

SAFETY COMPLIANCE TESTING FOR FMVSS No. 218 MOTORCYCLE HELMETS

Brand: ICON
Model: AIRFLITE
Size: L (59-60 cm)

Prepared By

ACT Lab LLC
3280 East 59th Street,
Long Beach CA 90805
www.act-lab.com



19 May 2020

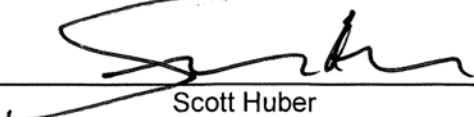
Final Report 218-ACT-20-014

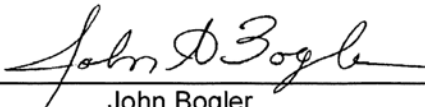
Prepared For

U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance (NEF-220)
1200 New Jersey Ave., S.E.
Washington, DC 20590

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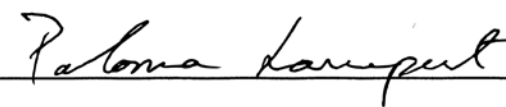
Technician: 
Devon Dahm

Project Manager: 
Scott Huber

Approved By: 
John Bogler

Approval Date: 19 May 2020

FINAL REPORT ACCEPTANCE BY OVSC

Accepted By: 

Acceptance Date: 07/07/2020

HS# 646687

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 218-ACT-20-014	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Sub-Title FINAL REPORT OF FMVSS NO. 218 COMPLIANCE TESTING OF ICON, MODEL AIRFLIGHT, SIZE L (59-60 cm) MOTORCYCLE HELMET		5. Report Date 19 May 2020	
		6. Performing Organization Code ACT	
7. Author(s) Scott Huber, Program Manager		8. Performing Organization Report No. 52.1114.001	
9. Performing Organization Name and Address ACT Lab LLC 3280 East 59th Street, Long Beach CA 90805		10. Work Unit No.	
		11. Contract or Grant No. 693JJ918D000022	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-220) 1200 New Jersey Avenue, S.E. Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report	
		14. Sponsoring Agency Code NEF-220	
16. Abstract 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: S5.1 Impact Attenuation. Accelerations in excess of 200g exceeded 2.0 ms on the low temperature sample.			
17. Key Words Helmet 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-120) 1200 New Jersey Avenue, S.E. Washington, D.C. 20590	
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages 35	22. Price

Form DOT F1700.7 (8-69)

Contract File No.: 52.1114

Test File: 001

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 14 May 2020/Rev.22

SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Technician: Devon Dahm

Test Date: 19 May 2020

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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"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 ACT Lab Helmet Testing Manual, Part I – Motorcycle Helmets³ 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.

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 2011.

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

HELMET DATA

HELMET BRAND NAME: ICON

HELMET MODEL DESIGNATION: AIRFLITE

HELMET MANUFACTURER: J-TECH

HELMET SIZE: L (59-60 cm)

HELMET COVERAGE: Partial: Full: Complete: X

HELMET POSITIONING INDEX: 28 mm

SHELL MATERIAL: Acrylonitrile Butadiene Styrene and Polycarbonate Blending
Thermoplastic

LINER MATERIAL: Expanded Polystyrene

BUCKLE DESCRIPTION: Double D-Rings

HELMET	A Ambient	B Low Temp	C High Temp	D Water Immersed	E Spare
SHELL COLOR/PATTERN	White	White	White	White	White
WEIGHT (grams)	1482	1482	1484	1478	1704
MONTH & YEAR OF MANUFACTURE	05/2019	05/2019	05/2019	05/2019	05/2019

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 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.

SUMMARY OF TEST RESULTS

INDICATE Pass or Fail

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

INDICATE Pass or Fail

TEST	PASS/FAIL
PERIPHERAL VISION	Pass
LABELING	Pass

COMMENT:

1. S5.6.1 Impact Attenuation. (b) Accelerations in excess of 200g exceeded a cumulative duration of 2.0 ms: Low temperature, sample, right location, flat anvil, 2nd impact, 2.1 ms

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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: L (59-60 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.

AVERAGE LAB TEMPERATURE : 22.2 °C ; AVERAGE LAB HUMIDITY : 51.9 %

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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	1.3	4.83	414.4	2.4	2.0	Pre 1	Crown
	2	1.3	4.81	410.6	2.4	2.0	Pre 2	Crown
	3	1.3	4.81	412.0	2.4	2.0	Pre 3	Crown
PRETEST AVERAGE		XXXX	XXXX	412.3	XXX	XXX	XXXX	XXXX
POSTTEST	1	1.3	4.81	398.4	2.4	2.0	Post 1	Crown
	2	1.3	4.76	404.4	2.4	2.0	Post 2	Crown
	3	1.3	4.81	404.2	2.4	2.0	Post 3	Crown
POSTTEST AVERAGE		XXXX	XXXX	402.3	XXX	XXX	XXXX	XXXX
DIFFERENCE BETWEEN PRE-TEST AND POST-TEST AVERAGES				410.0	DIFFERENCE NOT TO EXCEED 15 g			

Helmet Designation	Helmet Condition	Impact Location	Front		Left		Right		Rear	
		Impact Number	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	95	122	128	157	213	237	138	153
		ms @ 150	0.0	0.0	0.0	0.8	2.8	3.0	0.0	0.6
		ms @ 200	0.0	0.0	0.0	0.0	1.4	1.9	0.0	0.0
		Velocity m/s	5.25	5.28	5.26	5.26	6.06	6.06	6.17	6.16
B	Low Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	9	10	11	12	13	14	15	16
		Peak g	92	117	130	161	220	247	153	167
		ms @ 150	0.0	0.0	0.0	0.9	3.0	3.0	0.5	1.9
		ms @ 200	0.0	0.0	0.0	0.0	1.3	2.1	0.0	0.0
		Velocity m/s	5.24	5.25	5.26	5.21	6.01	6.01	6.16	6.13
C	High Temperature	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	17	18	19	20	21	22	23	24
		Peak g	89	108	122	146	203	229	138	154
		ms @ 150	0.0	0.0	0.0	0.0	2.8	2.9	0.0	0.8
		ms @ 200	0.0	0.0	0.0	0.0	0.6	1.7	0.0	0.0
		Velocity m/s	5.26	5.24	5.27	5.23	6.06	6.04	6.14	6.15
D	Water Immersed	Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	25	26	27	28	29	30	31	32
		Peak g	88	110	122	153	207	240	149	169
		ms @ 150	0.0	0.0	0.0	0.5	2.8	3.0	0.0	3.2
		ms @ 200	0.0	0.0	0.0	0.0	1.2	2.0	0.0	0.0
		Velocity m/s	5.25	5.25	5.26	5.28	6.04	6.05	6.14	6.16

COMMENTS: 1. The actual drop heights were: flat anvil 202 cm, hemi anvil 148 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 ± 0.1 mm (0.02 ± 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 ± 0.038 cm (1.5 ± 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.

