

# **SAFETY COMPLIANCE TESTING FOR FMVSS No. 218 MOTORCYCLE HELMETS**

Brand: Scorpion  
Model: EXO-AT950  
Size: M (57-58 cm)

Prepared By

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**31 March 2017**

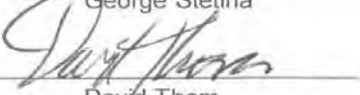
**Final Report 218-ACT-17-023**

Prepared For

**U.S. Department of Transportation**  
National Highway Traffic Safety Administration  
Office of Vehicle Safety Compliance (NEF-220)  
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<b>4. Title and Sub-Title</b>  FINAL REPORT OF FMVSS NO. 218 COMPLIANCE TESTING OF SCORPION EXO, MODEL EXO-AT950, SIZE M (57-58 CM) MOTORCYCLE HELMET				<b>5. Report Date</b>  31 March 2017	
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<b>16. Abstract</b> Compliance tests were conducted on the subject model motorcycle helmet in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-218-07. Test failures identified were as follows: None					
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Technician: George Stetina

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# PURPOSE OF COMPLIANCE TEST

## 1. PURPOSE OF COMPLIANCE TEST

This testing was conducted as part of the Department of Transportation, National Highway Traffic Safety Administration's Federal Motor Vehicle Safety Standard (FMVSS) No. 218, "Motorcycle Helmets"<sup>1</sup> Compliance Program. The purpose of the test was to determine if the production helmets supplied by the Office of Vehicle Safety Compliance satisfy the requirements of TP-218-07<sup>2</sup>, as governed by the contract.

## 2. TEST PROCEDURE

The ACT Lab Helmet Testing Manual, Part I – Motorcycle Helmets<sup>3</sup> submitted to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, contains the specific procedures used to conduct this test. The ACT Lab Helmet Testing Manual, Part I – Motorcycle Helmets as modified by Project-Specific notations is in accordance with TP-218-07.

The test procedure shall not be in conflict with any portion of FMVSS No. 218 nor amendments in effect as noted in the applicable contract.

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<sup>1</sup> NHTSA, FMVSS No. 218, Motorcycle Helmets, 49 CFR Chapter V Section 571.218, August 20, 1973 as last amended FR 28132 Vol. 76, No. 93, May 13, 2011.

<sup>2</sup> NHTSA, TP-218-07, Laboratory Test Procedure for FMVSS 218, Motorcycle Helmets, 13 May 2011.

<sup>3</sup> ACT Lab Helmet Test Manual, Version 4.2 – Motorcycle Helmets in accordance with FMVSS No. 218, 22 July 2013.

## HELMET DATA

Helmet Brand Name	SCORPION EXO					
Model Designation	EXO-AT950					
Manufacturer	Kido Sports Co. LTD.					
Helmet Size Label	M (57-58 cm)					
Test Headform size	Small		Medium		X	Large
Helmet Positioning Index (HPI)	49 mm		Manufacturer supplied		X	ACT determined
Helmet Coverage	Partial		Full		Complete X	
Shell Material	Thermoplastic Polycarbonate					
Liner Material	Expanded Polystyrene					
Comfort Padding	Resilient Foam					
Buckle Description	Double D-Rings					

HELMET	A Ambient	B Low Temp	C High Temp	D Water Immersed	E Spare
SHELL COLOR/PATTERN	Matte Anthracite	Matte Anthracite	Matte Anthracite	Matte Anthracite	Matte Anthracite
WEIGHT (grams)	1497	1491	1489	1483	1817
MONTH & YEAR OF MANUFACTURE	06/2016	08/2016	06/2016	08/2016	06/2016

### COMMENTS:

1. All helmets were received in undamaged condition and were appropriate for testing.
2. Weights listed above for helmets A-D are as tested with face shield, visor and sun shield removed.
3. Weight for helmet E is complete with all components in place.
4. NHTSA provided the HPI based on information obtained from the manufacturer.
5. This is a modular helmet, designed with a flip up chin bar

## SUMMARY OF TEST RESULTS

INDICATE Pass or Fail

HELMET	A	B	C	D
TEST	AMBIENT	LOW TEMP	HIGH TEMP	WATER IMMERSSED
IMPACT	Pass	Pass	Pass	Pass
PENETRATION	Pass	Pass	Pass	Pass
RETENTION	Pass	Pass	Pass	Pass

INDICATE Pass or Fail

TEST	PASS/FAIL
PERIPHERAL VISION	Pass
LABELING	Pass

## SELECTION OF APPROPRIATE HEADFORM

Paragraph S6.1 - If the helmet size designation falls into more than one of three size ranges, it shall be tested on each appropriate headform.

HELMET SIZE DESIGNATION	HEADFORM SIZE
Less than or equal to 6-3/4 (European Size 54)	SMALL
Greater than 6-3/4, but less than or equal to 7-1/2 (European Size 60)	MEDIUM
Greater than 7-1/2 (European 60)	LARGE

**COMMENTS:**

The manufacturer marked the helmet with its corresponding discrete size: M 57-58 cm  
Discrete Size: 57-58 cm, Headform Size: DOT Medium

**CONDITIONING FOR TESTING — Paragraph S6.4 —** The protective headgear shall be conditioned for not less than 4 hours and no more than 24 hours, in the specified environmental condition shown below, prior to test.

Ambient Conditions	16°C to 26°C (61°F to 79°F); 30% to 70% Relative Humidity
Low Temperature	-15°C to -5°C (5°F to 23°F)
High Temperature	45°C to 55°C (113°F to 131°F)
Water Immersion	16°C to 26°C (61°F to 79°F)

The maximum time during which the protective headgear may be out of the conditioning environment shall not exceed 4 minutes. It must then be returned to the conditioned environment for a minimum of 3 minutes for each minute or portion of a minute in excess of 4 minutes out of the conditioning environment or 12 hours, whichever is less, prior to resumption of testing.



## IMPACT ATTENUATION

SYSTEMS CHECK	TRIAL DROP	DROP (meters)	VEL. (m/s)	PEAK (g)	DWELL TIME (ms)		TEST RECORD	HEADFORM POSITION
					150 g	200 g		
PRETEST	1	1.4	5.08	393.5	2.4	2.0	Pre 1	Crown
	2	1.4	5.09	395.8	2.4	2.0	Pre 2	Crown
	3	1.4	5.12	396.2	2.4	2.0	Pre 3	Crown
PRETEST AVERAGE		XXXX	XXXX	395.2	XXX	XXX	XXXX	XXXX
POSTTEST	1	1.4	5.08	394.8	2.5	2.1	Post 1	Crown
	2	1.4	5.08	389.9	2.4	2.0	Post 2	Crown
	3	1.4	5.09	389.7	2.5	2.0	Post 3	Crown
POSTTEST AVERAGE		XXXX	XXXX	391.5	XXX	XXX	XXXX	XXXX
DIFFERENCE BETWEEN PRE-TEST AND POST-TEST AVERAGES				3.7	DIFFERENCE NOT TO EXCEED 15 g			

Helmet Designation	Helmet Condition	Impact Location	Front		Left		Right		Rear	
			1	2	1	2	1	2	1	2
A	Ambient	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	1	2	3	4	5	6	7	8
		Peak g	88	105	94	104	161	165	163	165
		ms @ 150	0.0	0.0	0.0	0.0	0.8	1.8	2.3	0.8
		ms @ 200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity m/s	5.22	5.20	5.23	5.20	5.99	5.99	6.06	6.09
B	Low Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	9	10	11	12	13	14	15	16
		Peak g	80	91	102	120	157	170	160	156
		ms @ 150	0.0	0.0	0.0	0.0	0.7	1.5	1.8	0.2
		ms @ 200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity m/s	5.19	5.18	5.21	5.21	6.01	6.01	6.09	6.02
C	High Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	17	18	19	20	21	22	23	24
		Peak g	74	93	94	101	143	151	133	158
		ms @ 150	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.6
		ms @ 200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity m/s	5.21	5.20	5.18	5.23	6.02	6.02	6.06	6.08
D	Water Immersed	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	25	26	27	28	29	30	31	32
		Peak g	81	93	91	101	149	168	142	146
		ms @ 150	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
		ms @ 200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity m/s	5.19	5.19	5.19	5.19	6.01	6.05	6.06	6.08

COMMENTS: 1. The actual drop heights were: flat anvil 195 cm, hemi anvil 146 cm.  
2. Values reported in the above tables are rounded.

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## PENETRATION

Paragraph S5.2 and S7.2

**WEIGHT OF STRIKER:** 2.95 to 3.06 kg (6 pounds, 8 ounces to 6 pounds, 12 ounces)

**POINT OF STRIKER:** Radius =  $0.5 \pm 0.1$  mm ( $0.02 \pm 0.004$  in.), included angle of  $60^\circ \pm 0.5^\circ$ , hardness minimum of 60 Rockwell "C" Scale and a cone height of not less than  $3.8 \pm 0.038$  cm ( $1.5 \pm 0.015$  in.).

**HEIGHT OF FALL:**  $300 \text{ cm} \pm 1.5 \text{ cm}$ , measured from the tip of the striker point to the outer surface of the mounted protective headgear.

