

Tactical Effectiveness

14 May 2014 **Small Arms Ammunition**



AP
Armor Piercing

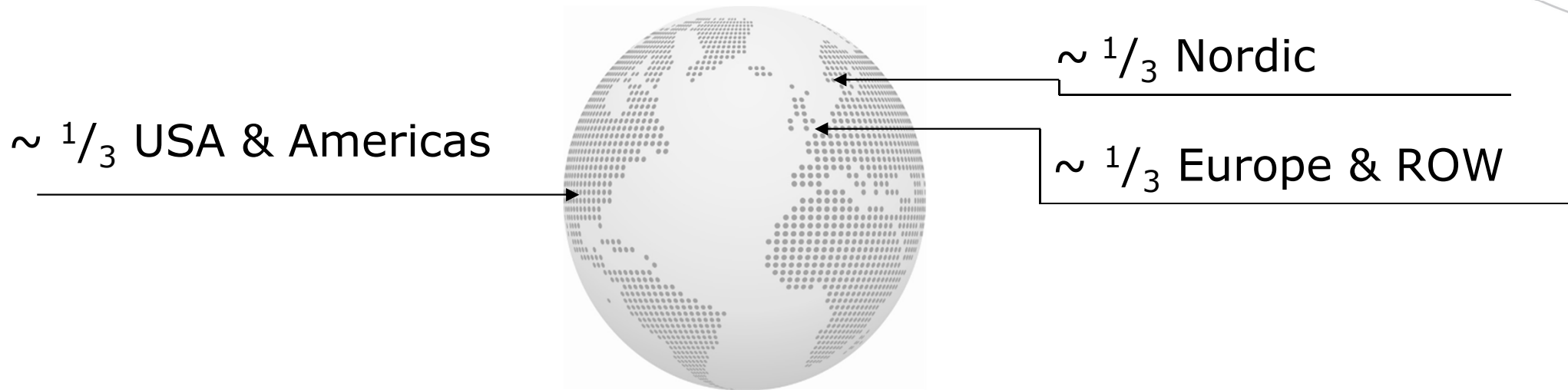
SMALL ARMS AMMUNITION

Fredrik Erninge
Market Director
Nammo SCD

NAMMO Overview

- A Technology Driven Aerospace & Defense Group

- Corporate HQ in Norway
 - Presence in 9 countries
 - 2200 employees
 - Revenue \$620 million (2013)
 - 85% defense / 15% civil
- Nammo Inc HQ in Virginia
 - Nammo Talley (SSA)
 - Nammo Pocal
 - Nammo Tactical Ammunition
 - Nammo Demilitarization
 - Nammo Composite Solutions



Core Business & Technologies

- **Ammunition**
 - Specialty producer of small, medium and large caliber ammunition
- **Shoulder-Launched Munitions**
 - Advanced multi-purpose SLMs for current and emerging warfighter missions
- **Missile Products**
 - Highly engineered rocket motors, warheads, composite/metallic cases and actuation systems
- **Demilitarization**
 - World leader in safe and environmentally responsible recycling of ammunition and energetic materials



Nammo; Supporting the US War Fighter

- M993 & M995 AP
 - Qualified by US Army 1996
 - 140M rounds delivered over the last 18 years
 - Current ID/IQ Contract
- 5.56 Dim Trace Mk301
 - Qualified by US Navy 2008
 - Qualified by US Army 2013
- 2:nd Source via Olin Winchester
 - Ongoing deliveries of Trace projectiles M856 & M62
 - Development of M62A1 projectile
- 2011: Nammo Tactical Ammunition established
 - Small quantity sniper ammunition assembly
 - Special Loads/Configurations
 - Research and Development Support
 - Improved Logistics Support (Foreign Trade Zone)



Nammo Small Caliber Specialty Ammunition

5.56 and 7.62 mm

- Non Toxic (lead free)
- High Performance
- Tracer
- Dim Tracer
- Armour Piercing
- Long Range
- Reduced Range

Improved Soldier Capability

- Enhanced Performance
- Enhanced Lethality

All military specified for safe and reliable function in automatic weapons in the full temperature range (-65° F to 126° F)

5.56 mm High Performance



NT

Green

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Nammo 5.56 mm Ball High Performance

- Meets all requirements in relevant STANAG and MOPI
- Reduced drag
 - Less wind sensitiveness
 - Flatter trajectory
 - Increased impact energy
- Improved lethality
- Improved penetration
- 100% Lead free
- Reduced emissions
- **Cost effective design**



