The Evolution of Artillery ammunition

- Cargo Ammunition
- SMOKE (WP) Ammunition
- Bags Charges

Need New Portfolio to Replace the Restricted Projectiles and Ineffective Charges
New Generation - MISSION STATEMENT

- **Improve efficiency** over any conventional HE projectile and **increase lethality** capability.
- **Incapacitate** and defeat **infantry** troops.
- Improve the **performance** against **variety of targets** in the battle field (tracks, LAV’s, Infrastructures etc.).
- **Low collateral damage** by using self-destruct mechanism.
- **Shoot & scoot** ability in order to prevent counter artillery fire.
• Advanced 155mm Super - HE projectile designed

• Neutralize infantry and “soft” targets (LAV’s) with **greater effectiveness** by utilizing an **advanced warhead**

• Compatible with all 155mm guns
155mm Super HE – M454

Time fuze initiation and ejection of parachuted warhead (500m)

Detonation on optimum height over the target

Fuze setting, Loading and firing

12 sec.

3 m

1

2

3

3 m
155mm Super HE – Technical characteristics

- Weight in flight: 48 Kg
- Length (w/o fuze): 804 mm
- Explosive & control fragmentation weight: 3 Kg CLX663 + 7,000 steel balls
- Time fuze type: IMI M910/M762 or similar
- Ranges: (*)
  - 39-cal barrel - 22 Km
  - 45-cal barrel - 24 Km
  - 52-cal barrel - 26 Km
- Proximity fuze operation height: 3 m Approx.
- Accuracy with time fuze: 60m CEP

(*) – For HB type
155mm Super HE – M454

Operations Research Results
Kill Probability Chart – Infantry in open terrain

Standard HE Cover Area

- Total Area with killing probability higher 75%: 1,250 Sqm
- Random Fragmentation

Super HE Cover Area

- Total Area with killing probability higher 75%: 6,400 Sqm
- Controlled Fragmentation

Up to 5 times more effective! than the standard HE
155mm Super HE – M454

155mm Super HE - Logistics Advantages
Minimal Logistic Footprint

S-HE

Regular HE
ADVANTAGES USING S-HE over HE PROJECTILES

Greater Effect on target & Shoot & Scoot capability

LOGISTICS Benefits
& More projectiles per barrel

TIME for target destruction

More TARGETS per Artillery carrier stowage
Bags
Five types:
M-4A2; M-8; M-8 ½; M-9; M-10

JBMoU* BMACS
Two types:
Short-range “green” module
Long-range “white” module

*Joint Ballistic Memorandum Of Understanding

Propellant charge Market development

(Modification)
The BMACS consists of two module types:
- TCM - Top Charge Module (White colour)
- BCM - Bottom Charge Module (Green colour)

Developed by IMI according to MIL-STD and NATO standards to replace the existing old charge systems.

Based on JBMoU principles for firing from all standard 155-mm Howitzer guns (39, 45 & 52 Cal.)
Modified BMACS

Modified BMACS Version (redesign)
Based on JBMoU principles (L15)

Redundancy and Flexibility

- 310 m/s
- 460 m/s
- 430 m/s
- 570 m/s
- 685 m/s
- 825 m/s
- 945 m/s
# JBMoU Compliance

## Parameter | Requirement | Compliance
---|---|---
Ignition Delay | ≤ 300 ms | ≤ 100 ms
Differential Pressure | ≤ 725 Bar | ≤ 150 Bar
Pressure Limit | ≤ 4158 Bar | ≤ 4158 Bar
Upper Temp Limit | 63°C | 63°C
Residues | no detrimental residues to operation | no detrimental residues to operation

## Parameter | Requirement | Compliance
---|---|---
Module Dimensions | D ≤ 158 mm | D ≤ 153 mm
 | L ≤ 156 mm | L ≤ 155 mm
Ignition hole dia. | ≥ 20 mm | d ≥ 28 mm
Muzzle Velocity | 945 m/s | 945 m/s

## Parameter | Requirement | Compliance
---|---|---
Trails for safety | Safety in a New Gun | Comply
 | Safety in Worn Barrel | Comply
 | Sequential Environmental | Comply
 | Safety of Prop. Charge | Comply
 | 12m Safety Drop | Comply
 | Low Charge Trial | Comply
 | Cook-Off in Hot Gun | Comply
Bags

Five types: M-4A2; M-8; M-8 ½; M-9; M-10

JBMoU*

BMACS & Modified BMACS

*Joint Ballistic Memorandum Of Understanding
Propellant charge Market development

Bags
Five types: M-4A2; M-8; M-8 ½; M-9; M-10

JBMoU*
BMACS & Modified BMACS

JBMoU*
UCM
One type

*Joint Ballistic Memorandum Of Understanding
IMI’s UCM is the only Uni-Modular charge propellant system which is based on single module type - one size.

