Table 4–15
Surface danger zone data for M973 Ball and M974 Tracer 7.62mm short range training ammunition[1,2]

Altitude (ft)	Impact media	Distance X (m)	Distance Y (m)	Distance W (m)	Area A[3] (m)	Area B (m)	Angle P[4] (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
0	Earth Steel	540 540	500 500	105 30	100 100	NR NR	38 10	45 20	178 178
1,000	Earth Steel	565 565	520 520	110 32	100 100	NR NR	38 10	45 20	184 184
2,000	Earth Steel	590 590	540 540	115 34	100 100	NR NR	38 10	45 20	190 190
3,000	Earth Steel	615 615	560 560	120 36	100 100	NR NR	38 10	45 20	196 196
4,000	Earth Steel	640 640	580 580	125 38	100 100	NR NR	38 10	45 20	202 202
5,000	Earth Steel	665 665	600 600	130 40	100 100	NR NR	38 10	45 20	208 208
6,000	Earth Steel	690 690	620 620	135 42	100 100	NR NR	38 10	45 20	214 214
7,000	Earth Steel	715 715	640 640	140 44	100 100	NR NR	38 10	45 20	220 220

Legend for Table 4-15:
NR=not required

Notes:
[1] For SDZ construction use figure 4–3, with the following change: Dispersion, use a dispersion angle of 12 degrees.
[2] Single hearing protection should be worn by all personnel within 24m when M973 Ball and/or M974 Tracer ammunition is being fired.
[3] Area A applies to cone SDZ only.
[4] To correct for cross wind, dispersion angle is increased by 0.8 degree per m/s or 0.4 degree per knot of cross wind, measured perpendicular to the line of fire

t. Table 4–16 contains SDZ data for MK 248 MOD 0 .300 caliber Winchester Magnum small arms direct-fire ammunition.

Table 4–16
Surface danger zone data for MK 248 MOD 0 .300 Winchester Magnum small arms direct-fire ammunition[1]

Altitude (ft)	Impact media	Distance X[2] (m)	Distance Y (m)	Distance W (m)	Area A[3] (m)	Area B (m)	Angle P[4] (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
0	Earth Armor	5,919 5,919	4,200 2,300	390 180	100 100	NR NR	40.00 28.00	10.00 12.00	322 128
1,000	Earth Armor	6,078 6,078	4,336 2,358	399 187	100 100	NR NR	40.45 27.75	10.30 12.15	340 138
2,000	Earth Armor	6,242 6,242	4,472 2,416	408 194	100 100	NR NR	40.90 27.50	10.60 12.30	358 150
3,000	Earth Armor	6,411 6,411	4,608 2,474	417 201	100 100	NR NR	41.35 27.25	10.90 12.45	382 160
4,000	Earth Armor	6,584 6,584	4,744 2,532	426 208	100 100	NR NR	41.80 27.00	11.20 12.60	410 165
5,000	Earth Armor	6,763 6,763	4,880 2,590	435 215	100 100	NR NR	42.25 26.75	11.50 12.75	433 180
6,000	Earth Armor	6,947 6,947	5,016 2,648	444 222	100 100	NR NR	42.70 26.50	11.80 12.90	457 194

Table 4–16
Surface danger zone data for MK 248 MOD 0 .300 Winchester Magnum small arms direct-fire ammunition[1]—Continued

Altitude (ft)	Impact media	Distance X[2] (m)	Distance Y (m)	Distance W (m)	Area A[3] (m)	Area B (m)	Angle P[4] (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
7,000	Earth Armor	7,137 7,137	5,152 2,706	453 229	100 100	NR NR	43.15 26.25	12.10 13.05	484 208

Legend for Table 4-16:
NR=not required

Notes:
[1] Single hearing protection should be worn by all personnel within 34 m when MK248 MOD 0 ammunition is being fired.
[2] Distance X must increase by 37 m per m/sec or 19 m per knot of tail wind, measured along the line of fire.
[3] Area A applies to cone SDZ only.
[4] Dispersion angle of 5 degrees must increase by 0.28 degree per or 0.15 degree per knot of cross wind, measured perpendicular to the line of fire.

u. Table 4–17 contains surface danger zone data for MK 248 MOD 1 .300 caliber Winchester Magnum small arms direct-fire ammunition.