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RETENTION SYSTEM

Paragraph S5.3 and S7.3

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	0.39	1.37	0.98
B	LOW TEMPERATURE	0.33	1.36	1.03
C	HIGH TEMPERATURE	0.49	1.50	1.01
D	WATER IMMERSED	0.30	1.28	0.98

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.

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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

COMMENTS:

1. 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	

COMMENTS:

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

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TEST DATA

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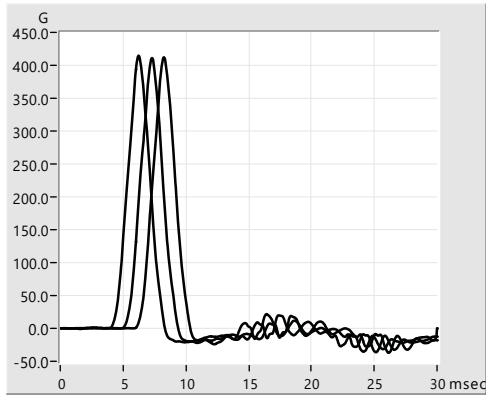
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Uni-Axial System-Check

Helmet Manufacturer : NHTSA
Address : 1200 New Jersey Ave, S.E. Washington,
DC 20590



Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Laboratory Technician name : Michael Valdez

M.E.P. Pad Model : H0171

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 1650 Hz

Acc. sensitivity (axis Z) : 10.47 mV/G

Acc. sensitivity (axis X) : 10.00 mV/G

Acc. sensitivity (axis Y) : 10.00 mV/G

Drop Device : D.O.T Size C (Uni-Axial)

Drop mass assembly : 5.036 kg Time gate flag height : 25.40 mm

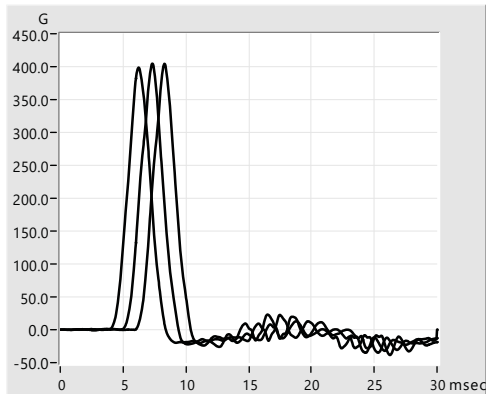
Calibration peak : 400.0 G +/- 20.00 G

Impact #	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	127.0	57.9	3.9	5.30	4.7956	409.0	2.34	2.00	3077	4281	10:48:25	2020-05-19	Pass
2	127.0	58.3	3.6	5.28	4.8110	409.4	2.37	2.00	3005	4246	10:50:13	2020-05-19	Pass
3	127.0	58.9	3.1	5.25	4.8375	410.4	2.35	2.00	3061	4293	10:51:37	2020-05-19	Pass
4	127.0	58.6	3.3	5.26	4.8250	414.4	2.37	2.02	3118	4350	10:52:43	2020-05-19	Pass
5	127.0	58.3	3.6	5.28	4.8113	410.6	2.35	2.00	3037	4284	10:54:33	2020-05-19	Pass
6	127.0	58.2	3.7	5.28	4.8077	412.0	2.36	2.00	3091	4321	10:55:37	2020-05-19	Pass
Last 3#	127.00	58.37	3.53	5.27	4.81	412.33	2.36	2.01	3082.00	4318.33	10.00	2020.00	0.00

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

Uni-Axial System-Check

Helmet Manufacturer : NHTSA
Address : 1200 New Jersey Ave, S.E. Washington,
DC 20590



Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Laboratory Technician name : Devon Dahm

M.E.P. Pad Model : H0171

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 1650 Hz

Acc. sensitivity (axis Z) : 10.47 mV/G

Acc. sensitivity (axis X) : 10.00 mV/G

Acc. sensitivity (axis Y) : 10.00 mV/G

Drop Device : D.O.T Size C (Uni-Axial)

Drop mass assembly : 5.030 kg Time gate flag height : 25.40 mm

Calibration peak : 400.0 G +/- 20.00 G

Impact #	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	127.0	58.4	3.4	5.27	4.8197	403.5	2.36	2.01	2946	4128	13:50:37	2020-05-19	Pass
2	127.0	58.2	3.6	5.28	4.8101	403.7	2.36	2.00	2956	4127	13:51:43	2020-05-19	Pass
3	127.0	57.4	4.3	5.32	4.7786	402.6	2.37	2.00	2977	4131	13:52:50	2020-05-19	Pass
4	127.0	58.3	3.5	5.28	4.8147	398.4	2.36	1.98	2941	4112	13:53:57	2020-05-19	Pass
5	127.0	57.1	4.6	5.33	4.7635	404.4	2.37	1.99	2928	4105	13:55:04	2020-05-19	Pass
6	127.0	58.3	3.5	5.28	4.8144	404.2	2.35	2.00	2947	4102	13:56:33	2020-05-19	Pass
Last 3#	127.00	57.90	3.87	5.30	4.80	402.33	2.36	1.99	2938.67	4106.33	13.00	2020.00	0.00

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

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : FY2020

Model : AIRFLITE

Color : White

Size : L (59-60 cm)

Weight : 1482.00 g

Manufacturing Date : 05/2019

Standard Request : FMVSS No.218

Identification Code : 521114001-A

Headform Model : D.O.T.

