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U.S. Navy Small Arms Ammunition Advancements

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7.62MM Special Ball, Long Range

MK 316 MOD 0

DODIC: AB39

NSN: 1305-01-567-6944

7.62MM Special Ball, Long Range

Shortfall

- Accuracy inconsistencies in the M118LR cartridge were identified
  - Joint working group failed to correct deficiencies

Objective

- NSWC Crane tasked to develop a cartridge to better meet user requirements
  - Consistent lot to lot accuracy (Minute of Angle (MOA))
  - Function in new and existing gas operated sniper weapons

MK 11 MOD 2

MK 17 Sniper Support Rifle (prototype)

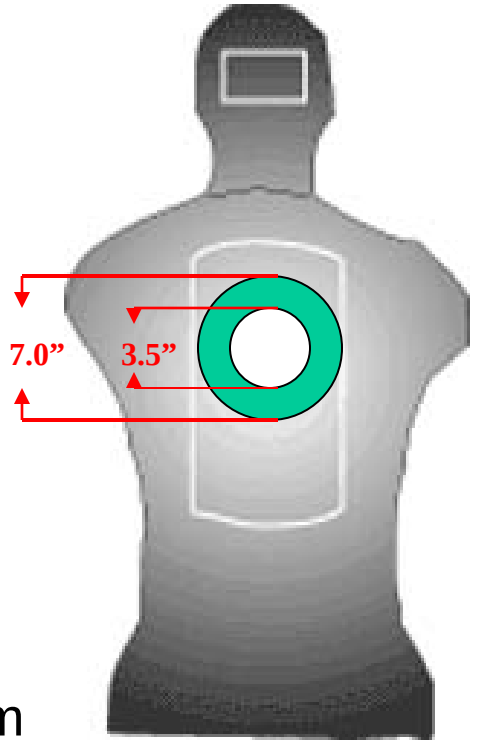
7.62MM Special Ball, Long Range

Objective (continued)

- Flash reduction

Specification Development

- Accuracy requirement based around 10 round shot groups
  - 7.0 in extreme spread max avg @ 600 yds (1st Production Lot)
  - 3.5 in extreme spread max avg @ 300 yds (after 1st Production Lot)
- Velocity standard deviation 15 fps maximum
  - A lower value equates to less vertical extreme spread at long range



7.62MM Special Ball, Long Range

Specification Development (continued)

- Flash reduced and temperature stable propellant
  - Comparable performance -25 F to +165 F
- Each production lot consists of a single lot of projectiles, cases, propellant, and primers
  - Ensures consistency across lots

Accuracy Test Equipment

Solicitation for Contract

- Full and open competition
- Projectile open to weights of 150 to 200 grain
- Product bid samples tested for:
  - Accuracy, Pressure, Velocity, etc

7.62MM Special Ball, Long Range Development

- Desired performance requirements communicated:
  - Accuracy, accuracy, accuracy…
  - Function & casualty and muzzle flash requirements in both bolt action and semi-automatic rifles
  - Extreme temperature stability
  - Supersonic past 1,000 yards, etc.
- Federal Cartridge has over 25 years experience with Gold Medal brand of match ammunition

MK 316 – 7.62MM Special Ball, Long Range

7.62MM Special Ball, Long Range Development

Cartridge Case:

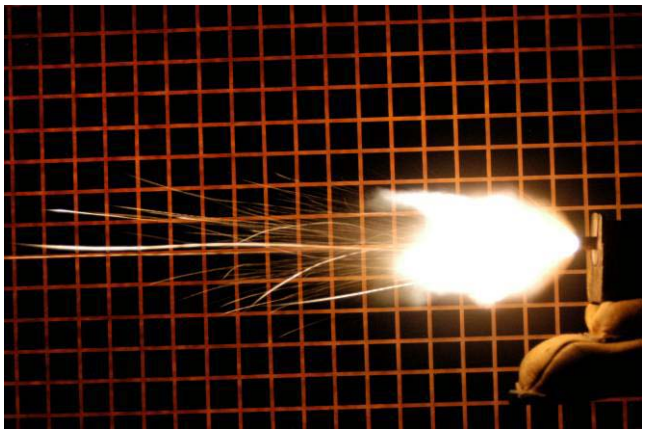
- Developed a new, 7.62mm Match Cartridge case from our experience with 308 Win. Gold Medal match cartridge

