

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

Brand: Icon Helmets
Model: Airframe Pro
Size: Large (59-60 cm)

Prepared By

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21 May 2019

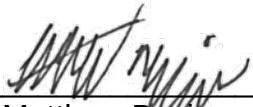
Final Report 218-DRI-19-004

Prepared For

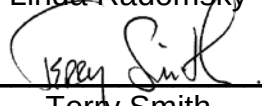
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code: NEF-220
1200 New Jersey Ave., SE
Washington, DC 20590

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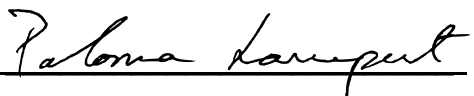
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Approval Date: May 21, 2019

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9 Performing Organization Name and Address Dynamic Research Inc. 355 Van Ness Avenue Torrance, CA 90501				10 Work Unit No. (TRAIS)	
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12 Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance Mail Code: NEF-220, W43-481 1200 New Jersey Ave., SE Washington, DC 20590				13 Type of Report and Period Covered Final Test Report	
				14 Sponsoring Agency Code NEF-220	
15 Supplementary Notes					
16 Abstract Compliance tests were conducted on the Icon Airframe Pro size large motorcycle helmet in accordance with the specifications of the Office of Vehicle Safety Compliant Test Procedure No. TP-218-07. Test failures were as follows: None.					
17 Key Words Compliance Testing Safety Engineering FMVSS No. 218			18 Distribution Statement Copies of this report are available from – National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Avenue SE (Room E12-100) Washington DC 20590		
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TABLE OF CONTENTS

Section I — Purpose of Compliance Test

Section II — Compliance Test Data Summary

Section III — Test Data

Section IV — Test Failure Details (if applicable)

**Appendix A — Interpretations or Deviations from
FMVSS No. 218**

Appendix B — Test Equipment List and Calibration Information

Appendix C — Photographs

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"¹ 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-218-07², as governed by the contract.

2. TEST PROCEDURE

The Dynamic Research Inc. In-House Test Procedures, FMVSS 218 Motorcycle Helmets³ submitted to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, contains the specific procedures used to conduct the test. The Dynamic Research Inc. In-House Test Procedures document 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.

¹ 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.

² NHTSA, TP-218-07, Laboratory Test Procedure for FMVSS 218, Motorcycle Helmets, 13 May 201.

³ Dynamic Research Inc., Dynamic Research Inc. In-House Test Procedures FMVSS No. 218, Motorcycle Helmets, November 2018.

HELMET DATA

HELMET BRAND NAME: ICON
HELMET MODEL DESIGNATION: Airframe Pro
HELMET MANUFACTURER: J-Tech Corp.
HELMET SIZE DESIGNATION: Large (59-60 cm)
HELMET COVERAGE: Complete
HELMET POSITIONING INDEX: 40 mm
SHELL MATERIAL: Fiberglass and polyester resin
LINER MATERIAL: Expanded polystyrene
BUCKLE DESCRIPTION: Double d-ring

Helmet	A Ambient	B Low Temp	C High Temp	D Water Immersed	E Spare
Shell Color/Pattern	Black	Black	Black	Black	Black
Weight (grams)	1544	1524	1552	1554	1682
Month & Year of Manufacture	07/2018	07/2018	07/2018	07/2018	07/2018

COMMENTS:

- All helmets were received in undamaged condition and were appropriate for testing
- The HPI was supplied by NHTSA based on information from the manufacturer
- The weight of the helmets A-D is recorded after auxiliary equipment has been removed and the helmet is ready for testing. The weight of helmet E is recorded with auxiliary equipment in place.
- Photographs of the helmets and equipment are given in Appendix C (Photographs)
- Helmet data given is based on information provided with the helmets, information the manufacturer/distributor provided to NHTSA, and measured data

SUMMARY OF TEST RESULTS

TEST DATE: May 21, 2019

INDICATE PASS OR FAIL

HELMET	A	B	C	D	COMMENTS
TEST	AMBIENT	LOW TEMP	HIGH TEMP	WATER IMMERSED	
IMPACT	PASS	PASS	PASS	PASS	
PENETRATION	PASS	PASS	PASS	PASS	
RETENTION	PASS	PASS	PASS	PASS	

INDICATE PASS OR FAIL OR NOT TESTED

TEST	PASS/FAIL
PERIPHERAL VISION	PASS
PROJECTIONS	PASS
LABELING	PASS

COMMENTS:

SELECTION OF APPROPRIATE HEADFORM

TEST DATE: May 21, 2019

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: 59-60cm
Discrete Size: 59-60 cm, Headform Size: DOT Medium
Headform Drop Assembly Weight = 5.158 kg

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; 30% to 70% Rel. Humidity
Low Temperature	-15°C to -5°C
High Temperature	45°C to 55°C
Water Immersion	16°C to 26°C

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 TESTS

TEST DATE: May 21, 2019

AMBIENT TEMPERATURE: 22.5°C

AMBIENT HUMIDITY: 45 %

SYSTEMS CHECK	TRIAL DROP	Drop Height (cm)	VEL. (m/s)	Peak Accel. (g)	Dwell Time (ms)		Test Record	Headform Position
					150g	200g		
PRE-TEST	4	156	5.33	414	2.5	2.1	Pre 4	Crown
	5	156	5.42	409	2.4	2.1	Pre 5	Crown
	6	156	5.34	412	2.5	2.1	Pre 6	Crown
PRE-TEST AVERAGE				412				
POST TEST	4	156	5.21	417	2.5	2.1	Post 4	Crown
	5	156	5.22	421	2.5	2.1	Post 5	Crown
	6	156	5.20	421	2.5	2.1	Post 6	Crown
POST-TEST AVERAGE				419				
DIFFERENCE BETWEEN PRETEST AND POST TEST AVERAGES				7	DIFFERENCE NOT TO EXCEED 15 G's			

COMMENTS:

In accordance with TP-218-07, pre-test and post-test values are derived from trial drops 4, 5 and 6. Trial drops 1, 2 and 3 are warm-up hits as prescribed by the test procedure.

