



UNITED STATES MARINE CORPS
TRAINING AND EDUCATION COMMAND
2007 ELLIOT ROAD
QUANTICO, VIRGINIA 22134

IN REPLY REFER TO:
3570
C 465

From: Commanding General, Training and Education Command
To: Distribution List

Subj: SAFETY OF USE MEMORANDUM 08-24; XM1186, 6.8MM GENERAL PURPOSE, XM1188,
6.8MM REDUCED RANGE AMMUNITION

Ref: (a) MCO 3570.1C
(b) FCDD-ACM-FA Memorandum For Record: UMR Surface Danger Zone Analysis
for the 6.8mm XM1186, XM1188 (Picatinny Arsenal dated 14 Sept 2022)

Encl: (1) Figure 1. Surface Danger Zone template for 6.8MM GP, XM1186, and
RRA, XM1188 Cartridges
(2) Table 2. UMR SDZ Parameters for 6.8MM GP, XM1186, Cartridge
(3) Table 3. UMR SDZ Parameters for 6.8MM RRA, XM1188, Cartridge

1. Purpose. In accordance with the references, this Safety of Use Memorandum (SOUM) provides Surface Danger Zone (SDZ) and tabular data for units conducting training utilizing the XM1186 General Purpose (GP) and XM1188 Reduced Range Ammunition (RRA) cartridges.

2. Background. Per reference (b), the data in this SOUM is based on testing and analysis conducted by Aeroballistics Division at U.S. Army Combat Capabilities Development Command (DEVCOM). DEVCOM was tasked to generate SDZ data for the 6.8mm XM1186 (GP) and XM1188 (RRA) cartridges. These SDZs were requested to support an Urgent Materiel Release. Following an analysis of the XM1186 and the XM1188 cartridges, the DEVCOM Armaments Center Aeroballistics Division has made an SDZ recommendation provided in Enclosures (1), (2), and (3). This data provides SDZs for use against hard and soft impact media.

a. Background Cartridge Descriptions. Per the references, the following descriptions are to provide clarity on the cartridges for live-fire training.

(1) XM1186. 6.8mm GP cartridge ball. The cartridge contains a projectile with a reverse drawn copper jacket and a slug with a steel penetrator, comparable to the M80A1 and M855A1, Enhanced Performance Round design, and a hybrid / brass steel casing.

(2) XM1188. 6.8mm RRA cartridge. The cartridge has a copper projectile and a hybrid brass / steel casting with a lesser maximum range than the XM1186.

3. SDZ and Safety Considerations. Enclosure (1) illustrates the batwing SDZs associated with these rounds. Enclosures (2) and (3) contain the data used to construct a batwing SDZs for each round. When constructing SDZs for XM1186 GP and XM1188 RRA cartridges, use the appropriate data from enclosures (2) and (3).

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4. Prohibitions. The use of 6.8mm XM1186 (GP) and XM1188 (RRA) cartridges are prohibited for use on Indoor/Outdoor baffle ranges, against Steel Reactive Targets (SRT), against Shock Absorbent Concrete (SACON) structures, Ballistic Rubber or inside Live-Fire Shoot Houses (LFSH) until further testing and analysis has been conducted by DEVCOM.

5. Responsibilities. The Installation Commander is ultimately responsible for the safety of all Base / Station training.

6. Applicability. This SOUM is Marine Corps specific and applicable to the total force.

7. Cancellation. This SOUM will remain in effect until it is canceled or incorporated into reference (a).

8. Point of Contact. The point of contact for this SOUM, is Mr. Carlos Hathcock, Head, Range Safety and Design Section, Range and Training Area Management Branch, Range and Training Programs Division, Training and Education Command, 703-784-2841, carlos.n.hathcock@usmc.mil.

