

Ballistic Block Penetration Ballistic Testing - Test Report

Report Date: May 14, 2010

By Sam Raheb

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Objective

The purpose of the Ballistic Block Penetration Ballistic Testing trials was to determine the maximum penetration depth and thus the material's resistance to various firearm projectiles shot into the Rubber Ballistic blocks.

A complete spectrum of the most common small arms calibers and ammunition used by the Military, Law Enforcement, and Civilians was used in the testing trials. The testing was divided into the following four firearm categories.

Handgun Weapon System

- SW 686 .357 Magnum Revolver
- Ruger Super Redhawk .44 Magnum Revolver
- Beretta 92 FS 9mm
- HK 45 Pistol .45 ACP

Sub Machine Gun Weapon System

- Colt M4 5.56 NATO Carbine
- HK MP5 9mm SMG

Rifle Weapon System

- AK47 7.62 x 39 mm Rifle
- Colt AR-15 5.56 NATO Rifle
- FN-FAL 7.62 NATO Rifle
- M1 Garand .30-06 Rifle
- Ruger 10/22 .22 caliber Rifle

Shotgun Weapon System

- Benelli M3 Super 90 12 Gauge Shotgun

Test Material - Ballistic Blocks

The following test material was submitted for testing:

Supplier Information

Rephouse America LLC

Sample Size: 600 x 300 x 225 mm [24 x 12 x 9 inch]

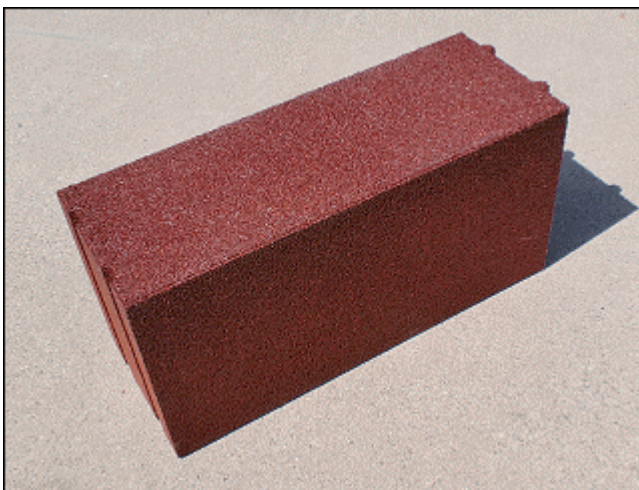
Sample Density: 800 kg/m³ [49.9 lbs/cu ft]

Rubber Block Test Specimen Measured Data

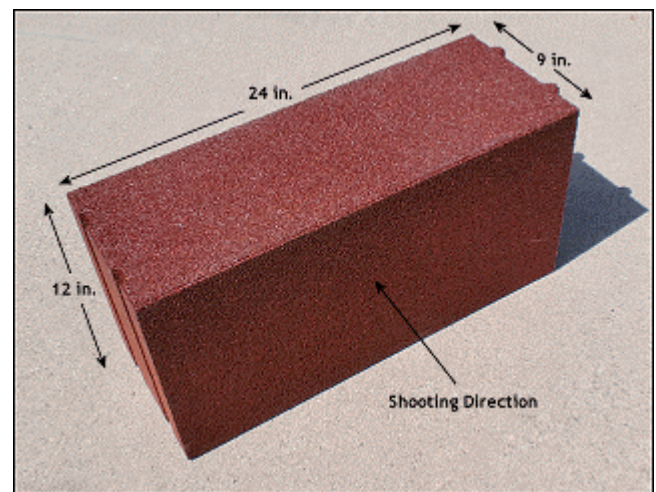
Sample Size: 608 x 302 x 226 mm [23.9 x 11.9 x 8.9 in.]

Sample Weight: 72.6 lbs

Below are two photos of the Rubber Ballistic Blocks used in the ballistic testing trials. A total of 40 Blocks were used in the testing trials. Additional larger sized photographs are included with this report.



Ballistic Block - Impact Side



Ballistic Block Dimensions and Shooting Direction

Test Material - Ballistic Tiles

Note: The Ballistic Tiles were only utilized in a few of the Shotgun tests. They were required in order to determine the penetration of the lighter weight projectiles used within the #7.5 shot the #4 buckshot rounds.

The following test material was submitted for testing:

Supplier Information

Rephouse America LLC

Sample Size: 608 x 608 x 43 mm [24 x 24 x 1.7 inch]

Sample Density: 800 kg/m³ [49.9 lbs/cu ft]

Rubber Tile Test Specimen Measured Data

Sample Size: 607 x 607 x 43 mm [23.9 x 23.9 x 1.7 in.]

Sample Weight: 28.8 lbs

Below are photos of the Rubber Ballistic Tiles used in the ballistic testing trials. A total of 6 Tiles were used in the testing trials. Additional larger sized photographs are included with this report.



Ballistic Tile - Impact Side



Ballistic Tile - Rear Side



Ballistic Tile

Test Plan Summary

The Test plan is outlined in the table below. The attached Table of Test Results at the end of this report states both the details of the testing performed and additional comments for each of the tests. There were a total of 70 individual tests performed.