IMPACT TEST RESULTS

Helmet Designation	Helmet Condition	Impact Location	Front		Left		Right		Rear	
		Impact #	1	2	1	2	1	2	1	2
A	Ambient	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record #	1	2	9	10	17	18	25	26
		Peak g	84	145	119	121	155	196	178	138
		ms @ 150G	0.0	0.0	0.0	0.0	1.1	2.8	2.2	0.0
		ms @ 200G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity (m/s)	5.00	5.06	5.06	5.09	5.82	5.81	5.95	5.97
B	Low Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record #	3	4	11	12	19	20	27	28
		Peak g	92	122	112	118	178	180	143	164
		ms @ 150G	0.0	0.0	0.0	0.0	2.6	2.0	0.0	2.1
		ms @ 200G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity (m/s)	5.00	5.01	5.07	5.08	5.81	5.88	5.93	5.95
C	High Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record #	5	6	13	14	21	22	29	30
		Peak g	89	124	125	130	165	179	128	166
		ms @ 150G	0.0	0.0	0.0	0.0	1.1	2.7	0.0	1.7
		ms @ 200G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity (m/s)	5.09	5.10	5.03	5.08	5.89	5.89	5.90	5.90
D	Water Immersed	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record #	7	8	15	16	23	24	31	32
		Peak g	61	61	112	100	177	171	124	143
		ms @ 150G	0.0	0.0	0.0	0.0	1.8	2.1	0.0	0.0
		ms @ 200G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Velocity (m/s)	5.10	5.10	5.08	5.08	5.89	5.89	5.93	5.92

COMMENTS: See Data Traces in Appendix B

PENETRATION TESTS

TEST DATE: May 21, 2019

AMBIENT TEMPERATURE: 22.5°C

AMBIENT HUMIDITY: 45 %

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 ± 0.1 mm, included angle of $60^\circ \pm 0.5^\circ$, hardness minimum of 60 Rockwell "C" Scale and a cone height of 3.8 ± 0.038 cm.

HEIGHT OF FALL: 300cm, + 0.0cm, - 3.0cm, as 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	COND	LOCATION	PASS	FAIL	COMMENTS
1	A	Ambient	Crown Front	X		
2	A	Ambient	Crown Rear	X		
3	B	Low	Crown Front	X		
4	B	Low	Crown Rear	X		
5	C	High	Crown Front	X		
6	C	High	Crown Rear	X		
7	D	Water	Crown Front	X		
8	D	Water	Crown Rear	X		

COMMENTS: See penetration test site photographs in Appendix C.

RETENTION SYSTEM TEST

TEST DATE: May 21, 2019

Paragraph S5.3 and S7.3

AMBIENT TEMPERATURE: 22.5°C

AMBIENT HUMIDITY: 45 %

REQUIREMENTS:

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

ELONGATION NOT TO EXCEED 2.54cm (1.0 INCH) AFTER LOAD INCREASE

HELMET ID	CONDITIONS	INITIAL READING (cm)	FINAL READING (cm)	ELONGATION (cm)
A	AMBIENT	2.33	4.08	1.75
B	LOW TEMPERATURE	2.25	3.87	1.63
C	HIGH TEMPERATURE	2.34	3.94	1.60
D	WATER IMMERSED	0.98	2.47	1.49

PERIPHERAL VISION - 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 2.54cm (1 inch) above all points in the basic plane that are within the angles of peripheral vision.

	REQUIREMENTS	TEST RESULTS
DEGREE EACH SIDE M.S. PLANE	> 105°	PASS
BROW OPENING	> 2.54cm (1 inch)	PASS

COMMENTS: Values in the above tables are rounded.

PROJECTIONS

TEST DATE: May 21, 2019

Paragraph S5.5 - REQUIREMENTS

PROJECTION TYPE	AVAILABILITY	HEIGHT
INTERNAL-RIGID	NONE	0.0mm (0.00 INCHES)
EXTERNAL-RIGID	OPERATIONAL	5mm MAXIMUM (0.20 INCHES MAXIMUM)

TEST RESULTS:

PROJECTION TYPE	AVAILABILITY	HEIGHT (mm)
INTERNAL – RIGID	None	Not applicable
EXTERNAL - RIGID	Operational	<5mm

COMMENTS: None.

LABELING

TEST DATE: May 21, 2019

Paragraph S5.6.1 - 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 or identification	Pass	Pass
Discrete Size	Pass	Pass
Month and year of manufacture	Pass	Pass
Instruction to the purchaser as follows:		
“Shell and liner construction 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 modification.”	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

COMMENTS:

1. Labels were determined to be both easily read and permanent based on the TP-218-07, Section 12.5.4. See Appendix C for sample labels.

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 S.5.6.1, 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 1.0cm high (.38 inch).	Pass	Pass
The term "FMVSS No. 218" horizontally centered beneath the symbol DOT, in letters not less 0.23 cm high (0.09 inch)	Pass	
The word "CERTIFIED" horizontally centered beneath the term "FMVSS No. 218" in letters no less than 0.23 cm high (0.09 inch)	Pass	
The precise model designation horizontally centered above the symbol DOT, in letters and/or numerals not less than 0.23 cm high (0.09 inch)	Pass	
The manufacturer's name and/or brand, horizontally centered above the model designation, in letters and/or numerals not less than 0.23cm high (0.09 inch)	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 S.5.6.1 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 2.5cm (1 inch) and a maximum of 7.6 cm (3.0 inches) from the bottom edge of the posterior portion of the helmet.	Pass	

COMMENTS: Labels were determined to be both easily read and permanent based on the TP-218-07, Section 12.5.4. See Appendix C for sample labels.

TEST DATA

PRE-TEST SYSTEM CHECK

Uni-Axial System-Check

Helmet Manufacturer : **ICON HELMETS**

BACK

PRINT

Address :

