

RIFLE MARKSMANSHIP M16-/M4-SERIES WEAPONS



25 METER ZEROING TARGET
M4 CARBINE
(NSN 6920-01-395-2949)

REAR SIGHT WINDAGE
FRONT SIGHT
300 METERS
REAR SIGHT WINDAGE
FRONT SIGHT

ZERO TARGET DATA FOR M4 CARBINE:
1- FOR ZEROING AT 25 METERS, ROTATE THE REAR SIGHT ELEVATION KNOB TO THE 300 METER (6/3) SETTING. (DO NOT USE THE "Z" MARK ON THE ELEVATION KNOB).
2- AIM AT TARGET CENTER. ADJUST SIGHTS TO MOVE SHOT GROUP CENTER AS CLOSE AS POSSIBLE TO THE WHITE DOT IN THE CENTER OF THE TARGET.
3- AFTER COMPLETING THE 25 METER ZERO, THE WEAPON WILL BE ZEROED FOR 300 METERS.

August 2008

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

**HEADQUARTERS
DEPARTMENT OF THE ARMY**

This page intentionally left blank.

Rifle Marksmanship M16-/M4-Series Weapons

Contents

	Page
	PREFACE.....xiii
Chapter 1	MARKSMANSHIP TRAINING 1-1
	Section I. Training Strategy 1-1
	Objectives 1-1
	Marksmanship Training Strategy 1-1
	Training Phases 1-5
	Section II. Unit Marksmanship Training Program 1-8
	Mission-Essential Tasks 1-9
	Training Assessment 1-9
	Trainers 1-11
	Trainer Certification Program 1-13
	Qualification Training 1-15
	Unit Live-Fire Exercises 1-17
Chapter 2	WEAPON CHARACTERISTICS, ACCESSORIES, AND AMMUNITION 2-1
	Section I. Rifles and Carbines 2-1
	Characteristics of M16-/M4-Series Weapons 2-1
	M4-Series Carbine 2-2
	M16A2/A3 Rifle 2-5
	M16A4 Rifle 2-7
	M16A1 Rifle 2-9
	Section II. Accessory Mounting 2-10
	M4/M5 Adapter Rail System 2-10
	Rail Grabbers 2-13
	Section III. Accessories 2-16
	M68 Close Combat Optic 2-17
	AN/PAQ-4B/C Infrared Aiming Light 2-19
	AN/PEQ-2A/B Target Pointer/Illuminator/Aiming Light 2-21
	AN/PEQ-15 Advanced Target Pointer/Illuminator Aiming Light 2-24
	AN/PAS-13B/C/D (V1) Light Weapon Thermal Sight and AN/PAS-13B/C/D (V3) Heavy Weapon Thermal Sight 2-26
	AN/PVS-4 Night Vision Sight 2-28

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

	Backup Iron Sight.....	2-30
	Advanced Combat Optical Gunsight.....	2-31
	Section IV. 10-Meter Boresight and 25-Meter Zero Offset	2-33
	Borelight	2-33
	10-Meter Boresight.....	2-34
	25-Meter Zero Offset.....	2-34
	Section V. Ammunition.....	2-35
	Authorized Ammunition	2-35
	Trajectory	2-37
	Storage.....	2-39
Chapter 3	TROUBLESHOOTING AND DESTRUCTION	3-1
	Stoppages	3-1
	Malfunctions	3-2
	Destruction Procedures	3-7
Chapter 4	PRELIMINARY MARKSMANSHIP INSTRUCTION.....	4-1
	Section I. Introduction to Basic Rifle Marksmanship and Mechanical Training	4-1
	Clearing	4-2
	Cycles of Functioning.....	4-4
	Modes of Fire	4-11
	Peer Coaching	4-12
	Section II. Marksmanship Fundamentals I	4-14
	Interceptor Body Armor	4-15
	Four Fundamentals	4-16
	Dominant Eye Training	4-24
	Basic Firing Positions.....	4-24
	Training Devices and Exercises.....	4-28
	Section III. Marksmanship Fundamentals II	4-29
	Engagement Skills Trainer 2000.....	4-29
	Laser Marksmanship Training System.....	4-30
Chapter 5	DOWNRANGE FEEDBACK.....	5-1
	Section I. Grouping Procedures	5-1
	Concept.....	5-2
	Organization of a 25-Meter Grouping Range.....	5-2
	Conduct of a 25-Meter Grouping Firing	5-2
	Shot Group Marking	5-3
	Single Shot Group Analysis	5-4
	Multiple Shot Group Analysis.....	5-7
	Troubleshooting the Fundamentals	5-14
	Section II. Zeroing Procedures	5-14
	Purpose	5-15
	Sight Variance.....	5-15
	Organization of a 25-Meter Zero Range	5-15
	Conduct of a 25-Meter Zero Firing.....	5-15
	Section III. Known Distance Range	5-19
	Concept.....	5-20

