

**MORTAR BALLISTICS
COMPUTERS FOR FIRING:
FOR
CARTRIDGE, 60MM

CARTRIDGE, 81MM

CARTRIDGE, 120MM**

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CHAPTER 1:

CARTRIDGE, 60MM

**1-a. CARTRIDGE, 60 MILLIMETER: SMOKE, WHITE PHOSPHORUS, M722A1
(DODIC: BA14)**

1. Reference: Firing Table 60-P-1, Firing Tables for Mortar, 60MM, M224, March 1980 w/C-1 through C-16, October 2007.
2. The M722A1 Smoke (WP) Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M722 Smoke (WP) Cartridge from the M23 MBC when firing the M722A1 Smoke (WP) Cartridge. The M722 and M722A1 Smoke (WP) Cartridges are ballistically equivalent. No other corrections need to be made.
3. The currently fielded M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contains correct ballistics solutions for the M722A1 Smoke (WP) Cartridge.
4. This authorization will remain in effect until all M23 MBCs in the field are replaced.
5. Ballistic solutions are also provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales (NSN 1220-01-394-8225, P/N 12913063) and plotting boards are available for use in firing the M722A1 Smoke (WP) Cartridge. Graphical firing scales are provided in the M722A1 Smoke (WP) Cartridge packaging.
6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
7. Technical POC is Mr. Stanley Chiu, RDAR-EIL-LM, DSN 880-3057, (973) 724-3057, E-mail: stanley.k.chiu.civ@mail.mil.

1-b. CARTRIDGE, 60 MILLIMETER: FULL RANGE PRACTICE, M769 (DODIC: BA15)

1. Reference: Firing Table 60-P-1, Firing Tables for Mortar, 60MM, M224, March 1980 w/ C-1 through C-16, October 2007.
2. The M769 Full Range Practice Cartridge (FRPC) is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the M720 HE Cartridge firing solutions from the M23 MBC when firing the M769 FRPC, in combination with the performance corrections supplied below in Figure 1.
3. The currently fielded M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contains correct ballistics solutions for the M769 FRPC.
4. This authorization for the M23 MBC will remain in effect until all M23 MBCs in the field are replaced.
5. Ballistic solutions are also provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales (NSN 1220-01-534-4481, P/N 13000962) and plotting boards are available for use in firing the M769 FRPC. Graphical firing scales are provided in the M769 FRPC packaging.
6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.
7. Technical POC is Mr. Stanley Chiu, RDAR-EIL-LM, DSN 880-3057, (973) 724-3057, E-mail: stanley.k.chiu.civ@mail.mil.

1-b. CARTRIDGE, 60 MILLIMETER: FULL RANGE PRACTICE, M769 (DODIC: BA15) – Continued

FIGURE 1: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCES IN PERFORMANCE FROM THE M23 SOLUTIONS FOR THE M720 HE CARTRIDGE AND THE FINAL PUBLISHED FIRING TABLES FOR THE M769 FRPC.

M23 Rev 3A

Charge	Temp (°F)	Elevation (mils)	M23 Range to Impact (meters)	Actual Range to Impact (M720) (meters)	Delta Range to Impact (M769) (meters)
0	0	800	389	369	-20
0	0	1156	297	281	-16
0	0	1511	67	63	-4
1	0	800	1234	1927	63
1	0	1156	934	982	48
1	0	1511	204	214	10
2	0	800	2031	2118	87
2	0	1156	1516	1582	66
2	0	1511	328	343	15
3	0	800	2763	2870	107
3	0	1156	2027	2109	82
3	0	1511	460	479	19
4	0	800	3268	3533	265
4	0	1156	2485	2688	203
4	0	1511	588	636	48
0	70	800	407	384	-23
0	70	1156	311	293	-18
0	70	1511	70	66	-4
1	70	800	1342	1351	9
1	70	1156	1015	1022	7
1	70	1511	221	223	2
2	70	800	2153	2209	56
2	70	1156	1605	1649	44
2	70	1511	346	357	11
3	70	800	2890	2973	83
3	70	1156	2118	2182	64
3	70	1511	480	495	15
4	70	800	3489	3636	147
4	70	1156	2653	2767	114
4	70	1511	628	655	27
0	110	800	411	394	-17
0	110	1156	313	300	-13
0	110	1511	70	67	-3
1	110	800	1385	1383	-2
1	110	1156	1047	1046	-1
1	110	1511	228	228	0
2	110	800	2218	2260	42
2	110	1156	1652	1686	34
2	110	1511	356	364	8
3	110	800	2962	3020	58
3	110	1156	2168	2216	48
3	110	1511	492	503	11
4	110	800	3601	3693	92
4	110	1156	2738	2810	72
4	110	1511	649	665	16

1-c. CARTRIDGE, 60 MILLIMETER: HE, M720A2 (DODIC: BA44)

1. Reference: Firing Table 60-P-1, Firing Tables for Mortar, 60MM, M224, March 1980 w/C-1 through C-16, October 2007.
2. The M720A2 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M720 HE Cartridge from the M23 MBC when firing the M720A2 HE Cartridge, in combination with the performance corrections supplied below in Figure 2. No other corrections need to be made.
3. The M720A2 HE Cartridge is not yet selectable in the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC). Units are authorized to use the firing solutions for the M720 HE Cartridge from the M32 LHMBC when firing the M720A2 HE Cartridge, in combination with the performance corrections supplied below in Figure 2. No other corrections need to be made.
4. Ballistic solutions for the M720A2 HE Cartridge are not yet available in the firing tables noted in Paragraph 1. Units are authorized to use the firing solutions for the M720 HE Cartridge from the firing tables noted in Paragraph 1 when firing the M720A2 HE Cartridge, in combination with the performance corrections supplied below in figure 2. No other corrections need to be made.
5. This authorization will remain in effect until all M23 MBCs in the field are replaced, and the M32 LHMBC and firing tables noted in Paragraph 1 are updated.
6. In addition, graphical firing scales (P/N 13059933) and plotting boards are available for use in firing the M720A2 HE Cartridge. Graphical firing scales are provided in the M720A2 HE Cartridge packaging.
7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
8. Technical POC is Mr. Stanley Chiu, RDAR-EIL-LM, DSN 880-3057, (973) 724-3057, E- mail: stanley.k.chiu.civ@mail.mil.

