (Ambient Temperature)
- Compacting (Ambient Temperature)
- Ready for Assembly

Cast Cure

- Homogenizing of the Components in a Kneader (Elevated Temperature)
- Addition of the Curing Agent (Elevated Temperature)
- Cast in Preheated Shells (Elevated Temperature)
- Polymerisation several days (Elevated Temperature)
- Ready for Assembly

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Press Fill, Focal Points

- **Higher efficiency for increasing production quantities**
  - proportionate costs for the pressing tool
  - no waiting periods (e.g. for curing)
  - no accumulation of IHE-charges
  - quality check immediately possible
- **Warhead Diameter smaller than 200 mm**
  - moderate press size
  - length:diameter ratio about 3:1 for a one step compaction in a shell
- **Warhead mass smaller than 15kg**
  - moderate safety distances
  - possible damage (automatic process remote controlled)

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Press fill is

Economic

- 3 steps to the final HE charge in the shell
- ambient temperature process with little waste
- for high quantities
- for moderate WH diameters
- for moderate safety distances

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Press fill is

Efficient

Economic

Effective

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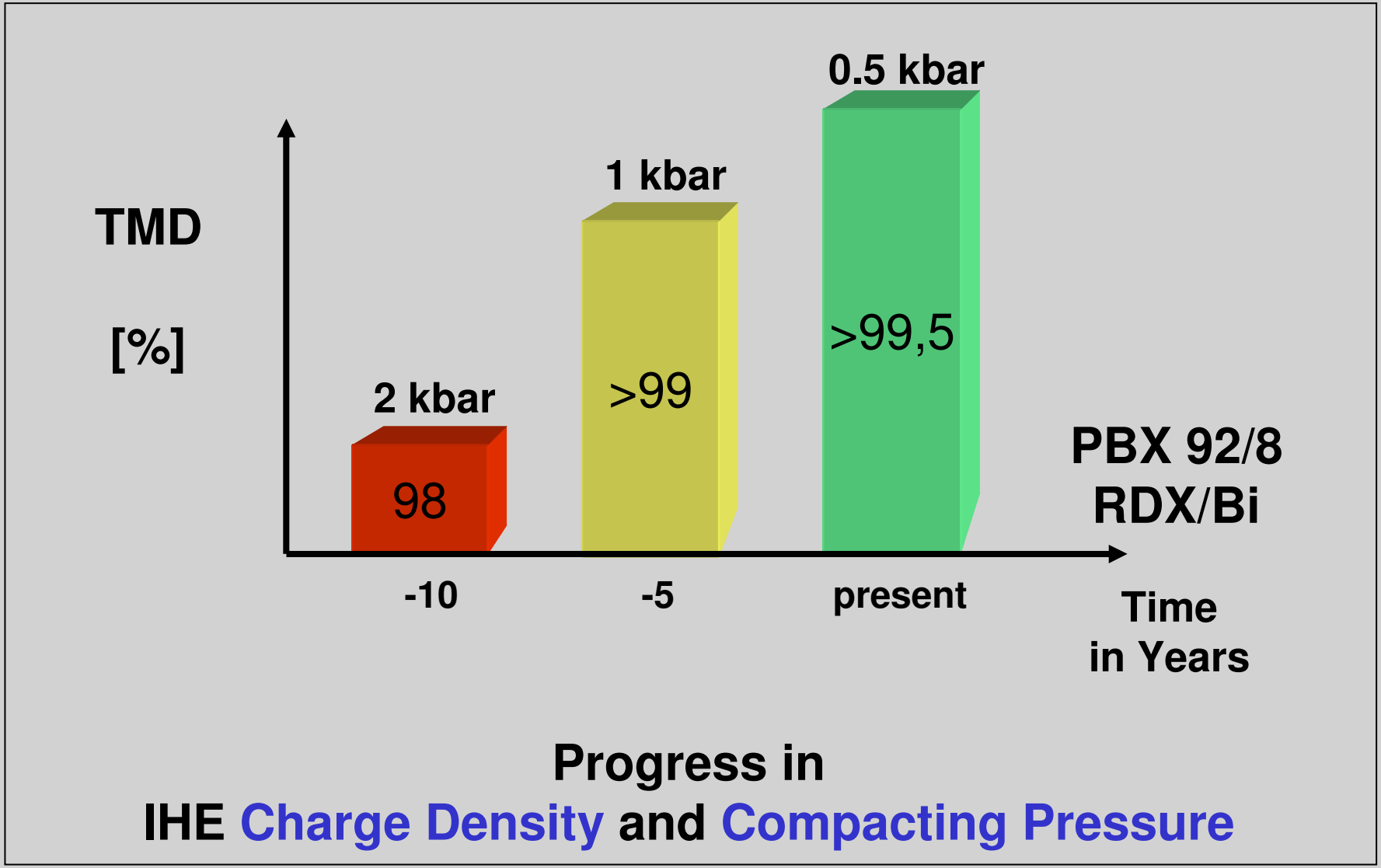