Headform Size : C D.O.T

Conditioning : Ambient

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 16504

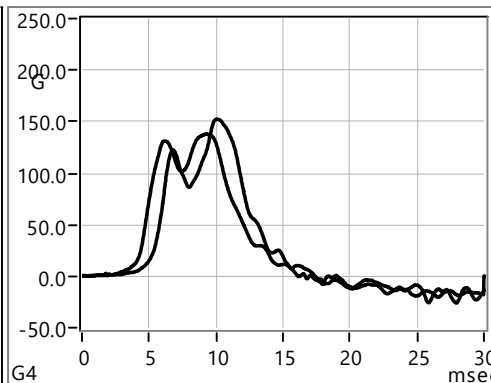
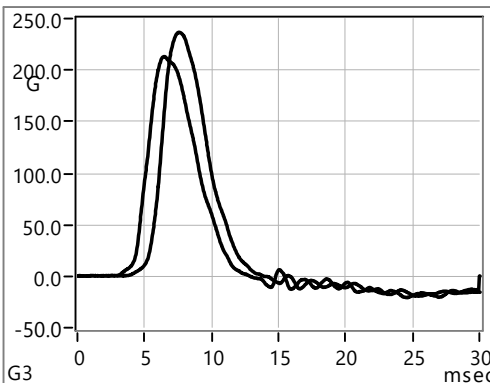
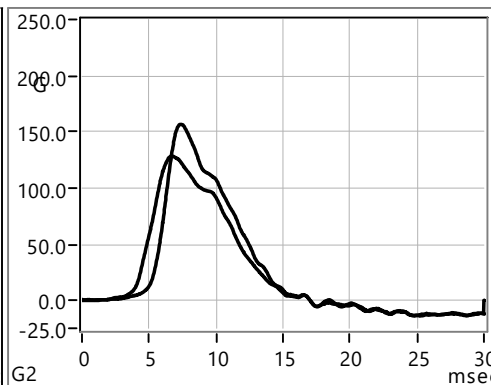
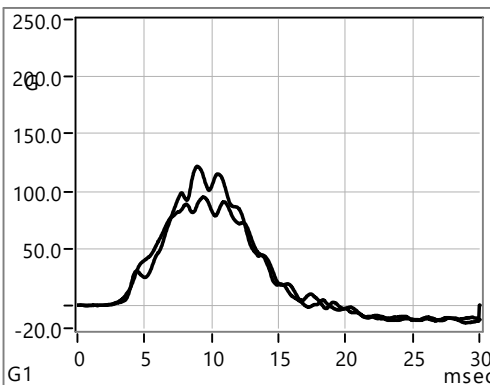
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.030 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL	
1	Front	Hemi	147.5	69.4	2.3	4.84	5.2528	94.8	0.00	0.00	401	451	11:22:27	2020-05-19	Pass	
2	Front	Hemi	147.5	70.0	1.9	4.81	5.2758	121.6	0.00	0.00	551	636	11:24:03	2020-05-19	Pass	
3	Left	Hemi	147.5	69.5	2.3	4.83	5.2572	128.4	0.00	0.00	609	711	12:16:22	2020-05-19	Pass	
4	Left	Hemi	147.5	69.7	2.2	4.83	5.2629	156.6	0.83	0.00	774	935	12:18:06	2020-05-19	Pass	
5	Right	Flat	201.5	92.4	3.6	4.19	6.0623	213.0	2.83	1.37	1440	1781	12:41:06	2020-05-19	Pass	
6	Right	Flat	201.5	92.3	3.7	4.19	6.0571	236.6	2.97	1.94	1694	2142	12:42:24	2020-05-19	Pass	
7	Rear	Flat	201.5	95.6	1.9	4.12	6.1655	138.1	0.00	0.00	868	988	13:29:46	2020-05-19	Pass	
8	Rear	Flat	201.5	95.4	2.0	4.12	6.1590	152.5	0.56	0.00	846	996	13:30:50	2020-05-19	Pass	

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : FY2020

Model : AIRFLITE

Color : White

Size : L (59-60 cm)

Weight : 1482.00 g

Manufacturing Date : 05/2019

Standard Request : FMVSS No.218

Identification Code : 521114001-B

Headform Model : D.O.T.

Headform Size : C D.O.T

Conditioning : Cold

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 1650

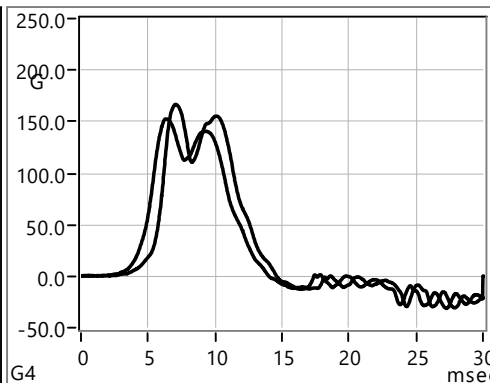
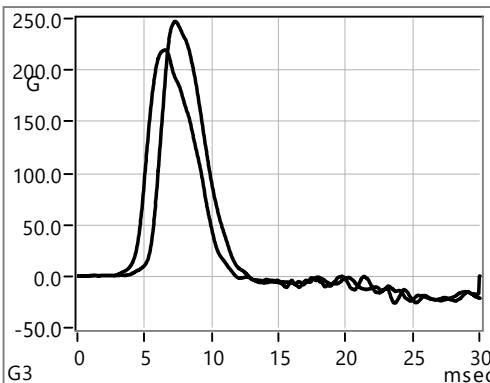
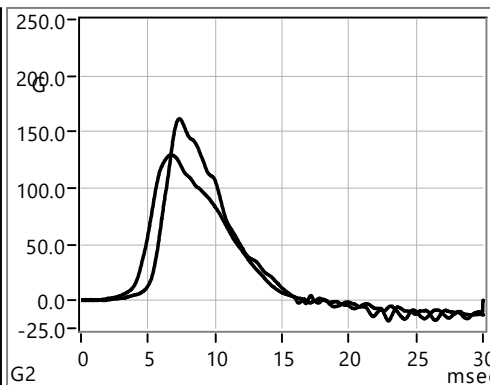
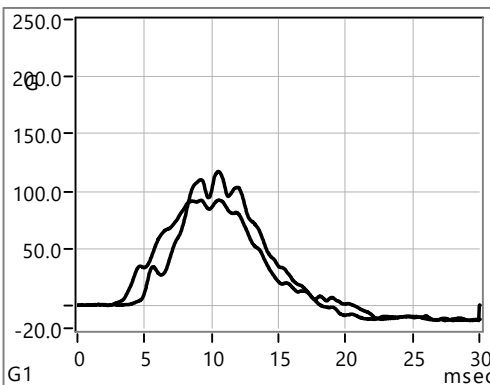
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.030 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL	
1	Front	Hemi	147.5	69.2	2.5	4.84	5.2441	92.1	0.00	0.00	405	456	11:26:11	2020-05-19	Pass	
2	Front	Hemi	147.5	69.4	2.3	4.84	5.2529	116.9	0.00	0.00	520	601	11:27:21	2020-05-19	Pass	
3	Left	Hemi	147.5	69.6	2.2	4.83	5.2618	129.5	0.00	0.00	587	697	12:20:01	2020-05-19	Pass	
4	Left	Hemi	147.5	68.3	3.1	4.87	5.2130	161.4	0.89	0.00	769	942	12:21:29	2020-05-19	Pass	
5	Right	Flat	201.5	90.9	4.4	4.23	6.0103	219.5	3.03	1.25	1511	1854	12:43:42	2020-05-19	Pass	
6	Right	Flat	201.5	90.9	4.4	4.22	6.0126	247.2	2.98	2.05	1820	2280	12:44:58	2020-05-19	Fail	
7	Rear	Flat	201.5	95.4	2.0	4.12	6.1595	152.6	0.49	0.00	960	1130	13:32:16	2020-05-19	Pass	
8	Rear	Flat	201.5	94.6	2.4	4.14	6.1345	166.6	1.85	0.00	1138	1325	13:33:24	2020-05-19	Pass	

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : FY2020

Model : AIRFLITE

Color : White

Size : L (59-60 cm)

Weight : 1484.00 g

Manufacturing Date : 05/2019

Standard Request : FMVSS No.218

Identification Code : 521114001-C

Headform Model : D.O.T.