1-c. CARTRIDGE, 60 MILLIMETER: HE, M720A2 (DODIC: BA44) – Continued

FIGURE 2: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCES IN PERFORMANCE FROM THE FIRING SOLUTIONS FOR THE M720 HE CARTRIDGE AND THE M720A2 HE CARTRIDGE.

Charge	Temp (°F)	Elevation (mils)	M720 Range to Impact (meters)	M720A2 Range to Impact (meters)	Delta Range to Impact (M720 to M720A2) (meters)
0	0	800	389	401	12
0	0	1156	297	306	9
0	0	1511	67	69	2
1	0	800	1234	1234	0
1	0	1156	934	934	0
1	0	1511	204	204	0
2	0	800	2032	2089	57
2	0	1156	1517	1558	42
2	0	1511	330	339	9
3	0	800	2763	2763	0
3	0	1156	2028	2028	0
3	0	1511	463	463	0
4	0	800	3269	3287	19
4	0	1156	2487	2501	14
4	0	1511	591	595	3
0	70	800	408	419	12
0	70	1156	311	320	9
0	70	1511	70	72	2
1	70	800	1342	1342	0
1	70	1156	1015	1015	0
1	70	1511	221	221	0
2	70	800	2153	2211	57
2	70	1156	1606	1647	42
2	70	1511	349	357	9
3	70	800	2890	2890	0
3	70	1156	2119	2119	0
3	70	1511	483	483	0
4	70	800	3489	3507	19
4	70	1156	2654	2668	14
4	70	1511	632	636	3
0	110	800	411	423	12
0	110	1156	313	322	9
0	110	1511	70	72	2
1	110	800	1385	1385	0
1	110	1156	1047	1047	0
1	110	1511	228	228	0
2	110	800	2218	2276	57
2	110	1156	1653	1695	42
2	110	1511	358	367	9
3	110	800	2962	2962	0
3	110	1156	2170	2170	0
3	110	1511	495	495	0
4	110	800	3601	3619	18
4	110	1156	2739	2753	14
4	110	1511	653	657	3

1-d. CARTRIDGE, 60 MILLIMETER: HE, M768A1 (DODIC: BA45)

1. Reference: Firing Table 60-P-1, Firing Tables for Mortar, 60MM, M224, March 1980 w/C-1 through C-16, October 2007.
2. The M768A1 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M720 HE Cartridge from the M23 MBC when firing the M768A1 HE, in combination with the performance corrections supplied below in Figure 3. No other corrections need to be made.
3. The M768A1 HE Cartridge is not yet selectable in the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC). Units are authorized to use the firing solutions for the M720 HE Cartridge from the M32 LHMBC when firing the M768A1 HE Cartridge, in combination with the performance corrections supplied below in Figure 3. No other corrections need to be made.
4. Ballistic solutions for the M768A1 HE Cartridge are not yet available in the firing tables noted in Paragraph 1. Units are authorized to use the firing solutions for the M720 HE Cartridge from the firing tables noted in Paragraph 1 when firing the M768A1 HE Cartridge, in combination with the performance corrections supplied below in Figure 3. No other corrections need to be made.
5. This authorization will remain in effect until all M23 MBCs in the field are replaced, and the M32 LHMBC and firing tables noted in Paragraph 1 are updated.
6. In addition, graphical firing scales (P/N 13059933) and plotting boards are available for use in firing the M768A1 HE Cartridge. Graphical firing scales are provided in the M768A1 HE Cartridge packaging.
7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
8. Technical POC is Mr. Stanley Chiu, RDAR-EIL-LM, DSN 880-3057, (973) 724-3057, E- mail: stanley.k.chiu.civ@mail.mil.

1-d. CARTRIDGE, 60 MILLIMETER: HE, M768A1 (DODIC: BA45) – Continued

FIGURE 3: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCES IN PERFORMANCE FROM THE FIRING SOLUTIONS FOR THE M720 HE CARTRIDGE AND THE M768A1 HE CARTRIDGE.

Charge	Temp (°F)	Elevation (mils)	M720 Range to Impact (meters)	M768A1 Range to Impact (meters)	Delta Range to Impact (M720 to M768A1) (meters)
0	0	800	389	401	12
0	0	1156	297	306	9
0	0	1511	67	69	2
1	0	800	1234	1234	0
1	0	1156	934	934	0
1	0	1511	204	204	0
2	0	800	2032	2089	57
2	0	1156	1517	1558	42
2	0	1511	330	339	9
3	0	800	2763	2763	0
3	0	1156	2028	2028	0
3	0	1511	463	463	0
4	0	800	3269	3287	19
4	0	1156	2487	2501	14
4	0	1511	591	595	3
0	70	800	408	419	12
0	70	1156	311	320	9
0	70	1511	70	72	2
1	70	800	1342	1342	0
1	70	1156	1015	1015	0
1	70	1511	221	221	0
2	70	800	2153	2211	57
2	70	1156	1606	1647	42
2	70	1511	349	357	9
3	70	800	2890	2890	0
3	70	1156	2119	2119	0
3	70	1511	483	483	0
4	70	800	3489	3507	19
4	70	1156	2654	2668	14
4	70	1511	632	636	3
0	110	800	411	423	12
0	110	1156	313	322	9
0	110	1511	70	72	2
1	110	800	1385	1385	0
1	110	1156	1047	1047	0
1	110	1511	228	228	0
2	110	800	2218	2276	57
2	110	1156	1653	1695	42
2	110	1511	358	367	9
3	110	800	2962	2962	0
3	110	1156	2170	2170	0
3	110	1511	495	495	0
4	110	800	3601	3619	18
4	110	1156	2739	2753	14
4	110	1511	653	657	3

CHAPTER 2:

CARTRIDGE, 81MM

2-a. CARTRIDGE, 81 MM: HE, M821A2 (DODIC: C868)

