

**NATIONAL TECHNICAL SYSTEMS**  
**NIJ 0106.01 HELMET:**  
**BALLISTIC PENETRATION TEST**

Date Received: February 18, 2023  
 Via: Fed Ex  
 Returned Via: Fed Ex

Record No.: PGD23001-2  
 Test Date: March 16, 2023  
 Customer: Protection Group Danmark

**Test Conditions**

Temperature: 20.6 °C  
 Humidity: 40 %

**Range 2**

Muzzle to Screen 1: 1.52 m  
 Screen 1 - 2: 1.52 m  
 Screen 2 - Target: 1.83 m  
 Midpoint to Target: 2.59 m

Test Standard: Modified / Abbreviated NIJ Standard 0106.01 for Ballistic Helmets  
 December 1981

Headform Size: 7 1/4  
 Witness Plate: 2024-T3 Alum.  
 Barrel Length: 25.4 cm

Test Method: IAW Paragraph 5.2 Ballistic Penetration Test  
 Test Ammunition: IAW NIJ Standard 0108.01, September 1985  
 Threat Level: IIIA  
 Conditioning: Wet

Sample Tested Description		Test / Ammunition Description					Chronograph		Test Results
Manufacturer:	Protection Group Danmark	Shot No.	Impact Location	Degree Obliquity	Caliber	Bullet Weight (gr.) / Type	TIME sx-5	VELOCITY m/s	Penetration
Model No.:	ARCH HIGH CUT	1	Front	0°	9mm	124 / FMJ	347.1	439.1	No Penetration
Size:	L	2	Back	0°			352.5	432.3	No Penetration
Serial No.:	2208108	3	Right	0°			364.7	417.9	No Penetration
Lot No.:	3777R	4	Left	0°			369.5	412.4	No Penetration
Weight (kg.):	1.381								
Protection Level:	NIJ IIIA								

**Notes:**  
 •Helmet tested as received from customer with retention / suspension system, chinstrap and pads.

**Conditioning:**  
 •Helmet tested at ambient conditions 20 - 28 °C (68 - 82°F) and 30% - 70% RH

**Test Ammunition / Velocity Information:**  
 Test Round: Remington (23558), 9mm 124 gr. FMJ RN  
 Test Velocity: 426 +/- 15 m/s (1400 +/- 50 ft/s)

Technician (s): Wilson / Zerger

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Date Received: February 18, 2023  
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Record No.: PGD23001-1  
 Test Date: March 16, 2023  
 Customer: Protection Group Danmark

**Test Conditions**

Temperature: 21.1 °C  
 Humidity: 40 %

**Range 2**

Muzzle to Screen 1: 1.52 m  
 Screen 1 - 2: 1.52 m  
 Screen 2 - Target: 1.83 m  
 Midpoint to Target: 2.59 m

Test Standard: Modified / Abbreviated NIJ Standard 0106.01 for Ballistic Helmets  
 December 1981

Headform Size: 7 1/4  
 Witness Plate: 2024-T3 Alum.  
 Barrel Length: 25.4 cm

Test Method: IAW Paragraph 5.2 Ballistic Penetration Test  
 Test Ammunition: IAW NIJ Standard 0108.01, September 1985  
 Threat Level: IIIA  
 Conditioning: Wet

Sample Tested Description		Test / Ammunition Description				Chronograph		Test Results	
Manufacturer:	Protection Group Danmark	Shot No.	Impact Location	Degree Obliquity	Caliber	Bullet Weight (gr.) / Type	TIME sx-5	VELOCITY m/s	Penetration
Model No.:	ARCH HIGH CUT	1	Front	0°			353.3	431.4	No Penetration
Size:	L	2	Back	0°	.44 Mag.	240 / LSWC GC	363.2	419.6	No Penetration
Serial No.:	22081817	3	Right	0°			369.8	412.1	No Penetration
Lot No.:	3777	4	Left	0°			351.2	433.9	No Penetration
Weight (kg.):	1.360								
Protection Level:	NIJ IIIA								

**Notes:**

•Helmet tested as received from customer with retention / suspension system, chinstrap and pads.