Primer:

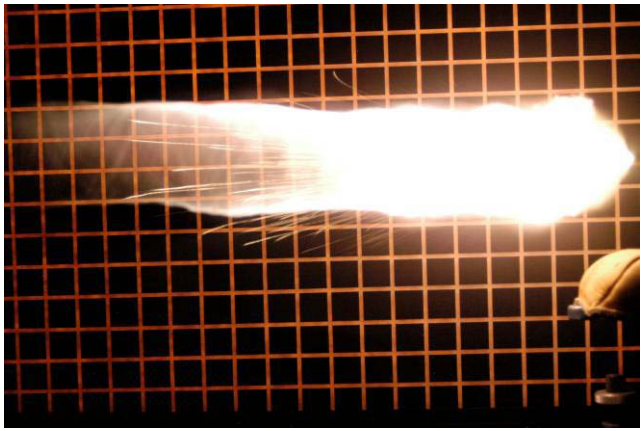
- Federal Cartridge Company's Gold Medal Match Primer was selected

Projectile:

- Over 15 different projectile designs were tested
- Sierra MatchKing, 30 caliber – 175 grain projectile was selected



FCC Gold Medal Match Primer Assembly (Lead Styphnate based)



Other Match Primer Assembly (Excessive Flame from Over-Pressure from PETN)

7.62MM Special Ball, Long Range Development

Propellant

- Over 20 different existing propellants and new propellant blends were evaluated
- A modified extruded propellant was utilized

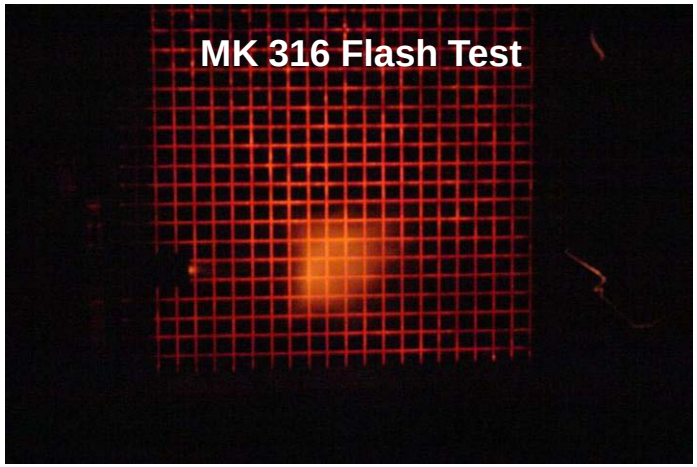
Manufacturing Process:

- Cartridge can be assembled on conventional high speed loading equipment
- Unique quality controls and test plan were established for manufacturing this cartridge

7.62MM Special Ball, Long Range

Results

- Contract award to FCC
- 175 grain Sierra MatchKing® Projectile
- Propellant stable across operational temps
  - -25 F to +165 F
- Reduced flash propellant
- Performance consistency



MK 316 New Production Lot Acceptance Results

LOT #	600 Yard Accuracy (in)	300 Yard Accuracy (in)	Velocity Std Dev (fps)
FCC09A750-001	4.8		11
FCC09B750-002		1.612	15
FCC09B750-006		1.833	14
FCC09C750-007		1.859	13
FCC09C750-008		1.721	13

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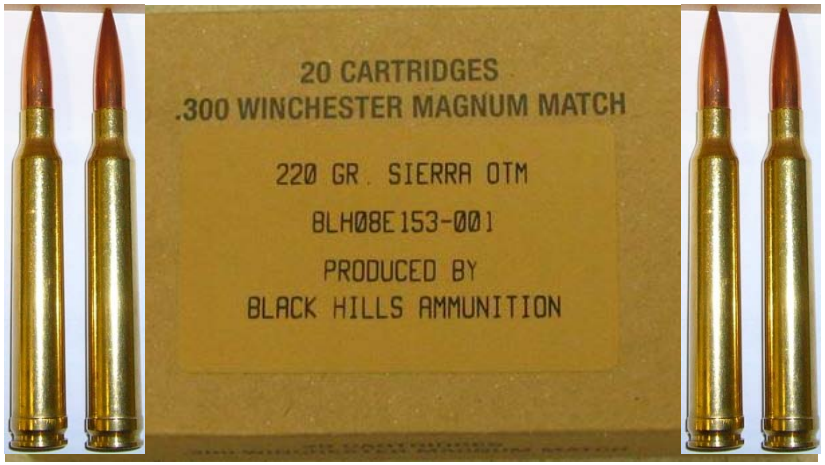
.300 Winchester Magnum Match Product Improvement (PIP) MK 248 MOD 1 DODIC: AB43 NSN: 1305-01-568-7504



