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IN REPLY REFER TO:

5100
Ser 405A/7015
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From: Commander, Crane Division, Naval Surface Warfare Center
To: Naval Ordnance Safety and Security Activity, Code N712

Subj: FIELDING APPROVAL FOR M40XM-3 SNIPER SYSTEM

Ref: (a) NSWC Crane ltr 5100 Ser 405A/7004 of 15 Feb 07

Encl: (1) M40XM-3 Sniper System Safety Assessment Report

1. Reference (a) was submitted to the Weapon System Explosives Safety review Board (WSESRB) requesting fielding approval for the Defense Advanced Research Projects Agency (DARPA) M40XM-3 Sniper System. Based on questions received from the WSESRB, enclosure (1) is resubmitted for review and approval.

2. NSWC Crane points of contact are Mr. David Armstrong, Code 4081, telephone DSN 482-5731 or 812-854-5731, and Mr. Steven Denney, Code 405A, telephone DSN 482-3561 or 812-854-3561.

J. A. McQueen

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By Direction

M40XM-3 Sniper System

Safety Assessment Report
(SAR)

30 March 2007

Prepared By
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M40XM-3 Sniper System

System Safety Assessment Report (SAR)

APPROVAL SHEET

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M40XM-3 Sniper System

Safety Assessment Report (SAR)

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to document the mishap risk associated with the M40XM-3 Sniper Rifle system prior to fielding of the system. This safety assessment identifies all safety features of the hardware and system design and identifies procedural and hardware related hazards that may be present in the system including specific procedural controls and precautions that should be followed.

1.2 Scope and Limitations

This report presents the background, methodology, and analysis of a safety assessment of the M40XM-3 Sniper System in accordance with MIL-STD-882. An initial assessment of the safety risk associated with the system was not conducted due to time constraints and limited quantity of assets. The design of the system utilizes, with minor modifications, assemblies and components with known characteristics and design reliability. The final assessment of the probability and severity of the hazards include design features and other mitigating steps implemented to ensure acceptable safe operation of the system.

1.3 Background

The Global War on Terror (GWOT) has been the driving force behind the significant recent changes in U.S. military tactics, training, and acquisition. In order to dominate the battlefields where the GWOT is being fought today and tomorrow, the U.S. must continue to advance the development and fielding of advanced infantry weapons and equipment. The Advanced Individual Combat Weapon (AICW) seedling study identifies investment areas where new technologies are needed to provide riflemen and snipers with the greatest possible advantages on tomorrow's battlefield. As a result of the study the M40 XM-3 sniper system was funded.

After-action reports from the GWOT have indicated that additional enhancements to the existing systems are needed to provide a leap-ahead improvement in system accuracy, precision, target detection, sound suppression, and reduction in system total weight. The M40XM-3 Sniper Rifle, which includes upgrades/improvements in these areas, is a direct result of these after-action reports.

1.4 References

A list of references used for this assessment is contained in Attachment 1. Attachment 2 contains the System Hazard Analysis (SHA) that identified the potential hazards and the associated severity and probability.

1.5 Assessment Methodology

This assessment is based on testing conducted by Crane Division, Naval Surface Warfare Center (NSWC Crane), user assessments, and analysis of the system.

2.0 SYSTEM DESCRIPTION

This section provides a description of the overall system and the subsystems for the M40XM-3 Sniper System.

2.1 M40XM-3 Sniper Rifle

The M40XM-3 is a bolt action, manually operated, magazine-fed, air cooled, shoulder fired Sniper Rifle. The M40XM-3 Sniper Rifle is 7.62 X 51mm NATO assembled by Iron Bridge Armory (IBA), and is based on the commercial Remington Model 700 rifle action. Figure 1 shows the M40XM-3 Sniper Rifle system.

Figure 1: M40XM-3 Sniper System (not shown is UNS type NVD included with each)

A comparison of the current USMC M40A3 to the M40XM-3 is provided in Table 1 below. As noted in the comparison chart, the critical components such as the receiver, bolt assembly, and trigger assembly are the same as current systems. Additionally, other components listed are the same or represent improvement in materials to reduce weight or improve strength.

Table 1: Relevant Part Comparison between M40A3 and M40XM-3

Component Part	M40A3	M40XM-3
Receiver	Standard Short Action Remington Model 700 (Chrome Moly) modified to support scope mount	Standard Short Action Remington Model 700 (Stainless Steel) modified to support scope mount
Bolt Assembly	Standard Remington to include extractor configuration	Standard Remington to include extractor configuration – has ergonomic bolt knob added (larger than std.)
Trigger	Remington (3-5 lbs pull)	Remington (3-5 lbs pull)
Bottom Metal	DD Ross Carbon Steel	Badger Ordnance M4 Carbon Steel
Magazine	Internal Box with standard follower	Internal Box with machined follower

Barrel	Schneider stainless (416) 1 turn in 12 inches USMC profile 24 inches long	Hart 416R stainless 1 turn in 10 inches USMC Profile. 18 inches long (threaded for SureFire flash suppressor)
Recoil Lug	Chromoly Steel 0.313 inch thick (Badger Ordnance)	Titanium 0.313 inch thick Badger Ordnance
Stock	McMillan A-4 Fiberglass	McMillan A-6 Fiberglass
Bipod	Harris LM	Harris BRM-S
Day Optic Mount Rail	G&G/Badger Chrome Moly (lugged for receiver interface)	IBA Inc. Titanium Rail (lugged for receiver interface)
Night Optic Mount Rail	None	IBA Inc. (aluminum – secured to stock)

The M40XM-3 sniper system utilizes proven existing weapon technology integrated into this system. The receiver, bolt assembly, and trigger assembly are identical to M40A3 which is presently in-service. The Remington Model 700 action design has been proven to be both safe and reliable and is currently used in the USMC M40 series as well as the US Army M24, and US Navy MK 13 series rifle. The M24 with the Remington 700 receiver has been used by the US Army since 1988. The Remington 700 receiver has successfully passed all recommended SAAMI (Sporting Arms and Ammunition Manufacturers' Institute) safety related environmental and rough handling tests (including drops) with no safety anomalies.

The barrel configuration for the M40XM-3 is shorter than the M40A3 and provides 1 turn in 10 inches as compared to 1 turn in 12 inches for the M40A3. Due to the tighter twist in the M40XM-3, the bullet has greater stability. The only potential drawback associated with a shorter barrel is a slight reduction in muzzle velocity which translates into a proportionally reduced spin rate at the muzzle exit, but it has been demonstrated that this is compensated for by the tighter twist. In comparison firings with the MK 11 with a 20 inch barrel, the MK 11 averaged 2590 fps muzzle velocity and the M40XM-3 averaged 2560 fps. These firings were under the same conditions at the same time. The M40XM-3 has demonstrated similar inherent accuracy to the MK 13 MOD 5 in comparative firings. Additionally, the shorter barrel on the M40XM-3 does not present a flash issue due to the flash suppressor built into the SureFire suppressor, FA762SS. The barrel configuration has not proven to present either reliability or safety issues.