**FAILURE CRITERION:** When tested, the protective headgear shall be failed if the penetrator has made an indentation in the headform.

TEST	HELMET	TEST LOCATION	PASS	FAIL	CONDITIONS
1	A	Crown	X		AMBIENT
2	A	Front Right	X		AMBIENT
3	B	Crown	X		LOW TEMPERATURE
4	B	Front Right	X		LOW TEMPERATURE
5	C	Crown	X		HIGH TEMPERATURE
6	C	Front Right	X		HIGH TEMPERATURE
7	D	Crown	X		WATER IMMERSED
8	D	Front Right	X		WATER IMMERSED

**COMMENT:** Photographs of penetration test locations are found in Appendix C.

## RETENTION SYSTEM

Paragraph S5.3 and S7.3

AMBIENT TEMPERATURE: 20 °C ;      AMBIENT HUMIDITY: 38 %

REQUIREMENTS:

READING	APPLIED LOAD
INITIAL	22.68 kg, + 4.54 kg, - 0 kg (50.0 Lbs, + 10 Lbs, - 0 Lbs)
FINAL	136 kg, + 0 kg, - 2.3 kg (300.0 Lbs, + 0 Lbs, - 5 Lbs)

ELONGATION NOT TO EXCEED 2.5 cm (1.0 INCH) AFTER LOAD INCREASE

HELMET	CONDITIONS	INITIAL READING (cm)	FINAL READING (cm)	ELONGATION (cm)
A	AMBIENT	0.45	1.40	0.95
B	LOW TEMPERATURE	0.67	1.66	0.99
C	HIGH TEMPERATURE	0.40	1.43	1.03
D	WATER IMMERSED	0.58	1.65	1.07

CONFIGURATION - Paragraph S5.4 - Helmet shall provide a minimum peripheral vision of 105° to each side of the midsagittal plane. The brow opening shall be at least 2.54 cm (1 inch) above all points in the basic plane that are within the angles of peripheral vision.

	REQUIREMENTS	TEST RESULTS
PERIPHERAL VISION	> 105°	Pass
BROW OPENING	> 2.5 cm (1 inch)	Pass

COMMENT: Values in the above tables are rounded.

## LABELING

S5.6.1 *Labeling* - Each helmet shall be permanently and legibly labeled, in a manner such that the label(s) can be easily read without removing padding or any other permanent part, with the following:

Required Information	Content/Format	Permanent
Manufacturer's name	Pass	Pass
Discrete size	Pass	Pass
Month and year of manufacture	Pass	Pass
Instructions to the purchaser as follows:	-----	-----
“Shell and liner constructed of (identify type(s) of materials).”	Pass	Pass
“Helmet can be seriously damaged by some common substances without damage being visible to the user.”	Pass	Pass
“Apply only the following: (Recommended cleaning agents, paints, adhesives, etc., as appropriate.”	Pass	Pass
“Make no modifications.”	Pass	Pass
“Fasten helmet securely.”	Pass	Pass
“If helmet experiences a severe blow, return it to the manufacturer for inspection, or destroy it and replace it.”	Pass	Pass

COMMENT: Labels were determined to be both easily read and permanent based on the TP-218-07, Section 12.5.4.

## LABELING

S5.6.2 Certification. Each helmet shall be labeled permanently and legibly with a label, constituting the manufacturer's certification that the helmet conforms to the applicable Federal motor vehicle safety standards, that is separate from the label(s) used to comply with S5.6.1, and complies with paragraphs (a) through (c) of this section.

(a) Content, format, and appearance. The label required by paragraph S5.6.2 shall have the following content, format, and appearance:

Required Certification Information	Content/ Format	Permanent
The symbol "DOT," horizontally centered on the label, in letters not less than 0.38 inch (1.0 cm) high.	Pass	Pass
The term "FMVSS No. 218," horizontally centered beneath the symbol DOT, in letters not less than 0.09 inches (0.23 cm) high.	Pass	
The word "CERTIFIED," horizontally centered beneath the term "FMVSS No. 218," in letters not less than 0.09 inches (0.23 cm) high.	Pass	
The precise model designation horizontally centered above the symbol DOT, in letters and/or numerals not less than 0.09 inch (0.23 cm) high.	Pass	
The manufacturer's name and/or brand, horizontally centered above the model designation, in letters and/or numerals not less than 0.09 inch (0.23 cm) high.	Pass	
All symbols, letters and numerals shall be in a color that contrasts with the background of the label.	Pass	
No information, other than the information specified in subparagraph (a), shall appear on the label.	Pass	
The label shall appear on the outer surface of the helmet and be placed so that it is centered laterally with the horizontal centerline of the DOT symbol located a minimum of 1 inch (2.5 cm) and a maximum of 3 inches (7.6 cm) from the bottom edge of the posterior portion of the helmet.	Pass	

COMMENT: Labels were determined to be both easily read and permanent based on the TP-218-07, Section 12.5.4.