	Known Distance Target Description	5-20
	Marking Known Distance Range Targets	5-21
	Known Distance Shot Grouping Analysis	5-22
	Known Distance Zeroing	5-23
	Conduct of a Standard Known Distance Range	5-25
	Known Distance Record Fire Range	5-27
	Modified Field Fire Range	5-27
	Record of Performance	5-27
	25-Meter Zero Standard	5-27
	Section IV. Effects of Wind and Gravity	5-28
	Effects of Gravity	5-28
	Effects of Wind	5-29
	Section V. Ballistics	5-34
	Internal Ballistics	5-34
	External Ballistics	5-39
	Terminal Ballistics	5-41
	Bullet Dispersion at Range	5-41
Chapter 6	FIELD FIRE	6-1
	Section I. Target Detection	6-1
	Locating Targets	6-1
	Marking Targets	6-4
	Range Determination	6-5
	Section II. Field Fire Training	6-6
	Conduct of a Field Fire Range	6-7
	Field Fire I (Single Timed Target)	6-8
	Field Fire II (Multiple or Single Timed Targets)	6-9
	Section III. Record Qualification	6-10
	Practice Record Fire I and II	6-10
	Record Fire	6-13
	Section IV. Alternate Qualification Courses	6-16
	Known Distance Record Fire Range	6-17
	25-Meter Scaled Target Alternate Course	6-18
	15-Meter Scaled Target Alternate Course	6-20
Chapter 7	ADVANCED RIFLE MARKSMANSHIP	7-1
	Section I. Advanced Firing Positions	7-1
	Kneeling Supported Firing Position	7-2
	Standing Unsupported Firing Position	7-3
	Standing Supported Firing Position Around Obstacles	7-4
	Modified Firing Positions	7-5
	Urban Operations Firing Positions	7-6
	Section II. Combat Fire Techniques	7-8
	Rapid Semiautomatic Fire	7-8
	Automatic or Burst Fire	7-12
	Suppressive Fire	7-16
	Quick Fire	7-19

	Section III. Chemical, Biological, Radiological, and Nuclear Firing	7-24
	Mission-Oriented Protective Posture Equipment Fire	7-24
	Section IV. Night Fire Training	7-30
	Unassisted Night Fire Training	7-30
	Artificial Illumination Training	7-35
	Section V. Moving Target Engagements	7-36
	Modifications for Moving Target Engagements	7-36
	Moving Target Live-Fire Exercise	7-41
	Section VI. Short-Range Marksmanship Training	7-41
	Conduct of Short-Range Marksmanship Training	7-41
	Fundamentals of Short-Range Marksmanship	7-42
	Preliminary Short-Range Marksmanship Instruction	7-47
	Phase I—Reflexive Fire Training	7-51
	Phase II—Target Discrimination Training	7-53
	Phase III—Short-Range Marksmanship Qualification	7-55
	Phase IV—Shotgun and Automatic or Burst Firing Familiarization	7-57
	Section VII. Squad Designated Marksman Training	7-57
	Mission of the Squad Designated Marksman	7-58
	Selection	7-58
	Squad Designated Marksman Skills Progression	7-58
Chapter 8	ADVANCED OPTICS, LASERS, AND IRON SIGHTS	8-1
	Section I. Borelight	8-1
	Concept	8-2
	Zeroing the Borelight	8-2
	Boresighting	8-6
	Section II. Training Strategies and Qualification Standards	8-11
	Backup Iron Sight	8-11
	M68 Close Combat Optic	8-12
	Advanced Combat Optical Gunsight	8-16
	AN/PAS-13B/C/D (V1) Light Weapon Thermal Sight and AN/PAS-13B/C/D (V3) Heavy Weapon Thermal Sight	8-20
	AN/PAQ-4B/C and AN/PEQ-2A/B Infrared Aiming Lasers	8-23
	AN/PVS-4 Night Vision Device	8-28
Appendix A	TRAINING AIDS, DEVICES, AND EXERCISES	A-1
	Section I. Engagement Skills Trainer 2000	A-1
	Section II. Laser Marksmanship Training System	A-5
	Section III. Other Training Devices and Exercises	A-13
Appendix B	SCORECARDS	B-1
Appendix C	NIGHT FIGHTING	C-1
	Section I. Unaided Night Vision	C-1
	Section II. Aided Night Vision	C-4
Appendix D	RANGE SAFETY AND RISK MANAGEMENT	D-1
Appendix E	RANGE PROCEDURES AND RANGE OPERATIONS CHECKLIST	E-1

Appendix F 10-METER TARGET OFFSETS AND 25-METER ZERO OFFSETS..... F-1
GLOSSARY Glossary-1
REFERENCES References-1
INDEX..... Index-1