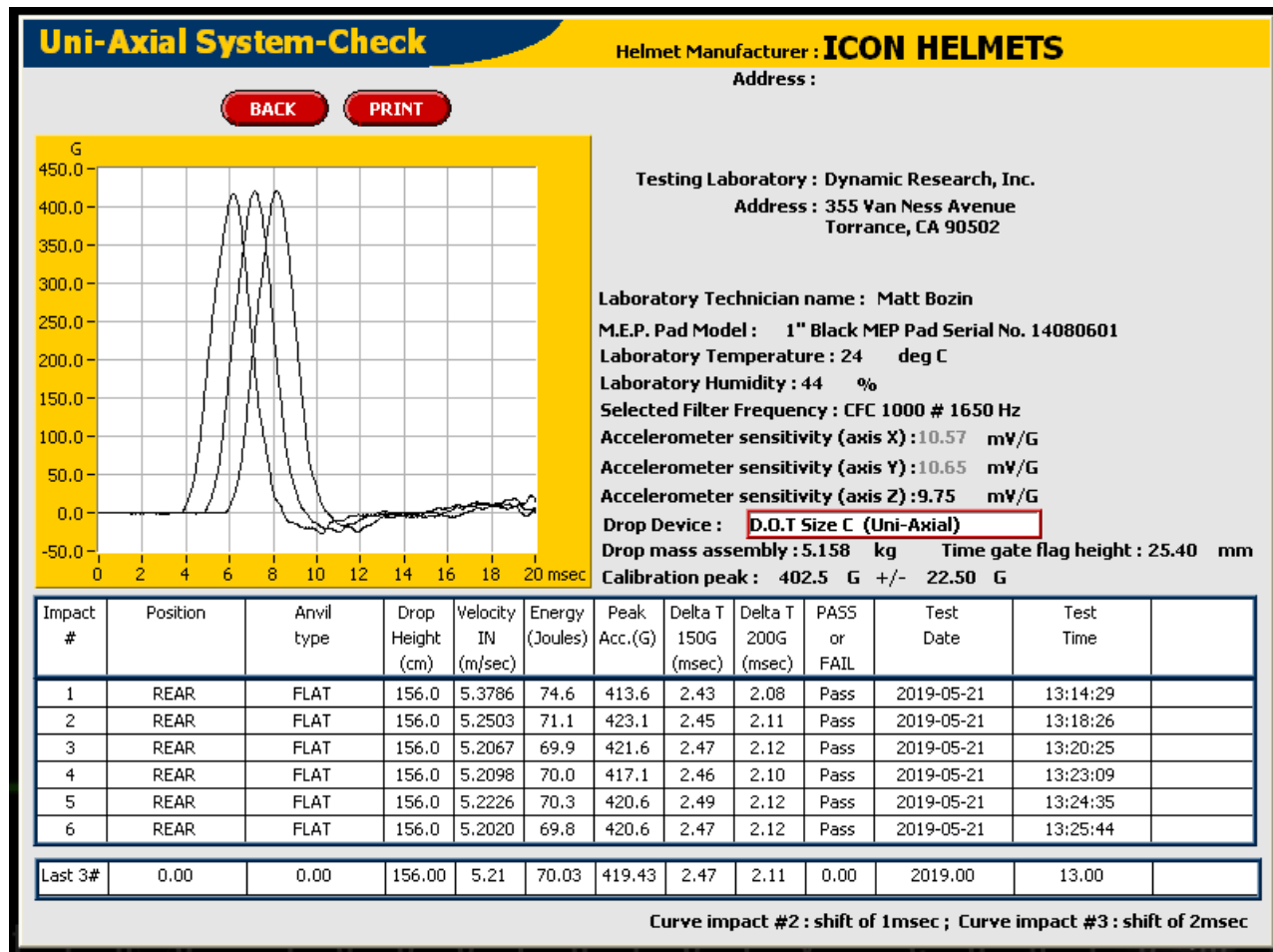
Testing Laboratory : Dynamic Research, Inc.
Address : 355 Van Ness Avenue
Torrance, CA 90502

Laboratory Technician name : Matt Bozin
M.E.P. Pad Model : 1" Black MEP Pad Serial No. 14080601
Laboratory Temperature : 24 deg C
Laboratory Humidity : 44 %
Selected Filter Frequency : CFC 1000 # 1650 Hz
Accelerometer sensitivity (axis X) : 10.57 mV/G
Accelerometer sensitivity (axis Y) : 10.65 mV/G
Accelerometer sensitivity (axis Z) : 9.75 mV/G
Drop Device : D.O.T Size C (Uni-Axial)
Drop mass assembly : 5.158 kg Time gate flag height : 25.40 mm
Calibration peak : 402.5 G +/- 22.50 G

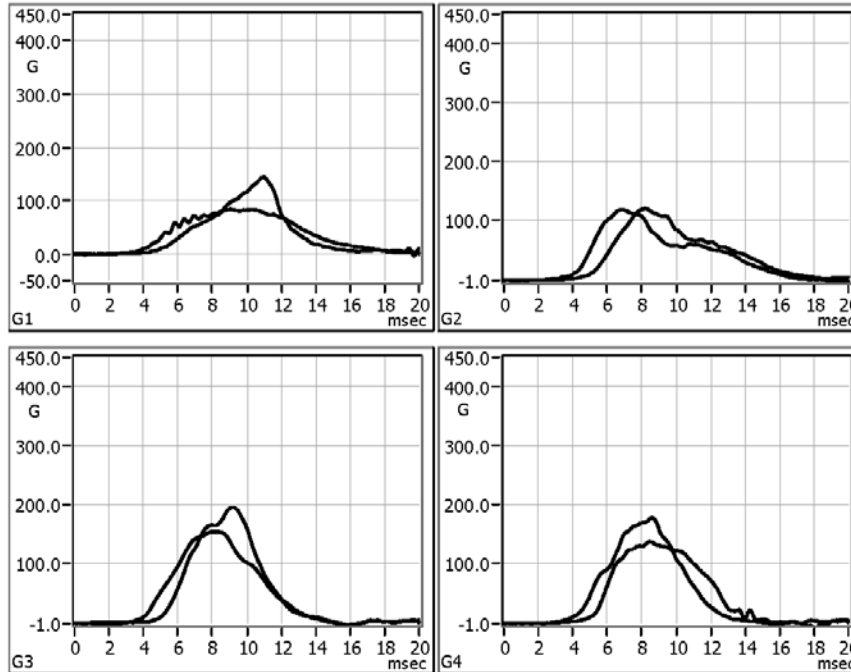
Impact #	Position	Anvil type	Drop Height (cm)	Velocity IN (m/sec)	Energy (Joules)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	PASS or FAIL	Test Date	Test Time	
1	0/0	FLAT	156.0	5.2273	70.5	394.1	2.41	2.01	Pass	2019-05-21	10:49:57	
2	0/0	FLAT	156.0	5.3153	72.9	403.6	2.40	2.03	Pass	2019-05-21	10:51:19	
3	0/0	FLAT	156.0	5.3214	73.0	408.6	2.42	2.06	Pass	2019-05-21	10:52:53	
4	0/0	FLAT	156.0	5.3327	73.3	414.1	2.45	2.08	Pass	2019-05-21	10:56:26	
5	0/0	FLAT	156.0	5.4193	75.7	408.6	2.43	2.06	Pass	2019-05-21	10:57:39	
6	0/0	FLAT	156.0	5.3411	73.6	412.1	2.45	2.08	Pass	2019-05-21	10:58:46	
Last 3#	0.00	0.00	156.00	5.36	74.20	411.60	2.44	2.07	0.00	2019.00	10.00	

