



4603 Compass Point Road  
Belcamp, MD 21017

# Preliminary Data

# BALLISTIC RESISTANCE TEST

**NTS-Chesapeake Testing**

 4603B Compass Point Road  
 Belcamp, MD 21017

 Client: Pangolin SAS  
 Project No.: PR154064  
 Test Date: 02/ 11/ 2022  
 Page 1 of 1

**Test Panel** Description: Hard armor. Reference FIRA-SAPI-SA. ID: 2712022-FIRA-SAPI-SA-2.

Manufacturer: Pangolin Defense

Sample No.: (M80 CJLC, V0) Plate 1

 Size: 10.00 X 12.00 in  
 Avg. Thickness: N/A  
 Thicknesses: N/A

 Weight: 5.560 lbs  
 Plies/ Laminates: N/A

 Date Received: 02/ 10/ 2022  
 Received Via: LA Poste  
 Returned Via: NA

**Setup**

 Shot Spacing: NIJ-STD-0101.04  
 Level III  
 Witness Panel: Clay  
 Backing Material: 5.5-in clay/ plywood  
 Condition: Wet per NIJ-STD-  
 0101.04

 Primary Vel. Screens (ft): 39.500, 39.833,  
 44.166, 44.500  
 Primary Vel. Location (ft): 42.000  
 Range to Target (ft): 50.000  
 Target to Witness (in): 0.000

 Range No.: Range 2  
 Temp: 67.5 °F  
 BP: 30 inHg  
 RH: 34.8 %  
 Barrel/ Gun: WC067190  
 Gunner: Luke Brannock  
 Recorder: William Ellis

**Ammunition**

Projectile	Lot No.	Manufacturer	Powder
(1) 7.62 x 51-mm, 150-grain M80 CJLC	NA	Military	N133

**Applicable Standards or Procedures**

Clay Drop 1 - Drop Time: 11:00 AM; Block No. WC074178; Temp: 96.8 °F; Drop Depths: 18.5 mm, 19.1 mm, 18.7 mm, 18.2 mm, 18.7 mm

- (1) NIJ-STD-0101.04 Level III
- (2) Customer Request

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/ s)	Time 2 (µs)	Vel. 2 (ft/ s)	Avg. Vel. (ft/ s)	Penetration	Deformation (mm)	Obliq. (°)	Footnotes
1	1	38.5	148.3	1805	2770	1563	2772	2771	None	32.8	0	
2	1	38.5	148.3	1818	2750	1576	2749	2750	None	33.1	0	
3	1	38.5	148.4	1810	2762	1571	2758	2760	None	34.4	0	
4	1	38.5	148.4	1813	2758	1574	2753	2755	None		0	
5	1	38.5	148.5	1805	2770	1569	2762	2766	None		0	
6	1	38.5	148.5	1793	2789	1556	2785	2787	None		0	

**Remarks:**

Required Velocity: 2750 - 2810 ft./s.

**Footnotes:**

N/A

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**Test Panel** Description: Hard armor. Reference FIRA-SAPI-SA. ID: 2712022-FIRA-SAPI-SA-3.

Manufacturer: Pangolin Defense

Sample No.: (BZ API, V0) Plate 2

Size: 10.00 x 12.00 in  
Avg. Thickness: N/A  
Thicknesses: N/A

Weight: 5.570 lbs  
Plies/ Laminates: N/A

Date Received: 02/10/2022  
Received Via: LA Poste  
Returned Via: NA

## Setup

Shot Spacing: NIJ-STD-0101.04  
Level III (modified)  
Witness Panel: Clay  
Backing Material: 5.5-in clay/ plywood  
Condition: Wet per NIJ-STD-0101.04

Primary Vel. Screens (ft): 39.500, 39.833,  
44.166, 44.500  
Primary Vel. Location (ft): 42.000  
Range to Target (ft): 50.000  
Target to Witness (in): 0.000

Range No.: Range 2  
Temp: 67.6 °F  
BP: 29.9 inHg  
RH: 33.2 %  
Barrel/ Gun: WC020650  
Gunner: Luke Brannock  
Recorder: William Ellis

## Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) 7.62 x 54R-mm, 148-grain LPS	NA	Russian	N133
(2) 7.62 x 39-mm, 121-grain BZ API	NA	Russian	N 110

## Applicable Standards or Procedures

Clay Drop 1 - Drop Time: 11:25 AM; Block No. WC074178; Temp: 96 °F; Drop Depths: 18 mm, 19 mm, 18.2 mm, 18.1 mm, 18.3 mm

- (1) NIJ-STD-0101.04 Level III (Modified)  
(2) Customer Request

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel. 2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Deformation (mm)	Obliq. (°)	Footnotes
1	2	20.8	119	2072	2413	1796	2413	2413	None	24.9	0	(a)
2	2	20.8	119	2047	2443	1776	2440	2441	None	24.1	0	(a)
3	1	39.0	149	1762	2838	1526	2839	2839	None	N/A	0	(b)
4	1	39.0	149	1755	2849	1523	2845	2847	None	N/A	0	(b)

### Remarks:

BZ API Required Velocity: 2411 - 2450 ft./s.  
LPS Required Velocity: 2822 - 2850 ft./s.