## TEST DATA

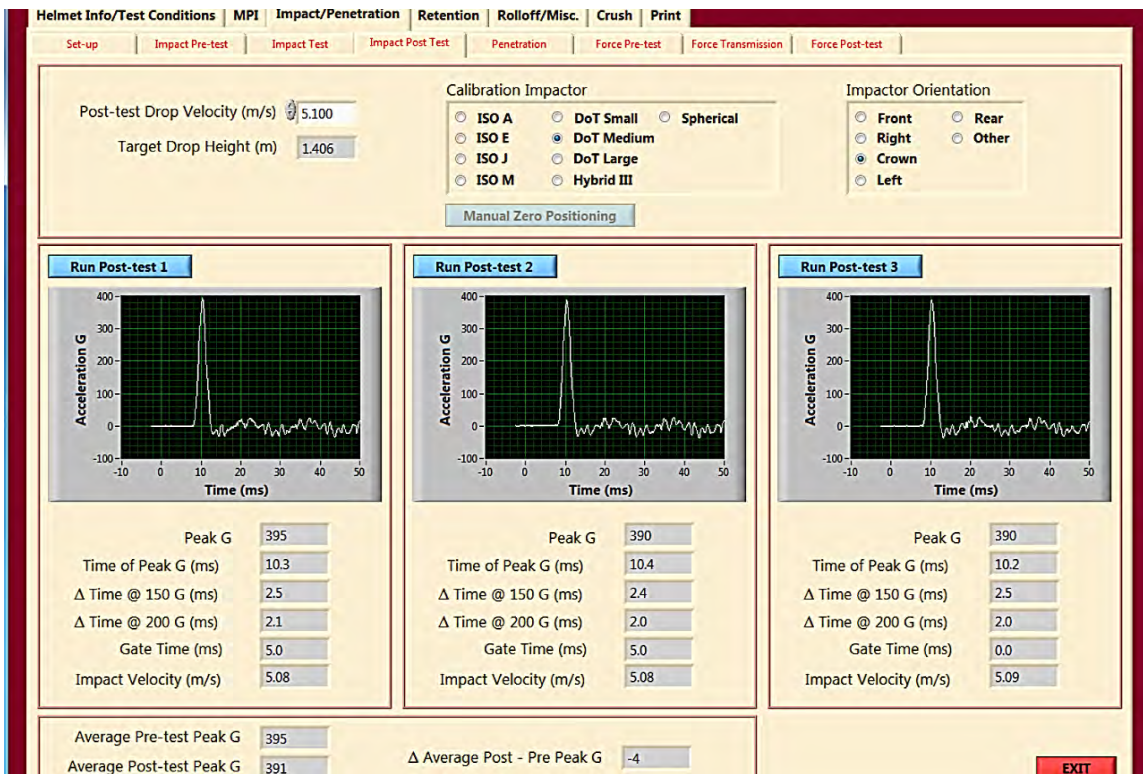
Contract File No.: 52.0823

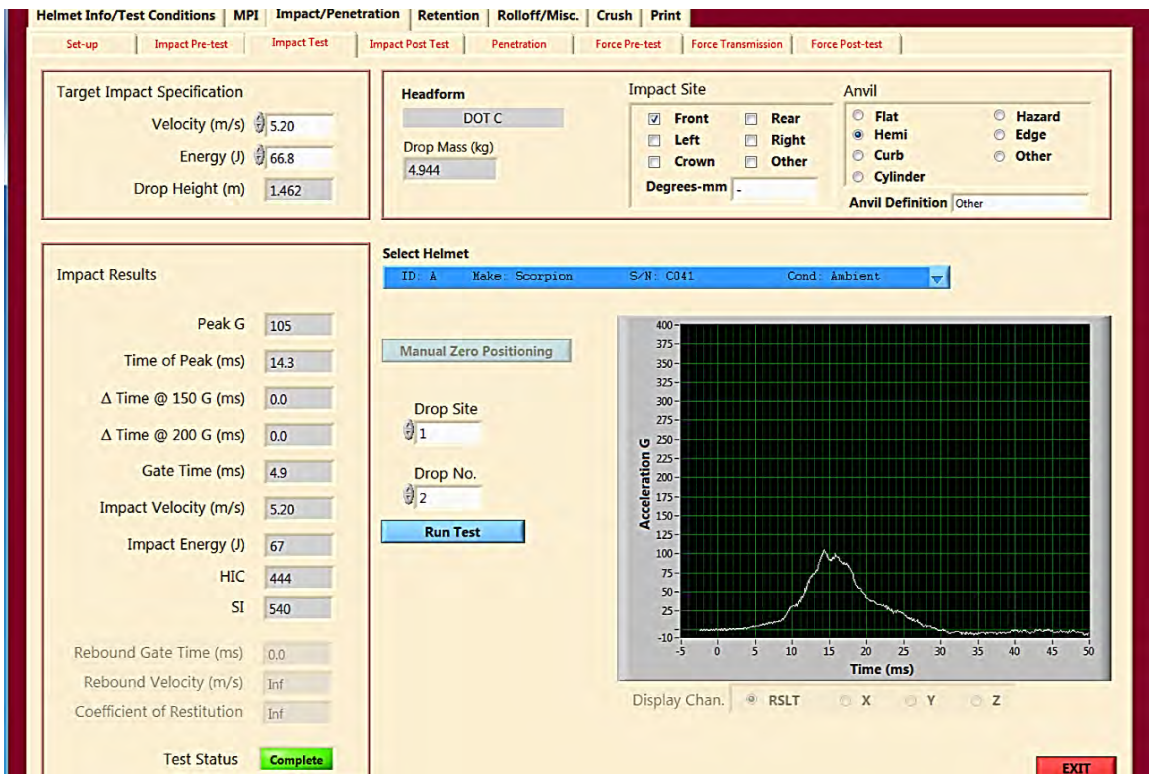
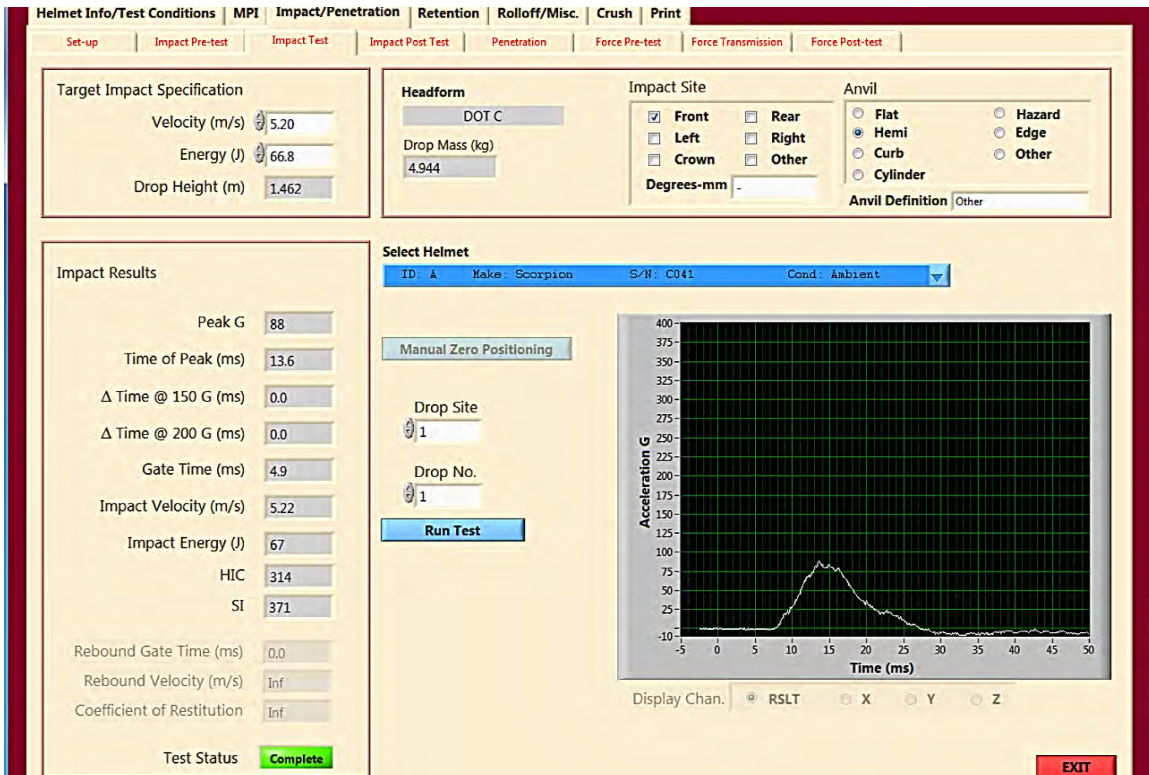
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Technician: George Stetina

Test Date: 31 March 2017







**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 94

Time of Peak (ms) 11.1

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.23

Impact Energy (J) 68

HIC 310

SI 375

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: A   Make: Scorpion   S/N: C041   Cond: Ambient

Manual Zero Positioning

Drop Site 2

Drop No. 1

**Run Test**

Acceleration G vs Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 104

Time of Peak (ms) 12.3

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.20

Impact Energy (J) 67

HIC 364

SI 423

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: A   Make: Scorpion   S/N: C041   Cond: Ambient