Harnessing the Power of Technology for the Warfighter

.300 Win Mag PIP

New Requirement

- The current 190 gr. .300 Win Mag cartridge, DODIC A191, has a published effective range of 1200 yds (1100 m).
- New requirement established a 1500 yds (1370 m) effective range
  - Initial tasking was to develop a 250 gr. .338 Lapua Magnum cartridge.

Objective

- Extend effective range from 1200 yds to 1500 yds (1370 m)
- Decrease the effect of wind drift on the projectile
- Flash reduced and temperature stable propellant -25 F to +165 F

.300 Win Mag PIP

RDT&E

- Research indicated that objectives could be met with .300 Win Mag
- Obtained prototypes
  - 210 gr. Sierra MatchKing® VLD .300 Win Mag
  - 220 gr. Sierra MatchKing® .300 Win Mag
  - 250 gr. Scenar .338 Lapua Mag
  - 250 gr. Sierra MatchKing® .338 Lapua Mag
  - 300 gr. Sierra MatchKing® .338 Lapua Mag
- Pressure, velocity, and 1000 yd accuracy testing conducted

.300 Win Mag PIP

RDT&E (continued)

- Results
  - Accuracy
    - All rounds performed similarly with exception of the 300 gr. .338 Lapua Mag.
  - Velocity
    - Comparable velocity retention between 250 gr. .338 Lapua Mag and 210/220 gr. .300 Win Mag

Mean Values	.300 Win Mag			.338 Lapua Mag		
	190 gr. Sierra	210 gr. Sierra	220 gr. Sierra	250 gr. Sierra	250 gr. Scenar	300 gr. Sierra
Muzzle Velocity (fps)	2,936	2,864	2,879	2,831	2,814	2,701
Velocity @ 1000 yds (fps)	1,470	1,557	1,550	1,594	1,544	1,657

.300 Win Mag PIP

Down Select

- 220 gr. Sierra MatchKing® .300 Win Mag
  - Meets objectives
  - Can be fired in existing weapons
  - Less sensitive than the 210 gr. VLD
  - Comparable accuracy and velocity retention to the 250 gr. .338 Lapua Mag
  - Significant cost savings over the .338 Lapua Mag

MK 13 MOD 5

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.300 Win Mag PIP

Results

- Increased effective range to 1,500 yds
- Reduced wind deflection
- Propellant stabile across operational temps (-25 F to +165 F)
- Comparable accuracy to existing A191
- Contract estimated award of June 09

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5.56MM	7.62MM
Cartridge, Caliber 5.56mm Ball, Carbine, Barrier	Cartridge, Caliber 7.62mm Ball, Rifle, Barrier
MK 318 MOD 0	MK 319 MOD 0
DODIC: AB49	DODIC: AB50
NSN: 1305-01-573-2229	NSN: 1305-01-572-8492

5.56MM & 7.62MM Enhanced

5.56MM & 7.62MM Enhanced

- AA53 MK 262 & MK 12 Special Purpose Rifle (SPR) Fielded late FY01 (Post 9/11)
- Post 9/11 reports of ineffective ammunition (specifically M855 w/M4A1)
- April 02 received funding for terminal study (M855, MK 262, M193, M995 and COTS 87 gr.).
- Joint Service Wound Ballistics (JSWB) IPT 1st meeting 28 April 03.

5.56MM & 7.62MM Enhanced

5.56MM & 7.62MM Enhanced (Continued)

- SCAR JORD included “Enhanced Ammunition”
- Enhanced ammunition program funded July 05
- Developmental contract awarded to ATK Sept. 06.
- Key performance characteristics derived from knowledge obtained from participation in JSWB IPT
- SOST developmental contract final report & proof of concept rounds delivered August 07.