**Conditioning:**

•Helmet tested at ambient conditions 20 - 28 °C (68 - 82°F) and 30% - 70% RH

**Test Ammunition / Velocity Information:**

Test Round: .44 Magnum 240 gr. Lead Semi-Wadcutter Gas Checked (LSWCGC)  
 Test Velocity: 426 +/- 15 m/s (1400 +/- 50 ft/s)

Technician (s): Wilson / Zerger

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Date Received: February 18, 2023  
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Record No.: PGD23001-4  
 Test Date: March 16, 2023  
 Customer: Protection Group Danmark

**Test Conditions**

Temperature: 21.1 °C  
 Humidity: 37 %

**Range 2**

Muzzle to Screen 1: 1.52 m  
 Screen 1 - 2: 1.52 m  
 Screen 2 - Target: 1.83 m  
 Midpoint to Target: 2.59 m

Test Standard: Modified / Abbreviated NIJ Standard 0106.01 for Ballistic Helmets  
 December 1981

Headform Size: 7 1/4  
 Witness Plate: 2024-T3 Alum.  
 Barrel Length: 25.4 cm

Test Method: IAW Paragraph 5.2 Ballistic Penetration Test  
 Test Ammunition: IAW NIJ Standard 0101.06, July 2008  
 Threat Level: IIIA  
 Conditioning: Wet

Sample Tested Description		Test / Ammunition Description					Chronograph		Test Results
Manufacturer:	Protection Group Danmark	Shot No.	Impact Location	Degree Obliquity	Caliber	Bullet Weight (gr.) / Type	TIME sx-5	VELOCITY m/s	Penetration
Model No.:	ARCH HIGH CUT	1	Front	0°			339.3	449.2	No Penetration
Size:	L	2	Back	0°	.357 Sig	125 / TMJ	340.4	447.7	No Penetration
Serial No.:	22081533	3	Right	0°			339.1	449.4	No Penetration
Lot No.:	3777	4	Left	0°			331.8	459.3	No Penetration
Weight (kg.):	1.353								
Protection Level:	NIJ IIIA								

**Notes:**  
 •Helmet tested as received from customer with retention / suspension system, chinstrap and pads.

**Conditioning:**  
 •Helmet tested at ambient conditions 20 - 28 °C (68 - 82°F) and 30% - 70% RH

**Test Ammunition / Velocity Information:**  
 Test Round: Speer (4362), .357 Sig 125 gr. TMJ  
 Test Velocity: 448 +/- 10 m/s (1430 +/- 30 ft/s)

Technician (s): Wilson / Zerger

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Date Received: February 18, 2023  
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Record No.: PGD23001-3  
 Test Date: March 16, 2023  
 Customer: Protection Group Denmark

**Test Conditions**

Temperature: 21.7 °C  
 Humidity: 40 %

**Range 2**

Muzzle to Screen 1: 1.52 m  
 Screen 1 - 2: 1.52 m  
 Screen 2 - Target: 1.83 m  
 Midpoint to Target: 2.59 m

Test Standard: Modified / Abbreviated NIJ Standard 0106.01 for Ballistic Helmets  
 December 1981

Headform Size: 7 1/4  
 Witness Plate: 2024-T3 Alum.  
 Barrel Length: 25.4 cm

Test Method: IAW Paragraph 5.2 Ballistic Penetration Test  
 Test Ammunition: IAW NIJ Standard 0101.06, July 2008  
 Threat Level: IIIA  
 Conditioning: Wet

Sample Tested Description	Test / Ammunition Description					Chronograph		Test Results
Manufacturer: Protection Group Danmark Model No.: ARCH HIGH CUT Size: L Serial No.: 22081775 Lot No.: 3777 Weight (kg.): 1.361 Protection Level: NIJ IIIA	Shot No.	Impact Location	Degree Obliquity	Caliber	Bullet Weight (gr.) / Type	TIME sx-5	VELOCITY m/s	Penetration No Penetration
	1	Front	0°			356.5	427.5	No Penetration
	2	Back	0°	.44 Mag.	240 / JHP	355.2	429.1	No Penetration
	3	Right	0°			353.6	431.0	No Penetration
	4	Left	0°			356.3	427.7	No Penetration

**Notes:**  
 •Helmet tested as received from customer with retention / suspension system, chinstrap and pads.

**Conditioning:**  
 •Helmet tested at ambient conditions 20 - 28 °C (68 - 82°F) and 30% - 70% RH

**Test Ammunition / Velocity Information:**  
 Test Round: Speer (4453 or 4736), .44 Magnum 240 gr. Jacketed Hollow Point (JHP)  
 Test Velocity: 436 +/- 10 m/s (1430 +/- 30 ft/s)