Penetration Performance – NATO Steel Plate

NATO Test Target 3.5 mm NATO plate at 0° obliquity

M855 Ball

Penetration at 570 m

Nammo High Performance Ball

Penetration at 725 m

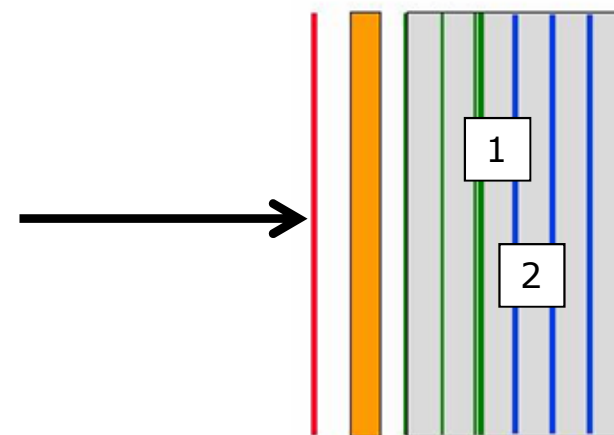
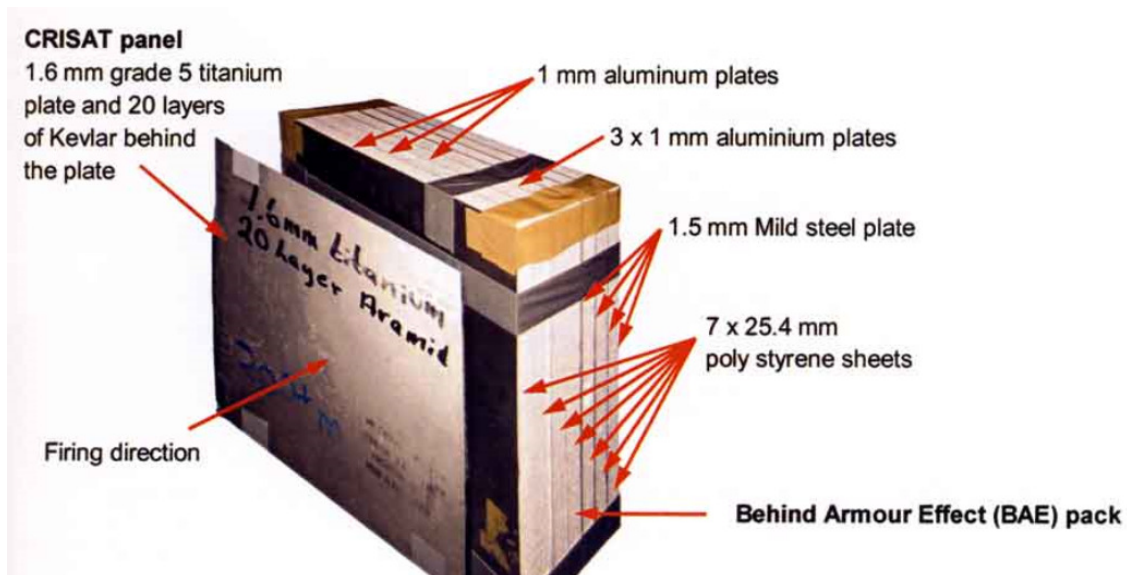