1. Reference: Firing Table 81-AR-2, Firing Tables for Mortar, 81MM, M252, June 1997 w/ C-1 through C-5, November 2009.
2. The M821A2 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the M23 MBC when firing the M821A2 HE Cartridge. The M821A1 and M821A2 HE Cartridges are ballistically equivalent. No other corrections need to be made.
3. The currently fielded M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contains correct ballistics solutions for the M821A2 HE Cartridge.
4. This authorization will remain in effect until all M23 MBCs in the field are replaced.
5. Ballistic solutions are also provided in the firing tables noted in Paragraph 1. In addition, a graphical firing scale (NSN 1220-01-519-8007, P/N: 12960762) and plotting boards are available for use in firing the M821A2 HE Cartridge. Graphical firing scales are provided in the M821A2 HE Cartridge packaging.
6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
7. Technical POC is Mr. Andrew De Block, RDAR-EIL-LM, DSN 880-5707, (973) 724-5707, E-mail: andrew.j.deblock.civ@mail.mil.

2-b. CARTRIDGE, 81MM: HE, M889A2 (DODIC: CA43)

1. Reference: Firing Table 81-AR-2, Firing Tables for Mortar, 81MM, M252, June 1997 w/ C-1 through C-5, November 2009.
2. The M889A2 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the M23 MBC when firing the M889A2 HE Cartridge. The M821A1 and M889A2 HE Cartridges are ballistically equivalent. No other corrections need to be made.
3. The currently fielded M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contains correct ballistics solutions for the M889A2 HE Cartridge.
4. This authorization will remain in effect until all M23 MBCs in the field are replaced.
5. Ballistic solutions are also provided in the firing tables noted in Paragraph 1. In addition, a graphical firing scale (NSN 1220-01-519-8007, P/N 12960762) and plotting boards are available for use in firing the M889A2 HE Cartridge. Graphical firing scales are provided in the M889A2 HE Cartridge packaging.
6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
7. Technical POC is Mr. Andrew De Block, RDAR-EIL-LM, DSN 880-5707, (973) 724-5707, E-mail: andrew.j.deblock.civ@mail.mil.

2-c. CARTRIDGE, 81 MM: HE, M821A3 (DODIC: CA61)

1. Reference: Firing Table 81-AR-2, Firing Tables for Mortar, 81MM, M252, June 1997 w/ C-1 through C-5, November 2009.
2. The M821A3 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the M23 MBC when firing the M821A3 HE Cartridge. The M821A1 and M821A3 HE Cartridges are ballistically equivalent. No other corrections need to be made.
3. The M821A3 HE Cartridge is not yet selectable in the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC). Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the M32 LHMBC when firing the M821A3 HE Cartridge. The M821A1 and M821A3 HE Cartridges are ballistically equivalent. No other corrections need to be made.
4. Ballistic solutions for the M821A3 HE Cartridge are not yet available in the firing tables noted in Paragraph 1. Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the firing tables noted in Paragraph 1 when firing the M821A3 HE Cartridge. The M821A1 and M821A3 HE Cartridges are ballistically equivalent. No other corrections need to be made.
5. This authorization will remain in effect until all M23 MBCs in the field are replaced, and the M32 LHMBC and firing tables noted in Paragraph 1 are updated.
6. In addition, a graphical firing scale (NSN 1220-01-519-8007, P/N: 12960762) and plotting boards are available for use in firing the M821A3 HE Cartridge. Graphical firing scales are provided in the M821A3 HE Cartridge packaging.
7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.
8. Technical POC is Mr. Andrew De Block, RDAR-EIL-LM, DSN 880-5707, (973) 724-5707, E-mail: andrew.j.deblock.civ@mail.mil.

2-d. CARTRIDGE, 81MM: HE, M889A4 (DODIC: CA63)

1. Reference: Firing Table 81-AR-2, Firing Tables for Mortar, 81MM, M252, June 1997 w/ C-1 through C-5, November 2009.
2. The M889A4 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solutions for the M821A1 HE Cartridge from the M23 MBC when firing the M889A4 HE Cartridge. The M821A1 and M889A4 HE Cartridges are ballistically equivalent. No other corrections need to be made.
3. The M889A4 HE Cartridge is not yet selectable in the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC). Units are authorized to use the firing solutions for the M821A1 or M889A2 HE Cartridges from the M32 LHMBC when firing the M889A4 HE Cartridge. The M821A1, M889A2, and M889A4 HE Cartridges are ballistically equivalent. No other corrections need to be made.
4. Ballistic solutions for the M889A4 HE Cartridge are not yet available in the firing tables noted in Paragraph 1. Units are authorized to use the firing solutions for the M821A1 or M889A2 HE Cartridges from the firing tables noted in Paragraph 1 when firing the M889A4 HE Cartridge. The M821A1, M889A2, and M889A4 HE Cartridges are ballistically equivalent. No other corrections need to be made.
4. This authorization will remain in effect until all M23 MBCs in the field are replaced, and the M32 LHMBC and firing tables noted in Paragraph 1 are updated.
5. In addition, a graphical firing scale (NSN 1220-01-519-8007, P/N 12960762) and plotting boards are available for use in firing the M889A4 HE Cartridge. Graphical firing scales are provided in the M889A4 HE Cartridge packaging.
6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
7. Technical POC is Mr. Andrew De Block, RDAR-EIL-LM, DSN 880-5707, (973) 724-5707, E-mail: andrew.j.deblock.civ@mail.mil.