Curve impact #2 : shift of 1msec ; Curve impact #3 : shift of 2msec

POST-TEST SYSTEM CHECK



SystemCheckFile#: N/A
Laboratory Technician name : Matt Bozin



Batch Number :
Ref. P.O. Number : 118-15-11004
Model : ICON AirFramePro
Color : Black
Size : Large
Weight : 1544.00 g
Manufacturing Date : July 2018
Standard Request : FMVSS 218
Identification Code : ICONAFLA
Headform Model : DOT
Headform Size : C D.O.T
Conditioning : Ambient
Laboratory Temperature : 24 deg C
Laboratory Humidity : 44 %
Selected Filter Frequency : CFC1000 # 1650 Hz
Maximum Peak G's authorized : 400 G
Maximum Peak m/s2 authorized : 3923 m/s2
Drop mass assembly : 5.158 kg
Time gate flag height : 25.40 mm
Acc. sensibility (axis Z) : 9.75

Impact #	Position	Anvil type	Drop Height (cm)	Velocity IN (m/sec)	Velocity IN (feet/s)	Energy (Joules)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	PASS or FAIL	
1	FRONT	HEMI	139.0	4.9971	16.395	64.4	83.6	0.00	0.00	Pass	
2	FRONT	HEMI	139.0	5.0587	16.597	66.0	144.7	0.00	0.00	Pass	
3	L SIDE	HEMI	139.0	5.0588	16.597	66.0	119.2	0.00	0.00	Pass	
4	L SIDE	HEMI	139.0	5.0883	16.694	66.8	121.2	0.00	0.00	Pass	
5	R SIDE	FLAT	186.0	5.8172	19.085	87.3	155.2	1.10	0.00	Pass	
6	R SIDE	FLAT	186.0	5.8108	19.064	87.1	195.8	2.75	0.00	Pass	
7	REAR	FLAT	186.0	5.9479	19.514	91.2	178.3	2.16	0.00	Pass	
8	REAR	FLAT	186.0	5.9657	19.573	91.8	137.7	0.00	0.00	Pass	

SystemCheckFile#: N/A
Laboratory Technician name : Matt Bozin

Batch Number :

Ref. P.O. Number : 118-15-11004

Model : ICON AirFramePro

Color : Black

Size : Large

Weight : 1524.00 g

Manufacturing Date : July 2018

Standard Request : FMVSS 218

Identification Code : ICONAFLB

Headform Model : DOT

Headform Size : C D.O.T

Conditioning : Cold

Laboratory Temperature : 24 deg C

Laboratory Humidity : 44 %

Selected Filter Frequency : CFC1000 # 1650 Hz

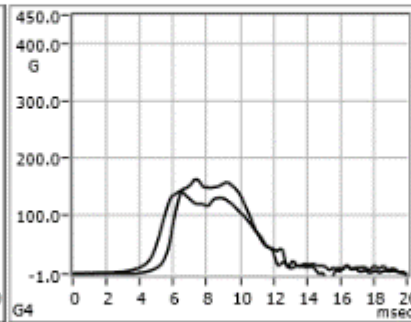
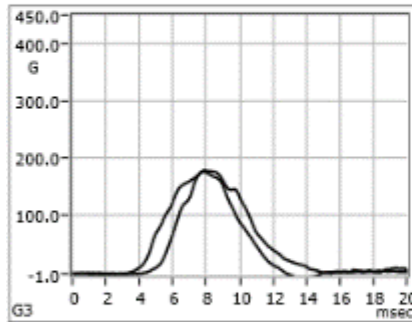
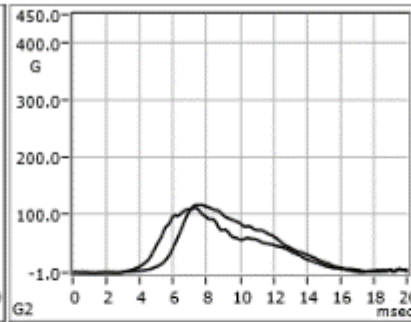
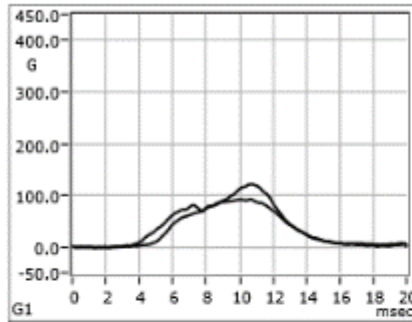
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.158 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 9.75



Impact #	Position	Anvil type	Drop Height (cm)	Velocity IN (m/sec)	Velocity IN (feet/s)	Energy (Joules)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	PASS or FAIL	
1	FRONT	HEMI	139.0	5.0006	16.406	64.5	92.1	0.00	0.00	Pass	
2	FRONT	HEMI	139.0	5.0063	16.425	64.6	121.7	0.00	0.00	Pass	
3	L SIDE	HEMI	139.0	5.0677	16.626	66.2	112.2	0.00	0.00	Pass	
4	L SIDE	HEMI	139.0	5.0780	16.660	66.5	117.7	0.00	0.00	Pass	
5	R SIDE	FLAT	186.0	5.8116	19.067	87.1	177.8	2.60	0.00	Pass	
6	R SIDE	FLAT	186.0	5.8783	19.286	89.1	179.8	2.01	0.00	Pass	
7	REAR	FLAT	186.0	5.9297	19.454	90.7	143.2	0.00	0.00	Pass	
8	REAR	FLAT	186.0	5.9477	19.513	91.2	163.7	2.08	0.00	Pass	

Laboratory Technician name : Matt Bozin

Batch Number :