+ 27%

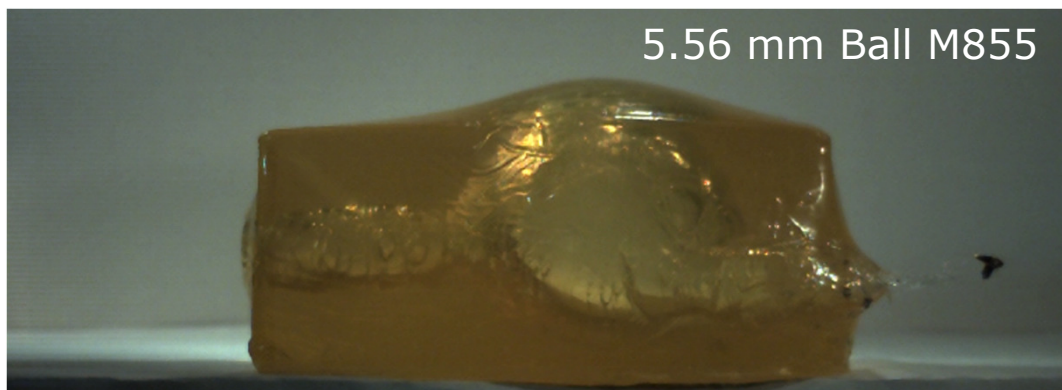
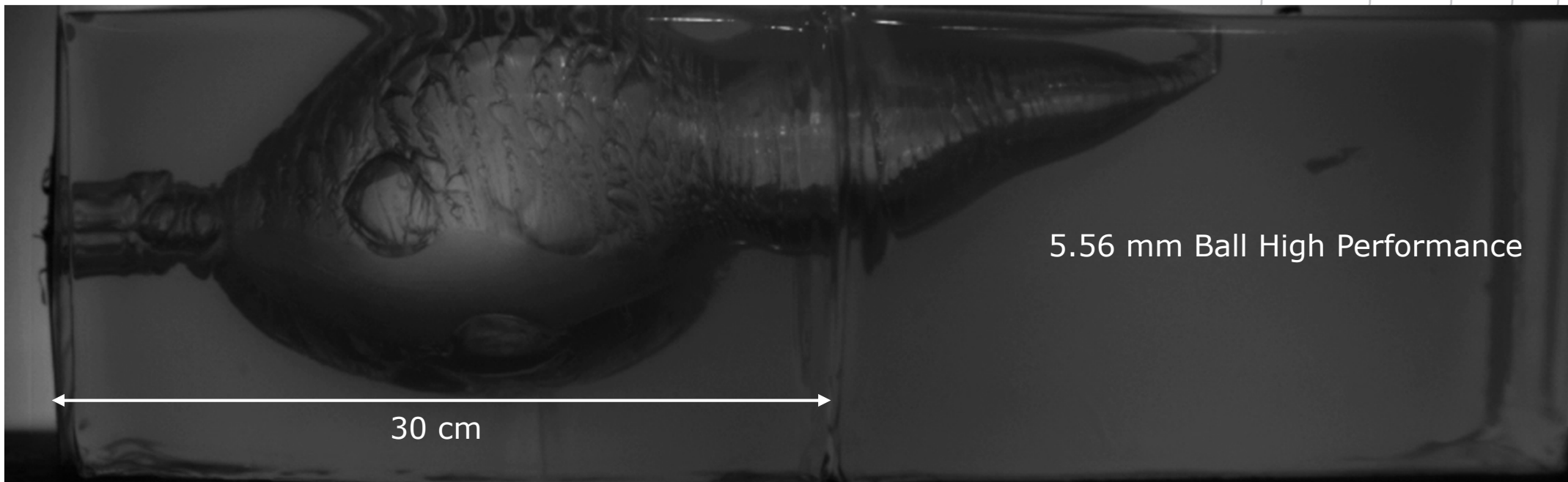
Penetration Performance – NATO Crisat Vest

Pk-values at 550 m		
	Cartridge	P(kill)
1	Ball M855	0.349
2	Nammo High Performance	0.425