Penetration Test Plan Summary								
Weapon System	Caliber	Weapon	Ammo Type	Projectile weight (grains)	Projectile Type	Distance (ft)	Angle (°)	Number of Shots
Handgun	.38 Special	6 inch Revolver	Target	158	RNL	6 ft / 25 ft	0 °	3
	.38 Special	6 inch Revolver	Defense	158	FMJ	6 ft / 25 ft	0 °	3
	.45 ACP	HK 45 Pistol	Std. Ball	230	FMJ	6 ft / 25 ft	0 °	3
	.45 ACP	HK 45 Pistol	Defense	230	JHP	6 ft / 25 ft	0 °	3
	9 mm	Beretta 92 F5	Std. Ball	115	FMJ	6 ft / 25 ft	0 °	3
	9 mm	Beretta 92 F5	Std. Ball	124	FMJ	6 ft / 25 ft	0 °	3
	9 mm	Beretta 92 F5	Defense	124	JHP	6 ft / 25 ft	0 °	3
	.357 Magnum	6 inch Revolver	Defense	125	JHP	6 ft / 25 ft	0 °	3
	.357 Magnum	6 inch Revolver	Hunting	158	JSP	6 ft / 25 ft	0 °	3
	.357 Magnum	6 inch Revolver	Defense	158	JHP	6 ft / 25 ft	0 °	3
	.357 Magnum	6 inch Revolver	Hunting	158	FMJ	6 ft / 25 ft	0 °	3
	.357 Magnum	6 inch Revolver	Target	158	SWC	6 ft / 25 ft	0 °	3
	.44 Magnum	9.5 inch Revolver	Target	240	SWC	6 ft / 25 ft	0 °	3
	.44 Magnum	9.5 inch Revolver	Hunting	240	FMJ	6 ft / 25 ft	0 °	3
	.44 Magnum	9.5 inch Revolver	Defense	240	JHP	6 ft / 25 ft	0 °	3
	.44 Magnum	9.5 inch Revolver	Hunting	240	JSP	6 ft / 25 ft	0 °	3
Sub Machine Gun	9 mm	HK MP5	Std. Ball	115	FMJ	6 ft / 25 ft	0 °	3
	9 mm	HK MP5	Std. Ball	124	FMJ	6 ft / 25 ft	0 °	3
	9 mm	HK MP5	Defense	124	JHP	6 ft / 25 ft	0 °	3
	.223 caliber	Colt M4	M193	55	FMJ	6 ft / 25 ft	0 °	3
	5.56 NATO	Colt M4	M855	62	FMJ	6 ft / 25 ft	0 °	3
Rifle	.22 Caliber	Ruger 10/22	General	40	RNL	6 ft / 25 ft	0 °	3
	.223 caliber	Colt AR-15	M193	55	FMJ	6 ft / 25 ft	0 °	3
	5.56 NATO	Colt AR-15	M855	62	FMJ	6 ft / 25 ft	0 °	3
	7.62 x 39 mm	AK47	M43	123	FMJ	6 ft / 25 ft	0 °	3
	7.62 NATO	FN FAL	M80	150	FMJ	6 ft / 25 ft	0 °	3
	.308 caliber	FN FAL	Sniper	168	JHP	6 ft / 25 ft	0 °	3
	.30-06	M1 Garand	M2	150	FMJ	6 ft / 25 ft	0 °	3
	.30-06	M1 Garand	Hunting	180	JSP	6 ft / 25 ft	0 °	3
Shotgun	12 Gauge	Benelli M3 Super 90	Shot	493	2 3/4 in. #7.5	6 ft / 25 ft	0 °	3
	12 Gauge	Benelli M3 Super 90	Slug	437	2 3/4 in.	6 ft / 25 ft	0 °	3
	12 Gauge	Benelli M3 Super 90	Slug	437	3.0 in. Magnum	6 ft / 25 ft	0 °	3
	12 Gauge	Benelli M3 Super 90	Buck	556	2 3/4 in. #4	6 ft / 25 ft	0 °	3
	12 Gauge	Benelli M3 Super 90	Buck	650	2 3/4 in. Magnum #00	6 ft / 25 ft	0 °	3
	12 Gauge	Benelli M3 Super 90	Buck	808	3.0 in. Magnum #00	6 ft / 25 ft	0 °	3

Projectile Type Legend

FMJ (Full Metal Jacket)
 JHP (Jacketed Hollow Point)
 JSP (Jacketed Soft Point)
 RNL (Round Nose Lead)

Projectile weight is in grains (15.44 grains / gram)

SWC (Semi Wad Cutter)
 #7.5 Shot (0.095 in. diameter & 1.25 gr./pellet)
 #4 Buck (0.24 in. diameter & 20.6 gr./pellet)
 #00 Buck (0.33 in. diameter & 53.8 gr./pellet)

Weapon Systems

The following weapons were used to perform the tests.

Handgun Weapon System



HK 45 Pistol .45 ACP



Beretta 92 FS 9mm



SW 686 .357 Magnum Revolver



Ruger Super Redhawk .44 Magnum Revolver

Shotgun Weapon System



Benelli M3 Super 90 12 Gauge Shotgun

Sub Machine Gun Weapon System



Colt M4 5.56 NATO Carbine

Rifle Weapon System



AK47 7.62 x 39 mm Rifle



Colt AR-15 5.56 NATO Rifle



FN-FAL 7.62 NATO Rifle



M1 Garand .30-06 Rifle



Ruger 10/22 .22 caliber Rifle



HK MP5 9mm SMG

Ammunition Calibers and Types

A complete spectrum of the most common small arms calibers and ammunition used by the Military, Law Enforcement, and Civilians was used in the testing trials. Below is a list of the Ammunition calibers and type of projectiles.

