New Ammunition with Insensitive High Explosive

• Requirements
• Configuration MP-HE / DM11
• JCB Data Link
• Firing Trials MP-HE / DM11
New Ammunition with Insensitive High Explosive

Requirements

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Specifications of the New 120mm HE Cartridge

1. Requirement Germany

Destroy Anti Tank Missile Position
(covered / non covered)
Range 5000m

Concept

=> Air Burst (Time Fuze)
=> Axial Fragments (Tungsten-Balls)
2. Requirement Germany

Engage Dismounted Mechanized Infantry, Range 5000 m

Concept

=> Air Burst (Time Fuze)
=> Axial and Radial Fragments
   (Tungsten-Balls + Shell Fragments)
Specifications of the New 120mm HE Cartridge

3. Requirement Germany

Defeat Covered Targets in Buildings

Concept

=> Wall Perforation (Thick-Shell)

=> Delayed Detonation (Delay Fuze)
4. Requirement Germany

- Destroy Light Armored Targets
- Targets at long Combat Ranges

Concept

- Impact Fuze (Short Ranges)
- High Firing Accuracy
- Air Brust (Long Ranges)
- Heavy Fragments (Heavy-Shell)

Specifications of the New 120mm HE Cartridge

10mm RHA Steel
Specifications of the New 120mm HE Cartridge

5. Requirement Germany

High Flexibility During Combat Operations

Concept

=> Programming of Fuze while loaded
Impact / Delay / Air Burst Modus
=> Data Transmission inside Cartridge
(Status Report by Feedback-Signal)
Specifications of the New 120mm HE Cartridge

1. Requirement US-MC

Engage Dismounted Infantry Squad in Wedge Formation
50% out of action with 2 shots

Concept

=> Air Burst (Time Fuze)

=> Axial and Radial Fragments
(Tungsten-Balls + Shell Fragments)
Specifications of the New 120mm HE Cartridge

2. Requirement US-MC

Breach a 8” Double Reinforced Concrete Wall with max. 3 shots
Opening: 0,76 x 1,27 m

Concept

=> Wall Perforation
=> Detonation inside the Wall
(Thick-Shell)
Specifications of the New 120mm HE Cartridge

3. Requirement US-MC

- Destroy Earth and Timber Bunker with max. 2 shots

Concept

=> Impact or Delay Function
=> Detonation inside the Sand Bags or inside the Bunker (High Firing Accuracy)
Configuration

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Programmable Cartridge, Signal Line Wiring

- Ballistic Cap with Tungsten Balls
- Driving Band
- Fuze
- Signal Cable
- Tracer
- Warhead with IHE and programmable Fuze
- Tail Unit
- Igniter with Data Link
- New Stub Case
Modular Design

Propulsion Unit
Programmable with Cabling

Programmable Fuze (JMT)

Warhead

Propulsion Unit
Without Cabling

Inert-Fuze

TP-Head
Programmable Cartridge, Signal Line Wiring

- New Stub Case
- Igniter with Data Link
- Pressure Switch
- Programmable Fuze
- IHE Booster
- IHE
- Cable Protection
- Tail Unit
- Tungsten Balls
- Tracer
System Integration

- Barrel
- HE Cartridge
- Breech
- Breech block
- Contact pin

HZF = Main telescope with laser
FCC = Fire control computer
LSBG = Loader's control box
ZL/HV = Tank control system / power supply
120mm JCB Data Link

INTERFACE
CONTROL DOCUMENTS
120 mm Tank Main Armament Systems
(Weapon and Ammunition)

Interface with Voltage Supply and Bidirectional
Data Transfer between System and Loaded Cartridge

SCHNITTSTELLEN-
KONTROLLDOKUMENTE
120 mm Kampfpanzerhauptbewaffnung
(Waffe und Munition)

Schnittstelle mit Spannungsversorgung und bidirektionaler
Datenübertragung zwischen System und geladener Patrone

120-007.00

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Firing Trials DM 11
Testing of Projectile Accuracy

January 2005

Firing with 120mm L55- Barrel

Cartridge 120mm HE (inert)