Technician (s): Wilson / Zerger

# NATIONAL TECHNICAL SYSTEMS

## V50 BALLISTIC LIMIT TEST

Date Received: February 18, 2023  
 Via: Fed Ex  
 Returned Via: Fed Ex

Record No.: PGD23001-5  
 Test Date: March 16, 2023  
 Customer: Protection Group Denmark

**Test Conditions**

Temperature: 20.5 °C  
 Humidity: 51 %

**Threat**

Projectile: Fragment Simulating Projectile  
 Weight: 1.1 g (17 gr.)  
 Type: Type 2 (HRC 27 +/- 3)  
 Powder: Bullseye  
 Barrel Length: 60.96 cm  
 Obliquity: 0°  
 Yaw: ≤ 5°

**Range 2**

Muzzle to Screen 1: 1.36 m  
 Screen 1 - 4: 1.52 m  
 Screen 2 - 3: 1.25 m  
 Screen 4 - Target: 2.35 m  
 Midpoint to Target: 3.11 m

**Sample Description**

Manufacturer: Protection Group Denmark  
 Model No.: ARCH HIGH CUT  
 Size: L  
 Serial No.: 22081474  
 Lot No.: 3777  
 Weight (kg.): 1.365  
 Protection Level: NIJ IIIA

**Test Standard / Specification**

STANAG 2920, Edition 2  
 31 July 2013  
 Target: Helmet Shell  
 Conditioning: Ambient

**Witness Information**

Witness Sheet: 0.5mm Aluminum Alloy  
 Target to Witness: 5 cm

Shot No.	Powder Charge (gr.)	CHRONOGRAPHS 1 - 4		CHRONOGRAPHS 2 - 3		AVERAGE VELOCITY m/s	LOSS VELOCITY m/s	STRIKING VELOCITY m/s	TEST RESULTS			
		TIME sx-5	VELOCITY m/s	TIME sx-5	VELOCITY m/s				IMPACT LOCATION	Shot Included Y or N	Complete - C Partial - P	
1	4.7	204.0	747.1	166.2	749.1	748.1	38.7	709.4	Crown	N	C	
2	4.4	214.3	711.2	174.6	713.1	712.1	36.7	675.4	Front	Y	P	
3	4.6	211.9	719.2	172.5	721.7	720.5	37.2	683.2	Right	N	C	
4	4.4	223.4	682.2	181.9	684.4	683.3	35.4	648.0	Back	Y	C	
5	4.2	219.6	694.0	178.9	695.9	695.0	35.9	659.0	Left	Y	C	
6	4.1	232.1	656.6	189.1	658.4	657.5	33.9	623.6	Crown	N	P	
7	4.2	221.4	688.3	180.3	690.5	689.4	35.5	653.9	Front	Y	P	
8	4.3	215.2	708.2	175.3	710.2	709.2	36.7	672.5	Right	Y	C	
9	4.2	222.6	684.6	181.3	686.7	685.7	35.5	650.2	Back	Y	P	
This test was performed in accordance with the specification requirements and the results properly reflect the ballistic performance of the listed sample.						V50 VELOCITY	HIGH PARTIAL	LOW COMPLETE	RANGE OF RESULTS	RANGE OF MIXED RESULTS		
						659.8 m/s	675.4 m/s	648.0 m/s	27.4 m/s	27.4 m/s		

**Notes:**

- Helmet was tested as a finished helmet shell with retention/suspension system removed for V50 consistency.
- Helmet Shell secured using helmet V50 fixture IAW Annex E to STANAG 2920, Figures E1 and E2.

**Projectile Used:**

.22 Caliber, 1.1g +/- 0.03g (17 gr.) Chisel Nose Fragment Simulating Projectile (FSP)  
 IAW Appendix 1 to Annex A - Category A2: Type 2 (27 +/- 3 HRC) IAW Figure A1a

**Starting Velocity / V50 Calculation:**

- Starting Velocity: 700 m/s
- V50 based on (6) fair impacts using (3) partial and (3) complete penetrations with a range of results ≤ 40 m/s.

Wilson / Zerger