### Footnotes:

- (a) Top of sample  
(b) Bottom of sample



Table 1. Summary of Ballistic Resistance Test Results

Project No.	Sample No.	Size	Weight (lbs)	Threat	Target Obliq. (deg)	Shot No.	Penetration Data		
							Velocity (ft/s)	Result	Deform. (mm)
OP0595307-1	Sample 1	C-3	2.030	9-mm, 124-grain FMJ	0.0	1	1446	None	28.2
						2	1457	None	25.5
						3	1429	None	NA
					30.0	4	1439	None	NA
						5	1422	None	NA
						6	1445	None	NA
OP0595307-2	Sample 2	C-3	2.030	.44-mag, 240-grain SJHP	0.0	1	1444	None	34.8
						2	1455	None	NA
						3	1460	None	29.9
					30.0	4	1446	None	NA
						5	1448	None	NA
					0.0	6	1450	None	NA

# BALLISTIC RESISTANCE TEST

## NTS-Chesapeake Testing

4603B Compass Point Road  
Belcamp, MD 21017

Client: Pangolin SAS  
Project No.: OP0595307-1  
Test Date: 10/11/2021  
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**Test Panel** Description: Soft armor panel.

Manufacturer: Pangolin SAS

Sample No.: Sample 1

Size: C-3  
Avg. Thickness: N/A  
Thicknesses: N/A

Weight: 2.030 lbs  
Plies/Laminates: N/A

Date Received: 10/11/2021  
Received Via: FEDEX Ground  
Returned Via: FEDEX Ground

## Setup

Shot Spacing: NIJ-STD-0101.04 Level IIIA  
Witness Panel: Clay  
Backing Material: 5.5-in clay/plywood  
Condition: Wet per NIJ-STD-0101.04

Primary Vel. Screens (ft): 6.500, 6.833, 11.166, 11.500  
Primary Vel. Location (ft): 9.000  
Range to Target (ft): 16.400  
Target to Witness (in): 0.000

Range No.: Range 3  
Temp: 66.9 °F  
BP: 30 inHg  
RH: 54.7 %  
Barrel/Gun: WC020651  
Gunner: William Ellis  
Recorder: Ramon Chavez

## Ammunition

Projectile	Lot No.	Powder
(1) 9-mm, 124-grain FMJ	Remington 23558	Accurate No. 2

## Applicable Standards or Procedures

Clay Drop 1- Drop Time: 1:35 PM; Block No. WC074179; Temp: 96.1 °F; Drop Depths: 19.2 mm, 18.1 mm, 17.8 mm, 17.1 mm, 18.9 mm  
(1) NIJ-STD-0101.04 Level IIIA  
(2) Customer Request

Shot No.	Ammo	Powder/Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel.2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Deformation (mm)	Obliq. (°)	Footnotes
1	1	6.0	124.0	3463	1444	2994	1447	1446	None	28.2	0.0	
2	1	6.0	124.0	3436	1455	2970	1459	1457	None	25.5	0.0	
3	1	6.0	124.0	3504	1427	3028	1431	1429	None	NA	0.0	
4	1	6.0	124.0	3480	1437	3006	1441	1439	None	NA	30.0	
5	1	6.0	124.0	3519	1421	3043	1424	1422	None	NA	30.0	
6	1	6.0	124.0	3465	1443	2994	1447	1445	None	NA	0.0	

### Remarks:

Required Velocity: 1400 - 1460 ft/s  
Projectile yaw check: 0° yaw on all impacts.

### Footnotes:

N/A

# BALLISTIC RESISTANCE TEST

## NTS-Chesapeake Testing

4603B Compass Point Road  
Belcamp, MD 21017

Client: Pangolin SAS  
Project No.: OP0595307-2  
Test Date: 10/11/2021  
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**Test Panel** Description: Soft armor panel.