Headform Size : C D.O.T

Conditioning : Hot

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 1650

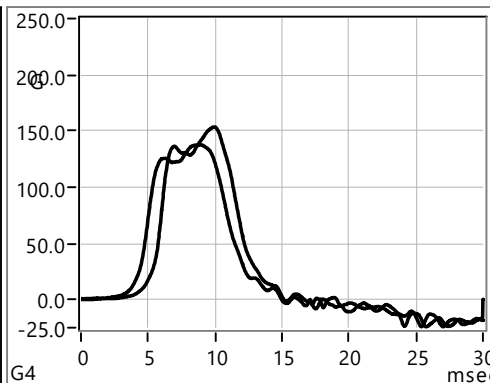
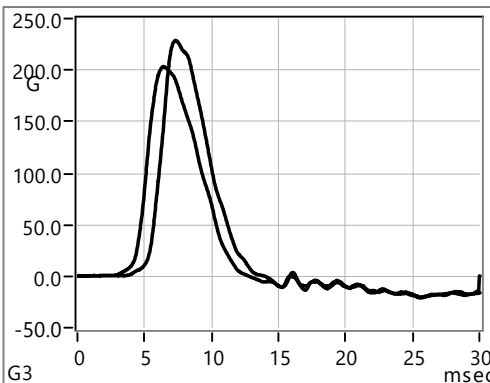
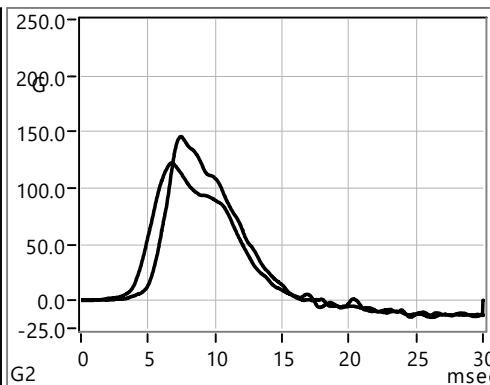
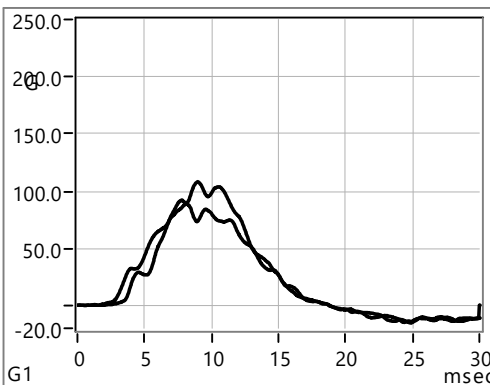
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.030 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL	
1	Front	Hemi	147.5	69.5	2.3	4.83	5.2564	88.8	0.00	0.00	347	392	11:29:19	2020-05-19	Pass	
2	Front	Hemi	147.5	69.1	2.5	4.84	5.2433	108.1	0.00	0.00	475	550	11:30:26	2020-05-19	Pass	
3	Left	Hemi	147.5	69.9	2.0	4.82	5.2702	122.0	0.00	0.00	564	643	12:23:05	2020-05-19	Pass	
4	Left	Hemi	147.5	68.9	2.7	4.85	5.2349	145.7	0.00	0.00	700	850	12:24:09	2020-05-19	Pass	
5	Right	Flat	201.5	92.3	3.6	4.19	6.0584	203.4	2.83	0.59	1317	1657	12:46:18	2020-05-19	Pass	
6	Right	Flat	201.5	91.8	3.9	4.20	6.0414	228.8	2.90	1.74	1585	1992	12:47:36	2020-05-19	Pass	
7	Rear	Flat	201.5	94.9	2.3	4.14	6.1421	137.9	0.00	0.00	881	1022	13:36:10	2020-05-19	Pass	
8	Rear	Flat	201.5	95.2	2.1	4.13	6.1515	153.5	0.79	0.00	1039	1181	13:37:35	2020-05-19	Pass	

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : FY2020

Model : AIRFLITE

Color : White

Size : L (59-60 cm)

Weight : 1478.00 g

Manufacturing Date : 05/2019

Standard Request : FMVSS No.218

Identification Code : 521114001-D

Headform Model : D.O.T.

Headform Size : C D.O.T

Conditioning : Wet

Laboratory Temperature : 22 deg C

Laboratory Humidity : 50 %

Selected Filter Frequency : CFC1000 # 16500

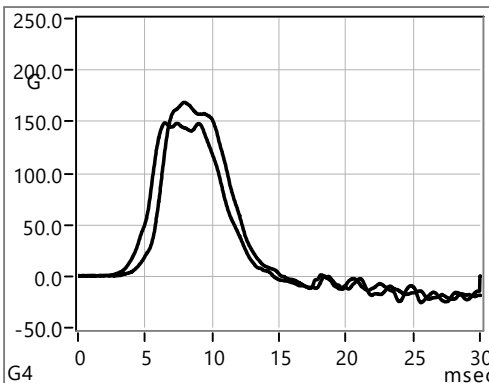
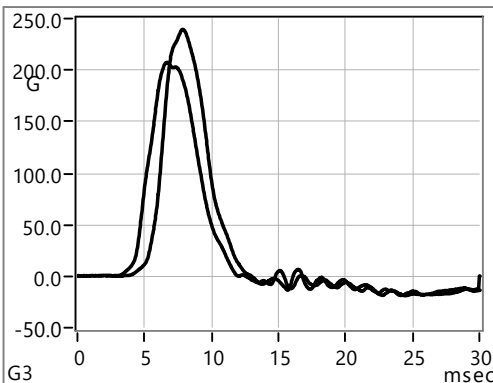
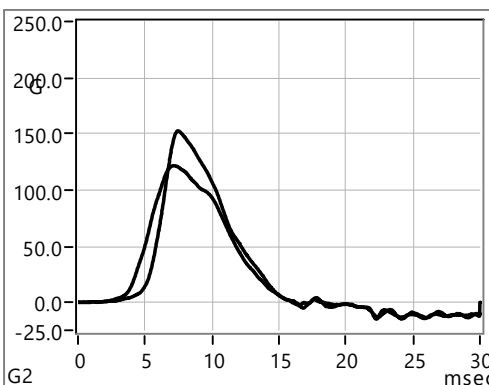
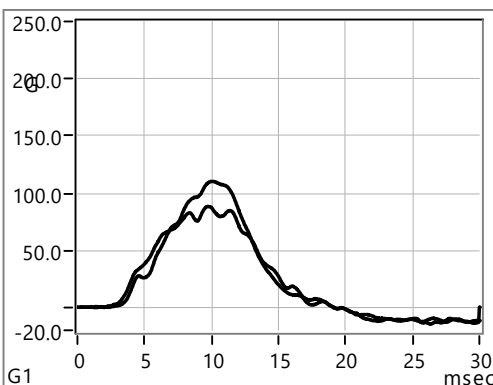
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 5.030 kg