2-e. CARTRIDGE, 81 MM, PRACTICE: M879A1 (DODIC: C875)

1. Reference: Firing Table 81-AR-2, Firing Tables for Mortar, 81MM, M252, June 1997 w/ C-1 through C-5, November 2009.
2. The M879A1 Practice Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the firing solution for the M879 Practice Cartridge from the M23 MBC when firing the M879A1 Practice Cartridge. The M879 and M879A1 Practice Cartridges are ballistically equivalent. No other corrections need to be made.
3. The M879A1 Practice Cartridge is not yet selectable in the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC). Units are authorized to use the firing solution for the M879 Practice Cartridge from the M32 LHMBC when firing the M879A1 Practice Cartridge. The M879 and M879A1 Practice Cartridges are ballistically equivalent. No other corrections need to be made.
4. Ballistic solutions for the M879A1 Practice Cartridge are not yet available in the firing tables noted in Paragraph 1. Units are authorized to use the firing solution for the M879 Practice Cartridge from the firing tables noted in Paragraph 1 when firing the M879A1 Practice Cartridge. The M879 and M879A1 Practice Cartridges are ballistically equivalent. No other corrections need to be made.
5. This authorization will remain in effect until all M23 MBCs in the field are replaced, and the M32 LHMBC and firing tables noted in Paragraph 1 are updated.
6. In addition, a graphical firing scale (NSN 1220-01-413-9150, P/N: 12912958) and plotting boards are available for use in firing the M879A1 Practice Cartridge. Graphical firing scales are provided in the M879A1 Practice Cartridge packaging.
7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on "TFT Access", then "New Access Request", and follow the links to send a request for access.
8. Technical POC is Mr. Andrew De Block, RDAR-EIL-LM, DSN 880-5707, (973) 724-5707, E-mail: andrew.j.deblock.civ@mail.mil.

CHAPTER 3:

CARTRIDGE, 120MM

3-a. CARTRIDGE, 120 MILLIMETER: HIGH EXPLOSIVE, M933A1 (DODIC: CA44)

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. The M933A1 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the M933 HE Cartridge firing solutions from the M23 MBC when firing the M933A1 HE Cartridge, in combination with the performance corrections supplied below in Figure 4.

3. The correction factors are necessary because the M933A1 HE Cartridge has higher muzzle velocities than the M933 HE Cartridge. This causes a variation in range between the two cartridges.

4. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M933A1 HE Cartridge.

5. This authorization will remain in effect until all M23 MBCs in the field are replaced.

6. Ballistic solutions for the M933A1 HE Cartridge are provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales NSN 1220-01-502-1296 (P/N 13002218) for M120/M121/M120A1 Mortar and NSN 1220-01-533-8125 (P/N 13007850) for Stryker (RMS6-L) and plotting boards are available for use in firing the M933A1 HE Cartridge. The graphical firing scales are provided in the M933A1 HE Cartridge packaging. Note: The graphical firing scales provided in older lots of M933A1 HE ammunition may only mention the M934A1 HE, but are authorized to be used to fire the M933A1 HE Cartridge without correction. The M933A1 and M934A1 HE Cartridges are ballistically equivalent.

**3-a. CARTRIDGE, 120 MILLIMETER: HIGH EXPLOSIVE, M933A1 (DODIC: CA44) –
Continued**

7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.

8. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033, E-mail: michael.c.villacillo.civ@mail.mil.

3-a. CARTRIDGE, 120 MILLIMETER: HIGH EXPLOSIVE, M933A1 (DODIC: CA44) – Continued

FIGURE 4: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCE IN PERFORMANCE FROM THE M23 MBC (REV 3A) SOLUTIONS FOR THE M933 HE CARTRIDGE AND THE FINAL PUBLISHED FIRING TABLES FOR THE M933A1 HE CARTRIDGE IN REF 1A.

Charge	Temp (°F)	Elevation (mils)	M23 Range to Target (m)	Actual Range to Impact (m)	Delta Range to Target (m)
0	-25	800	941	953	12
0	-25	1156	718	727	9
0	-25	1511	159	161	2
1	-25	800	2332	2388	56
1	-25	1156	1775	1818	43
1	-25	1511	384	393	9
2	-25	800	3788	3876	88
2	-25	1156	2879	2946	67
2	-25	1511	645	660	15
3	-25	800	5346	5412	66
3	-25	1156	4063	4113	50
3	-25	1511	902	913	11
4	-25	800	6770	6793	23
4	-25	1156	5150	5163	18
4	-25	1511	1136	1140	4
0	70	800	1018	981	-37
0	70	1156	777	749	-28
0	70	1511	172	166	-6
1	70	800	2555	2555	0
1	70	1156	1945	1945	0
1	70	1511	419	419	0
2	70	800	4158	4158	0
2	70	1156	3160	3160	0
2	70	1511	707	707	0
3	70	800	5783	5751	-32
3	70	1156	4397	4372	-25
3	70	1511	974	969	-5
4	70	800	7159	7079	-80
4	70	1156	5454	5390	-64
4	70	1511	1201	1188	-13
0	125	800	1160	1024	-136
0	125	1156	884	781	-103
0	125	1511	195	173	-22
1	125	800	2820	2687	-133
1	125	1156	2146	2045	-101
1	125	1511	460	439	-21
2	125	800	4493	4350	-143
2	125	1156	3414	3306	-108
2	125	1511	764	740	-24
3	125	800	6100	5970	-130
3	125	1156	4639	4539	-100
3	125	1511	1027	1005	-22
4	125	800	7404	7217	-187
4	125	1156	5649	5500	-149
4	125	1511	1243	1211	-32

3-b. CARTRIDGE, 120 MILLIMETER: HIGH EXPLOSIVE, M934A1 (DODIC: CA04)

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. The M934A1 HE Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the M934 HE Cartridge firing solutions from the M23 MBC when firing the M934A1 HE Cartridge, in combination with the performance corrections supplied below in Figure 5.

3. The correction factors are necessary because the M934A1 HE Cartridge has higher muzzle velocities than the M934 HE Cartridge. This causes a variation in range between the two cartridges.

4. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M934A1 HE Cartridge.

5. This authorization will remain in effect until all M23 MBCs in the field are replaced.

6. Ballistic solutions for the M934A1 HE Cartridge are provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales NSN 1220-01-502-1296 (P/N 13002218) for M120/M121/M120A1 Mortar and NSN 1220-01-533-8125 (P/N 13007850) for Stryker (RMS6-L) and plotting boards are available for use in firing the M934A1 HE Cartridge. The graphical firing scales are provided in the M934A1 HE Cartridge packaging.

7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.

8. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033, E-mail: michael.c.villacillo.civ@mail.mil.