Manufacturer: Pangolin SAS

Sample No.: Sample 2

Size: C-3  
Avg. Thickness: N/A  
Thicknesses: N/A

Weight: 2.030 lbs  
Plies/Laminates: N/A

Date Received: 10/11/2021  
Received Via: FEDEX Ground  
Returned Via: FEDEX Ground

## Setup

Shot Spacing: NIJ-STD-0101.04 Level IIIA  
Witness Panel: Clay  
Backing Material: 5.5-in clay/plywood  
Condition: Wet per NIJ-STD-0101.04

Primary Vel. Screens (ft): 6.500, 6.833, 11.166, 11.500  
Primary Vel. Location (ft): 9.000  
Range to Target (ft): 16.400  
Target to Witness (in): 0.000

Range No.: Range 3  
Temp: 67.0 °F  
BP: 30 inHg  
RH: 59 %  
Barrel/Gun: WC020651  
Gunner: William Ellis  
Recorder: Ramon Chavez

## Ammunition

Projectile	Lot No.	Powder
(1) .44-mag, 240-grain SJHP	Remington	Accurate No. 5

## Applicable Standards or Procedures

Clay Drop 1- Drop Time: 1:05 PM; Block No. WC074179; Temp: 96.8 °F; Drop Depths: 19.5 mm, 18.8 mm, 18.6 mm, 16.2 mm, 18.8 mm  
(1) NIJ-STD-0101.04 Level IIIA  
(2) Customer Request

Shot No.	Ammo	Powder/Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel.2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Deformation (mm)	Obliq. (°)	Footnotes
1	1	14.8	240.0	3473	1440	2990	1449	1444	None	34.8	0.0	
2	1	14.8	240.0	3441	1453	2975	1456	1455	None	NA	0.0	
3	1	14.8	240.0	3429	1458	2963	1462	1460	None	29.9	0.0	
4	1	14.8	240.0	3463	1444	2994	1447	1446	None	NA	30.0	
5	1	14.8	240.0	3463	1444	2982	1453	1448	None	NA	30.0	
6	1	14.8	240.0	3458	1446	2980	1454	1450	None	NA	0.0	

### Remarks:

Required Velocity: 1400 - 1460 ft/s  
Projectile yaw check: 0° yaw on all impacts.

### Footnotes:

N/A



**POC: Mr. Benjamin Delcourt**  
**Purchase Order No.: Prepay**  
**Test Date: 11 October 2021**  
**Project No.: OP0595307**

**ATTACHMENT A**  
**CALIBRATION CHECKLIST**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC020651	Barrel (gun)	Bill Wiseman & Company	N/A	NCR	NCR
WC027078	Measurement Tools (Tape Measure)	Starrett	530-100	03/10/2021	03/10/2022
WC027148	Meter (Chronograph)	YIS/Cowden Group, Inc	Chrono USB	08/26/2021	08/26/2022
WC060600	Scale (Floor)	Sartorius	Combics	12/09/2020	12/09/2021
WC060714	Measurement Tools (Tape Measure)	Dewalt Industrial Tool	DWHT33373	01/20/2020	01/20/2022
WC060802	Range 3 (shooting)	Chesapeake Testing	N/A	NCR	NCR
WC064273	Measurement Tools (Angle Gauge)	SPI	91-316-0	12/16/2020	12/16/2021
WC067022	Meter (Chronograph)	YIS/Cowden Group, Inc	Chrono-USB	08/26/2021	08/26/2022
WC067351	Meter (Thermometer)	Control Company	4371	06/18/2021	06/18/2022
WC067358	Gauge (Depth)	Starrett	3753A-6/150	07/21/2021	07/21/2022
WC074179	Block (Clay)	Chesapeake Testing		02/22/2019	NCR
WC074968	Scale (Digital)	RCBS	ChargeMaster 1500	04/08/2021	04/08/2022
WC074987	Measurement Tools (Tape Measure)	Dewalt Industrial Tool	DWHT36107	04/19/2021	04/19/2022
WC075093	Meter (Thermometer)	Control Company	4378, 98768-49	11/20/2020	11/20/2022
WC075099	Gauge (Depth)	Starrett	3753A-6/150	12/15/2020	12/15/2021
WC075116	Sensor (Temperature/Humidity)	Omega Engineering	ZW-CM-BTH	03/23/2021	03/23/2022



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# Preliminary Data



# BALLISTIC RESISTANCE TEST

**NTS-Belcamp**  
4603B Compass Point Road  
Belcamp, MD 21017

Client: Pangolin SAS  
Project No.: OH000008736  
Test Date: 03/16/2023  
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**Test Panel** Description: Soft armor panel.