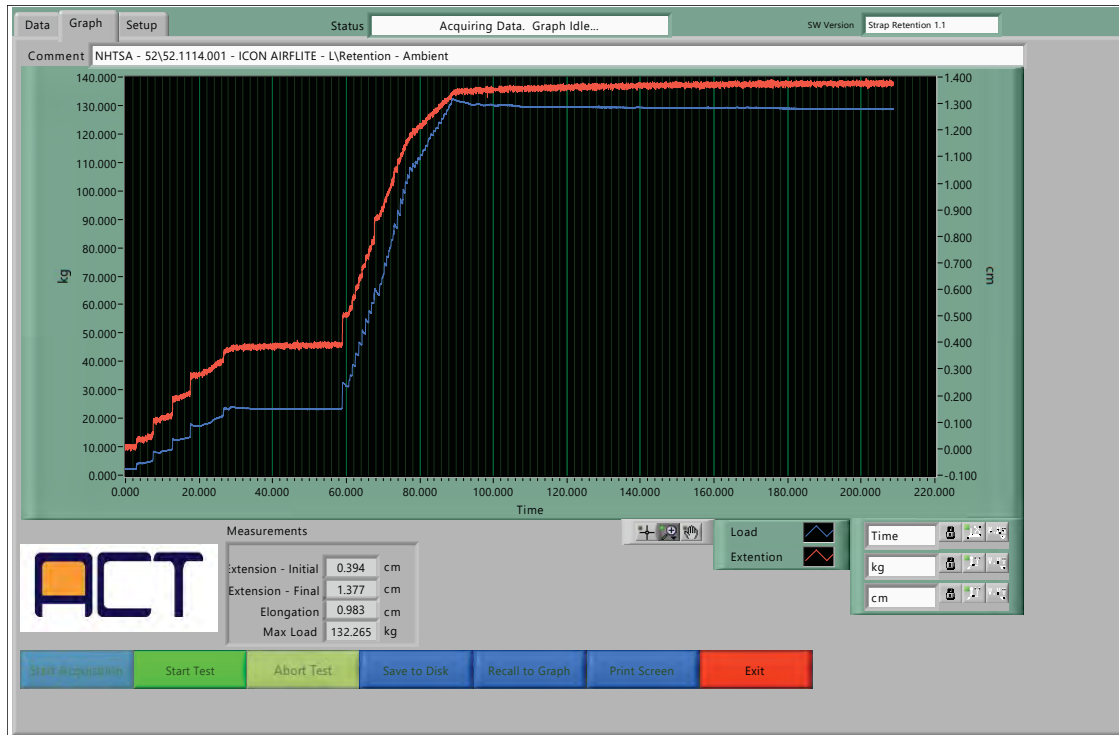
Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL	
1	Front	Hemi	147.5	69.4	2.3	4.84	5.2534	88.3	0.00	0.00	355	404	11:33:50	2020-05-19	Pass	
2	Front	Hemi	147.5	69.3	2.4	4.84	5.2474	110.2	0.00	0.00	492	572	11:34:59	2020-05-19	Pass	
3	Left	Hemi	147.5	69.7	2.2	4.83	5.2628	121.7	0.00	0.00	568	663	12:26:04	2020-05-19	Pass	
4	Left	Hemi	147.5	70.0	1.9	4.81	5.2756	152.5	0.47	0.00	742	899	12:27:09	2020-05-19	Pass	
5	Right	Flat	201.5	91.7	3.9	4.21	6.0391	207.4	2.82	1.23	1389	1709	12:48:50	2020-05-19	Pass	
6	Right	Flat	201.5	92.2	3.7	4.20	6.0545	239.5	2.98	2.02	1697	2150	12:49:57	2020-05-19	Fail	
7	Rear	Flat	201.5	94.9	2.3	4.14	6.1420	148.8	0.00	0.00	1026	1194	13:39:36	2020-05-19	Pass	
8	Rear	Flat	201.5	95.5	2.0	4.12	6.1614	168.8	3.24	0.00	1243	1450	13:41:02	2020-05-19	Pass	