+ 22%



Improved Lethality



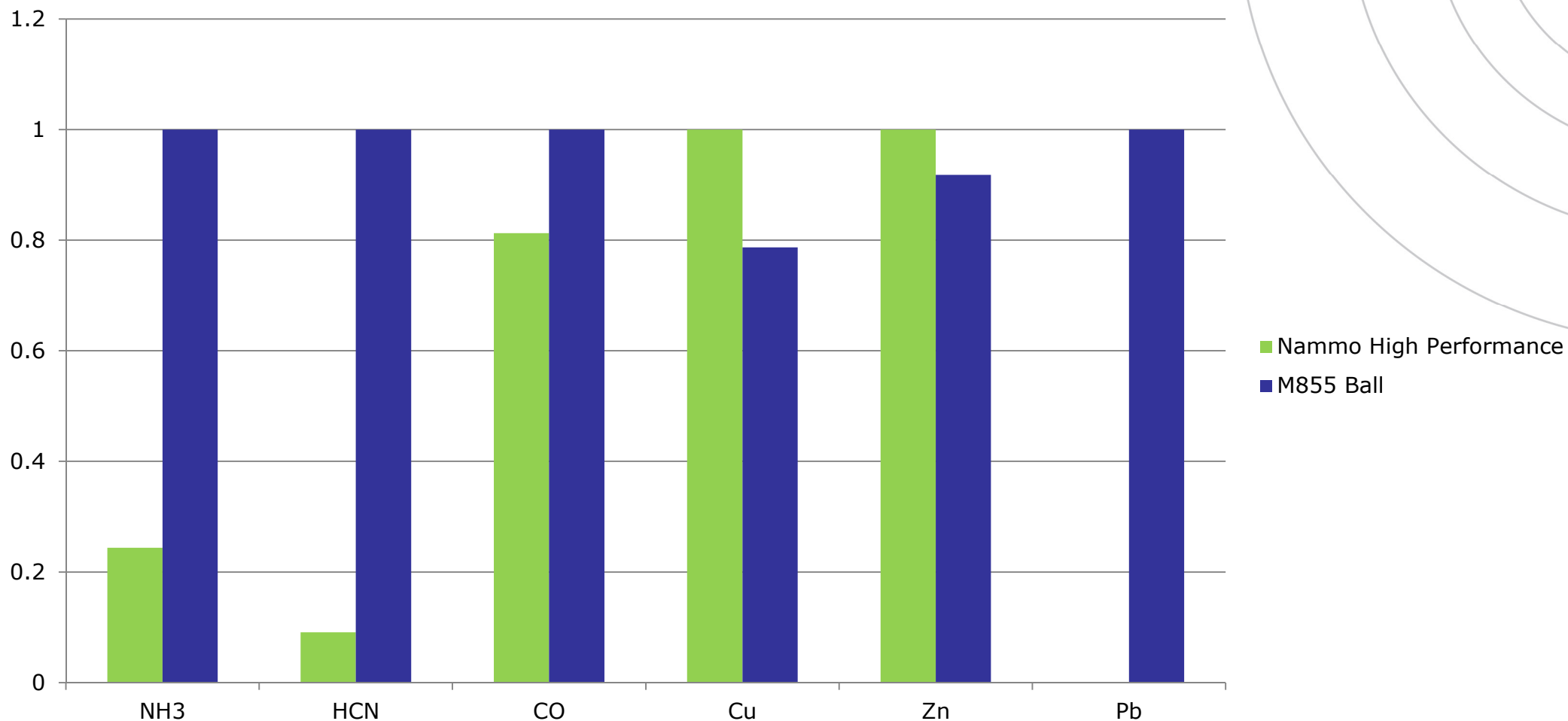
Barrel Erosion

- NATO MOPI requirement
- 20 000 Rounds in HK416
- Pressure values as M855



Optimized for Reduced Emission

- Normalized values for comparison
- Gases and airborne metal particles



7.62 mm High Performance

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BNT 9 HP – Penetration NATO Test Target