Manual Zero Positioning

Drop Site 2

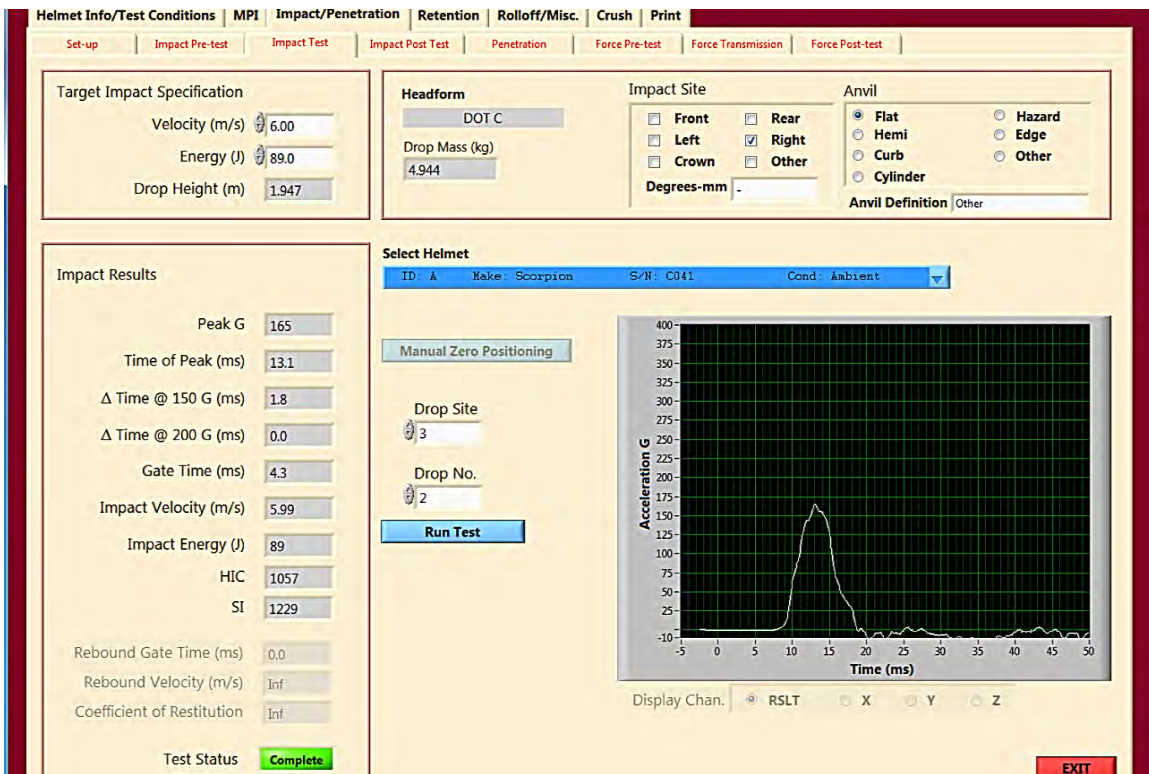
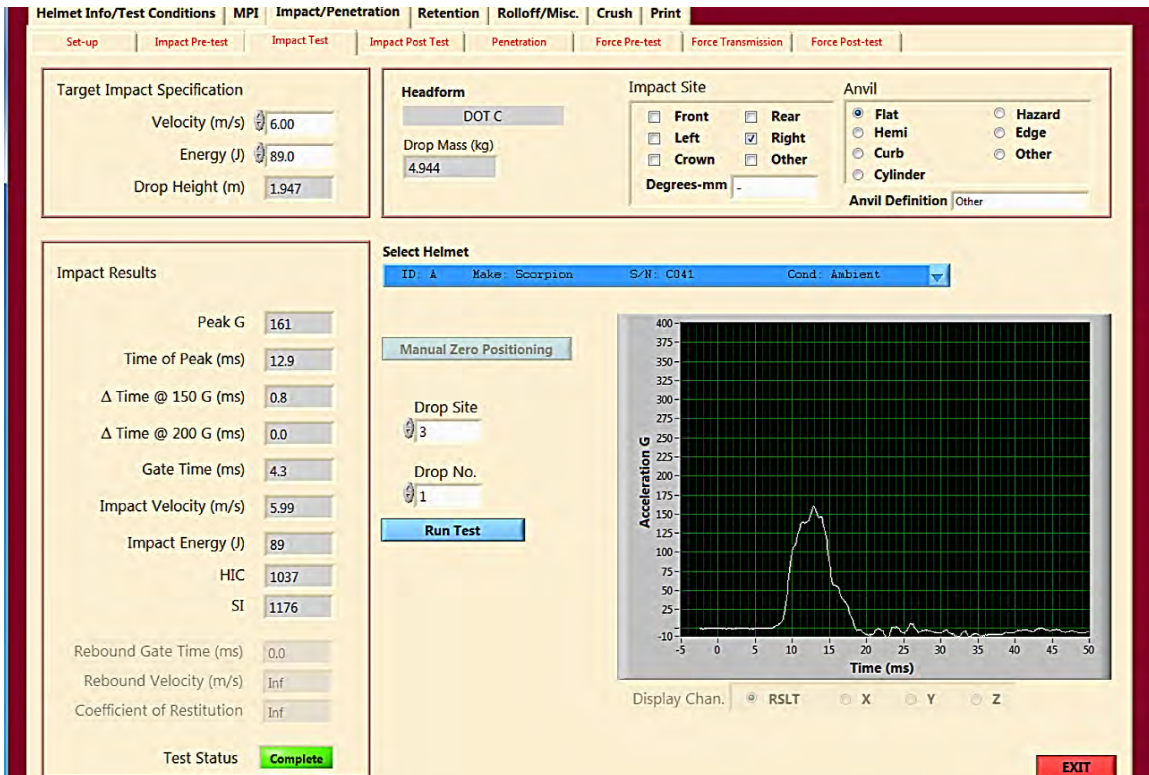
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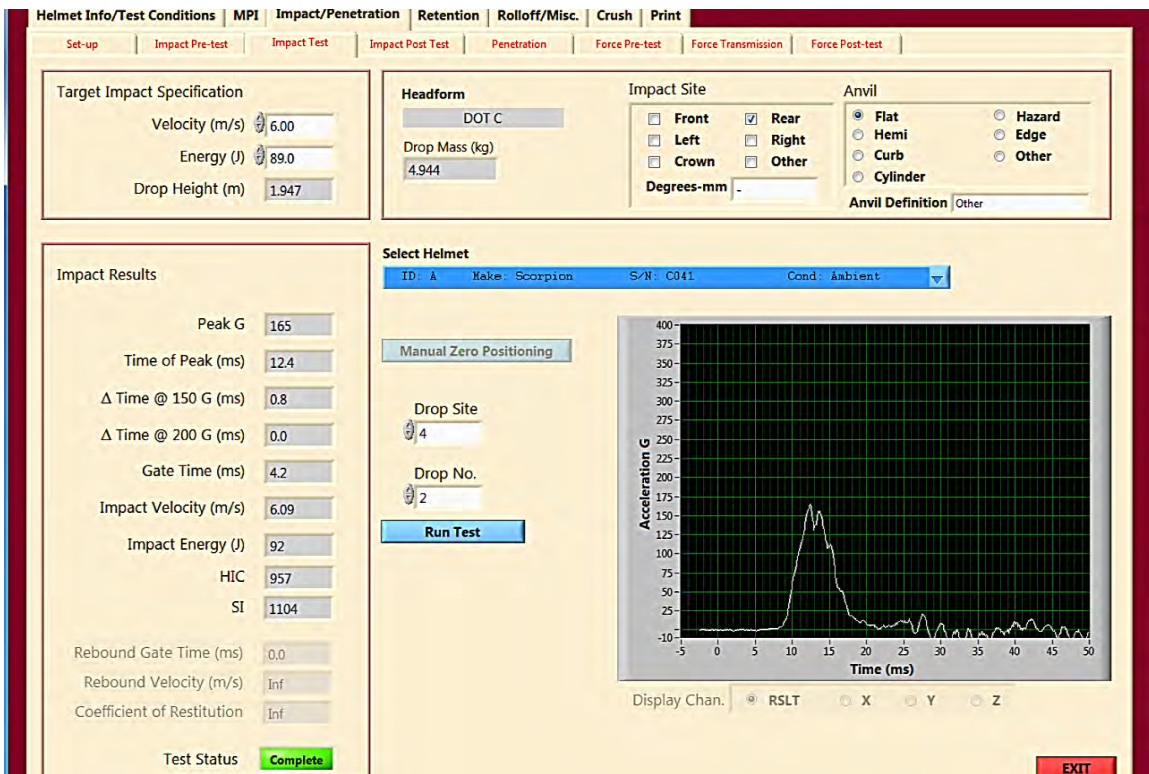
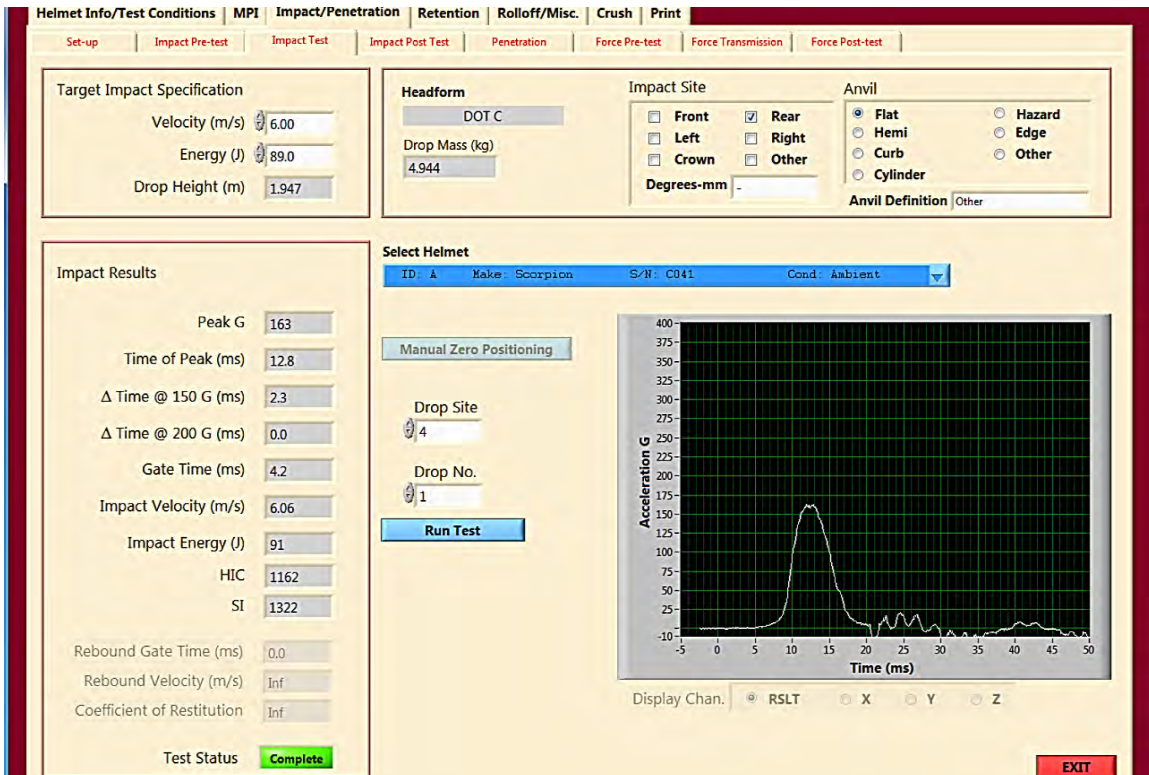
**Run Test**

Acceleration G vs Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**





**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 80

Time of Peak (ms) 15.1

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.19

Impact Energy (J) 67

HIC 244

SI 295

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B Make: Scorpion S/N: C041 Cond: Cold

Manual Zero Positioning

Drop Site 1

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 91

Time of Peak (ms) 14.3

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.18

Impact Energy (J) 66

HIC 341

SI 413

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B Make: Scorpion S/N: C041 Cond: Cold

Manual Zero Positioning

Drop Site 1

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 102

Time of Peak (ms) 11.1

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.21

Impact Energy (J) 67

HIC 403

SI 474

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B   Make: Scorpion   S/N: C041   Cond: Cold

Manual Zero Positioning

Drop Site 2

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 120

Time of Peak (ms) 12.1

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.21

Impact Energy (J) 67

HIC 387

SI 486

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B   Make: Scorpion   S/N: C041   Cond: Cold

Manual Zero Positioning

Drop Site 2

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | **MPI** | **Impact/Penetration** | **Retention** | **Rolloff/Misc.** | **Crush** | **Print**

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 157

Time of Peak (ms) 12.9

Δ Time @ 150 G (ms) 0.7

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.3

Impact Velocity (m/s) 6.01

Impact Energy (J) 89

HIC 975

SI 1123

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B   Make: Scorpion   S/N: C041   Cond: Cold

Manual Zero Positioning

Drop Site 3

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | **MPI** | **Impact/Penetration** | **Retention** | **Rolloff/Misc.** | **Crush** | **Print**