D. A. SALM

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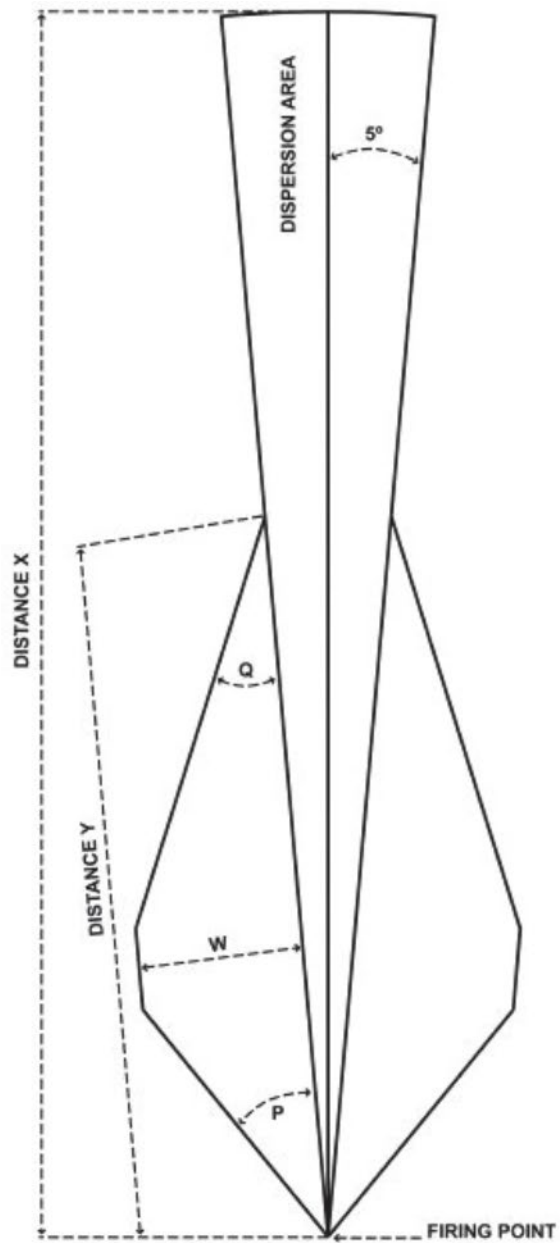


Figure 1. Batwing Surface Danger Zone for Firing Small Arms Direct-Fire Weapons without Explosive Projectiles

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Table 1. UMR SDZ Parameters for 6.8MM GP, XM1186, Cartridge

Altitude (ft)	Impact media	Distance X ¹ (m)	Distance Y (m)	Distance W ² (m)	Angle P ³ (deg)	Angle Q (deg)	Vertical Ricochet Hazard (m)
0	Earth	3894	3355	505	33.00	42.00	406
	Armor	3894	3440	325	15.50	45.00	370
1000	Earth	4014	3450	520	33.50	44.00	417
	Armor	4014	3524	335	15.70	47.00	381
2000	Earth	4138	3545	535	34.00	46.00	429
	Armor	4138	3608	345	15.90	49.00	392
3000	Earth	4267	3640	550	34.50	48.00	441
	Armor	4267	3692	355	16.10	51.00	403
4000	Earth	4400	3735	565	35.00	50.00	453
	Armor	4400	3776	365	16.30	53.00	415
5000	Earth	4537	3830	580	35.50	52.00	466
	Armor	4537	3860	375	16.50	55.00	427
6000	Earth	4682	3925	595	36.00	54.00	480
	Armor	4682	3944	385	16.70	57.00	441
7000	Earth	4832	4020	610	36.50	56.00	494
	Armor	4832	4028	395	16.90	59.00	454

Notes:

- 1- Distance X must increase by 26 meters per m/s or 13 meters per knot of tail wind, measured along the line of fire.
- 2- Angle P is measured from the dispersion angle. To correct for cross-range winds, the dispersion angle must be increased by 0.5 degree per m/s or 0.25 degree per knot of cross range wind, measured from the line of fire.
- 3- Vertical hazard represents the maximum vertical ricochet distance and is referenced to AGL (Above Ground Level).

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Table 2. UMR SDZ Parameters for 6.8MM RRA, XM1188, Cartridge

Altitude (ft)	Impact media	Distance X ¹ (m)	Distance Y (m)	Distance W ² (m)	Angle P ³ (deg)	Angle Q (deg)	Vertical Ricochet Hazard (m)
0	Earth	2586	2080	335	31.00	60.00	259
	Armor	2586	2060	225	14.50	40.00	238
1000	Earth	2667	2150	346	31.20	60.00	266
	Armor	2667	2130	233	14.70	40.00	245
2000	Earth	2752	2220	357	31.40	60.00	274
	Armor	2752	2200	241	14.90	40.00	253
3000	Earth	2839	2290	368	31.60	60.00	282
	Armor	2839	2270	249	15.10	40.00	261
4000	Earth	2930	2360	379	31.80	60.00	291
	Armor	2930	2340	257	15.30	40.00	269
5000	Earth	3025	2430	390	32.00	60.00	299
	Armor	3025	2410	265	15.50	40.00	278
6000	Earth	3123	2500	401	32.20	60.00	308
	Armor	3123	2480	273	15.70	40.00	287
7000	Earth	3225	2570	412	32.40	60.00	318
	Armor	3225	2550	281	15.90	40.00	296

Notes:

- 1- Distance X must increase by 26 meters per m/s or 13 meters per knot of tail wind, measured along the line of fire.
- 2- Angle P is measured from the dispersion angle. To correct for cross-range winds, the dispersion angle must be increased by 0.5 degree per m/s or 0.25 degree per knot of cross range wind, measured from the line of fire.
- 3- Vertical hazard represents the maximum vertical ricochet distance and is referenced to AGL (Above Ground Level).