Handgun Ammunition

- .38 Special 158 gr. FMJ
- .38 Special 158 gr. RNL
- .45 ACP 230 gr. FMJ
- .45 ACP 230 gr. JHP
- 9 mm Parabellum 115 gr. FMJ
- 9 mm Parabellum 124 gr. FMJ
- 9 mm Parabellum 124 gr. JHP
- .357 Magnum 125 gr. JHP
- .357 Magnum 158 gr. FMJ
- .357 Magnum 158 gr. JHP
- .357 Magnum 158 gr. JSP
- .357 Magnum 158 gr. SWC
- .44 Magnum 240 gr. FMJ
- .44 Magnum 240 gr. JHP
- .44 Magnum 240 gr. JSP
- .44 Magnum 240 gr. SWC

Rifle Ammunition

- .22 Caliber RNL 40 gr. RNL
- 5.56 NATO / M193 55 gr. FMJ
- 5.56 NATO M855 / SS109 62 gr. FMJ
- 7.62 x 39 mm M43 124 gr. FMJ
- 7.62 NATO / M80 150 gr. FMJ
- .308 Winchester 168 gr. JHP
- .30 caliber 30-06 Hunting 180 gr. JSP
- .30 caliber 30-06 M2 150 gr. FMJ

Shotgun Ammunition

- 2 3/4 in. #7.5 Shot 493 gr. Shot
- 2 3/4 in. 12 Gauge Slug 437 gr. Slug
- 2 3/4 inch #4 Buck 556 gr. Buck
- 2 3/4 inch Magnum #00 Buck 650 gr. Buck
- 3.0 in. Magnum #00 Buck 808 gr. Buck
- 3.0 in. Magnum 12 Gauge Slug 437 gr. Slug

Projectile Type Legend

FMJ (Full Metal Jacket)
JHP (Jacketed Hollow Point)
JSP (Jacketed Soft Point)
RNL (Round Nose Lead)

Projectile weight is in grains (15.44 grains / gram)

SWC (Semi Wad Cutter)
#7.5 Shot (0.095 in. diameter & 1.25 gr./pellet)
#4 Buck (0.24 in. diameter & 20.6 gr./pellet)
#00 Buck (0.33 in. diameter & 53.8 gr./pellet)

Test Set Up - Block Mounting for the Handgun, Sub Machine Gun, Rifle, and Shotgun tests

Multiple rubber Blocks were stacked and clamped together as shown in the following images. Sheets of standard 20# white printer type paper were placed between each of the stacked blocks to determine if projectiles fully penetrated a single block.



Ballistic Block Test Set Up



Ballistic Block Test Set Up

Test Set Up - Tile / Block Mounting for the Shotgun #7.5 shot the #4 buckshot tests

Note: This Test set up was only utilized in a few of the Shotgun tests. It was required in order to determine the penetration of the lighter weight projectiles used within the #7.5 shot the #4 buckshot rounds.

Since determining the penetration depth of both the #7.5 shot the #4 buckshot projectiles would be difficult using just the rubber blocks, we set up the following Tile / Block test system.

Three (3) 24 x 24 x 1.7 inch thick rubber tiles were stacked and clamped together in front of a 2-block stack of rubber blocks. Sheets of standard 20# white printer type paper were placed between each tile to determine if projectiles fully penetrated a single tile.



Ballistic Tile and Block Set Up - Shotgun Tests



Ballistic Tile and Block Set Up - Shotgun Tests

Determination of the Penetration Depth

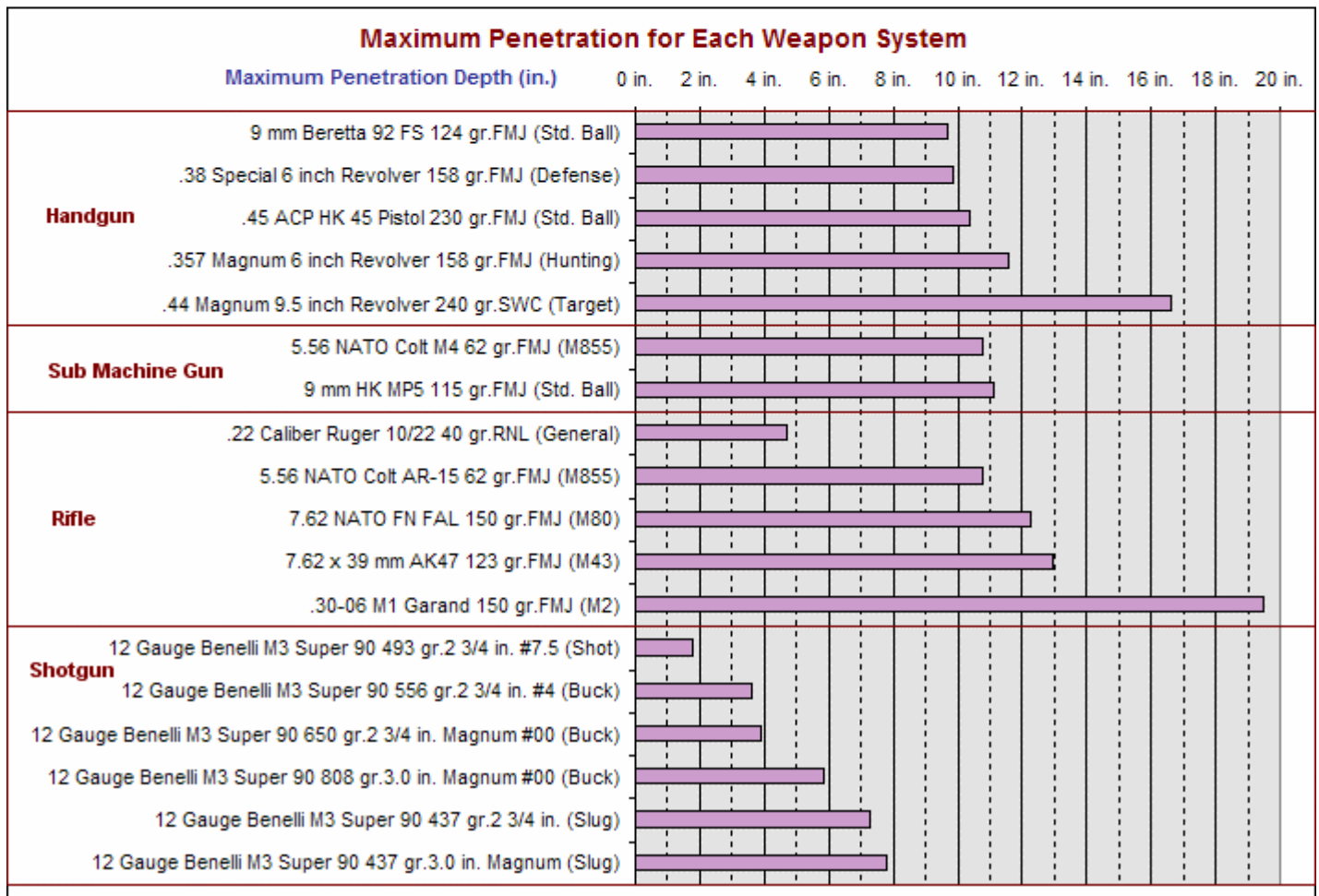
A straight 14-inch long 1/16-inch diameter steel rod was used to determine the depth of penetration of the projectiles. The steel rod was inserted into each bullet hole to acquire the depth of the hole. The maximum penetration depth for each 3-round shot sequence was recorded. If the projectiles completely penetrated a block by observation of bullet holes in the 20# white paper, then the depth of holes in the second block was measured. The total penetration depth was determined using the following formula:

