

PERFORMANCE SPECIFICATION

5123-001

Revision D, September 30, 2008

HIGH RELIABILITY ONE-PIECE 30-ROUND MAGAZINE

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Revision C: Added plastic epoxy powder coating to magazine body

Revision D: Added phosphate coated magazine and part number configuration chart

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Scope: This procedure is written for design, first article test, and production verification testing of the high reliability one-piece 30-round magazine and its variants.

1. Design Verification – Samples of the magazine shall be subjected to design verification testing per Table 1.
2. First Article Test Requirement – (FATR) Samples of the magazine shall be subjected to first article inspection per table 1. The testing shall be performed for each lot produced.
3. Magazine Design, Materials and Mfg. Processes –

Tube – Single piece (not two clam shelled together) 0.021” thickness 1050 steel stamping that is robotically MIG welded and nitride heat treated to diamond hard surface. The tube is manufactured using a continuous progressive die tool, certified robotic MIG welders and CNC weld removal tools. Manual labor must be minimized in order to hold close tolerances and reduce variability.

Floorplate – 0.035” thickness 1050 steel stamping, nitride heat treated

Retainer – 0.021” thickness 1050 steel stamping, nitride heat treated

Follower – 0.024” thickness 1050 steel stamping using a continuous progressive die tool, nitride heat treated, anti-tilt design

Spring – 17-7PH stainless steel high strength wire, passivated

Lubricant – None required, use MIL-PRF-63460 CLP oil (Break-Free) or commercial equivalent if desired. LUBRICANTS ARE NOT RECOMMENDED FOR SAND / DIRT ENVIRONMENTS.

4. Magazine Capacity – The magazine shall be capable of holding exactly 30 rounds of 5.56mm ammunition. *FATR - Fully load each of 20 sample magazines per lot with 5.56mm cartridges. Failure of the magazine to hold exactly 30 5.56mm rounds shall result in failure of the test.*
5. Maintenance – The magazine shall be able to be completely cleaned in accordance with the procedures specified in M16 / M4 Technical Manual without the use of any tools to disassemble or reassemble the magazine. The magazine shall be capable of reassembling in only one way. *FATR - This requirement shall be verified during function testing on each of 20 magazines per lot.*
6. Function – For Design Verification and First Article Testing the magazine shall operate without stoppages or unserviceable Parts when firing 5.56mm ammunition from the M16 / M4 /AR15 Rifle in the following attitudes: normal firing attitude, rotated 180° up-side down, rotated 90° horizontally to the left and right. *FATR - Each of 20 sample magazines per lot shall be fully loaded with 5.56mm ammunition and ten rounds from each magazine shall be fired in each of the above attitudes.*
7. Finish – The magazine’s steel body is to be nitride heat treated then pickled to remove the black oxide layer followed by water based rust preventative compound. The follower, retainer and floorplate are to be nitride heat treated followed by water based rust preventative compound that includes a permanent wax film that is dry to the touch and provides enhance rust protection.

Part Number	Finish Type	Color
6000-001	Powder coat	Black
6000-002	Heavy Manganese phosphate per MIL-DTL-16232G Type M	Dark Grey to Black
6000-003	Powder coat	Custom color per customer specification
6000-004	Per customer specification	

FATR - Visually inspect each of the 20 sample magazines per lot. The magazine body finish shall be matte black plastic (powder coat) or other specified non-reflective color (per customer order). Raw nitride surfaces must file hard and resist scratching. Test nitride surfaces by using a new utility sharp corner razor blade, apply a 20-pound load and move razor across the surface. No permanent scratch may be visible after cleaning and re-waxing or re-oiling.

8. Magazine Release – When the magazine catch on the M16 / M4 rifle is depressed, it shall disengage an empty magazine and a full magazine, and the magazine shall drop out of the receiver of its own weight. *FATR - Each of 20 empty sample magazines shall be inserted into an M16 or M4 rifle and then the magazine release will be depressed. The sample magazines shall then be fully loaded with 30 rounds of 5.56mm ammunition and the test repeated. Failure of the magazine to fall of its own weight shall result in failure of the test.*

9. Slide Catch – When the last round in a magazine is fired from the M16 / M4 / AR15 rifle, the magazine mechanism shall automatically engage the rifle bolt stop, keeping the bolt in the rear locked position. *FATR- Place a single 5.56mm cartridge into each of 20 sample magazines and insert the magazines into the rifle. The rifle cocking handle shall then be manually pulled to the rear and released to eject the cartridge. Failure of the bolt to remain to the rear shall be cause for rejection. Repeat the test and fire the rifle into the safety trap. Again failure of the bolt to remain to the rear shall be cause for rejection.*