ACT DOT Strap Retention Acquisition
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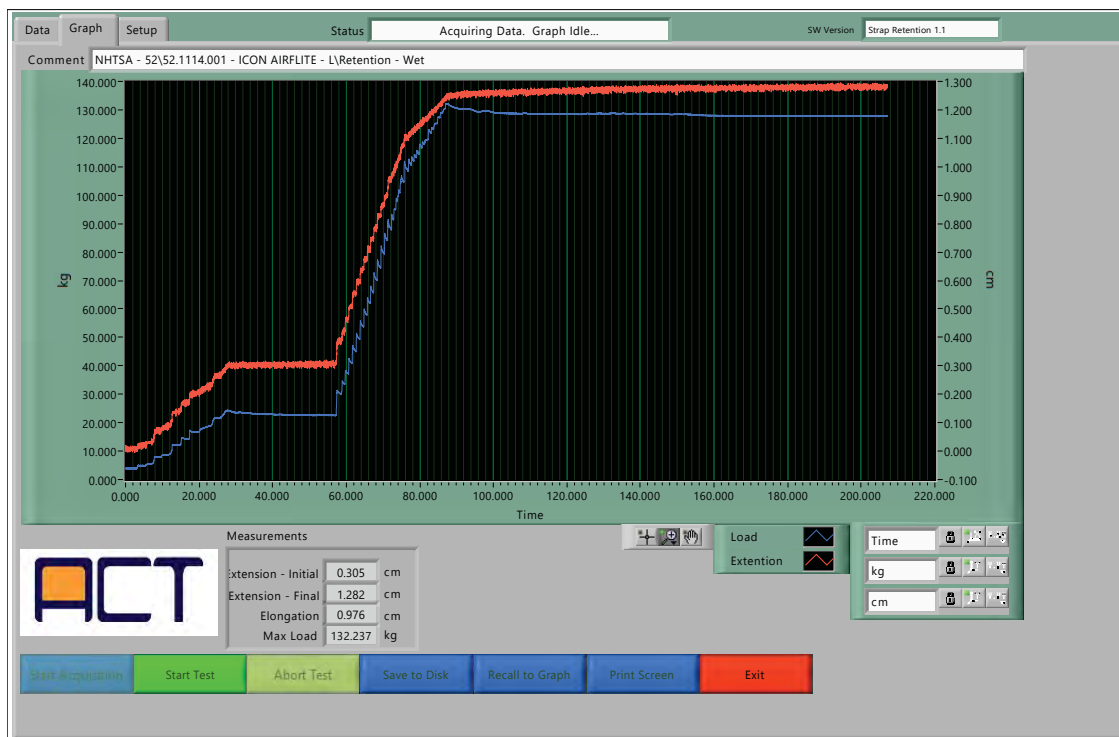
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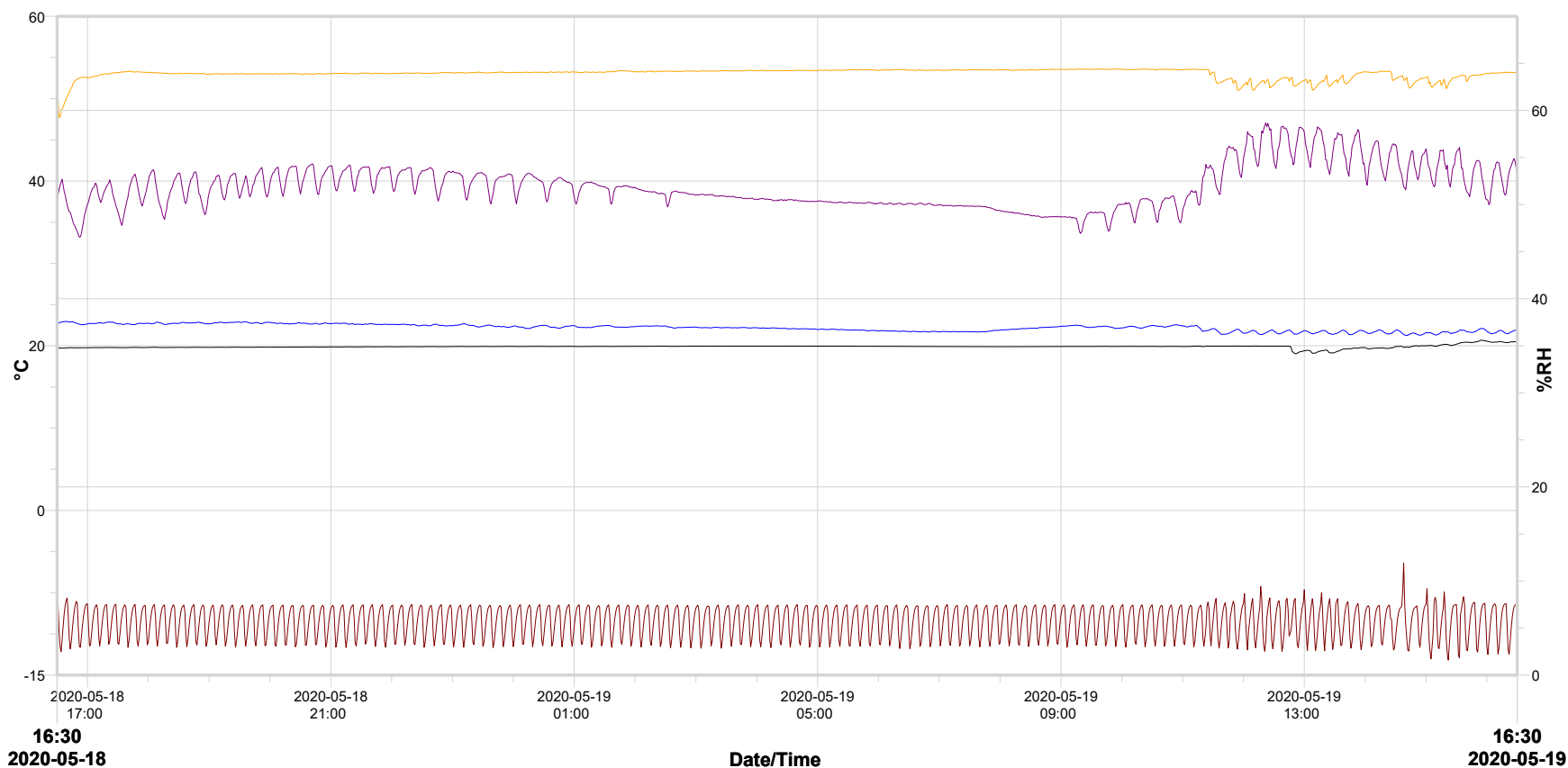


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ACT DOT Strap Retention Acquisition
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Report Summary Statistics

#	Location	Zone	Color	Units	Avg	Min	Max	STD	MKT	Samples
1	H0177 - Humidity (1044)	viewLinc/ACT-Helmet Lab (1041)		%RH	51.89	46.53	58.67	2.27	0.00	1441
2	H0177 - Lab Temp. (1042)	viewLinc/ACT-Helmet Lab (1041)		°C	22.19	21.26	22.95	0.42	22.20	1441
3	H0178 - Oven (1046)	viewLinc/ACT-Helmet Lab (1041)		°C	53.05	47.74	53.62	0.62	53.07	1441
4	H0178 - Water (1048)	viewLinc/ACT-Helmet Lab (1041)		°C	19.89	19.03	20.66	0.18	19.89	1441
5	H0179 - Freezer (1050)	viewLinc/ACT-Helmet Lab (1041)		°C	-11.51	-14.17	-6.38	1.88	-13.27	1441

APPENDIX A

INTERPRETATIONS OR DEVIATIONS FROM FMVSS No. 218

Excess water on the water immersed sample was allowed to drip off before testing to prevent water damage to test equipment.

Contract File No.: 52.1114

Test File: 001

Technician: Devon Dahm

Test Date: 19 May 2020

APPENDIX B

EQUIPMENT LIST AND CALIBRATION SCHEDULES

ACT ID	Description	Make/Model	S/N	Last Check	Next Check
H0028	Anvil Hemispherical	Cadex	C070911-01	12/5/2019	12/5/2020
H0029	Anvil Flat	Cadex	C310811-02	12/5/2019	12/5/2020
H0171	Anvil MEP	Cadex	2141901	4/18/2019	4/18/2020
H0040	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0146	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0055	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0144	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0047	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0145	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0194	Drop Carriage	Cadex	NA	5/11/2020	12/3/2020
H0064	Penetration Striker #1	Cadex	NA	12/5/2019	12/5/2020
H0065	Penetration Striker #2	Cadex	NA	12/5/2019	12/5/2020
H0173	Drop Carriage	Cadex	NA	12/3/2019	12/3/2020
H0195	Magnesium Ball Arm	Cadex	NA	5/11/2020	12/3/2020
H0115	Steel Ball Arm	Cadex	NA	12/3/2019	12/3/2020
H0172	Aluminum Ball Arm	Cadex	NA	12/3/2019	12/3/2020
H0092	Environmental Chamber	Immersion Bucket	NA	NA	NA
H0174	Environmental Chamber	Heratherm OSG 750		NA	NA
H0186	Environmental Chamber	69K-035	9123314	NA	NA
H0187	Environmental Chamber	69K-031HC	9129337	NA	NA
H0079	Fixture	Mono Rail Tower	NA	12/5/2019	12/5/2020
H0080	Fixture	Penetration Tube	NA	12/5/2019	12/5/2020
H0081	Fixture	Positional Stability Stand	NA	12/5/2019	12/5/2020
H0082	Fixture	Retention	NA	12/5/2019	12/5/2020
H0087	Fixture	Penetration Heaform Mount	NA	NA	NA
H0088	Fixture	Penetration Height Stick	NA	NA	NA
H0089	Fixture	Peripheral Vision Stand	NA	NA	NA
H0096	Fixture	Positional Stability Ap.	NA	12/5/2019	12/5/2020
H0111	Fixture	Precision Brow Block	NA	12/5/2019	12/5/2020
H0114	Fixture	Peripheral Vision Protractor	NA	NA	NA
H0120	Fixture	Penetration Base	NA	NA	NA
H0148	Fixture	Headform Stand	NA	NA	NA
H0166	Fixture	Peripheral Vision Go-No-Go	NA	12/5/2019	12/5/2020
H0117	Headform Penetration: S	Cadex	7293	12/5/2019	12/5/2020
H0118	Headform Penetration: M	Cadex	7294	12/5/2019	12/5/2020
H0119	Headform Penetration: L	Cadex	7296	12/5/2019	12/5/2020
H0138	Headform Impact: S	Cadex	C04574 - 7567	12/5/2019	12/5/2020
H0139	Headform Impact: M	Cadex	C04575 - 7571	12/5/2019	12/5/2020
H0140	Headform Impact: L	Cadex	C04576 - 7573	12/5/2019	12/5/2020
H0093	Ballast Weight	NA	NA	12/3/2019	12/5/2020
H0188	Lab Computer	ASUS		NA	NA