Figures

Figure 1-1. Initial entry training marksmanship training strategy..... 1-2
 Figure 1-2. Unit marksmanship sustainment strategy..... 1-3
 Figure 1-3. Active Army home station marksmanship training strategy..... 1-4
 Figure 1-4. National Guard home station marksmanship training strategy..... 1-4
 Figure 1-5. Army Reserve home station marksmanship training strategy..... 1-5
 Figure 1-6. Deployed unit marksmanship training strategy..... 1-5
 Figure 2-1. M4/M4A1 carbine with accessories..... 2-2
 Figure 2-2. M4 MWS with accessories..... 2-3
 Figure 2-3. M4/M4A1 and M4/M4A1 MWS..... 2-3
 Figure 2-4. M4/M4A1 or M4 MWS mechanical zero..... 2-4
 Figure 2-5. M4/M4A1 or M4 MWS battlesight zero..... 2-4
 Figure 2-6. M16A2/A3 rifle with accessories..... 2-5
 Figure 2-7. M16A2/A3 mechanical zero..... 2-6
 Figure 2-8. M16A2/A3 battlesight zero..... 2-6
 Figure 2-9. M16A4 rifle with accessories..... 2-7
 Figure 2-10. M16A4 mechanical zero..... 2-8
 Figure 2-11. M16A4 battlesight zero..... 2-8
 Figure 2-12. M16A1 rifle..... 2-9
 Figure 2-13. M16A1 mechanical zero..... 2-9
 Figure 2-14. M16A1 battlesight zero..... 2-10
 Figure 2-15. Adapter rail system..... 2-11
 Figure 2-16. M5 rail covers/heat shields..... 2-11
 Figure 2-17. Address markings on the adapter rail system..... 2-12
 Figure 2-18. Vertical pistol grip..... 2-13
 Figure 2-19. Insight rail grabber..... 2-14
 Figure 2-20. Insight rail grabber MILES training extender..... 2-15
 Figure 2-21. Picatinny rail grabber..... 2-15
 Figure 2-22. M68 close combat optic..... 2-17
 Figure 2-23. Mounting the M68 on an M16A4 rifle or M4-series carbine..... 2-17
 Figure 2-24. Mounting the M68 on an M16A1/A2/A3 rifle..... 2-18
 Figure 2-25. Mounting the M68/AN/PVS-14 combination on an M4 MWS..... 2-19
 Figure 2-26. AN/PAQ-4B/C infrared aiming light..... 2-19
 Figure 2-27. Mounting the AN/PAQ-4B/C on the M4 MWS top or left..... 2-20
 Figure 2-28. Mounting the AN/PAQ-4B/C on the M16A1/A2/A3 rifle and M4 carbine..... 2-21

Figure 2-29. AN/PEQ-2A/B target pointer/illuminator/aiming light.....	2-22
Figure 2-30. Mounting the AN/PEQ-2A/B on the M16A4 rifle and M4 MWS.....	2-22
Figure 2-31. Mounting the AN/PEQ-2A/B on M16A1/A2/A3 rifles and M4 carbines.....	2-23
Figure 2-32. MILES training extender bracket installation on M16-/M4-series weapons.....	2-24
Figure 2-33. AN/PEQ-15 advanced target pointer illuminator aiming light.....	2-25
Figure 2-34. AN/PEQ-15 mounted on M4 carbine.....	2-25
Figure 2-35. AN/PAS-13B/C/D (V1) light weapon thermal sight and AN/PAS-13B/C/D (V3) heavy weapon thermal sight.....	2-26
Figure 2-36. Mounting the TWS on M16A4 rifle or M4 carbine.....	2-26
Figure 2-37. Mounting the TWS on an M16A1/A2/A3 rifle.....	2-27
Figure 2-38. AN/PVS-4 night vision sight.....	2-28
Figure 2-39. Mounting the AN/PVS-4 on an M4 carbine or M4 MWS.....	2-28
Figure 2-40. Mounting the AN/PVS-4 on an M16A1/A2/A3 rifle.....	2-29
Figure 2-41. Backup iron sight.....	2-30
Figure 2-42. Backup iron sight in the stowed position.....	2-30
Figure 2-43. Advanced combat optical gunsight.....	2-31
Figure 2-44. Mounting the ACOG on M16A4 rifle and M4 carbine.....	2-31
Figure 2-45. Mounting the ACOG on an M16A1/A2/A3 rifle.....	2-32
Figure 2-46. ACOG locking screw.....	2-33
Figure 2-47. Borelight with a 5.56-millimeter mandrel.....	2-33
Figure 2-48. 10-meter boresighting target and 25-meter zero offset.....	2-34
Figure 2-49. M855 drop during 25-meter zeroing (M16A2 at 8/3+1, M4 at 6/3).....	2-37
Figure 2-50. Bullet drop of M855 ammunition with M16A2 (8/3).....	2-37
Figure 2-51. Bullet drop of M855 ammunition with M4 (6/3).....	2-38
Figure 2-52. M4 carbine and M16A2 rifle bullet trajectory comparison.....	2-38
Figure 2-53. Bullet drop of M4/M855 during 25-meter zeroing on 6/3.....	2-39
Figure 3-1. Failure to feed, chamber, or lock.....	3-2
Figure 3-2. Failure to fire.....	3-4
Figure 3-3. Other possible malfunctions.....	3-7
Figure 4-1. Clearing.....	4-3
Figure 4-2. Feeding.....	4-4
Figure 4-3. Chambering.....	4-5
Figure 4-4. Locking.....	4-6
Figure 4-5. Firing.....	4-7
Figure 4-6. Unlocking.....	4-8
Figure 4-7. Extracting.....	4-8
Figure 4-8. Ejecting.....	4-9
Figure 4-9. Cocking.....	4-10
Figure 4-10. Semiautomatic and automatic fire mode selector positions.....	4-11
Figure 4-11. Burst fire mode selector position.....	4-11
Figure 4-12. Prone position of coach (right-handed firer).....	4-14