The system was approved for a demonstration per MCSC letter, Safety Release for the Demonstration of DARPA's XM Experimental Sniper Rifle of 26 July 2006. During the demonstration approximately 100 suppressed rounds were fired and the system also went through the sniper course. There were no safety anomalies identified. Additionally, a Limited User Evaluation (LUE) was conducted for the M40XM-3 system and approved per MCWL letter, Safety Release for the Defense Advanced Research Projects Agency (DARPA) Experimental Sniper Rifle M40XM-3 for the Purpose of Limited User Evaluation by the WASP Fly-Away Cell of 18 September 2006. During the LUE, each weapon fired over 600 rounds in a variety of conditions including sea level and high altitude/cold environments. The results of the LUE were positive with no safety

anomalies. It should be noted that only the M118 (AA11) ammunition was used for the user evaluation. NSWC Crane has fired the following ammunition with the M40XM-3 system: M80 Ball (A130/A149), M993 armor piercing (AA03), M62 Tracer (A124), M118 (AA11), and M276 Dim Tracer (A257). All ammunition types functioned reliably; the bullet was stable punching a clean hole in the target. There were no safety anomalies.

2.1.1 Safety Features

- The M40XM-3 is equipped with a "safety". When the "safety" is engaged, it positively supports the sear so that it can not move away from the firing pin head. The trigger no longer contacts the firing pin head with the "safety" engaged. Attachment 3 contains a drawing and more in-depth explanation of the how the trigger assembly works.
- The integrity of the "safety" has been demonstrated by successfully passing SAAMI rough handling and safety related testing.
- The M40XM-3 is a magazine fed bolt action rifle. A round of ammunition must be intentionally fed into the chamber via the bolt action.

2.2 Sound and Flash Suppressor

The sound/flash suppressor system used with the M40XM-3 is the SureFire Model FA762SS which is the same design and construction as the FA762K. The FA762K suppressor has recently undergone qualification testing at NSWC Crane for use on the MK 14 MOD 1 Rifle. The FA762SS and the FA762K are constructed of the same materials, but the FA762K design focus is for assault rifles while the FA762SS design focus is for semi-automatic and bolt action rifles. The primary difference is a larger bore size on the first two (2) baffles in the FA762K. Both suppressors have been tested and survived durability tests in excess of the standard specified in the MK 14 suppressor tests. The sound/flash suppressor system is a two-part assembly. The flash suppressor unit internal threads interface with the barrel threads. The sound suppressor unit then slides over the flash suppressor unit and a rotating collar locks it in place by means of a spring loaded latch. Figure 2 shows the flash suppressor unit and Figure 3 shows the sound suppressor unit (FA762K).

Figure 2

Figure 3

This sound/flash suppressor system was tested by NSWC Crane. One hundred-sixty rounds were fired through each suppressor at approximately one (1) shot per second. There were no failures or safety anomalies during the testing. Additionally, two (2) suppressors had approximately two thousand (2,000) rounds fired through without failures or safety anomalies. Additionally, NSWC Crane has fired all the types of ammunition identified in paragraph 2.3 through the weapon with suppressor and in the opinion of the NSWC Crane engineering and safety personnel all types of ammunition recommended for use with the M40XM-3 are considered safe. The suppressor has demonstrated to be both reliable and safe for use. Attachment 5 contains the Operator's Manual for the suppressor.

2.2.1 Safety Features

- Internal threads of the flash suppressor interface with the barrel muzzle threads. The body extends over the barrel at close tolerance to the diameter to ensure added support.
- The sound suppressor is locked into place by a locking collar rotated into position to engaged flash suppressor unit and is retained in position by the spring loaded retention latch.

2.3 Ammunition

Authorized ammunition for the M40XM-3 sniper rifle will be limited to M80 Ball, M993 AP, M62 Tracer, M276 Dim Trace, and M118LR. SLAP and Frangible ammunition shall not be used with the M40XM-3 system. All authorized ammunition has been fired with the M40XM-3 system with no anomalies.

2.4 M1913 Small Arms Accessory Mounting Rail

The M40XM-3 rifle is equipped with a M1913 Small Arms Accessory Mounting rail to allow for mounting day/night optics. The day scope is the Nightforce NXS 3.5-15x50 and the night vision scope is the OSTI Universal Night Sight AN/PVS-22. Both scopes are in-service at the present time.

3.0 M40XM-3 OPERATION

3.1 Normal Operation

The M40XM-3 Sniper Rifle operation consists of the following tasks.

3.1.1 Loading

To load the weapon, proceed as follows:
1. Engage the “safety” on the receiver housing.
2. Insert individual cartridges into magazine box through the ejection port of the receiver.
3. Cycle bolt to chamber a round.

The weapon is now loaded.

3.1.2 Firing

To fire the weapon, proceed as follows:
1. Set the “safety” to fire.
2. While holding and aiming the weapon, firing may proceed.
3. Pull the trigger
4. All five (5) rounds may be fired in succession by cycling the bolt.

3.1.3 Operational Functioning

The trigger releases the sear allowing the firing pin to move forward and strike the primer which in turn ignites the propellant in the cartridge case. The build-up of high pressure gases propels the projectile from the muzzle of the weapon.

3.2 Maintenance

3.2.1 The M40XM-3 is designed to be low maintenance. The degree to which the weapon may be stripped by the user is limited to the removal of assemblies necessary to maintain it in a clean and lubricated condition. Additional stripping for repair and replacement of worn or damaged components is only to be performed by qualified armorers. If parts become worn or damaged, the weapon is to be reported to the unit armorer for repair.

3.2.2 Training

There are no unique, safety-specific issues related to the training environment. Operating personnel shall be qualified and familiar with general weapon procedures and range safety procedures.

3.3 Transportation

The M40XM-3 is safe to transport by land, sea, and air in the unloaded condition.

3.4 Storage

The weapon shall be stored in accordance with standard weapon preservation methods and materials.

3.5 Disposal

There are no unique, safety-specific issues related with disposal. The weapon and suppressor should be disposed of in accordance with standard procedures for disposal of conventional weapons defined in DOD 4160.21-M-1.

3.6 Facilities and Support Equipment

There are no unique, safety-specific issues related to facilities and support equipment. Support equipment is similar to existing equipment.

4.0 SYSTEM SAFETY

4.1 System Safety

MIL-STD-882 provides for a process of classification of hazards according to a prioritization of the associated hazards. Hazards can be categorized by severity (Table 2) and by level of probability (Table 3). Combining the severity and probability provides a Hazard Risk Index (HRI) as shown in Table 4. When these categorizations are applied to the hazards of a system, a risk assessment of that system can be made. The final authority for the acceptance of risk is related to the risk levels assessed, as prescribed in Table 4.

Table 2: Hazard Severity Category

MISHAP SEVERITY CATEGORIES		
DESCRIPTION	**CATEGORY**	**ENVIRONMENTAL, SAFETY, AND HEALTH RESULT CRITERIA**
CATASTROPHIC	I	Could result in death, permanent total disability, or irreversible severe environmental damage that violates law or regulation.
CRITICAL	II	Could result is permanent partial disability, injuries or occupational illness that may result in hospitalization of at least three personnel, or reversible environmental damage causing a violation of law or regulation.
MARGINAL	III	Could result in injury or occupational illness resulting in one or more lost work day(s), or mitigatible environmental damage without violation of law or regulation where restoration activities can be accomplished.
NEGLIGIBLE	IV	Could result in injury or illness not resulting in a lost work day, or minimal environmental damage not violating law or regulation.