NATO Test Target 3.5 mm NATO plate at 0° obliquity

Standar Ball M80 Type

Penetration at 550 m

Nammo Ball High Performance

Penetration at 950 m



+ 73%

Real Target – 5" Concrete

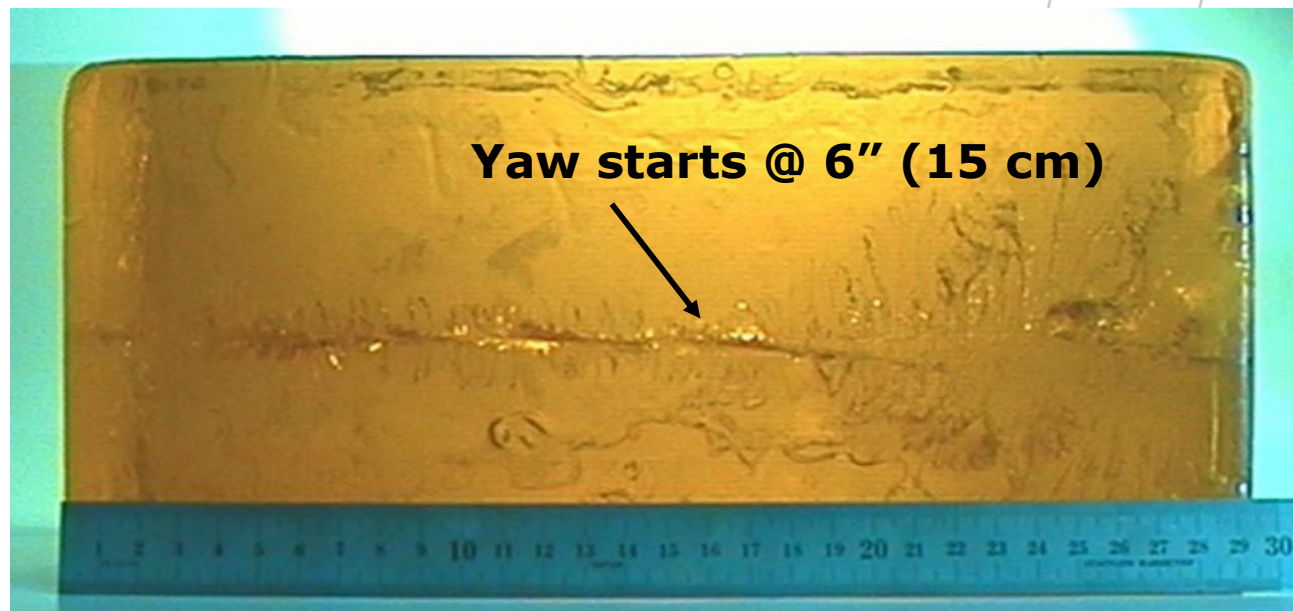
Ball M80
23 rounds
Two bursts

Nammo High Performance
10 rounds
One burst

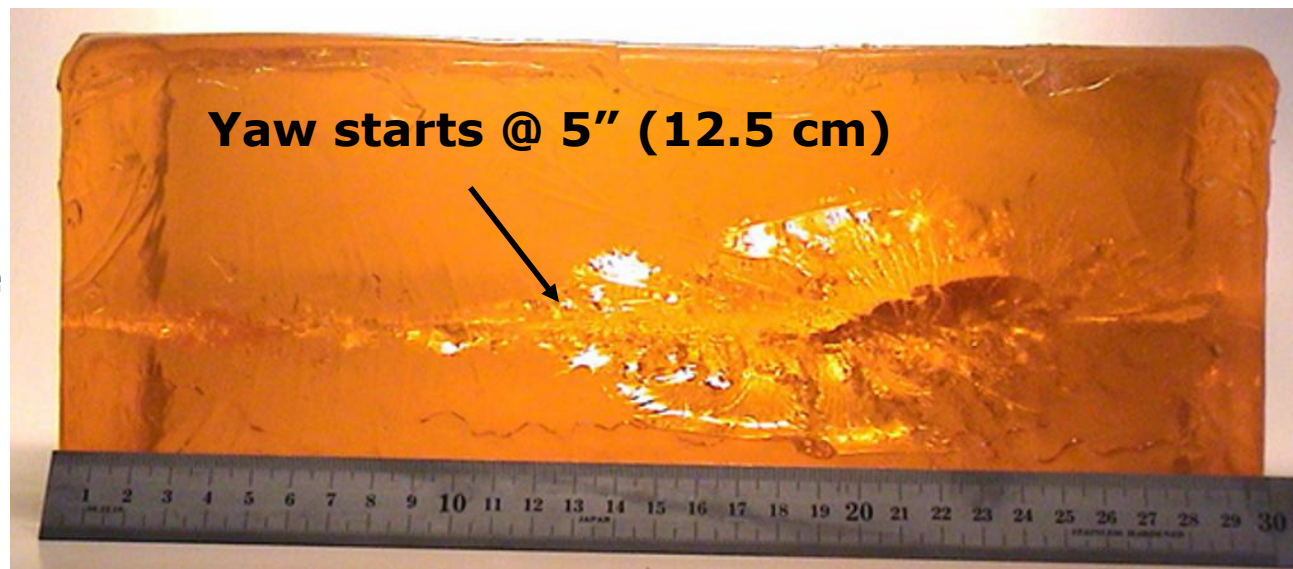


Lethality – Ballistic Gelatin

Ball M80



Nammo High Performance



Tungsten Carbide Core Armour Piercing



AP

Armor Piercing

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M993 & M995 Armor Piercing

- World leading military specified Armor Piercing in caliber 5.56 and 7.62 mm
- Designed by Nammo Vanäsverken 20 years ago
- Kennametal has been sole supplier of the Tungsten Carbide core