**Manufacturer:** Pangolin Defense

**Sample No.:** (9mm, V0) 732023-FILA IIA-2047

Size: 406.4 x 406.4 mm  
Avg. Thickness: N/A  
Thicknesses: N/A

Weight: 0.310 kg  
Plies/Laminates: N/A

Date Received: 03/06/2023  
Received Via: UPS, 3 Day Select  
Returned Via: UPS, 3 Day Select

## Setup

Shot Spacing: Per customer request  
Witness Panel: 0.02 in 2024-T3 Al  
Backing Material: N/A  
Condition: Ambient

Primary Vel. Screens (m): 1.980, 2.080,  
3.400, 3.510  
Primary Vel. Location (m): 2.743  
Range to Target (m): 4.999  
Target to Witness (mm): 152.400

Range No.: Range 5  
Temp: 20.1 °C  
BP: 30 inHg  
RH: 43 %  
Barrel/Gun: WC024524  
Gunner: Nick Dawson  
Recorder: Joseph Gerdes

## Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) 9-mm, 124-grain FMJ	23558	Remington	Accurate No. 2

## Applicable Standards or Procedures

- (1) NIJ-STD-0101.04 Level IIA (Modified) (for velocity and projectile only)  
(2) Customer Request

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (m/s)	Time 2 (µs)	Vel.2 (m/s)	Avg. Vel. (m/s)	Penetration	Obliq. (°)	Footnotes
1	1	4.0	124	4262	357.5	3685	358.4	358.14	None	0	
2	1	4.0	124	4479	340.2	3885	339.9	340.16	None	0	
3	1	4.0	124	4480	340.2	3886	339.9	340.16	None	0	
4	1	4.0	124	4535	336.2	3927	336.2	336.19	None	0	
5	1	4.0	124	4462	341.7	3862	342	341.68	None	0	
6	1	4.0	124	4280	356	3698	357.2	356.62	None	0	

### Remarks:

Required Velocity: 341 +/- 9 m/s  
Projectile Yaw Check: 0° Yaw on all Impacts.  
Sample tested in ATC fixture.

### Footnotes:

N/A

# BALLISTIC RESISTANCE TEST

**NTS-Belcamp**  
4603B Compass Point Road  
Belcamp, MD 21017

Client: Pangolin SAS  
Project No.: OH000008736  
Test Date: 03/16/2023  
Page 1 of 1

**Test Panel** Description: Soft armor panel.

**Manufacturer:** Pangolin Defense

**Sample No.:** (.40 SW, V0) 732023-FILA IIA-2046

Size: 406.4 x 406.4 mm  
Avg. Thickness: N/A  
Thicknesses: N/A

Weight: 0.320 kg  
Plies/Laminates: N/A

Date Received: 03/06/2023  
Received Via: UPS, 3 Day Select  
Returned Via: UPS, 3 Day Select

## Setup

Shot Spacing: Per customer request  
Witness Panel: 0.02 in 2024-T3 Al  
Backing Material: N/A  
Condition: Ambient

Primary Vel. Screens (m): 1.980, 2.080,  
3.400, 3.510  
Primary Vel. Location (m): 2.743  
Range to Target (m): 4.999  
Target to Witness (mm): 152.400

Range No.: Range 5  
Temp: 20.1 °C  
BP: 30 inHg  
RH: 43 %  
Barrel/Gun: WC024524  
Gunner: Nick Dawson  
Recorder: Joseph Gerdes

## Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) .40 S&W, 180-grain FMJ	NA	Remington	Accurate No. 2

## Applicable Standards or Procedures

- (1) NIJ-STD-0101.04 Level IIA (Modified) (for velocity and projectile only)  
(2) Customer Request

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (m/s)	Time 2 (µs)	Vel.2 (m/s)	Avg. Vel. (m/s)	Penetration	Obliq. (°)	Footnotes
1	1	3.6	180	4563	334.1	3960	333.5	333.76	None	0	
2	1	3.6	180	4570	333.5	3969	332.8	333.15	None	0	
3	1	3.6	180	4620	329.8	4020	328.6	329.18	None	0	
4	1	3.6	180	4650	327.7	4050	326.1	327.05	None	0	
5	1	3.6	180	4672	326.1	4069	324.6	325.53	None	0	
6	1	3.6	180	4680	325.5	4075	324	324.92	None	0	

### Remarks:

Required Velocity: 322 +/- 9 m/s  
Projectile Yaw Check: 0° Yaw on all Impacts.  
Sample tested in ATC fixture.

### Footnotes:

N/A