3-b. CARTRIDGE, 120 MILLIMETER: HIGH EXPLOSIVE, M934A1 (DODIC: CA04) – Continued

FIGURE 5: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCE IN PERFORMANCE FROM THE M23 MBC (REV 3A) SOLUTIONS FOR THE M934 HE CARTRIDGE AND THE FINAL PUBLISHED FIRING TABLES FOR THE M934A1 HE CARTRIDGE IN REF 1A.

Charge	Temp (°F)	Elevation (mils)	M23 Range to Target (m)	Actual Range to Impact (m)	Delta Range to Target (m)
0	-25	800	941	953	12
0	-25	1156	718	727	9
0	-25	1511	159	161	2
1	-25	800	2332	2388	56
1	-25	1156	1775	1818	43
1	-25	1511	384	393	9
2	-25	800	3788	3876	88
2	-25	1156	2879	2946	67
2	-25	1511	645	660	15
3	-25	800	5346	5412	66
3	-25	1156	4063	4113	50
3	-25	1511	902	913	11
4	-25	800	6770	6793	23
4	-25	1156	5150	5163	18
4	-25	1511	1136	1140	4
0	70	800	1018	981	-37
0	70	1156	777	749	-28
0	70	1511	172	166	-6
1	70	800	2555	2555	0
1	70	1156	1945	1945	0
1	70	1511	419	419	0
2	70	800	4158	4158	0
2	70	1156	3160	3160	0
2	70	1511	707	707	0
3	70	800	5783	5751	-32
3	70	1156	4397	4372	-25
3	70	1511	974	969	-5
4	70	800	7159	7079	-80
4	70	1156	5454	5390	-64
4	70	1511	1201	1188	-13
0	125	800	1160	1024	-136
0	125	1156	884	781	-103
0	125	1511	195	173	-22
1	125	800	2820	2687	-133
1	125	1156	2146	2045	-101

1	125	1511	460	439	-21
2	125	800	4493	4350	-143
2	125	1156	3414	3306	-108
2	125	1511	764	740	-24
3	125	800	6100	5970	-130
3	125	1156	4639	4539	-100
3	125	1511	1027	1005	-22
4	125	800	7404	7217	-187
4	125	1156	5649	5500	-149
4	125	1511	1243	1211	-32

3-c. CARTRIDGE, 120 MILLIMETER: FULL RANGE PRACTICE, M931 (DODIC: CA09)

WARNING

At no time should live fire training be conducted using high explosive and practice cartridges during the same mission.

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. The M931 FRPC is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the M933 or M934 HE Cartridge firing solutions from the M23 MBC when firing the M931 FRPC.

3. Units should expect the maximum range deltas in Figure 6 below when using the M933 HE or M934 HE Cartridge ballistic solutions from the M23 MBC (Rev 3a) for firing the M931 FRPC.

FIGURE 6: EXPECTED RANGE DELTAS WHEN USING M933 HE OR M934 HE CARTRIDGE BALLISTIC SOLUTIONS TO FIRE M931 FRPC.

CHARGE	DELTA RANGE (M)
0	-44.7
1	38.0
2	45.9
3	54.8
4	106.4

3-c. CARTRIDGE, 120 MILLIMETER: FULL RANGE PRACTICE, M931 (DODIC: CA09) - Continued

4. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M931 FRPC.
5. This authorization will remain in effect until all M23 MBCs in the field are replaced.
6. Ballistic solutions for the M931 FRPC are provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales NSN 1220-01-540-6635 (P/N 13011841) for M120/M121/M120A1 Mortar and NSN 1220-01-533-8122 (P/N 13011780) for Stryker (RMS6-L) and plotting boards are available for use in firing the M931 FRPC. The graphical firing scales are provided in the M931 FRPC packaging.
7. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.
8. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033, E-mail: michael.c.villacillo.civ@mail.mil.

3-d. CARTRIDGE, 120 MILLIMETER: ILLUMINATION (IR), M983 (DODIC: CA07)

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. The M983 IR Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the XM930 or M930 (if available) IL Cartridge firing solutions from the M23 MBC when firing the M983 IR Cartridge, in combination with the performance corrections supplied in Figure 7 below. A copy of this table is also included in the M983 IR Cartridge packaging.

3. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M983 IR Cartridge.

4. This authorization will remain in effect until all M23 MBCs in the field are replaced.

5. Ballistic solutions for the M983 IR Cartridge are provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales NSN 1220-01-515-4612 (P/N 13005843) for M120/M121/M120A1 Mortar and NSN 1220-01-533-8126 (P/N 13011778) for Stryker (RMS6-L) and plotting boards are available for use in firing the M983 IR Cartridge. The graphical firing scales are provided in the M983 IR Cartridge packaging.

6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.

3-d. CARTRIDGE, 120 MILLIMETER: ILLUMINATION, IR, M983 (DODIC: CA07) - Continued

7. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033, E-mail: michael.c.villacillo.civ@mail.mil.

FIGURE 7: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCE IN PERFORMANCE FROM THE M23 MBC (REV 3A) SOLUTIONS FOR THE M930 IL CARTRIDGE AND THE FINAL PUBLISHED FIRING TABLES FOR THE M983 IR CARTRIDGE IN REF 1A. A COPY OF THIS TABLE IS ALSO INCLUDED IN THE M983 IR CARTRIDGE PACKAGING.