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 170

Time of Peak (ms) 13.2

Δ Time @ 150 G (ms) 1.5

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.3

Impact Velocity (m/s) 6.01

Impact Energy (J) 89

HIC 1020

SI 1226

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B   Make: Scorpion   S/N: C041   Cond: Cold

Manual Zero Positioning

Drop Site 3

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 160

Time of Peak (ms) 12.9

Δ Time @ 150 G (ms) 1.8

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.09

Impact Energy (J) 92

HIC 1144

SI 1296

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B Make: Scorpion S/N: C041 Cond: Cold

Manual Zero Positioning

Drop Site 4

Drop No. 1

**Run Test**

Acceleration G vs Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 156

Time of Peak (ms) 14.0

Δ Time @ 150 G (ms) 0.2

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.3

Impact Velocity (m/s) 6.02

Impact Energy (J) 90

HIC 998

SI 1139

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: B Make: Scorpion S/N: C041 Cond: Cold

Manual Zero Positioning

Drop Site 4

Drop No. 2

**Run Test**

Acceleration G vs Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 74

Time of Peak (ms) 15.0

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.21

Impact Energy (J) 67

HIC 256

SI 300

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 1

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 93

Time of Peak (ms) 17.1

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.20

Impact Energy (J) 67

HIC 330

SI 394

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 1

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**



**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 94

Time of Peak (ms) 11.7

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.18

Impact Energy (J) 66

HIC 277

SI 342

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 2

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 101

Time of Peak (ms) 12.5

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.23

Impact Energy (J) 68

HIC 395

SI 443

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 2

Drop No. 2

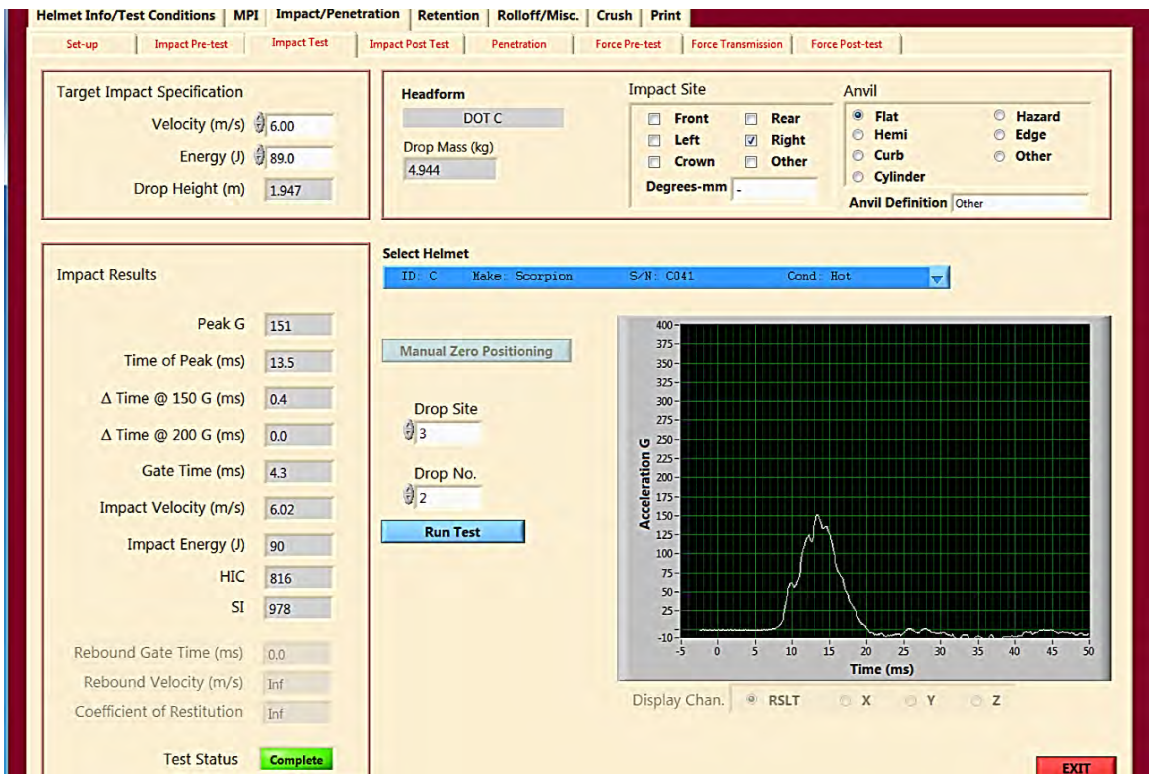
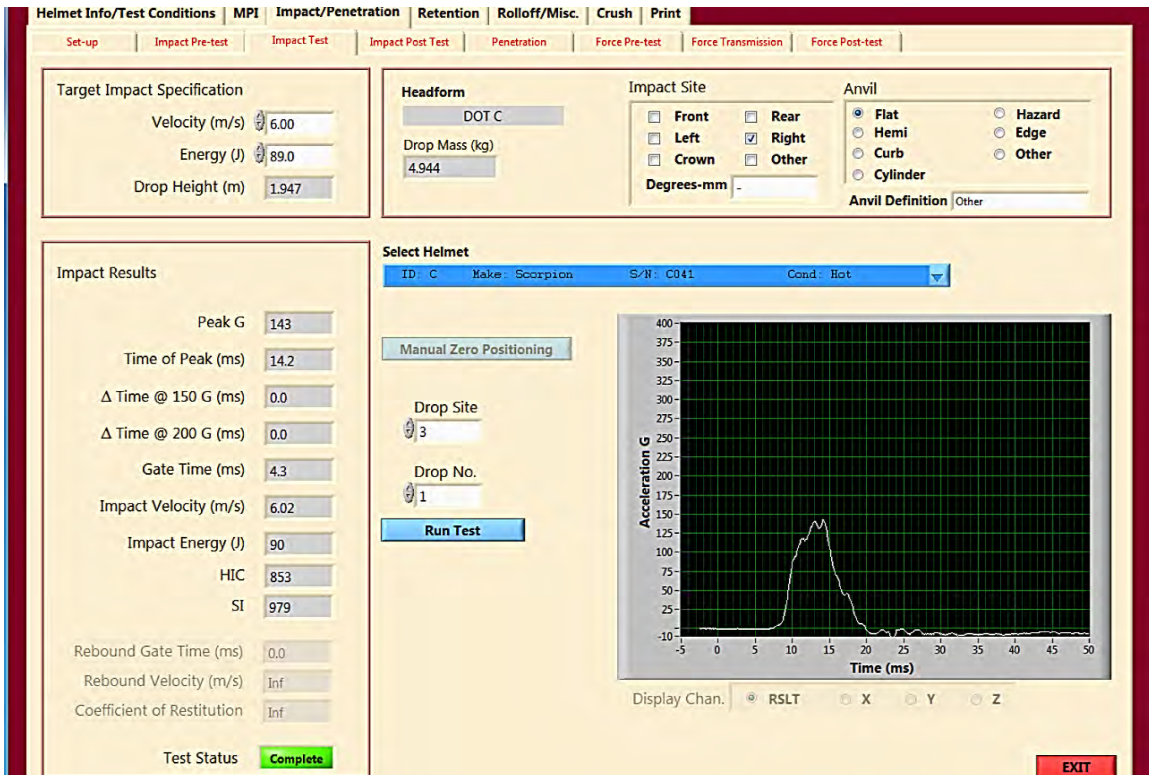
**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**



**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 133

Time of Peak (ms) 13.4

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.06

Impact Energy (J) 91

HIC 810

SI 915

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 4

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 158

Time of Peak (ms) 13.7

Δ Time @ 150 G (ms) 0.6

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.08

Impact Energy (J) 91

HIC 908

SI 1069

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: C Make: Scorpion S/N: C041 Cond: Hot

Manual Zero Positioning

Drop Site 4

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 81

Time of Peak (ms) 15.3

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.19

Impact Energy (J) 67

HIC 278

SI 329

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D Make: Scorpion S/N: C041 Cond: Wet

Manual Zero Positioning

Drop Site 1

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 5.20

Energy (J) 66.8

Drop Height (m) 1.462

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear

Left  Right

Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard

Hemi  Edge

Curb  Other

Cylinder

Anvil Definition Other

**Impact Results**

Peak G 93

Time of Peak (ms) 16.3

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.9

Impact Velocity (m/s) 5.19

Impact Energy (J) 67

HIC 334

SI 407

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D Make: Scorpion S/N: C041 Cond: Wet