- Higher muzzle velocities with less modules:
  - 945 m/s with 6 modules (for 52 cal. gun)
  - 685 m/s with 4 modules (Optimized 39 cal. gun)

- Muzzle Velocity could be tailored to customer requirements
UCM - Product Advantages

- **Next generation technology** for next generation of cannons.
- Only **one type** of modular artillery charge system in all artillery logistics chain, from the artillery gun, company, battalion and above.
- Adjusted to **FALCS** (Full Automatic Load Charge System).
- Minimum **ignition** delay time.
- Increase **fire rate**.
- **Water proof** protecting surface.
- **No residue** in the barrel.
- Proper **internal ballistics** - pressure and differential Pressure.
- Reducing barrel’s wear, **longer barrel life**.
- Identical and symmetric module design **prevents** any chance of **human/loading error** in day or night-operation.
Uni-Modular Artillery Charge System M662

- New and STATE-OF-THE-ART solution
- Fully Comply with JBMoU
- Can be used with any 155mm gun
- The most affordable solution with logistic simplicity (FIFO)
- Qualified by the IDF
- In service by the IDF (no risk)
Sponge sleeve for high protection during storage and handling

Absorber to prevent wear between the modules

Remove before loading
1. Need Smoke projectile for screening and spotting

2. **Smoke WP has Phosphor**, which may cause burns when in contact with human skin.

3. Israeli internal committee decided not to use of such projectiles in urban terrain involving civilians.

4. Decision to use improved smoke projectile → **Elbit’s Smoke HC**.
155mm Smoke HC M150
155 mm SMOKE HC – Description

- Mono - block Body
- 5 HC canisters
- Ejection Plate
- Expulsion Charge
**155 mm SMOKE HC – Comparison with M116**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Elbit’s M150 Smoke HC</th>
<th>M116 (WP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>~ 3 Minutes</td>
<td>~ 2 Minutes</td>
</tr>
<tr>
<td>Screen Size</td>
<td>120% (in L&amp;H)</td>
<td>100%</td>
</tr>
<tr>
<td>Range (39 Caliber)</td>
<td>22 km</td>
<td>18 km</td>
</tr>
<tr>
<td>Canisters</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Quantity</td>
<td>HC = 13.5 kg</td>
<td>WP = 8.7 kg</td>
</tr>
<tr>
<td>Projectile</td>
<td>Based on M483 family</td>
<td>Based on M107 family</td>
</tr>
<tr>
<td>MV (m/sec)</td>
<td>Up to 890 (52 Caliber)</td>
<td>685</td>
</tr>
</tbody>
</table>
155 mm SMOKE HC – Advantages

1. Long lasting smoke – up to 3 minutes
2. Higher screening size
3. Higher density
4. Better spotting at long distances
5. No use of phosphor
The M910 fuze is suitable for use on all projectiles in accordance with STANAG 9216 (MIL – STD - 333B) for 105mm to 203mm calibers.

The fuze initiates all types of carrier shells at airburst (smoke, illuminating and Super-HE) or Impact.

The fuze can receive the data by using Stand Alone Setter Device or by inductive during automatic projectile loading in compliance with STANAG 4369.
NEW GENERATIONS OF ARTILLERY AMMUNITION

A globally recognized leader in high-performance combat-proven artillery ammunition

UCM/BMACS
M910
Electronic time fuse

M454
(S-HE) 155mm artillery projectile

M401-A1
(HE-ER-BB) 155mm artillery projectile

M107-A3
155mm smoke projectile

M150
155mm artillery projectile

M481
(HE-ER-IM) 155mm artillery projectile
THANK YOU
FOR LISTENING

Danny Schirding
BD & Marketing Director, Land Ammunition
Tel: +972-3-5486122
Fax: +972-3-5485365
E-mail: danny.schirding@imisystems.com