Progress in
IHE Charge Density and Compacting Pressure

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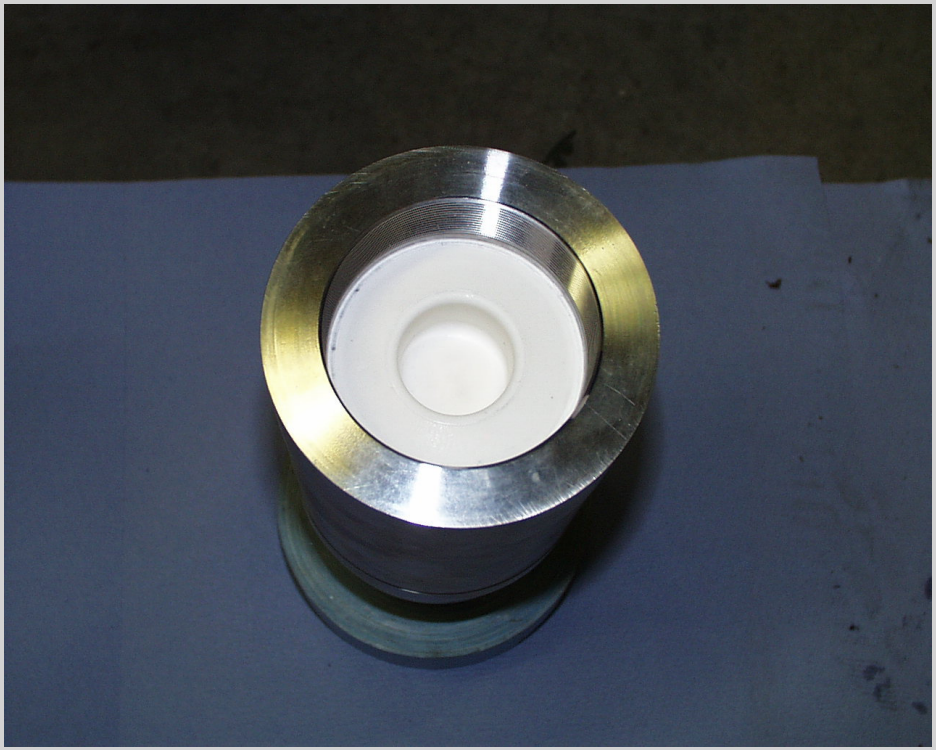
Press Fill, Charge Properties



- **Quality**
  - no gaps
  - no voids
- **Density**
  - close to TMD
- **Gap Test, no go**
  - more than 28 kbar
- **Energy content**
  - More than 90% solids