Charge	Temp (°F)	Elevation (mils)	M23 Range to Target (m)	M23 Range to Impact (m)	Actual Range to Target (m)	Actual Range to Impact (m)	Delta Range to Target (m)	Delta Range to Impact (m)
1	-25	800	1795	2335	1777	2291	-18	-44
1	-25	1156	1558	1778	1543	1745	-15	-33
1	-25	1511	345	385	341	378	-4	-7
2	-25	800	3359	3798	3316	3707	-43	-91
2	-25	1156	2692	2887	2658	2818	-34	-69
2	-25	1511	610	647	603	632	-7	-15
3	-25	800	4970	5363	4943	5310	-27	-53
3	-25	1156	3897	4077	3875	4036	-22	-41
3	-25	1511	871	905	866	896	-5	-9
4	-25	800	6438	6798	6381	6690	-57	-108
4	-25	1156	5005	5172	4959	5089	-46	-83
4	-25	1511	1110	1142	1100	1124	-10	-18
1	70	800	2045	2560	2000	2453	-45	-107
1	70	1156	1733	1948	1696	1867	-37	-81
1	70	1511	381	420	373	403	-8	-17
2	70	800	3744	4169	3685	4047	-59	-122
2	70	1156	2978	3169	2931	3076	-47	-93
2	70	1511	673	710	663	689	-10	-21
3	70	800	5420	5803	5335	5640	-85	-163
3	70	1156	4236	4412	4169	4288	-67	-124
3	70	1511	945	978	930	951	-15	-27
4	70	800	6837	7190	6764	7054	-73	-136

4	70	1156	5313	5478	5254	5371	-59	-107
4	70	1511	1176	1207	1163	1184	-13	-23
1	120	800	2303	2797	2224	2617	-79	-180
1	120	1156	1918	2128	1853	1992	-65	-136
1	120	1511	418	456	405	429	-13	-27
2	120	800	4054	4470	3949	4256	-105	-214
2	120	1156	3209	3397	3126	3235	-83	-162
2	120	1511	724	760	706	724	-18	-36
3	120	800	5716	6094	5595	5861	-121	-233
3	120	1156	4460	4635	4364	4456	-96	-179
3	120	1511	993	1026	972	988	-21	-38
4	120	800	7065	7414	6970	7238	-95	-176
4	120	1156	5493	5657	5414	5516	-79	-141
4	120	1511	1214	1245	1197	1215	-17	-30

3-e. CARTRIDGE, 120 MILLIMETER: ILLUMINATION, M930 (DODIC: C625)

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. Units are authorized to use the XM930 or M930 (if available) Cartridge firing solutions from the M23 MBC to fire the M930 IL Cartridge, in combination with the performance corrections supplied in Figure 8 below. The correction factors are necessary because the XM930/M930 solutions in the M23 MBC software are not up-to-date. A copy of this table is also included in the M930 IL Cartridge packaging.

3. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M930 IL Cartridge.

4. This authorization will remain in effect until all M23 MBCs in the field are replaced.

5. Ballistic solutions for the M930 IL Cartridge are provided in the firing tables noted in Paragraph 1. In addition, graphical firing scales NSN 1220-01-510-7985 (P/N 13005827) for M120/M121/M120A1 Mortar and NSN 1220-01-533-8121 (P/N 13011774) for Stryker (RMS6-L) and plotting boards are available for use in firing the M930 IL Cartridge. The graphical firing scales are provided in the M930 IL Cartridge packaging.

6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.

**3-e. CARTRIDGE, 120 MILLIMETER: ILLUMINATION, M930 (DODIC: C625) -
Continued**

7. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033,
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FIGURE 8: THE FOLLOWING CHART SUMMARIZES THE EXPECTED DIFFERENCE IN PERFORMANCE FROM THE M23 MBC (REV 3A) SOLUTIONS FOR THE XM930/M930 CARTRIDGE AND THE FINAL PUBLISHED FIRING TABLES FOR THE M930 IL CARTRIDGE IN REF 1A. A COPY OF THIS TABLE IS ALSO INCLUDED IN THE M930 IL CARTRIDGE PACKAGING.

Charge	Temp (F)	Elev (mils)	M23 Range to Target (m)	M23 Range to Impact (m)	Actual Range to Target(m)	Actual Range to Impact (m)	Delta Range to target (m)	Delta Range to Impact (m)
1	-25	800	1795	2335	1777	2291	-18	-44
1	-25	1156	1558	1778	1543	1745	-15	-33
1	-25	1511	345	385	341	378	-4	-7
2	-25	800	3359	3798	3316	3707	-43	-91
2	-25	1156	2692	2887	2658	2818	-34	-69
2	-25	1511	610	647	603	632	-7	-15
3	-25	800	4970	5363	4943	5310	-27	-53
3	-25	1156	3897	4077	3875	4036	-22	-41
3	-25	1511	871	905	866	896	-5	-9
4	-25	800	6438	6798	6381	6690	-57	-108
4	-25	1156	5005	5172	4959	5089	-46	-83
4	-25	1511	1110	1142	1100	1124	-10	-18
1	70	800	2045	2560	2000	2453	-45	-107
1	70	1156	1733	1948	1696	1867	-37	-81
1	70	1511	381	420	373	403	-8	-17
2	70	800	3744	4169	3685	4047	-59	-122
2	70	1156	2978	3169	2931	3076	-47	-93
2	70	1511	673	710	663	689	-10	-21
3	70	800	5420	5803	5335	5640	-85	-163
3	70	1156	4236	4412	4169	4288	-67	-124
3	70	1511	945	978	930	951	-15	-27
4	70	800	6837	7190	6764	7054	-73	-136
4	70	1156	5313	5478	5254	5371	-59	-107
4	70	1511	1176	1207	1163	1184	-13	-23
1	120	800	2303	2797	2224	2617	-79	-180
1	120	1156	1918	2128	1853	1992	-65	-136
1	120	1511	418	456	405	429	-13	-27
2	120	800	4054	4470	3949	4256	-105	-214
2	120	1156	3209	3397	3126	3235	-83	-162
2	120	1511	724	760	706	724	-18	-36
3	120	800	5716	6094	5595	5861	-121	-233
3	120	1156	4460	4635	4364	4456	-96	-179
3	120	1511	993	1026	972	988	-21	-38
4	120	800	7065	7414	6970	7238	-95	-176
4	120	1156	5493	5657	5414	5516	-79	-141
4	120	1511	1214	1245	1197	1215	-17	-30

3-f. CARTRIDGE, 120 MILLIMETER: ILLUMINATION, M930E1 (DODIC: CA39)

1. Reference:

a. FT 120-E-1, Firing Tables for Mortar, 120MM: Carrier Mounted M121 and Mortar, 120MM: Towed M120, June 1999, w/ C-0 through C-10 November 2009.

b. FT 120-F-1, Firing Tables for Mortar, 120MM: Carrier-Mounted RMS6L (BCT Stryker); Mortar, 120MM: Carrier-Mounted RMS6L-DVH (Stryker DVH); and Mortar, 120MM: Advanced Mortar Protection System (AMPS), XM908, 31 August 2005, w/ C-0 through C-4 February 2013.