Manual Zero Positioning

Drop Site 1

Drop No. 2

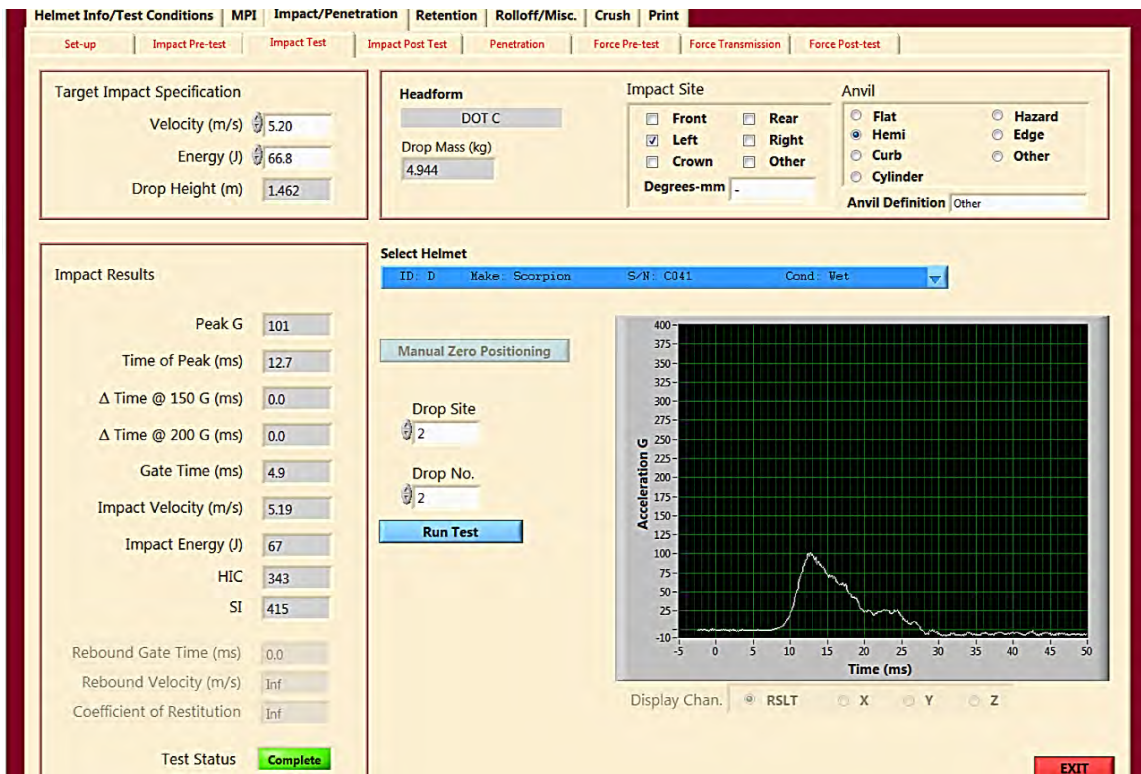
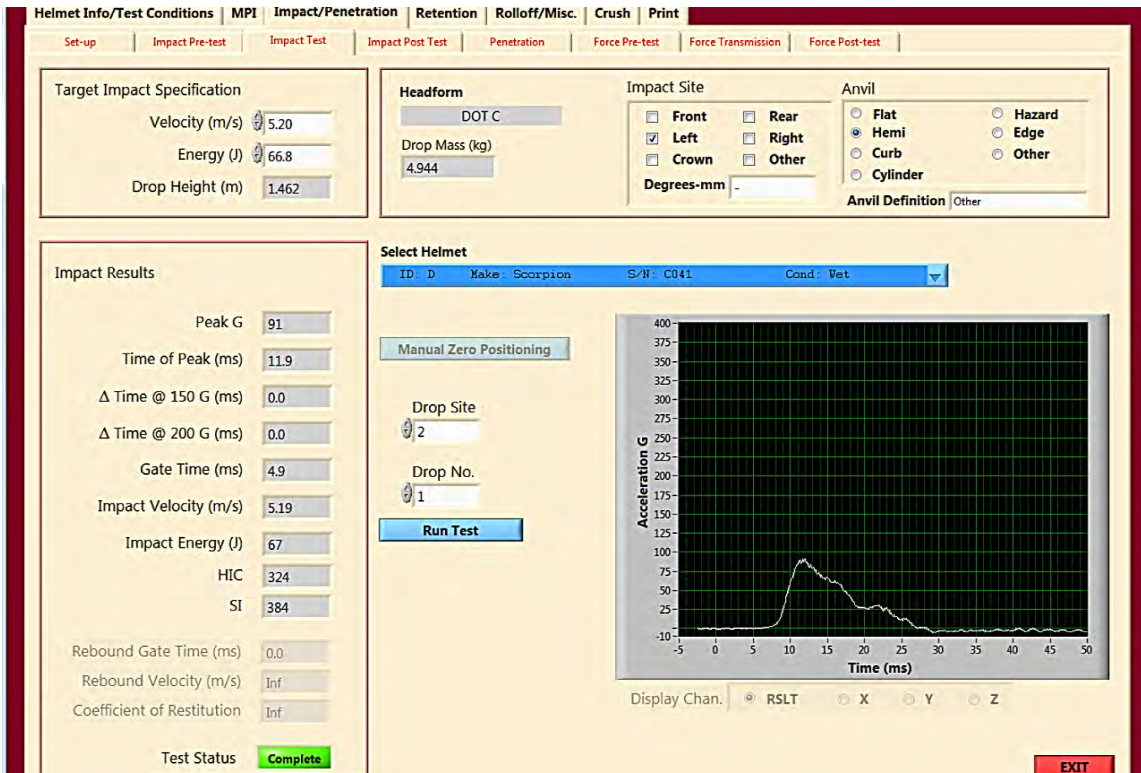
**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**



**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 150

Time of Peak (ms) 12.5

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.3

Impact Velocity (m/s) 6.01

Impact Energy (J) 89

HIC 899

SI 1033

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D   Make: Scorpion   S/N: C041   Cond: Wet

Manual Zero Positioning

Drop Site 3

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front    Rear  
 Left    Right  
 Crown    Other

Degrees-mm -

**Anvil**

Flat    Hazard  
 Hemi    Edge  
 Curb    Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 168

Time of Peak (ms) 12.9

Δ Time @ 150 G (ms) 1.8

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.05

Impact Energy (J) 90

HIC 1020

SI 1208

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D   Make: Scorpion   S/N: C041   Cond: Wet

Manual Zero Positioning

Drop Site 3

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT    X    Y    Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 142

Time of Peak (ms) 11.9

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.06

Impact Energy (J) 91

HIC 893

SI 1009

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D Make: Scorpion S/N: C041 Cond: Wet

Manual Zero Positioning

Drop Site 4

Drop No. 1

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

**Helmet Info/Test Conditions** | MPI | **Impact/Penetration** | Retention | Rolloff/Misc. | Crush | Print

Set-up | Impact Pre-test | **Impact Test** | Impact Post Test | Penetration | Force Pre-test | Force Transmission | Force Post-test

**Target Impact Specification**

Velocity (m/s) 6.00

Energy (J) 89.0

Drop Height (m) 1.947

**Headform**

DOT C

Drop Mass (kg) 4.944

**Impact Site**

Front  Rear  
 Left  Right  
 Crown  Other

Degrees-mm -

**Anvil**

Flat  Hazard  
 Hemi  Edge  
 Curb  Other  
 Cylinder

Anvil Definition Other

**Impact Results**

Peak G 146

Time of Peak (ms) 13.8

Δ Time @ 150 G (ms) 0.0

Δ Time @ 200 G (ms) 0.0

Gate Time (ms) 4.2

Impact Velocity (m/s) 6.08

Impact Energy (J) 91

HIC 993

SI 1141

Rebound Gate Time (ms) 0.0

Rebound Velocity (m/s) Inf

Coefficient of Restitution Inf

Test Status **Complete**

**Select Helmet**

ID: D Make: Scorpion S/N: C041 Cond: Wet

Manual Zero Positioning

Drop Site 4

Drop No. 2

**Run Test**

Acceleration G

Time (ms)

Display Chan:  RSLT  X  Y  Z

**EXIT**

C:\DAQ\DAQ\_ADMIN\Strap Retention\Strap\_Retention.exe\Strap Retention - Main.vi  
Last modified on 1/21/2013 at 7:38 PM  
Printed on 4/11/2017 at 3:59 PM

L21NR1



C:\DAQ\DAQ\_ADMIN\Strap Retention\Strap\_Retention.exe\Strap Retention - Main.vi  
Last modified on 1/21/2013 at 7:38 PM  
Printed on 4/11/2017 at 4:07 PM

L21NR1





C:\DAQ\DAQ\_ADMIN\Strap Retention\Strap\_Retention.exe\Strap Retention - Main.vi  
Last modified on 1/21/2013 at 7:38 PM  
Printed on 4/11/2017 at 4:12 PM