Total Penetration Depth = (Number of blocks completely penetrated * block thickness) + Depth of hole in last block + projectile length. For Example: Total Penetration Depth = (1 blocks * 9 inches) + 7 inches + 0.6 inches = 16.6 inches

Summation of Test Results

The Table and Chart below displays the maximum penetration depths obtain throughout the testing trials for each weapon system. These values can be used to determine the number of blocks required to defeat the rounds.

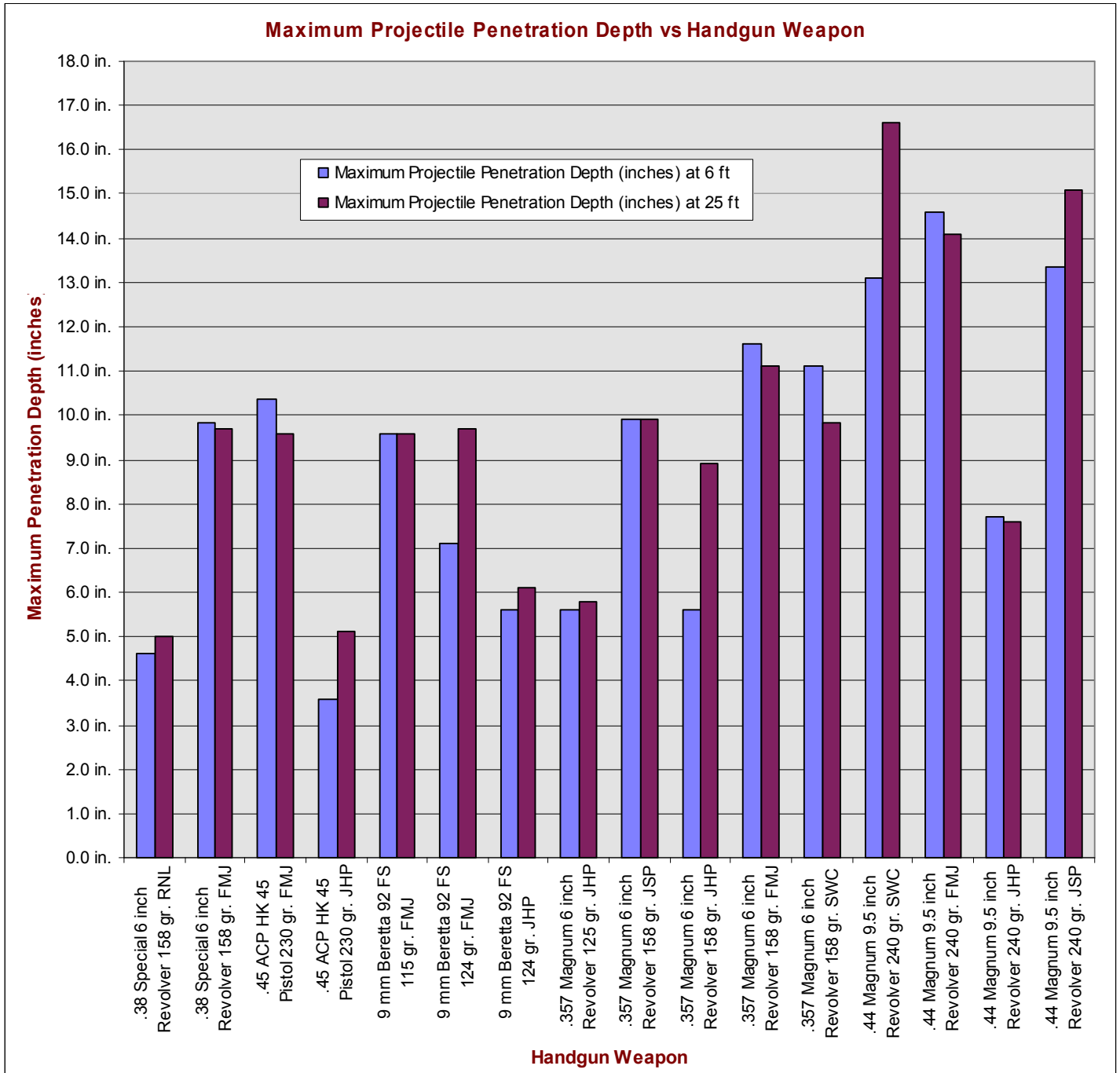
Summary of Results - Maximum Penetration for Each Weapon System				
Type	Weapon System	Distance (ft)	Angle (°)	Maximum Penetration
Handgun	9 mm Beretta 92 FS 124 gr.FMJ (Std. Ball)	25 ft	0 °	9.7 in.
	.38 Special 6 inch Revolver 158 gr.FMJ (Defense)	6 ft	0 °	9.9 in.
	.45 ACP HK 45 Pistol 230 gr.FMJ (Std. Ball)	6 ft	0 °	10.4 in.
	.357 Magnum 6 inch Revolver 158 gr.FMJ (Hunting)	6 ft	0 °	11.6 in.
	.44 Magnum 9.5 inch Revolver 240 gr.SWC (Target)	25 ft	0 °	16.6 in.
Sub Machine Gun	5.56 NATO Colt M4 62 gr.FMJ (M855)	25 ft	0 °	10.8 in.
	9 mm HK MP5 115 gr.FMJ (Std. Ball)	6 ft	0 °	11.1 in.
Rifle	.22 Caliber Ruger 10/22 40 gr.RNL (General)	6 ft	0 °	4.7 in.
	5.56 NATO Colt AR-15 62 gr.FMJ (M855)	6 ft	0 °	10.8 in.
	7.62 NATO FN FAL 150 gr.FMJ (M80)	25 ft	0 °	12.3 in.
	7.62 x 39 mm AK47 123 gr.FMJ (M43)	25 ft	0 °	13.0 in.
	.30-06 M1 Garand 150 gr.FMJ (M2)	25 ft	0 °	19.5 in.
Shotgun	12 Gauge Benelli M3 Super 90 493 gr.2 3/4 in. #7.5 (Shot)	6 ft	0 °	1.80 in.
	12 Gauge Benelli M3 Super 90 556 gr.2 3/4 in. #4 (Buck)	25 ft	0 °	3.60 in.
	12 Gauge Benelli M3 Super 90 650 gr.2 3/4 in. Magnum #00 (Buck)	25 ft	0 °	3.90 in.
	12 Gauge Benelli M3 Super 90 808 gr.3.0 in. Magnum #00 (Buck)	25 ft	0 °	5.85 in.
	12 Gauge Benelli M3 Super 90 437 gr.2 3/4 in. (Slug)	6 ft	0 °	7.3 in.
	12 Gauge Benelli M3 Super 90 437 gr.3.0 in. Magnum (Slug)	6 ft	0 °	7.8 in.