2. The M930E1 IL Cartridge is not selectable in the M23 Mortar Ballistic Computer (MBC). Units are authorized to use the XM930 or M930 (if available) Cartridge firing solutions from the M23 MBC when firing the M930E1 IL Cartridge, in combination with the performance corrections supplied in the “CORRECTIONS (Δ) TO M23 MBC TO FIRE CTG, 120MM, ILLUM, M930E1” enclosure below. A copy of the enclosure is either contained in an envelope on the outside or inserted inside each wooden box of M930E1 IL Cartridge.

3. The currently fielded M95/M96 Mortar Fire Control System – Mounted (MFCS-M), M150/M151 Mortar Fire Control System – Dismounted (MFCS-D), and the M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) contain correct ballistics solutions for the M930E1 IL Cartridge.

4. This authorization will remain in effect until all M23 MBCs in the field are replaced.

5. Ballistic solutions for the M930E1 IL Cartridge are provided in the firing tables noted in Paragraph 1 for use with plotting boards. There are no graphical firing scales provided in the packaging of the M930E1 IL Cartridge.

6. The latest version of the firing tables may be accessed via AKO by the following web link: <https://www.us.army.mil/suite/page/131620>. Click on “TFT Access”, then “New Access Request”, and follow the links to send a request for access.

7. Technical POC is Michael Villacillo, RDAR-EIL-LM, DSN 880-2033, (973) 724-2033, E-mail: michael.c.villacillo.civ@mail.mil.

**CORRECTIONS (Δ) TO M23 MBC
TO FIRE CTG, 120MM, ILLUM, M930E1**

20 JANUARY 2005

MORTAR, 120MM, M120 / M121
CTG, 120MM, ILLUM, M930E1
FUZE, MTSQ, M776

EXPLANATION OF CORRECTIONS TABLES

1. Compute data for the illumination fire mission using the M23 MBC.
2. Obtain Quadrant Elevation (QE) and Fuze Setting (FS) based on computed range from M23 MBC.
3. Find Δ QE given by M23 MBC in Step 2 on corrections table provided for the relevant charge.
4. Add corresponding Δ QE correction and Δ FS correction from corrections table to QE and FS obtained from M23 MBC.
5. Fire M930E1 using these corrected QE and FS settings to obtain the range to target selected in Step 1.
6. If fuze fails to function at the set time (range to burst), the M930E1 will impact at the range given in the RANGE TO IMPACT column on corrections table.

CHARGE 1

QE (mils)	Δ QE	Δ FS	RANGE TO IMPACT (m)	QE (mils)	Δ QE	Δ FS	RANGE TO IMPACT (m)
900	98	2.7	2417	1210	14	0.8	1751
910	91	2.5	2410	1220	14	0.8	1722
920	84	2.4	2402	1230	13	0.8	1694
930	77	2.2	2394	1240	13	0.8	1638
940	71	2.0	2388	1250	12	0.7	1607
950	64	1.9	2383	1260	12	0.7	1579
960	57	1.7	2378	1270	11	0.7	1522
970	53	1.6	2369	1280	11	0.7	1494
980	49	1.5	2352	1290	10	0.7	1437
990	46	1.5	2334	1300	10	0.7	1409
1000	43	1.4	2318	1310	9	0.7	1353
1010	40	1.4	2306	1320	9	0.7	1289
1020	37	1.3	2287	1330	8	0.7	1241
1030	35	1.2	2271	1340	8	0.7	1185
1040	34	1.2	2238	1350	8	0.7	1129
1050	31	1.2	2215	1360	8	0.7	1102
1060	29	1.1	2205	1370	7	0.7	1048
1070	28	1.1	2173	1380	7	0.7	991
1080	28	1.1	2141	1390	7	0.7	983
1090	25	1.0	2120	1400	6	0.7	908
1100	24	1.0	2110	1410	6	0.7	852
1110	23	0.9	2079	1420	5	0.7	811
1120	22	0.9	2048	1430	5	0.7	770
1130	21	0.9	2018	1440	5	0.7	715
1140	19	0.9	1987	1450	5	0.7	660
1150	18	0.9	1957	1460	4	0.7	605
1160	18	0.9	1927	1470	4	0.7	577
1170	17	0.8	1898	1480	4	0.7	555
1180	16	0.8	1868	1490	3	0.7	522
1190	16	0.8	1828	1500	3	0.7	487
1200	15	0.8	1780	1510	3	0.7	440

CHARGE 2

QE (mils)	Δ QE	Δ FS	RANGE TO IMPACT (m)	QE (mils)	Δ QE	Δ FS	RANGE TO IMPACT (m)
870	110	3.6	4033	1200	21	0.9	2910
880	103	3.4	4024	1210	20	0.9	2884
890	96	3.2	4015	1220	19	0.9	2802
900	89	3.0	4006	1230	18	0.9	2749
910	83	2.8	3993	1240	18	0.9	2695
920	78	2.6	3977	1250	17	0.8	2615
930	73	2.5	3961	1260	16	0.8	2561
940	69	2.3	3941	1270	16	0.8	2508
950	65	2.2	3920	1280	15	0.8	2427
960	62	2.1	3898	1290	14	0.8	2374
970	59	2.0	3870	1300	14	0.8	2294
980	56	1.9	3844	1310	14	0.7	2241
990	52	1.8	3821	1320	13	0.7	2181
1000	50	1.7	3790	1330	13	0.7	2082
1010	47	1.7	3762	1340	12	0.7	2029
1020	45	1.6	3729	1350	11	0.7	1949
1030	43	1.6	3695	1360	11	0.7	1870
1040	41	1.5	3654	1370	10	0.7	1790
1050	39	1.4	3628	1380	9	0.7	1737
1060	37	1.4	3598	1390	9	0.7	1658
1070	35	1.4	3541	1400	8	0.7	1579
1080	34	1.3	3513	1410	8	0.7	1500
1090	33	1.3	3457	1420	8	0.7	1421
1100	32	1.2	3430	1430	7	0.7	1342
1110	30	1.2	3374	1440	7	0.7	1263
1120	29	1.2	3347	1450	6	0.7	1183
1130	28	1.1	3291	1460	6	0.7	1105
1140	27	1.1	3237	1470	6	0.7	1028
1150	26	1.0	3182	1480	5	0.7	947
1160	25	1.0	3127	1490	5	0.7	868
1170	24	1.0	3073	1500	4	0.7	799
1180	22	0.9	3046	1510	4	0.7	716
1190	22	0.9	2984				