Figure 4-13. Interceptor body armor..... 4-15

Figure 4-14. Steady position..... 4-17

Figure 4-15. Correct sight alignment. 4-19

Figure 4-16. Focus of the eye and correct sight picture..... 4-20

Figure 4-17. Side aiming technique..... 4-21

Figure 4-18. Breath control for engaging single targets. 4-22

Figure 4-19. Breath control for engaging short-exposure targets. 4-22

Figure 4-20. Individual foxhole supported firing position..... 4-25

Figure 4-21. Basic prone unsupported firing position..... 4-26

Figure 4-22. Alternate prone unsupported firing position. 4-26

Figure 4-23. Basic prone supported firing position..... 4-27

Figure 4-24. Alternate prone supported firing position. 4-27

Figure 4-25. Kneeling unsupported firing position..... 4-28

Figure 5-1. 25-meter range..... 5-2

Figure 5-2. Shot group marking..... 5-4

Figure 5-3. Central point of an odd-shaped group. 5-4

Figure 5-4. 25-meter match grade performance. 5-5

Figure 5-5. Shot groups with no firer error. 5-5

Figure 5-6. Shot groups with minor shooting error. 5-6

Figure 5-7. Shot groups with considerable shooting error. 5-6

Figure 5-8. Shot groups with major shooting error. 5-7

Figure 5-9. Central point of three shot groups..... 5-8

Figure 5-10. Acceptable shot grouping performance. 5-8

Figure 5-11. Shot groups with inconsistent aiming..... 5-9

Figure 5-12. Shot groups with consistent aiming and major shooting error..... 5-10

Figure 5-13. Shot groups with inconsistent aiming and major shooting error. 5-11

Figure 5-14. Shot groups with improper vertical placement..... 5-12

Figure 5-15. Improper shot groups on the edge of the target. 5-13

Figure 5-16. Correct aiming (A), initial shot group results (B). 5-16

Figure 5-17. Final shot group results..... 5-16

Figure 5-18. M16A1 25-meter zero target. 5-17

Figure 5-19. M16A2 and M4 25-meter zero target..... 5-18

Figure 5-20. Downrange feedback targets. 5-21

Figure 5-21. Target marking with spotters (markers). 5-21

Figure 5-22. Comparison of firing performance..... 5-22

Figure 5-23. Known distance range. 5-26

Figure 5-24. 25-meter zero standard..... 5-27

Figure 5-25. M16-/M4-series weapon aiming points. 5-28

Figure 5-26. Determine wind value using the clock method. 5-29

Figure 5-27. Determine wind speed using the flag method..... 5-30

Figure 5-28. Determine wind speed using the pointing method..... 5-31

Figure 5-29. Calculate the adjusted point of aim based on wind speed. 5-32

Figure 5-30. M16-/M4-series weapons adjusted point of aim based on wind speed. 5-33

Figure 5-31. Projectile differences. 5-34

Figure 5-32. Ammunition impact comparison. 5-35

Figure 5-33. M855 zeroed at 300 meters; M193 re-zeroed at 300 meters. 5-36

Figure 5-34. M855 zeroed at 25 meters; M193 re-zeroed at 25 meters. 5-37

Figure 5-35. M855 zeroed at 25 meters; M193 fired using M855 zero. 5-38

Figure 5-36. Minute of angle. 5-41

Figure 5-37. Increase in shot group size as range increases. 5-42

Figure 7-1. Kneeling supported firing position. 7-2

Figure 7-2. Standing unsupported firing position. 7-3

Figure 7-3. Standing supported firing position around obstacles. 7-4

Figure 7-4. Modified supported prone firing position. 7-5

Figure 7-5. Firing over a rooftop. 7-6

Figure 7-6. Firing around an obstacle. 7-7

Figure 7-7. Firing from a window. 7-8

Figure 7-8. Landscape target. 7-18

Figure 7-9. Aimed quick fire. 7-20

Figure 7-10. Pointed quick fire. 7-21

Figure 7-11. Sight picture when canting the rifle while wearing a protective mask (75-meter target). 7-26

Figure 7-12. Engagement of 175-meter target. 7-27

Figure 7-13. Engagement of 300-meter target. 7-27

Figure 7-14. Lower weapon—target alignment. 7-32

Figure 7-15. Daytime field of view using pinpoint focus. 7-33

Figure 7-16. Nighttime field of view using off-center vision. 7-33

Figure 7-17. Night-fire target. 7-34

Figure 7-18. Lead requirement based on distance and approach angle. 7-37

Figure 7-19. Sight-target relationship for the single-lead rule. 7-38

Figure 7-20. Lead increasing at greater ranges. 7-38

Figure 7-21. Target movement (distance) at various angles. 7-39

Figure 7-22. High ready position. 7-43

Figure 7-23. Low ready position. 7-44

Figure 7-24. Lethal zone. 7-46

Figure 7-25. Incapacitation zone. 7-46

Figure 7-26. Right-side parallel magazine changing method. 7-49

Figure 7-27. Left-side parallel magazine changing method. 7-49

Figure 7-28. Right-side L-shaped magazine changing method. 7-50

Figure 7-29. Left-side L-shaped magazine changing method. 7-51

Figure 7-30. Dimensions and placement of bowling pin targets. 7-51

Figure 7-31. Bullet trajectory comparison. 7-67

Figure 7-32. Windage effects of a 10-mph crosswind. 7-68

Figure 8-1. Example of a zeroing mark. 8-3

Figure 8-2. Borelight in the START POINT position..... 8-4

Figure 8-3. Borelight in the HALF-TURN position. 8-4

Figure 8-4. Example of a start point, half-turn, and reference point..... 8-5

Figure 8-5. Close combat optic, 25-meter zeroing target..... 8-15

Figure 8-6. Width of horizontal hash marks..... 8-18

Figure 8-7. Advanced combat optical gunsight reticle point of aim at 100 meters..... 8-18