Maximum Projectile Penetration Depth versus Weapon Systems

The following charts summarize all the results of the testing trials for each Weapon system.

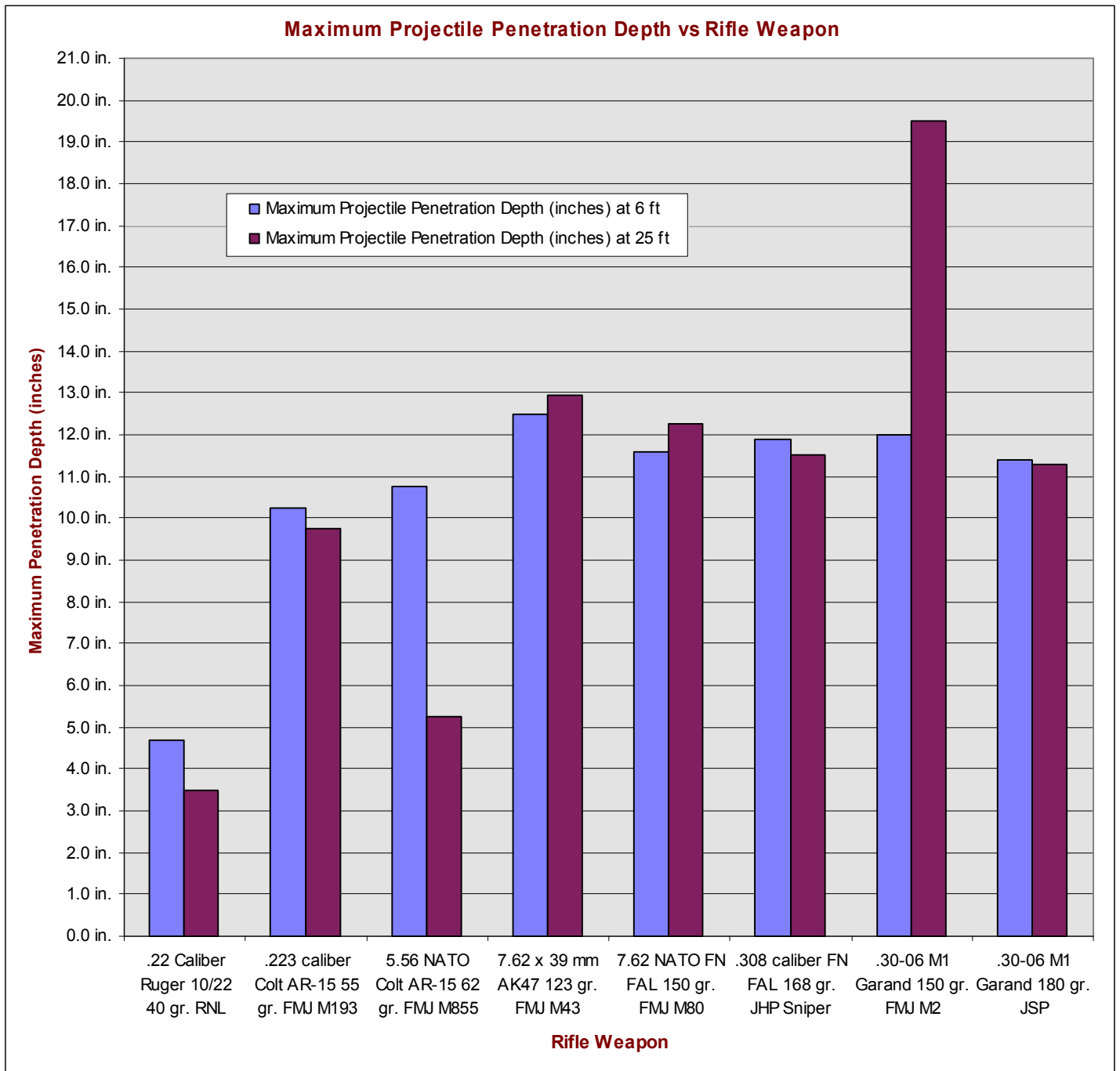
Handgun Weapon System



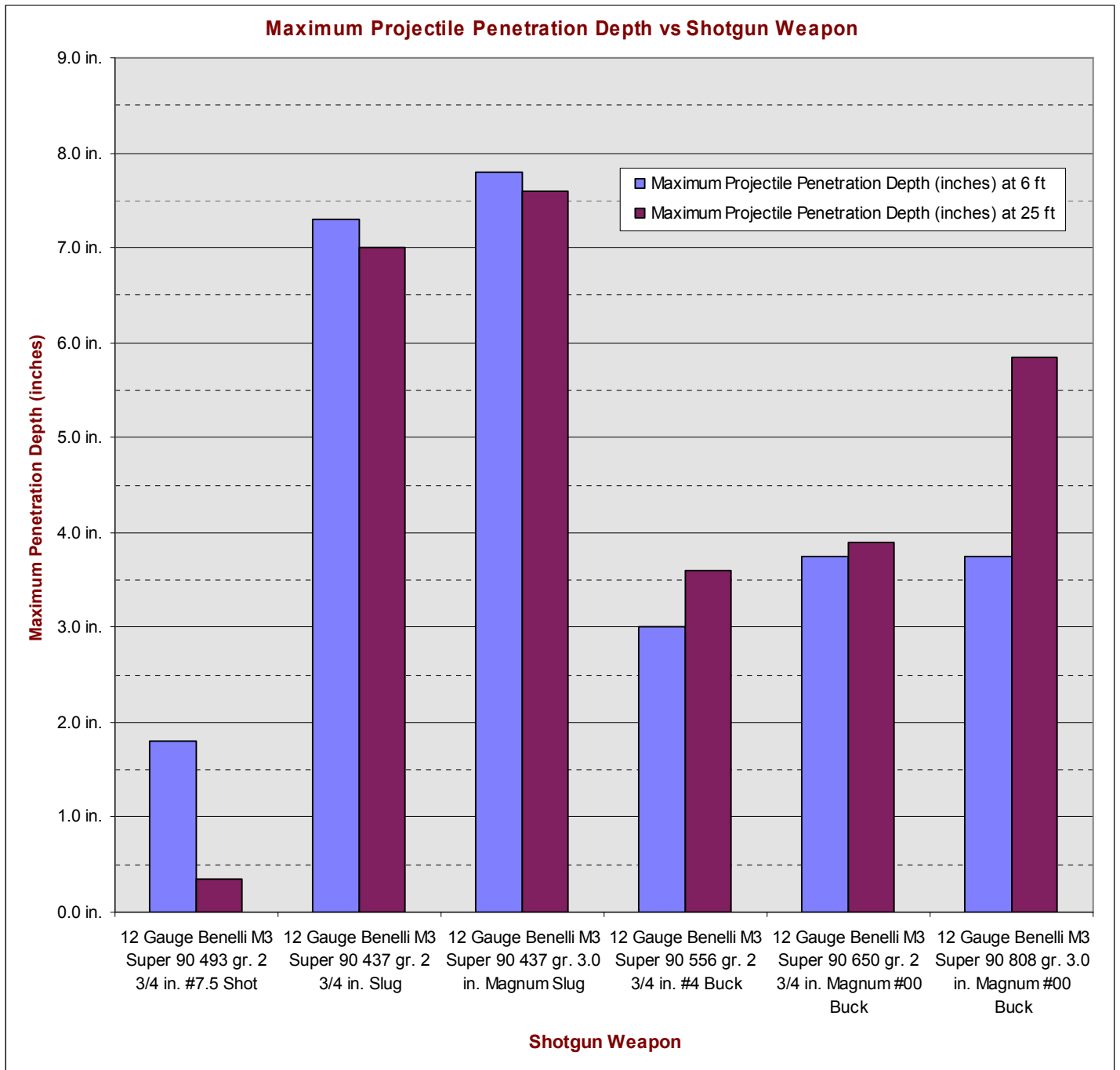
Sub Machine Gun (SMG) Weapon System



Rifle Weapon System



Shotgun Weapon System



Penetration as a function of Temperature

The ambient air temperature was 72° F degrees during the outdoor testing trials. One must be aware that the penetration depths could change as a function of ambient air temperature and rubber block temperature.

For instance, a lower temperature will tend make the rubber material harder and stiffer thus adding resistance to penetration. This would cause the penetration depth to decrease. The opposite can happen too. At higher temperatures, the rubber material will get softer and thus be less resistance to penetration. In this case, the penetration depth would increase.

Test Results - Photos

Below are the photographs showing the post test results of all 70 individual tests. Additional larger sized photographs are included with this report.