Table 4–17
Surface danger zone data for MK 248 MOD 1 .300 Winchester Magnum small arms direct-fire ammunition[1]

Altitude (ft)	Impact media	Distance X[2] (m)	Distance Y (m)	Distance W (m)	Area A[3] (m)	Area B (m)	Angle P[4] (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
0	Earth Armor	6,294 6,294	4,600 3,800	390 220	100 100	NR NR	39.00 24.00	14.00 10.00	350 146
1,000	Earth Armor	6,462 6,462	4,675 3,858	402 227	100 100	NR NR	39.15 23.75	14.60 10.15	372 155
2,000	Earth Armor	6,635 6,635	4,750 3,916	414 234	100 100	NR NR	39.30 23.50	15.20 10.30	397 165
3,000	Earth Armor	6,814 6,814	4,825 3,974	426 241	100 100	NR NR	39.45 23.25	15.80 10.45	424 175
4,000	Earth Armor	6,998 6,998	4,900 4,032	438 248	100 100	NR NR	39.60 23.00	16.40 10.60	440 187
5,000	Earth Armor	7,188 7,188	4,975 4,090	450 255	100 100	NR NR	39.75 22.75	17.00 10.75	468 198
6,000	Earth Armor	7,384 7,384	5,050 4,148	462 262	100 100	NR NR	39.90 22.50	17.60 10.90	500 211
7,000	Earth Armor	7,587 7,587	5,125 5,206	474 269	100 100	NR NR	40.05 22.25	18.20 11.05	533 223

Legend for Table 4-17:
NR=not required

Notes:
[1] Single hearing protection should be worn by all personnel within 34 m when MK248 MOD 1 ammunition is being fired.
[2] Distance X must increase by 40 meters m/sec or 21 m per knot of tail wind, measured along the line of fire.
[3] Area A applies to cone SDZ only.
[4] Dispersion angle must increase by 0.28 degree per m/s or 0.15 degree per knot of cross range wind, measured perpendicular to the line of fire.

v. Table 4–18 contains SDZ data for .50 caliber small arms direct-fire ammunition.

Table 4–18
Surface danger zone data for .50 caliber small arms direct-fire

Ammunition .50 caliber	Impact media	Distance X (m)	Distance Y (m)	Distance W (m)	Area A[1] (m)	Area B (m)	Angle P (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
M8 API, M2 AP, M20, M1	Earth/ Water	6,100	5,142	1,659	100	NR	40.80	69.60	904
	Steel/ Concrete	6,100	4,300	718	100	NR	16.30	33.10	462
M33 Ball, M2 Ball, M17, M10, M17, Spotter Tracer	Earth/ Water	6,500	5,211	1,652	100	NR	38.19	63.35	901
	Steel/ Concrete	6,500	4,147	714	100	NR	16.03	44.13	478
M858 Ball Plastic, M860 Tracer Plastic	Earth/ Water	700	398	20	100	NR	4.28	9.16	41
	Steel/ Concrete	700	415	53	100	NR	11.65	21.14	41

Legend for Table 4-18:
AP=armor piercing
API=armor-piercing incendiary
NR=not required

Notes:
[1] Area A applies to cone SDZ only.

w. Table 4–19 contains SDZ data for M903 .50 caliber SLAP small arms direct-fire ammunition.

Table 4–19
Surface danger zone data for M903 .50 caliber saboted light armor penetrator

Altitude (ft)	Impact media	Distance X (m)	Distance W (m)	Distance D (m)	Area A (m)	Area B (m	Angle P (deg)	Ricochet vertical hazard (m)
0	Sand/Steel	8,625	1,130	1,074	NR	NR	47.34	1,130
1,000	Sand/Steel	8,885	1,155	1,101	NR	NR	47.34	1,155
2,000	Sand/Steel	9,145	1,180	1,128	NR	NR	47.38	1,180
3,000	Sand/Steel	9,405	1,205	1,155	NR	NR	47.39	1,205
4,000	Sand/Steel	9,665	1,230	1,182	NR	NR	47.40	1,230
5,000	Sand/Steel	9,925	1,255	1,209	NR	NR	47.42	1,255
6,000	Sand/Steel	10,185	1,280	1,236	NR	NR	47.43	1,280
7,000	Sand/Steel	10,445	1,305	1,263	NR	NR	47.44	1,305

x. Table 4–20 contains SDZ data for M962 .50 caliber SLAP–T small arms direct-fire ammunition.

Table 4–20
Surface danger zone data for M962 .50 caliber saboted light armor penetrator-T

Altitude (ft)	Impact media	Distance X (m)	Distance W (m)	Distance D (m)	Area A (m)	Area B (m)	Angle P (deg)	Ricochet vertical hazard (m)
0	Sand/Steel	9,560	1,240	1,001	NR	NR	48.00	1,240
1,000	Sand/Steel	9,870	1,270	1,025	NR	NR	48.00	1,270
2,000	Sand/Steel	10,180	1,300	1,049	NR	NR	48.01	1,300
3,000	Sand/Steel	10,490	1,330	1,073	NR	NR	48.02	1,330
4,000	Sand/Steel	10,800	1,360	1,098	NR	NR	48.03	1,360
5,000	Sand/Steel	11,110	1,390	1,122	NR	NR	48.04	1,390
6,000	Sand/Steel	11,420	1,420	1,146	NR	NR	48.04	1,420
7,000	Sand/Steel	11,730	1,450	1,170	NR	NR	48.04	1,450

y. Table 4–21 contains SDZ data for .50 caliber MK211, MK211–0/API–T small arms direct-fire ammunition.