Table 3: Hazard Probability Category

MISHAP PROBABILITY LEVELS		
DESCRIPTION	**LEVEL**	**SPECIFIC INDIVIDUAL ITEM**
FREQUENT	A	Likely to occur often in the life of an item, with a probability of occurrence > 10^{-1} in that life.
PROBABLE	B	Will occur several times in life of an item, with a probability of occurrence < 10^{-1} but > 10^{-2} in that life.
OCCASIONAL	C	Likely to occur some time in the life of an item, with a probability of occurrence < 10^{-2} but > 10^{-3} in that life.
REMOTE	D	Unlikely but possible to occur in the life of an item, with a probability of occurrence < 10^{-3} but > 10^{-6} in that life.

IMPROBABLE	E	So unlikely, it can be assumed occurrence may not be experienced, with a probability of occurrence < 10^{-6} in that life.

Table 4: Hazard Risk Index

Hazard Risk Index Values				
SEVERITY **PROBABILITY**	**CATASTROPHIC**	**CRITICAL**	**MARGINAL**	**NEGLIGIBLE**
A *- FREQUENT*	1 High	3 High	7 Serious	13 Medium
B *- PROBABLE*	2 High	5 High	9 Serious	16 Medium
C *- OCCASIONAL*	4 High	6 Serious	11 Medium	18 Low
D *- REMOTE*	8 Serious	10 Medium	14 Medium	19 Low
E *- IMPROBABLE*	12 Medium	15 Medium	17 Medium	20 Low
RISK ACCEPTANCE AUTHORITY				
HIGH (1-5)	Component Acquisition Executive approval required			
SERIOUS (6-9)	Program Executive Officer approval required			
MEDIUM (10-17)	Program Manager approval required			
LOW (18-20)	Program Manager approval required			

4.2 Safety Analysis

Critical assemblies associated with the M40XM-3 have been utilized with other weapons as shown in Table 1. The analyses of the potential hazards are presented below. Attachment 2 contains the System Hazard Analysis from which the assessment is based. Attachment 5 contains the safety design characteristics for the M40XM-3 Sniper System.

4.2.1 Operation and Use

Operating personnel shall be trained and qualified in the use of the weapon and the general safety procedures. The procedures for the installation and removal of the suppressor are provided as Attachment 5.

The System Hazard Analysis (SHA) has identified eighteen (18) basic hazards with some containing more than one causal factor for each hazard. Five (5) hazards are related to the suppressor and the remaining are weapon and ammunition related. The ammunition related hazards include human error, and exposure to environmental stimuli. The human errors are common hazards associated with all small arms use and are covered by existing training and operating instructions. The issues concerning environmental stimuli have

been addressed by the qualification and testing program for the ammunition. Only approved ammunition shall be used with the weapon. The weapon related hazards are comprised of operator error and weapon failures. The other weapon related hazards are weapon related due to worn, missing, or out of tolerance parts which can be detected by routine maintenance.

The system incorporates safe features normally incorporated into weapons of this type. Training, supervision, and discipline are effective means of mitigating the operator-induced hazards and will reduce the probability of identified hazards to remote. Quality assurance testing should reduce any quality hazards to improbable.

The identified hazards fall in the serious, medium, and low risk categories as defined by Table 4. All the identified hazards are the same hazards associated with similar systems (M40A3, M24, and MK 13 rifle systems).

4.2.2 Transportation

There are no significant safety hazards identified with transportation. Normal procedures for transportation of conventional arms apply.

4.2.3 Storage

There are no significant safety hazards identified during storage. Normal procedures for storage of conventional arms apply.

4.2.4 Disposal

There are no significant safety hazards identified during disposal. Normal procedures for disposal of conventional arms apply.

4.2.5 Facilities and Support Equipment

There are no significant safety hazards identified for facilities and support equipment.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The M40XM-3 rifle is very similar to several other bolt action fielded sniper rifles and does not pose any greater risk. Semi-automatic sniper rifles such as SR-25/MK11 and MK 13 utilize a sound suppressor and have been in the inventory for several years.

5.2 Hazards

A total of 21 hazards were identified for the M40XM-3 Sniper System. Table 5 presents the final system risk assessment by number and category.

Risk Category	Acceptance Authority	Number
High Risk	Component Acquisition Executive approval required	0
Serious Risk	Program Executive Officer approval required	1
Medium Risk	Program Manager approval required	20
Low Risk	Program Manager approval required	1

Table 5: Final Risk Assessment Summary

Overall, the M40XM-3 Sniper System presents a risk similar to the existing sniper systems (M40A3, M24, and MK 13). These weapons have been previously approved and are in-service at the present time. The M40XM-3 rifle utilizes existing proven technology. Although the suppressor design has not received official safety approval, approved, it has undergone qualification testing by NSWC Crane and has been approved by the Navy Weapon System Explosives Safety Review Board for user evaluation by the end users and will be incorporated in the MK 14 MOD 1 rifle system.

The M40XM-3 system has received a safety release for demonstration as per MCSC letter 5100/IWS of 26 July 2006 and approval for user evaluation per MCSC letter 5100/MCWL of 18 Sep 2006. The numbers of rounds fired during the demonstration, user evaluation, and testing were in excess of 2,000 rounds per weapon most of which were suppressed. Additionally, two (2) FA762K suppressors of the same basic design as the FA762SS had approximately two thousand (2,000) round fired through them with no failures or safety anomalies. The M40XM-3 Sniper system has demonstrated that it is both safe and reliable.

The ammunition used with the M40XM-3 is limited to M80 Ball (A130/A149), M993 AP, M62 Tracer, M276 Dim Trace, and M118LR (AA11) which is its primary cartridge. In

the opinion of the NSWC Crane weapons engineers, the hazards associated with the ammunition are similar whether being fired from an M40XM-3 or M40A3, etc.

The optics used with the M40XM-3 are presently in-service and present no significant safety hazards.

There were no hazards classified as high. The hazards associated with the M40XM-3 Sniper System are the same as those associated with other similar systems.

5.3 Recommendations

This assessment is based on the commonality of components between the M40XM-3 and other bolt action sniper rifles which are currently in-service, user assessments, and analysis. Although limited testing was conducted, in the opinion of the weapons engineering personnel additional testing was not needed. The M40XM-3 sniper system utilizes proven existing weapon technology integrated into this system. The receiver, bolt assembly, and trigger assembly are identical to M40A3 which is presently in-service. The Remington Model 700 action design has been proven to be both safe and reliable and is currently used in the USMC M40 series as well as the US Army M24, and US Navy MK 13 series rifle. The Remington Model 700 receiver has successfully passed all recommended SAAMI safety related environmental and rough handling tests (including drops) with no safety anomalies. Additionally, the M40XM-3 has undergone a user assessment in which the weapon system was functioned at sea level and high altitude as well as cold conditions with no safety anomalies. It should be noted that function of a bolt action rifle is not impacted by temperature extremes as much as the semi-automatic weapon, but temperature extremes have a greater effect on a function of the ammunition. All ammunition used with the system has been fully tested and qualified at temperature extremes. NSWC Crane has fired the following ammunition with the M40XM-3 system: M118LR (AA11), M80 (A130/A149), M993 (AA03), M62 Tracer (A124), and M276 Dim Tracer (A257). All ammunition functioned reliably and the bullet was stabilized as evidenced by target impacts. There were no safety anomalies.