Table of Test Results Below

Rephouse America LLC - Penetration Tests			May 10, 2010			Ambient Air Temperature: 72 °F			By Close Focus Research							
Handgun Weapon System			Ammunition Type			Usage			Test and Penetration Data						Test Results	
Test #	Caliber	Weapon	Ammo Type	Projectile weight (grains)	Projectile Type	Civilian	Law Enforcement	Military	Distance (ft)	Angle (°)	Number of Shots	Tile Thickness (inches)	Number of stacked tiles penetrated	Maximum Penetration Depth to rear of the projectile (inches)	Maximum Penetration Depth including projectile length (inches)	Comments Block size: 24 x 12 x 9 inch
1	.38 Special	6 inch Revolver	Target	158	RNL	X			6 ft	0 °	3	9.0 in.	1	4.0 in.	4.6 in.	
2			Defense	158	FMJ	X	X		6 ft	0 °	3	9.0 in.	2	9.3 in.	9.9 in.	
3	.45 ACP	HK 45 Pistol	Std. Ball	230	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	2	9.8 in.	10.4 in.	
4			Defense	230	JHP	X	X		6 ft	0 °	3	9.0 in.	1	3.0 in.	3.6 in.	
5	9 mm	Beretta 92 FS	Std. Ball	115	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	1	9.0 in.	9.6 in.	
6			Std. Ball	124	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	1	6.5 in.	7.1 in.	
7			Defense	124	JHP	X	X		6 ft	0 °	3	9.0 in.	1	5.0 in.	5.6 in.	
8	.357 Magnum	6 inch Revolver	Defense	125	JHP	X			6 ft	0 °	3	9.0 in.	1	5.0 in.	5.6 in.	
9			Hunting	158	JSP	X	X		6 ft	0 °	3	9.0 in.	2	9.3 in.	9.9 in.	
10			Defense	158	JHP	X	X		6 ft	0 °	3	9.0 in.	1	5.0 in.	5.6 in.	
11			Hunting	158	FMJ	X	X		6 ft	0 °	3	9.0 in.	2	11.0 in.	11.6 in.	
12			Target	158	SWC	X			6 ft	0 °	3	9.0 in.	2	10.5 in.	11.1 in.	
13	.44 Magnum	9.5 inch Revolver	Target	240	SWC	X			6 ft	0 °	3	9.0 in.	2	12.5 in.	13.1 in.	
14			Hunting	240	FMJ	X			6 ft	0 °	3	9.0 in.	2	14.0 in.	14.6 in.	
15			Defense	240	JHP	X			6 ft	0 °	3	9.0 in.	1	7.1 in.	7.7 in.	
16			Hunting	240	JSP	X			6 ft	0 °	3	9.0 in.	2	12.8 in.	13.4 in.	
17	.38 Special	6 inch Revolver	Target	158	RNL	X			25 ft	0 °	3	9.0 in.	1	4.4 in.	5.0 in.	
18			Defense	158	FMJ	X	X		25 ft	0 °	3	9.0 in.	2	9.1 in.	9.7 in.	
19	.45 ACP	HK 45 Pistol	Std. Ball	230	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	1	9.0 in.	9.6 in.	
20			Defense	230	JHP	X	X		25 ft	0 °	3	9.0 in.	1	4.5 in.	5.1 in.	
21	9 mm	Beretta 92 FS	Std. Ball	115	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	1	9.0 in.	9.6 in.	
22			Std. Ball	124	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	2	9.1 in.	9.7 in.	
23			Defense	124	JHP	X	X		25 ft	0 °	3	9.0 in.	1	5.5 in.	6.1 in.	
24	.357 Magnum	6 inch Revolver	Defense	125	JHP	X			25 ft	0 °	3	9.0 in.	1	5.2 in.	5.8 in.	
25			Hunting	158	JSP	X	X		25 ft	0 °	3	9.0 in.	2	9.3 in.	9.9 in.	
26			Defense	158	JHP	X	X		25 ft	0 °	3	9.0 in.	1	8.3 in.	8.9 in.	
27			Hunting	158	FMJ	X	X		25 ft	0 °	3	9.0 in.	2	10.5 in.	11.1 in.	
28			Target	158	SWC	X			25 ft	0 °	3	9.0 in.	2	9.3 in.	9.9 in.	
29	.44 Magnum	9.5 inch Revolver	Target	240	SWC	X			25 ft	0 °	3	9.0 in.	2	16.0 in.	16.6 in.	
30			Hunting	240	FMJ	X			25 ft	0 °	3	9.0 in.	2	13.5 in.	14.1 in.	
31			Defense	240	JHP	X			25 ft	0 °	3	9.0 in.	1	7.0 in.	7.6 in.	
32			Hunting	240	JSP	X			25 ft	0 °	3	9.0 in.	2	14.5 in.	15.1 in.	

Rephouse America LLC - Penetration Tests			May 10, 2010			Ambient Air Temperature: 72 °F			By Close Focus Research							
Sub Machine Gun Weapon System			Ammunition Type			Usage			Test and Penetration Data						Test Results	
Test #	Caliber	Weapon	Ammo Type	Projectile weight (grains)	Projectile Type	Civilian	Law Enforcement	Military	Distance (ft)	Angle (°)	Number of Shots	Tile Thickness (inches)	Number of stacked tiles penetrated	Maximum Penetration Depth to rear of the projectile (inches)	Maximum Penetration Depth including projectile length (inches)	Comments Block size: 24 x 12 x 9 inch
33	9 mm	HK MP5	Std. Ball	115	FMJ		X	X	6 ft	0 °	3	9.0 in.	2	10.5 in.	11.1 in.	
34			Std. Ball	124	FMJ		X	X	6 ft	0 °	3	9.0 in.	2	10.0 in.	10.6 in.	
35			Defense	124	JHP		X		6 ft	0 °	3	9.0 in.	1	4.1 in.	4.7 in.	
36	.223 caliber	Colt M4	M193	55	FMJ		X	X	6 ft	0 °	3	9.0 in.	1	9.0 in.	9.8 in.	
37	5.56 NATO	Colt M4	M855	62	FMJ		X	X	6 ft	0 °	3	9.0 in.	1	5.4 in.	6.2 in.	
38	9 mm	HK MP5	Std. Ball	115	FMJ		X	X	25 ft	0 °	3	9.0 in.	2	9.5 in.	10.1 in.	
39			Std. Ball	124	FMJ		X	X	25 ft	0 °	3	9.0 in.	2	9.1 in.	9.7 in.	
40			Defense	124	JHP		X		25 ft	0 °	3	9.0 in.	1	3.4 in.	4.0 in.	
41	.223 caliber	Colt M4	M193	55	FMJ		X	X	25 ft	0 °	3	9.0 in.	1	6.3 in.	7.0 in.	
42	5.56 NATO	Colt M4	M855	62	FMJ		X	X	25 ft	0 °	3	9.0 in.	2	10.0 in.	10.8 in.	

