



19 July 2022

Pangolin SAS
8 Bis Route de Palaiseul
Violot, FRG 52600 FR

Attention: Mr. Benjamin Delcourt

Subject: Pangolin SAS, Armor Protection Ballistic Resistance Test: Project No. PR162260,
Tested 5 July 2022, Purchase Order No. Wire

Dear Mr. Delcourt:

Please find enclosed a report documenting the subject test series conducted by NTS-Chesapeake Testing on 5 July 2022. This report includes a summary of the test as well as a detailed shot record for each armor sample tested.

If you have any questions related to this test, please call Mr. Craig Thomas at 410-297-8154 or contact him via e-mail at craig.thomas@nts.com.

Sincerely,

A handwritten signature in black ink, appearing to read "CS", is written over a horizontal line.

Chris Schueler
General Manager, NTS-Chesapeake Testing

bw

Enc. a/s

NTS-Chesapeake Testing is an independent testing facility and has no affiliation with Pangolin SAS

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PANGOLIN SAS, PROPRIETARY INFORMATION

4603B Compass Point Rd., Belcamp, MD 21017

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National Technical Systems Test Report for Ballistic Resistance Testing

Prepared For

Pangolin SAS | 8 Bis Route de Palaiseul | Violot, FRG 52600 FR

Prepared By

National Technical Systems | 4603B Compass Point Road | Belcamp, MD 21017 | (410) 297-8154 | www.nts.com

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Further dissemination only as directed by Pangolin SAS, 19 July 2022.

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1 Introduction

Pangolin SAS provided four armor samples to NTS-Chesapeake Testing for ballistic testing on 5 July 2022.

2 Threats and Instrumentation

2.1 Threats*

- 9-mm, 124-grain full metal jacket (FMJ) projectiles
- .44-mag, 240-grain semi jacketed hollow point (SJHP) projectiles

*All projectiles were fired from a universal receiver which was fitted with the appropriate barrel and mounted on an NTS-Chesapeake Testing mount.

*The threat projectiles were required to have no greater than 3° total yaw. Projectile yaw was measured to ensure that the test impacts were within this constraint by placing a yaw card at the appropriate gun-to-target range during velocity verification shots.

2.2 Instrumentation

Projectile velocity measurements were obtained using Oehler Research model No. 57 infrared screens with Y.I.S. Cowden Group Chrono-USB chronographs. A digital caliper was used to measure the post-impact deformations observed in the backing clay. Calibration data is provided in Attachment A. A digital video camera was used to record the test, video files will be uploaded separately through LabInsight.

3 Details of Test

The objective of this test was to conduct a ballistic resistance test on the armor samples in accordance with NIJ-STD-0101.04 Level IIIA (Modified) and the customer's request. Shot spacing between multiple impacts on a single sample was in accordance with the referenced performance standard. Shots against the armor samples were performed at 0.0° or 30.0° obliquity and ambient range temperature (67 ± 1 °F).

Each sample was conditioned wet per NIJ-STD-0101.04 prior to testing as referenced on each data sheet. For each shot, the target was strapped to a 5.5-in clay/plywood backing that was clamped to a rigid test fixture. All firings were conducted at 16.400 ft from the target. The projectile velocity for each armor sample was in accordance with the referenced performance standard.

4 Summary of Results

The results of the ballistic resistance test are summarized in Table 1. The detailed ballistic data sheets for all testing performed are provided on the following pages.



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	Def. (mm)
PR162260-1	(9-mm, V0, Wet) Pangolin-Pro-9-mm	C-3	1.930	9-mm, 124-grain FMJ	0.0	1	1418	None	26.8
						2	1434	None	26.2
						3	1432	None	NA
					30.0	4	1440	None	NA
						5	1416	None	NA
					0.0	6	1425	None	NA
PR162260-2	(9-mm, V0, Wet) Pangolin-Light-9-mm	C-3	1.510	9-mm, 124-grain FMJ	0.0	1	1405	None	29.0
						2	1417	None	26.8
						3	1411	None	NA
					30.0	4	1416	None	NA
						5	1444	None	NA
					0.0	6	1425	None	NA
PR162260-3	(.44-mag, V0, Wet) Pangolin-Pro-.44-mag	C-3	1.940	.44-mag, 240-grain SJHP	0.0	1	1448	None	32.7
						2	1447	None	35.0
						3	1440	None	NA
					30.0	4	1443	None	NA
						5	1442	None	NA
					0.0	6	1437	None	NA
PR162260-4	(.44-mag, V0, Wet) Pangolin-Light-.44-mag	C-3	1.500	.44-mag, 240-grain SJHP	30.0	1	1441	None	36.0
						2	1448	None	34.6
						3	1447	None	NA
					0.0	4	1444	None	NA
						5	1444	None	NA
					30.0	6	1433	None	NA

PANGOLIN SAS, PROPRIETARY INFORMATION

BALLISTIC RESISTANCE TEST

NTS-Chesapeake Testing

4603B Compass Point Road
Belcamp, MD 21017

Client: Pangolin SAS
Project No.: PR162260-1
Test Date: 07/05/2022
Page 1 of 1

Test Panel Description: Soft armor panel.