The barrel configuration for the M40XM-3 is shorter than the M40A3 and provides 1 turn in 10 inches as compared to 1 turn in 12 inches for the M40A3. Due to the tighter twist in the M40XM-3, the bullet has greater stability. The only potential drawback associated with a shorter barrel is a slight reduction in muzzle velocity which translates into a proportionally reduced spin rate at the muzzle exit, but it has been demonstrated that this is compensated for by the tighter twist. There were no issues associated with flash or unburned propellant. The barrel configuration has not proven to present either reliability or safety issues.

The M40XM-3 is equipped with the SureFire Model FA762SS sound and flash suppressor. Although the suppressor has not been previously approved, the design has undergone extensive testing with the MK 14 MOD 1 Rifle system. In addition over 2,000 rounds of ammunition (primarily M118LR) has been fired through XM-3 rifles mostly suppressed (FA762SS) with no safety anomalies. All ammunition listed in

paragraph 2.3 has been fired through the M40XM-3 rifle and suppressor. The suppressor has proven to be both reliable and safe.

Based on the commonality of critical components, testing, user assessment, and analysis, the risk associated with the transportation, handling and use of the M40XM-3 Sniper system is no greater than the risk associated with similar systems. It is recommended by the NSWC Crane weapons engineers, safety personnel, and the Navy Small Arms Technical Warrant Holder that the safety risk associated with the operational use of the M40XM-3 Sniper System is identical to several other currently fielded sniper rifles based on the Remington Model 700 action.

ATTACHMENT 1: REFERECNES

MIL-STD-882, DOD Standard Practices for System Safety, dated 10 February 2000

DOD 4160.21-M-1 w/Ch1, Defense Demilitarization Manual, 14 February 1995

Memorandum of Understanding between Defense Advanced Research Projects Agency and Commanding General Marine Corps Combat Development Command for the Enhanced Sniper Rifle Evaluation, Dated 18 December 2006

Final Report for the LOT Acceptance Test of the M91 7.62mm NATO Sniper Rifle, dated 13 April 1993

Weapon System Explosives Safety Review Board Safety Approval for a User Assessment for the MK 14 MOD 1 Enhanced Battle Rifle Sound/Flash Suppressor System, dated 25 August 2006

MCSC Letter, Safety Release for the Demonstration of DARPA's XM Experimental Sniper Rifle, dated 26 July 2006

MCWL Letter, Safety Release for the Defense Advanced Research Projects Agency (DARPA) Experimental Sniper Rifle M40XM-3 for the Purpose of Limited User Evaluation by the WASP Fly-Away Cell, dated 18 September 2006

SW010-AD-GTP-010, Small Arms and Special Warfare Ammunition, Chapter 5

SW020-AC-SAF-010, Transportation & Storage Data for Ammunition, Explosives and Related Hazardous Materials

ATTACHMENT 2
SYSTEM HAZARD ANALYSIS

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** 1 OF 10

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
1	Inadvertent or accidental initiation of cartridge.	A. Primer impacted or struck during handling, loading and/or unloading of weapon.	IIE (15)	1. All personnel shall be qualified and certified in the operation of the system. 2. Standard Operating Procedures shall address safe and proper handling and loading/unloading of weapon. 3. All storage and handling shall be IAW OP-5 and other applicable instructions, manuals, and procedures. 4. All personnel shall be qualified/certified to handle, ship, receive, store, and issue explosive material.	IIE (15)	Closed – 2/9/07. Procedures are in-place.
		B. Cartridge subjected to environmental extremes resulting in auto-ignition of energetic materials (primer or propellant).	IIE (15)	Same above.	IIE (15)	Closed – 2/9/07. Only M80 Ball, M993 AP, M62 Tracer, M276 Dim Trace, and M118LR are requested for use with the M40XM-3. All ammunitions listed above are approved for use.
		C. Unwanted stimuli (mechanical shock) imparted on cartridge.	IIE (15)	1. Only approved cartridges tested IAW applicable instructions shall be used.	IIE (15)	Closed – 2/9/07. Only M80 Ball, M993 AP, M62 Tracer, M276 Dim Trace, and M118LR are requested for use with the M40XM-3.

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** **2** OF **10**

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
2	Intentional or unintentional firing of cartridge.	A. Cartridge primer impacts stationary object (firing pin, ground, sharp object, etc.).	IIID (14)	1. Normal handling and operating procedures shall be utilized. 2. Operating procedures shall address safe and proper handling and loading/unloading of weapon. 3. All personnel shall be qualified/certified in the proper use of the system.	IIID (14)	Closed – 2/9/07. Operating procedures are in-place.

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** 3 OF 10

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
		B. Weapon's "Safety" does not function to prevent weapon from being inadvertently functioned.	ID (8)	1. Weapon shall not be carried with round in the chamber. 2. "Safety" shall be engaged when transporting the weapon.	IE (12)	Closed – 2/9/07. Safety has been tested to ensure proper operation. Additionally, "Safety" is tested during LAT.
		C. Weapon dropped resulting in advertent functioning of weapon	ID (8)	1. Weapon shall not be carried with round in the chamber. 2. Weapon shall not be used in a situation where the potential exists to drop the weapon directly on the muzzle. 3. Operating personnel shall be briefed on the potential hazard of dropping the weapon on the muzzle.	IE (12)	Closed – 2/9/07. Safety has been tested to ensure proper operation. Additionally, "Safety" is tested during LAT.

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** 4 OF 10

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
3	Mild throat and eye irritation.	Inhalation of cartridge gasses and lead particulate	IIID (14)	1. Use only in well-ventilated areas. 2. Operating instructions shall require shooter to wear safety glasses during training exercises. 3. Operators shall wash hands and other exposed areas of the skin with soapy water after shooting and prior to eating, drinking or smoking.	IIID (14)	Closed – 2/9/07. Operating instructions are in-place.

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** **5** OF **10**

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
4	Projectile/projectile fragment impacts personnel when weapon system is functioned	Intentional or unintentional functioning of weapon system in unauthorized area, or presence of personnel in flight path. Dropping weapon. Accidentally actuating trigger. Projectile strikes object at close range.	ID (8)	1. All personnel shall be qualified and certified in the proper use of the system. 2. Proper security controls shall be in place to control issue of the ammunition and weapons. 3. Operating procedures for the functioning weapons require that: a. The person firing the weapon system shall ensure that no personnel are down range or in close proximity. b. Any person in the general proximity of a person with weapon shall ensure that he/she is not downrange from or in front of the weapon's muzzle. c. Personnel handling weapon system shall always treat weapon as though it were loaded, which includes ensuring that the muzzle of the weapon is never aimed in the direction of other personnel. d. No firing shall take place unless authorized by the range safety officer.	ID (8)	Closed – 2/9/07. Operating instructions are in-place.

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
5	Chambering and firing other than approved ammunition.	Human error.	IIID (14)	1. Only approved ammunition shall be used. 2. Proper security controls shall be in place to control issue of the ammunition and weapons. 3. All personnel shall be qualified and certified in the proper use of the system. 4. All ammunition shall be inspected prior to use to ensure that they are the proper approved type and in good condition.	IIID (14)	Closed – 2/9/07. Only M80 Ball, M62 Tracer, M993 AP, M276 Dim Trace, and M118LR are requested for use with the M40XM-3. All ammunitions listed above have been approved for use.
6	Weapon fails to function properly.	Mechanical failure, such as, broken, worn, or missing firing pin, broken magazine box, etc.	IIID (14)	1. Ensure proper preventive maintenance has been performed on the weapon. 2. Ensure that weapon is cleaned prior to use. 3. Weapon shall be inspected prior to use.	IIID (14)	Closed – 2/9/06. Function & Causality testing was conducted utilizing recommended maintenance procedures with no safety anomalies. Over 2,000 rounds have been fired through the system with no safety anomalies.
7	Operator exposed to excessive flash or debris	Incomplete combustion of propellant due to shorter barrel.	IIID (14)	1. Weapon is equipped with sound and flash suppressor. 2. Testing has demonstrated that there is complete combustion of propellant.	IIIE (17)	Closed – 3/15/07. Verified by testing.

