

# 40mm Low Velocity Extended Range Munitions (LVER)

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# Introduction



## Need for Extended Range Munitions in Urban Warfare

- Operating in Urban terrain (short ranges) means **quick engagements**.
- Traditional 40mm low velocity munitions has a lower muzzle velocity (75m/s), **long flight time** and **not effective enough**.
- Warfighters demand 40mm low velocity munitions with **flatter trajectory** and **shorter time of flight** to meet the wider range of threats.



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# Advantages of LVER Munitions



## Enhanced Soldier Firepower with Extended Range

- 40mm **Low Velocity Extended Range** munitions (100m/s) will improve the effectiveness & flexibility of infantry soldiers fighting in urban terrain using existing LV grenade launchers.
- **Operational Benefits** of LVER Munitions
  - **Quick engagement** with shorter time of flight
  - **Better hit probability** with flatter trajectory
  - **Longer range** engagement of more than 600m
  - **Many payloads** solution are available.
- **Logistic Benefits**
  - Compatible to all existing low velocity grenade launchers with no modification.



40mm LV ER Munitions Variants



M4/M203



SAR21/40GL



SCAR MK 16



SCAR MK 13



SA80/UGL

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# Technology



## ■ Key Innovations

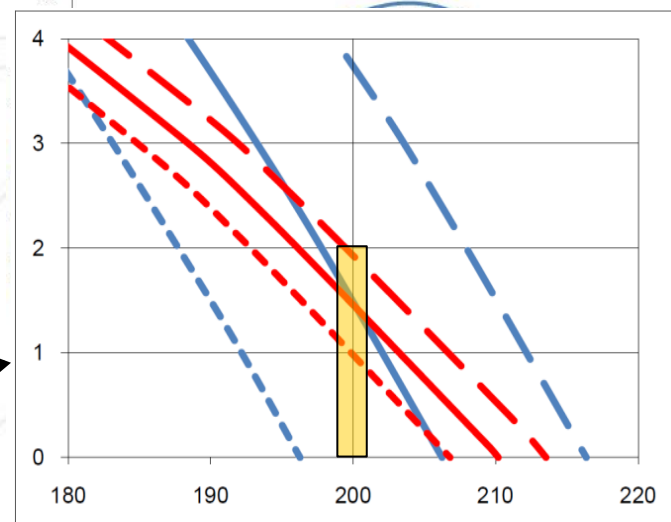
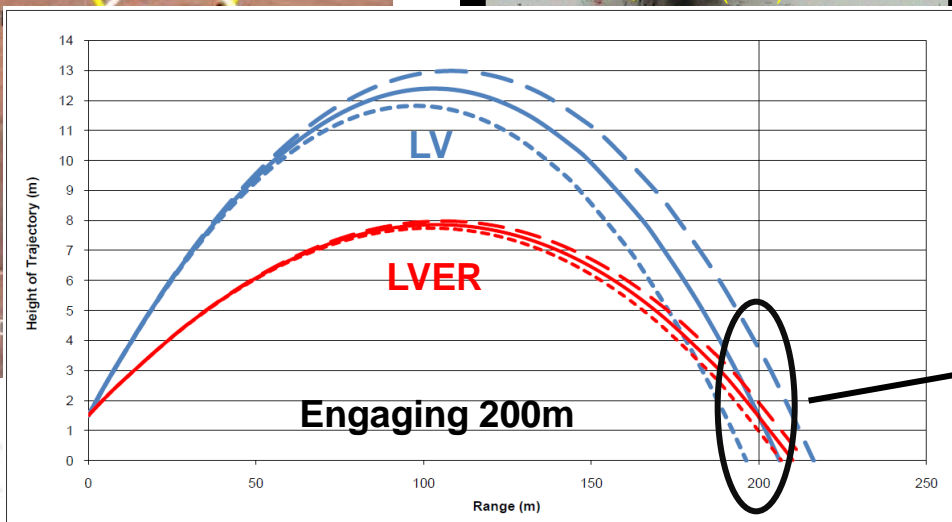
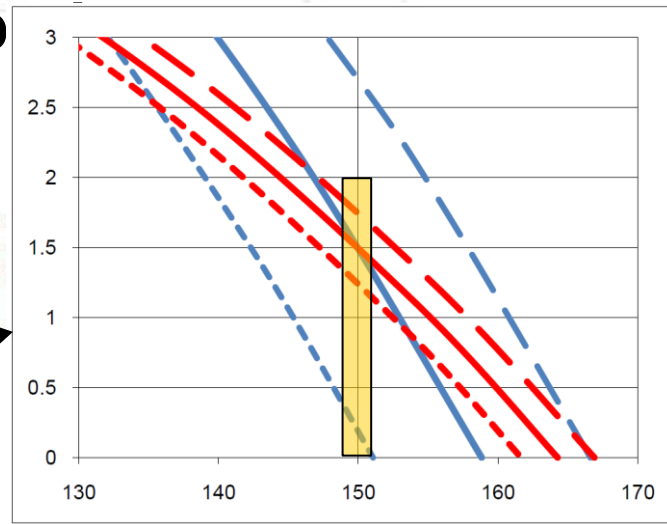
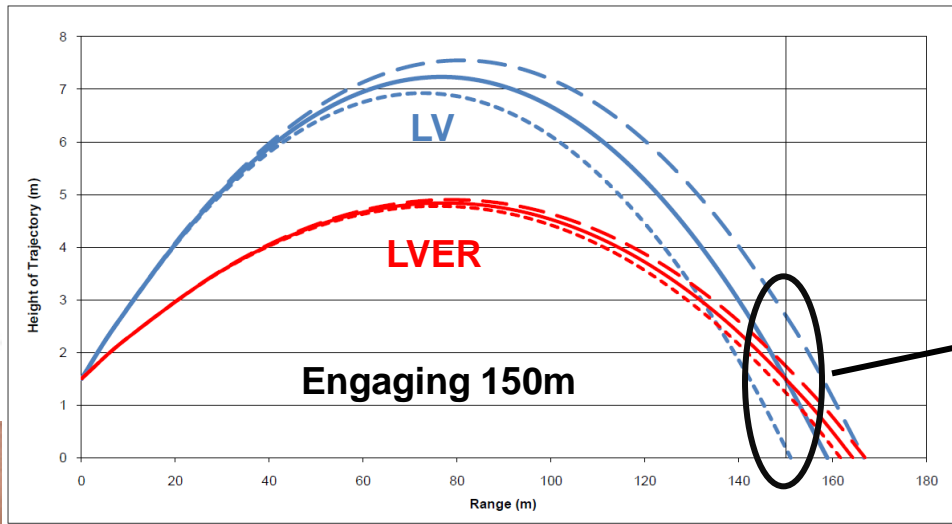
- New propulsion charge system
  - No change in case length
  - No increase of propellant powder
  - Low muzzle velocity variation
- Payload
  - Use of LV projectiles.