Figure 8-8. Advanced combat optical gunsight reticle point of aim at 25 meters..... 8-19

Figure 8-9. Example of thermal weapon sight zeroing adjustments. 8-22

Figure 8-10. Example of shot group adjustment with strike zone. 8-26

Figure A-1. Engagement skills trainer (five-lane configuration). A-1

Figure A-2. Exercise 1..... A-8

Figure A-3. Exercise 2..... A-10

Figure A-4. Exercise 3..... A-11

Figure A-5. Exercise 4..... A-12

Figure A-6. M15A1 aiming card..... A-15

Figure A-7. Riddle sighting device..... A-16

Figure A-8. M16 sighting device..... A-17

Figure A-9. Blank firing attachment..... A-18

Figure A-10. Weaponeer set up in the standing supported position. A-21

Figure A-11. Replay of shot..... A-22

Figure A-12. Weaponeer printouts..... A-23

Figure A-13. Target box exercise..... A-24

Figure A-14. Rifle-holding device (TA-G-12A)..... A-25

Figure A-15. Staked rifle holding box..... A-25

Figure A-16. Paper being placed on a stationary object..... A-26

Figure A-17. Target box paddle (DVC-T-7-86)..... A-27

Figure B-1. Example of completed DA Form 5239-R (100-, 200-, and 300-Meter
Downrange Feedback Scorecard)..... B-2

Figure B-2. Example of completed DA Form 3601-R (Single Target—Field Fire I
Scorecard)..... B-2

Figure B-3. Example of completed DA Form 5241-R (Single and Multiple Targets—
Field Fire II Scorecard)..... B-3

Figure B-4. Example of completed DA Form 3595-R (Record Fire Scorecard)..... B-3

Figure B-5. Example of DA Form 5789-R (Record Fire Scorecard—Known Distance
Course)..... B-4

Figure B-6. Example of completed DA Form 5790-R (Record Fire Scorecard—
Scaled Target Alternate Course)..... B-4

Figure B-7. Example of completed DA Form 7489-R (Record Night Fire Scorecard)..... B-5

Figure B-8. Example of completed DA Form 7649-R (Squad Designated Marksman—
Record Fire I and II)..... B-5

Figure D-1a. Sample DA Form 7566 (Composite Risk Management Worksheet)..... D-8

Figure D-1b. Sample DA Form 7566 (Composite Risk Management Worksheet)
(page 2)..... D-9

Figure E-1. Rifle/machine gun zero range (17801)..... E-11
 Figure E-2. Automated field fire range (17803). E-12
 Figure E-3. Automated record fire range (17805)..... E-13
 Figure E-4. Modified record fire range (17806)..... E-14
 Figure E-5. Qualification training range (17809)..... E-15
 Figure F-1. 10-meter target offset symbols..... F-1
 Figure F-2. Blank 10-meter target offset. F-3
 Figure F-3. M16A2 10-meter boresighting target/25-meter zeroing target offsets. F-4
 Figure F-4. M4 MWS 10-meter boresighting target/25-meter zeroing target offsets. F-4
 Figure F-5. M4/M4A1 10-meter boresighting target/25-meter zeroing target offsets. F-5
 Figure F-6. M16A4 MWS 10-meter boresighting target/25-meter zeroing target
 offsets F-5

Tables

Table 1-1. Training simulators, devices, and exercises..... 1-17
 Table 2-1. Characteristics of M16-/M4-series weapons. 2-1
 Table 2-2. Point of impact for the M4/M4A1 and M4 MWS. 2-5
 Table 2-3. Point of impact for the M16A2/A3 rifle..... 2-7
 Table 2-4. Point of impact for the M16A4 rifle. 2-9
 Table 2-5. Point of impact for the M16A1 rifle. 2-10
 Table 2-6. Accessory compatibility and mounting. 2-16
 Table 2-7. Characteristics of various accessories. 2-16
 Table 2-8. Authorized ammunition..... 2-35
 Table 2-8. Authorized ammunition (continued)..... 2-36
 Table 3-1. Other malfunctions..... 3-6
 Table 3-2. Methods of destruction and their applications. 3-8
 Table 4-1. Introduction to basic rifle marksmanship and mechanical training..... 4-1
 Table 4-2. Marksmanship Fundamentals I training program..... 4-14
 Table 4-3. Marksmanship Fundamentals II training program..... 4-29
 Table 5-1. Grouping procedures..... 5-1
 Table 5-2. Techniques used to identify errors in Soldiers' application of the
 fundamentals..... 5-14
 Table 5-3. Zeroing procedures..... 5-14
 Table 5-4. Downrange feedback..... 5-19
 Table 5-5. M16A2/3 and front sightpost of an M16A4..... 5-24
 Table 5-6. M4/M4A1 and windage of an M16A4..... 5-25
 Table 5-7. M193 calculated adjusted point of aim based on wind speed (full value). 5-32
 Table 5-8. Drift for 10 mile-per-hour wind using M855 ammunition..... 5-33
 Table 5-9. M855 zeroed at 300 meters; M193 re-zeroed at 300 meters using an
 M16A2/A3/A4 rifle and an M4 carbine..... 5-36