Ref. P.O. Number : 118-15-11004

Model : ICON AirFramePro

Color : Black

Size : Large

Weight : 1552.00 g

Manufacturing Date : July 2018

Standard Request : FMVSS 218

Identification Code : ICONAFLC

Headform Model : DOT

Headform Size : C D.O.T

Conditioning : Hot

Laboratory Temperature : 24 deg C

Laboratory Humidity : 44 %

Selected Filter Frequency : CFC1000 # 1650 Hz

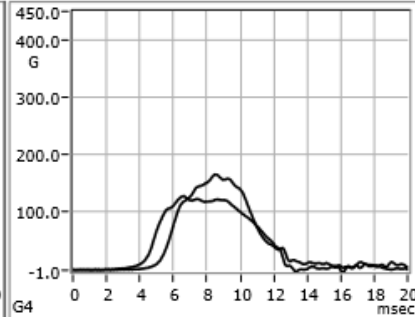
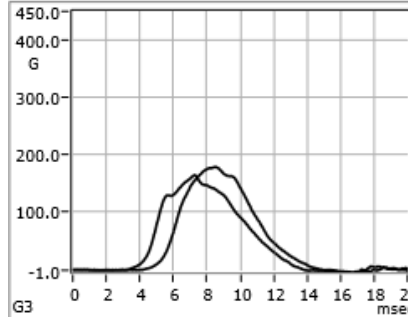
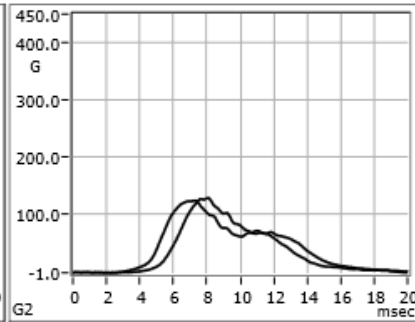
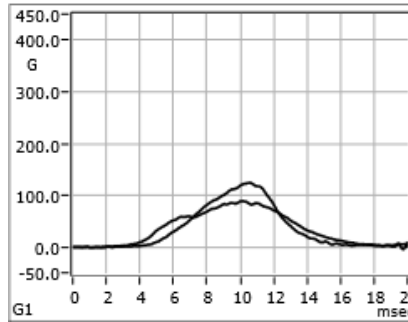
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.158 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 9.75



Impact #	Position	Anvil type	Drop Height (cm)	Velocity IN (m/sec)	Velocity IN (feet/s)	Energy (Joules)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	PASS or FAIL	
1	FRONT	HEMI	139.0	5.0938	16.712	66.9	88.6	0.00	0.00	Pass	
2	FRONT	HEMI	139.0	5.0984	16.727	67.0	124.2	0.00	0.00	Pass	
3	L SIDE	HEMI	139.0	5.0295	16.501	65.2	124.7	0.00	0.00	Pass	
4	L SIDE	HEMI	139.0	5.0791	16.664	66.5	129.7	0.00	0.00	Pass	
5	R SIDE	FLAT	186.0	5.8920	19.331	89.5	165.2	1.06	0.00	Pass	
6	R SIDE	FLAT	186.0	5.8894	19.322	89.5	179.3	2.73	0.00	Pass	
7	REAR	FLAT	186.0	5.9027	19.366	89.9	128.2	0.00	0.00	Pass	
8	REAR	FLAT	186.0	5.8959	19.344	89.7	166.2	1.71	0.00	Pass	

Laboratory Technician name : Matt Bozin

Batch Number :

Ref. P.O. Number : 118-15-11004

Model : ICON AirFramePro

Color : Black

Size : Large

Weight : 1554.00 g

Manufacturing Date : July 2018

Standard Request : FMVSS 218

Identification Code : ICONAFLD

Headform Model : DOT

Headform Size : C D.O.T

Conditioning : Wet

Laboratory Temperature : 24 deg C

Laboratory Humidity : 44 %

Selected Filter Frequency : CFC1000 # 1650 Hz

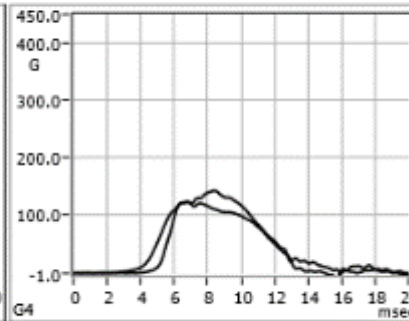
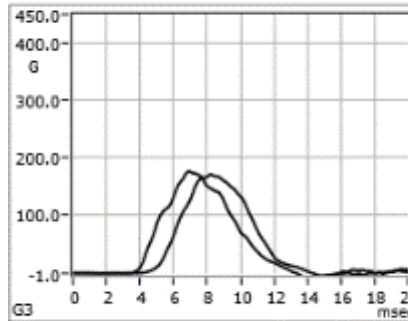
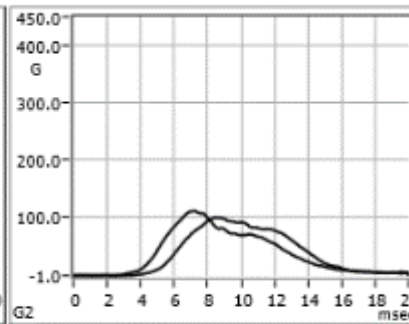
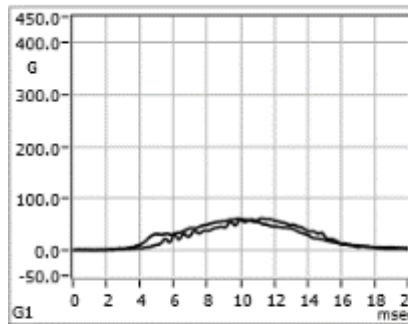
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