Rehouse America LLC - Penetration Tests									May 10, 2010		Ambient Air Temperature: 72 °F				By Close Focus Research	
Rifle Weapon System			Ammunition Type			Usage			Test and Penetration Data						Test Results	
Test #	Caliber	Weapon	Ammo Type	Projectile weight (grains)	Projectile Type	Civilian	Law Enforcement	Military	Distance (ft)	Angle (°)	Number of Shots	Tile Thickness (inches)	Number of stacked tiles penetrated	Maximum Penetration Depth to rear of the projectile (inches)	Maximum Penetration Depth including projectile length (inches)	Comments Block size: 24 x 12 x 9 inch
43	.22 Caliber	Ruger 10/22	General	40	RNL	X			6 ft	0 °	3	9.0 in.	1	4.3 in.	4.7 in.	
44	.223 caliber	Colt AR15	M193	55	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	2	9.5 in.	10.3 in.	2 of the 3 shots did not penetrate block the 2nd block
45	5.56 NATO	Colt AR15	M855	62	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	2	10.0 in.	10.8 in.	2 of the 3 shots did not penetrate block the 2nd block
46	7.62 x 39 mm	AK47	M43	123	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	2	11.8 in.	12.5 in.	
47	7.62 NATO	FN FAL	M80	150	FMJ	X	X	X	6 ft	0 °	3	9.0 in.	2	10.6 in.	11.6 in.	
48	.308 caliber	FN FAL	Sniper	168	JHP	X	X	X	6 ft	0 °	3	9.0 in.	2	10.9 in.	11.9 in.	
49	.30-06	M1 Garand	M2	150	FMJ	X		X	6 ft	0 °	3	9.0 in.	2	11.0 in.	12.0 in.	
50			Hunting	180	JSP	X			6 ft	0 °	3	9.0 in.	2	10.4 in.	11.4 in.	
51	.22 Caliber	Ruger 10/22	General	40	RNL	X			25 ft	0 °	3	9.0 in.	1	3.1 in.	3.5 in.	
52	.223 caliber	Colt AR15	M193	55	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	1	9.0 in.	9.8 in.	
53	5.56 NATO	Colt AR15	M855	62	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	1	4.5 in.	5.3 in.	
54	7.62 x 39 mm	AK47	M43	123	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	2	12.2 in.	13.0 in.	
55	7.62 NATO	FN FAL	M80	150	FMJ	X	X	X	25 ft	0 °	3	9.0 in.	2	11.3 in.	12.3 in.	
56	.308 caliber	FN FAL	Sniper	168	JHP	X	X	X	25 ft	0 °	3	9.0 in.	2	10.5 in.	11.5 in.	
57a	.30-06	M1 Garand	M2	150	FMJ	X		X	25 ft	0 °	3	9.0 in.	3	18.5 in.	19.5 in.	Projectiles yawed into 2nd block
57b			M2	150	FMJ	X		X	25 ft	0 °	3	9.0 in.	2	15.6 in.	16.6 in.	
58			Hunting	180	JSP	X			25 ft	0 °	3	9.0 in.	2	10.3 in.	11.3 in.	

Rehouse America LLC - Penetration Tests									May 10, 2010		Ambient Air Temperature: 72 °F				By Close Focus Research	
Shotgun Weapon System			Ammunition Type			Usage			Test and Penetration Data						Test Results	
Test #	Caliber	Weapon	Ammo Type	Projectile weight (grains)	Projectile Type	Civilian	Law Enforcement	Military	Distance (ft)	Angle (°)	Number of Shots	Tile Thickness (inches)	Number of stacked tiles penetrated	Maximum Penetration Depth to rear of the projectile (inches)	Maximum Penetration Depth including projectile length (inches)	Comments Block size: 24 x 12 x 9 inch Tile size: 24 x 24 x 1.7 inch
59	12 Gauge	Benelli M3 Super 90	Shot	493	2 3/4 in. #7.5	X	X	X	6 ft	0 °	3	1.70 in.	2	1.70 in.	1.80 in.	Used 1.7 inch stacked tiles
60			Slug	437	2 3/4 in.	X	X	X	6 ft	0 °	3	9.0 in.	1	6.8 in.	7.3 in.	
61			Slug	437	3.0 in. Magnum	X	X	X	6 ft	0 °	3	9.0 in.	1	7.3 in.	7.8 in.	
62	12 Gauge	Benelli M3 Super 90	Buck	556	2 3/4 in. #4	X	X	X	6 ft	0 °	3	9.0 in.	1	2.8 in.	3.0 in.	
63			Buck	650	2 3/4 in. Magnum	X	X	X	6 ft	0 °	3	9.0 in.	1	3.5 in.	3.8 in.	
64			Buck	808	3.0 in. Magnum #00	X	X	X	6 ft	0 °	3	9.0 in.	1	3.5 in.	3.8 in.	
65	12 Gauge	Benelli M3 Super 90	Shot	493	2 3/4 in. #7.5	X	X	X	25 ft	0 °	3	1.70 in.	1	0.25 in.	0.35 in.	Used 1.7 inch stacked tiles
66			Slug	437	2 3/4 in.	X	X	X	25 ft	0 °	3	9.0 in.	1	6.5 in.	7.0 in.	
67			Slug	437	3.0 in. Magnum	X	X	X	25 ft	0 °	3	9.0 in.	1	7.1 in.	7.6 in.	
68	12 Gauge	Benelli M3 Super 90	Buck	556	2 3/4 in. #4	X	X	X	25 ft	0 °	3	1.70 in.	3	3.40 in.	3.60 in.	Used 1.7 inch stacked tiles
69			Buck	650	2 3/4 in. Magnum	X	X	X	25 ft	0 °	3	1.70 in.	3	3.65 in.	3.90 in.	Used 1.7 inch stacked tiles
70			Buck	808	3.0 in. Magnum #00	X	X	X	25 ft	0 °	3	1.70 + 9.0 in.	3 + 1	5.60 in.	5.85 in.	Used 1.7 inch stacked tiles and 9.0 inch block