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5.56MM & 7.62MM Enhanced

Objective

- Develop ammo & weapon as a SYSTEM
- Incorporate lessons learned from JSWB IPT.

Performance

- Consistency; shot to shot & lot to lot.
- Accuracy, Combat - NTE 2 MOA.
- Intermediate barriers; auto glass/doors.
- Terminal, specifically CQC & behind barriers.
- Cost; as close to current rounds as possible.

Enhanced Cartridge Development

- Desired performance requirements communicated:
  - Behind barrier performance
  - Function & casualty and muzzle flash requirements in short barrel carbines
  - Extreme temperature stability
  - Accuracy, waterproof, cartridge configuration, etc.
- Federal Cartridge Company has over thirty years experience working with military and law enforcement customers on developing custom projectiles
- Testing begun with ATK and externally manufactured projectiles against performance requirements

Enhanced Cartridge Development

- New projectile developed from technology utilized in current law enforcement projectile
  - Front of bullet is designed to help defeat barrier
  - Back of bullet is solid copper and acts as a rear penetrator
- Short barrel propellant was specifically designed for this cartridge configuration
- Test results are positive
- Cartridge is compatible with various 5.56mm and 7.62mm firearms
- Projectile can be manufactured on conventional bullet assembly machinery and it can be assembled on high speed loading equipment

5.56mm Ball, Carbine, Barrier - MK 318 MOD 0

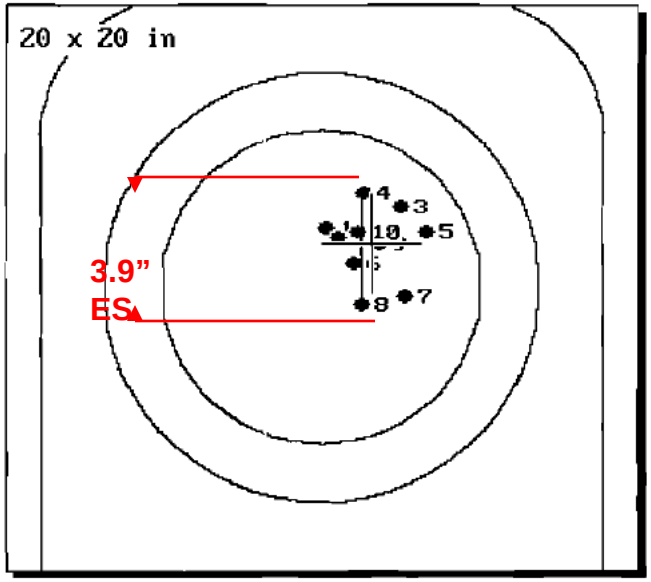
7.62mm Ball, Carbine, Barrier - MK 319 MOD 0

5.56MM & 7.62MM Enhanced

Accomplishments

- ✓Consistency; shot to shot & lot to lot
- ✓Accuracy, combat - NTE 2 MOA. (600 yds)
- ✓Intermediate barriers; auto glass/doors.
- ✓Terminal, Specifically CQC & behind barriers
- ✓Cost: as close to M855 and M80 as possible.

ACCURACY



5.56 Enhanced 300YD
3.9 IN. EX. SPREAD

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5.56MM & 7.62MM Enhanced

AB49, MK 318 MOD 0
(5.56MM Enhanced)

- 62 grain OTM (reverse draw jacket) bullet
- Temp stable flash reduced propellant
- Not yaw dependant
- Optimized for MK 16 (14” BBL)
- 2925 fps @ 15’

AB50, MK 319 MOD 0
(7.62MM Enhanced)

- 130 grain OTM (reverse drawn Jacket) Bullet
- Temp stable flash reduced Propellant
- Not yaw dependant
- Reduced recoil (10%)
- Optimized for MK 17 (16” BBL)
  - 2925 fps @ 15’
  - 2750 fps @ 15 (13” CQC BBL)

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5.56MM & 7.62MM Enhanced

Scheduled Availability

- 260K rounds 5.56MM, 750k rounds 7.62MM under a one year Limited Release to support MK 16/17 LRIP fielding
- Safety Testing for full type qualification in process. Completed by Sept. / Oct. 09
- Contract Award – Nov. 09 / May 10 (will know more by 5/8/09)
- Initial contract deliveries, full fielding capability – 1st/2nd Qtr 10.

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Questions?

Also available at booth #620