Table 5-10. M855 zeroed at 25 meters; M193 re-zeroed at 25 meters..... 5-37

Table 5-11. M855 zeroed at 25 meters; M193 fired using M855 zero. 5-38

Table 6-1. Field Fire I and II training program. 6-1

Table 6-2. Number of rounds that must be fired from each position during Field Fire I..... 6-8

Table 6-3. Field Fire I firing tables. 6-9

Table 6-4. Number of rounds that must be fired from each position during Field Fire II. 6-10

Table 6-5. Field Fire II firing tables. 6-10

Table 6-6. Practice Record Fire I and II training program. 6-11

Table 6-7. Number of rounds that must be fired from each position during Practice Record Fire I and II. 6-11

Table 6-8. Qualification ratings for Practice Record Fire I and II. 6-12

Table 6-9. Record Fire training program. 6-13

Table 6-10. Probability of hits. 6-14

Table 6-11. Results from an adequate unit training program. 6-14

Table 6-12. Number of rounds that must be fired from each position during Record Fire. 6-14

Table 6-13. Qualification ratings for Record Fire..... 6-16

Table 6-14. Known distance record fire range firing tables and related information. 6-17

Table 6-15. Qualification ratings for the known distance record fire range. 6-18

Table 6-16. 25-meter scaled target alternate course firing tables and related information. 6-19

Table 6-17. Qualification ratings for the 25-meter scaled target alternate course. 6-20

Table 7-1. Rapid semiautomatic fire training program. 7-11

Table 7-2. Rapid semiautomatic fire training and related information. 7-11

Table 7-3. Automatic or burst fire training program. 7-15

Table 7-4. Automatic or burst fire training and related information. 7-15

Table 7-5. Suppressive fire training program. 7-18

Table 7-6. Suppressive fire training and related information. 7-19

Table 7-7. Quick fire training program. 7-24

Table 7-8. Quick fire training and related information. 7-24

Table 7-9. Chemical, Biological, Radiological, and Nuclear fire training program. 7-28

Table 7-10. Unassisted night fire training program. 7-30

Table 7-11. Artificial illumination training program. 7-35

Table 7-12. Moving target engagement training program. 7-36

Table 7-13. Modifications for a steady position when firing at moving targets. 7-37

Table 7-14. Angle of target movement. 7-39

Table 7-15. Target angle when dead center; hits occur using the single-lead rule..... 7-40

Table 7-16. Short-range marksmanship training program. 7-42

Table 7-17. Preliminary SRM tasks and explanation. 7-48

Table 7-18. Familiarization (stationary). 7-52

Table 7-19. Familiarization (moving). 7-53

Table 7-20. Record and practice fire. 7-55

Table 7-21. Barricade transition fire.....	7-57
Table 7-22. Zero/zero confirmation firing event.	7-61
Table 7-23. Elevation knob, M16A2/3 and front sightpost, M16A4.	7-66
Table 7-24. Elevation knob, M4/M4A1 and windage, M16A4.....	7-66
Table 7-25. Known distance (mech. adj.) firing event.....	7-66
Table 7-26. Calculated adjusted point of aim based on wind speed (full value).....	7-68
Table 7-27. Drift for 10-mph wind using M855 ammunition when fired from M16A2 rifle with 300-meter battlesight zero.	7-69
Table 7-28. Firing event, known distance (hold off).....	7-69
Table 7-29. Firing event, Record Fire I and II.	7-69
Table 8-1. Weapon/aided-vision device combinations.	8-1
Table 8-2. Borelight training program.	8-2
Table 8-3. Backup iron sights training program.	8-11
Table 8-4. M68 close combat optic training program.....	8-13
Table 8-5. Advanced combat optical gunsight training program.	8-17
Table 8-6. AN/PAS-13B/C/D thermal weapon sight training program.	8-20
Table 8-7. AN/PAQ-4B/C or AN/PEQ-2A/B infrared aiming laser training program.	8-24
Table 8-8. AN/PVS-4 night vision device training program.....	8-28
Table A-1. Laser marksmanship training strategy parts list.....	A-5
Table A-1. Laser marksmanship training strategy parts list (continued).....	A-6
Table A-2. Action, conditions, and standards for a reflective target exercise.....	A-8
Table A-3. Action, conditions, and standards for an interactive dry-fire exercise.....	A-9
Table A-4. Action, conditions, and standards for a grouping and zeroing exercise.	A-10
Table A-5. Action, conditions, and standards for a laser marksmanship training strategy prequalification exercise.	A-11
Table A-6. Training aids and devices.....	A-13
Table A-7. Target ordering numbers.....	A-14
Table D-1. Five levels of probability.....	D-4
Table D-2. Four levels of severity.	D-5
Table D-3. Risk assessment matrix.	D-5
Table D-4. Four levels of risk.	D-6
Table D-5. Worksheet instructions.....	D-10
Table E-1. Primary/alternate range selection.	E-10
Table F-1. Offset mounting.	F-6
Table F-1. Offset mounting (continued).	F-7
Table F-1. Offset mounting (continued).	F-8

Preface

This manual provides guidance for planning and executing training on the 5.56-millimeter M16-series rifle (M16A1/A2/A3/A4) and M4 carbine. It is a guide for commanders, leaders, and instructors to develop training programs, plans, and lessons that meet the objectives or intent of the United States Army rifle marksmanship program and FM 7-0.