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NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
8	Split barrel resulting in potential fragments.	A. Excessive chamber pressure. B. Obstructed bore C. Defective barrel. D. Defective ammunition.	ID (8)	1. Evaluate the specifications for the weapon and ammunition pressures to ensure compatibility. 2. Use only approved ammunition.	IE (12)	Closed – 2/9/07. 1. Function and Causality testing was conducted with no safety anomalies. 2. Visual and Dimensional inspection indicate that the weapons were within specifications.
9	Loss of control while firing.	A. Bipod moves/collapses due to not locking into position. B. Bipod mechanical failure.	IIID (14)	1. Ensure that bipod is locked into position prior to use. 2. The same bipod has been used with other weapons and there have not been any safety issues.	IIID (14)	Closed – 2/9/07. The bipod is the same bipod used for Mk 13, M24, M40A3, etc. The M40XM-3 is a single shot weapon. Operating instructions are in-place.
10	Personnel exposed to high noise levels.	Firing of ammunition.	IIID (14)	Operator and personnel in immediate vicinity shall wear single hearing protection.	IIID (14)	Closed – 2/9/07. Although the weapon is equipped with a sound suppressor, single hearing protection is recommended.

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NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
11	Misfire	Non-initiation of round due to mechanical failure of weapon or ammunition defect.	IVD (19)	1. Wait designated time before proceeding with clearing weapon. 2. Clear weapon using approved misfire procedures. 3. Dispose of cartridge per required range directives.	IVD (19)	Closed – 2/9/07. Misfire procedures are in-place.
12	Hangfire	Ammunition defect/physical condition.	IIID (14)	1. Wait designated time before proceeding with clearing weapon. 2. Clear weapon using approved hangfire procedures. 3. Dispose of cartridge per required range directives.	IIID (14)	Closed – 2/9/07. Hangfire procedures are in-place.
13	Cleaning of weapon with solvent or bore cleaner.	Personnel injury due to contact with skin or eyes from cleaning solvent liquid or vapors.	IIID (14)	1. Use protective gloves and eyewear when using solvent. 2. Handle solvent with care to avoid spillage. 3. Use in well ventilated area.	IIID (14)	Closed – 2/9/07. Procedures are in-place.

SYSTEM: XM-3 SYSTEM **SUBSYSTEM:** Weapon & Ammunition **OPERATIONAL PHASE:** ALL **REVISION:** A	**SYSTEM HAZARD ANALYSIS**	**ANALYST:** T.M. LEACH **REVIEWER:** D. ARMSTRONG **DATE:** 15 MARCH 2007 **PAGE:** 9 OF 10

NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
14	Injury due to deflection of projectile	Projectile contacts suppressor unit baffles due to misalignment with barrel bore.	IIID (14)	1. Mount Flash Suppressor Unit and interfacing Sound Suppressor Unit according to installation instructions. 2. Insure mounted Sound Suppressor Unit aligns with bore using .30 caliber barrel straightness gage.	IIID (14)	Closed – 2/9/07. Vendor Instructions will be followed and bore alignment will be verified.
15	Injury due to accidental discharge due to cook-off of a chambered or misfed cartridge in a hot weapon	Fewer number of rounds fired is required to reach cook-off temperatures when using a sound suppressor.	ID (8)	1. XM-3 is a bolt action single shot rifle. Weapon is fed from a 5 round magazine. 2. The sustained rate of fire is 4 shots per minute.	IE (12)	Closed – 2/9/07. Weapon is fed from 5 round magazines and fired single shot only. Operator can not load and shoot fast enough to reach cook-off.
16	Burned Personnel	Hot Sound Suppressor Unit contacts personnel causing burns.	IIIC (11)	1. Ensure personnel are aware that the Sound Suppressor Unit heats up quickly when installed on a rifle fired more than a few rounds. 2. Allow weapon / suppressor combination to cool prior to handling without heat protective hand ware.	IIIC (11)	Closed – 2/9/07. Operators shall be provided New Equipment Training prior to handling rifles configured with SFS. PPE available.
17	Injury due to rearward directed projectile / SSU fragments	Separation of SSU from FSU during firing with subsequent rounds impacting SSU.	IID (10)	1. Verify security of Sound Suppressor Unit to Flash Suppressor Unit prior to firing sequences. 2. SFS successfully passed tested with no safety anomalies. 3. Do not use the FA762SS suppressor on automatic or semi-automatic weapons.	IIE (15)	Closed – 2/9/07. Two (2) SSU/FSU units have had over 2,000 rounds fire through with no safety anomalies.

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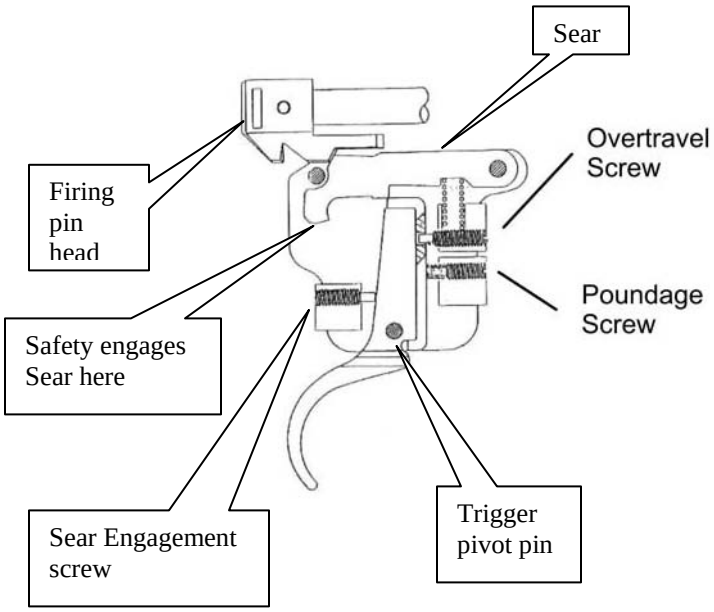
NUMBER	HAZARD DESCRIPTION	CAUSE	MISHAP RISK VALUE	HAZARD CONTROL	MITIGATED RISK VALUE	STATUS – OPEN CLOSED - DATE
18	Injury due to rearward directed gasses	Gases / Debris expelled from chamber during firing with Suppressor installed.	IIIC (11)	1. Use protective eyewear when firing all rifles with and without suppressors. 2. Use in well ventilated area. 3. Testing has verified that there are no unburned propellant expelled.	IIID (14)	Closed – 2/9/07. Protective eyewear will be used. Firing will be outdoors.

ATTACHMENT 3

Remington Model 700 Trigger Function

Remington Model 700 Trigger Function



The trigger itself is composed of two pieces - the part the finger presses on and a hardened "overlay" called a trigger connecter bar, which interfaces with the sear.