10. Marking – *FATR- Visually examine each of 20 sample magazines to determine if proper Floorplate markings are in place. These markings are as follows; ASSY 5123 MM/YYYY (Date of stamping) and 5.56MM FUSIL-USA, ELK GROVE VILLAGE, IL USA (optional stamps are available for private branding). Note: cutom orders are to be inspected per customers contract requirements.*

11. Operation – The magazine and all moving components shall operate throughout their full range of travel without binding. *FATR - Visually and manually examine each of 20 sample magazines to ensure that each operates through their full range of travel without binding. To accomplish this task place a rectangular stick into the opening and fully depress the follower and both slowly release and quickly release the stick. Ensure that the tilt-resistant feature of the magazine follower does not allow the follower to jam. Failure of the follower to move properly or bind shall be cause for rejection.*

12. Rough Handling – The magazine shall remain intact and operational after being dropped onto concrete from a height of 1.5 meters when fully loaded. The magazine shall remain intact and operational after being subjected to a side load of 500 pounds on the side surface (simulates being stepped on by a soldier). *FATR - Each of 5 sample magazines shall be*

loaded with 30 rounds of 5.56mm ammunition and dropped from a height of 1.5 +0.05 meters (59.06 +1.97 inches) onto a flat concrete surface five times in each of the following orientations:

- a. Floorplate impacting flat on the bare floor.
- b. Toe of Floorplate impacting the bare floor.
- c. Heel of Floorplate impacting the bare floor.
- d. Left-hand edge of the Floorplate impacting the bare floor.
- e. Right-hand edge of the Floorplate impacting the bare floor.

The magazine shall remain intact. The magazine shall then be loaded into a M16, M4, or AR15 rifle and the full load of cartridges shall then be fired. The occurrence of a magazine related stoppage, failure of the bolt to remain to the rear after the last round is fired, or failure of the magazine to be retained in the rifle during firing shall result in failure of the test.

13. Fit and Retention – The magazine shall fit into the M16 / M4 / AR15 Rifle and shall be positively retained in place by the magazine catch. The magazine shall be capable of being inserted into a rifle with a minimum well size. The magazine shall contain a magazine catch slot on the left sides of the magazine. The magazine will not be able to be removed (or released) without the activation of the magazine release button. *FATR - each of 20 sample magazines, measure the dimensions of the magazine tube using a Go gage #5123-301 that conforms to Government drawing number 8448674 minimum dimensions. Place each magazine into the M16 / M4 / AR15 rifle and ensure that the magazine is positively retained. The magazine shall not be able to be removed without activation of the magazine release button. Measure the magazine retention slots on both sides of the magazine tube per Government drawing number 8448674 using an optical comparator. Above tests are to be performed with the magazines both empty and full.*
14. Weight – Weight of empty magazine shall not exceed 180 grams (6.3 ounces). *FATR - Measure 20 samples using a digital gram scale. **Reference: a standard military specified aluminum magazine weighs 130 grams or 4.6 ounces (a 5.56mm round weighs 12.2 grams or .43 ounces) and an H&K steel magazine weighs 12 ounces.***
15. Chemical Resistance – The magazine and its components shall not degrade when submerged into the following list of chemicals for 20 hours at 73° ±4° F and 50% ±5% humidity. Measure temperature and humidity using Psychrometer and record results hourly. Place each chemical into a steel container and submerge the components in the individual chemicals. After 20 hours remove the components, drain and let dry for 12 hours at ambient conditions. Examine the components and inspect for evidence of chemical reaction, degradation, damage, change in dimensions or change in hardness. All are causes for rejection.
 - A. Antifreeze, A-A-52624 – Prestone ASTM D 3306 / SAE 1034 (Type 1 Green)
 - B. Bore cleaner, MIL-PRF-372 – Per QPL-372-26
 - C. Carbon removing compound, P-C-111 – Document was cancelled without replacement
 - D. Cleaner, lubricant, preservative, MIL-PRF-63460 – Per QPL-63460-31
 - E. Diesel fuel, DL-2, ASTM D 975 (Low sulfur No. 2) – Standard truck fuel
 - F. Dry cleaning solvent, MIL-PRF-680 – LPS #61432 (Grainger #4JB69) 32 oz bottle