AP | 5.56
7.62
12.7
Armor Piercing
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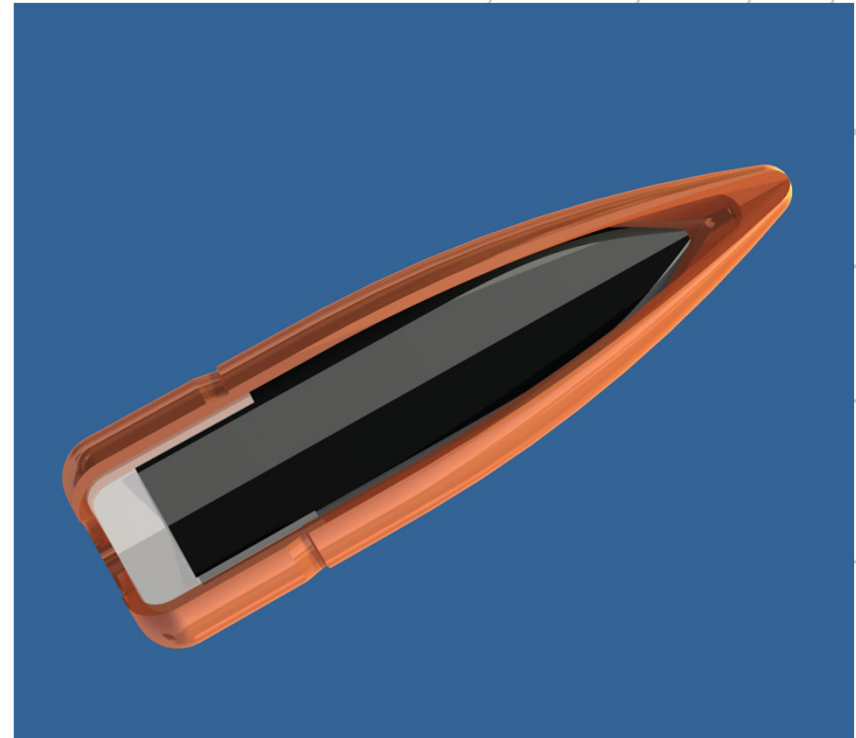
- 150 million Armor Piercing cartridges produced
- Qualified as M993 respectively M995 by US Army 1996

Nammo AP - Cartridge Design



M995

M993



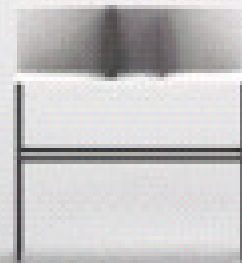
Projectile Weight:
7.62 mm - 8.3 g
5.56 mm - 3.4 g