Table 4–21
Surface danger zone data for .50 caliber MK211, MK211–0/API–T

Altitude (ft)	Impact media	Distance X (m)	Distance W (m)	Distance D (m)	Area A (m)	Area B (m)	Angle P (deg)	Ricochet vertical hazard (m)
0	Sand/Steel	7,955	1,075	530	NR	NR	49.48	1,075
1,000	Sand/Steel	8,104	1,100	528	NR	NR	50.26	1,100
2,000	Sand/Steel	8,325	1,125	526	NR	NR	51.02	1,125
3,000	Sand/Steel	8,515	1,150	524	NR	NR	51.76	1,150
4,000	Sand/Steel	8,700	1,175	522	NR	NR	52.49	1,175
5,000	Sand/Steel	8,885	1,200	520	NR	NR	53.20	1,200
6,000	Sand/Steel	9,075	1,225	518	NR	NR	53.89	1,225
7,000	Sand/Steel	9,260	1,250	516	NR	NR	54.56	1,250

z. Table 4–22 contains SDZ data for 20 mm small arms direct-fire weapons.

Table 4–22
Surface danger zone data for 20 mm small arms direct-fire weapons

Ammunition 20 mm	Impact media	Distance X (m)	Distance Y (m)	Distance W (m)	Area A (m)	Area B (m)	Angle P (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
M55A2 TP	Earth	4,500	3,780	733	100[1]	NR	25.74	33.20	357
	Water	4,500	3,500	737	100[1]	NR	26.16	36.66	350
	Steel	4,500	4,053	1,025	100[1]	NR	38.14	36.82	585
	Concrete	4,500	3,750	969	100[1]	NR	34.12	37.78	509
M220 TP–T	Earth	3,940	3,340	581	100[1]	NR	25.83	22.83	317
	Water	3,940	3,040	558	100[1]	NR	26.08	30.96	311
	Steel	3,940	3,290	804	100[1]	NR	36.66	47.76	513
	Concrete	3,940	3,260	765	100[1]	NR	34.33	34.09	447
M56A3 HEI	Earth	4,250	3,940	771	156	156	26.89	34.54	403
	Water	4,250	3,980	864	156	156	27.21	40.82	396
	Steel	4,250	4,160	1,219	156	156	38.36	58.05	664

Table 4–22
Surface danger zone data for 20 mm small arms direct-fire weapons—Continued

Ammunition 20 mm	Impact media	Distance X (m)	Distance Y (m)	Distance W (m)	Area A (m)	Area B (m)	Angle P (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
	Concrete	4,250	4,240	1,189	156	156	34.65	43.79	577
M246 HEITSD	Earth	4,230	3,537	685	156	156	26.73	39.83	360
	Water	4,230	3,316	716	156	156	25.81	35.87	354
	Steel	4,230	3,937	991	156	156	38.63	38.58	590
	Concrete	4,230	3,758	952	156	156	34.99	50.31	531

Legend for Table 4-22:
HEI=higher explosive incendiary
HEITSD=high explosive incendiary tracer self-destruct
NR=not required
TP=training practice
TP–T=training practice-tracer

Notes:
[1] Area A applies to cone SDZ only.

aa. Table 4–23 contains SDZ data for 30 mm small arms direct-fire weapons.

Table 4–23
Surface danger zone data for 30 mm small arms direct-fire weapons

Ammunition 30 mm	Impact media	Distance X (m)	Distance Y (m)	Distance W (m)	Area A (m)	Area B (m)	Angle P (deg)	Angle Q (deg)	Ricochet vertical hazard (m)
M788 TP	Earth	4,020	3,116	636	100[1]	NR	24.93	40.37	311
	Water	4,020	3,252	730	100[1]	NR	25.19	28.65	298
	Steel	4,020	3,631	1,023	100[1]	NR	36.78	33.18	524
	Concrete	4,020	3,600	874	100[1]	NR	30.66	35.59	451
M789 HEDP	Earth	4,122	3,305	654	275	275	25.37	39.65	318
	Water	4,122	3,263	746	275	275	24.71	34.53	302
	Steel	4,122	3,947	1,058	275	275	36.26	39.59	534
	Concrete	4,122	3,684	886	275	275	31.56	42.14	460

Legend for Table 4-23:
HEDP=high-explosive dual-purpose
NR=not required

Notes:
[1] Area A applies to cone SDZ only.

4–3. Small caliber dummy, drill, and inert ammunition

The dummy, drill, and inert (DDI) cartridges are designed to aid in easy identification of inert ammunition to prevent injury caused by any mix-up with live service ammunition during training. The DDI are completely nickel plated with the 9mm DDI having two holes drilled in the cartridge case, while the 5.56, 7.62, and .50 caliber DDI have fluted cartridge cases to aid tactile identification in darkness. For the Army, the nickel plated DDI will be the only DDI inert small caliber cartridges authorized for classroom training and weapon cycling functioning for weapon maintenance, or other situations when inert cartridges are needed.

Chapter 5
Grenades and Grenade Launchers

5–1. Hand grenades

a. High explosive loaded type grenades. These contain explosive charges that detonate after a short delay (3 to 5