Contract File No.: 52.1114

Test File: 001

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 14 May 2020/Rev.22

SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Technician: Devon Dahm

Test Date: 19 May 2020

Calibrated Measurement Equipment								
ACT ID	Description	Make/Model	S/N	Range	Accuracy from Cal. Certs	Last Calibration	Next Calibration	Calibration By:
H0193	Velocity Gate	Velocimeter HVTG Short	HVTG120200129-1	--	5.77E-02	1/29/2020	1/29/2021	CADEX
H0192	Accelerometer	PBC	LW226129	2000 g	±2.5%	8/23/2019	8/23/2020	PCB Piezotronics
H1089	Data Acquisition Box	353B18	CC120200129-1		±2.84 mV	1/29/2020	1/29/2021	CADEX
H1089	Data Acquisition Box	PC--4400	CC120200129-1		±2.84 mV	1/29/2020	1/29/2021	CADEX
H0098	LVDT - Retention	Schaevitz	16071	2 in	±0.5%	11/26/2019	11/26/2020	Micro Quality Calibration
H0180	Ohaus Scale	2000-HR	90921684	0-6000 gm	±1 g	10/28/2019	10/28/2020	Micro Quality Calibration
H0099	Load Cell - Retention	Futek	490706	0-500 lbs	±0.2%	11/25/2019	11/26/2020	Micro Quality Calibration
H0105	Height Gage	LSB350	3121016	0-12 in	±0.001 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0180	Ohaus Scale	V11P6	90921684	0-6000 gm	±1 g	10/28/2019	10/28/2020	Micro Quality Calibration
H0124	Digital Measuring Tape	ADIR PRO	-	16.5 ft/192 in	±0.03125 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0179	Environmental Data Logger	Etape	19381045	-90 To +95 °C	±0.05 °C	9/17/2019	9/17/2020	Vaisala
H0105	Height Gage	Mitutoyo	3121016	0-12 in	±0.001 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0177	Environmental Data Logger	Veriteq	19382001	-25 To +70°C,	0.80%RH	9/16/2019	9/16/2020	Vaisala
H0181	Digital Caliper	SP-2000-20R	B19221219	0-100% RH	±0.06 °C	11/13/2019	11/13/2020	Micro Quality Calibration
H0178	Environmental Data Logger	Veriteq	19381048	-90 To +95 °C	±0.07 °C	9/17/2019	9/17/2020	Vaisala

Contract File No.: 52.1114

Test File: 001

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 14 May 2020/Rev.22
SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Technician: Devon Dahm

Test Date: 19 May 2020

APPENDIX C

PHOTOGRAPHS

Contract File No.: 52.1114

Test File: 001

Technician: Devon Dahm

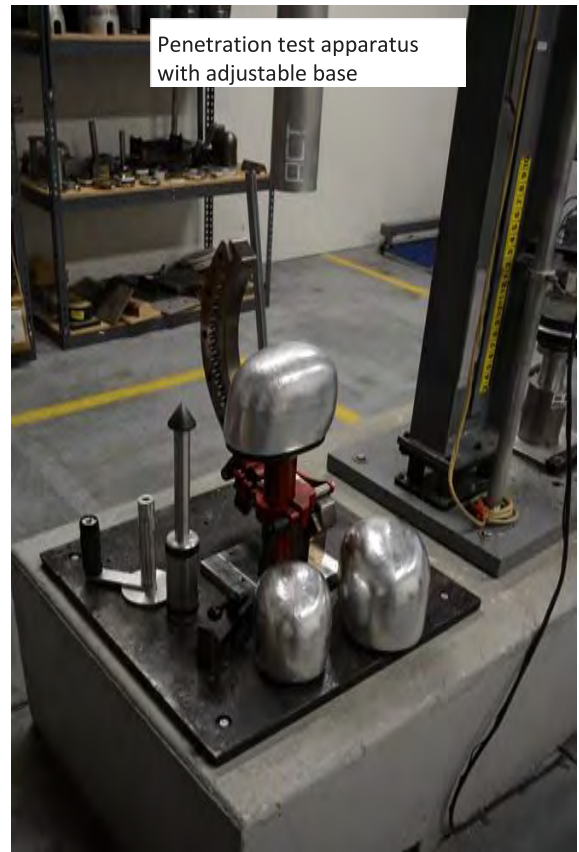
Test Date: 19 May 2020

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 14 May 2020/Rev.22
SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

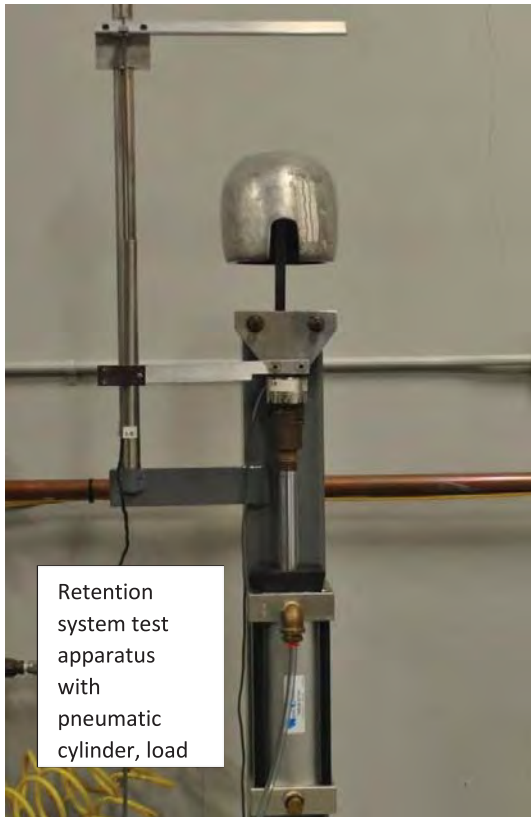
Impact attenuation test apparatus with three headforms (S, M, L), flat, hemi and MEP anvils