Manufacturer: Pangolin Defense

Sample No.: (9-mm, V0, Wet) Pangolin-Pro - 9-mm

Size: C-3
Avg. Thickness: N/A
Thicknesses: 7.73 mm

Weight: 1.930 lbs
Plies/Laminates: N/A

Date Received: 07/01/2022
Received Via: DHL
Returned Via: DHL

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: 29.9 inHg
RH: 59.4 %
Barrel/Gun: WC020651
Gunner: Keivin Guzman
Recorder: Ramon Chavez

Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) 9-mm, 124-grain FMJ	23358	Remington	Accurate No. 2

Applicable Standards or Procedures

Clay Drop 1 - Drop Time: 1:30 PM; Block No. WC074196; Temp: 95.8 °F; Drop Depths: 20.1 mm, 19.8 mm, 20.2 mm, 19.0 mm, 18.1 mm
(1) NIJ-STD-0101.04 Level IIIA (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	1	6.0	124.0	3526	1418	3055	1418	1418	None	26.8	0.0	
2	1	6.0	124.0	3487	1434	3021	1434	1434	None	26.2	0.0	
3	1	6.0	124.0	3492	1432	3026	1432	1432	None	NA	0.0	
4	1	6.0	124.0	3470	1441	3009	1440	1440	None	NA	30.0	
5	1	6.0	124.0	3531	1416	3058	1417	1416	None	NA	30.0	
6	1	6.0	124.0	3507	1426	3041	1425	1425	None	NA	0.0	

Remarks:

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

Footnotes:

N/A

BALLISTIC RESISTANCE TEST

NTS-Chesapeake Testing

4603B Compass Point Road
Belcamp, MD 21017

Client: Pangolin SAS
Project No.: PR162260-2
Test Date: 07/05/2022
Page 1 of 1

Test Panel Description: Soft armor panel .

Manufacturer: Pangolin Defense

Sample No.: (9-mm, V0, Wet) Pangolin-Light - 9-mm

Size: C-3
Avg. Thickness: N/A
Thicknesses: 5.98 mm

Weight: 1.510 lbs
Plies/Laminates: N/A

Date Received: 07/01/2022
Received Via: DHL
Returned Via: DHL

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: 67.1 °F
BP: 29.9 inHg
RH: 53 %
Barrel/Gun: WC020651
Gunner: Keivin Guzman
Recorder: Ramon Chavez

Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) 9-mm, 124-grain FMJ	23358	Remington	Accurate No. 2

Applicable Standards or Procedures

Clay Drop 1 - Drop Time: 2:00 PM; Block No. WC074196; Temp: 95.3 °F; Drop Depths: 20.0 mm, 19.1 mm, 19.8 mm, 20.3 mm, 19.2 mm
(1) NIJ-STD-0101.04 Level IIIA (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	1	6.0	124.0	3558	1405	3085	1405	1405	None	29.0	0.0	
2	1	6.0	124.0	3529	1417	3058	1417	1417	None	26.8	0.0	
3	1	6.0	124.0	3544	1411	3070	1411	1411	None	NA	0.0	
4	1	6.0	124.0	3531	1416	3060	1416	1416	None	NA	30.0	
5	1	6.0	124.0	3465	1443	2999	1445	1444	None	NA	30.0	
6	1	6.0	124.0	3509	1425	3041	1425	1425	None	NA	0.0	

Remarks:

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

Footnotes:

N/A

BALLISTIC RESISTANCE TEST

NTS-Chesapeake Testing

4603B Compass Point Road
Belcamp, MD 21017

Client: Pangolin SAS
Project No.: PR162260-3
Test Date: 07/05/2022
Page 1 of 1

Test Panel Description: Soft armor panel.