- G. Gasoline, ASTM D 910 – 100 LL Aviation Gasoline
- H. Hydraulic fluid, fire resistant, MIL-H-46170 – Per QPL-46170-12
- I. Hydraulic fluid, petroleum, MIL-H-5606 – Per QPL-5606-31
- J. Insect repellent diethyltoluamide (DEET), A-A-59104 – SC Johnson 1 oz Deep Woods Off 100% (cut to 75% by weight with 25% by weight denatured alcohol to conform with the obsolete specification)
- K. Lubricant, MIL-L-46000 – Per QPL-46000-21
- L. Lubricating oil, MIL-L-14107 – Per QPL-14107-29
- M. Lubricating oil, MIL-PRF-2104 (SAE J300) – Per QPL-2104-45 or SAE J300 per specification
- N. Lubricating oil, VV-L-800 - Document was cancelled without replacement
- O. Turbine fuel, JP-8, MIL-DTL-83133 – Use pure distilled kerosene

The chemical resistance testing is required once every 6 months.

16. Magazine Reliability – *4 sample magazines shall be subjected to reliability testing by firing 4,800 rounds (19,200 total) of 5.56mm ammunition from each magazine. The rifles shall be hand held, and all magazines shall be fully loaded whenever possible.*

The rifles shall be allowed to cool after each 300 rounds fired, and the rifle shall be cleaned and lubricated after each 600 rounds fired per MIL-PRF-63460. The rifles shall also be cleaned and lubricated after each day's firing. The sample magazines shall be rotated through each rifle until 4,800 rounds are fired.

Firing shall be in a series of 600 rounds using fully loaded magazines whenever possible. The first 30 rounds from each magazine shall be fired slowly with approximately 2 seconds between shots (semi-automatic). The remaining rounds shall be fired in rapid automatic mode.

Failure is defined as follows:

- *Occurrence of more than 3 magazine related rifle stoppages (including failure of the slide to lock back after last round fired),*
- *Failure of the magazine to be retained in the rifle during firing,*
- *Failure of any magazine component.*

During production the above tests shall be performed monthly on two magazines selected at random from that month's production lot.

17. Rifle Durability – *FATR - The results from Magazine Reliability log will be used to verify conformance with rifle durability requirements. The failure of any rifle component related to the magazine shall result in failure of the durability test.*
18. Maintainability – *The maximum time required to repair (MTTR) the magazine shall not exceed 0.25 hours. The time to repair is defined as the total time required to restore the magazine to operation, including diagnostic time, after a stoppage or unserviceable part occurs. FATR - After completion of the Reliability test two magazines will be fully disassembled, cleaned and reassembled while being timed using a digital stopwatch. The MTTR time shall not exceed 15 minutes.*

19. Corrosion Resistance – The lubricated magazine shall be free of corrosion and function as intended after exposure to a salt fog atmosphere. Five Magazine Tubes, Followers, Retainers, Floor Plates and Springs shall each separately be exposed to a 96-hour salt fog test per ASTM B117. Rejection criteria are per ASTM D610 rust grade #9.

FATR - During production the above test shall be performed weekly on five sets of magazine parts selected at random from that weeks production lot.

20. Fungus Resistance – The magazine and its components shall not be degraded by exposure to tropical climate fungus, rot, or mildew. No plastic parts are to be incorporated therefore per DoD no actual tests needs to be performed.
21. Temperature – The following tests require 3 sample magazines each once per year for FATR.

High Temperature Test – Fire 600 rounds of 5.56mm ammunition from each magazine. The rifle, sample magazines, and at least 600 rounds of ammunition shall be exposed to the following condition: a 4-hour heat soak at 165°C in the heat cabinet. The rifles shall be fired hand-held in 100 round cycles. Since the rifles are being fired outside of a heat chamber, the rifle and magazines must be conditioned for 2 hours after each cycle of 100 rounds. The magazines shall be rotated through the rifles until a total of 600 rounds are fired through each magazine.

The rifle and magazines shall be cleaned and lubricated prior to the beginning of testing and after 600 rounds fired per MIL-PRF-63460. The rifles shall also be cleaned and lubricated after each day's firing.

Failure is defined as follows:

- Occurrence of more than 2 magazine related rifle stoppages (including failure of the bolt to lock back after last round fired),
- Failure of the magazine to be retained in the rifle during firing,
- Failure of any magazine component.

Low Temperature Test – Fire 600 rounds of 5.56mm ammunition from each magazine. The rifle, sample magazines and at least 600 rounds of ammunition shall be exposed to the following condition: a 4-hour heat soak at -55°C. The rifles shall be fired hand-held in 100 round cycles. Since the rifles are being fired outside of a cooling chamber, the rifle and magazines must be conditioned for 2 hours after each cycle of 100 rounds. The magazines shall be rotated through the rifles until a total of 600 rounds are fired through each magazine.