The sear is hinged on the front trigger group retaining pin with its rear area held up or supported by the trigger (contact at rear edge of trigger "overlay"). The rear trigger group retaining pin acts as a sear upper limit/stop.

When cocked the firing pin head is held rearward by the rear area of the sear which is only allowed to fall away when the trigger is "pulled".

When the safety lever in engaged "safe" it positively supports the rear of the sear so it cannot move away from the firing pin head. The trigger no longer contacts the firing pin head with safety engaged so pulling the trigger has no effect.

The safety is retained in "on" or "off" position by a spring loaded ball detent. When safety is disengaged the trigger again supports the sear to retain the firing pin in the cocked position.

Firing pin head (thus firing pin) is released as sear falls when trigger is pulled.

ATTACHMENT 4: SAFETY DESIGN REQUIREMENTS

The following Safety Design Requirements are present in the M40XM-3 Sniper System.

General

- The system or comparable systems have demonstrated through testing and evaluations that it is safe to operate and use under environmental extremes.
- The hazards identified for the system are the same hazards presented by similar systems.

Trigger and Firing Mechanism

- The "safety" has been tested and prevents the functioning of the weapon due to inadvertent drops or inadvertent pulling of the trigger. LOT Acceptance Testing ensures that "safety" functions as designed.
- LOT Acceptance Testing ensures that trigger pull and firing mechanisms are within specifications.
- An ergonomic bolt knob has been incorporated on the standard Remington Bolt Assembly. The bolt knob is larger.
- Since the weapon is a magazine-fed bolt action weapon, the bolt must be manually cycled in order to chamber a round of ammunition.

Mechanical Safety

- The mechanical "safety" is achieved by locking the trigger which in turn locks the sear to the striker firing pin assembly.

Human Factors

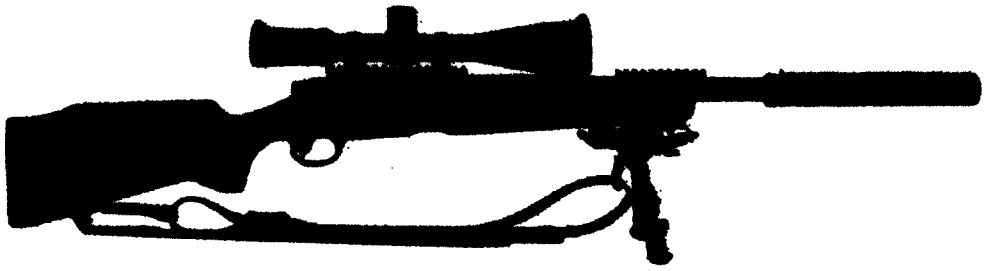
- The bolt knob of the Bolt Assembly has been ergonomically designed for ease of operation.
- There are no sharp edges or projections that could either cut or cause injury the user.
- The recoil energy is below the level which could cause injury to the user.
- The weapon parts which are removed by the operator as part of routine field maintenance are not capable of being assembled in an unsafe condition.

Noise

- The noise level generated by the functioning of the weapon does not exceed the capability of the single hearing protection required.

Attachment 5
Weapon Specifications
and
Surefire Suppressor Operator's Manual

SPEC SHEET
DARPA XM



- Weapon - Darpa M40XM-3
- Barrel - 18"
- Weight -
  - Rifle with scope and UNS mount- 12lbs 7oz
  - Rifle with scope, UNS mount and Suppressor- 13lbs 10oz
  - Rifle with Scope, UNS mount, Suppressor and UNS- 15lbs 10oz
  - Rifle with all above, loaded with 5 rounds, bi-pod, Sling 17lbs 8oz

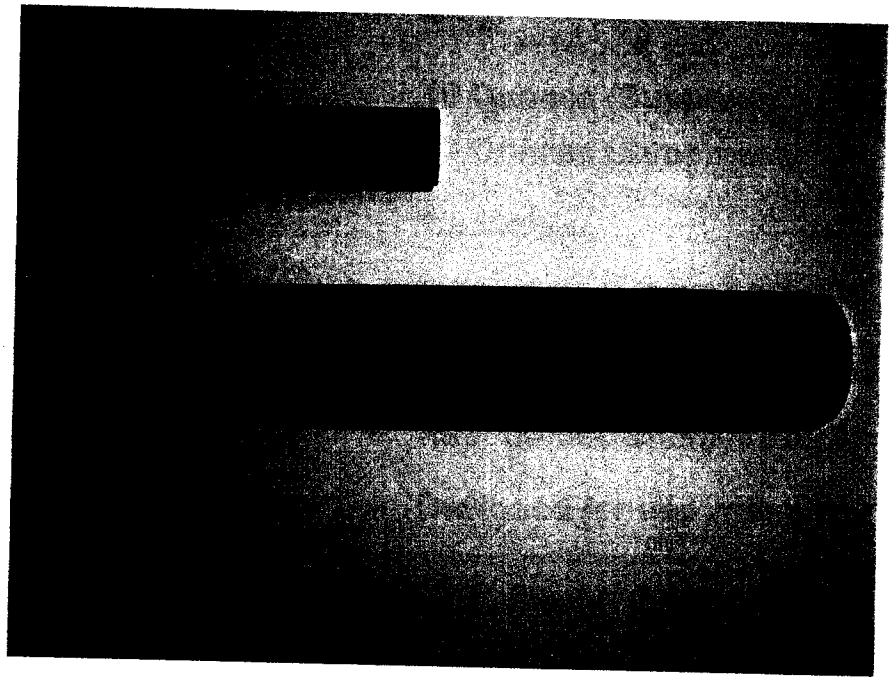
- Day scope - Nightforce NXS 3.5-15x50 Mil-Spec w/ Zero Stop
- Night Vision - OSTI Universal Night Sight AN/PVS-22
- Suppressor - Surefire FA762SS Quick Detach
- Length of weapon without suppressor - 38.250"
- Length of weapon with suppressor - 44"

Weapons Component	Manufacturer
• Receiver- M700, Clip-Slotted by IBA, Stainless Steel	Remington Arms
• Stock- McMillan A-6, 13" LOP	McMillan Stocks
• Barrel- 18" OAL, 416R Stainless Steel, Twist Rate 1:10"	Hart Rifle Barrels
• UNS Mount- BCM22H 6061 Aluminum, Anodized	IBA Inc.
• Trigger Guard- M4 Carbon Steel	Badger Ordnance
• Sling Swivels- One Piece, Permanently Installed	Wichita Arms
• Recoil Lug- Titanium @ 1.070" .313"	Badger Ordnance
• Scope mount- Titanium Picatinny Rail, 20 MOA, Lugged	IBA Inc.
• Scope Rings- .885 Ultra-lite, Aluminum / Titanium	Nightforce Inc.
• Fire Control- M700 Trigger Re-Built and Adjusted	Remington Arms
• Magazine- Internal W/ Modified Milled Follower	Remington Arms
• Bipod- BRM-S with Pod-Lock	Harris Engineering
• Sling- All Weather Sling, OD Green	Turner Saddlery

D-Kit

Bore guide, Cleaning Rod, .075" Allen wrench, T-15 wrench, T-30 take-down wrench, Seekonk Torque Wrench w/ ½" Socket & T-30 Adapters, Hardigg Storm Case Fitted