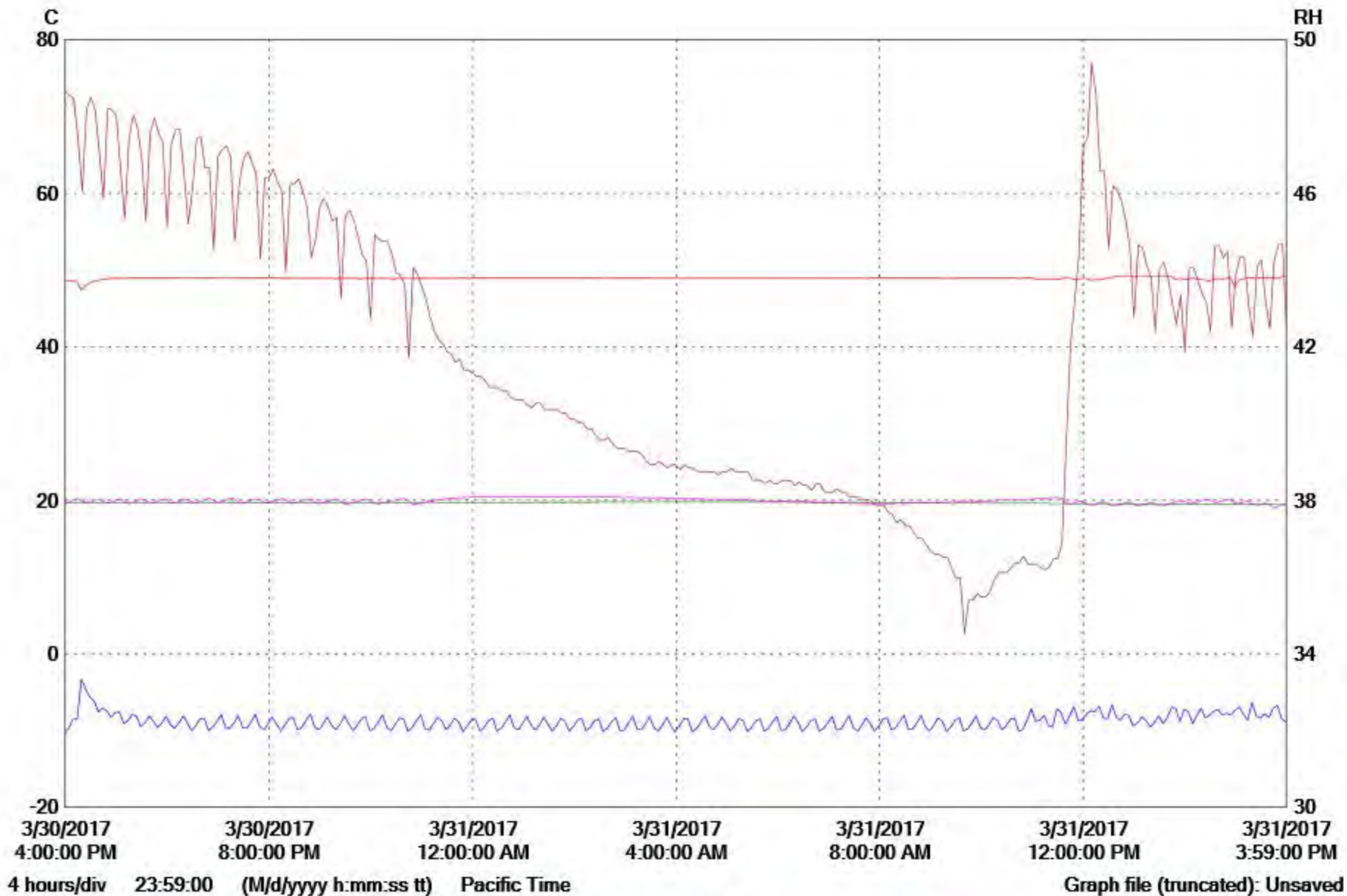
LEINER



C:\DAQ\DAQ\_ADMIN\Strap Retention\Strap\_Retention.exe\Strap Retention - Main.vi  
Last modified on 1/21/2013 at 7:38 PM  
Printed on 4/11/2017 at 4:17 PM

LEINER





LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	09021116	Oven/Water	1	49.22	48.92	47.42	C	Oven	Oven_Water-09021116-2017-04-18 09-15-08.spl	
2	09021116	Oven/Water	2	19.77	19.65	19.40	C	Water	Oven_Water-09021116-2017-04-18 09-15-08.spl	
3	08071106	Freezer	1	-3.26	-8.84	-10.16	C	Freezer	Freezer-08071106-2017-04-18 09-15-03.spl	
4	08052076	LAB TEMP/RH	1	20.48	19.92	19.03	C	Lab Temp.	LAB TEMP_RH-08052076-2017-04-18 09-14-59.spl	
5	08052076	LAB TEMP/RH	2	49.4	41.8	34.5	RH	Humidity	LAB TEMP_RH-08052076-2017-04-18 09-14-59.spl	

**APPENDIX A**  
**INTERPRETATIONS OR DEVIATIONS FROM FMVSS 218**

None

## APPENDIX B

### EQUIPMENT LIST AND CALIBRATION SCHEDULES

Equipment List					
ACT ID	Description	Make/Model	S/N	Dimensional Check	Next
H0079	Monorail	US Testing	NA	11/18/2016	11/18/2017
H0004	DOT Small Headform	Controlled Casting	NA	11/18/2016	11/18/2017
H0005	DOT Medium Headform	Controlled Casting	NA	11/18/2016	11/18/2017
H0006	DOT Large Headform	Controlled Casting	NA	11/18/2016	11/18/2017
H0028	Anvil	Hemispherical	C070911-01	11/18/2016	11/18/2017
H0029	Anvil	Flat	C310811-02	11/18/2016	11/18/2017
H0078	Anvil	MEP	16100801	11/18/2016	11/18/2017
H0088	Penetration Height Spacer	La Cienega Manufacturing	NA	11/18/2016	11/18/2017
H0064	Penetration Striker	Cadex	4324	11/18/2016	11/18/2017
H0111	Peripheral Vision	1 inch Block	NA	11/18/2016	11/18/2017
H0059	Drop Carriage Assembly	Cadex	NA	11/18/2016	11/18/2017
H0080	Penetrator Tube	La Cienega Manufacturing	NA	NA	NA
H0087	Penetration Headform Mount	La Cienega Manufacturing	NA	NA	NA
H0082	Retention Strength Tester	La Cienega Manufacturing	NA	NA	NA
H0090	High Temperature Chamber	Thermolyne	116005-0891414	NA	NA
H0091	Low Temperature Chamber	Sciencemp	S8001170	NA	NA
H0092	Water Immersion Container	Rubbermaid	NA	NA	NA
H0114	Laser Level	Ryobi	NA	NA	NA
H0115	Computer	Dell	67G5891	NA	NA
H0116	I-O Board	National Instruments	PCI-6023E	NA	NA

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Calibrated Measurement Equipment								
ACT ID	Description	Make/Model	S/N	Range	Accuracy from Cal. Certs	Last Calibration	Next Calibration	Calibration By:
H0102	Velocity Gate	Biok-Gate 9304	9304-001	--	0.16 ms	11/18/2016	11/18/2017	ACT
H0097	Accelerometer/ Amplifier/Filter	2279/104/109	ANTP2/AK/A P23	2000 g	±2.60%	8/25/2016	8/25/2017	Precision Labs
H0112	Peripheral Vision	D&K 125	NA	180 °	0.7 °	11/17/2016	11/17/2017	Micro Quality Calibration
H0098	LVDT - Retention	Schaevitz 2000-HR	16071	2 in	±0.06 mm	11/21/2016	11/21/2017	Micro Quality Calibration
H0099	Load Cell - Retention	LSB350	490706	500 lbs	±0.2%	11/22/2016	11/22/2017	Micro Quality Calibration
H0103	Ohaus Scale	Scout Pro SP6000	7126321419	0-6000 gm	±1 g	11/17/2016	11/17/2017	Micro Quality Calibration
H0104	Digital Height Gauge	Starrett Digitape D34-16	64639	300 cm	±0.0625 in	11/18/2016	11/18/2017	Micro Quality Calibration
H0105	Height Gage	Mitutoyo	3121016	12 in	±0.002 in	11/30/2016	11/30/2017	Micro Quality Calibration
H0106	Environmental Data Logger	Veriteq SP-2000-20R	8052076	-40 To +95C, 0-100% RH	±0.03 °C	6/21/2016	6/21/2017	Veriteq
H0107	Environmental Data Logger	Veriteq SP-1000-22N	8071106	-40 To +95 °C	±0.02 °C	6/21/2016	6/21/2017	Veriteq
H0108	Environmental Data Logger	Veriteq SP-1000-22N	9021116	-40 To +95 °C	±0.02 °C	6/21/2016	6/21/2017	Veriteq

Contract File No.: 52.0823

Test File: C041

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Technician: George Stetina

Test Date: 31 March 2017

**APPENDIX C**  
**PHOTOGRAPHS**

Contract File No.: 52.0823  
Test File: C041

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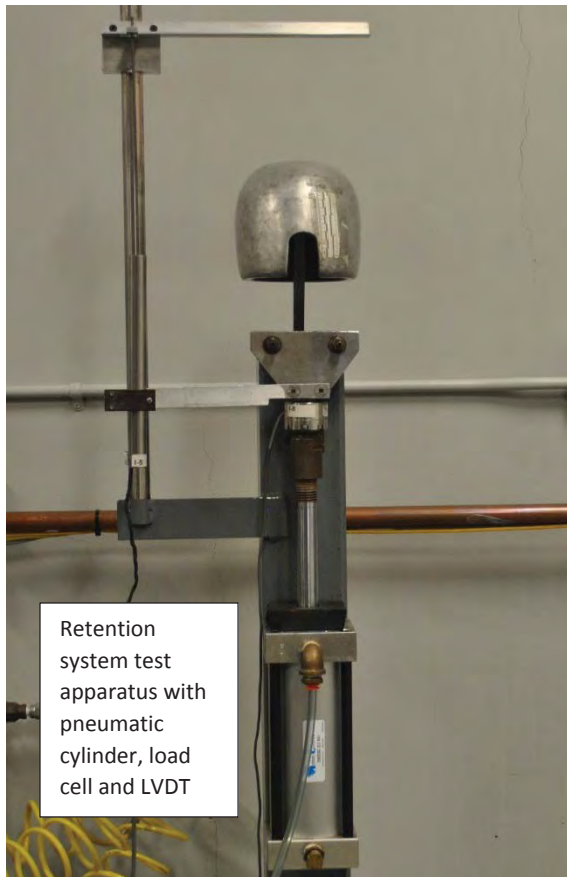
Test Date: 31 March 2017