This manual is organized to lead the trainer through the material needed to conduct training during initial entry training (IET) and unit sustainment training. Preliminary subjects include discussion on the weapon's capabilities, mechanical training, and the fundamentals and principles of rifle marksmanship. Live-fire applications are scheduled after the Soldier has demonstrated preliminary skills.

This manual was revised to include references to new materiel and systems. This revision includes—

- The new Army total marksmanship training strategy, to include specific strategies for the United States Army Reserve (USAR) and the Army National Guard (ARNG).
- Information about the advanced combat optical gunsight (ACOG), the AN/PEQ-15 advanced target pointer/illuminator aiming light (ATPIAL), various thermal sights, and the MK 262 round.
- Information about the alternate qualification record fire courses (known distance [KD] record fire, 25-meter scaled target alternate course, 15-meter scaled target alternate course).
- Information about the rapid magazine change and barricade transition fire for short-range marksmanship (SRM).
- Changes to all of the scorecards.
- Updated terminology.

This publication prescribes DA Form 3595-R (Record Fire Scorecard), DA Form 3601-R (Single Target—Field Fire I Scorecard), DA Form 5239-R (100-, 200-, and 300-Meter Downrange Feedback Scorecard), DA Form 5241-R (Single and Multiple Targets—Field Fire II Scorecard), DA Form 5789-R (Record Fire Scorecard—Known-Distance Course), DA Form 5790-R (Record Fire Scorecard—Scaled Target Alternate Course), DA Form 7489-R (Record Night Fire Scorecard), DA Form 7649-R (Squad Designated Marksman—Record Fire I and II), and DA Form 7650-R (Squad Designated Marksman—Position Evaluation).

This publication applies to the Active Army, the Army National Guard (ARNG)/National Guard of the United States (ARNGUS), and the US Army Reserve (USAR).

Terms that have joint or Army definitions are identified in both the glossary and the text. Terms for which FM 3-22.9 is the proponent FM are indicated with an asterisk in the glossary.

Uniforms depicted in this manual were drawn without camouflage for clarity of the illustration. Unless this publication states otherwise, masculine nouns and pronouns refer to both men and women.

The proponent for this publication is the US Army Training and Doctrine Command. The preparing agency is the United States Army Infantry School (USAIS). You may send comments and recommendations by any means (US mail, e-mail, fax, or telephone) as long as you use DA Form 2028 (Recommended Changes to Publications and Blank Forms) or follow its format. Point of contact information is as follows:

E-mail: benn.29IN.229-S3-DOC-LIT@conus.army.mil
 Phone: Commercial: 706-545-8623
 DSN: 835-8623
 Fax: Commercial: 706-545-8600
 DSN: 835-8600
 US Mail: Commandant, USAIS
 ATTN: ATSH-INB
 6650 Wilkin Drive, Bldg 74, Rm 102
 Fort Benning, GA 31905-5593

This page intentionally left blank.

Chapter 1

Marksmanship Training

An effective marksmanship program can be measured by the unit's ability to put effective fire on a target. This chapter provides a proven strategy for establishing and conducting an effective rifle marksmanship training program. The strategy begins with the progressive individual training periods taught during initial entry training (IET) and culminates with advanced rifle marksmanship (ARM) skills. Refresher training is conducted only when necessary.

A Soldier's marksmanship proficiency depends on proper training and application of the basic marksmanship fundamentals. During initial marksmanship training, emphasis is placed on learning the firing fundamentals, which are taught in four phases—preliminary marksmanship instruction (PMI), downrange feedback, field firing, and advanced firing exercises. This prepares Soldiers for advanced optic and laser training for combat-type collective exercises and real-world deployments.

SECTION I. TRAINING STRATEGY

The total Army marksmanship training strategy is the overall concept for integrating resources into a program designed to train, sustain, and improve the individual and collective skills needed to achieve proficiency in individual and collective gunnery tasks. Training strategies for rifle marksmanship are implemented in TRADOC institutions (IET, Noncommissioned Officers Education System [NCOES], Basic Officer Leaders Course [BOLC]) and in units. The overall training strategy is multifaceted and includes supporting strategies that use resources such as publications; ranges; ammunition; and training aids, devices, simulators, and simulations (TADSS). These strategies focus on developing the Soldier and leader skills required for success in combat.

NOTE: See AR 350-1 for specific requirements pertaining to marksmanship training and DA Pam 350-38 for live-fire frequency requirements.