Live fire penetration test; 7.62 mm AP M993



100 meter

CAM SPEED 25 000 fps



- 18 mm Armor Steel 300 HB
- Target distance 100 m
- Impact angle 0° Nato

Armour Piercing New Developments



- 5.56 mm AP 45
- 7.62 mm AP 10
- 5.56 & 7.62 mm AP Long Range

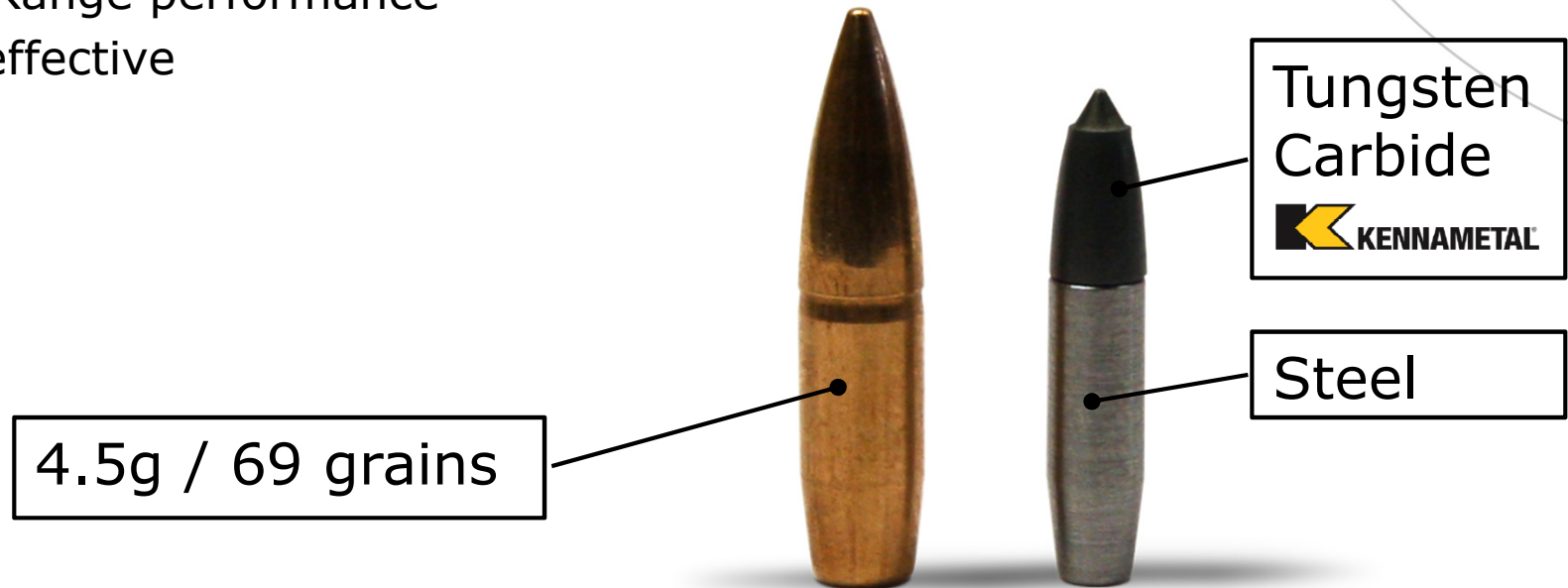
AP

Armor Piercing

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5.56 mm AP 45 – A Cost Effective Design

- Based on Nammo 5.56 mm High Performance Ball
- Powered by Nammo penetrator technology
- Synergy effect
 - Armour Piercing
 - Long Range performance
 - Cost effective



5.56 mm AP 45 – Penetration Performance

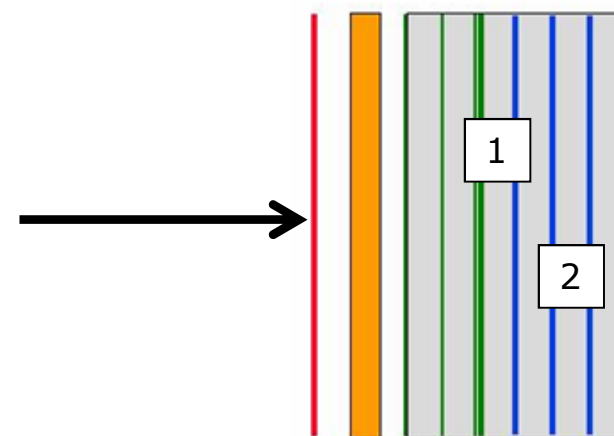
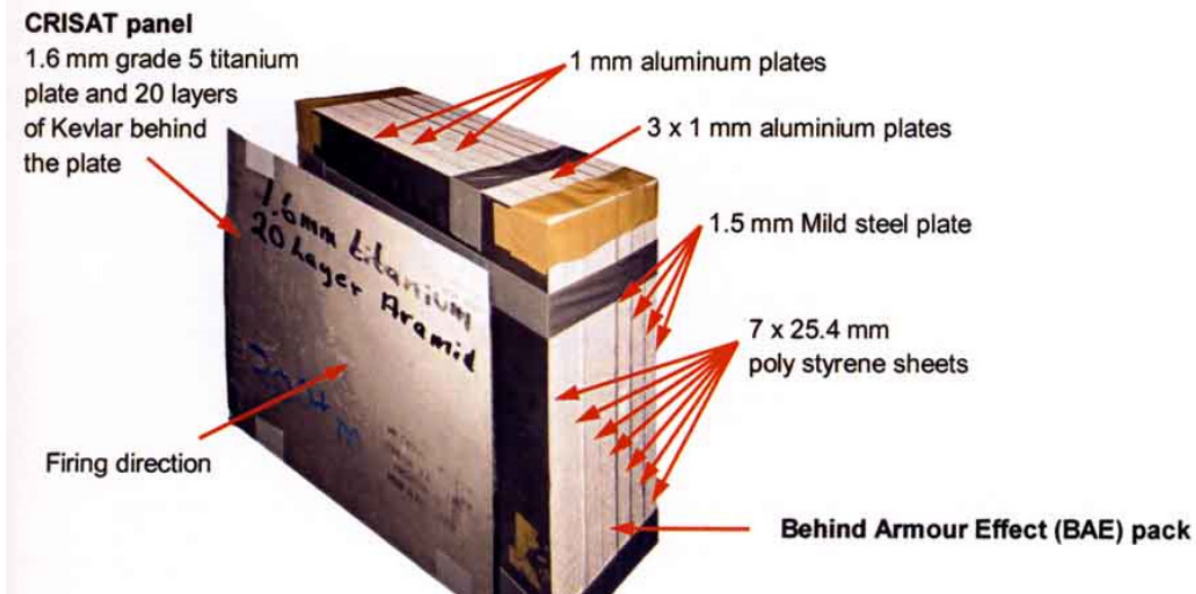
- 7 mm RHA 400HB at 0° impact angle at 200 m
- 7 mm RHA 400HB at 30° impact angle at 100 m
- 7 mm RHA 500HB at 0° impact angle at 100 m