Manufacturer: Pangolin Defense **Sample No.:** (.44-mag, V0, Wet) Pangolin-Pro - .44-mag

Size: C-3
Avg. Thickness: N/A
Thicknesses: 7.44 mm

Weight: 1.940 lbs
Plies/Laminates: N/A

Date Received: 07/01/2022
Received Via: DHL
Returned Via: DHL

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: 56.9 %
Barrel/Gun: WC020651
Gunner: Keivin Guzman
Recorder: Ramon Chavez

Ammunition

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

Applicable Standards or Procedures

Clay Drop 1 - Drop Time: 12:55 PM; Block No. WC074179; Temp: 95.7 °F; Drop Depths: 17.8 mm, 17.7 mm, 19.7 mm, 19.7 mm, 18.2 mm
(1) NIJ-STD-0101.04 Level IIIA (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	1	15.2	240.0	3453	1448	2992	1448	1448	None	32.7	0.0	
2	1	15.2	240.0	3456	1447	2994	1447	1447	None	35.0	0.0	
3	1	15.2	240.0	3473	1440	3009	1440	1440	None	NA	0.0	
4	1	15.2	240.0	3465	1443	3002	1443	1443	None	NA	30.0	
5	1	15.2	240.0	3468	1442	3004	1442	1442	None	NA	30.0	
6	1	15.2	240.0	3480	1437	3016	1437	1437	None	NA	0.0	

Remarks:

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

Footnotes:

N/A

BALLISTIC RESISTANCE TEST

NTS-Chesapeake Testing

4603B Compass Point Road
Belcamp, MD 21017

Client: Pangolin SAS
Project No.: PR162260-4
Test Date: 07/05/2022
Page 1 of 1

Test Panel Description: Soft armor panel.

Manufacturer: Pangolin Defense **Sample No.:** (.44-mag, V0, Wet) Pangolin-Light - .44-mag

Size: C-3
Avg. Thickness: N/A
Thicknesses: 5.12 mm

Weight: 1.500 lbs
Plies/Laminates: N/A

Date Received: 07/01/2022
Received Via: DHL
Returned Via: DHL

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: 54.5 %
Barrel/Gun: WC020651
Gunner: Keivin Guzman
Recorder: Ramon Chavez

Ammunition

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

Applicable Standards or Procedures

Clay Drop 1 - Drop Time: 1:15 PM; Block No. WC074179; Temp: 95.1 °F; Drop Depths: 18.5 mm, 17.9 mm, 18.3 mm, 19.1 mm, 18.7 mm
(1) NIJ-STD-0101.04 Level IIIA (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	1	15.2	240.0	3470	1441	3006	1441	1441	None	36.0	0.0	
2	1	15.2	240.0	3453	1448	2992	1448	1448	None	34.6	0.0	
3	1	15.2	240.0	3456	1447	2992	1448	1447	None	NA	0.0	
4	1	15.2	240.0	3463	1444	2999	1445	1444	None	NA	30.0	
5	1	15.2	240.0	3463	1444	2999	1445	1444	None	NA	30.0	
6	1	15.2	240.0	3490	1433	3021	1434	1433	None	NA	0.0	

Remarks:

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

Footnotes:

N/A

ATTACHMENT A CALIBRATION CHECKLIST

NCR = No Calibration Required.

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC020651	Barrel (gun)	Bill Wiseman & Company	N/A	NCR	NCR
WC027148	Meter (Chronograph)	YIS/Cowden Group, Inc	Chrono USB	08/26/2021	08/26/2022
WC060600	Scale (Floor)	Sartorius	Combics	12/06/2021	12/06/2022
WC060658	Measurement Tools (Tape Measure)	Starrett	530-100	07/21/2021	07/21/2022
WC060802	Range (shooting)	N/A	N/A	NCR	NCR
WC067022	Meter (Chronograph)	YIS/Cowden Group, Inc	Chrono-USB	08/26/2021	08/26/2022
WC067358	Gauge (Depth)	Starrett	3753A-6/150	07/21/2021	07/21/2022
WC074982	Meter (Thermometer)	Control Company	4371	03/31/2022	03/31/2023
WC075060	Gauge (Depth)	Starrett	3753A -6/150	11/08/2021	11/08/2022
WC075093	Meter (Thermometer)	Control Company	4378, 98768-49	11/20/2020	11/20/2022
WC075109	Scale (Digital)	RCBS	1500	03/22/2022	03/22/2023
WC075118	Sensor (Temperature/Humidity)	Omega Engineering	ZW-CM-BTH	03/18/2022	03/18/2023
WC078628	Measurement Tools (Tape Measure)	Craftsman	CMHT37525	09/01/2021	09/01/2023
WC078632	Measurement Tools (Tape Measure)	Craftsman	CMHT37525	09/01/2021	09/01/2023



END OF REPORT