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Press fill is

Effective

- density nearly 100% TMD
- no voids
- solid HE content > 90%

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Press fill is

- Efficient
- Economic
- Effective
- Safe

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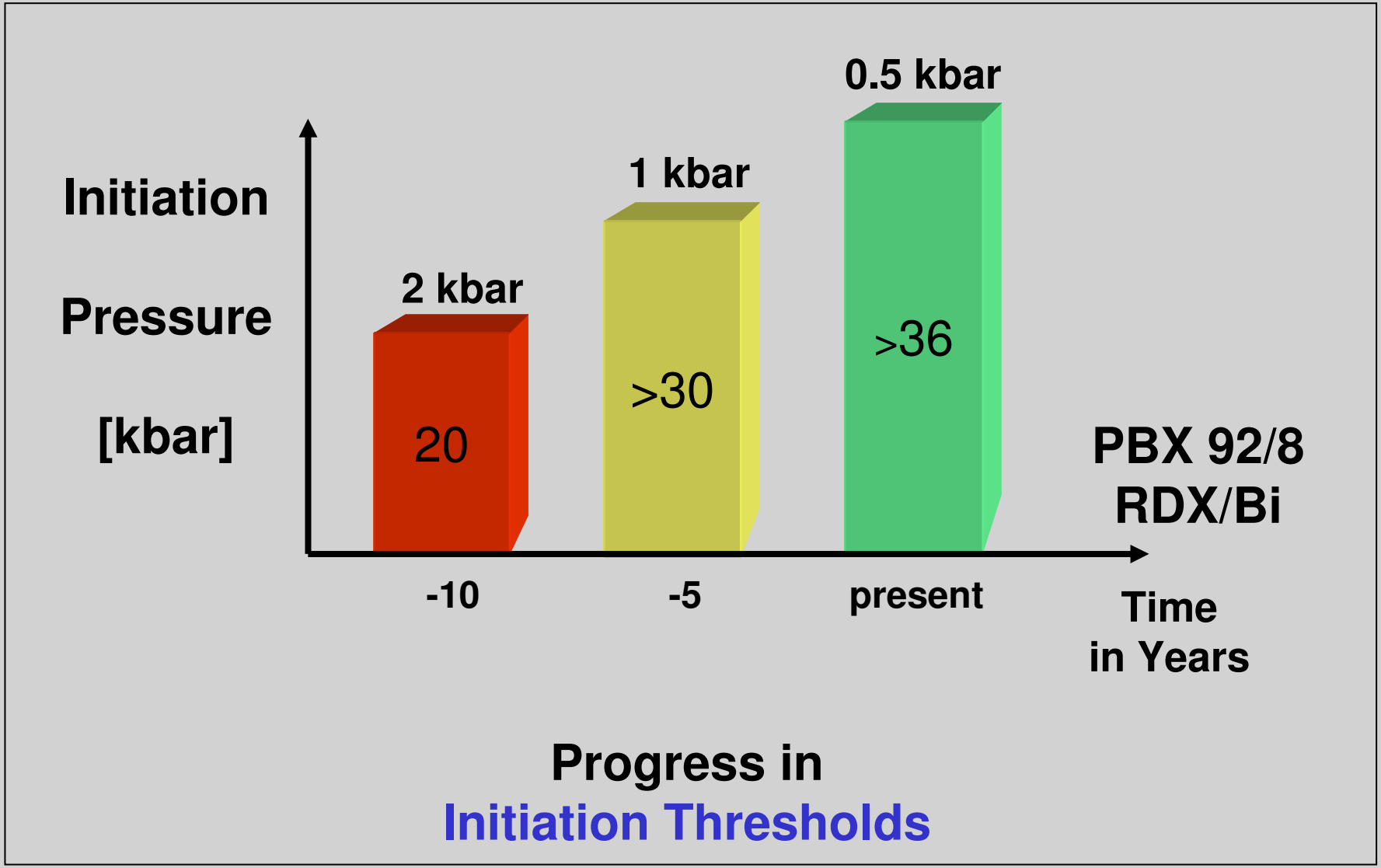

Progress in
Initiation Thresholds

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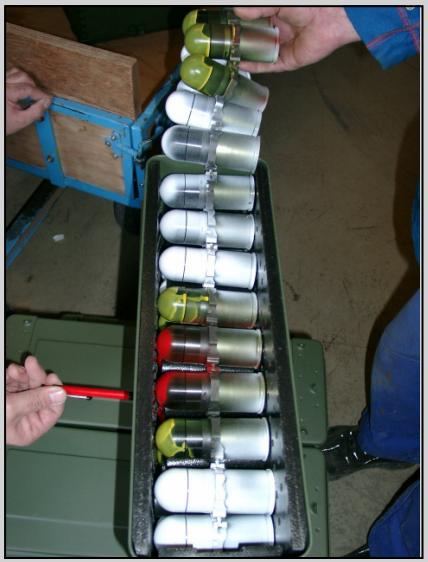
IM TECHNOLOGY



Preparation

Test Setup

- Test Result

Press Filled PBX Round 40mm IM

- **Sympathetic Reaction**
- **No detonation transfer**

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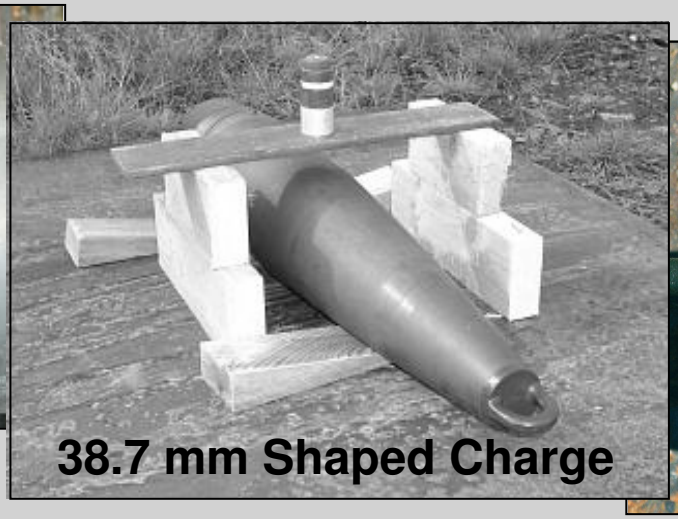
IM TECHNOLOGY

Test Result



Test Setup

Test Result

Press Filled PBX Round 155mm IM

- **SCJI Impact**
  - Better than Type III Reaction

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Press fill is

Safe

- low compacting pressure (< 1kbar)
- high initiation level
- IM compatible
  - SD with 40mm pressed into the thin shell
  - SCJI with 155mm pressed into the confined shell

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Press fill is

Efficient

Economic

Effective

Safe

An economical and effective manufacturing method for

Insensitive Munitions