5.56 mm AP 45 – NATO Crisat Vest

Pk-values at 550 m		
	Cartridge	P(kill)
1	M855	0.349
2	AP 45	0.488

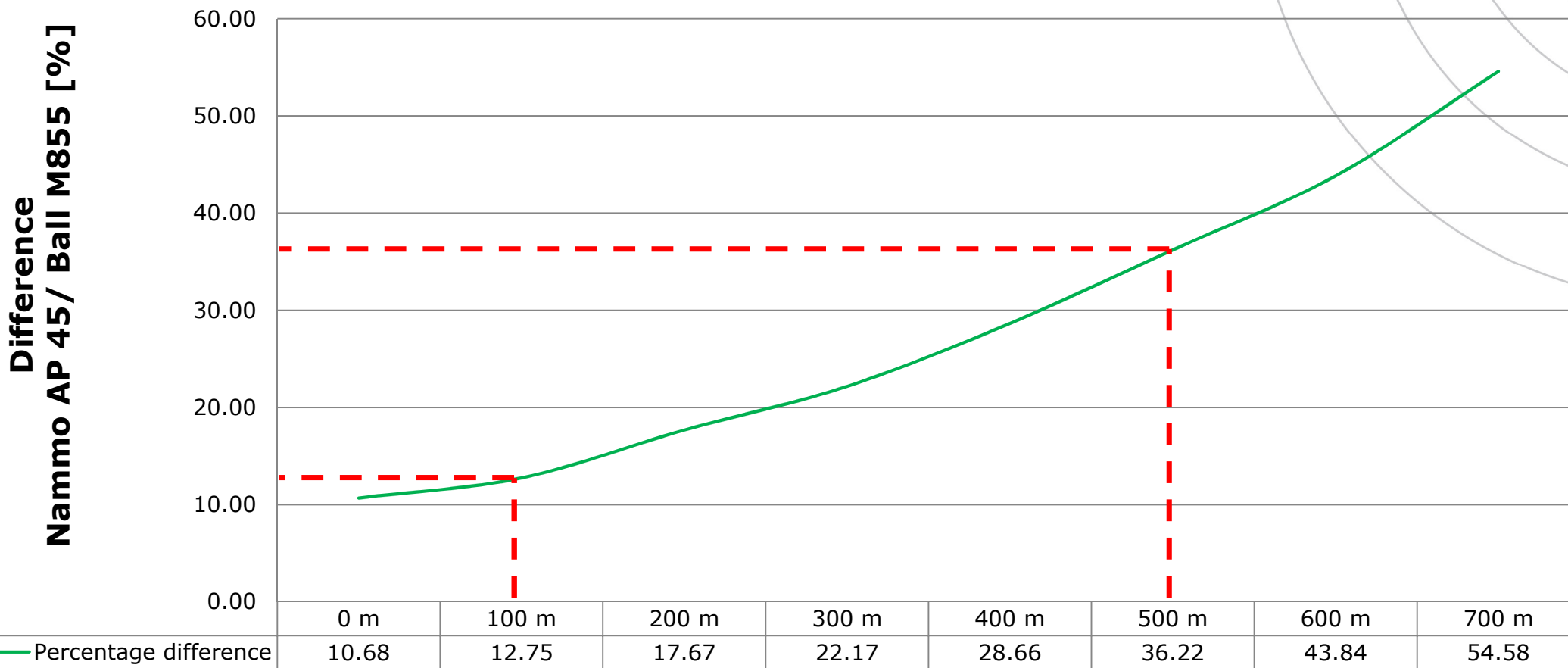
+ 40%



Impact Energy

Increased effective combat distance

Projectile Energy vs. Range



Summary

Nammo Specialty Small Arms Ammo

- Increasing the soldier performance
- High Performance Ball
- Tungsten carbide Armour Piercing
- Enhanced Performance
 - Hard targets
 - Soft targets
- Cost effective designs

AP
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Questions

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Speaker information

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