Penetration test apparatus with adjustable base



Retention system test apparatus with pneumatic cylinder, load



Data acquisition equipment





Low temperature conditioning cabinet



High temperature conditioning cabinet
and water immersion equipment

ICON AIRFLITE helmet and box showing model designation



ICON AIRFLITE helmet with test line, front left view



ICON AIRFLITE helmet
with test line, rear left
view



ICON AIRFLITE helmet interior view



ICON AIRFLITE helmet
front and left side
hemispherical anvil
impact locations



ICON AIRFLITE helmet
right side and rear flat
anvil impact locations



ICON AIRFLITE helmet
crown penetration test
location



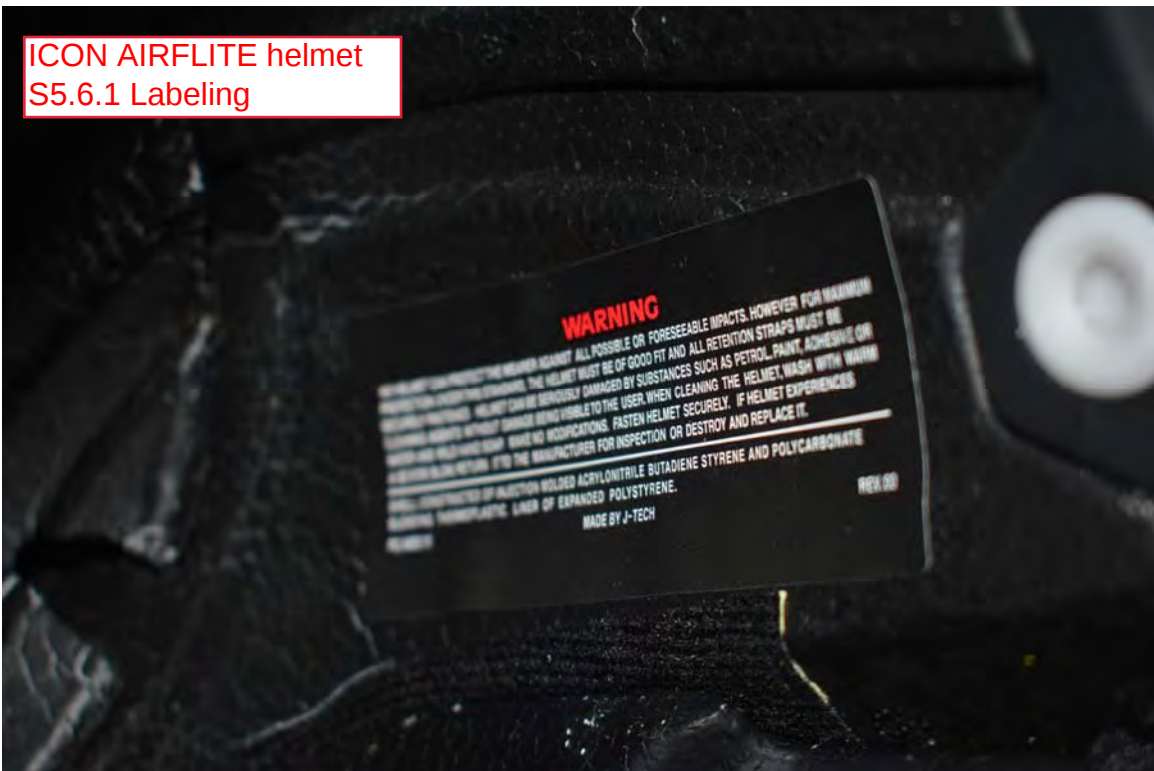
ICON AIRFLITE helmet
front right penetration test
location



ICON AIRFLITE helmet
S5.6.1 Labeling

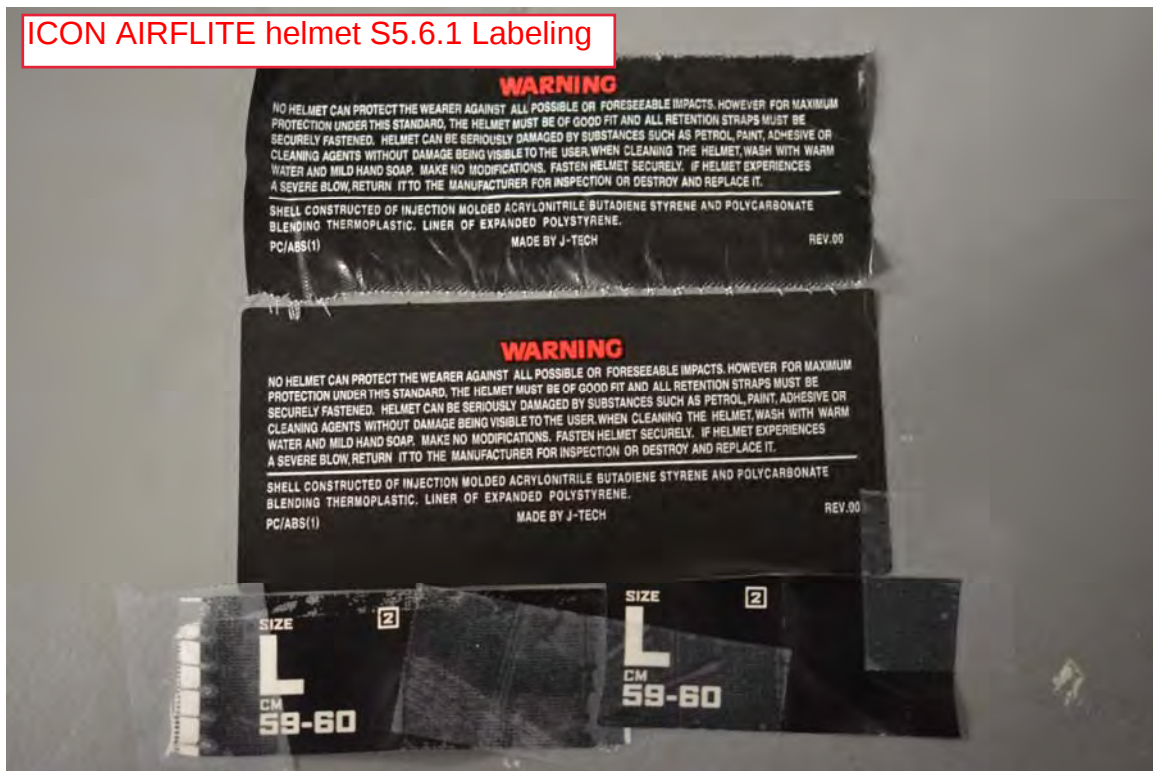


ICON AIRFLITE helmet
S5.6.1 Labeling





ICON AIRFLITE helmet S5.6.1 Labeling



ICON AIRFLITE helmet S5.6.2 Certification Label