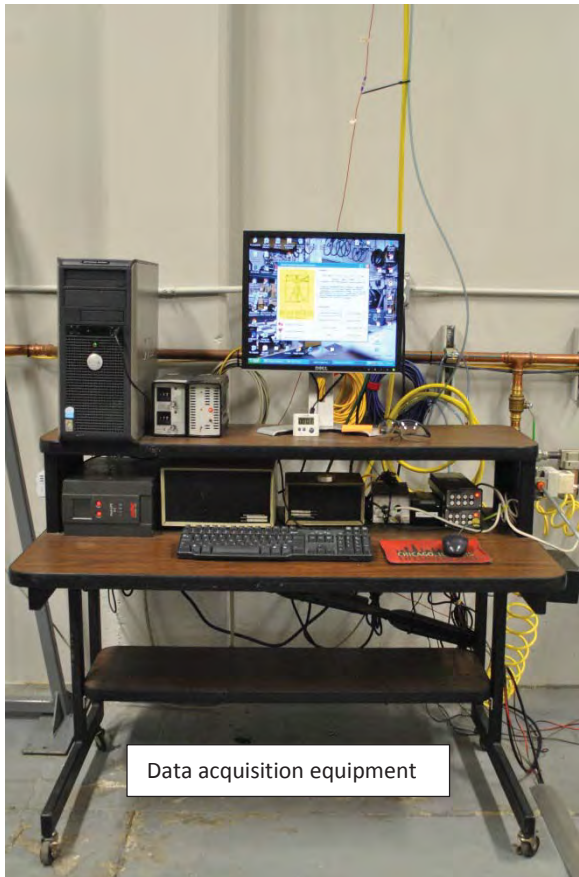
Impact attenuation test apparatus with three headforms (S, M, L), flat, hemi and MEP anvils



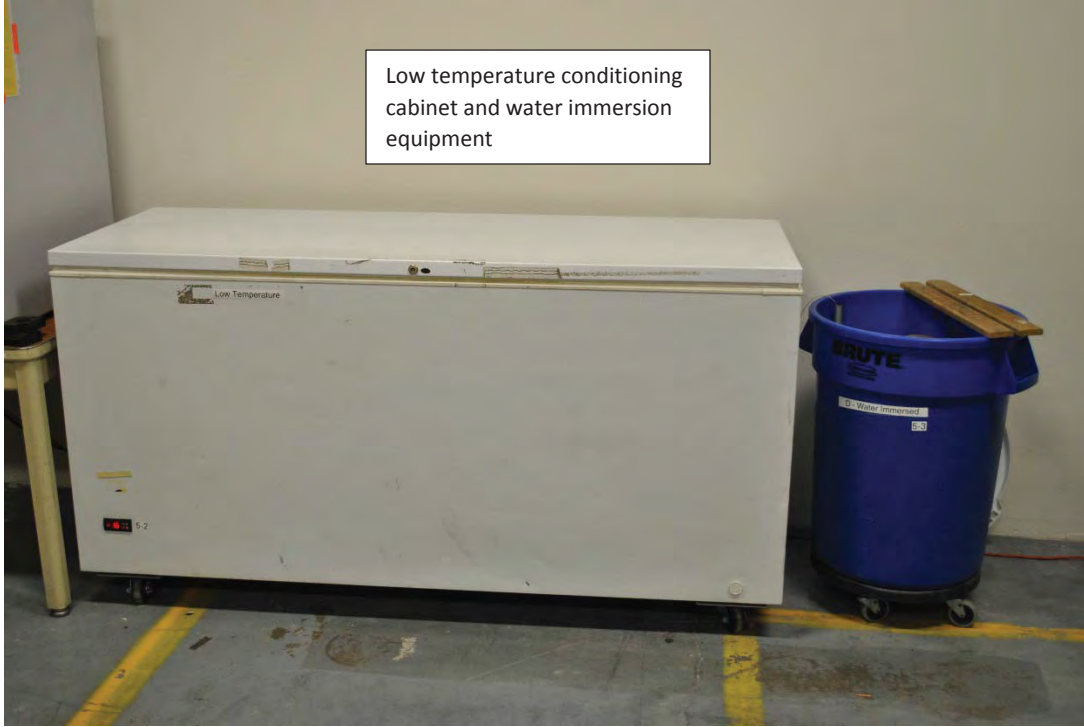
Penetration test apparatus with adjustable base



Retention system test apparatus with pneumatic cylinder, load cell and LVDT



Data acquisition equipment



Low temperature conditioning cabinet and water immersion equipment



High temperature chamber



SCORPION EXO  
EXO-AT950 helmet  
and box showing  
model designation



SCORPION EXO  
EXO-AT950 helmet  
with test line, front left  
view



SCORPION EXO  
EXO-AT950 helmet  
with test line, rear left  
view



SCORPION EXO  
EXO-AT950 helmet  
interior view



SCORPION EXO  
EXO-AT950 front  
and left side  
hemispherical anvil  
impact locations



SCORPION EXO  
EXO-AT950 right  
side and rear flat  
anvil impact locations



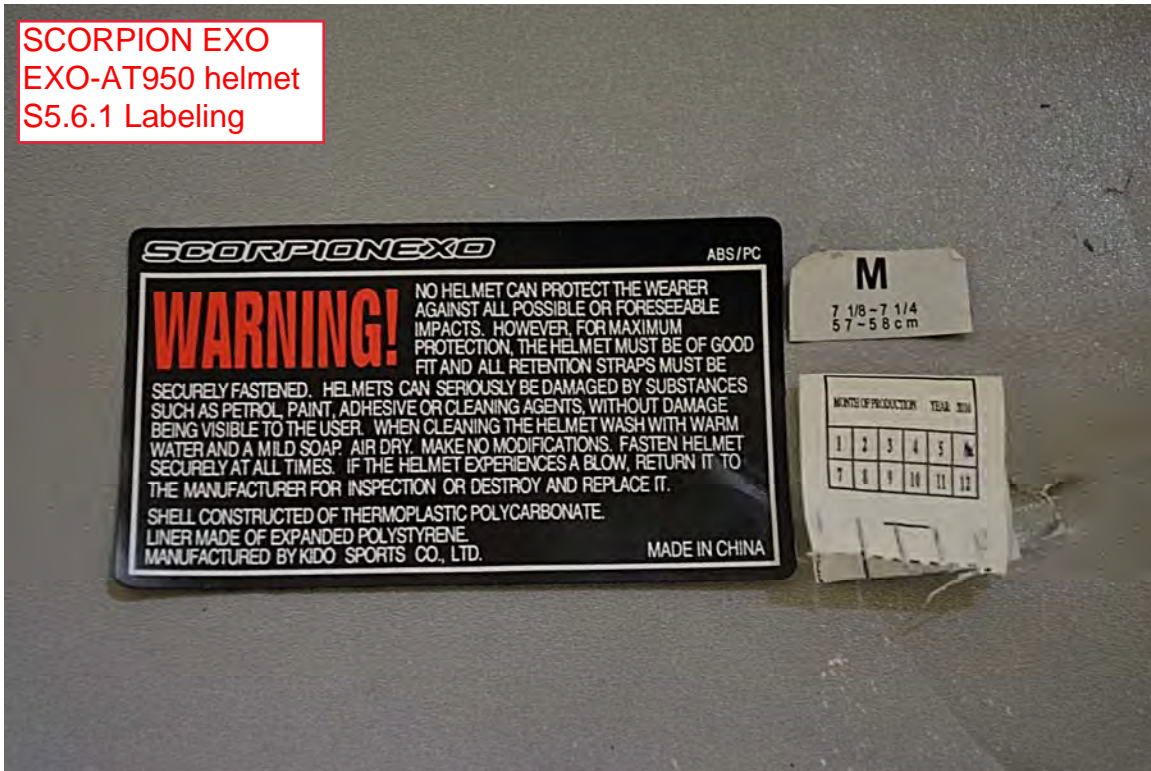
SCORPION EXO  
EXO-AT950 crown  
penetration test



SCORPION EXO  
EXO-AT950 front  
right penetration test



**SCORPION EXO  
EXO-AT950 helmet  
S5.6.1 Labeling**



**SCORPION EXO  
EXO-AT950 helmet  
S5.6.2 Certification**