SUREFIRE FA762K
FAST-ATTACH™ LIGHT WEIGHT
SOUND SUPPRESSOR FOR SR25K



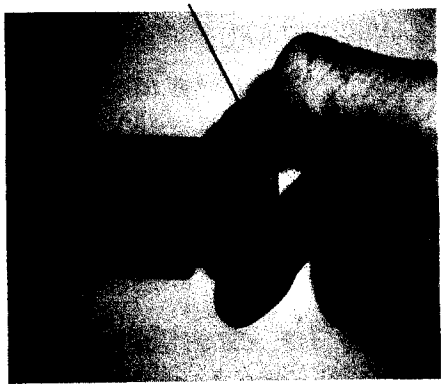
FA762K
OPERATOR'S MANUAL

SureFire® Suppressor Division
18300 Mt. Baldy Circle
Fountain Valley, CA 92708
Telephone: (714) 545-9444
FAX: (714) 545-9537

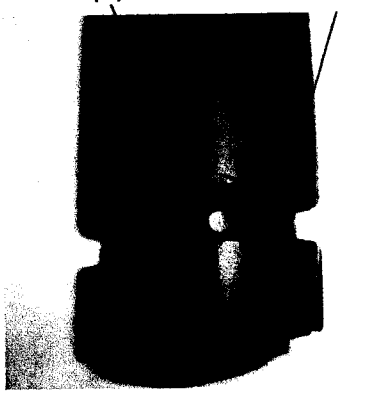
SPECIFICATIONS FOR FA762K SOUND SUPPRESSOR

Suppressor Material:	**High Temperature Alloys / Stainless Steel**
Weight:	**19 Ounces (Suppressor Only)** **23 Ounces (Suppressor and Adapter)**
Diameter:	**1½ inches**
Length:	**8.4 inches**
Length in front of Compensator:	**6.5 inches**
Compensator/Adapter	**Heat treated stainless steel alloy**
Application:	**Designed for use with sniper rifles**

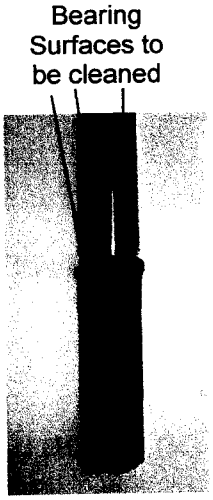
Nomenclature of the SureFire FA762K sound Suppressor



Bottom View
With Locking Ring in Open Position Showing Ratchet Stop

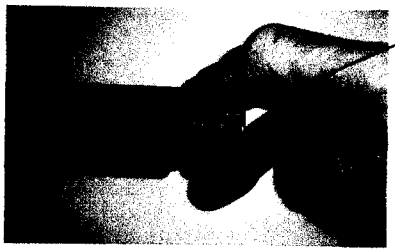


Bottom View
Locking Ring in Closed Position



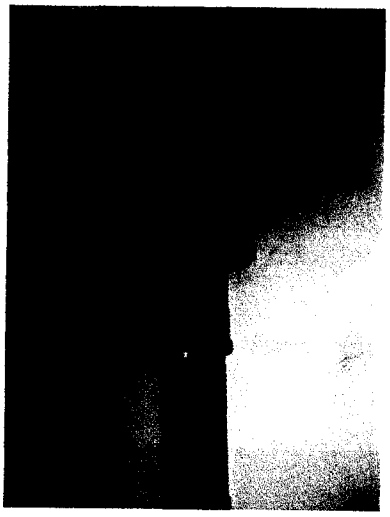
SUPPRESSOR INSTALLATION

WARNING: Confirm that weapon is unloaded and on Safe (Refer to your weapon's Operator Manual for weapon safety features and handling instructions.) With muzzle pointed in a safe direction remove the magazine, lock the bolt to the rear and inspect chamber and receiver verifying the weapon is clear.



1. **OPEN Locking Ring**
   - Rotate the Locking Ring (Counter Clock-wise) until it stops.

2. **Attach**
   - Fully open Lock Ring (rotated counter-clockwise)
   - Orient Suppressor with serial number stamp on top and slide over the Compensator/Adapter.
   - Rotate Suppressor body clockwise until the Suppressor drops into the intercept slot.
   - With weapon stock on the ground, muzzle up, pull Suppressor firmly onto the weapon until fully seated on the flash hider/Adapter.
   - Note: If the mating surfaces are carbon fouled, installation may be difficult. Clean mating surface at the next opportunity.



3. **Rotate and Lock**
   - While holding the suppressor body in with the left hand grasp the lock ring and Rotate Locking Ring clockwise, **TIGHTEN FIRMLY** by hand (approx. ½ turn) until it can be rotated no further.

Note:

Tightness of the Locking Ring is critical to accuracy and minimal point of impact shift.

4. **Confirm Tightness!**
   - Fully tighten the Locking Ring as tight as possible!
5. **Verify**
   - Attempt to rotate Suppressor, only very slight movement under tension should be felt.
   - Attempt to remove Suppressor by aggressively pulling Suppressor forward. When attached correctly, the Suppressor will have no movement.
6. **Installation is now complete**

SUPPRESSOR REMOVAL

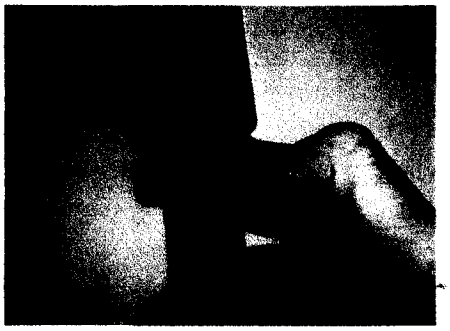
NOTE: After firing, Sound Suppressors are most easily removed from the weapon while they are still warm. Carbon fouling solidifies as the unit cools, making later removal more difficult.

WARNING: Do not remove / install Suppressor on a loaded weapon.

WARNING: Confirm that weapon is unloaded and on Safe (Refer to your weapon's operator's manual for weapon safety features and handling instructions). With muzzle pointed in a safe direction remove ammunition from receiver. Draw bolt/carrier assembly to rear and inspect chamber and receiver verifying weapon is clear.

1. **Secure weapon, keeping muzzle pointed in a safe direction.**
2. **Press Ratchet Latch, disengaging it.**
3. **Open Locking-Ring.**

   Hold Suppressor body with your left hand pulling Suppressor lightly into the weapon. Grasp the Locking Ring firmly and press your knuckle against the Ratchet Stop, disengaging it. Then break the Locking Ring loose by quickly rotating it counter-clockwise. Now relax your grip and continue rotating the ring until it stops.
4. **Firmly pull Suppressor forward, twisting left and right, to remove it from the Flash Hider/Adapter.**



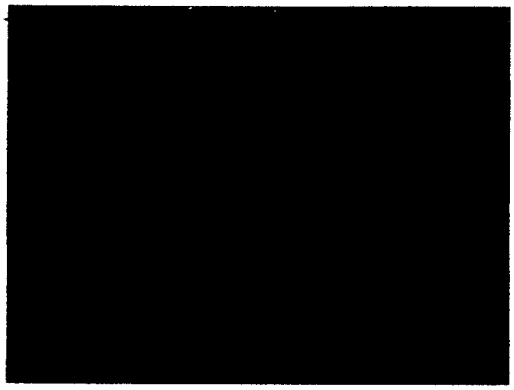
MAINTENANCE

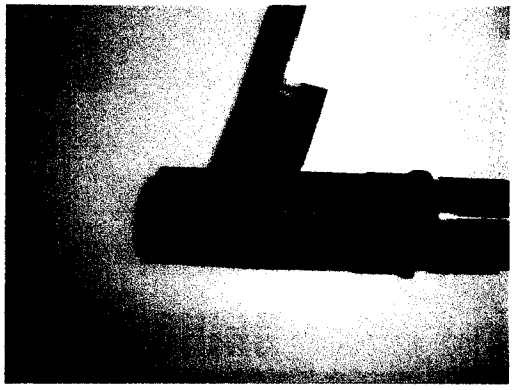
CLEANING

NOTE: The Suppressor is a precision instrument having a tight fit between the bearing surfaces. Therefore, to assure a proper fit, the Flash Hider/Adapter requires cleaning to remove carbon and copper fouling deposits from bearing surfaces.