Distances: 1000m, 1500m, 2000m, 2500m
## Firing Results

<table>
<thead>
<tr>
<th>Distance</th>
<th>n</th>
<th>Vertical</th>
<th>Lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 m</td>
<td>7</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>1500 m</td>
<td>5</td>
<td>0.17</td>
<td>0.26</td>
</tr>
<tr>
<td>1500 m</td>
<td>5</td>
<td>0.08</td>
<td>0.30</td>
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<tr>
<td>2000 m</td>
<td>5</td>
<td>0.09</td>
<td>0.34</td>
</tr>
<tr>
<td>2000 m</td>
<td>5</td>
<td>0.31</td>
<td>0.27</td>
</tr>
<tr>
<td>2500 m</td>
<td>5</td>
<td>0.25</td>
<td>0.19</td>
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<tr>
<td>2500 m</td>
<td>5</td>
<td>0.17</td>
<td>0.21</td>
</tr>
<tr>
<td>All Distances</td>
<td>37</td>
<td>0.17</td>
<td>0.23</td>
</tr>
</tbody>
</table>
Firing Accuracy (Example)

**Dispersion Pattern (1000 m)**

-1 -0,5 0 0,5 1

![Dispersion Pattern (1000 m)](image)

**Dispersion Pattern (2500 m)**

-1 -0,5 0 0,5 1

![Dispersion Pattern (2500 m)](image)

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Firing Trials

Impact-Function with Delay (mV)

Target 3  Germany

Firing with Programmable Weapon System
Digital Programming of Fuze
(Impact-Function with Delay at Brick Wall)
Firing Trials

Impact-Function with Delay
Firing Trials

Impact-Function with Delay

Brick Wall after Perforation

Brick Wall 1000m
Impact-Function with Delay

Firing Trials

<table>
<thead>
<tr>
<th>Anzahl Durchschläge WSM Kugeln</th>
<th>Anzahl Durchschläge Hüllensplitter</th>
</tr>
</thead>
</table>

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Impact Function at Steel Plate

Target 4  Germany

Firing without Programming
(Impact Function of Fuze)  or

Digital Programming of Fuze
(Impact-Function with Delay)
Firing Trials

Perforation of 10mm RHA Steel Platte
Firing Trials

Impact-Function at 5 mm Steel Plate

03_0767
Schuß Nr.: 368
Firing Trials

Impact-Function at Steel Plate

Performance (Average of three Firings)

Required Performance

0-10°  10-20°  20-30°  30-40°

+ 30%
Air Burst Detonation

Target 1 and 2  Germany
Target 1 US-MC

Firing with Programmable Weapon System
Digital Programming of Fuze (Time-Function Mode)
Firing Trials

Air Burst Detonation

First Shot
Firing Trials

Air Burst Detonation

Second Shot
Firing Trials

Air Burst Detonation

Squad in Wedge Formation (Shot 904, 905)

First Shot
17 of 30

Second Shot
(15) +7 of 30

Two Shots: 24 of 30

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Air Burst Detonation

Shot 904

17 of 30
Air Burst Detonation
Shot 905
15 of 30
Air Burst Detonation
Impact- Function at DRCW

Target 2  US-MC

Firing without Programming of Fuze

(Impact-Function at Double Reinforced Concrete Wall)
Firing Trials

Impact-Function at Concrete Wall

First Shot
Double Reinforced Concrete Wall

One Shot, 700 mm
Firing Trials

Impact-Function at Concrete Wall

Second Shot
Firing Trials

Double Reinforced Concrete Wall

Two Shots
700 x 1250 mm

Requirement
Three Shots
760 x 1270 mm

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Firing Trials

Function at Earth and Timber Bunker

Target 3 US-MC

Firing without and with Programming of Fuze
(Impact-Function and Delay Function
at Earth and Timber Bunker)
Firing Trials

Function at Earth and Timber Bunker
Firing Trials

Function at Earth and Timber Bunker

Inside:
Kneeling and Standing Pressure Gauge

Sand Bags
Loose Sand
Pine Timbers

36 cm
57 cm
15 cm Pine Timbers

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Impact Function at Earth and Timber Bunker

Target 3  US-MC

Firing without Programming of Fuze

(Impact-Function (PD) at Earth and Timber Bunker)
Firing Trials

PD Function at Earth and Timber Bunker
Firing Trials

PD Function at Earth and Timber Bunker

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Delay Function at Earth and Timber Bunker

Target 3  US-MC

Firing with Programming of Fuze

(Delay Function at Earth and Timber Bunker)
Firing Trials

Delay Function at Earth and Timber Bunker
Firing Trials

Delay Function at Earth and Timber Bunker
Current Status

- Type Qualification completed in 2009
- Start of Serial Production 2010
- In Service with US Marine Corps
- In Procurement for German Bundeswehr
- In Contract Negotiations with various other Customers
Questions?