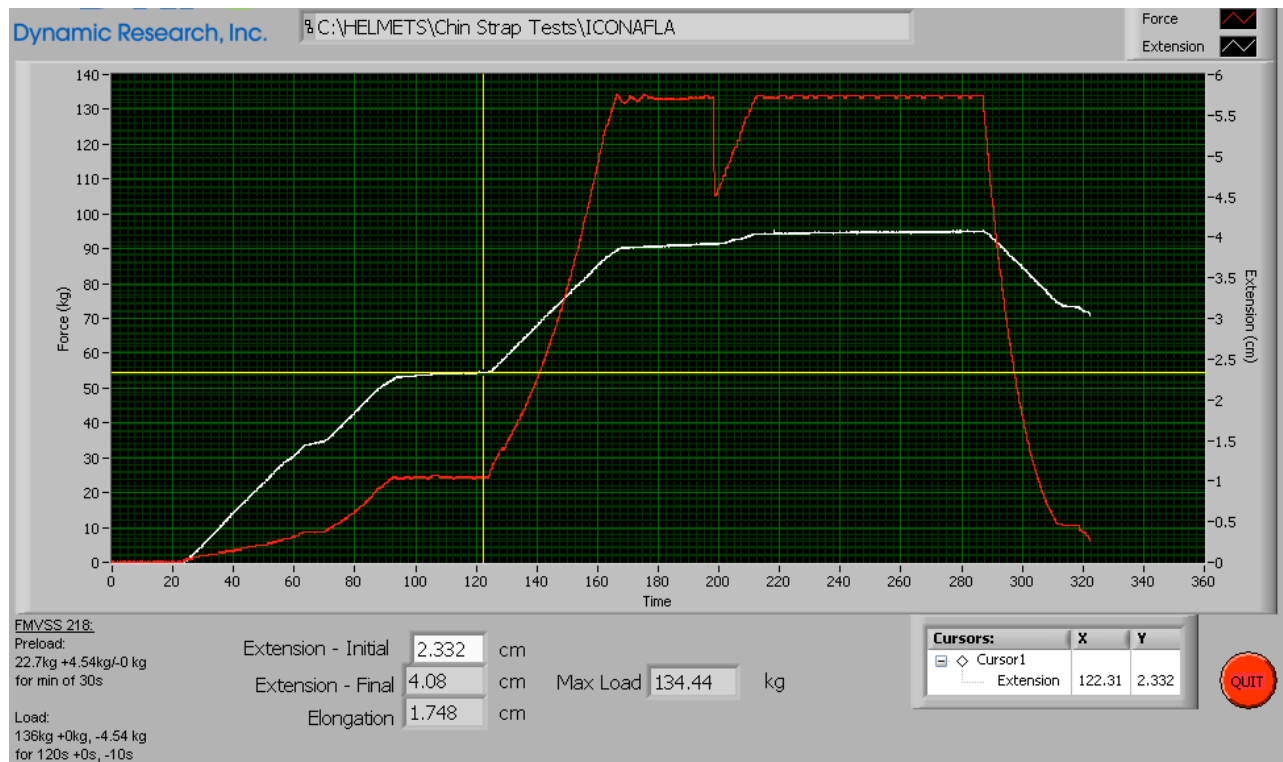
Drop mass assembly : 5.158 kg

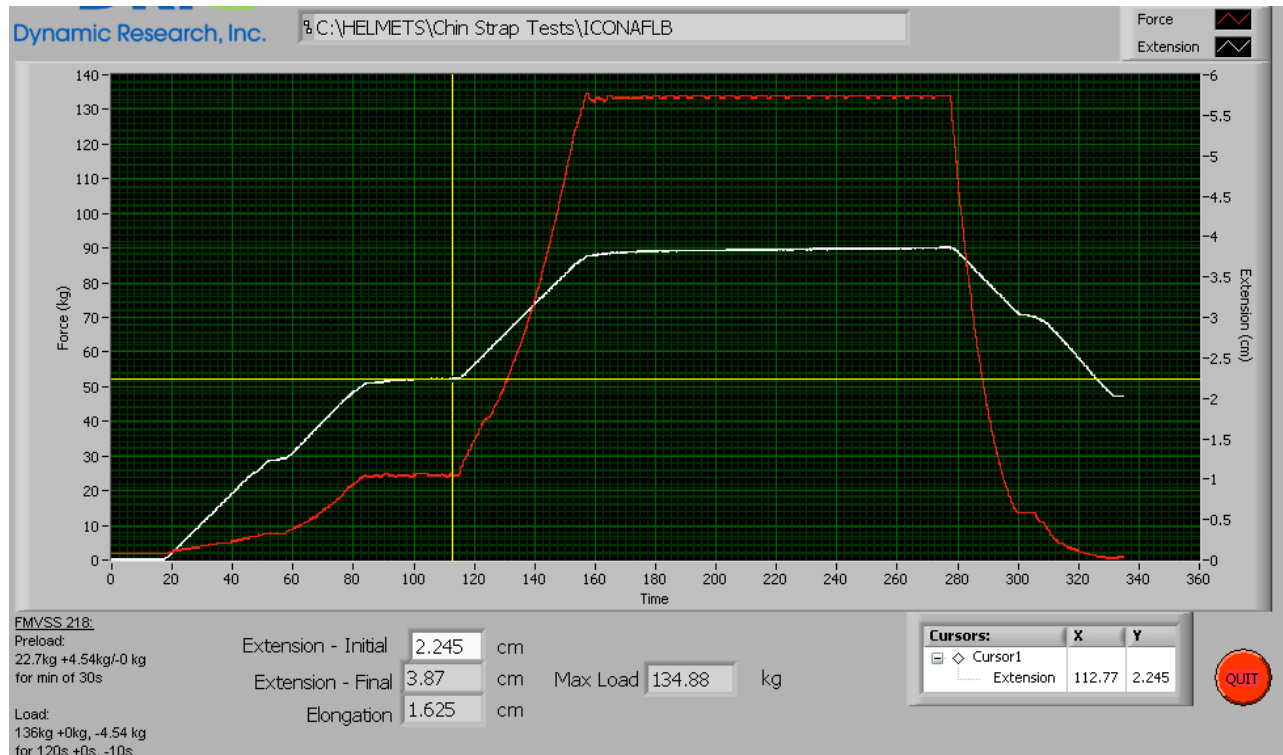
Time gate flag height : 25.40 mm

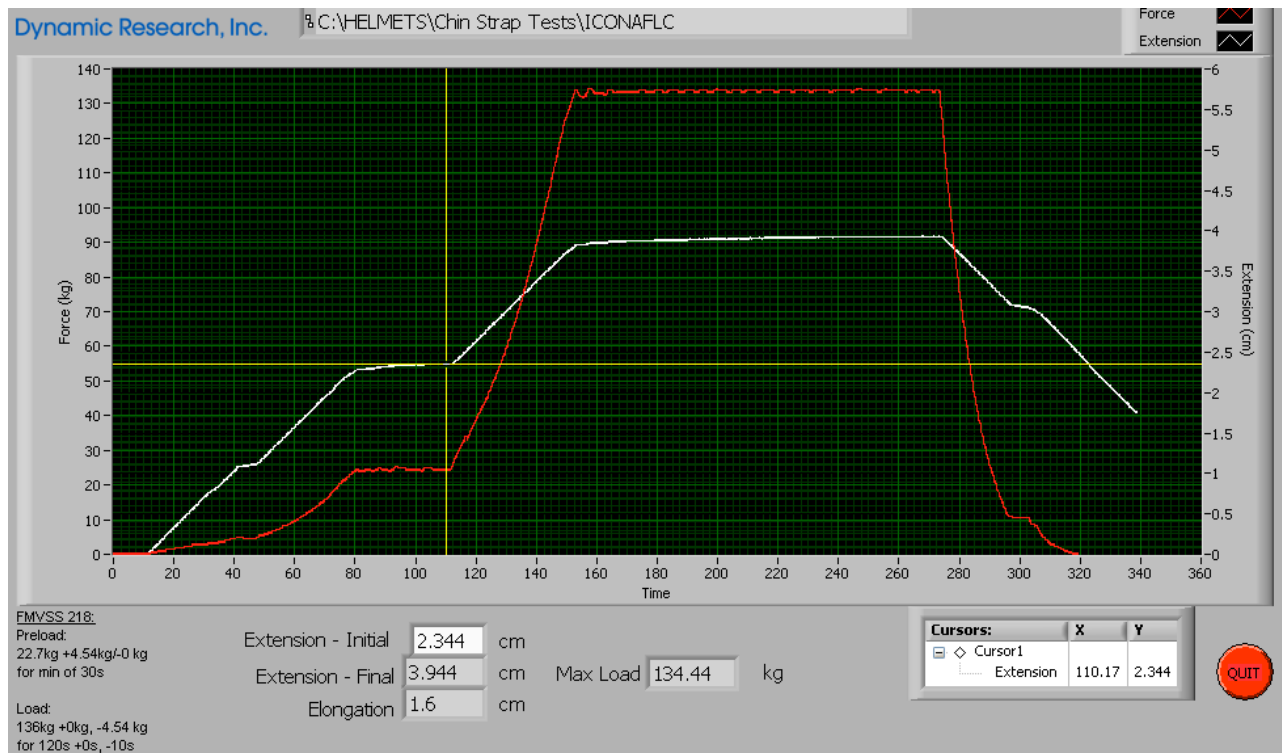
Acc. sensibility (axis Z) : 9.75

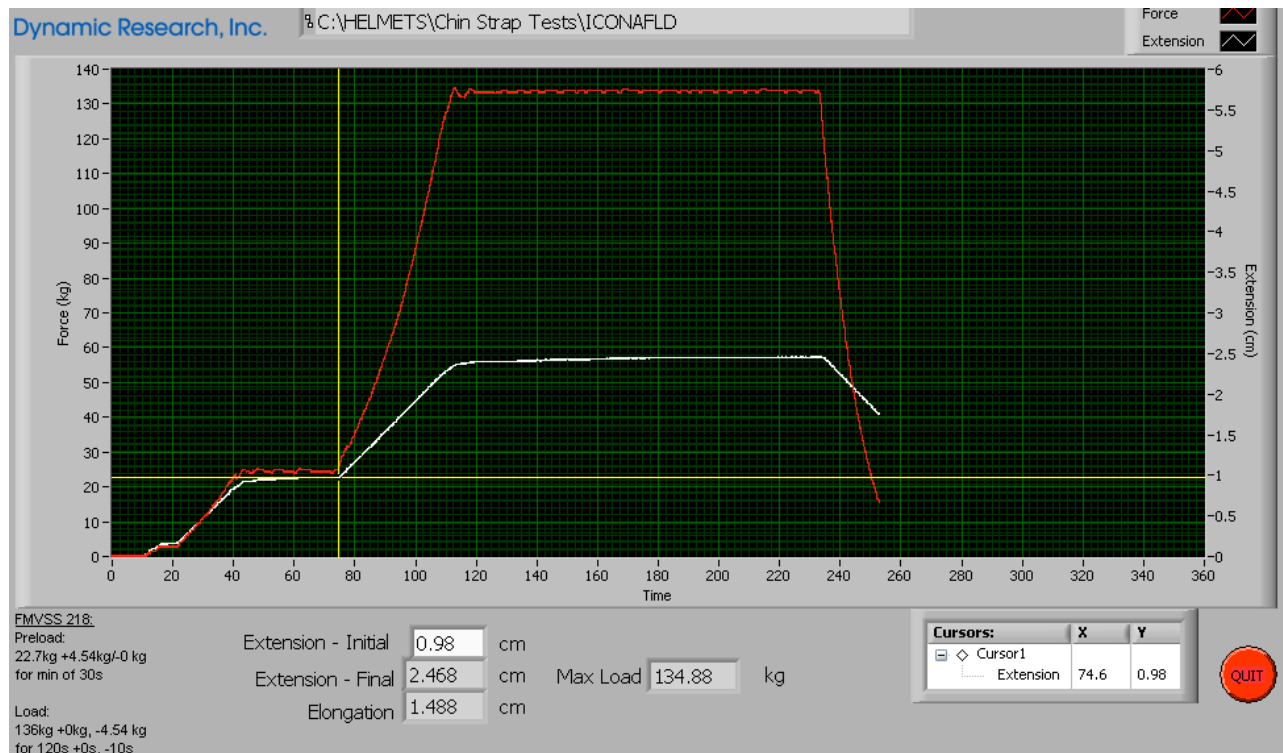


Impact #	Position	Anvil type	Drop Height (cm)	Velocity IN (m/sec)	Velocity IN (feet/s)	Energy (Joules)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	PASS or FAIL	
1	FRONT	HEMI	139.0	5.1037	16.744	67.2	60.6	0.00	0.00	Pass	
2	FRONT	HEMI	139.0	5.0985	16.727	67.0	60.6	0.00	0.00	Pass	
3	L SIDE	HEMI	139.0	5.0771	16.657	66.5	111.7	0.00	0.00	Pass	
4	L SIDE	HEMI	139.0	5.0774	16.658	66.5	100.1	0.00	0.00	Pass	
5	R SIDE	FLAT	186.0	5.8905	19.326	89.5	176.8	1.80	0.00	Pass	
6	R SIDE	FLAT	186.0	5.8894	19.322	89.5	171.3	2.13	0.00	Pass	
7	REAR	FLAT	186.0	5.9277	19.448	90.6	123.7	0.00	0.00	Pass	
8	REAR	FLAT	186.0	5.9170	19.413	90.3	143.2	0.00	0.00	Pass	