**New propulsion design**

**Patented**

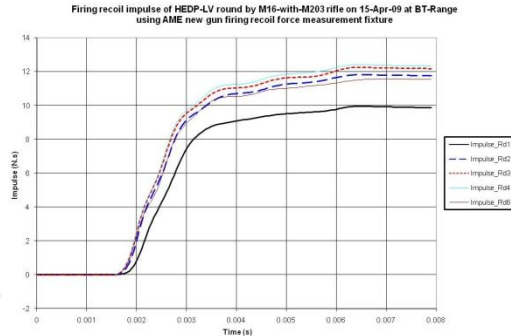
# LVER Exterior Ballistic



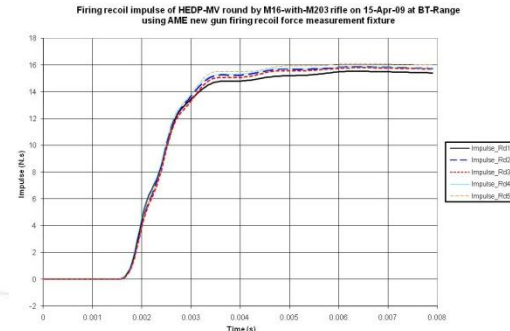
# LVER Recoil Energy



## Results of Recoil Test



LV rds impulse test



LVER rds impulse test

Table 1 - Firing Limitations for Test Weapons

Computed Recoil Energy (See para 3.2c)	Limitations on Rounds
Less than 15 ft-lb (20.3 joules)	Unlimited firing
15 to 30 ft-lb (20.3 to 40.7 joules)	200 rounds/day/man
30 to 45 ft-lb (40.7 to 61.0 joules)	100 rounds/day/man
45 to 60 ft-lb (61.0 to 81.4 joules)	25 rounds/day/man
Greater than 60 ft-lb (81.4 joules)	No shoulder firing

LV = 13.80J

LVER = 21.62J

- Reference to U.S Army TOP 3-2-504, the LVER round energy allows firing of 200 rounds/day/man.

# Terminal Effects



## **40MM LOW VELOCITY EXTENDED RANGE (LV ER) MUNITIONS TERMINAL EFFECTS**

# Maximum Distance Firing



**40MM LOW VELOCITY  
EXTENDED RANGE  
FIRING ON M203 AT 600m**

**Firing from M16/M203**

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# Compliant Ammunition Standards

- All LVER ammunition are developed and qualified to international standards

Standard	TPM (S492)	F&B (S493)	HE (S482)	HEDP (S481)	ABM F&B (S490)	ABM HE (S491)
Mil-Std-331B	-	✓	✓	✓	✓	✓
Mil-Std-810F	✓	✓	✓	✓	✓	✓
Mil-Std-1316E	-	✓	✓	✓	✓	✓
STANAG 4157	-	✓	✓	✓	✓	✓
Mil-Std-461E	-	-	-	-	✓	✓
Mil-Std-464A	-	-	-	-	✓	✓
OB 42351	✓	✓	✓	✓	✓	✓



- Ammunition is also subjected to System Safety assessment
  - Mil-Std-882D



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# Firing by Visiting Customers



**Handheld Firing by  
Visiting Customers**

# LVER Firing Demonstration



Fired from SAR21/M203

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# Technical Specifications



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TP

F&B



HE

HEDP



ABM  
F&B

ABM  
HE

Performance	TPM (S492)	F&B (S493)	HE (S482)	HEDP (S481)	ABM F&B (S490)	ABM HE (S491)
Muzzle Safety	-	15 m	15 m	15 m	15 m	15 m
Arming Distance	-	30 m	30 m	30 m	30 m	30 m
Muzzle Velocity	100 m/s	100 m/s	100 m/s	100 m/s	100 m/s	100 m/s
Penetration	-	-	-	63.5 mm	-	15 mm
Lethal Radius	-	-	5 m	5 m	-	9 m
Warhead Filling	Orange Dye	Report charge	Comp. A5	Comp. A5	Report Charge	Comp. A5
Fuze	-	PIBD	PIBD	PIBD	Programmable Base Fuze	Programmable Base Fuze
Self-Destruct	-	*	*	*	Yes	Yes
Max. Range	600 m	600 m	600 m	600 m	600 m	600 m
Status	Production	Production	Production	Production	Production	Production



- TPM - Effective training
- F&B - Effective training indicates by Flash and Sound
- HE - Effective against personnel and soft skin targets
- HEDP - Effective against personnel and light armour targets
- ABM F&B - Effective training indicates by Flash and Sound
- ABM HE - Improved accuracy and lethality

Note: \* Can have self-destruct feature.

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# Summary



## Operational Benefits

- Quick engagement
- Better hit probability
- Longer range engagement
- Many payloads solution
- Compatible to all existing LV grenade launchers.

**Enhanced Soldier Fighting Capability with existing LV grenade launchers**

## 40mm LVER in various customer configurations



## Technology Readiness

Engaging by

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