The rifle and magazines shall be cleaned and lubricated prior to beginning of testing and after 600 rounds fired per MIL-L-14107. The rifles shall also be cleaned and lubricated after each days firing.

Failure is defined as follows:

- Occurrence of more than 2 magazine related rifle stoppages (including failure of the bolt to lock back after last round fired),
- Failure of the magazine to be retained in the rifle during firing,

- Failure of any magazine component.
22. Preload – Each of 5 sample magazines shall be fully loaded with 5.56mm ammunition and stored for 30 days. Then fire 10 full cycles for a total of 300 rounds. This test is performed once per monthly lot to test spring lot conformance.

Failure is defined as follows:

- Occurrence of more than 3 magazine related rifle stoppages (including failure of the bolt to lock back after last round fired),
 - Failure of the magazine to be retained in the rifle during firing,
 - Failure of any magazine component.
23. Workmanship – *FATR* - *Each of 20 sample magazines shall be visually examined for dents, scratches, cracks, sharp edges or any other defects that may affect functioning of either the magazine or rifle.*

Table 1

	PRF12991621 Section 3 Requirement	Verification Methods				Verification Class			Design Verification	FAT Verification LOT Inspection	MIL-STD-1916 Lot Verification Level
		N/A	1	2	3	4	A	B			
1	3.1 Design verification				X	X	X				
2	3.2 First Article				X	X		X			
3	3.3 Design, Materials and Mfg. Processes	X									
4	3.4.1 Magazine Capacity				X		X	X	All	All	II
5	3.4.2 Maintenance				X		X	X	4	3	
6	3.4.3 Function					X	X	X	All	All	II
7	3.4.4 Finish				X		X	X	All	All	II
8	3.4.5 Magazine Release					X	X	X	All	All	III
9	3.4.6 Round Count				X		X	X	All	All	II
10	3.4.7 Slide Catch					X	X	X	All	All	II
11	3.4.8 Marking				X		X	X	All	All	II
12	3.4.9 Operation				X		X	X	All	All	II
13	3.4.10 Rough Handling					X	X	X	5	5	
14	3.5.2 Fit and Retention				X		X	X	All	All	III
15	3.5.3 Weight				X		X	X	All	All	
16	3.5.4 Chemical Resistance					X	X		Note 1		
17	3.6.1 Magazine Reliability					X	X	X	4	3	2 Magazines
18	3.6.2 Rifle Durability					X	X		4		
19	3.6.3 Maintainability			X			X		2		
20	3.7.1 Corrosion Resistance					X	X	X	5	3	5 Magazines Weekly Lot
21	3.7.2 Fungus Resistance		X				X		Note 2		
22	3.7.3 Temperature					X	X		3		
23	3.7.4 Preload					X	X	X	5	3	
24	3.8 Workmanship			X			X	X	All	All	III

Method of Verification

1 - Analysis

2 - Demonstration

3 - Examination

4 - Test

Classes of Verification

A - Design Verification

B - First Article Inspection

C - Conformance Inspection

Note 1 - Non-Metallic Components

Note 2 - Verified by Analysis

Test Equipment

- Qty 6 – M16 / M4 automatic rifles
- Qty 300,000 – 5.56mm ammunition
- Qty 1 – Measuring tape
- Qty 1 – Go Gage #5123-006 (Magazine Well)
- Qty 1 – Mitutoyo Digital Caliper
- Qty 1 – Optical Comparator J&L FC14
- Qty 1 – Ohaus Adventurer AS8100 Digital Scale (Gram Scale) S/N 8026251083
- Qty 1 – Psychrometer Conforming to Fed Spec GG-P-725B, Type III, Style B (McMaster Carr #3885K11)
- Qty 1 – Digital Stopwatch
- Qty 1 – Fluke digital multi-meter Model 77 or Model 87
- Qty 1 – Fluke Temperature Probe Model 80T-150U

Miscellaneous Supplies

- Qty 12 – Steel plated steel 4 oz cans (McMaster Carr #4084T41)
- Qty 10 – 5.56MM dummy cartridges
- Qty 1 – Thermal Conditioning Cabinet 165°C ±5° Tech-Star heat cabinet M/N None with Omron temperature controller Model E5CS (this item was custom designed and manufactured for Airtronic Services by Tech-Star). Size 78” H x 36” W x 24” D.
- Qty 1 – Plastic and Styrofoam Cooler
- A/R – Dry Ice