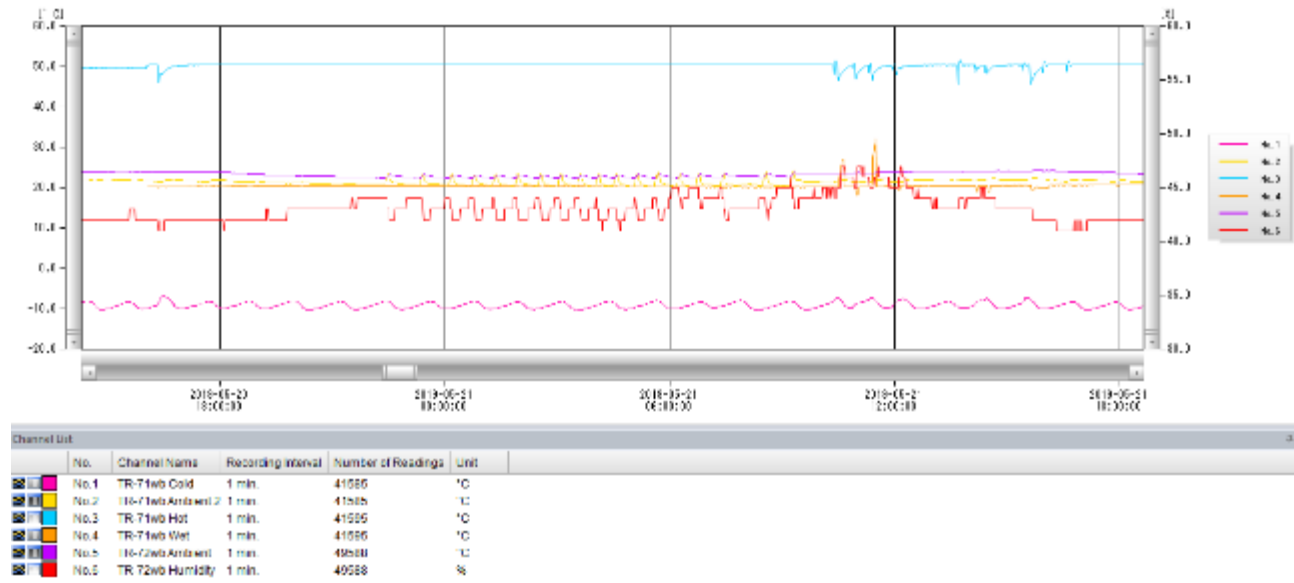








ENVIRONMENTAL MONITORING



APPENDIX A

INTERPRETATIONS OR DEVIATIONS FROM FMVSS No. 218

All testing was performed in accordance with the requirements of FMVSS 218.

APPENDIX B

EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT REQUIRING DIMENSIONAL CHECKS

Item Number	Description	Manufacturer	Model	Serial Number	Last Check	Next Check	Checked By
1	Headform	Cadex Inc.	DOT Small	4527	4/11/2019	4/11/2020	DRI
2	Headform	Cadex Inc.	DOT Medium	4516	4/11/2019	4/11/2020	DRI
3	Headform	Cadex Inc.	DOT Large	4530	4/11/2019	4/11/2020	DRI
4	Penetrator	Cadex Inc	DOT	2076	4/11/2019	4/11/2020	DRI
5	Retention Rollers	HPRL	-	-	4/11/2019	4/11/2020	DRI
6	Flat Anvil	Cadex Inc	-	-	4/11/2019	4/11/2020	DRI
7	Hemi Anvil	Cadex Inc	-	-	4/11/2019	4/11/2020	DRI

TEST EQUIPMENT REQUIRING CALIBRATION/ VERIFICATION

DRI Asset ID	Description	Mfr	Model	Serial Number	Last Calibration	Next Calibration	Checked By
2160	Scale	OHAUS	ES6R	06649366ML	1/15/2019	1/15/2020	CAL-CERT
2118	Thermocouple	PCB	-	2118	11/15/2018	11/15/2019	DRI
2119	Thermocouple	PCB	-	2119	11/15/2018	11/15/2019	DRI
2120	Thermocouple	PCB	-	2120	11/15/2018	11/15/2019	DRI
2121	Thermocouple	PCB	-	2121	11/15/2018	11/15/2019	DRI
2117	Reference Thermometer	Thermo Works	-	D09310618	1/18/2019	1/18/2020	CAL-CERT
2106	Brandstedt Data Recorder	Brandstedt Controls	WR1095i	945836	12/20/2017	12/20/2019	CAL-CERT
2122	Humidity Sensor	Brandstedt Controls	-	945673	12/20/2017	12/20/2019	CAL-CERT
2005, 2102	Data Acquisition Computer & Software	DRI/National Instruments/ Cadex	-	-	11/1/2018	11/1/2019	Precision Labs
2010	Velocimeter	Cadex	-	CCS030703-1	2/19/2019	2/19/2020	Cadex
2002	Accelerometer	PCB	353B18	109429	11/1/2018	11/1/2019	Precision Labs
2161	String Potentiometer	Unimeasure	P510-25	30050277			CAL-CERT
2162	Load Cell	Nikkei	NS-1K	W79144	1/15/2019	1/15/2020	CAL-CERT
2164	Laser Height	Bosch	GLM30	604304806	1/18/2019	1/18/2020	CAL-CERT
2154	Digital Height Gauge	Unknown	-	2154	1/15/2019	1/15/2020	CAL-CERT

APPENDIX C
PHOTOGRAPHS



Impact attenuation test apparatus with flat, hemi and MEP anvils



Impact test headforms (Small, Medium, Large)



**Penetration test apparatus with headform,
penetration striker and adjustable base**



**Retention system test apparatus
with load cell and string potentiometer**



Low temperature conditioning cabinet



High temperature conditioning chamber



Water immersion container



Helmet Front Three-Quarter View



Helmet Interior View with Retention System Hardware and Labels



Helmet Rear View showing Required Permanent Markings



Helmet Front View with Test Line



Helmet Side View with Test Line



Helmet Rear View with Test Line



Helmet Front Three-Quarter View with Test Line



Pre-Test Photograph of Helmet on Monorail Test Rig



Pre-Test Photograph of Helmet Penetration Test



Pre-Test Photograph of Helmet Retention Test



Helmet penetration test locations



Helmet Labels (magnified)