The FA762K Sound Suppressor and Flash Hider/Adapter mating surfaces should be cleaned after firing using the following procedure:

1. Brush and/or scrape carbon & copper residue from Suppressor mounting surfaces of the Flash Hider/Adapter. Take care to orient the parts so carbon does not fall into the weapon bore, or into the Suppressor body.

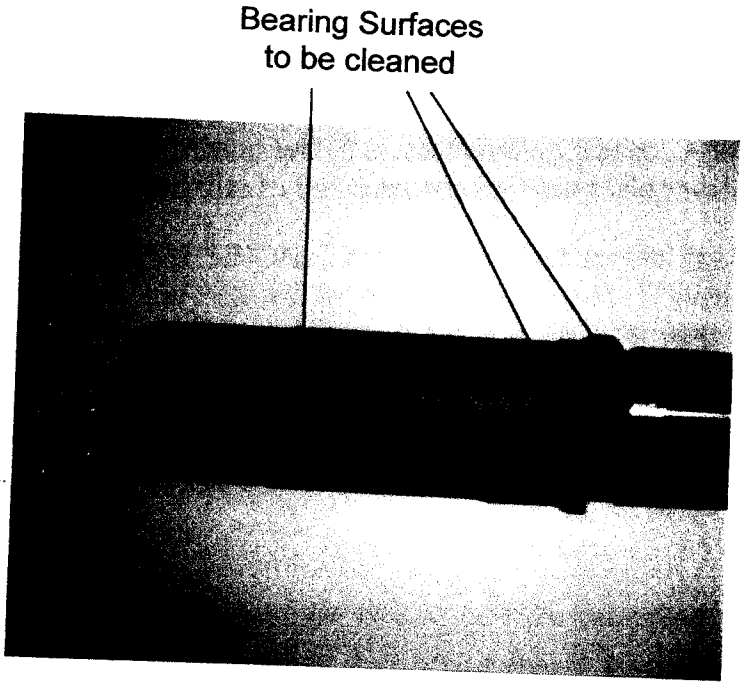




2. Copper remover or gun cleaning solvent may be used to remove fouling from both the Compensator/Adapter and the corresponding internal surfaces of the Suppressor.

NOTE: Do not allow solvent(s) to flow into the Suppressor body. Keep Suppressor "muzzle up" when brushing the inside or when soaking the Compensator/Adapter contact area.

FLASH HIDER / ADAPTER
FA762K



FLASH HIDER /ADAPTER CLEANING

THE SUPPRESSOR YOU ARE USING IS A PRECISION UNIT; IT FITS WITH MINIMUM CLEARANCE AT THE BEARING SURFACES. REATTACHMENT WILL BE DIFFICULT IF THESE SURFACES ARE CARBON FOULED. SCRAPE AND BRUSH THESE SURFACES ON THE FLASH HIDER AND THE MATING SURFACES INSIDE THE SUPPRESSOR REMOVING CARBON TO PREVENT ANY ATTACHMENT PROBLEMS.

OPERATOR USE NOTES

1. ZEROING: Confirm zero both with and without Suppressor attached. SureFire Suppressors have minimal impact shift but this can vary from weapon to weapon.

2. As a rule all Suppressors have some flash on the first round fired because of air inside the Suppressor mixing with the combustion gases. After the first round most of the flash is eliminated due to the Suppressor being filled with inert gases.

3. "WET" FLASH SUPPRESSION: To minimize first round flash, detach Suppressor and pour water into the rear of detached Suppressor. Rotate slowly spreading the water inside the Suppressor. Then drain the excess water out the front of the Suppressor.

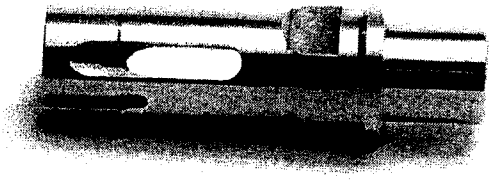
4. If water is unavailable, saliva can be spit into the Suppressor.

WARNING: Under no circumstances should the Suppressor be filled with grease, oil, or any other material before use.

CAUTION: As with all weapons, eye protection is recommended when firing your rifle with or without the Suppressor attached.

SureFire LLC

FH762KM14 Flash Hider / Adapter Installation



Flash Hider Adapter

Barrel

Shims

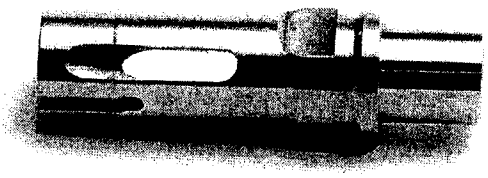
1. Secure the barrel in a vise or fixture per manufacture's recommendations.

Fit Check:

2. Install Flash Hider/Adapter and tighten to 20-30 ft. lbs. Index slot of Flash Hider should be at 6 O'CLOCK after torque.
3. If the index slot is not at 6 O'CLOCK, remove Flash Hider/Adapter and add the appropriate amount of shims to position the index slot at 6 O'CLOCK.

Approximate amount shim will rotate Flash Hider/Adapter: The barrel thread on an M14 will move .032 per revolution.

Color	Thickness	Amount
None	.005 =	1/6 of a turn
Red	.008 =	1/4 of a turn
Blue	.010 =	1/3 - of a turn
Black	.012 =	1/3+ of a turn
Green	.020 =	2/3 of a turn



4. Install Flash Hider/Adapter and shims on the barrel. Tighten to 20-30 ft. lbs. Check alignment of index slot, it should be positioned at 6 O'CLOCK after torque.

Note: If the index slot is not at 6 O'CLOCK, repeat steps 3 and 4 until the index slot is at 6 O'CLOCK.

5. Remove Flash Hider/Adapter
6. Clean and degrease the threads and contact area of the barrel and Flash Hider/Adapter.

Final Installation:

7. Apply a coat of Rocksett to the threads and the first couple inches of the barrel (Do not apply Rocksett to the muzzle or between the shims)
8. Slide the Flash Hider/Adapter and shims onto the barrel, then torque the Flash Hider/Adapter to 20-30 ft lbs. until the index slot is at 6 O'CLOCK.

Notes:

1. Dry patch barrel after installation in case Rocksett accidentally entered the bore during adapter installation.
2. Before firing the weapon with suppressor, allow the Rocksett to cure for a minimum of 24 hours in a warm dry environment.