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**CORRECTIONS (Δ) TO M23 MBC
TO FIRE CTG, 120MM, ILLUM, M930E1**

20 JANUARY 2005

MORTAR, 120MM, M120 / M121
CTG, 120MM, ILLUM, M930E1
FUZE, MTSQ, M778

EXPLANATION OF CORRECTIONS TABLES

1. Compute data for the illumination fire mission using the M23 MBC.
2. Obtain Quadrant Elevation (QE) and Fuze Setting (FS) based on computed range from M23 MBC.
3. Find QE given by M23 MBC in Step 2 on corrections table provided for the relevant charge.
4. Add corresponding ΔQE correction and ΔFS correction from corrections table to QE and FS obtained from M23 MBC.
5. Fire M930E1 using these corrected QE and FS settings to obtain the range to target selected in Step 1.
6. If fuze fails to function at the set time (range to burst), the M930E1 will impact at the range given in the RANGE TO IMPACT column on corrections table.

CHARGE 3

QE (mils)	ΔQE	ΔFS	RANGE TO IMPACT (m)	QE (mils)	ΔQE	ΔFS	RANGE TO IMPACT (m)
850	99	3.9	5892	1190	18	1.0	4155
860	92	3.7	5951	1200	17	1.0	4078
870	85	3.5	5970	1210	18	1.0	3998
880	80	3.3	5952	1220	18	1.0	3919
890	75	3.0	5933	1230	15	1.0	3840
900	71	2.8	5910	1240	15	1.0	3735
910	68	2.8	5990	1250	14	1.0	3657
920	63	2.5	5961	1260	14	0.9	3578
930	58	2.4	5940	1270	13	0.9	3474
940	56	2.3	5925	1280	13	0.9	3395
950	52	2.2	5479	1290	12	0.9	3291
960	49	2.1	5448	1300	11	0.9	3213
970	47	2.0	5409	1310	11	0.9	3109
980	45	1.9	5389	1320	11	0.9	3005
990	42	1.8	5334	1330	10	0.9	2901
1000	40	1.8	5293	1340	10	0.9	2810
1010	38	1.7	5250	1350	10	0.9	2719
1020	38	1.8	5208	1360	9	0.9	2615
1030	35	1.8	5158	1370	9	0.9	2511
1040	34	1.8	5104	1380	8	0.9	2407
1050	33	1.5	5050	1390	8	0.9	2303
1060	31	1.4	5001	1400	7	0.9	2200
1070	29	1.4	4951	1410	7	0.9	2080
1080	28	1.3	4893	1420	7	0.9	1975
1090	27	1.3	4834	1430	7	0.9	1883
1100	26	1.3	4766	1440	6	0.9	1759
1110	25	1.3	4712	1450	6	0.9	1658
1120	24	1.3	4640	1460	5	0.8	1535
1130	23	1.2	4579	1470	5	0.8	1423
1140	22	1.2	4515	1480	5	0.8	1319
1150	21	1.2	4448	1490	4	0.8	1218
1160	20	1.1	4387	1500	4	0.8	1095
1170	20	1.1	4314	1510	3	0.8	993
1180	19	1.0	4235				

CHARGE 4

QE (mils)	ΔQE	ΔFS	RANGE TO IMPACT (m)	QE (mils)	ΔQE	ΔFS	RANGE TO IMPACT (m)
830	148	5.7	7083	1180	30	1.2	5247
840	139	5.4	7088	1190	29	1.1	5189
850	132	5.1	7053	1200	28	1.1	5095
860	125	4.8	7037	1210	27	1.0	4982
870	118	4.5	7021	1220	28	1.0	4858
880	111	4.2	7005	1230	25	1.0	4755
890	105	4.0	6983	1240	24	1.0	4651
900	100	3.8	6955	1250	23	0.9	4548
910	95	3.8	6927	1260	22	0.9	4444
920	90	3.5	6898	1270	21	0.9	4327
930	88	3.3	6883	1280	21	0.9	4212
940	82	3.1	6828	1290	20	0.9	4095
950	79	3.0	6783	1300	19	0.9	3980
960	75	2.9	6744	1310	18	0.8	3885
970	72	2.7	6698	1320	18	0.8	3735
980	69	2.6	6652	1330	18	0.8	3619
990	65	2.5	6610	1340	18	0.8	3491
1000	63	2.4	6554	1350	18	0.8	3362
1010	61	2.3	6507	1360	15	0.8	3233
1020	58	2.2	6454	1370	15	0.8	3105
1030	55	2.1	6395	1380	14	0.8	2978
1040	53	2.0	6321	1390	13	0.8	2848
1050	51	2.0	6288	1400	12	0.8	2719
1060	49	1.8	6202	1410	12	0.8	2591
1070	47	1.8	6136	1420	11	0.8	2449
1080	45	1.7	6057	1430	11	0.8	2318
1090	43	1.7	6005	1440	10	0.8	2180
1100	42	1.8	5928	1450	10	0.8	2037
1110	40	1.5	5847	1460	9	0.8	1910
1120	39	1.5	5789	1470	8	0.8	1770
1130	37	1.4	5690	1480	8	0.8	1623
1140	36	1.4	5612	1490	7	0.8	1495
1150	34	1.3	5520	1500	6	0.8	1365
1160	32	1.3	5429	1510	6	0.8	1219
1170	32	1.2	5351				

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