OBJECTIVES

- 1-1. The procedures and techniques for implementing the total Army rifle marksmanship training strategy are based on the concept that Soldiers must become skilled marksmen. FM 7-0 stresses marksmanship as the paramount Soldier skill. Further, Soldiers should understand common firing principles and be confident in applying their firing skills in combat. Unit leaders accomplish proficiency through practice supervised by qualified instructors/trainers and thorough objective performance assessments.
- 1-2. The basic firing skills and exercises outlined in this manual must be part of every unit's marksmanship training program. Unit commanders must focus their basic and advanced marksmanship training programs to support their mission-essential task lists (METLs).

MARKSMANSHIP TRAINING STRATEGY

- 1-3. The following marksmanship training strategy guide contains the tasks that are currently trained in basic rifle marksmanship (BRM) programs, during basic combat training at Army training centers (ATCs), and during infantry one-station unit training (OSUT). It also provides a basis for structuring unit sustainment programs for active Army, Army National Guard, and United States Army Reserve units. Units

normally perform diagnostic tests of the tasks and only conduct training on specific periods for Soldiers who must improve their basic firing skills. Unit training is usually conducted in less time than at IET.

1-4. There are two primary components of a marksmanship training strategy: initial training and sustainment training. Both may include individual and collective tasks and skills. Initial training must be taught correctly the first time. A task taught correctly and learned well is retained longer, and skills can be more easily sustained. However, an individual or unit eventually loses skill proficiency if the training is not reinforced. This learning decay depends on many factors, such as the difficulty and complexity of the task. Personnel turnover is a main factor in the decay of collective skills, since the loss of critical team members requires retraining to regain proficiency. If a long period elapses between initial and sustainment sessions or training doctrine is altered, retraining may be required.

INITIAL ENTRY TRAINING

1-5. The training strategy for BRM begins in IET and continues in the unit. Figure 1-1 shows the IET training strategy.

1-6. In IET, Soldiers learn how to maintain a rifle, hit a point target, and apply the four marksmanship fundamentals and other skills needed to engage a target. Once Soldiers understand the weapon and have demonstrated skill in zeroing, additional simulations and live-fire training exercises are conducted to prepare Soldiers for qualification. During these exercises, Soldiers master target types and scenarios of increasing difficulty to develop their proficiency.

1-7. IET culminates in the Soldier’s proficiency assessment (which is conducted on the standard record fire range or approved alternates), followed by instruction on advanced firing techniques (a night-fire exercise with iron sights [unassisted] or night vision goggles [assisted]). This evaluation allows leaders to determine the effectiveness of the training.

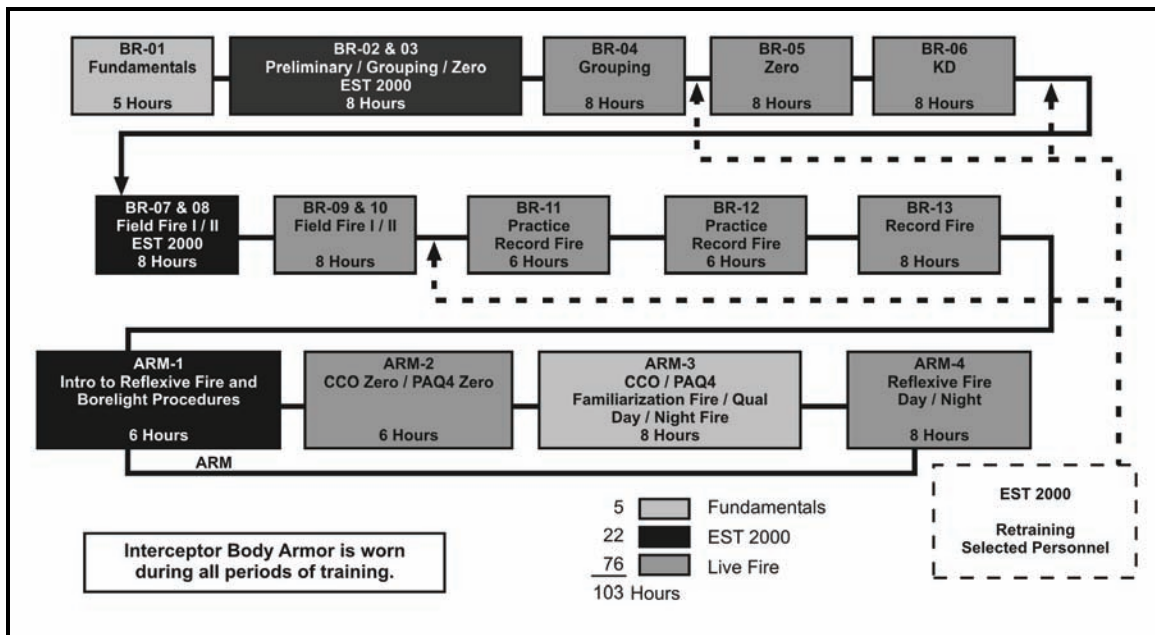


Figure 1-1. Initial entry training marksmanship training strategy.

SUSTAINMENT TRAINING

1-8. Training continues in active Army, National Guard, and Army Reserve units using the same basic skills taught in IET. Units must set up a year-round program to sustain skills and have a plan not only for when they are at their home station, but for when they are deployed as well.